following is an editorial from the *New York Times* on the occurrence of this local windstorm:

In spite of the great amount of damage done by Sunday afternoon's storm, and the many fatalities of which it directly or indirectly was the cause, there is reason for doubting that it was a real tornado—that its brief violence was anything more than an exaggeration of the heavy gust of wind that almost always marks the beginning of an ordinary thundershower. * * * One mystery of the storm was that its approach was unheeded and apparently unseen by the Sunday pleasure seekers whom its arrival was to overwhelm with disaster. Yet they all had been warned, first, by the definite prediction of the Weather Bureau in the morning papers, and, second, by the ominously black clouds that had been gathering in the west for hours.

Small-craft warnings remained displayed through the 12th on the Atlantic coast at and north of Atlantic City, N. J., in connection with the strong westerly winds following the disturbance of the 11th, and on the morning of the 17th small-craft warnings were displayed over the same area, when a disturbance of moderate intensity was over the Great Lakes and moving eastward. Again, on the 21st, small-craft warnings were displayed on the coast at and north of Sandy Hook, N. J., when a disturbance of moderate intensity was central off the New Jersey coast and moving northeastward.

CHICAGO FORECAST DISTRICT.

The Forecast District was unusually free from strong winds and frosts during the month of June, 1922. No storm warnings were issued, but small-craft warnings were issued on the morning of June 11 for the Lower Lakes and on the morning of the 16th for Lakes Superior, Michigan, Huron, and Erie.

On the morning of June 25 an advisory message was sent to the observers in the cranberry marshes in Wisconsin to exercise caution in the marshes that night and to be prepared. Of the four special cranberry-marsh stations, two, Mather and Cranmoor, reported light frost the following morning. The bogs were flooded at these places and damage averted. Critical temperatures were not reached in the cranberry marshes at any other time during the month.—*H. J. Cox.*

NEW ORLEANS FORECAST DISTRICT.

Moderate weather conditions prevailed along the west Gulf coast during the month of June, 1922, and there was no storm without warnings. A disturbance appeared in the west Gulf on the 16th, and storm warnings were displayed from Corpus Christi to the mouth of the Rio Grande River, which the conditions justified.—*I. M. Cline.*

DENVER FORECAST DISTRICT.

Unusually warm and dry weather prevailed in the Denver Forecast District during June, 1922.

No storms of importance crossed the district, and no warnings were issued except for frost in Colorado and northern New Mexico on June 1. Frost temperatures occurred in localities, but no damage was reported.—*Frederick W. Brist.*

SAN FRANCISCO FORECAST DISTRICT.

June, 1922, was a quiet month in this district. No storms from the north Pacific moved inland far enough south to cause more than cloudy weather, and a few light showers on the Washington coast. Thunderstorms were frequent in the northern Plateau from the 6th to the 14th, but the accompanying precipitation was light, and consequently a drought condition prevailed during the month.

Very warm weather prevailed in Nevada on the 24th and 25th, when a record temperature was reported at Tonopah on the 24th, and the highest June temperatures were reported at both Reno and Tonopah on the 25th.

Fire-weather warnings were issued four times during the month, as follows: In Washington, Oregon, and Idaho on the 7th and 23d, and in northern California and Nevada on the 15th and 22d. The warnings issued on the 7th were a failure owing to the occurrence of thunderstorms that afternoon and night causing a drop in temperature. The warnings of the 15th, 22d, and 23d were both timely and highly justified.—*G. H. Willson.*

RIVERS AND FLOODS.

By H. C. FRANKENFIELD, Meteorologist.

SUMMARY OF THE SPRING FLOODS OF 1922, IN THE MISSISSIPPI DRAINAGE BASIN.

Owing to the wide distribution of frequent and heavy rains there were floods throughout the entire Mississippi Basin except in the Missouri River and tributaries above Kansas City, Mo., and in the Mississippi River north of St. Paul, Minn. In the upper Mississippi Valley the floods, except that of the Illinois River, while not extremely high, were sufficiently so as to cause much apprehension as well as considerable damage. Records were not exceeded in the Mississippi River except at Muscatine, Iowa, where the crest stage on April 24, was 19.5 feet, or 1.5 feet above the previous high-water record of April 8, 1920.

The greatest floods that occurred above Cairo, Ill., were those in the Illinois, White, and Wabash Rivers, especially the Illinois. Over many portions of this river the crest stages were the highest of record, some even exceeding those of the great flood of 1844. The most disastrous overflow occurred at Beardstown, Ill., and vicinity through the breaking of a levee, and about 200,000 acres of cultivated lands were covered. The crest stage on April 20, at this place was 25.1 feet, or 2.6 feet above the previous high-water record of June, 1844.

The lower Mississippi River floods exceeded all previous records below the mouth of the Arkansas River. The river reached the flood stage of 45 feet at Cairo on March 16, and passed below the flood stage of 18 feet at New Orleans, La., on June 4. However, at Baton Rouge, La., the river did not fall below the flood stage of 35 feet until June 12, and below the flood stage of 28 feet at Donaldsonville, La., until June 10, the return of crevasse water holding the waters at high stage.

There were four crevasses of importance. The greatest one, known as the Weecama Crevasse, occurred on April 26, on the right bank of the Mississippi River near Ferriday, La. The next in order of importance occurred on April 27, on the left bank of the Mississippi River at Poydras, La., 14 miles below New Orleans; the third in the right bank of the Atchafalaya system over Bayou des Glaises, about one-half mile below Hamburg, La., in Avoyelles Parish, and the fourth on April 22, on the right bank of the Mississippi River at Myrtle Grove, La., 25 miles below New Orleans.

The levees surrounding the State farm at Angola, La., also gave way on May 17, and the farm was overflowed.

About 13,200 square miles of land were overflowed during the floods, about 4,400 less than in 1912, almost all of the 1922 deficiency occurring in the Vicksburg,

Miss., district, which extends from the mouth of the White River to Vicksburg, and includes the Yazoo River.

The record of loss and damage is very incomplete, and data from one of the largest districts are not yet available. Figures thus far received show a loss of more than $17,000,000, of which more than one-half was in prospective crops, and it is probable that later information will increase the above total by a few millions of dollars at least.

A complete report of these floods will shortly appear in another publication.

The table following gives the stages reached at river stations during the floods:

Stages during spring floods of 1922.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Mississippi:	*Feet.*			*Feet.*	
La Crosse, Wis.	12	Apr. 12	Apr. 21	13.7	Apr. 17.
Prairie du Chien, Wis.	18	Apr. 17	Apr. 22	19.4	Apr. 19.
Dubuque, Iowa	18	...do....	Apr. 26	21.0	Apr. 20-21.
Clinton, Iowa	16	Apr. 18	Apr. 29	19.0	Apr. 22-23.
Le Claire, Iowa	10	Apr. 17	Apr. 30	12.9	Apr. 23.
Davenport, Iowa	15	Apr. 19	Apr. 28	17.1	Do.
Muscatine, Iowa	16	...do....	Apr. 29	19.5	Apr. 24.
Keokuk, Iowa	14	Apr. 15	May 3	17.6	Apr. 23.
Warsaw, Ill.	17	...do....	May 2	20.2	Apr. 24
Quincy, Ill.	14	Apr. 14	May 5	18.7	Apr. 25.
Hannibal, Mo.	13	Apr. 12	May 8	18.9	Do.
Louisiana, Mo.	12	Mar. 16	Mar. 16	12.3	Mar. 16.
Do.	12	Apr. 10	May 8	17.0	Apr. 26-27.
Grafton, Ill.	18	Mar. 17	Mar. 17	18.4	Mar. 17.
Do.	18	Apr. 1	Apr. 4	19.4	Apr. 2.
Do.	18	Apr. 7	May 9	25.8	Apr. 20.
Alton, Ill.	21	Mar. 16	Mar. 19	23.0	Mar. 17.
Do.	21	Mar. 27	May —	31.5	Apr. 19-20.
St. Louis, Mo.	30	Apr. 10	Apr. 23	34.0	Apr. 19.
Chester, Ill.	27	Apr. 3	Apr. 3	27.0	Apr. 3.
Do.	27	Apr. 9	May 3	34.0	Apr. 20-21.
Cape Girardeau, Mo.	30	Mar. 28	May 5	38.0	Apr. 21-22.
New Madrid, Mo.	34	Mar. 16	May 9	41.7	Apr. 26-27.
Memphis, Tenn.	35	Mar. 20	May 13	43.6	Mar. 31-Apr. 1.
Helena, Ark.	42	Mar. 19	May 18	53.1	May 3.
Arkansas City, Ark.	48	Mar. 17	May 23	58.0	Apr. 22-27.
Greenville, Miss.	42	Mar. 28	May 22	52.1	Apr. 25-27
Vicksburg, Miss.	45	...do....	May 30	55.0	Apr. 28-29.
Natchez, Miss.	46	Mar. 31	June 2	55.5	Apr. 26.
Baton Rouge, La.	35	Apr. 2	June 12	45.7	May 16.
Donaldsonville, La.	28	Apr. 1	June 10	35.9	Do.
New Orleans, La.	18	Mar. 31	June 4	22.7	Apr. 24.
Ohio:					
Portsmouth, Ohio	50	Mar. 17	Mar. 17	51.0	Mar. 17.
Dam No. 35, Oneonta, Ky.	45	...do....	Mar. 19	46.6	Mar. 18.
Cincinnati, Ohio	50	Mar. 16	Mar. 20	52.2	Do.
Madison, Ind.	46	Mar. 19	Mar. 19	46.1	Mar. 19.
Louisville, Ky.	28	Mar. 16	Mar. 21	30.2	Do.
Cloverport, Ky.	40	...do....	Mar. 24	46.4	Mar. 20.
Do.	40	Apr. 21	Apr. 22	40.1	Apr. 21-22.
Evansville, Ind.	35	Mar. 14	Mar. 28	42.9	Mar. 21.
Do.	35	Apr. 5	Apr. 10	36.6	Apr. 7.
Do.	35	Apr. 20	Apr. 26	37.6	Apr. 23.
Henderson, Ky.	33	Mar. 15	Mar. 28	41.3	Mar. 21-22.
Do.	33	Apr. 5	Apr. 10	34.7	Apr. 8.
Do.	33	Apr. 20	Apr. 26	35.9	Apr. 23.
Dam No. 48, Indiana	42	Mar. 15	Mar. 28	49.5	Mar. 22.
Do.	42	Apr. 6	Apr. 9	42.7	Apr. 8.
Do.	42	Apr. 21	Apr. 26	44.1	Apr. 24.
Mount Vernon, Ind.	35	Mar. 15	Mar. 30	43.5	Mar. 23.
Do.	35	Apr. 5	Apr. 12	37.5	Apr. 9.
Do.	35	Apr. 19	Apr. 28	39.5	Apr. 24.
Shawneetown, Ill.	35	Mar. 15	May 1	47.6	Mar. 25.
Paducah, Ky.	43	Mar. 17	Mar. 31	48.8	Mar. 24.
Do.	43	Apr. 21	Apr. 29	44.0	Apr. 26.
Cairo, Ill.	45	Mar. 16	May 7	53.6	Mar. 25-27.
Conemaugh-Kiskiminetas:					
Saltsburg, Pa.	8	Apr. 16	Apr. 16	9.5	Apr. 16.
Muskingum:					
Zanesville, Ohio	25	Apr. 15	...do....	25.7	Apr. 15.
McConnellsville, Ohio	22	...do....	...do....	25.0	Apr. 16
Tuscarawas:					
Norris Point, Ohio	8	Mar. 31	Apr. 2	8.6	Apr. 1.
Do.	8	Apr. 15	Apr. 19	11.7	Apr. 16.
Coshocton, Ohio	8	...do....	...do....	11.4	Do.
Walhonding:					
Walhonding, Ohio	8	Apr. 15	Apr. 16	11.2	Apr. 15.
Do.	8	Apr. 18	Apr. 18	9.0	Apr. 18.
Do.	8	May 20	May 20	9.0	May 20.
Hocking:					
Athens, Ohio	17	Mar. 15	Mar. 16	19.8	Mar. 16.
Do.	17	Apr. 15	Apr. 16	21.9	Apr. 16.
Scioto:					
Larue, Ohio	11	Apr. 1	Apr. 1	11.8	Apr. 1.
Do.	11	Apr. 15	Apr. 16	13.5	Apr. 15.
Do.	11	Apr. 18	Apr. 19	14.0	Apr. 18.
Do.	11	May 20	May 21	12.0	May 20.
Do.	11	May 27	May 27	12.0	May 27.

Stages during spring floods of 1922—Continued.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Scioto—Continued.	*Feet.*			*Feet.*	
Prospect, Ohio	10	Apr. 1	Apr. 1	10.3	Apr. 1.
Do.	10	Apr. 19	Apr. 20	11.7	Apr. 19.
Circleville, Ohio	10	Mar. 15	Mar. 16	11.7	Mar. 16.
Do.	10	Apr. 1	Apr. 1	10.0	Apr. 1.
Do.	10	Apr. 15	Apr. 17	14.6	Apr. 16
Do.	10	May 28	May 28	11.0	May 28.
Chillicothe, Ohio	16	Mar. 16	Mar. 16	16.5	Mar. 16.
Do.	16	Apr. 15	Apr. 17	20.5	Apr. 16.
Stillwater:					
Pleasant Hill, Ohio	13	...do....	Apr. 15	13.2	Apr. 15.
Kentucky:					
Beattyville, Ky	30	Mar. 11	Mar. 11	31.2	Mar. 11.
Green:					
Lock No. 6, Brownsville, Ky.	30	Mar. 4	Mar. 5	32.4	Mar. 5.
Do.	30	Mar. 17	Mar. 17	30.5	Mar. 17.
Lock No. 4, Woodbury, Ky.	33	Mar. 3	Mar. 8	40.7	Mar. 5.
Do.	33	Mar. 11	Mar. 20	40.4	Mar. 17.
Do.	33	Apr. 3	Apr. 3	33.0	Apr. 3.
Lock No. 2, Rumsey, Ky	34	Feb. 25	Mar. 2	35.6	Feb. 28.
Do.	34	Mar. 6	Mar. 30	40.8	Mar. 21-22.
Big Barren:					
Bowling Green, Ky	20	Mar. 3	Mar. 3	25.3	Mar. 3.
Wabash:					
Bluffton, Ind.	12	Apr. 19	Apr. 20	13.4	Apr. 19.
Lafayette, Ind.	11	Mar. 12	Mar. 18	17.4	Mar. 16.
Do.	11	Mar. 29	Apr. 6	21.0	Apr. 2.
Do.	11	Apr. 9	Apr. 23	20.7	Apr. 18.
Terre Haute, Ind.	16	Mar. 15	Mar. 23	19.7	Mar. 16.
Do.	16	Apr. 1	Apr. 26	24.4	Apr. 19.
Vincennes, Ind.	14	Mar. 17	Mar. 29	18.9	Mar. 21.
Do.	14	Mar. 31	Apr. 30	23.0	Apr. 21-22.
Mount Carmel, Ill.	15	Mar. 16	May 2	26.0	Apr. 23.
Do.	15	May 4	May 4	15.1	May 4.
White:					
Decker, Ind.	18	Mar. 18	Mar. 28	34.6	Mar. 22.
Do.	18	Mar. 31	Apr. 27	25.7	Apr. 22.
Georgetown, Ark.	22	Mar. 17	Mar. 22	22.4	Mar. 21.
Do.	22	Mar. 31	Apr. 24	23.9	Apr. 6-11.
East Fork of White:					
Williams, Ind.	10	Mar. 18	Mar. 23	15.4	Mar. 19.
Do.	10	Apr. 3	Apr. 5	11.8	Apr. 4.
Do.	10	Apr. 15	Apr. 22	17.4	Apr. 19.
Shoals, Ind.	20	Mar. 19	Mar. 23	26.3	Mar. 20.
Do.	20	Apr. 3	Apr. 6	22.5	Apr. 5.
Do.	20	Apr. 15	Apr. 23	28.0	Apr. 19.
West Fork of White:					
Anderson, Ind.	12	Mar. 15	Mar. 16	12.1	Mar. 15.
Do.	12	Apr. 1	Apr. 1	12.2	Apr. 1.
Do.	12	Apr. 11	Apr. 12	12.8	Apr. 11.
Do.	12	Apr. 15	Apr. 16	17.5	Apr. 15.
Do.	12	Apr. 18	Apr. 19	14.7	Apr. 18.
Noblesville, Ind.	14	Mar. 16	Mar. 16	14.0	Mar. 16.
Do.	14	Apr. 12	Apr. 12	14.7	Apr. 12.
Do.	14	Apr. 15	Apr. 16	17.3	Apr. 16.
Do.	14	Apr. 18	Apr. 19	15.4	Apr. 18.
Elliston, Ind.	19	Mar. 15	Mar. 22	26.3	Mar. 17.
Do.	19	Mar. 31	Apr. 5	24.5	Apr. 3.
Do.	19	Apr. 9	Apr. 23	27.0	Apr. 20.
Cumberland:					
Carthage, Tenn.	40	Mar. 3	Mar. 6	44.0	Mar. 4.
Do.	40	Mar. 12	Mar. 16	43.5	Mar. 12.
Nashville, Tenn.	40	Mar. 3	Mar. 20	45.1	Do.
Clarksville, Tenn.	46	Mar. 4	Mar. 21	51.3	Mar. 16.
French Broad:					
Penrose, N. C.	13	Mar. 28	Mar. 28	14.1	Mar. 28.
Tennessee:					
Knoxville, Tenn.	12	Mar. 11	Mar. 12	13.0	Mar. 12.
Gunthersville, Ala.	31	Mar. 15	Mar. 15	31.0	Mar. 15.
Florence, Ala.	18	Mar. 3	Mar. 8	20.0	Mar. 5.
Do.	18	Mar. 10	Mar. 18	21.5	Mar. 11.
Savannah, Tenn.	40	...do....	Mar. 21	43.5	Mar. 16.
Riverton, Ala.	32	Mar. 3	Mar. 22	42.8	Mar. 11.
Johnsonville, Tenn.	31	Mar. 7	Mar. 7	31.0	Mar. 7.
Do.	31	Mar. 10	Mar. 24	36.4	Mar. 15.
North Fork of Holston:					
Mendota, Va.	8	Mar. 11	Mar. 11	8.2	Mar. 11.
Do.	8	Mar. 16	Mar. 16	8.7	Mar. 16.
Hiwassee:					
Charleston, Tenn.	22	Mar. 11	Mar. 11	22.6	Mar. 11.
Duck:					
Columbia, Tenn.	30	Mar. 2	Mar. 3	32.0	Mar. 3.
Do.	30	Mar. 10	Mar. 11	31.4	Mar. 11.
Wisconsin:					
Merrill, Wis.	11	Apr. 11	Apr. 11	11.0	Apr. 11.
Knowlton, Wis.	12	Apr. 5	Apr. 13	18.6	Do.
Wisconsin Rapids, Wis.	12	Apr. 11	Apr. 12	13.5	Do.
Portage, Wis.	14	...do....	Apr. 17	15.8	Apr. 14.
Des Moines:					
Ottumwa, Iowa	10	May 27	May 27	10.0	May 27.
Illinois:					
Morris, Ill.	13	Mar. 21	Mar. 22	13.6	Mar. 21.
Do.	13	Mar. 31	Apr. 22	20.1	Apr. 12.
Peru, Ill.	14	Mar. 13	May 12	23.8	Apr. 13.
Do.	14	May 27	June 1	15.0	May 28.
Henry, Ill.	7	Mar. 12	June 11	18.0	Apr. 15-16.
Peoria, Ill.	16	Mar. 19	May 14	24.8	Apr. 15.
Havana, Ill.	14	Mar. 20	May 19	22.6	Apr. 20.
Beardstown, Ill.	12	Mar. 14	June 12	25.1	Do.
Pearl, Ill.	12	Mar. 16	May 22	23.0	Apr. 19.

Stages during spring floods of 1922—Continued.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Missouri:	*Feet.*			*Feet.*	
Hermann, Mo.	21	Apr. 8	Apr. 20	24.7	Apr. 18.
St. Charles, Mo.	25	Mar. 27	Mar. 27	25.4	Mar. 27.
Do.	25	Apr. 1	Apr. 2	26.5	Apr. 1.
Do.	25	Apr. 8	Apr. 22	30.8	Apr. 13, 19.
Grand:					
Chillicothe, Mo.	18	Apr. 10	Apr. 11	19.1	Apr. 10.
Brunswick, Mo.	10	...do.....	Apr. 14	12.6	Apr. 11-12.
James:					
Huron, S. Dak.	9	Mar. 16	May 8	16.5	Mar. 22.
Do.	9	May 12	May 29	11.4	May 19-21.
Osage:					
Osceola, Mo.	20	Mar. 19	Mar. 22	21.8	Mar. 20.
Do.	20	Mar. 31	Apr. 2	21.6	Apr. 2.
Do.	20	Apr. 8	Apr. 21	28.8	Apr. 10.
Warsaw, Mo.	22	Mar. 15	Mar. 22	26.7	Mar. 15.
Do.	22	Mar. 31	Apr. 6	26.8	Apr. 4.
Do.	22	Apr. 8	Apr. 22	34.9	Apr. 12.
Do.	22	Apr. 28	Apr. 30	25.3	Apr. 28.
Tuscumbia, Mo.	25	Mar. 17	Mar. 22	26.0	Mar. 21.
Do.	25	Mar. 31	Apr. 23	37.7	Apr. 17.
Do.	25	Apr. 29	May 1	27.4	Apr. 30.
Meramec:					
Steelville, Mo.	12	Apr. 18	Apr. 18	13.1	Apr. 18.
Pacific, Mo.	11	Mar. 16	Mar. 17	12.7	Mar. 16.
Do.	11	Mar. 28	Mar. 29	12.2	Mar. 28.
Do.	11	Apr. 1	Apr. 3	17.9	Apr. 3.
Do.	11	Apr. 11	Apr. 13	12.3	Apr. 11.
Do.	11	Apr. 17	Apr. 20	17.4	Apr. 20.
Do.	11	Apr. 30	Apr. 30	12.6	Apr. 30.
Valley Park, Mo.	14	Apr. 1	Apr. 4	21.0	Apr. 3.
Do.	14	Apr. 11	Apr. 13	14.8	Apr. 12.
Do.	14	Apr. 15	Apr. 21	22.8	Apr. 19.
Bourbeuse:					
Union, Mo.	10	Mar. 15	Mar. 16	11.3	Mar. 16.
Do.	10	Mar. 28	Mar. 28	11.6	Mar. 28.
Do.	10	Apr. 1	Apr. 3	14.4	Apr. 2.
Do.	10	Apr. 17	Apr. 19	13.6	Apr. 19.
St. Francis:					
Marked Tree, Ark.	17	Mar. 28	May 3	19.3	Apr. 15-17.
Yazoo:					
Yazoo City, Miss.	25	Mar. 21	June 14	31.9	Apr. 29-May 1, 4-6.
Tallahatchie:					
Swan Lake, Miss.	25	Mar. 5	Apr. 30	29.2	Mar. 19-21.
Do.	25	May 3	May 29	27.7	May 13-17.
Red:					
Fulton, Ark.	28	Apr. 8	Apr. 10	28.5	Apr. 9.
Do.	28	May 1	May 2	28.4	May 2.
Do.	28	May 15	May 16	28.4	May 16.
Alexandria, La.	36	Apr. 12	Apr. 23	37.1	Apr. 18-20.
Do.	36	May 5	May 25	37.4	May 10.
Ouachita:					
Camden, Ark.	30	Mar. 30	Apr. 13	36.2	Apr. 4.
Do.	30	Apr. 30	May 4	32.4	May 2.
Monroe, La.	40	Apr. 11	May 29	42.3	May 9-11.
Atchafalaya:					
Simmesport, La.	41	Apr. 6	June 12	51.3	May 16.
Melville, La.	37	Apr. 1	June 14	45.9	May 14-16.
Smoky Hill:					
Lindsborg, Kans.	19	Apr. 26	Apr. 27	21.4	Apr. 27.
Arkansas:					
Wichita, Kans.	9	Mar. 15	Mar. 15	10.2	Mar. 15.
Do.	9	Apr. 9	Apr. 10	9.9	Apr. 9.
Fort Smith, Ark.	22	Apr. 10	Apr. 17	27.8	Apr. 12.
Dardanelle, Ark.	20	Apr. 11	Apr. 18	25.2	Apr. 13.
Little Rock, Ark.	23	Apr. 14	Apr. 15	23.3	Apr. 14.
Pine Bluff, Ark.	25	...do.....	Apr. 17	26.0	Apr. 16.
Neosho:					
Neosho Rapids, Kans.	22	Apr. 10	Apr. 11	24.4	Apr. 11.
Le Roy, Kans.	24	Mar. 25	Mar. 25	24.8	Mar. 25.
Do.	24	Apr. 9	Apr. 11	27.4	Apr. 9.
Iola, Kans.	10	Mar. 18	Mar. 18	10.2	Mar. 18.
Do.	10	Mar. 25	Mar. 26	13.4	Mar. 26.
Do.	10	Apr. 9	Apr. 13	19.2	Apr. 10.
Oswego, Kans.	17	Apr. 5	Apr. 17	23.8	Apr. 9.
Wyandotte, Okla.	23	Apr. 10	Apr. 10	23.5	Apr. 10.
Fort Gibson, Okla.	22	...do.....	Apr. 17	30.0	Apr. 11.
Do.	22	Apr. 19	Apr. 19	22.4	Apr. 19.
Cottonwood:					
Emporia, Kans.	20	Apr. 10	Apr. 12	22.9	Apr. 11.
North Canadian:					
Woodward, Okla.	3	Mar. 11	Mar. 11	3.2	Mar. 11.
Do.	3	Mar. 13	Mar. 23	6.0	Mar. 15.
Do.	3	Apr. 5	Apr. 10	3.4	Apr. 8.
Do.	3	Apr. 25	May 13	5.0	Apr. 25.
Canton, Okla.	3	Mar. 15	Mar. 17	4.1	Mar. 16.
Do.	3	Apr. 26	Apr. 26	3.7	Apr. 26.
Oklahoma City, Okla.	12	Mar. 22	Mar. 22	12.1	Mar. 22.
Do.	12	Apr. 10	Apr. 10	12.6	Apr. 10.
Little Arkansas:					
Sedgwick, Kans.	18	Mar. 14	Mar. 15	23.4	Mar. 14.
Do.	18	Apr. 8	Apr. 9	23.5	Apr. 9.
Petit Jean:					
Danville, Ark.	20	Mar. 31	Apr. 3	22.7	Apr. 2.
Do.	20	Apr. 6	Apr. 9	22.6	Apr. 7.
Do.	20	May 5	May 6	21.0	May 5.
Do.	20	May 8	May 9	20.6	May 9.
White:					
Newport, Ark.	26	Apr. 13	Apr. 14	23.2	Apr. 13-14.
Georgetown, Ark.	22	Mar. 17	Mar. 22	22.4	Mar. 21.
Do.	22	Mar. 31	Apr. 24	23.9	Apr. 6-9, 11, 15.
Clarendon, Ark.	30	Apr. 7	Apr. 27	30.7	Apr. 11-21.
Black:					
Black Rock, Ark.	14	Mar. 10	May 8	23.4	Apr. 9.

Stages during spring floods of 1922—Continued.

River and station.	Flood stage.	Above flood stage—dates.		Crest.	
		From	To—	Stage.	Date.
Cache:	*Feet.*			*Feet.*	
Patterson, Ark.	9	Mar. 11	Apr. 19	10.3	Apr. 1.
Sulphur:					
Finley, Tex.	24	Mar. 31	Apr. 16	26.4	Apr. 2-3.
Do.	24	Apr. 27	May 6	28.2	Apr. 30.
Do.	24	May 15	May 18	25.0	May 15-16.
Ringo Crossing, Tex.	20	Mar. 27	Mar. 28	22.5	Mar. 27.
Do.	20	Apr. 6	Apr. 10	23.0	Apr. 6.
Do.	20	Apr. 26	May 2	23.8	Apr. 28.
Do.	20	May 10	May 13	24.4	May 11.
Cypress:					
Jefferson, Tex.	18	Apr. 2	Apr. 8	21.6	Apr. 4.
Do.	18	Apr. 27	May 5	20.5	Apr. 28.

THE FLOODS OF JUNE, 1922.

The great outstanding floods of the month of June occurred in the lower Rio Grande and the following report thereon was prepared by Mr. J. H. Jarboe, meteorologist, San Antonio, Tex.:

The flood in the Rio Grande during June, 1922, will long be remembered. The great magnitude of the flood, together with the season and manner of its occurrence tend to make it epochal.

On the night of June 15 a tropical storm of moderate intensity entered Mexico below the mouth of the Rio Grande. The progress of the storm could be followed to a certain extent by the heavy rains along the river. However, when the storm reached the higher elevations of northern Mexico, very heavy rains resulted, and the resultant runoff produced serious flood conditions in two separate portions of the Rio Grande.

The flood waters reached the Rio Grande first from the San Juan, a tributary from Mexico entering the river just above Rio Grande City, Tex. The river rose at this station to 26.5 feet, a stage exceeding by 0.3 foot the great flood of September, 1919. A second rise caused by water coming down the main channel of the Rio Grande took the stage at Rio Grande City to 29.5 feet, 14.5 feet above flood stage, on June 22. This is the highest stage reached at this station since 1909, when the estimated stage was 30 feet.

The water that caused the record rises came into the river above Eagle Pass, where the river reached a stage of 45.6 feet on the 19th, or 29.6 feet above flood stage. The Southern Pacific and International bridges were washed away, and stores and houses on the west side of Commercial Street were damaged. At Piedras Negras, the town on the Mexican side of the river, several blocks of houses were destroyed. The crest moved rapidly downstream between high river banks with stage at Laredo of 43.9 feet, 15.9 feet above flood stage, on the 20th. The flood reached the lower Rio Grande while the river was still swollen by water from the San Juan. Two crests moved toward the Gulf, but the flat nature of the Lower Valley, with a fall of less than a foot to the mile, together with the many levees built in recent years, caused the crests of the two floods to merge into one, producing unprecedented conditions. The crest stage at Mission, Tex., was 28.4 feet, 4.4 feet above flood stage, on the 23d.

Upon receipt of flood warnings new levees were built and old ones strengthened, foundations of pumping plants were reenforced, and everything possible was done to protect property. In many places the water swept entirely over the main levees causing great damage to wide sections of agricultural lands. The flooded districts ranged in width from 6 to 20 miles across Hidalgo County; and 20 to 40 miles across Cameron County. A corresponding inundation occurred in Mexico. Not all the ground in this triangle was submerged, however, as many sections remained above the water line.

Flood stage was reached at all stations, and the river was out of its banks 2 days at Laredo, 4 days at Eagle Pass, 7 days at Mission, and 12 days at Rio Grande City. Stages recorded at Del Rio, Eagle Pass, and Laredo, were the highest ever known to have occurred.

It is estimated that 30,000 acres of agricultural lands were inundated with loss of crops. There was much damage to levees, bridges, roads, irrigation systems, transportation lines, and buildings of all kinds. Many towns from the western border of Hidalgo County to the Gulf suffered complete or partial inundation, with great property losses. Rail communication to the lower Rio Grande Valley and throughout the valley was broken. Mail service by boat was inaugurated, and airplanes used.

Much damage would have resulted from the great overflow at any time of the year, but the flood, coming as it did in the height of the growing season, destroyed $2,000,000 worth of crops. Another million will have to be spent to repair levees, roads, buildings, and to put the irrigation systems in working order.

Few, if any, lives were lost on the American side of the Rio Grande, which is remarkable when the magnitude of the flood is considered.

From incomplete reports it is impossible to express the money value of the flood warnings issued. Lives and much property were saved by the warnings, and the people have repeatedly expressed their appreciation.

Advisory warnings for the lower Rio Grande Valley were issued on June 12. The warnings were based on a rapid rise in the river at Rio Grande City. Advisory warnings were again issued on the 13th, and almost daily thereafter. On June 17, flood warnings were issued, and people were advised to use every precaution to protect their property. The river rose steadily at Mission from this date on, reaching flood stage on the 19th, with the crest passing on the 23d.

On June 17 a very rapid rise developed in the Rio Grande in the Del Rio section. This flood quickly reached serious proportions, with a crest stage at Del Rio of 32.3 feet, which is 3.6 feet above the record flood of 1919.

The action of our river observer at Eagle Pass in giving warning to the many people living in the low sections around the city is commendable. The warnings were quickly disseminated, although but little time was available, and more than 2,000 people with most of their personal property moved to higher ground.

The Southern Pacific and the International bridges went out before midnight, but the crest at Eagle Pass was not reached until 2 a. m. on the 19th. A stage of 45.6 feet was recorded. This is 5.2 feet higher than the previous record flood of June 14, 1889.

It took the flood wave 35 hours to run from Eagle Pass to Laredo, a distance of 127 miles. The people at Laredo were warned well in advance of the rise. The river banks are high at Laredo, and no great damage resulted. The river reached a stage of 43.9 feet at 1 p. m. on the 20th, which is 9.9 feet higher than the previous record flood of September, 1919. The new International highway bridge was completely submerged. Approaches to the bridge were damaged to the extent of several thousand dollars, but the main structure stood intact.

Two days later, June 22, the crest of the flood was at Rio Grande City, with a stage of 29.5 feet. This is just 2 feet lower than the previous record flood of 1872. Great overflows resulted in this section with corresponding damage to growing crops.

The crest was 30 hours running from Rio Grande City to Mission, a distance of 32 miles; here a stage of 28.4 feet resulted. This is 1.9 feet lower than the previous record flood of September 7, 1909.

The Arroyo Colorado, an old river bed of the Rio Grande, begins in the west portion of Hidalgo County and extends eastward across Cameron County to the Gulf, a distance of about 90 miles. When the Rio Grande reaches a stage of 22 feet at Mission, oveflow starts through the Arroyo Colorado, as well as through old channels on the Mexican side of the river. Great volumes of water passed through the Arroyo Colorado during this flood; in fact, the main channel of the river carried only a small portion of the discharge. Levees that have been built in recent years near the Arroyo checked and diverted the water in many places. This resulted in submerging sections never before subject to flood. Points in Cameron County 40 miles north of the Rio Grande were under water. At the end of the month the water had not entirely subsided.

Following is a comparison of the highest known stages of the Rio Grande with the stages recorded in the flood of June, 1922:

Station.	Highest of record.	Stage reached June, 1922.
Del Rio, Tex	28.7 feet, Sept. —, 1919	32.3 feet, 18th.
Eagle Pass, Tex	40.4 feet, June 14, 1889	45.6 feet, 19th.
Laredo, Tex	34.0 feet, Sept. 19, 1919	43.9 feet, 20th.
Rio Grande City, Tex	31.5 feet, ——, —, 1872	29.5 feet, 22d.
Mission, Tex	30.3 feet, Sept. 7, 1909	28.4 feet, 23d.

East of the Rocky Mountains there were no other floods of importance in rivers of any consequence, but there were several floods in smaller streams caused by torrential local rains. These occurred over many districts east of the Mississippi River and were very destructive both in rural and urban communities. The rainfall was heaviest and the floods severe over the drainage basins of the Susquehanna and Delaware Rivers within the State of New York. At Syracuse, the rainfall for the month of June was 15.92, at Cortland, 15.04, at New Berlin, 10.59, and at Port Jervis, 11.03 inches. The first heavy rains occurred on June 2 and 3 and in a very short time the volume of water was far in excess of the carrying capacity of the small streams. Houses, factories, bridges, railroad tracks and State highways were destroyed and thousands of acres of land overflowed, the flooded area extending through the Lackawanna Valley of extreme northeastern Pennsylvania.

The main streams were not seriously affected, although the Susquehanna above Binghamton and its larger tributaries were from 2 to 3.5 feet above flood stages on June 12 and 13.

The next severe local flood occurred on June 9, in the town of Frederick, Md., and the adjacent country. A heavy rain during the previous evening was followed in the early morning by a terrific downpour, and soon Carroll Creek, which runs through Frederick, overflowed its banks. Streets and houses were flooded, and cattle and other property swept away, the losses and damage amounting to many thousands of dollars.

On June 10, excessive rains in Wisconsin soon caused all the smaller streams to overflow their banks, with resulting casualties similar to those that had visited the east a few days earlier. The sections immediately south and west of Green Bay suffered most, crop losses predominating, although railroad losses were also heavy.

The next visitation of torrential rains occurred on June 18 and 19, over portions of eastern New York, northeastern Pennsylvania and New England. At Port Jervis, N. Y., on the Delaware River, the rainfall for the 24 hours ending at 8 a. m., June 18, was 6.78 inches, of which, according to press reports, 5.5 inches fell in five hours during the early hours of June 18.

Hundreds of families were driven from their homes, houses were floated from their foundations, industrial plants were flooded and railroad tracks and highways destroyed. In the streets of the town the waters were from five to ten feet deep. Damage of a similar character, but less extensive was also reported at Westfield in northern Vermont.

The last floods centered in the vicinity of Broome Co., New York, following the heavy rains of the night of June 28. This flood was not as severe as its precedessors, and the damage was proportionately less.

In all, the damage caused by these "cloudbursts" in New York and Pennsylvania, amounted to about $4,000,000, to which must be added the large total of intangible losses occasioned by the enforced delay in farming operations.

As a rule the southern floods were not severe. The Ocmulgee River of Georgia was in flood early in the month with considerable resulting damage, and there was a severe local flood in New River, Tenn., caused by very heavy rains during the night of June 13–14. Lowlands, fences, and crops were destroyed and roads blocked, and a Southern Railway passenger train was wrecked by running into a washout.

The Colorado River at Yuma, Ariz., after reaching a crest of 27.4 feet on June 10, or 2.4 feet above the flood stage, began to fall slowly, although there was a slight recovery to the flood stage from June 18 to 23, inclusive.

The flood in the San Joaquin River of California, caused by the rapid melting of the snows in the mountains, were the highest in recent years, and did damage to crops, in hand and prospective, to an estimated amount of $710,000. In all about 18,500 acres of cultivated lands were overflowed. There were also numerous breaks in the levees.

Regarding these losses, Mr. W. E. Bonnett, meteorologist, Fresno, Calif., commented as follows:

The greater portion of the losses occasioned by floods in this district, beginning in the latter part of May and continuing during the first half

of June, were occasioned by unwise encroachments on some natural flood reservoirs, and in order that the cause and effect may be better understood some explanation of conditions in the Tulare Lake Basin is presented.

The original area of the Tulare Lake Basin was approximately 400,000 acres of which about 360,000 have been reclaimed behind levees that are adequate to protect against more than normal run-off from King River. After a series of dry seasons the remainder of the lake bed becomes dry and the extremely fertile soil makes it a particularly alluring field for big returns from a comparatively small outlay.

Flood waters from the Kings first entered the dry lake bed on May 23 and more or less of the surplus waters continued to pour into the lake until about the same date in June, although the maximum area of grain land had been submerged by June 4.

Warning had been issued at the end of the snowfall season in April that high water might be expected in June.

The crest of the annual rise of the Columbia River was reached during the month, although at its close the river was still generally above the flood stage. A report on the flood should be ready for the MONTHLY WEATHER REVIEW for July, 1922.

In Alaska the abnormally high temperatures of June melted the snow and ice so rapidly that some floods occurred in the upper Yukon and its tributaries. Press reports stated that overflow waters from the Klondike River inundated the town of Bear Creek, near Dawson, to the depth of 2 feet, and the inhabitants were driven to the hills.

Flood stages during June, 1922.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
ATLANTIC DRAINAGE.					
Connecticut:	*Feet.*			*Feet.*	
White River Junction, Vt.	13	22	24	13.6	23
Do.	13	30	(1)	14.9	30
Susquehanna:					
Oneonta, N. Y.	12	12	12	14.1	12
Unadilla:					
New Berlin, N. Y.	8	12	13	11.5	12
Do.	8	23	24	9.7	23
Chenango:					
Sherburne, N. Y.	8	12	12	8.9	12
Neuse:					
Neuse, N. C.	14	5	5	15.8	5
Santee:					
Rimini, S. C.	12	(2)	17	14.7	8
Do.	12	22	25	12.9	25
Ferguson, S. C.	12	(2)	19	13.5	8-9
Do.	12	24	27	12.4	26
Broad:					
Blairs, S. C.	15	3	3	15.5	3
Ocmulgee:					
Macon, Ga.	18	2	4	22.3	3
Abbeville, Ga.	11	6	14	14.7	8-9
Lumber City, Ga.	15	11	14	16.0	12
					5
EAST GULF DRAINAGE.					
Apalachicola:					
River Junction, Fla.	12	(2)	16	20.5	5
Blountstown, Fla.	15	(2)	16	20.5	5
MISSISSIPPI DRAINAGE.					
Walhonding:					
Walhonding, Ohio	8	17	17	8.8	17
New:					
New River, Tenn.	25	14	14	28.0	14
Mississippi:					
Natchez, Miss.	46	(2)	2	46.9	1
Baton Rouge, La.	35	(2)	12	42.2	1
Donaldsonville, La.	28	(2)	10	32.7	1
New Orleans, La.	18	(2)	4	19.2	1
Illinois:					
Peru, Ill.	14	(2)	1	14.1	1
Henry, Ill.	7	(2)	11	8.8	1
Beardstown, Ill.	12	(2)	12	13.4	1-2
Grand:					
Brunswick, Mo.	10	29	29	10.0	29
Yazoo:					
Yazoo City, Miss.	25	(2)	14	29.7	1
Atchafalaya:					
Simmesport, La.	41	(2)	12	48.1	1
Melville, La.	37	(2)	14	43.0	1

[1] Continued into July. [2] Continued from May.

Flood stages during June, 1922—Continued.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
MISSISSIPPI DRAINAGE—continued.					
North Platte:					
North Platte, Nebr.	4.8	2	3	4.8	2-3
Arkansas:					
Ralston, Okla.	4	27	27	4.1	27
WEST GULF DRAINAGE.					
Trinity:					
Dallas, Tex.	25	7	7	26.1	7
Trinidad, Tex.	28	11	14	30.6	12-13
Liberty, Tex.	25	(2)	7	27.6	1-2
Nueces:					
Cotulla, Tex.	15	16	17	15.8	16-17
Rio Grande:					
Del Rio, Tex.	.....	.....	.....	32.3	18
Eagle Pass, Tex.	16	18	21	45.6	19
Laredo, Tex.	28	20	20	43.9	20
Rio Grande City, Tex.	15	12	14	23.5	13
Do.	15	16	24	29.5	22
Mission, Tex.	24	19	25	28.4	23
COLORADO DRAINAGE.					
Colorado:					
Topock, Ariz.	14	(2)	7	19.7	4
Do.	14	13	21	16.4	16
Parker, Ariz.	7	(2)	(1)	11.0	3-4
Yuma, Ariz.	25	2	11	27.4	10
Do.	25	18	23	25.2	20-21
Lees Ferry, Ariz.	12	(2)	(1)	22.1	2
Gunnison:					
Sapinero, Colo.	16	(2)	1	16.3	1
Do.	16	6	12	17.0	9
North Fork of Gunnison:					
Paonia, Colo.	8	(2)	30	9.0	1,8
Green:					
Elgin, Utah	13	(2)	2	13.3	1
Do.	13	11	14	13.4	12
PACIFIC DRAINAGE.					
San Joaquin:					
Firebaugh, Calif.	12	3	17	13.4	10
Lathrop, Calif.	17	1	25	18.2	6-8
Kings:					
Piedra, Calif.	12	(2)	10	13.8	5
Do.	12	16	21	12.5	17,20
Columbia:					
Marcus, Wash.	24	(2)	(1)	30.5	18-19
Wenatchee, Wash.	40	8	10	40.2	9
Do.	40	13	19	40.4	15-18
Vancouver, Wash.	15	(2)	(1)	23.4	11
Kootenai:					
Bonners Ferry, Idaho	26	6	8	26.7	7
Pend O'Reille:					
Newport, Wash.	16	5	27	18.9	15-17
Clearwater:					
Kamiah, Idaho	14	5	7	14.4	6
Willamette:					
Portland, Oreg.	15	(2)	(1)	22.4	11-12

[1] Continued into July. [2] Continued from May.

MEAN LAKE LEVELS DURING JUNE, 1922.

By UNITED STATES LAKE SURVEY.

[Detroit, Mich., July 5, 1922.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes.[1]			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during June, 1922:	*Feet.*	*Feet.*	*Feet.*	*Feet.*
Above mean sea level at New York	602.20	580.54	572.91	246.75
Above or below—				
Mean stage of May, 1922	+0.26	+0.14	+0.17	+0.20
Mean stage of June, 1921	−0.23	−0.04	−0.11	+0.11
Average stage for June, last 10 years	−0.24	−0.40	−0.09	−0.19
Highest recorded June stage	−1.23	−3.06	−1.61	−1.88
Lowest recorded June stage	+0.96	+0.64	+1.34	+1.86
Average relation of the June level to:				
May level	.....	+0.20	+0.20	+0.20
July level	.....	−0.10	0.00	+0.10

[1] Lake St. Clair's level: In June, 575.46 feet.