At the request of the Chief of Bureau, special forecasts covering the itinerary of President Wilson in the Chicago district were wired to Secretary Tumulty. Under date of September 7, Mr. Tumulty wired the Chicago station, as follows:

"I thank you very warmly for your several telegrams."—*H. J. Cox.*

Denver, Colo., Forecast District.—September was free from the severe temperature conditions that occasionally bring the crop season to an abrupt close about the middle of the month. No killing frosts occurred in agricultural districts. Warnings of light frost were issued on the 21st, 22d, and 23d for parts of the eastern Rocky Mountain slope, and on the 27th for freezing temperature in northeastern Colorado. Practically no damage occurred.—*Frederick H. Brandenburg.*

San Francisco, Calif., Forecast District.—During the first decade of September unsettled and showery weather prevailed in the northern portion of this district breaking the long drought and extinguishing, or permitting to be brought under control, many large and serious forest fires which had been raging in that section. In the southern portion of the district, except for showers in California from the San Francisco Bay section north on the 7th and 8th, fair and seasonable weather prevailed until near the end of the month, when rain fell generally in California and Nevada, breaking the drought and putting out large and damaging forest fires in those States. The rainfall was considerably above the normal in western Oregon and southern California.

The temperature for the month was nearly normal throughout the entire district.

Fire-weather warnings were issued in Washington, Oregon, and Idaho on the 10th, but were not verified, as rain fell the following day in those States.

Rain warnings were issued in northern California on the 7th and 8th, and in the entire State from the 27th to the 30th, and were verified.

Southwest storm warnings were ordered on the morning of the 30th, from the Columbia River north, on the approach of the first north Pacific storm of the season and were verified.

The following commendations were received during the month:

STATE OF WASHINGTON,
DEPARTMENT OF FORESTRY,
Olympia, Wash., September 11, 1919.

I take this opportunity of congratulating you upon the accuracy of the many previous fire-weather warnings you have furnished this Department this season. I consider this service invaluable in the successful protection of our forests and hope your service may be so extended next season that each county and district warden will receive telegraphic forecasts.

F. E. PAPE,
State Forester.

LOCAL OFFICE, WEATHER BUREAU,
Sacramento, Calif., September 13, 1919.

The rain forecast received Sunday morning (Sept. 7) from the district forecaster was repeated to all prune-drying districts in this section, at the expense of the producers, who themselves disseminated the information, and it is quite gratifying to state that few were caught unawares.

The commissioner of horticulture of the State of California stated: "The service in connection with the last rain was unexcelled, and again exhibited the value of the Weather Bureau."

—*G. H. Willson.*

RIVERS AND FLOODS, SEPTEMBER, 1919.

By ALFRED J. HENRY, Meteorologist in Charge.

[Dated: Weather Bureau, Washington, Oct. 25, 1919.]

The severe tropical cyclone that crossed the Gulf of Mexico during the first decade of the month passed westward over the lower Rio Grande Valley and evidently dissipated in heavy rains over that valley (see fig. 1, p. —). As a result the river for at least 100 miles from its mouth overflowed its banks and formed a stream said to have been 40 to 50 miles wide. Much damage was done on both sides of the river but there was very little loss of life due, in part at least, to ample warning of the coming of the floods.

The influence of this storm extended to the northwest as far as New Mexico, where heavy rains on the 15th to the 17th caused freshet stages in the Pecos River (see fig. 1, p. 640).

Closely following the rains in New Mexico very heavy downpours occurred locally over the valley of the Solomon River of Kansas on the 17th and 18th. These heavy rains caused sharp rise in that river to a crest of 33.6 feet at Beloit—15 feet above flood-stage on the 20th. Fortunately the crops throughout the valley were mostly gathered, thus greatly reducing the loss.

No estimates are available at this time as to the loss in the lower Rio Grande. The total damage due to the Solomon River flood is estimated at $416,000, more than 50 per cent of which was to crops. Railroads through the flooded district suffered a loss of $57,500 to bridges, roadbed, etc.

The following additional information respecting the Rio Grande flood has been received:

The flood of the Rio Grande was by far the most disastrous flood during the month and was more severe than any previous flood of that stream of which this office has record. There were in reality two floods of the Rio Grande, which were distinct in the upper portions of the stream, but formed one continuous flood in the lower portions.

At Eagle Pass the river was at flood stage from September 16 to 18, and from September 22 to 25. The crest of the former rise passed Eagle Pass at 11.40 a. m. September 17, with stage 38.5 feet; and that of the latter rise at 1 p. m. September 23, with stage 32.6 feet.

At Laredo the river was flooded September 18 to 20, and September 24 to 26. The highest stage recorded during the former rise was 33 feet at 7 a. m. September 19; and during the latter rise, 30 feet at 6 a. m. September 25.

At Rio Grande City the stream was flooded continuously from September 16 to 29, but there were fluctuations sufficiently large to make a distinction between the two rises. The highest stage recorded was 26.2 feet on September 26.

At Mission the stream was flooded from September 21 to 30, and the highest stage recorded was 27.6 feet at 6 p. m. September 27. No river stations are maintained below Mission by this service; but it was reported that the crest of the flood passed Brownsville at 10 a. m. October 3.

The flood had its inception in the heavy rains attending and following the tropical storm that moved northwestward over the Rio Grande Valley September 14 to 16. The rises at Eagle Pass and Laredo were remarkably sudden. At Eagle Pass the rise during the 24 hours ending at 7 a. m. September 17 amounted to 27.2 feet, and at Laredo during a similar period, ending 7 a. m. September 18, the rise was 18 feet.

Advisory warnings of the second rise were issued to all points along the Rio Grande. Much water appeared to be coming from the San Juan just above Rio Grande City, thus aggravating the second rise; and on September 26 points below Rio Grande City were advised that the secondary flood appeared to be worse than the preliminary.—*B. Bunnemeyer.*

The usual tables follow.

TABLE I.—*Flood stages in the West Gulf Drainage during month of Sept., 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Colorado:	*Feet.*			*Feet.*	
Austin, Tex.	18	25	25	19.5	24–25
Columbus, Tex.	28	25	28	32.8	27
Guadalupe:					
Gonzales, Tex.	22	19	21	24.0	20
Do	22	25	28	27.1	26
Victoria, Tex.	16	21	24	20.2	23
Do	16	27	(1)	22.0	30
Rio Grande:					
Eagle Pass, Tex.	16	17	18	38.5	17
Do	16	22	24	32.6	23
Laredo, Tex.	27	18	19	33.0	19
Do	27	24	25	30.6	25
Rio Grande City, Tex.	15	16	28	26.2	26
Mission, Tex.	24	21	30	27.6	27

[1] Continued into October.

TABLE II.—*Flood stages in the Mississippi Drainage during month of Sept., 1919.*

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
Solomon:	*Feet.*			*Feet.*	
Beloit, Kans.	18	20	23	33.6	20
Republican:					
Clyde, Kans.	17	.....	.....	17.4	20

RIVER GAGINGS ON TANANA RIVER AT NENANA, ALASKA.

SUMMARIZED BY ALFRED J. HENRY, METEOROLOGIST.

The Alaska Engineering Commission (Government Railroad Engineers) has established a river gage at Nenana, Alaska, about half a mile above the confluence of the Nenana River and has been making daily gagings since June, 1916, except when the river was frozen. The elevation of the zero of the gage has been fixed by Mr. Frederick D. Browne, engineer in charge of the Nenana district, at 335 feet above mean lower low water at Portage Bay in Prince William Sound. The gage graduations extend from −1 to 15 feet. Through the courtesy of Mr. Browne the Weather Bureau has been furnished with a copy of the daily gagings for the seasons 1916, 1917, 1918 and up to August of 1919. These have been summarized and the means and extremes appear in the table below.

The Tanana River, it may be remembered, flows from lower to higher latitudes and consequently the ice breaks up first on the headwaters. The river freezes over about the last week in October and water appears on the ice in spring at Nenana in the last half of April, the break-up coming a little later. The total range from extreme low to extreme high water during the period of observations was 18.1 feet and both highest and lowest water were due to ice conditions. The lowest water was −0.6 on November 1, 1916, and the river froze on that date. There does not appear to be a pronounced snow flood in the spring as the ice breaks up. The river is highest on the average of 4 seasons in July and gradually declines until freezing sets in in the autumn. The daily variations are small, rarely as much as 2 feet. The absence of heavy summer rains and a small run-off from such precipitation as occurs during the open season seems to indicate that the flood menace, if any, must be confined to the breaking up of the ice in spring.

Monthly means and extremes of river gagings on Tanana River, at Nenana, Alaska.[1]

[Monthly means = feet and tenths.]

Year.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1916	.....	9.3	9.4	7.9	5.8	4.3	.....
1917	5.6	7.5	11.3	9.3	6.3	2.1	.....
1918	9.9	11.9	10.6	9.3	6.5	3.1	.....
1919	5.8	7.9	10.6	9.5	.....	.....	.....
Means	7.1	9.1	10.5	9.0	6.2	3.2	.....
HIGHEST.							
1916	.....	10.9	10.6	10.0	7.3	8.5	.....
1917	9.3	9.2	14.1	11.5	10.9	3.2	.....
1918	17.5	16.0	11.7	11.1	8.4	4.4	.....
1919	7.8	10.5	12.0	11.1	.....	.....	.....
LOWEST.							
1916	.....	6.9	8.3	5.6	3.7	0.1	−0.6
1917	2.6	5.7	8.8	7.0	3.4	0 2	.....
1918	3.7	9.9	9.3	7.0	4.2	−0.4	.....
1919	.....	.....	.....	.....	.....	.....	.....

[1] Zero of gage 335 feet above mean lower low water at Portage Bay, Prince William Sound.

MEAN LAKE LEVELS DURING SEPTEMBER, 1919.

By UNITED STATES LAKE SURVEY.

[Dated: Detroit, Mich., Oct. 6, 1919.]

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

Data.	Lakes.[1]			
	Superior.	Michigan and Huron.	Erie.	Ontario.
	Feet.	*Feet.*	*Feet.*	*Feet.*
Mean level during Sept., 1919:				
Above mean sea level at New York	602.55	580.81	572.75	246.86
Above and below—				
Mean stage of Aug., 1919	−0.04	−0.33	−0.39	−0.4
Mean stage of Sept., 1918	+0.04	+0.31	+0.28	+0.66
Average stage for Sept., last 10 years	−0.08	+0.14	+0.38	+0.73
Highest recorded September stage	−1.53	−2.62	−1.19	−0.75
Lowest recorded September stage	+1.06	+1.15	+1.47	+2.86
Average relation of the September level to—				
August level	.....	−0.2	−0.2	−0.4
October level	.....	+0.2	+0.3	+0.4

[1] Lake St. Clair's level: In September, 575.61 feet.