

ances that moved slowly eastward along the Canadian border, no well-defined storm centers crossed the district. There was the usual summer condition of low pressures over the Southwest and the Great Basin and a persistence of high pressure over the Missouri Valley, a condition always favorable to local showers and thunderstorms over the Rocky Mountain region in the summer months. No warnings of any kind were issued or required. Daily forecasts of wind conditions were furnished for forestry interests of western Montana, but the month was not one of high fire hazard in that region.—*E. B. Gittings.*

#### SAN FRANCISCO FORECAST DISTRICT

The North Pacific anticyclone maintained its normal position for the season throughout most of the month, and although it showed more than normal development, the velocity and direction of the winds along its southern and eastern periphery were about normal. The settled character of the weather along the great circle route between San Francisco and Honolulu made it possible to issue definite forecasts of wind and weather for the entire course with considerable assurance during the Dole Pacific flight and later during the intensive search for the three airplanes which failed to arrive at Honolulu. On the morning of departure, August 16th, the pilot or navigator of each airplane was handed a bulletin containing a detailed forecast of wind and weather over the entire route to be covered, together with a weather chart made up from data received the same morning from ships on the Pacific. Special bulletins were issued morning and evening from the 14th to the 22d and a special forecast was made for the airplane *Dallas Spirit* just before its departure from Oakland for Honolulu on the 19th. All of these ocean airway forecasts were verified in almost every detail.

Temperatures were above normal and humidity below normal throughout most of the month in the Pacific Northwest, except for a short period near the middle of the month in Idaho. Changes in the fire hazard were gradual and no special warnings were issued, the situation being covered from day to day in the general forecasts. However, special forecasts of mountain thunderstorms were issued for southern California on several occasions. At the request of the Forest Service special forecasts were issued for several areas where severe fires were in progress.

No storm warnings were issued during the month and none were necessary. No precipitation of consequence fell in California and no rain warnings were issued.—*Floyd D. Young.*

#### RIVERS AND FLOODS

By R. E. SPENCER

Heavy rains in four periods during August over Kansas, Oklahoma, southern Missouri, and Arkansas caused floods of varying magnitude in the rivers of the Topeka, Wichita, Fort Smith, and Little Rock River districts. The first rain period, from August 1 to 4, was followed by moderate rises in the first three of these districts; the second period, from the 6th to the 9th, affected only the Topeka and Fort Smith districts; the third, from August 12 to 17, which was by far the most serious, caused floods in all four districts; and the effects of the fourth, from August 23 to 27, were felt only moderately in the Topeka and Wichita districts.

*Topeka district.*—The rains of the first period were practically without consequence; but those of August 6-8 resulted in the overflow of a considerable area of farm land in the Blue River Basin and slight damage at Oswego, Kans., on the Neosho.

During the third period, following August 12, damaging overflows occurred along the Smoky Hill, the Blue, the Cottonwood, the Neosho, and in small streams where Weather Bureau gauges are not maintained. The heaviest losses occurred at Salina, Kans., where about half the area of the city was flooded and approximately \$500,000 damage was done. Losses in other portions of the Smoky Hill Valley amounted to about \$40,000, and one life was lost in Lincoln County. In the Blue River Basin the combined loss for the rise of this period and that following August 6, amounted to \$40,000, most of which occurred in Marshall and Washington Counties. In the Cottonwood Basin, Lyon, Chase, and Marion Counties suffered losses amounting to \$65,000. At and near Council Grove, Kans., on the Neosho, \$16,000 damage was done to bridges, highways, and business buildings; and further downstream, in the vicinity of Oswego, an additional \$15,000 loss occurred. At and near Fort Scott, Kans., where the rains were extremely heavy, one life was lost and \$206,000 damage was done. An additional \$6,000 is estimated also for the overflowing of small streams in the district.

The rains following the 22d occasioned a further rise in the upper Solomon, resulting in damages estimated at \$25,000.

Warnings were in the main timely and well verified.

*Wichita, Little Rock, and Fort Smith districts.*—In the Wichita district flood conditions followed closely each of the rainfall periods from the 2d to the 4th, after the 12th, and on the 27th, but the only one of the three having serious consequences was that following the 12th. The official in charge of the Weather Bureau office at Wichita, Kans., reports regarding this rise as follows:

In the period from the 13th to the 22d there were floods and recurrences of floods, merging into one another with barely a separate crest at times, over the section of the Arkansas River from Great Bend to Wichita, Kans., culminating in the highest stages ever known from just below Great Bend almost to the city limits of Wichita, and equaling the highest stage previously recorded at Wichita. At Great Bend the overflow covered 100 city blocks; Hutchinson reported 100 acres of city property overflowed; in Wichita the flooded area amounted to 160 acres; and in addition to the flooded areas in the cities about 40,000 acres were overflowed in Reno County and about 27,000 in Sedgwick County. Below Wichita the flood intensity was progressively diminished so that at Arkansas City the flooding was only moderate.

The total estimate of losses for the Wichita district for August was \$1,842,450, of which the greater part occurred in Barton County. The rains of the 12th and 13th in this county are reported as having been of such proportions as to result in overflow from creeks that covered some farm land to a depth of 6 feet. The value of property saved through Weather Bureau warnings was \$637,000.

In the Fort Smith district on the Arkansas River, the flood stage was passed on the 6th at Webbers Falls, Okla., but the rise was practically without consequence. On the Neosho, however, a comparatively serious overflow occurred just below the Kansas line following the rains of the 12th. Approximately 3,000 acres of land were inundated near Miami, Okla., and the damage to that vicinity was estimated at \$75,000. A saving of about \$25,000 was affected by the flood warnings.

In the Little Rock district the White River was in flood following the 17th, and water from that stream and

the lower Arkansas, escaping through unrepaired levees, did considerable damage to farm lands. Of these overflows the official in charge of the Weather Bureau office at Little Rock reports in part as follows:

If the levees had been intact no damage of consequence would have occurred, but water began going through a number of breaks before a stage of 20 feet had been reached at Georgetown. The water flowing through these breaks inundated 100,000 acres, about one-third of which was cultivated, and most of the highways in this section were under water \* \* \*.

With a stage of 21.6 feet at Pine Bluff, on the Arkansas River, and about 15 feet at Memphis, water ran through the breaks at Southbend, Pendleton, and Medford, inundating about 100,000 acres, one-third of which was in crops. This is the fifth time this season this area has been inundated.

It is thought that water from the White destroyed 30,000 or more acres, and that from the Arkansas at least 33,000 acres, of crops; and as the value of the crops was probably more than \$10 an acre, the combined losses through these overflows amounted to at least \$630,000. No lives were lost and no loss of stock was reported. Owing to the previous floods there was little else to lose.

Report on the rise in the Osage River in August has not been received.

The flood in the Illinois River, report of which was deferred from the issues of this REVIEW for June and July, will be discussed in the special report of the great Mississippi River floods of this year.

MEAN LAKE LEVELS DURING AUGUST, 1927

By UNITED STATES LAKE SURVEY

[Detroit, Mich., September 6, 1927]

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

Data	Lakes <sup>1</sup>			
	Superior	Michigan and Huron	Erie	Ontario
Mean level during August, 1927:				
Above mean sea level at New York.....	Feet 602.77	Feet 579.46	Feet 572.01	Feet 245.77
Above or below—				
Mean stage of July, 1927.....	+0.08	-0.09	-0.15	-0.24
Mean stage of August, 1926.....	+1.75	+0.85	+0.71	+0.78
Average stage for August last 10 years.....	+0.59	-0.85	-0.30	-0.29
Highest recorded August stage....	-1.16	-4.05	-2.10	-2.49
Lowest recorded August stage....	+1.75	+1.02	+0.93	+1.42
Average departure (since 1860) of the August level from the July level.....	+0.11	-0.05	-0.18	-0.30

<sup>1</sup> Lake St. Clair's level: In August, 1927, 574.74 feet.

EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, AUGUST, 1927

By J. B. KINCER

*General summary.*—Temperatures during the month tended to subnormal generally and retarded development of warm-weather crops considerably. During the first decade there was too frequent rain for cotton in the Southeast, while in the central Great Plains and more east-central areas beneficial showers occurred. Warm weather in southern sections promoted rapid growth, while farm work proceeded satisfactorily in more northern portions. The weather in northern areas was generally cool, but no materially harmful temperatures occurred, except that some more or less local frost damage was noted in parts of the upper western Lake region. It remained generally cool for the season in northern States east of the Rocky Mountains, but the South had warmer than normal weather.

The continuation of cool weather during the last decade east of the Rocky Mountains materially retarded warm-weather crops and higher temperatures were generally needed. Showers to generous rainfall, however, relieved the drought in some sections of the central-northern portions and in the Southwest; from western Texas westward showers were beneficial, but in other parts, including much of Texas, it continued too dry. There was considerable frost damage to tender vegetation in some parts of the Central Northern States, particularly on lowlands of Wisconsin and Minnesota, with some light frost in parts of Iowa. At the close of the month rain was still badly needed in much of Texas and also in most sections from Michigan to Minnesota, but elsewhere east of the Rocky Mountains the soil was in mostly good condition with fall plowing progressing rapidly in many places and some seeding of winter grains begun in the West. West of the Rocky Mountains conditions continued generally favorable, especially in the Pacific Northwest, though moisture was needed in some sections.

*Small grains.*—The threshing of winter grains made good progress under generally favorable weather the first part of the month, and in the spring wheat belt the cool, fair weather made exceptionally good conditions for harvest. Late spring wheat was badly damaged by rust in Minnesota, and there was considerable rust

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
<b>ATLANTIC DRAINAGE</b>					
Neuse: Smithfield, N. C.....	Feet 14	26	27	15.0	27
<b>MISSISSIPPI DRAINAGE</b>					
Tippecanoe: Norway, Ind.....	6	2	2	6.0	2
Smoky Hill:					
Mentor, Kans.....	22	14	21	25.8	17
Solomon, Kans.....	24	15	23	26.8	21
Solomon: Beloit, Kans.....	18	3	3	20.5	3
		18	18	20.1	18
		23	26	24.5	26
Blue: Blue Rapids, Kans.....	20	8	9	23.6	9
		13	15	23.0	14
Osage:					
Osceola, Mo.....	20	8	12	27.9	10
		16	24	28.5	20
Warsaw, Mo.....	22	9	13	31.8	10
		18	24	25.9	21
Tuscumbia, Mo.....	25	10	15	30.5	13
		22	24	25.4	23
Arkansas:					
Fort Lyon, Colo.....	6			8.2	3
Dodge City, Kans.....	5	5	5	5.3	5
Great Bend, Kans.....	5	3	7	6.3	7
		13	13	5.8	13
		16	17	6.0	17
Wichita, Kans.....	9	14	22	13.5	17
Arkansas City, Kans.....	15	4	4	16.1	4
		17	22	17.2	23
Webbers Falls, Okla.....	23	6	6	23.2	6
Dardanelle, Ark.....	20	8	8	20.0	8
Little Arkansas: Sedgwick, Kans.....	18	15	17	23.2	16
		27	28	19.8	28
Neosho:					
Oswego, Kans.....	17	10	10	18.8	10
		15	22	22.1	18
Wyandotte, Okla.....	23	18	19	25.8	18
Fort Gibson, Okla.....	22	20	20	22.5	20
Cottonwood:					
Elmdale, Kans.....	32	18	18	32.5	18
Emporia, Kans.....	20	17	20	22.5	19
Cimarron: Perkins, Okla.....	11	4	4	12.2	4
Canadian: Logan, N. Mex.....	4			5.0	5
North Canadian:					
Woodward, Okla.....	4	3	6	5.1	4, 6
Oklahoma City, Okla.....	12	10	10	12.0	10
Petit Jean: Danville, Ark.....	20	11	12	20.2	11
White:					
Calico Rock, Ark.....	18	17	19	24.8	17
Batesville, Ark.....	23	18	20	29.3	19
Newport, Ark.....	26	19	22	27.4	21
Georgetown, Ark.....	22	24	24	22.0	24
Black:					
Corning, Ark.....	11	16	21	12.1	18
Black Rock, Ark.....	14	18	22	15.0	19
<b>WEST GULF DRAINAGE</b>					
Rio Grande:					
San Marcial, N. Mex.....	2			3.7	25