

## CHICAGO FORECAST DISTRICT

Two outstanding features marked the month's weather: Unprecedented amounts of rain over large areas, principally in the southern half, and a cool wave that caused either the lowest or near the lowest temperatures of record for so early in the season, over most of the district. The heavy rains caused floods in many sections, while frosts damaged late crops. The bulk of the staple crops had matured, however, so that general production was relatively little affected by frost.

Frost warnings for some northwestern sections were issued on the 8th, 9th, 11th, 12th, 13th, and from the 16th to the 21st, inclusive. The cool wave already mentioned was notable for so early in the season. On the night of the 24th-25th heavy-to-killing frost occurred southward and eastward across northern Kansas, most of Iowa, and western Wisconsin, while on the succeeding night it extended across most of Michigan and the northern portions of Illinois and Indiana. Thus, either heavy or killing frost visited the whole district at this time, except southern Kansas, central and southern Missouri, southern Illinois, and extreme southern Indiana. As a result of the widespread dissemination of warnings, in which radio broadcasting took a conspicuous part, much seed corn was saved in Iowa.

No severe storms visited the Great Lakes, but conditions called for either small-craft or storm warnings on a number of occasions. The most general storm warnings were issued on the 8th, 21st, and 23d. In most cases the disturbances lost force as they reached or crossed the Lakes.—*C. A. Donnel.*

## NEW ORLEANS FORECAST DISTRICT

No storm occurred on the west Gulf coast except that the southeast portion of Louisiana came under the influence of the left portion of the tropical storm of September 18-21, for which timely warnings were issued.

Small-craft warnings were displayed for increasing northerly winds on the Texas coast on the 25th. Frost warnings were issued on the 25th for the extreme northern portion of the district. Cloudy weather prevented frost, but freezing occurred in the extreme northwest portion of the district.—*I. M. Cline.*

## DENVER FORECAST DISTRICT

An unusual number of disturbances moved eastward from the Plateau Region and Arizona, and frequent lows also advanced during the middle and last of the month from the coasts of British Columbia and Washington. Pressures over Alaska and western Canada were generally high during the first 25 days.

As a result of these pressure conditions, cold, stormy weather prevailed in the northern portion of the district. Heavy rains also fell in New Mexico and Arizona on the 25th, 26th, and 27th. A storm that advanced south-eastward from British Columbia and crossed Montana and Wyoming on the 21st and 22d brought snow in Montana on the 22d and 23d and in northern Wyoming on the 23d. This disturbance was followed by an area of decidedly high pressure and severely low temperature. Thermometer readings of 6° F. and 7° F. were observed in western Montana and Yellowstone Park on the 24th, and of 9° to 19° in Wyoming on the morning of the 25th, freezing weather on the 25th extending southward to

southern Utah and extreme southern Colorado. The 24-hour falls in temperature were hardly sufficient to justify cold wave warnings, although warnings of freezing temperatures were issued for northern Montana on the morning of the 22d, Montana and northern and western Wyoming on the 23d, and Utah and Colorado on the 24th, with warning of temperatures decidedly below freezing issued on the 23d for Montana and on the 24th for eastern Colorado.

Numerous frost warnings were issued during the first half of the month, and frequent frost and freezing temperature warnings during the period from the 16th to the 30th. These were generally verified.—*J. M. Sherier.*

## SAN FRANCISCO FORECAST DISTRICT

The month of September in the far western States was characterized by frequent and pronounced changes in temperature and generally dry weather, except in the Pacific Northwestern States, where rains occurred on a number of days. No storm of sufficient intensity to require warnings occurred. The notable occurrence during the month was the cold weather of the 24th to 26th in Nevada, Idaho, Washington, and Oregon. This period gave freezing temperature throughout these States, except over the extreme western parts of Washington and Oregon, and required forecasts of frosts and freezing temperatures. At points in eastern Washington and eastern Oregon the lowest September temperatures of record were recorded. Following this cold wave the barometric pressure increased decidedly over the interior, including British Columbia and Alberta, Canada, the winds in the Pacific States became north to east, and the humidity decreased to very low readings. Previous to the occurrence of the low humidity, fire-weather warnings were disseminated throughout Washington, Oregon, and California. The conditions that followed gave a period of very high forest-fire hazard in these States. In California a number of large fires occurred in the Sierra and were not extinguished until rains occurred on the first of October. On the 30th of the month when a radical change in the pressure distribution was taking place over the northeast Pacific Ocean, rain warnings were issued for northern and central California for the benefit of those who had fruit sundrying on trays. The rains on October 1 were general over northern California, but, due to the rain warnings, damage to drying fruit was negligible.—*E. H. Bowie.*

## 627.41 (73) RIVERS AND FLOODS

By R. E. SPENCER

Besides rises of varying importance in the middle Mississippi and several other streams of the Middle West, disastrous floods occurred during September in the Neosho, Floyd, Illinois, and Wabash Rivers, and the Grand River of Missouri. Of these latter the first two will be discussed in this report, and those in the Illinois, Wabash, and Grand, the first two of which persisted with pronounced damage into October, will be reported on in full in the October number of this REVIEW.

Rains at least partially contributory to the September floods (except those of northwest Iowa) began falling in the second week of August, so that the ground was already saturated when the heavy falls of early September set in. These continued generally from the 1st to the 6th, and moderate to excessive falls occurred on the 8th and 9th, the 12th to the 16th, the 19th and 20th, and following the

22d, reaching totals far in excess of the normal amounts. Detailed precipitation data covering the Middle West will be published with the October report.

*Neosho, Verdigris, and Cottonwood Rivers.*—Two floods occurred in the Neosho, the first on the 7th below Iola, Kans., and the second following the 12th along the entire river above the Kansas-Oklahoma line, including the Cottonwood, and also in the Verdigris. In the first and less important rise, which was well forecast, the losses amounted to \$15,300 in crops, \$600 in livestock and \$500 in real property, while a saving of \$5,000 was effected through the Weather Bureau warnings. Of the second flood (12th to 22d) the official in charge at Fort Smith reports, "It was the worst flood in the history of the area affected because of the record stages and because of its coming in the season of mature crops." The rise, both in the Neosho and Verdigris, was remarkably sudden, as the rain which caused it fell directly over or near the streams and was thus productive of immediate maximum effect. The rain began early on the morning of the 12th and was excessive from the beginning. Warnings were issued immediately. The Cottonwood River at Emporia rose from 11 feet at 8 a. m. of the 12th to the crest of 29.9 feet, 9.9 feet above flood stage, at 3 p. m. on the 13th; at LeRoy, where the heaviest and fastest rains occurred, the rise started with the beginning of rain in the early morning of the 12th, reaching a crest of 29.6 feet, 5.6 feet above flood stage, at 3 p. m. the same day; at Iola a rise started at about 5 a. m. of the 12th and a crest of 22.1 feet, 7.1 feet above flood stage, was reached at 11 a. m. of the 13th. The rise at Oswego was much slower; this station was below the area of heavy rainfall and the crest of 25.1, 8.1 feet above flood stage, was not reached until the 19th. The stages of 29.9 at Emporia and 29.6 at LeRoy are record stages for those stations.

The rapidity with which the stream rose because of the immediate effectiveness of the rainfall, and at which the crests receded after leaving the area of excessive rainfall are equally noteworthy. The suddenness of the rise rendered impossible the issue of warnings very long in advance, although it is a conservative estimate that those issued effected a saving of \$500,000. Of the losses the official in charge at Fort Smith reports as follows:

Four lives were lost during the flood, three from drowning and one from shock. It is estimated that 100,000 acres of land were overflowed causing a crop loss of \$2,500,000. Losses of all kinds, including crops, were at least \$5,000,000, and more according to some estimates received. Half of this total was due to erosion of land and losses of buildings, improvements, bridges, and to suspension and disorganization of business.

*Topeka and Wichita districts.*—Two other rises in eastern Kansas for which reports have been received were as follows: In Walnut Creek, which enters the Arkansas River just below Great Bend, an unusual and damaging rise occurred as a result of severe local rainfall. The resulting damage was about \$250 to highways, \$10,000 to crops and \$1,000 to prospective crop on 100 acres of alfalfa land. An overflow along the Kansas River resulted in a loss of \$22,000, of which \$20,000 was in crops and \$2,000 in damage to buildings, highways and bridges.

*Floyd and Big Sioux Rivers of Iowa.*—This flood was the result of an extremely heavy 15-hour rainfall, which began in the afternoon of September 17, over the five northwest Iowa counties. The area of maximum rainfall, which was about 15 miles wide and in which the average depth was 10 inches, covered the central portion of Sioux County, extending from near Hawarden north-

eastward about 35 miles, so that the north-south divide between the basins of the Floyd and Big Sioux split the area almost in two. This division of distribution of the rain was doubtless very fortunate, reducing by half as it did the drainage required of either stream; but even so the damage done was remarkably great for a flood of such limited extent and duration. On this point Mr. G. K. Greening, in charge of the Weather Bureau office at Sioux City, Iowa, reports as follows:

Six lives were lost and the reported property damage over the flooded area in Sioux County and the lowlands below on the Big Sioux and Floyd Rivers and tributaries alone amounted to \$1,412,252. In Hawarden, Iowa, at the confluence of the Big Sioux River and Dry Creek, a small stream that drains a portion of the area of terrific rains, property valued at \$275,000 was destroyed; 350 houses and buildings were flooded, 3 bridges were destroyed, and 5,000 square yards of pavement were made worthless. Valuable farm land along the Big Sioux and Floyd Rivers and tributaries in Sioux, O'Brien, Plymouth, and Woodbury Counties was inundated and crop damage and loss of livestock was estimated at \$90,000. In Sioux City 600 homes in the Floyd bottoms were flooded and reported property damage amounted to \$246,710. The damage to bridges, highways, telegraph and telephone lines and interruptions to railroads by washouts far exceeded any other flood over the stricken area. The extent of the area overflowed is estimated at 50,000 acres.

In spite of the suddenness of the rise, an effective distribution of warnings was accomplished. The value of the proper cooperation of municipal agencies in this connection is well illustrated in the following extract from Mr. Greening's report:

*Warnings.*—Flood warnings were issued for the Floyd River lowlands from Merrill to Leeds, Iowa, as early as 7 a. m., September 18 and at noon a general flood warning was given for the bottoms in Sioux City, when alarming reports were received from Merrill and Hinton, Iowa. No effort was spared to arouse the inhabitants to the seriousness of the situation. City officials were alert to the needs and early in the afternoon all of the available boats were moved to the Floyd River banks. Many people living along the river appeared to consider this an unnecessary precaution, but a few hours later the boats were seen to be invaluable.

The precautions that were taken probably saved a number of lives. Police and firemen went from house to house and warned the people. Moving vans were placed at their disposal merely for the asking. The Service Company whistles were blown at 15-minute intervals and thousands of people visited the section of the city late in the afternoon and evening where the flood was expected to strike, so general had the distribution of the warnings been. Yet most of the victims of the flood awaited its arrival before making ready to move. However, business houses heeded the warning and took precautionary measures, and as a result property within the city valued at \$85,650 was saved.

The saving effected outside the city totaled \$100,290.

*Raccoon River.*—The flood in the Raccoon River of Iowa was characterized by the same suddenness and concentrated destruction as that of other floods in this State following the heavy rains of September 18. The greatest damage in this, as in the other cases, was to prospective crops. The reported losses are listed as follows:

To prospective crops, mostly corn, damaged but not totally destroyed, 10,000 acres.....	\$60,000
Livestock and other movable property.....	10,000
Losses to bridges and highways.....	10,000
Loss by suspension of business, including wages.....	20,000
Money value of property saved by warnings.....	10,000

*Hannibal, Mo., district.*—In this district greater damage was done by overflows in the smaller rivers and creeks than by the floods in the Des Moines River. The following extract from the report of the official in charge of the Weather Bureau office at Hannibal indicates the type and extent of the damage.

The losses in the Des Moines valley are estimated as follows: To growing crops, \$10,000 to \$15,000. The damage by creeks and small rivers to roads and bridges was \$20,000 in Wapello County

and probably nearly as much in four other counties in that vicinity.

Skunk River in Iowa was in flood twice during the month. It caused the breaking of the levee of the Green Bay levee district and the flooding of 4,000 acres, mostly in cultivation, and an estimated loss to growing crops of \$150,000.

A creek levee broke at New Canton, Ill., causing \$20,000 damage to tangible property and \$250,000 to growing crops.

The damage to growing crops in Salt River Valley is estimated at \$100,000.

At Hannibal the flood in Bear Creek on September 4 caused a damage of \$2,000 to \$3,000, and it probably cost another \$1,000 to clean and repair property.

The rains of 3d-4th caused about \$20,000 damage to city streets, \$60,000 to the highways and bridges in Marion County, and about \$40,000 to highways and bridges in Ralls County.

Reported railroad losses due to washouts amounted to \$2,250.

**Ohio and Indiana.**—Except for the flood in the Wabash (to be reported on in the October REVIEW), no serious rise occurred in these States in September. In the Dayton, Ohio, district some damage occurred through overflows from creeks and small streams, but flood stages were not reached at Weather Bureau river stations. The nearest approach was at Sidney, Ohio, where, as reported by the official in charge at Dayton, "on the 4th and 5th, 3.93 inches of rain fell. The river rose rapidly, but the Conservancy district dams functioned and no damage resulted." The Maumee River was above flood stage at Fort Wayne, Ind., from the 24th until the 27th. This is the first time in the history of the station that flood stage has been reached in this month. Some bottom lands and basements were flooded but no damage of consequence was reported.

**Pennsylvania.**—A noteworthy instance of the effect on mountain streams of sudden heavy rain is reported by the official in charge of the Weather Bureau office at Scranton, Pa. Heavy thunderstorms occurred on the night of the 5th-6th in southwest Susquehanna County, Pa. The report on conditions following the rain reads:

\* \* \* The waters, rushing down the mountain sides, filled the gullies and ravines with torrents laden with logs and rocks. These streams, pouring into the valleys, swept through three villages—Harford, Kingsley, and Hopbottom—which are located on the smaller tributaries of the Susquehanna River. The first floors of buildings were flooded, furniture washed into the streets, buildings battered by logs and rocks, and fields, gardens, and highways washed out. Kingsley and Hopbottom are on the Lackawanna Trail and portions of the concrete highways were undermined and torn out. No lives were lost but the property loss was heavy, probably amounting to \$50,000, including damage to highways and bridges.

**Texas.**—In this State floods were not severe and were well forecast. The only reported loss was highway damage amounting to \$5,000 along the Trinity River.

**Arizona.**—The flood in southeastern Arizona during the latter part of the month is reported on by the official in charge at Phoenix as follows:

\* \* \* Unusually heavy rains in southeastern Arizona from September 25 to 27, inclusive, resulted in marked rises in streams draining that section. During the night of 26th-27th a stage of 6 feet was reached at Kelvin, on the Gila River; at 9.30 a. m. of the 28th a stage of 9.5 feet was reported, and the crest of the rise, 16 feet, 11 feet above the flood stage, was reached at 10 p. m. of the 28th. The stage declined rapidly thereafter reaching 7 feet at 8 a. m. the 29th and dropping below flood stage by the morning of the 30th. The major damage occurred along small tributaries in the immediate vicinity of the heavy rainfall, the property suffering most being railway tracks, bridges, highways and approaches to highway bridges. Railroad damage was estimated at \$375,000, state highways at about \$60,000, and damage to the military post at Camp Little, Ariz., at \$12,000. It is thought that little damage occurred below Kelvin, where the increased width of the river caused the crest to flatten out considerably in its downward course.

Following is a table, by districts, of losses and savings in the floods discussed above. The figures are necessarily very incomplete and partly estimated.

District	Lives	Tangible property	Farm losses	Suspension of business	Total losses	Savings by warnings
Fort Smith, Ark.....	4		\$2,515,900		\$5,000,000	\$505,000
Topeka and Wichita, Kans.....		\$2,250	31,000		33,250	
Sioux City, Iowa.....	6	1,275,052	91,700	\$45,500	1,412,252	185,940
Des Moines, Iowa.....		10,000	70,000	20,000	100,000	10,000
Hannibal, Mo.....		146,250	515,000		661,250	
Scranton, Pa.....		50,000			50,000	
Dallas, Tex.....		5,000			5,000	
Phoenix, Ariz.....		447,000			447,000	
Totals.....	10	1,935,552	3,223,600	65,500	7,708,752	700,940

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
<b>GREAT LAKES DRAINAGE</b>					
Maumee: Fort Wayne, Ind.....	Feet 15	24	27	17.0	24
<b>MISSISSIPPI DRAINAGE</b>					
Shenango: Sharon, Pa.....	9	26	27	9.2	26
Tuscarawas:					
Gnadenhutten, Ohio.....	9	6	8	10.3	7
		24	28	13.8	26
Coshocton, Ohio.....	8	24	25	9.4	24
Walhonding: Walhonding, Ohio.....	8	24	24	8.8	24
Scioto:					
Larue, Ohio.....	11	5	7	12.9	5
		10	10	11.1	10
Prospect, Ohio.....	10	7	8	10.4	7
Wabash:					
La Fayette, Ind.....	11	5		16.0	8
		26		16.5	28
Terre Haute, Ind.....	16	8	17	20.7	12
		30	(1)		
Vincennes, Ind.....	14	12		17.7	17-18
Mount Carmel, Ill.....	16	12	24	21.5	20
Tippecanoe: Norway, Ind.....	6	1	2	6.0	1-2
		14	21	6.4	16-17
		25	(1)	6.5	26 and 30
White: Decker, Ind.....	18	17	22	21.6	19
White, East Fork: Seymour, Ind.....	10	11	13	11.4	13
White, West Fork:					
Anderson, Ind.....	12	6	7	12.8	7
		10	11	14.0	10
Noblesville, Ind.....	14	11		14.4	11
		26	26	14.3	26
Elliston, Ind.....	19	8	17	27.4	13
Edwardsport, Ind.....	15	8	20	19.95	15
Mississippi:					
Quincy, Ill.....	14	17	17	14.1	17
		26	30	14.8	28
Hannibal, Mo.....	13	5	5	13.2	5
		9	11	14.2	10
		16	19	14.4	17
		25	(1)	14.9	28
Louisiana, Mo.....	12	5	12	13.9	11
		17	20	13.4	18
		26	(1)	14.0	29
Grafton, Ill.....	18	10	13	18.8	12
		19	21	18.5	20
		27	(1)	19.5	30
Alton, Ill.....	21	29	(1)	21.3	30
Des Moines:					
Tracy, Iowa.....	15	23	25	16.3	24
Ottumwa, Iowa.....	10	22	26	12.3	25
Raccoon: Van Meter, Iowa.....	13	19	23	18.8	20
Skunk: Augusta, Iowa.....	15		11	17.4	9
		15	18	19.9	16
		27	30	16.9	29
Illinois:					
Morris, Ill.....	13	24	30	14.0	25
Peru, Ill.....	14	4	(1)		
Henry, Ill.....	10	9	(1)		
Peoria, Ill.....	18	15	(1)		
Havana, Ill.....	14	4	(1)		
Beardstown, Ill.....	14	5	(1)		
Pearl, Ill.....	12	5	(1)		
Floyd: Merrill, Iowa.....	13			20.0	18
Solomon: Beloit, Kans.....	18	15	18	27.4	17
Grand:					
Gallatin, Mo.....	20	4	5	24.9	5
		10	10	21.8	10
		15	22	37.0	18
Chillicothe, Mo.....	18	4	25	30.3	19
Brunswick, Mo.....	12	20	27	14.6	23
Grand, Thompsons Fork: Trenton, Mo.....	20	15	18	23.5	17
Neosho:					
Neosho Rapids, Kans.....	22	13	15	24.6	14
Le Roy, Kans.....	24	12	17	29.6	12

(1) Continued at end of month.

River and station	Flood stage	Above flood stages—dates		Crest	
		From—	To—	Stage	Date
<b>MISSISSIPPI DRAINAGE—continued</b>					
Neosho—Continued.	<i>Feet</i>			<i>Feet</i>	
Iola, Kans.....	15	12	18	22.1	13
Oswego, Kans.....	17	7	7	17.5	7
Fort Gibson, Okla.....	22	15	22	25.1	19
Cottonwood: Emporia, Kans.....	20	7	7	23.5	7
Canadian: Logan, N. Mex.....	4	-----	-----	29.9	13
Sulphur: Ringo Crossing, Tex.....	20	8	9	5.0	7
				21.0	8
<b>WEST GULF DRAINAGE</b>					
Trinity:					
Dallas, Tex.....	25	7	9	29.6	7
Trinidad, Tex.....	28	10	13	30.3	12
<b>PACIFIC DRAINAGE</b>					
Gila: Kelvin, Ariz.....	5	27	29	16.0	28

**MEAN LAKE LEVELS DURING SEPTEMBER, 1926**

By UNITED STATES LAKE SURVEY

[Detroit, Mich., October 5, 1926]

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 September, 1926:				
Above mean sea level at New York.....	<i>Feet</i> 601.30	<i>Feet</i> 578.51	<i>Feet</i> 571.43	<i>Feet</i> 244.86
Above or below—				
Mean stage of August, 1926.....	+0.32	-0.08	+0.13	-0.13
Mean stage of September, 1925.....	-0.15	+0.29	+0.50	+0.30
Average stage for September, last 10 years.....	-1.18	-1.83	-0.77	-1.02
Highest recorded September, stage.....	-2.78	-4.92	-2.51	-2.75
Lowest recorded September, stage.....	-0.15	+0.29	+0.50	+0.86
Average departure (since 1860) of the September level from the August level.....	+0.05	-0.20	-0.26	-0.40

<sup>1</sup> Lake St. Clair's level: In Sept., 1926, 547.01 feet.

**EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, SEPTEMBER, 1926**

By J. B. KINCER

*General summary.*—Over a considerable area extending from the Ohio and extreme lower Missouri Valleys northward, frequent rains and cloudy weather were unfavorable for farming operations and for maturing fall crops, as the soil was usually too wet for proper working. There was also considerable delay in harvesting crops and in late threshing, with complaint of root crops rotting.

In the South, the generally warm weather and light to moderate rain made favorable conditions, except that soil moisture was insufficient for minor crops in the south Atlantic section and some Gulf districts. Except for wet soil and flooding in some eastern districts of the central plains States, conditions were generally favorable throughout the plains area and also west of the Rocky Mountains, wherever it was not too dry. Rain was badly needed in parts of the Great Basin, and there was insufficient moisture locally in the Pacific Northwest.

Crops suffered heavy loss in a limited area in extreme southern Florida and some extreme southern sections along the east Gulf coast by the severe hurricane of the 18th-20th. The greatest loss in southern Florida

was to citrus fruit (chiefly grapefruit) and in other sections to open cotton. A detailed description of this storm will appear in the October REVIEW.

Heavy-to-killing frost damaged late crops over a considerable area of the Northwest during the latter part of the month. Late vegetation and immature corn suffered considerably over a belt extending from Michigan, northwestern Illinois, extreme northern Missouri, and northwestern Kansas northward, but in much the greater part of this area the bulk of staple crops had matured, and damage from a general production standpoint was comparatively small. No other material frost damage occurred, as harmful temperatures did not extend into the interior valley States.

*Small grains.*—Frequent rains and continued wet soil were unfavorable for the preparation of seed beds and for the seeding of winter wheat quite generally from the lower Missouri and upper Mississippi Valleys eastward to the Appalachian Mountain districts. At the close of the month wheat seeding had become considerably delayed in this area. South of the Ohio River, and quite generally throughout the Great Plains, conditions were much better and seeding made favorable progress in these sections. Wheat needed more moisture, however, in the west-central plains, especially in western Kansas, and it was too dry in parts of the Southeast, as well as in some far northwestern districts. The freeze damaged late flax in the northern Great Plains, but most of the crop had matured previously. The harvest of rice advanced satisfactorily with favorable weather, while grain sorghums in the lower Great Plains were mostly mature at the close of the month.

*Corn.*—The mostly cool, wet, and cloudy weather over the northern half of the country east of the Great Plains was decidedly unfavorable for maturing corn. The crop ripened very slowly, only about one-fourth of it being safe from frost in the upper Mississippi Valley by the middle of September. In the Great Plains area and generally throughout the South maturity was more rapid with better drying weather prevailing. Frost damaged late corn considerably in parts of the Northwest about the 25th, the damaging temperatures extending as far east as the western Lake region. Most of the crop in this area had matured, however, and no widespread serious harm occurred, except through lowering of grade. Elsewhere in the principal corn sections the temperature did not go low enough to be harmful.

*Cotton.*—The persistently warm weather and mostly light to moderate rainfall were favorable for the cotton crop in most sections, though part of the month was too cloudy and wet in the northern portion of the belt west of the Mississippi River. In most districts the warm and generally sunshiny weather favored rapid opening of bolls, and also good progress of the harvest.

*Miscellaneous crops.*—In the far Southwest sufficient rain fell to benefit the range materially but in the Great Basin the continued drought was detrimental. In the central and eastern portions of the country meadows and pastures continued generally good for the season, though grass lands needed more moisture in southeastern districts. Potatoes were damaged somewhat by frost in the western Lake region, and wet weather interfered with harvest to a considerable extent in the Ohio Valley; elsewhere conditions were generally favorable. Sugar cane made fair to good progress in Louisiana, and the weather was mostly favorable for sugar beets. Apples and other fruits suffered considerable damage from freezing weather in the far Northwest.