

RELATIVE HUMIDITY

There were large excesses in the average percentages of relative humidity, as compared with the normal, in most of the mountain and southern plateau States, where

the positive departures ranged from 10 to 20 per cent; there were excesses also from the Ohio Valley southward and southeastward to the Gulf and South Atlantic States. In other districts the averages were mainly below normal, the deficiencies being large in the far Northwest.

SEVERE LOCAL STORMS, SEPTEMBER, 1929

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the annual report of the chief of bureau]

Place	Date	Time	Width of path, yards <sup>1</sup>	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Fergus and Wheatland, Mont.	1					Hail	Considerable crop destruction	Official, U. S. Weather Bureau.
Toole and Hill, Mont.	2					do	do	Do.
Paducah, Tex.	4	3 p. m.	440		\$2,500	do	Crops damaged and poultry killed or injured	Do.
Rankin, Tex.	4	5.40 p. m.	4 mi.		4,000	Hail and wind	Buildings unroofed and otherwise damaged by wind.	Do.
Littlefield, Tex.	4	7 p. m.	10 mi.			do	Crops considerably injured	Do.
Liberty, Mont.	4					Hail	Crops damaged	Do.
Plainview, Tex.	5	8 p. m.	1,760		25,000	do	do	Do.
Spur, Tex.	5	8 p. m.	2,640		10,000	do	do	Do.
Crosbyton, Tex.	5	10 p. m.	3 mi.			do	Buildings and crops damaged	Do.
Anadarko, Okla.	8	5 p. m.	6 mi.		100,000	Wind and rain	Severe damage to property and crops	Do.
Kingston, Okla.	8	5 p. m.				Hail	Chief damage to crops; minor property damage	Do.
Fort Stockton, Tex.	8	5-7 p. m.	5 mi.		50,000	Wind	Much damage to property; 1 person injured	Do.
Chickasha, Okla. (4 miles southwest of)	8	7-8 p. m.	1,760		33,000	do	Damage chiefly to property other than crops	Do.
Chickasha, Okla. (northwest of)	8	8 p. m.	1,320			Hail	Crops and buildings damaged	Do.
Norman, Okla. (near)	8	9.15 p. m.	1,760		25,000	Wind	Airport and 2 planes damaged; 2 planes demolished; minor crop injury; 1 person injured	Do.
Stonewall, Okla. (near)	8	10 p. m.				Wind and hail	Crops badly damaged; 4 persons injured	Do.
Monroe, Wapello, and Delaware Counties, Iowa.	8	P. m.			63,000	do	Character of damage not reported	Do.
Pennsylvania (southeastern).	8			1	100,000	Wind, rain, and electrical.	Several barns destroyed; great crop damage over entire section.	Do.
San Jon, N. Mex. (10 miles southeast of)	8					Small tornado	A few farm buildings wrecked	Do.
Wayne, Okla., and vicinity.	8		2 mi.		75,000	Wind	Extensive damage to crops and other property	Do.
Westminster, Md.	8				20,000	Electrical	2 barns and contents destroyed	Do.
Spur, Tex.	9	10 p. m.	2 mi.		50,000	Hail	Crops damaged	Do.
Lake Michigan, (near Grand Haven, Mich.)	10			25		Wind	Steamer Andaste foundered, losing entire crew	Do.
Oilton, Tex.	11	8-9 p. m.	880		10,000	Hail	Crops considerably injured	Do.
Dillon, S. C.	14	2 p. m.	80		1,500	Small tornado	A warehouse damaged; 3 persons injured	Do.
Arizona (south-central and southeastern)	19-24				50,000	Wind, rain, and floods.	Much damage to roads, culverts, and bridges	Do.
Lee Ranch, N. Mex. (near)	25					Hail	75 per cent of crops ruined	Do.
Houghton, Mich.	27	P. m.				Thunderstorm, hail, and rain.	Windows broken; considerable damage to telephone and electric circuits.	Do.
Miami and Fort Lauderdale area, Fla.	28	P. m.				5 tornadoes	Details not yet received	Do.
Florida (southern and western).	28-30			3	676,000	Tropical hurricane.	Heavy damage to fruit and truck, highways, telephone and telegraph lines, small boats and equipment, timber, buildings, power plants, and shops.	Do.
Grays Lake and Ava, Ill.	29					Electrical	4 barns destroyed	Do.
Pottsville, Pa., and vicinity.	29-30				20,000	Hail and rain	Damage confined to flooding of cellars, washing of fields, etc.; several small bridges destroyed.	Do.

<sup>1</sup> Mi. signifies miles instead of yards.

RIVERS AND FLOODS

By R. E. SPENCER

No floods of importance occurred during September, except those in the South Atlantic and East Gulf States during the last three days and that in the Rio Grande in the vicinity of San Marcial, N. Mex., on the 23d. As the South Atlantic and East Gulf floods were in all cases merely forerunners of much more severe ones in early October, they will be discussed in the flood report for that month.

The Rio Grande rise, resulting from heavy local rains about the 22d, exceeded by 0.5 foot the high-water record of last month at San Marcial, destroying the levee and completely flooding the town. Press accounts state that only three buildings remained standing after the flood. Incomplete reports of losses place the total at \$92,000, divided as follows:

Tangible property	\$60,000
Matured crops	10,000
Prospective crops	15,000
Livestock, etc.	2,000
Suspension of business	5,000

[All dates in September unless otherwise specified]

River and station	Flood stage	Above flood stages— dates		Crest	
		From—	To—	Stage	Date
ATLANTIC DRAINAGE					
	<i>Feet</i>			<i>Feet</i>	
Santee: Rimini, S. C. ....	12	29	( <sup>1</sup> )		
Congaree: Columbia, S. C. ....	15	28	29	19.1	28
Broad: Blairs, S. C. ....	15	27	29	25.0	28
Saluda:					
Pelzer, S. C. ....	7	26	29	11.2	27
Chappells, S. C. ....	14	26	( <sup>1</sup> )	30.2	28
Savannah:					
Calhoun Falls, S. C. ....	6	27	27	8.7	27
Augusta, Ga. ....	32	26	29	46.3	27
Broad: Carlton, Ga. ....	11	17	17	11.0	17
		26	28	19.2	27
Altamaha:					
Charlotte, Ga. ....	15	28	( <sup>1</sup> )		
Everett City, Ga. ....	10	29	( <sup>1</sup> )		
Oconee: Milledgeville, Ga. ....	22	27	28	25.2	27
Ocmulgee: Lumber City, Ga. ....	15	29	30	15.6	29
EAST GULF DRAINAGE					
Chattahoochee: Norcross, Ga. ....	16	27	28	19.5	27
Etowah: Canton, Ga. ....	11	26	26	14.0	26
MISSISSIPPI DRAINAGE					
French Broad: Asheville, N. C. ....	4	27	28	5.0	27
Big Pigeon: Newport, Tenn. ....	6	26	26	8.0	26
Elk: Fayetteville, Tenn. ....	14	14	14	14.7	14
Canadian: Logan, N. Mex. ....	4			6.0	23
WEST GULF DRAINAGE					
Nueces: Cotulla, Tex. ....	15	22	24	18.4	23
Rio Grande:					
Albuquerque, N. Mex. ....	4			4.5	23
San Marcial, N. Mex. ....	2			6.0	23
PACIFIC DRAINAGE					
Colorado: Parker, Ariz. ....	7	( <sup>1</sup> )		11.9	June 2.
Gila: Kelvin, Ariz. ....	5			9.4	Sept. 27-28
				8.0	24

<sup>1</sup> Continued at end of month.<sup>2</sup> Approximately.<sup>3</sup> Last reading taken; levee collapsed shortly afterwards.<sup>4</sup> Continued from last month.

## EFFECT OF WEATHER ON CROPS AND FARMING OPERATIONS, SEPTEMBER, 1929

By J. B. KINCER

*General summary.*—During the first decade the agricultural situation was materially improved by fairly general rains, especially with respect to the condition of the soil for preparation of winter grain seeding in the principal producing States, and many late crops were benefited also, but in general the rains came too late to be widespread, marked benefit. In the Atlantic area moisture was helpful in general, but some areas were still too dry, while there was again too much rain in parts of the Southeast; the Gulf area, including the southern half of Texas, continued dry, on the whole. Droughty conditions were effectively relieved in most sections between the Mississippi River and the Rocky Mountains, but crops were mostly too far advanced to be helped. Severe drought continued over the far Northwest.

During the second decade there was more or less severe frost over a rather wide area, extending from Pennsylvania, the northern part of the Ohio Valley States, and much of Iowa northward. Considerable damage resulted to late crops and tender vegetation in some sections, but harm was rather spotted. Showers were helpful to minor crops in parts of the Southeast, but in other sections they were not needed and were mostly unfavorable for cotton in the eastern belt. It was still too dry for plowing and seeding winter grains in a good many places, especially in parts of the Ohio Valley and more generally in the Northwest and northern Pacific States.

During the last decade there were damaging and heavy rains in the Southeast, attending a tropical storm that moved northeastward over that section. Rains were frequent and in many places heavy, resulting in the washing of fields, flooding of lowlands, and damage to outstanding crops. Rainfall was still needed in some areas, the sections needing moisture most being Michigan, the northern portions of Indiana and Illinois, and Missouri and eastern Kansas. The drought was also largely unrelieved in the grain areas of the Pacific Northwest. The warm, sunny weather in the interior and Southwest favored rapid maturity of late crops and only local frost damage was reported.

*Small grains.*—During the first decade cold weather, with considerable snow in elevated northwestern sections, was unfavorable for late harvest and threshing, while plowing was still retarded in much of the Lake region and in the far Northwest because of dry soil. Soil moisture was improved, however, in most of the main winter-wheat States. During the second decade the soil was still too dry and hard for plowing in the northern parts of Indiana and Illinois, much of Missouri, and south-central and southeastern Kansas, while this work was hampered in Wisconsin and Minnesota. Satisfactory advance was made in the Great Plains region, except as noted above, but in much of the Northwest it was too dry for extensive operations. During the last decade there was some improvement in conditions for plowing and seeding winter wheat, but parts of the Southwest continued dry. Good progress in seeding was made in the eastern Ohio Valley, but parts of Indiana and Illinois continued dry. In Kansas seeding was nearly done in the western two-thirds, but this work was delayed in the east by dry soil.

*Corn.*—The corn crop was too far advanced during the first decade to benefit materially from the rains, although some of the late crop was helped. In Iowa early corn was too mature and the late too badly fired for material benefit, while in eastern Kansas most corn was mature and it was largely beyond frost damage in the northern Great Plains. During the second decade corn matured slowly, due to cool weather, from the Mississippi Valley eastward; in the western belt the crop was largely matured. Frosts were rather general in some northern Ohio Valley sections, with more or less damage to the late crop, while in Iowa the frost killed the leaves of corn, but penetrated husks only in local areas. During the last decade corn was reported practically all beyond frost danger in the western portion of the belt. In Iowa conditions were only fair for drying, but advance toward maturity was very good. At the close of the month much was still green in central and southern Illinois and 10 to 20 days were still required in Missouri.

*Cotton.*—During the first decade the severe drought that had prevailed in the western Cotton Belt was effectively relieved in Oklahoma, the northern half of Texas, and western Arkansas, but the rains came too late to greatly benefit the crop. Progress was very good in parts of Texas, but was mostly poor, with continued complaints of shedding and premature opening of small bolls. Progress ranged from fair to good in Oklahoma, with shedding and premature opening checked; east of the Mississippi River there was further deterioration because of dry weather in interior sections, while there was too much rain in other parts.

During the second decade conditions were favorable in the western belt and unfavorable in the east. In the western belt, where the period was sunny and practically