

REPORT ON THE DROUGHT OF 1913 IN ARKANSAS.

By H. F. ALCIATORE, Section Director.

While the summer of 1913, with a mean temperature of 80.2°, which is 1.7° above the normal, was an unusually warm one, yet the records show that there have been three warmer ones, namely, the summer of 1896, with a mean of 81.3°; that of 1901, with a mean of 81.2°; and that of 1909, with a mean of 80.4°. The highest temperature recorded this summer was 107°, August 6, as compared with 116° for the summer of 1901. In August maximum temperatures ranging from 100° to 107° occurred at two stations in the eastern half, and at nine stations in the western half of the State on 10 to 20 days. At all stations but three, the thermometer reached the 100° mark on one or more days.

Considering the summer as a whole, June, July, and August, the average rainfall for the State was 7.61 inches, which amount is 4.32 inches less than the normal. The drought was not a general one, as in not more than 35 or 40 per cent of the agricultural portions of the State was its effect felt. There was considerably less than the average rainfall at 19 out of 54 stations, of which two are in the northeastern, 5 in the southeastern, 7 in the northwestern, and 5 in the southwestern district, the deficiencies ranging from 2.82 inches in the southwestern to more than 9 inches in the northwestern counties. There have been drier summers than the present one since observations began.

In 1896 the summer rainfall averaged 5.84 inches, which is more than 5 inches below the normal, and in 1901 the average was only 6.89 inches.

The drought of 1913 began about July 14 in some parts of the State, and later in other parts. Barring fairly general showers on July 25 and 26 and on August 10 and 23, the total rainfall from July 14 to September 6, a period of 55 days, was widely scattered and insufficient in most of the counties from which reports have been received.

It was not until the close of July, however, that the drought became serious. August, with one exception, 1909, average rainfall 1.27 inches, was the driest month of that name on record. No rain occurred in the State between the 4th and 8th, and the last 8 days were practically rainless, while on the other 18 days of the month the rainfall was very light and scattered. The total fall ranged from 0.01 inch at Bentonville to 8 inches at Calico Rock, the latter amount having occurred in 24 hours. The rainfall was deficient at 47 out of 54 stations, and at 21 stations the total fall was less than 1 inch. Of the 24 localities in which the deficiency equaled or exceeded 2 inches, 18 were in the northern half of the State. An excellent idea of the duration and severity of the drought may be had by considering the rainy days at a few representative stations. In the northwestern district we find Bentonville with a record of 0.01 inch in 43 days; at Fort Smith no rain of consequence occurred during a period of 37 days beginning with August 2; and at Bergman rain occurred but once in 42 days. In the northeastern district, Pocahontas had only two light showers in 43 days, and Corning only three showers in 42 days. In the southeastern district, Pine Bluff shows two days with rain in 39 days, and Stuttgart only one light shower in 45 days. Finally, in the southwestern district, Mena and Centerpoint reported one shower each in a period of 40 days, and at Amity rain occurred only once in 46 days.

The drought was practically broken by fairly general and, in some places, heavy rains that fell September 7, 8, and 9.

As to the effects of the drought, it appears that all the staple crops were more or less damaged over the greater part of Arkansas, but the greatest damage occurred in the western part of the State. The Little Rock Board of Trade has estimated the damage to corn and cotton crops to be about 25 per cent, as compared with conditions of August 1, in the eastern half and from 25 to 40 per cent in the western half.

So far as known, there has been no complete failure of the water supplies in cities and towns that have water-works.

The rivers were all very low in August and the early part of September. At Little Rock, on the Arkansas River, a new low-water record was made on September 4, when the river fell to a stage of 1.3 feet below zero, and remained at that stage until the 10th. This is the lowest recorded stage in any month of the past 34 years.

In conclusion it should be stated that while the drought and the excessive heat of the present summer have been very damaging, yet there is no evidence of anything like a general failure of crops, except, perhaps, in a few localities here and there.

THE DROUGHT OF AUGUST 2-SEPTEMBER 7, 1913, AT FORT SMITH, ARK.

By LEON J. GUTHRIE, Observer.

In the vicinity of Fort Smith an unusually dry, hot period began August 2, 1913, and partially terminated September 8, 1913. It could scarcely be termed an unusually destructive drought, as ample and well-distributed rains that occurred in July and on August 1 gave considerable surplus moisture and practically assured fair staple crops. These preceding favorable conditions greatly lessened the discomforts and losses that otherwise might have resulted from the protracted period of abnormally light rainfall and continuous heat.

On August 1, 0.82 of an inch of rain fell. From that date until September 8 the total fall was 0.02 inch. This is the longest period without substantial rainfall that has occurred at the Fort Smith station; but there have been several periods nearly as long, and some of them were preceded by less favorable conditions.

High day temperatures and abnormally low relative humidity were the characteristics of the period. The mean maximum temperature for August was 98.1°, the highest for any month of record. The highest previous records were 97.9° in July, 1901, and 97.7° in August, 1896. There were 13 days on which the maximum temperature reached 100° or higher. The greatest number of consecutive days with maximum temperatures of 90° or higher that has occurred during the 31 years of record began July 13 and ended September 7, 1913.

The relative humidity was the lowest of record, and toward the latter part of the month, under the influence of southwesterly winds, afternoon readings as low as those prevailing in arid regions were obtained. The mean for the month of August was 55 per cent, which is 15 per cent lower than the August normal. The lowest observed reading was 10 per cent at 5 p. m., August 29.

Upper clouds predominated, and the distinctive "fair weather type" of cumulus was seldom observed. The

sunshine averaged 88 per cent of the possible amount. There were 15 days with 100 per cent of sunshine and none without some sunshine. The wind movement was below normal, especially at night, and there were no high winds.

The effects of the drought upon vegetation were not noticeable until the middle of August, when the abnormally low moisture content of the air began to hasten the exhaustion of surplus moisture and prevent the usual copious deposits of dew. During the latter part of August the deterioration was rapid. Grasses, especially the Bermuda grass of the city lawns, were first affected, and the lawns had assumed their midwinter lifeless appearance by August 31. The soil became dry to an average depth of 6 or 8 inches; and for fully three weeks the country roads and some of the unpaved city streets were almost impassable on account of dust.

The drought occurred too late in the season to cause such radical injury to cotton as had been suffered in a number of previous years, notably 1896 and 1911, the season's loss, estimated by competent authorities, being about 30 per cent of the normal crop. Though the season's fruit crop was uninjured, it is believed that the negligence of fruit growers in failing to cultivate the orchards and the strawberry beds during the critical period will materially reduce next season's crops, and may result in the ultimate loss of a number of trees. The damage to the corn was about 40 per cent and to late potatoes 50 per cent of the normal crops. Owing to lack of moisture very little late garden truck was planted, and that planted was nearly a total loss.

The volume of water in the Arkansas River was the smallest in many years, though the records show lower gage readings. There were places where the river was only 15 or 20 yards wide and easily fordable. There was, however, little suffering or inconvenience on account of depleted water supplies. The Poteau River, from which the city of Fort Smith is supplied, was exceedingly low, but auxiliary pumps prevented serious inconvenience, except during the two or three days consumed in placing the pumps in service. The water supply in wells and small creeks became low, but it was not wholly exhausted at any time.

Neither the intense, protracted heat nor the extreme dryness produced any marked physiological effects. The heat, accompanied as it was by low humidity, caused little physical discomfort and no sunstrokes. There were, however, a few days with heavily dust-laden atmosphere, and this was the only really disagreeable feature.

DROUGHT AND HEAT WAVE OF 1913 IN IOWA.

By GEORGE M. CHAPPEL, Section Director.

The year 1913 will be noted for its long-continued high temperatures and droughty conditions, especially over the southern half of the State, but in several respects the adverse conditions were not as well marked as in the memorable years of 1894 and 1901. Considering the combination of high temperatures and lack of moisture the summer of 1894 was the severest in its effects on staple crops ever experienced in this State, although the temperature was not as high nor were there as many days with readings of 90° or above as there were in 1901, which was the hottest summer on record for this section.

This year the temperature was above the normal nearly all the time from June 13 to September 7, inclusive.

August was warmer than July, and the first week of September was the hottest ever recorded in that month, and over much of the State it was the hottest week of the season. The rainfall was below the normal for each of the summer months, but as there had been an excess of precipitation during March, April, and May, the high temperatures during the latter half of June and the first half of July were considered favorable for the staple crops, and corn probably never made a more rapid growth than during the last 15 days of June, but owing to the cold and backward spring and the adverse conditions during the planting season and the average condition of corn on July 1 was only 93 per cent as compared with the average of past years on that date, as shown by the reports of the Iowa Weather and Crop Service.

July was the warmest month of that name since State-wide observations began in 1890, except in 1894 and 1901, and it was the driest since 1894. There was an average deficiency of rainfall for the State of 2.62 inches, but over the southwest quarter and practically all of the north half of the State there was sufficient moisture to keep corn in fine condition, but at the close of the month pastures, potatoes, and garden truck were in need of rain. In the southeastern counties where the average precipitation for the month was only about 0.25 inch, and where several stations within that area reported only a trace during the entire month, pastures were bare, corn was seriously injured, and water for stock was getting scarce. The excessively high temperatures that prevailed for the four days July 13 to 16 were injurious to corn in that it damaged the pollen and prevented perfect fertilization.

The high temperatures and lack of moisture continued during August, but these features were more pronounced in the southern than in the northern part of the State. While the northern section had an excess of 3.4° in temperature and a deficiency of 0.61 inch in rainfall, the southern section had an excess of 6.4° in temperature and a deficiency of 2.13 inches in precipitation. These departures were still more marked in the southwestern counties, where it was the warmest August on record, and one of the driest. The excessive heat was almost continuous throughout the month, and on many days the maximum temperature readings were near or above 100°. At Northboro, Page County, the maximum temperature was 90° or higher on 29 days and 100° or higher on 16 days. The precipitation came in local showers which were poorly distributed geographically, and throughout the month. Thurman, in Fremont County, recorded only 0.08 inch, while Winterset, in Madison County, recorded 7.13 inches, and in Pocahontas, Palo Alto, Clay, and Dixon Counties the monthly amounts ranged from 5 inches to 6.99 inches. While there was a generous amount of moisture over a large part of the State, its beneficial effect was only temporary, as the hot, dry winds caused rapid evaporation, and at the close of the month all vegetation was suffering for water. Wells were failing and small streams were dry in the southern part of the State, and in many localities stock was being fed as in winter on account of the lack of pastureage.

Excessively high temperatures and almost a total absence of rainfall prevailed during the first seven days of September. It was, in fact, the hottest week ever recorded in the State in September. The daily maximum temperatures were above 90° in practically all sections, and in the southern counties they were 100° or higher. The intense heat, bright sunshine, and brisk winds absorbed what little moisture there was left in the ground