

iciency of 40 inches, or practically the precipitation of one year since 1910. The unprecedented length of time, during which dry weather has continued, thus becomes a potent factor in the discussion of the present dry spell and has added largely to the severity of the crop losses.

This condition has resulted in the greatest scarcity of available water ever known in this usually well watered section. The James River, a stream which has an average flow of 1,500 cubic feet per second, is practically dry, and deep springs and wells, considered never failing, have gone dry. The available water supply of Springfield was so low that the use of water except for necessities was prohibited by order of the mayor of the city. Many farmers have been hauling water for two months, at serious loss and inconvenience, in order to keep their stock alive; and dust is so deep on country roads as to seriously impede traffic, especially by automobile. Pastures are burned up and little or no rough feed remains in the country. Farmers and dairymen are buying food for their stock, and milk and butter are selling at the usual midwinter prices. Thousands of trees have died and large numbers have been seriously injured, both the cultivated and wild. Many apple trees are shedding their buds, and the prospect for fruit next year is believed to be small. Nearly one-half the trees shed their leaves in August, and in many cases the leaves would shrivel and die in a day, as though the tree had been cut down or girdled. This condition apparently resulted from unusually low humidity during the latter portion of August, a reading of 14 per cent being reported from this station on the 30th. Complaints were made from all over the city of paper cracking and falling from the walls, and the increased danger from fires necessitated the establishment of patrols for the safety of the city.

The wheat crop is estimated as above the average, oats were poor, corn is from 33 to 40 per cent of the average, early potatoes were average, but late potatoes, gardens, hay, and forage crops as almost a total loss. The sowing of fall wheat has been delayed past the usual time, but many are sowing since rains.

All of the rainfall during the summer was of a local and restricted type, and in many cases good showers were reported as covering not more than 1 or 2 square miles. Springfield reported 1.75 inches on July 30, while 1 mile north and the same distance south no rain fell. As a result, occasional farms will be found with good crops, while perhaps adjoining farms have no crop, a condition more noticeable this year than ever before.

In 1901, 51 days with temperatures above 90° occurred during June, July, and August, as against 45 during the present season, and while the day temperatures were higher in 1901 than the present year, the excess in temperature during the growing season, April to August, was practically the same. August had an average temperature this year of 82°, the highest monthly August temperature ever reported at this station, and the highest monthly temperature ever reported here with the exception of July, 1901. The drought conditions were aggravated during the present year by an unusually large percentage of sunshine, excessively low humidity and vapor pressure, and with winds above the average.

Bankers in this place generally report collections as slow, and as likely to continue thus for a year or more. Much surplus stock has been disposed of on account of the scarcity of feed, but reports from among farmers do not indicate greater discouragement than in 1901, and high prices are being realized for all products.

Typhoid fever, hay fever, and asthma have been unusu-

ally prevalent during the present year, due it is believed to the low-water supply; at the same time there has been a marked decrease in the number of flies during the summer, as compared with previous years.

THE DROUGHT OF 1913 AT LINCOLN, NEBR.

By G. A. LOVELAND, Section Director.

The dry period of 1913 at Lincoln, Nebr., began on June 8 and continued until September 7. During this period of three months only 2.84 inches of rain fell, which is but 25 per cent of the normal. Only two showers occurred with sufficient rainfall to be beneficial to vegetation during this time, 0.62 inch on the 26 and 0.99 on the 28th of July. This is the smallest rainfall in 92 days at this time of the year ever recorded at Lincoln, Nebr. The years that most nearly approach this for small rainfall are 1881, 1886, and 1894, but in each of these years while the rainfall for July and August was small that for June and September was ample.

The temperature was high the last half of June and the first half of July, but the remarkably high temperatures of the hot period did not begin until July 13 and lasted until the 17th, 5 very hot days with maximum temperatures from 102° to 109°, then followed a week of moderate temperature after which the real heated period began. From July 26 to September 7 high temperatures continued almost without a break, only on four of the 44 days was the mean temperature below normal, and then but slightly. The maximum temperature was 100° or above on 23 of the 44 days, was below 95° on 11 days, and below 90° on 7 days.

The only hot period that compares with this occurred in 1901. This began June 23 and ended August 1. In these 40 days the maximum temperature was 100° or over on 25 days, was below 95° on 9 days and below 90° on 4 days. The mean temperature for the 40 days was 85.6° and for the hottest 44 days, June 21 to August 3, the mean temperature was 84.6°. For the 44 days, July 26 to September 7, 1913, the mean temperature was 83.5°.

For the period June 1 to September 7, 1913, the average temperature was 79.9°, the highest on record for the same period, although some of the individual months were not as high as in 1901.

The dry weather materially injured vegetation. There is no official estimate of the damage to crops obtainable, but the corn crop in this section will be exceedingly light, almost a failure, and all grass and forage crops are very light, except the first cutting of alfalfa. All fruit and garden vegetables were much injured. The water here is nearly all pumped from deep wells and was not affected.

THE HEAT AND DROUGHT OF 1913 AT OMAHA, NEBR.

By L. H. WELSH, Local Forecaster.

An examination of the records of this station shows that the present period of drought and heat has never been exceeded in intensity and duration, including at it does practically all of July, all of August, and the first week of September. While less precipitation than fell during July has been recorded in other months of the same name a few times in previous years, and the mean temperature has been equaled once and exceeded once, they were not coincident, and were followed by cooler and wetter weather during August than was the case this year.

The mean temperature for July was 79.8°, or 3.3° above the normal, with seven days having maxima of 100° or above; 13th-17th with 100° to 104°; 29th, 100°; and 30th with 101°. The total rainfall amounted to 1.92 inches, or 2.41 inches below the normal; fairly good showers occurred on the 6th, 7th, and 28th, and five light showers between the latter dates.

The mean temperature for August was 82.4°, or 8° above the normal. This is the hottest August of record, and in fact the hottest month, except July, 1901, the mean of which was 85.1°. On only 1 day was the mean temperature below normal, and on 10 days the maxima reached 100° or higher, 105° on the 8th equaling the previous records. The precipitation amounted to 0.18 inch, the smallest amount ever received in August, and 3.44 inches below the normal. A fall of 0.12 inch occurred on the 10th, and the remainder in four light showers after that date.

The drought and heat wave continued into September, and the mean temperature for the first 7 days was 88°, or over 18° above the normal, and on the 4th and 5th 100° was recorded. Light showers amounting to 0.06 inch fell on the 2d.

Compared with previous years, the present period shows that at Omaha there were 19 days with temperatures of 100° or above, while in 1901 there were but 15, 14 of which occurred in July and 1 in June. The precipitation for July exceeded that of last July by 1.06 inches, and August of that year had 0.65 inch, and the mean temperature was 5.5° lower than that of the present August.

On approximately 50 days temperatures of 100 or higher occurred at one or more points in the State from which reports are received.

The damage to crops was confined principally to corn and hay, as the small grain was practically past the stage where it could be seriously affected when the drought became pronounced. Gardens and trees suffered greatly, and on account of the baked condition of the soil fall plowing was seriously delayed. Locally there was little complaint on account of a shortage of water. Opinions as to the damage done to crops vary so greatly that it is impracticable to make any estimate as to the amount of loss, but according to the best of authorities the corn crop will amount to from 25 to 40 per cent of the average yield.

The effect of the continued heat and lack of rain upon human and animal life was not serious, owing to the low humidity that obtained most of the time.

REPORT ON THE DROUGHT OF 1913 IN THE VICINITY OF NORTH PLATTE, NEBR.

By A. H. SHILLING, Assistant Observer.

The warm spell of the past summer practically began toward the latter part of May, that month ending with an average excess of temperature of 1°, and there were 3 days with temperatures of 90° or more in the last decade. June temperature was also above the normal with an average daily excess of 2.2° and with 6 days with 90° or more. July taken on an average and comparing with other years, was not unduly warm, as the average temperature for the month, 74.4°, is only 0.5° above the normal. In July there were 13 days with temperatures of 90° or more, which is slightly above the average for such days, and has been equaled or ex-

ceeded in 8 years since 1875, notably in July, 1901, with 27 days. August and the first 7 days in September was the hot period during the summer in this vicinity. August with a mean temperature of 77.3° exceeds the normal by 5.1°, and the temperature in the first week of September averaged 13.3° above normal. There were only 10 days in the period August 1 to September 7, inclusive, on which the temperature did not reach the 90° mark or higher. On August 27 a maximum temperature of 103° was registered, which equals the former record for high temperature for that month, made on August 7, 1878. This was also the highest temperature recorded during the summer.

Comparing the temperature from May to September 7, inclusive, this year with a like period in the years 1881 and 1901, which were warm summers, indicates that this has been the record summer for continuous extreme hot weather in this locality. The mean temperature of 72.6° this year for the period as compared with the means for the same period in 1881 and 1901, 71.4° and 71.0°, respectively, shows that this is the warmest summer since the establishment of the station in the fall of 1874. This present summer also exceeds the record for days with maximum temperature of 90° or more by 50, as compared with 39 days in 1881 and 41 days in 1901. In 1881 and 1901 the last 2 or 3 days of August were free from excessively high temperatures, and the early part of September was comparatively cool, whereas this year the excessive heat continued to September 8.

The rainfall from May 1 to September 7, inclusive, was 9.99 inches, slightly greater than in 1901, which was the driest season in the history of the station. The rainfall was ample and well distributed up to the end of the second decade of June, and around the 1st of July the outlook for crops was most promising, and farmers and merchants were jubilant over the prospect. The rainfall decreased considerably in the last decade of June and the first week of July, just at the critical period for all small grains, and the consequence was that despite the outlook which had been so promising in the early part of the season they gave only fair yields in this part of the State. During July the rainfall, while above the normal, was offset by hot, dry, clear days, and no relief was experienced. In August the rainfall was decidedly deficient and poorly distributed, nearly two-thirds of the total amount falling in two hours on the 19th. The rainfall during the first week in September at this station was 0.01 of an inch, although good rains were reported east and west of here.

The following statements regarding the effects of the hot weather upon crops, water supply, and animal life is obtained principally from Mr. H. C. Diesem, irrigation engineer, Office of Experiment Stations, and Dr. W. T. Pritchard, Bureau of Animal Industry, and also from local merchants and farmers in this vicinity.

Nonirrigated lands.—Wheat: Yield fair, averaging from 12 to 15 bushels to the acre, which is slightly below the 10-year average. Corn: Yield of seed complete failure; fodder made a very poor growth and where not cut for ensilage is almost a complete loss. Alfalfa: First crop average yield; succeeding crops very poor, in many cases the plants not starting after the second or third was cut. Potatoes where raised are small, with poor yield. Garden truck after July 1 dried up. Wild hay made about 60 per cent of a crop.

Sandhills region.—Corn made a fair growth with a fair yield. Potatoes very nearly average yield and of a good quality. Pasturage good, and ranchmen are hold-