

U. S. DEPARTMENT OF AGRICULTURE  
WEATHER BUREAU

IN CO-OPERATION WITH THE

Iowa Weather and Crop Service

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ANNUAL REPORT FOR 1910

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GEO. M. CHAPPEL, Director

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## LETTER OF TRANSMITTAL

*To His Excellency, Beryl F. Carroll, Governor of Iowa:*

SIR: In accordance with the requirements of the law, I have the honor to submit herewith, the twenty-first annual report of the Iowa Weather and Crop Service for the year 1910.

I am, sir, very respectfully, your obedient servant,

GEO. M. CHAPPEL,  
*Director.*

## ANNAL REPORT, 1910

This report is a compilation of climatic data and statistics of soil products, for the year 1910, in convenient form for reference and comparison.

Meteorological reports were received regularly each month of the year from 120 co-operative and 7 regular stations of the U. S. Weather Bureau, and weekly weather and crop reports were received during the six crop months from 175 correspondents.

During the year this office distributed 42,000 copies of the weekly bulletin (issued during the six crop months); also 27,000 copies of the Monthly Review of the Weather and Crop Service, and 5,000 pamphlets giving the precipitation data for the several drainage basins of the State, which were printed by the Chief U. S. Weather Bureau.

The distribution of the daily weather forecasts was continued during the year as follows: by telephone, 171,389; rural mail services, 4,189; ordinary mail, 1,993; by telegraph at expense of U. S. Weather Bureau, 142, making a total of 177,711 forecasts distributed daily. Special warnings of the approach of cold waves and heavy snows were also distributed whenever issued.

## CLIMATOLOGY OF THE YEAR, 1910.

The year, 1910, was in some respects extremely abnormal. It was the driest year on record since observations began in 1890, and the early spring and fall months were warm and pleasant; the average temperature for the latter half of March being higher than the mean for the latter half of April. The precipitation was below the normal every month of the year except January and September, and the excess in these months was small. There were not as many severe wind storms as usual and the average amount of snowfall was less than 50 per cent. of the amount for 1909.

BAROMETER, (Reduced to sea level.)—The mean pressure of the atmosphere for the year 1910, was 30.04 inches. The highest observed pressure was 30.83 inches, at Keokuk, Lee County on December 13th. The lowest

pressure observed was 29.14 inches, at Charles City, Floyd county on January 26th. The range for the state was 1.69 inches.

**TEMPERATURE.**—The mean temperature for the state was 48.7°, which is 1.2° above the normal for the state. The highest annual mean was 52.9° at Keokuk, Lee County; and at Ottumwa, Wapello County. The lowest annual mean was 44.5° at Sibley, Osceola County. The highest temperature reported was 108° at Ridgeway, Winneshiek County, on July 16th. The lowest temperature reported was -35° at Elkader, Clayton County, on January 7th. The range for the state was 143°.

**PRECIPITATION.**—The average amount of rain and melted snow for the year as shown by the complete records of 111 stations was 20.03 inches, which is 12.62 inches below the normal, and 19.98 inches below the average amount in 1909. The greatest amount recorded at any station during the year was 27.99 inches at Burlington, Des Moines county. The least amount recorded was 12.11 inches, at Clear Lake, Cerro Gordo county. The greatest monthly rainfall was 11.22 inches at Atlantic, Cass County, in August. The least monthly precipitation was 0.00 at Audubon, Audubon County, Little Sioux, Harrison County, Odebolt, Sac County, Rock Rapids, Lyon County, and at Zearing, Story County, in March. The greatest amount in any twenty-four consecutive hours was 7.98 inches, at Pacific Junction, Mills County, on the 28th and 29th of August. The average amount of snowfall was 22.8 inches. The greatest amount of snowfall, unmelted, at any station during the year was 52.5 inches at Elkader, Clayton County. The least amount was 4.4 inches at Keokuk, Lee County. The greatest monthly snowfall was 26.5 inches at Elkader, Clayton County and at Humboldt, Humboldt County, in January; and the greatest twenty-four hour snowfall was 14.7 inches, at Humboldt, Humboldt, County on January 20th. Measurable precipitation occurred on an average of 67 days.

**WIND.**—The prevailing direction of the wind was northwest. The highest velocity reported was at Sioux City, Woodbury County, 65 miles an hour from the north, on April 23rd, and on August 2d.

**SUNSHINE AND CLOUDINESS.**—The average number of clear days was 188; partly cloudy, 92; and, cloudy, 85; as against 152 clear days; 92 partly cloudy; and 121 cloudy days in 1909. The duration of sunshine was as a whole, slightly above the normal.

## MONTHLY SUMMARIES

### JANUARY.

The first ten days of January were unseasonably cold, but the remainder of the month, with the exception of two or three days, was mild, so that the average temperature for the month was only slightly below the normal. The 6th and 7th were the coldest days, the lowest temperature occurring generally on the 6th, when the minimum ranged from -8° to -33°, over the southern counties, and, from -18° to -35°, over the northern counties. The lowest temperatures were recorded in the western portion of the southern, and in the eastern portion, of the northern districts. There have been six colder Januarys during the past 21 years, but the minimum for the state, for the past month, was lower than in any January since 1892. The 19th and 25th were generally the warmest days, but there were only two or three days in the month on which the minimum temperature was above the freezing point, even in the extreme southern portions of the state.

The precipitation was above the normal, except in the southeast, and west central districts where there was a slight deficiency. Most of it fell in the form of snow during two storms; the first of which occurred on the 4th-5th, and the second on the 12th-13th. The fall of snow during these two storms was unusually heavy, and caused much delay in railroad traffic, which, together with the severe cold weather, during the early part of the month, came very near causing a fuel famine in this state. Only the energetic efforts of the railroad companies in clearing the snow from the tracks, and abandoning all freight trains, excepting those carrying coal, in order that fuel could be distributed as rapidly, and in as large quantities as possible, prevented serious suffering of the people in many localities. As it was, all coal had been exhausted in many towns, several days before a supply could be delivered to them. The accumulation of snow also did considerable damage to buildings, especially in the northern part of the state. The roofs of numerous structures collapsed as a result of the weight of the snow, causing damage estimated at about \$10,000, in the City of Dubuque. Snow flurries occurred at frequent intervals during the latter half of the month, but the amounts of snow were small, and only tended to prolong the good sleighing, which began on December 5th or 6th. The ground was thoroughly covered with snow during the entire month, in the northern, and most of the month, in the southern districts and as a result, fall grains suffered no injury from the effects of the cold weather.

**TEMPERATURE.**—The monthly mean temperature for the State, as shown by the records of 117 stations, was 18.1°, which is 1.2° below the normal

for Iowa. By sections the mean temperatures were as follows: Northern section, 14.5°, which is 1.7° below the normal; Central section, 18.1° which is 1.1° below the normal; Southern section, 21.6°, which is 0.8° below the normal. The highest monthly mean was 27.0°, at Keokuk, Lee county, and the lowest monthly mean 11.8°, at Charles City, Floyd county. The highest temperature reported was 56°, at Perry, Dallas county, on the 10th; and at Stuart, Guthrie county, on the 26th; the lowest temperature reported was -35°, at Elkader, Clayton county, on the 7th. The average monthly maximum was 43°, and the average monthly minimum was -22°. The greatest daily range was 56°, at Iowa Falls, Hardin county. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the state as shown by the records of 121 stations, was 1.57 inches, which is 0.52 inch above the normal. By sections the averages were as follows: Northern section, 1.48 inches, which is 0.66 inch above the normal; Central section, 1.60 inches, which is 0.50 inch above the normal; Southern section, 1.64 inches, which is 0.40 inch above the normal. The greatest amount, 3.15 inches, occurred at Sheldon, O'Brien County, and the least, 0.55 inch, at Washta, Cherokee county. The greatest amount in twenty-four hours, 1.52 inches, occurred at Lacona, Warren county, on the 11th and 12th. Measurable precipitation occurred on an average of six days.

The average snowfall, unmelted, was 12.6 inches. By sections the average was as follows: Northern section, 16.3 inches; Central section, 13.0 inches; Southern section, 12.6 inches. The greatest monthly snowfall, 26.5 inches, occurred at Elkader, Clayton county, and at Humboldt, Humboldt county; and the greatest amount in 24 hours, 14.7 inches, occurred at Humboldt, Humboldt county, on the 20th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 13; partly cloudy, 7; cloudy, 11. The duration of sunshine was below the normal, the percentage of the possible amount being 45 at Charles City; 44 at Davenport; 51 at Des Moines; 42 at Keokuk, and 43 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 55 miles per hour from the northwest, at Sioux City, Woodbury County, on the 20th.

#### OBSERVER'S REMARKS.

ALBIA.—*J. I. Chenoweth*. There was from one to nine inches of snow on the ground during the entire month.

ALLERTON.—*Mrs. George Shriver*. There is considerable corn still in the fields. Some corn has been shipped in and is selling for 65 cents per bushel. Hay is selling at \$15 per ton.

ALTON.—*W. S. Slagle*. There was snow on the ground every day of the month. About 15 per cent of the corn still remains unpickered. No stalk fodder has been used and hay is scarce and high.

AMANA.—*Conrad Schadt*. At the close of the month snow still covered the fields well and affords good protection to fall sown grains. There was also good sleighing throughout the month, which greatly lightened the burden of transportation on country roads.

BAXTER.—*W. R. Vandike*. The sleighing has been good since the 4th of December.

BELMONT.—*Geo. P. Hardwick*. The first half of the month was very cold and the total snowfall for the month was excessive. Stock feed is short on account of unhusked corn yet in the fields.

CHARLES CITY.—*E. W. McGann*. The minimum temperature on the 6th was 32° below zero and the mean for the day was 18° below. This is the lowest temperature on record for the month of January. The month was noted for its severe cold, frequent snows, great lack of sunshine and frequent light fogs.

CORNING.—*Jerome Smith*. The snow is all gone from the roads and exposed places in the pastures but in the corn fields the snow is still quite deep.

DAVENPORT.—*J. M. Sherier*. A period of decidedly cold weather extended from the 2d to the 10th with the greatest daily deficiency, 27° on the 6th when the minimum temperature was 13° below zero. Excepting the 21st and 22d, it was warmer than the average during the remainder of the month. The total snowfall was 7.2 inches, of which 5.0 inches fell in one storm, on the 4th-5th. The greatest depth of snow on the ground was 12.4 inches, on the 5th, and the least was 5.0 inches on the 28th.

DEBUQUE.—*J. H. Spencer*. The coldest period was from the 3d to the 10th, inclusive, when all minimum temperatures were zero or below. The remainder of the month was mild. The minimum of the 7th, -25°, was the lowest in January in 22 years, or since January 16, 1888, when the lowest was -30°. The temperature has been lower than -25° only on six dates since the station was established 37 years ago. The snow storm that began at 7:23 a. m. of the 4th was the worst of the winter up to that date, and the total amount for the storm was 9.3 inches. The snow drifted during the night of the 4th-5th. Street car service was maintained with much difficulty and railroad trains were much delayed. Another heavy snow storm occurred on the 12th-14th. This storm gave over a foot of snow and by the night of the 13th, there was over 20 inches on the level with drifts three or four feet in places. Several days were required to restore railroad traffic to a normal basis and for a period of ten or more days freight traffic was practically at a standstill. The roofs of several buildings collapsed as a result of the weight of snow, causing damage estimated at about \$10,000.

FAIRFIELD.—*Prof. R. Monroe McKenzie*. The first ten days were very cold but the remainder of the month was quite mild for January. There was an unusual amount of snow on the ground during the first half of the month.

FAYETTE.—*R. Z. Latimer*. The minimum temperature, 32.5° below zero, on the 7th was the lowest on record at this station for the past 21 years.

FOREST CITY.—*J. A. Peters*. Sleighing has been good since December 1st and the snow is 15 inches deep on the ground at the close of January. A number of farmers are out of corn on account of not being able to get into the fields to husk and gather the remainder of the crop of 1909.

GRAND MEADOW. (POSTVILLE P. O.)—*F. L. Williams*. The month was very cold; there being eleven days with the minimum temperature below zero and there is no record of the ground being so evenly covered with snow. There are no bare places.

INWOOD.—*F. B. Hanson*. January was a cold, bad month, especially the first half. The minimum temperature for the month,  $-30^{\circ}$ , was the lowest for four years.

KEOKUK.—*F. Z. Goswisch*. The first ten days of the month were cold with an average daily deficiency of temperature of  $10^{\circ}$ . Since the 11th the temperature has been mild for the season and the snow has almost entirely disappeared except in sheltered places. An excellent quality of ice from 12 to 16 inches in thickness, has been cut and the ice harvest is practically completed. Streams are above the normal winter stage and the ground contains a large amount of water.

KEOSAUQUA.—*J. H. Landes*. There was some extremely cold weather during the first ten days of the month and the sleighing was fine during the greater part of the month.

LAMONT.—*Prof. T. J. Fitzpatrick*. January, as a whole, was a pleasant winter month. During the last two weeks a comet was observed in the evenings in the western sky.

NORTHWOOD.—*Chas. H. Dwelle*. A comet of much brilliancy was observed above the western horizon on the 23d and following days when the clouds did not interfere. It was brightest about 7 to 8 p. m., just before passing below the horizon.

PERRY.—*J. A. Harvey*. But little snow fell during the latter half of the month but there is now 6 to 8 inches of snow on the ground.

POCAHONTAS.—*F. E. Hronek*. The sleighing has been better than for many years. It is estimated that 25 per cent of the corn is still in the fields. The snow has settled considerably but is 8 inches deep on the ground and it is hard and icy.

SHELDON.—*Dr. A. W. Beach*. The sleighing is the best and continued longer than ever before known in this vicinity.

WAUKEE.—*Samuel F. Foft*. Some corn was gathered during the past week but about 30 per cent of the crop is still in the fields.

## FEBRUARY.

The weather during February was exceptionally pleasant, notwithstanding the fact that the average temperature was below the normal. The month opened with moderate temperature which continued until the 5th, and was then followed by alternating periods of cold and warm weather, with the coldest spell between the 22nd and 24th. The warmest day was generally on the 1st in the northern district, and on the 14th in the central and southern districts. There have been eight colder Februaries during the past twenty years. In 1905, the average temperature was  $5^{\circ}$  lower than the average for the past month. The coldest February during the past 20 years was in 1899 when the average temperature was  $12.2^{\circ}$ .

There was a marked deficiency of precipitation; the average for the state being only 0.46 inch, which is 0.60 below the normal. At several stations it was the driest February in over 30 years.

There were no severe storms and the 20th and 22d were the only days on which the precipitation was general. The ground was practically bare of snow over the southern counties, except from the 20th to 24th; but over the northern counties there was snow on the ground during the whole month.

The rivers remained closed with ice averaging from 10 to 22 inches at the close of the month.

Some progress was made in gathering last year's corn, but there is over 15 per cent of the crop yet in the fields.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 116 stations, was  $17.8^{\circ}$ , which is  $1.4^{\circ}$  below the normal for Iowa. By sections the mean temperatures were as follows: Northern section,  $13.2^{\circ}$ , which is  $3.0^{\circ}$  below the normal; Central section,  $18.0^{\circ}$  which is  $1.6^{\circ}$  below the normal; Southern section,  $22.1^{\circ}$ , which is  $0.3^{\circ}$  above the normal. The highest monthly mean was  $26.1^{\circ}$  at Keokuk, Lee county, and the lowest monthly mean  $10.0^{\circ}$ , at Sibley, Osceola County. The highest temperature reported was  $58^{\circ}$ , at Keokuk, Lee County, on the 15th; the lowest temperature reported was  $-21^{\circ}$ , at Inwood, Lyon county, on the 17th. The average monthly maximum was  $46^{\circ}$ , and the average monthly minimum was  $-12^{\circ}$ . The greatest daily range was  $48^{\circ}$ , at Clarinda, Page County. The average of the greatest daily ranges was  $35^{\circ}$ .

PRECIPITATION.—The average precipitation for the state, as shown by the records of 127 stations, was 0.46 inch, which is 0.60 inch below the normal. By sections the averages were as follows: Northern section, 0.35 inch, which is 0.59 inch below the normal; Central section, 0.44, which is 0.64 inch below the normal; Southern section, 0.59 inch, which is 0.56 inch below the normal. The greatest amount, 2.09 inches, occurred at Burlington, Des Moines county, and the least, a trace, at Sibley Osceola county. The greatest amount in twenty-four hours, 0.80 inch, occurred at Audubon, Audubon county, on the 22nd, and at Fort Madison, Lee county, on the 26th. Measurable precipitation occurred on an average of 3 days.

The average snowfall, unmelted, was 4.0 inches. By sections the averages were as follows: Northern section, 3.6 inches; Central section, 4.0 inches; Southern section, 4.4 inches. The greatest monthly snowfall, 11.3 inches, occurred at Fayette, Fayette county; and the greatest amount in twenty-four hours, 8.0 inches, occurred at Audubon, Audubon county, on the 22d.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 14; partly cloudy, 8; cloudy, 6. The duration of sunshine was slightly above the normal, the percentage of the possible amount being 66 at Charles City; 62 at Davenport; 47 at Des Moines; 61 at Dubuque; 53 at Keokuk, and 59 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 60 miles per hour from the northwest, at Sioux City, Woodbury county, on the 15th.

## OBSERVER'S REMARKS.

ALGONA.—*Dr. F. T. Seeley.* February was a very cold month, there being 10 days on which the temperature was zero or below.

ALTA.—*David E. Hadden.* The first decade was warm but the remainder of the month was cold. The weather, however, was pleasant with but little snowfall.

ALTON.—*W. S. Stagle.* The month was quite cold but there was no high wind. There is very little frost in the ground and if no hard freezing weather comes after the snow goes off, the soil will be in better condition than usual for early farm work.

AMANA.—*C. Schadt.* There has been good sleighing from about the 5th of December to the close of February. The snow also afforded good protection to the fall sown grain.

ATLANTIC.—*Thos. H. Whitney.* February was a fairly favorable month but there was a sufficient depth of snow on the ground to prevent general gathering of corn and a considerable acreage remains in the field.

BAXTER.—*W. R. Vandike.* The sleet and snow that fell on the 4th and 5th of December is still on the ground at the close of February.

BELMONT.—*Geo. P. Hardwick.* Sleighing has been good for the past three months and the snow has been deeper than usual. About one-fourth of last year's corn crop is still in the fields and the scarcity of available feed has prompted a liberal sale of farm stock. The germinating test of seed-corn has proven a serious shortage of such seed.

BONAPARTE.—*Hon. B. R. Vale.* Pleasant weather has prevailed; there being only two mornings with temperature below zero. The roads are good and the conditions were favorable for feeding stock.

CHARITON.—*C. C. Burr.* Stock feed is not as plentiful as usual and is higher in price.

CHARLES CITY.—*E. W. McGann.* The total depth of snowfall for the winter up to the close of February is 63.9 inches.

DAVENPORT.—*J. M. Shelier.* The ground was generally covered with snow from the 1st to the 13th, and from the 20th to the 25th. From the 14th to the 19th there were only occasional patches of snow on the ground.

DEBUQUE.—*J. H. Spencer.* The month was uneventful, and there were no storms of importance. There were two cold waves. The first occurred on the 9th-10th, and the temperature fell about 22° in 24 hours to a temperature of -4°. The second occurred on the 22d-23d, and the temperature fell about 24° in 24 hours to a minimum of -11°. Neither of these cold waves was exceptionally severe and resulted in no damage worthy of mention. Sleighing has been fairly good during the month, making nearly three months of continuous sleighing for the winter to date. The snowfall during January was too heavy to make good sleigh-

ing, and country roads have been very rough. All rivers in this district continue frozen at the end of the month, and the ice ranges from 16 to 22 inches in thickness at this station.

ELLIOTT.—*Henry Barnes.* The month closes with only a few patches of snow on the ground. From 25 to 30 per cent of the corn remains un-gathered and is in very poor condition.

FAYETTE.—*R. Z. Latimer.* The total depth of the snowfall, for the winter, up to the end of February, is 64.0 inches, and there has been continuous sleighing for 84 days.

FOREST CITY.—*J. A. Peters.* There is 10 inches of snow on the ground at the close of the month and 35 per cent of the corn is yet in the fields. There were no bad storms during February.

GRAND MEADOW. (Postville P. O.)—*F. L. Williams.* There is no record of the county being so evenly covered with snow for such a long time. There was 15 days in February with the temperature zero or below.

GREENFIELD.—*R. B. Oldham.* There is still too much snow in the fields for corn husking.

KEOKUK.—*Fred Z. Gosewisch.* Streams remain above the average winter stage, and the ground is well saturated with moisture.

NORTHFIELD.—*Chas. H. Duvette.* There has been 86 days of sleighing without an appreciable thaw.

PLOVER.—*J. S. Smith.* There is more snow on the ground at the end of the month than there has been at the close of February since 1881.

POCAHONTAS.—*F. E. Hronek.* Corn husking was resumed on the 28th and about 15 to 20 per cent of the crop is yet in the fields. Wild geese were seen flying northward on February 26th.

SIGOURNEY.—*J. T. Parker.* The remnants of a few snowdrifts are visible at the close of the month.

STOCKPORT.—*C. L. Beswick.* Clover, winter wheat and rye are in good condition.

WAUKEE.—*Samuel F. Foft.* There is some snow in the fields and drifts but the roads and all high grounds are bare, but there is no frost in the ground. About 30 per cent of the corn is still in the fields.

## THE WINTER OF 1909-1910.

The mean temperature for the three winter months was 17.0°, which is 4.5° below the normal for the state. The highest temperature reported was 60° at Keosauqua, Van Buren county, on December 1st. The lowest temperature was 35° below zero at Elkader, Clayton county, on January 7th. The average monthly precipitation for the state was 1.40 inches and the average total precipitation was 4.21 inches, or .88 inches above the winter normal. The average total snowfall, unmelted, was 30.3 inches, or 11.0 inches more than for the winter of 1908-1909. The average number of days on which .01 inch or more of precipitation was reported was 20 or 6 more than the average for the winter of 1908-1909.

The average number of clear days was 37; partly cloudy, 20; cloudy, 33; as compared with 35 clear, 20 partly cloudy and 35 cloudy during the winter of 1908-1909.

AVERAGE WINTER TEMPERATURE FOR IOWA.

In Degrees Fahrenheit.

	Decem- ber	January	Febru- ary	Winter Min.
1890-1	20.1	26.0	19.4	24.8
1891-2	32.3	15.3	28.1	25.3
1892-3	18.9	9.3	16.4	14.9
1893-4	22.0	19.3	19.7	20.3
1894-5	30.1	13.6	16.4	20.0
1895-6	25.4	23.4	27.4	25.4
1896-7	30.8	17.2	24.7	24.2
1897-8	18.0	25.4	24.3	21.9
1898-9	18.1	19.3	19.3	16.7
1899-0	22.6	25.6	14.8	21.0
1900-1	26.9	23.7	17.5	22.7
1901-2	20.5	22.4	17.6	20.2
1902-3	20.1	23.0	19.8	21.0
1903-4	19.6	14.0	14.8	16.1
1904-5	23.4	11.2	12.8	15.8
1905-6	27.0	24.6	23.6	25.1
1906-7	25.7	18.8	25.0	23.2
1907-8	28.8	24.9	24.3	26.0
1908-9	27.2	21.2	26.2	24.9
1909-0	15.1	18.1	17.8	17.0
Means.....	24.1	19.7	20.1	21.3

MARCH.

March, 1910, will be long remembered as having furnished more pleasant weather than any other March in the history of the state. It was the warmest and driest March on record. It gave the largest amount of sunshine; the least number of cloudy days; the least number of days with appreciable precipitation; the least number of days with freezing temperature; and less snowfall than any other March since State-wide observations began. The temperature was uniformly high and above the normal every day of the month, with the warmest period between the 22d and 29th. The maximum occurred generally on the 23d and ranged from 81° to 87° over the Northern, 81° to 90° over the Central, and from 82° to 92° over the Southern districts. The monthly minimum temperatures occurred on various dates between the 1st and 15th.

There was no snowfall in excess of a trace at any station and the rainfall was abnormally light in all sections of the state. There were 8 stations that had no precipitation, and 34 that had only a trace. Rainfall was practically nil until the 26th, and the only days on which showers were at all general were the 26th and 29th. On the 1st of March there was from 6 to 8 inches of snow on the ground in the northern part of the State, but it had all melted by the 9th, and as there was practically no frost in the ground, the soil dried rapidly, and farmers were in the field early in the month gathering the remainder

of last year's corn crop, plowing and seeding small grain. The larger part of the corn had been gathered by the 15th, and by the end of the month nearly all of the wheat and about 50 per cent of the oats had been seeded, and considerable ground had been prepared for corn. The season at the close of the month was nearly a month in advance of the normal and from five to six weeks ahead of last year. Spring flowers were in bloom; elms, soft maples, and box elders were green or becoming so, even in the extreme northern part of the State. Plum, cherry and apple trees were in bloom in the southern, and plums in the central districts. Pastures and meadows were green, and some of the early sown grain was up before the end of the month. Fall grain, clover and alfalfa were generally in good condition, but reports indicate much damage by winter killing in the western and southern counties.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 118 stations, was 48.9°, which is 14.9° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section 46.3°, which is 15.1° above the normal; Central section 49.2°, which is 13.1° above the normal; Southern section 51.2°, which is 14.5° above the normal. The highest monthly mean was 53.8°, at Ottumwa, Wapello County, and the lowest monthly mean 43.7°, at Elma, Howard County. The highest temperature reported was 92° at Clarinda, Page County, on the 22d; the lowest temperature reported was 10°, at Rock Rapids, Lyon County, on the 1st. The average monthly maximum was 85°, and the average monthly minimum was 20°. The greatest daily range was 61°, at Elkader, Clayton County. The average of the greatest daily ranges was 44°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 126 stations, was 0.17 inch, which is 1.75 inches below the normal. By sections the averages were as follows: Northern section, 0.09 inch, which is 1.64 inches below the normal; Central section, 0.17 inch, which is 1.81 inches below the normal; Southern section, 0.26 inch, which is 1.79 inches below the normal. The greatest amount, 1.32 inches, occurred at Ames, Story County, and the least, 0.00 at eight stations, principally in the western part of the State. The greatest amount in any twenty-four hours, 1.32 inches, occurred at Ames, Story County, on the 26th. Measurable precipitation occurred on an average of one day.

Snow fell at eight scattered stations during the month but at no station was there an appreciable amount.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 23; partly cloudy, 6; cloudy, 2. The duration of sunshine was much above the normal, the percentage of the possible amount being 86 at Charles City; 82 at Davenport; 78 at Des Moines; 84 at Dubuque; 78 at Keokuk, and 65 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 52 miles per hour from the Northwest at Sioux City, Woodbury County, on the 6th.

**THUNDERSTORMS.**—Twenty-five co-operative stations reported thunderstorms on the 26th; ten on the 18th; nine on the 25th; five on the 19th; two on the 29th; and one on the 4th, 20th, 23d and 28th.

Thunderstorms were quite general on the 18th and on the night of the 25th and 26th. Thunder was also heard at scattered stations on the 4th, 20th, 23d, 28th and 29th.

An aurora of unusual brilliancy was observed over the northern counties on the 27th.

#### OBSERVERS' REMARKS.

**AFTON.**—*A. W. Rowe*. A remarkable March. Almost continuous sunshine during the days. The grass is green; trees putting out leaves; some fruit in bloom; seeding being done; ground is dry and the roads are good.

**ALBIA.**—*J. I. Chenoweth*. March was a warm and pleasant month, with only three cloudy days. There was no rain until the 26th and only .35 inch during the entire month. Farm work is progressing rapidly with the soil in fine condition. Plums, pears and early apples are blooming six weeks ahead of last year. Pastures are good.

**ALGONA.**—*Dr. F. T. Secley*. This has been the finest March ever seen in this section of the country. There were 27 clear days and the larger number were perfectly cloudless. On March 1st there was six inches of snow on the ground but it disappeared within a few days.

**ALLESTON.**—*Mrs. George Shriver*. Seeding of oats finished in good shape. Grass was well started and the ground was dry at the end of the month.

**ALTA.**—*David E. Hadden*. March was a remarkably fine month, more like May than March; the mean temperature was 17.5° above the 20-year normal. The only rainfall occurred on the 29th. The last snow left the ground on the 4th, and the roads were dry, smooth and dusty the rest of the month. Grass, trees and some weeds were in leaf and flower during the last decade. A fine aurora with streamers, colored effects and beams, was seen on the 27th.

**ALTON.**—*W. S. Stagle*. March was a very fine month. Farmers had excellent weather for finishing corn picking. Pastures are in condition to receive cattle. Plums are ready to blossom and maples and box elders are in bloom. Soil was in shape for plowing on the 8th.

**AMANA.**—*Conrad Schadt*. The weather was remarkably warm and dry, making the season about three weeks early. All of the spring wheat and the bulk of oats and barley have been sown. Early plums began to bloom on the 29th. A brilliant aurora observed on the 27th.

**ATLANTIC.**—*Thos. H. Whitney*. Ideal weather prevailed during the month for completing corn gathering and drying the roads and fields. Quality of corn was much improved by drying. Wheat seeding well completed and some oats and barley planted.

**AUDUBON.**—*Geo. E. Kellogg*. This has been the warmest and driest March in the history of this county. Seeding is nearly done and some corn has been planted.

**BELMOND.**—*Geo. P. Hardwick*. There was eight inches of snow on the ground on the 1st and only a trace from the 6th to the 9th inclusive. The month was comparatively dry and ideal for gathering and drying the corn that had been in the fields during the winter. Trees and meadows are green at the end of the month. Pasturage nearly one month earlier than the average. Seed corn very scarce.

**BOONE.**—*Carl F. Henning*. The most wonderful weather for March that I have ever experienced. Most farmers have all of their small grain in and some are plowing for corn.

**BLOOMFIELD.**—*C. R. Davis*. Although the winter was extremely cold with much snow, the spring is far in advance of the normal.

**BRITT.**—*L. M. Goodman*. The country roads were dry and smooth on the 15th. The weather was remarkably clear, dry, warm and pleasant. Grass and the earlier varieties of trees were showing green the latter part of the month.

**CHARLES CITY.**—*Edward W. McGann*. The mean temperature of the month, 44.4° is the highest on record for the past 21 years and is 16° above the normal for the month.

**COLUMBUS JUNCTION.**—*J. B. Johnson*. Robins and bluebirds appeared on the 4th. Ice broke in the Iowa river on the 5th. Early bulbs were in bloom on the 17th and early plums on the 29th.

**DAVENPORT.**—*J. M. Sherier*. This has been the warmest, and, with the single exception of the same month in 1885, the driest March on record at this station. There was not a cloudy day and only five partly cloudy days during the month. On account of the continued high temperature and the great amount of sunshine, vegetation is about a month in advance of the average.

**DUBUQUE.**—*J. H. Spencer*. Mean temperature, 47.8°, or 13.8° above the average of 37 years. The daily mean temperature was not below normal on a single date. From the 22d to the 29th the daily mean was 20° to 32° above the normal. No previous March since the record began in 1874 has recorded an average temperature above 41°, except March, 1878, when the average was 47°, or nearly as high as during the present month. But March, 1878, was not otherwise comparable with the present month, since it was a wet March, and there were only two days with a maximum of 70° or above. During the present month, the maximum has been above 70° on 10 dates, within one of being as many as during the previous 36 Marches considered as a whole. It has been the driest March on record, and with the exception of July, 1894, and November, 1904, the driest month on record.

**ELKADER.**—*Chas. Reinecke*. Ice went out of the Turkey river on the 12th.

**ELLIOTT.**—*Henry Barnes*. A remarkable month. Corn was all gathered but in somewhat damaged condition. Fall wheat, clover, alfalfa and peach trees badly damaged by being winter killed. Vegetation three to four weeks early. Plum trees in bloom.

**ELMA.**—*H. A. Moore*. Farmers have been working in the fields, plowing and sowing for the past two weeks.

FAYETTE.—*R. Z. Latimer.* Robins, bluebirds, meadow larks and other migratory birds were seen on the 12th; maple sap ran freely on the 15th; frogs were croaking on the 24th; plowing began on the 25th; most of the small grain sown at the end of the month. Blossoms are out on plum and apple trees and on strawberry vines. Lawns are about ready for the lawn mower and pastures are ready for stock. All vegetation four to six weeks earlier than usual.

FOREST CITY.—*J. A. Peters.* Wheat all sown and some pieces up. Some oats sown. Season about six weeks ahead of the normal. Trees in leaf and the ground is in good physical condition. No rain to speak of but nothing is suffering for moisture.

GRAND MEADOW. (Postville P. O.)—*F. L. Williams.* The month was dry and very warm. Plowing began on the 16th and seeding on the 24th. Grass as green as in May at end of the month. Roads dry.

GREENFIELD.—*R. B. Oldham.* Favorable month for farm work; 75 per cent of small grain sown; early fruit trees in bloom and pastures are making a fine start.

INWOOD.—*F. B. Hanson.* March, 1910, has been a remarkable month, following a remarkable winter which continued steadily through the last day of February, when it changed suddenly to spring. By March 5th the farmers were again picking corn. Work began in the stalk fields on the 17th, and 35 to 40 per cent of seeding was done by the end of the month. Fruit buds nearly ready to open.

IOWA CITY.—*Prof. Arthur G. Smith.* The ice went out of the Iowa river on the 8th.

IOWA FALLS.—*J. B. Parmelee.* Twelve weeks of sleighing ended on the 4th; snow practically off the fields on the 6th; frost out of the ground on the 15th and fruit buds were swelling on the 25th.

KEOSAUQUA.—*J. H. Landes.* "The oldest inhabitant cannot remember another March as fine as this. Sunshine and good roads marked the entire month. Oats crop practically all in; rain would help the wheat, meadows and pastures.

LARRABEE.—*H. B. Strever.* March has been a remarkable month. Almost continuous sunshine daily and practically no rainfall enabled farmers to gather the corn that was left in the fields last fall.

MASSENA.—*C. E. Smeltzer.* The freeze on the 31st did no damage to fruit or small grain. Winter wheat looks good. There is an increased acreage of spring wheat. Nearly all of the oats are in the ground.

MASON CITY.—*J. S. Mills.* Wild geese observed on the 3d; robins on the 10th and bluebirds on the 12th.

OTTUMWA.—*W. J. Mesmer.* Ice breaking up and going out of the Des Moines river on the 3d.

RIDGEWAY.—*Arthur Betts.* Warmest and driest on record. Typical April weather. No frost after St. Patrick's day. Eighteen days with 100 per cent sunshine. The longest period on record without rain was from the 4th to the 28th.

SHELDON.—*Dr. A. W. Beach.* A most remarkable month for this locality. Corn left in fields over winter was gathered early in month. Ground is in good condition and seeding is nearly completed.

SIoux CITY.—*C. D. Reed.* The month of March, 1910, was very remarkable in all its meteorological features. The mean temperature of 50.8° was higher by 8.8° than the previous high record; the highest temperature observed was 88°, exceeding by 5° the previous high record; and the record was also broken for mean daily range of temperature and for least number of days with freezing temperature. It was the driest March on record. From February 23d to March 28th, a period of 34 days, there was not an appreciable amount of precipitation. Not a flake of snow fell during the month, while heretofore there has never been less than three days in March with an appreciable amount of snow.

#### APRIL.

The first half of the month, like the whole of March, was dry and generally warm, but the latter half was very changeable and erratic; the temperature fluctuating from one extreme to another and the precipitation from rain to snow.

The average mean temperature was 4.0° above the normal for April; the excess occurring the first fifteen and the last three days. A cold spell set in on the evening of the 14th, attended by moderate showers which changed to snow on the 15th and continued over the larger part of the State until the 18th; the minimum temperatures on the 16th, 17th, and 18th being from 3° to 12° below the freezing point in all districts and the amounts of snowfall ranged from a trace in the southern to over five inches at some of the stations in the northeastern counties. The freezing temperatures seriously damaged the prospects of a fruit crop as apple, cherry and other fruit trees were in full bloom in the northern part of the State by the 10th of the month. The damage done, however, was small as compared with the damage resulting from the freeze of the 23d and 24th, when the minimum temperatures were 10° to 12° below the freezing point in the southern counties. The maximum temperature on the 23d was below the freezing point in the northeastern counties and the minimum on that date at many stations was lower than ever before recorded during the last decade of April. Great damage resulted to such fruit, garden truck, etc., as was not killed during the previous week. The ground froze hard on the morning of the 23d and the 24th and ice formed from one-half to one inch thick in tubs of standing water. Few trees or shrubs escaped injury and the foliage and new growth on some varieties, such as soft maples, box elders, wistaria, Virginia creeper, etc., were frozen and at the close of the month the dead leaves were falling off. Following this last cold period the temperature rose rapidly and the 28th and 29th were excessively warm; the maximum temperatures on those dates being 90° or higher over the western and central districts, the highest being 99° on the 28th in the extreme northwestern county. The maximum temperature on the 28th was higher than ever before recorded during April, over the western half of the State.

The average precipitation was 1.35 inches below the normal and was unevenly distributed; the eastern third of the State and the south central counties receiving the largest amounts while the extreme southwestern and a few localities in the north central counties received less than one-fourth of an inch. Much of the precipitation was in the form of snow or snow mixed with rain during the storms on the 15-18 and 22-24.

Owing to the warm, dry and pleasant weather during March, farming operations were further advanced than usual on April 1st. Practically all small grain was seeded before the middle of the month and nearly all of the corn ground was ready for the planter by the close of the month. Considerable corn was planted during the second week but that work was suspended generally after the 15th on account of cold weather.

The growth of grass and small grain was checked by the freezing temperature and in the western part of the State small grain, especially oats, was damaged by dry weather and high winds, but for the State at large small grain is reported to be in fairly good condition.

All rivers and creeks are below the normal stage for the season of the year.

**TEMPERATURE.**—The monthly mean temperature for the State, as shown by the records of 119 stations, was 52.5°, which is 4.0° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 51.7°, which is 4.9° above the normal; Central section, 52.7°, which is 4.2° above the normal; Southern section, 53.2°, which is 2.9° above the normal. The highest monthly mean was 56.0°, at Grinnell, Poweshiek county, and the lowest monthly mean 49.0°, at Sibley, Osceola county. The highest temperature reported was 99°, at Inwood, Lyon county, on the 28th; the lowest temperature reported was 15°, at Rock Rapids, Lyon county, on the 5th. The average monthly maximum was 92°, and the average monthly minimum was 22°. The greatest daily range was 57°, at Pacific Junction, Mills county. The average of the greatest daily ranges was 44°.\*

**PRECIPITATION.**—The average precipitation for the State, as shown by the records of 125 stations, was 1.48 inches, which is 1.35 inches below the normal. By sections the averages were as follows: Northern section, 1.18 inches, which is 1.29 inches below the normal; Central section, 1.48 inches, which is 1.39 inches below the normal; Southern section, 1.78 inches, which is 1.36 inches below the normal. The greatest amount, 4.86 inches, occurred at Burlington, Des Moines county, and the least, 0.10 inch, at Webster City, Hamilton county. The greatest amount in twenty-four hours, 1.83 inches, occurred at Keosauqua, Van Buren county, on the 6th. The average amount of unmelted snowfall was 3.0 inches, averaging as follows: Northern section, 4.3 inches; Central section, 2.3 inches; Southern section, 2.3 inches; the greatest amount was 11.3 inches at Ridgeway, Winnebago county, while at eight stations only a trace occurred. Measurable precipitation occurred on an average of seven days.

**SUNSHINE AND CLOUDINESS.**—The average number of clear days was 14; partly cloudy, 7; cloudy, 9. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 71 at Charles City; 61 at Davenport; 50 at Des Moines; 46 at Keokuk, and 61 at Sioux City.

**WIND.**—Northwest winds prevailed. The highest velocity reported was 65 miles per hour from the north, at Sioux City, Woodbury county, on the 23d.

#### OBSERVERS' REMARKS.

**ALBIA**—*J. C. Chenoweth.* The temperature was down to 25° on the 17th, killing all the fruit which was in full bloom. On the 29th the temperature was up to 89°. Trees are shedding their leaves as in the fall. No damage to small grain. Farm work is farther advanced than usual. Soaking rains needed.

**ALGONA**—*Dr. F. T. Seeley.* Driest April in many years; only .29 inch of precipitation. Early plum and cherry trees in blossom were killed and leaves on elm and maple trees were killed.

**ALLETON**—*Mrs. Geo. Shriver.* Practically all fruit killed and garden stuff badly damaged. Some corn planted and all ground ready for planting. Ground very dry.

**ALTON**—*W. S. Slagle.* Frost hurt trees and garden truck and also small grain. Leaves are falling from trees.

**AMANA**—*C. Schadt.* On account of the continuous warm weather in March all fruit trees were in full bloom early in April and were severely damaged by the freeze of the 17th and 18th, and all that escaped were killed by the freeze on the 23d and 24th. The whole fruit crop is practically destroyed.

**ATLANTIC**—*Thos. H. Whitney.* Freeze of 16th destroyed all fruit, and lack of moisture has much retarded growth of grain and grass. In general, however, the month was exceptionally favorable for all outdoor work.

**BONAPARTE**—*Hon. B. R. Vale.* The temperature was below the freezing point on seven nights.

**BRITT**—*L. M. Goodman.* The month was very dry with extreme varieties of temperature. On the 28th the maximum temperature was 92°, which broke all former records for April.

**CHARLES CITY**—*Ed W. McGaun.* The mean temperature, 50.3°, is 4.0° above the normal and the maximum, 92°, on the 29th, is the highest on record at this station. The minimum, 22°, on the 23d, is the lowest recorded during the last decade of the month. The severe freezing temperature on the 17th, 20th, 22d, 24th and 25th, destroyed the bloom on all varieties of fruit trees, the leaves being frozen black. The first chimney swallows arrived on the morning of the 20th, eight days earlier than last year. At the close of the month all vegetation was suffering from the great lack of moisture, especially meadows and pastures.

**CHARITON**—*C. C. Burr.* The season was very favorable until the 16th, when low temperatures did much damage to all vegetation. Some corn planted and a large area is ready to plant but the soil is too cold. Pasturage is fair but rain is needed badly.

**CLINTON**—*Dr. Luke Roberts.* Freezing temperature on the 17th, 18th, 23d and 29th killed much of the vegetable crops and all kinds of fruit blossoms. The first decade was abnormally warm and the mean temperature

for the month, 52.6°, was above the normal. Fifty-two per cent of cloudiness. Streams low, but rising slowly. Ground in good condition.

DAVENPORT—*J. M. Sherier*. Two notable cold periods occurred during the month, the first extending from the 16th to the 20th, and the second from the 22d to the 26th. Both cold spells were attended by snow that generally melted at it fell.

DENISON—*W. C. Van Ness*. Leaves were out and of good size on box elders and maples and lilacs were in blossom when the hard freeze came on the 16th and 17th.

DUBUQUE—*J. H. Spencer*. With only one exception the maximum temperature, 87° on the 29th, was the highest ever recorded at this station during April. The first fifteen days were very warm, but the following ten days were exceptionally cold for the season, with the minimum below freezing on seven days. Apple, cherry, and other fruit trees were in full bloom by the 10th of the month, and the freeze on the 16th, 17th and 18th did great damage. It was small, however, compared to the damage resulting from the freeze of the 23d and 24th. On the 23d the temperature was below the freezing point all day, with a maximum of 30° and a minimum of 22°. It was the coldest day, by several degrees, ever recorded so late in the spring. Great damage resulted to such fruit, garden truck, etc., as was not killed during the previous week. By the morning of the 24th ice had formed one-half of an inch thick in tubs of standing water. The ground froze hard on the morning of the 23d and the 24th. The damage to ornamentals was great. Few trees or shrubs escaped injury, and the foliage on some varieties, such as soft maples, box elders, wistaria, Virginia creepers, etc., was entirely frozen.

ELLIOTT—*Henry Barnes*. Killing frosts and unseasonable weather during the latter part of the month proved fatal to fruit prospects. Corn land nearly all prepared for planting and some planting done during the latter part of the month.

ELMA—*H. A. Moore*. Snow fell all day on the 23d with high northwest wind, which drifted the snow and made regular blizzard conditions. Ice formed one inch thick.

FAIRFIELD—*Prof. R. Monroe McKenzie*. The season was very early at the first of the month; fruit trees were in full bloom in March. Much fruit was killed by the freezing temperature on the 17th and 18th. The blossoms and leaves were frosted black in the storm of the 23d. The rain was needed, however, for grass.

FOREST CITY—*J. A. Peters*. The 29th was the warmest April day on record here. The freeze of the 17th and 24th practically killed all fruit and leaves are falling off the trees, but small grain was not injured. The month was very dry and crops and grass need rain. Some corn planted.

GRAND MEADOW (Postville P. O.)—*F. L. Williams*. The temperature ranged from 20° to 89°. Grass is very forward and small grain is looking well. Leaves came early but were nearly all killed by the freeze on the 17th and 23d, but are appearing for the second time.

GREENFIELD—*R. B. Oldham*. All of the corn ground has been plowed and a good start has been made in planting.

GRINNELL—*D. W. Brainard*. The month was remarkable for the extremes of temperature from winter cold to midsummer heat.

HAMPTON—*E. C. Grenelle*. Plums and cherries, being in full bloom, were about all killed by the hard freeze on the 17th and apples were killed on the 23d.

INWOOD—*T. B. Hanson*. All vegetation has been checked by the severe freeze and lack of rain. Preparation of corn ground has progressed nicely.

JEFFERSON—*G. W. Jackson*. Snow fell all day on the 17th, but melted as fast as it fell.

KEOKUK—*U. S. Weather Bureau*. Owing to high temperature of March and the first half of April all vegetation was a month in advance of the season. The cold spell, with snow from the 16th to 18th, did great damage to fruit and gardens, and the more severe cold spell from the 22d to 24th, when the temperature fell to 23°, 6° colder than any previous record during the last decade of the month of April, increased the damage. Forest trees, which were in full leaf, are wilted and the leaves are falling. Wheat, oats and grass seem to have suffered no damage, and in a few fields where corn had already been planted, and was above the ground, plants frozen down, are again sprouting.

LAMONI—*T. J. Fitzpatrick*. The month was remarkable for drouth and bad freezes.

LARRABEE—*H. B. Strever*. Clear dry weather prevailed during most of the month with extremes of heat and cold during the last decade. Fruit trees were in bloom very early and were greatly damaged by freezing weather.

LEON—*J. Morris Gardner*. Ice formed 1 inch thick on the 17th.

MT. Ayr—*A. F. Beard*. Up to the 16th, prospects for fruit were never better. Severe freeze on 17-18 and 23-24 killed most of the fruit.

NORTHWOOD—*Chas. H. Dwelle*. Ground is in fine condition for corn planting but rain is needed for small grain and pastures.

POCAHONTAS—*L. E. Hronek*. April was unfavorable for crops and fruits. Heavy frost killed all blossoms. Oats at a standstill on account of dry, cold and windy weather. Corn planting just begun.

RIDGEWAY—*Arthur Betts*. Warmest April in 12 years of record. Eleven inches of snow fell between the 15th and 25th.

ROCK RAPIDS—*W. C. Wyckoff*. Snow flurries occurred on the 15th and 16th and 6 inches of snow fell on the 17th, with a regular blizzard.

SHELDON—*A. W. Beach*. Not enough rain to make crops do well. Frosts of the 16th, 17th and 23d killed most of the fruit and garden truck and damaged oats badly. Some reseeding is being done.

SIoux CITY—*U. S. Weather Bureau*. The first decade of April, like the whole of March, was dry and warm, thus giving vegetation a much better start than usual. A cold spell set in on the evening of the 14th attended by moderate showers which turned to snow on the 15th and con-

tinued until the 18th, doing much damage to fruit trees, at that time in blossom, and vegetation generally. As a result of the low temperatures that obtained during this period, nearly all of the trees lost their leaves and the fruit crop will be nearly a failure. This wet and cold spell was followed by dry weather until the close of the month with frequent high winds, reaching a velocity of 65 miles an hour from the north on the 23d. On the 29th the maximum temperature of 98° was the highest ever recorded at this station during the twenty-one years of its existence.

STOCKPORT—*C. L. Beswick*. First half of month gave ideal May weather but the latter half was more like March than April. Considerable corn planted. Stock in pasture but cold has retarded growth of grass as well as small grain.

WAPELLO—*G. W. Schofield*. The month was favorable for farm work but it gave the highest as well as the lowest temperature recorded in April for many years. Plowing mostly done and some corn planted.

WASHTA—*H. L. Fetter*. The temperature was down to freezing or below on 14 mornings, doing great damage to fruit.

WAUKEE—*Samuel F. Foft*. The freeze on the 17th, 23d and 24th killed about all the fruit and most of the new growth on the trees but did but slight damage to small grain. Corn planting in progress.

WAVERLY—*H. S. Hoover*. Lilac leaves were 1.5 inches long and 1 inch wide on April 1st. Plum blossoms out on the 6th and in full bloom on the 9th. After the severe freezes, the plums, cherries and apples were all frozen. During the last four days apple and cherry blossoms show some life and vigor.

#### CONDITION OF FRUIT TREES.

The following report issued by the Secretary Iowa State Horticultural Society, shows the average condition of fruit trees and plants on April 1, 1910:

"Apples, 85 per cent; pears, 80 per cent; American plums, 89 per cent; domestica plums, 70 per cent; Japanese plums, 69 per cent; cherries, 83 per cent; peaches, 3 per cent; grapes, 80 per cent; red raspberries, 52 per cent; black raspberries, 53 per cent; blackberries, 65 per cent; strawberries, 86 per cent.

"Peach trees are badly injured in many places; raspberry canes are killed to the ground in some localities; climbing roses are also damaged. The injury to trees and plants is attributed to the freeze in October which caused the leaves to fall before the wood was mature; followed by warm, wet weather which pushed bud development on the defoliated plants too far in the fall to withstand the winter.

"Bloom on plum and cherry trees is two weeks in advance of 1871, the earliest record we have since the Society was organized."

#### WIND STORMS IN DES MOINES.

A small tornado passed over the northwestern part of the city of Des Moines shortly after 11 o'clock on the night of the 3d, which did considerable damage to several dwellings and small outbuildings. The storm struck

and unroofed the residence of E. A. Paul, No. 4106 Kingman avenue, then passed diagonally across the street north of east, striking and blowing the roof off the residence of Charles Barchaus, No. 4003 Kingman avenue. The storm track was very narrow as buildings on the adjacent lots of either side of Mr. Paul's house were not injured, and the path of destructive violence was only about 400 feet long. There was, however, some slight damage done to trees and small outbuildings on the north side of the main track of the storm. Some thunder and lightning accompanied the storm and it was preceded by the typical roar of a tornado. No one was injured and the damage done was estimated to be less than \$5,000.00.

#### MAY.

The weather was abnormally cold, and except over the extreme southern counties was unusually dry. The temperature was uniformly low, there being only four or five days during the month when the daily mean was above the normal and on those days the excess was very slight. There are very few, if any cases on record in the State where the monthly maximum temperatures for May were as low as during the past month. Freezing temperature occurred on one or more days in nearly all parts of the State but as practically all the fruit was killed during the April freeze, there was little damage done.

The rainfall was well distributed throughout the month but the monthly, weekly and daily amounts were small and below the normal for May except in the southern counties where there was an excess during the week from the 15th to the 21st inclusive, which brought the monthly amounts for that district, slightly above the normal. There were less than the usual number of thunderstorms and wind-squalls.

Owing to poor seed and continuous cold weather much of the corn failed to germinate and over 50 per cent of the corn acreage was planted the second and in many fields the third time, but with all the extra work there will not be over 65 to 75 per cent of an average stand; cut and wire worms were very active, especially on sod ground and the damage wrought by these insects has aided in cutting down the stand. The cold weather also prevented the normal growth of all vegetation and the drouthy conditions over the larger part of the State has seriously reduced the prospects of an average hay crop. Pasturage is short but the grass is of better quality than usual at the end of May. Small grains have made steady but slow improvement and are generally in good condition.

The shade and fruit trees that lost their foliage by the severe freeze in April have put forth new leaves and at the end of the month are about as far advanced as they were on April 15th.

The near approach of Halley's Comet to the earth on the 18th caused no unusual meteorological phenomena.

TEMPERATURE.—The monthly mean temperature for the State, as shown by records of 115 stations, was 55.4°, which is 4.7° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 54.1°, which is 4.4° below the normal; Central section 55.8°, which is 4.4° below the normal; Southern section 56.4°, which is 5.2° below the

normal. The highest monthly mean was 59.0°, at Keokuk, Lee county, Ottumwa, Wapello county, and Grinnell, Poweshiek county, and the lowest monthly mean 52.0°, at Sibley, Osceola county. The highest temperature reported was 89°, at Mt. Pleasant, Henry county, on the 21st; the lowest temperature reported was 18°, at Washta, Cherokee county, on the 3d. The average monthly maximum was 81°, and the average monthly minimum was 30°. The greatest daily range was 50°, at Sheldon, O'Brien county. The average of the greatest daily ranges was 39°.

**PRECIPITATION.**—The average precipitation for the State, as shown by the records of 122 stations, was 3.41 inches, which is 1.09 inches below the normal. By sections the averages were as follows: Northern section, 2.59 inches, which is 1.96 inches below the normal; Central section, 3.05 inches, which is 1.42 inches below the normal; Southern section, 4.58 inches, which is 0.11 inch above the normal. The greatest amount, 6.91 inches occurred at Lamoni, Decatur county, and the least, 1.29 inches, at Plover, Pocahontas county. The greatest amount in twenty-four hours, 2.99 inches, occurred at Keokuk, Lee county, on the 1st and 2d. Measurable precipitation occurred on an average of 10 days.

Traces of snowfall occurred at four widely scattered stations.

**SUNSHINE AND CLOUDINESS.**—The average number of clear days was 15; partly cloudy, 7; cloudy, 9. The duration of sunshine was about the normal, the percentage of the possible amount being 77 at Charles City, 68 at Davenport; 55 at Des Moines; 64 at Dubuque; 60 at Keokuk, and 51 at Sioux City.

**WIND.**—Northwest winds prevailed. The highest velocity reported was 38 miles per hour from the east, at Sioux City, Woodbury county, on the 1st.

#### OBSERVER'S REMARKS.

**ALBIA.**—*J. I. Chenoweth.* May, 1910, was a cold month with 14 rainy days. Foliage on trees not yet up to where it was in April, when it was killed by the freeze. Farmers have replanted most of their corn—some the third time—on account of poor seed and cold ground. Small grain is doing well.

**ALGONA.**—*Dr. F. T. Seeley.* This has been a very cold and dry May.

**ALLERTON.**—*Mrs. George Shriver.* May was a very unfavorable month for crops, much corn having to be replanted. Oats and grass making fair growth.

**ALTA.**—*David E. Hadden.* May was quite cool and rather dry. Frost was observed on a number of days, the last light frost being on the 25th. Corn is backward.

**ATLANTIC.**—*Thos. H. Whitney.* The ground is in fine condition but crops of all kinds are much behind the usual growth. At least 50 per cent of the first planting of corn failed to come up. The month has been cool and cloudy.

**AUDUBON.**—*Geo. E. Kellogg.* This has been the coldest May since observations have been taken at this station. Much of the corn rotted in the ground and wire and cut worms are doing considerable damage.

**BELMONT.**—*Geo. P. Hardwick.* The freeze in April and the fore part of May killed nearly all fruits—only a few cherries and strawberries survived. Ground so dry until the middle of May that corn did not germinate and some of the early planting is not up at end of month. Hay crop will be very light.

**CHARITON.**—*C. C. Burr.* More than the usual amount of corn has been planted the second time. All vegetation making slow growth and the general prospect is not flattering.

**CHARLES CITY.**—*E. W. McGaun.* The mean daily temperature was below the normal on every day except the 9th, 10th, 19th, and 20th, when it was only 1 to 3 degrees above. The total precipitation 2.67 inches is 2.27 inches below the normal for the month. It came in the form of light showers upon 9 days; the heaviest occurring on the 16th and 17th. There were only two thunderstorms, 21st and 31st. That on the 21st being the most severe and during the storm a large barn, two miles northwest of the station was struck by lightning and it and contents totally destroyed by fire. Killing frosts occurred on the mornings of the 3d and 4th, and the last light frost on the morning of the 26th, but did no injury.

**DUBUQUE.**—*J. H. Spencer.* This has been the coldest May in 18 years, with one exception. The maximum, 76° occurred on the 20th. A lower maximum for the month has not been recorded in May in 37 years, except once. The temperature was quite uniformly cool throughout the month, and there were only six days when the average for the day was above normal, and it was not much above on those dates. The rivers were low for May throughout the district. The Mississippi at Prairie du Chien was below a 4.0 foot stage from the 15th to the 25th inclusive, while at Dubuque it reached a 4.0 foot stage on the 20th and 21st, or the lowest during May in eight years. It has been lower at Dubuque only four times during May in 37 years. Vegetation had not fully recovered from the April freeze at the close of the month. The growth of all vegetation was very slow during the month, owing to the abnormally cold weather.

**ELLIOTT.**—*Henry Barnes.* The month closes with vegetation in fairly good condition. Fifty per cent of the corn shows an average stand and much of the replanted is just coming up and showing a good stand. With favorable weather conditions a fairly good crop may be expected.

**FOREST CITY.**—*J. A. Peters.* May was a cold and dry month. Corn is not all planted yet but much replanting is being done. Pastures are poor on account of dry weather. Small grain has good color but the stand is thin.

**INWOOD.**—*F. B. Hanson.* May has been a month of low average temperature with very little rain. Crops of all kinds and especially pastures need rain badly.

**KEOKUK.**—*Fred Z. Gosewisch.* The month has been cool and wet; the fields being too wet to work until within the past ten days, which has delayed corn planting and the weather is still too cool for the growth of corn. Cut worms are abundant and will necessitate much replanting. Oats, grass and potatoes are doing well, but the Hessian fly is working

much damage in the winter wheat. Tree fruit will not make one-tenth of a crop although the crop of berries promises well. Shade trees, which lost all their foliage and new growth during the April freeze, have put forth new leaves. Notwithstanding the abundant rains, the Mississippi river is much below the average stage for the season.

**KEOSAUQUA.**—*J. H. Landes.* This has been a cold cloudy month. Corn planting is nearly completed, but much of it has been or will be replanted, on account of cold, damp weather. Oats and winter wheat look well and meadows are fairly good.

**STOUC CITY.**—*Harry O. Geren.* The temperature was below normal nearly every day during the month, the mean for the month being 6° below the normal. It is the third coldest May on record. The precipitation was less than half of the normal amount and was confined to the first two decades. Rain is now needed badly.

**STOCKPORT.**—*C. L. Beswick.* Month closes cold. Oats above average and corn decidedly below. Fifty per cent of corn ground planted twice and many fields three times. Hay will be only a fair crop. Pasturage is good but growing slowly.

**WASHTA.**—*H. L. Fetter.* The freeze on the 3d finished the last of the fruit blossoms.

#### CONDITION OF FRUIT TREES.

The secretary of the State Horticultural Society reports the condition of fruit, on May 1st, as follows: "Apples, 8 per cent; pears, less than 1 per cent; American plums, 1 per cent; domestica plums, Japanese plums, and peaches, less than 1 per cent; cherries, 6 per cent; grapes, 20 per cent; red raspberries, 10 per cent; black raspberries, 12 per cent; blackberries, 21 per cent; currants, 5 per cent; gooseberries, 4 per cent; strawberries, 38 per cent of a full crop.

"The average for May is only 9 per cent of a full crop. This is the lowest percentage ever estimated for May on the condition of the crop in this State. The bloom on tree fruits was three weeks in advance of normal; two weeks earlier than any record we have since the society was organized.

"When new growth starts we believe conditions will improve, and as the season advances we may be able to harvest at least a third to a half crop, especially of small fruits."

#### OBSERVATIONS ON HALLEY'S COMET.

Following is a report of observations made by Mr. J. H. Spencer, Local Forecaster, U. S. Weather Bureau, Dubuque, Iowa, on May 17, 18 and 19, 1910, as to the meteorological conditions preceding, during and succeeding the passage of the earth through the tail of Halley's comet. While the observer does not show that any unusual atmospheric phenomena occurred at that time, the report is given for future reference and with the hope that it may aid in dispelling the superstitious fears of the ignorant people at the time of the next approach of the celestial visitor.

**SIR:** I have the honor to report that practically continuous day and night observations were made at this station on May 17, 18 and 19, 1910. These observations were taken under exceptionally favorable weather conditions from sunset of the 17th until about noon of the 19th, when the weather changed from clear to cloudy, and later to rain.

Assisting in these observations were Principal J. A. Anderson, of the High school, S. J. McFarland, and the weather bureau force consisting of W. W. Christman, Karl C. Rupert and myself.

During the ten days preceding these observations the weather was cloudy or hazy most of the time and the comet itself could not be seen, except very briefly and dimly once or twice. On the 13th and 14th dense haze prevailed as the result of forest fires in Wisconsin and Minnesota, and the color of the sun at sunrise and sunset was a vivid, deep red. The moderately heavy rains of the 15th, 16th and 17th cleared the atmosphere, and from shortly after sunset of the 17th until dawn of the 19th there was not a cloud in the sky.

#### DAY OF THE 17TH.

On the 17th the weather was cloudy all day until 6:40 p. m., but the bright sun shone through the clouds at intervals. All the reddish, murky color of the previous ten days had disappeared. Patches of deep blue sky appeared at intervals through the clouds.

Sunset—There were a few clouds above the sun, but the sun set clear and white, with a faint reddish yellow glow surrounding it. There were no sunset colors worthy of mention.

#### NIGHT OF 17TH-18TH.

At 2:45 a. m. a remarkably bright and distinct shaft or band of light, now known to have been the comet's tail, appeared, and was visible for three-quarters of an hour. Beginning in the east at about the point where the sun rises, it extended southwestwardly nearly half way across the heavens to the Constellation Aquila. It was narrow, and looked a good deal like the rays from a powerful searchlight, and was brighter than the milky way, which also was very bright at that hour.

Meteors—There were a few stray meteors during the night, but no more than would be expected on any clear night, and they did not radiate from any particular part of the heavens.

No other phenomena were observed.

#### DAY OF THE 18TH.

Sunrise—the sun rose clear, and was only slightly reddish.

There were no clouds during the day, and the sky was light blue and the sun white.

Sunset—the sun set clear and white, but the sky near it was a dirty, reddish-yellow.

## NIGHT OF 18TH-19TH.

Corona—A faint but distinct and complete ring was observed around the moon, beginning about 8:00 p. m., and lasting for about three-quarters of an hour. Its color was blue, with a faint band of red around the outside. Its radius was unknown, but was much greater than that of an ordinary corona, and possibly may have been 16 degrees. The planet Jupiter was inside the ring, but nearer the ring than the moon. The moon was very bright and there were no clouds visible.

Aurora Borealis—A rosy glow was observed in the north from dusk to 11:45 p. m., and again for a few minutes about 1:00 a. m. This glow extended from due northeast to about 20 degrees west of north, and upwards a few degrees only. Beginning at 9:22 p. m. faint but distinct whitish streamers shot up 20 or 30 degrees high into the Constellation Cassiopea, and they continued at irregular intervals until 10:32 p. m. They were visible at 9:22 p. m., 9:27 p. m., 9:57 p. m., 10:15 p. m., and 10:32 p. m. In each case they lasted a few minutes only, and they extended about 20 degrees on either side of north. No colors were visible in these streamers.

Comet's Tail—The comet's tail appeared in the heavens at the identical hour and in the same location as on the previous night, but it was very much less distinct, and the bottom half seemed much broader than on the previous night. It appeared at 2:45 a. m. and disappeared at 3:30 a. m. As on the previous night this band of light began at about the point in the east where the sun rose and extended southwestwardly across the heavens, through the southern stars in the Square of Pegasus, to the Constellation Aquila.

Meteors—Meteors were no more numerous than on the previous night, nor did they appear to radiate from any particular portion of the heavens.

No other phenomena were observed.

## DAY OF THE 19TH.

Sunrise—Cirrus clouds appeared in the east at dawn, and the sun rose slightly red, but presented no unusual features. Increasing cloudiness prevailed during the morning and by noon the sky was seven-tenths obscured and soon after entirely obscured. Observations were made as often as possible through the clouds, but nothing of interest was noted.

Sunset—Cloudy.

The night was cloudy and rainy and no observations could be made.

Very respectfully,

J. H. SPENCER, Local Forecaster.

## JUNE.

The most notable climatic features of June were the unusually cool weather during the first half of the month, and the continuously high temperatures during the latter half; the excessive amount of sunshine; the low percentage of humidity; the great deficiency of rainfall, the

light wind velocities, and the small number of thunderstorms. The temperature was abnormally low during the first 14 days, and then changed within three days to excessively warm and continued so during the remainder of the month. The deficiency of temperature during the first half of the month, however, nearly equalled the excess during the latter half as the monthly mean was only 0.7° above the normal. At many stations the record for the number of days with a maximum temperature of 90°, or higher, was broken; there being from 9 to 11 days with temperature up to or above 90°, and the average of the maximum temperatures for the last 15 days of the month was above 90°.

The past month was the driest June on record since statewide observations began in 1890. The average rainfall was only 1.99 inches which is 2.53 inches below the normal, and .68 inch less than the average for June, 1894, which was the driest June on record prior to the past month. Showers were frequent during the first 10 days, over the western and central sections of the state but after the 10th the rainfall was light and unevenly distributed; the western counties receiving the larger amounts. In the eastern part of the state the rainfall was light during the entire month.

Corn made very slow growth during the first half of the month and owing to poor seed, cold weather and the activity of the moles and cut and wire worms, much more replanting was done than usual. During the latter half of the month, however, corn made very rapid growth and was nearly up to the normal stage of growth at the end of the month. The dry weather and intense sunshine were exceptionally favorable for killing weeds and the fields were never cleaner at the end of June than they were this year. The soil was in the very best of condition to withstand the effect of dry weather. Small grains made considerable advancement and at the close of the month were in good condition and filling and ripening nicely. On the whole June was a favorable month, though the condition of all crops at its close was somewhat below the average of the past 10 years; hay, pasturage and early potatoes receiving the greatest damage from the drouthy conditions.

TEMPERATURE. The monthly mean temperature for the state, as shown by the records of 115 stations, was 69.5°, which is 0.7° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 68.8°, which is 1.4° above the normal; Central section, 69.8°, which is 0.8° above the normal; Southern section, 69.9°, which is 0.1° below the normal. The highest monthly mean was 73.8°, at Tipton, Cedar county, and the lowest monthly mean, 66.6°, at Sibley Osceola county. The highest temperature reported was 105°, at Decorah, Winneshiek county, on the 29th; the lowest temperature reported was 33°, at Northwood, Worth county, and at Sibley, Osceola county, on the 5th. The average monthly maximum was 96°, and the average monthly minimum was 41°. The greatest daily range was 46° at Elkader, Clayton county; Greene, Butler county, and at Mount Pleasant, Henry county. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 125 stations, was 1.99 inches, which is 2.53 inches below

the normal. By sections the averages were as follows: Northern section, 2.11 inches, which is 2.46 inches below the normal. Central section, 2.12 inches, which is 2.25 inches below the normal; Southern section, 1.74 inches, which is 2.88 inches below the normal. The greatest amount, 5.51 inches, occurred at Estherville, Emmet county, and the least, 0.05 inch, at Decorah, Winneshiek county. The greatest amount in twenty-four hours, 2.23 inches, occurred at Rockwell City, Calhoun county, on the 26th. Measurable precipitation occurred on an average of seven days. No snow fell at any station in the state during the month.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 18; partly cloudy, 7; cloudy, 5. The duration of sunshine was above the normal, the percentage of the possible amount being 84 at Charles City; 81 at Davenport; 66 at Des Moines; 82 at Dubuque; 75 at Keokuk, and 68 at Sioux City.

WIND.—Southeast winds prevailed. The highest velocity reported was 46 miles per hour, from the south, at Sioux City, Woodbury county, on the 15th.

#### OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell*. This has been the warmest June in many years, although the first ten days were cool. The amount of precipitation has been less than usual, but it has been a splendid month for the growth of crops. Corn is up to the average height for July 4th.

ALBIA.—*J. I. Chenoweth*. June ended hot and dry with only 1.72 inches of rainfall for the month. The temperature was excessive during the latter half of the month and only .25 inch of rain fell after the 10th. Corn is doing extraordinarily well but spring wheat, oats, pastures and potatoes are suffering for rain.

ALLERTON.—*Mrs. George Shriver*. Rain was needed badly during the greater part of the month, but corn has made rapid growth.

ALTA.—*David E. Hadden*. June, 1910, was warm and very dry; the temperature was about half of a degree above the normal and the rainfall was about 3.25 inches below the 20 years' average.

AMANA.—*Conrad Schadt*. The first half of the month was rather cool with a normal amount of rainfall, but the latter half was hot and very dry.

ATLANTIC.—*Thos. H. Whitney*. After the 21st the days were quite hazy or smoky, especially the 30th, the sun being almost obscured. The hot weather of the closing days was of great benefit to corn, which rapidly regained normal growth.

AUDUBON.—*Geo. E. Kellogg*. A hot and dry month. Crops, however, have done well except hay, which will be short.

BELMOND.—*Geo. P. Hardwick*. The high temperature during the latter half of the month advanced corn and seems to have developed an excess of smut in grain. Insect life has been very active, especially the potato beetle.

BONAPARTE.—*B. R. Vale*. Only 1.32 inches of rain during the month, which is the least for June in the past twenty years. The month was very dry but no serious harm was done to crops until the close of the month, when rain was badly needed.

CHARITON.—*C. C. Burr*. Corn is nearly "knee high" and making a wonderful growth. Oats will make a fair crop, but grass is short. All vegetation is in need of rain. Hay making is in progress.

CHARLES CITY.—*U. S. Weather Bureau*. The marked features of the month were the very cool temperatures that prevailed during the first fourteen days, and the very warm weather during the remaining sixteen; the maximum temperature being 90° or above for fourteen consecutive days; the low percentage of humidity, 63; the excessive sunshine and small number of thunderstorms, only two occurring and they were feeble and distant.

CLINTON.—*Luke Roberts*. The stage of the Mississippi River is 2.1 feet, which is the lowest since 1864.

DAVENPORT.—*U. S. Weather Bureau*. The temperature was continuously below the normal from the 1st to the 12th, and has been above the average on every day since the latter date. With the exception of June, 1886, when the rainfall was only .49 inch, the present month is the driest June on record at this station.

DUBUQUE.—*U. S. Weather Bureau*. The temperature was below normal from the 1st to the 13th and above the normal every day after the 13th. There were eleven days with a maximum of 90° or higher, breaking the record for hot days in June. The maximum temperatures averaged 93° during the last fifteen days of the month. The weather was excessively dry from the 5th to the 25th, but the heavy rainfall of the 26th came just in time to prevent serious damage to crops.

ELLIOTT.—*Henry Barnes*. June was a fine growing month, in spite of the light rainfall. Corn is doing finely and the fields are very clean. Potatoes, pastures and meadows need rain, but no other vegetation is suffering.

ELMA.—*H. A. Moore*. Lawns, hay and small grain are drying up and corn needs rain. The atmosphere is very hazy.

FOREST CITY.—*J. A. Peters*. Some fields of corn "knee high." Pastures very poor on account of drouth. Small grain has headed out. The season has been very dry.

GRAND MEADOW. (Postville P. O.)—*F. L. Williams*. The month was dry with a great amount of sunshine. Pastures are short but the small grain crop is good and corn is coming on finely, although the stand is rather poor.

INWOOD.—*F. B. Hanson*. The driest June on record at this station, but crops are showing up remarkably well. Corn and small grain prospects, except possibly late oats, fully up to the normal. Pastures are nearly dead. Haying begun.

IOWA CITY.—*Prof. A. G. Smith*. The drouth during the month has damaged crops, especially hay. The heat has been severe, as the air has been very humid.

KEOKUK.—*U. S. Weather Bureau.* The first half of the month was cool, with showers. A warm spell began on the 18th and still continues. Rains since the 9th have been confined to badly distributed local thundershowers. Corn has made good growth, and the weather has been excellent for cultivation of this crop. Fields are clean and the plants are good color. Hay harvest is in progress with yield below the average. Potatoes are suffering for rain.

KEOSAUQUA.—*J. H. Landes.* A dry month, with the first half cool and the latter half hot; Corn looks fine; the fields are clean and the ground is in excellent condition.

OLIN.—*M. H. Crissman.* Haying begun. Clover is a good crop, but timothy is short. Corn is making excellent growth, but rain is needed.

POCAHONTAS.—*F. E. Hronck.* The weather was ideal for field work. Corn fields are cleaner than for years, and the plants are up to the normal height.

RIDGEWAY.—*Arthur Betts.* This has been the hottest June since 1901, and breaks all records for the amount of sunshine and dry weather. Only .28 inch of rainfall since May 21st. The drouth has been very damaging and vegetation is not doing well. There were eighteen days with 100 per cent of sunshine and on sixteen days the temperature was up to or above 90°.

SHELTON.—*Dr. A. W. Beach.* All crops are better than the average for the past five years, except hay and pasturage, which need rain badly.

SIOUX CITY.—*U. S. Weather Bureau.* The mean temperature was slightly above the normal, the first half being 6° below normal, and the second half 8° above. Notwithstanding the decided coolness of the first half of the month the record for June for the number of days with a maximum of 90° or higher was broken; there being nine such days, while the previous record was seven, in 1897. The precipitation was confined almost entirely to the first decade, and the total of 1.41 inches was the smallest on record for June.

STOCKPORT.—*C. L. Beswick.* The maximum temperature of 100° on the 30th was the highest ever recorded at this station. The month has been very dry and the ground in oats, wheat and hay is badly cracked. Clover is mostly cut and oats are ready for harvest.

## JULY.

The drouthy conditions that prevailed over the latter half of June, continued over the larger part of the state during the entire month of July. The average rainfall was only 1.87 inches, or 2.59 inches below the normal. July, 1894, was drier than the past month, but the total precipitation for the first seven months of 1894 was 12.25 inches as compared with 10.94 inches for the same months this year. The total deficiency of precipitation from January 1, to July 31, 1910, was 9.38 inches, which is the greatest on record in the state for a like period. Showers, although quite frequent, were badly distributed as to time and locality, except over the northwestern counties where they came at frequent intervals and the

amount of rainfall was sufficient to keep the crop conditions above the normal for that season of the year. In the northeastern and some localities in the central and southwestern counties, showers were few and widely scattered and the rainfall light.

The average temperature was only 1.1° above the normal, but July, 1910, will be remembered as a hot month. The day temperatures were higher than usual, but the night temperatures were, with a few exceptions, low. Temperatures in excess of 100° were recorded in the northeastern counties on the 15th and 16th; in the southeastern counties on the 24th, and in the southwestern counties on the 27th. The month, as a whole, was in many respects ideal for agricultural pursuits. There were very few if any wind storms, and while it was excessively dry over the larger part of the state, the clear weather was very beneficial for haying, harvesting and threshing. Hay and all small grain was secured in excellent condition and, although the hay crop was lighter than usual, it was of the very best quality. The yield of small grain was above the average and the quality is also excellent. Corn made rapid growth and at the end of the month was strong and vigorous and earing nicely except in the northeastern and some localities in the central and southwestern counties, where the drought has been the most severe. Pastures and potatoes were, however, severely damaged by lack of moisture. Pastures were practically bare and early potatoes are nearly a failure. Small streams and shallow wells were dry and the stage of the rivers was lower than for many years.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 112 stations, was 74.5°, which is 1.1° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 73.1°, which is 1.0° above the normal; Central section, 74.8°, which is 1.1° above the normal; Southern section, 75.6°, which is 1.1° above the normal. The highest monthly mean was 79.2°, at Tipton, Cedar county, and the lowest monthly mean, 69.8°, at Sibley, Osceola County. The highest temperature reported was 108°, at Ridgeway, Winneshiek County, on the 16th; the lowest temperature reported was 43°, at Woodburn, Clarke County, on the 19th. The average of the monthly maxima was 97°, and the average of the monthly minima was 50°. The greatest daily range was 47°, at Woodburn, Clarke County. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 120 stations, was 1.86 inches, which is 2.58 inches below the normal. By sections the averages were as follows: Northern section, 1.85 inches, which is 2.43 inches below the normal; Central section, 1.57 inches, which is 2.94 inches below the normal; Southern section, 2.16 inches, which is 2.38 inches below the normal. The greatest amount, 5.69 inches, occurred at Keosauqua, Van Buren County, and the least, 0.12 inch, at New Hampton, Chickasaw County. The greatest amount in twenty-four hours, 3.52 inches, occurred at Keosauqua, Van Buren County, on the 29th. Measurable precipitation occurred on an average of seven days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 19; partly cloudy, 8; cloudy, 4. The duration of sunshine was slightly above the normal, the percentage of the possible amount being 88 at Charles City; 80 at Davenport; 62 at Des Moines; — at Dubuque; 69 at Keokuk, and 71 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 54 miles per hour from the south, at Sioux City, Woodbury County, on the 7th.

#### OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell*. This has been the driest July in Afton for sixteen years. Corn is suffering for rain.

ALMA.—*J. I. Chenoweth*. Precipitation deficient and sunshine excessive and hot. Small grain harvested in good shape and threshing returns show extra good. Some oats making by weight 56 bushels per acre. Wheat plump and heavy, making 25 bushels per acre. Corn damaged and pastures burned up. Feeding has to be resorted to. Hay crops short and no timothy seed.

ALLERTON.—*Mrs. George Shriver*. Corn doing well but beginning to need rain. Harvest about completed and threshing begun. Quality of hay good but light yield.

ALTA.—*David E. Hadden*. Compared with the normal of 20 years' observations, the month was only three-tenths of a degree warmer, but the rainfall was 2.25 inches below the average. Showers were light but sufficiently frequent for all growing vegetation. There was an excess of sunshine.

ALTON.—*W. S. Stagle*. Began cutting oats July 11th; barley, 14th; finished cutting July 30th.

AMANA.—*Conrad Schadt*. July was hot and dry. Meadows, pastures, corn and potatoes suffered much from drouth. There was a remarkable absence of storms and high winds; there being only two thunderstorms.

ATLANTIC.—*Thos. H. Whitney*. Prevailing drouth was severe on pastures and meadows, but permitted harvest to be made under exceptionally favorable conditions. Yield and quality of grain fully equal, if not better, than average. Corn on good land was in fully average condition at close of month.

AUDUBON.—*Geo. E. Kellogg*. July was a hot, dry month, but all crops are doing well except potatoes and pastures. Rain is needed to mature the corn crop.

BAXTER.—*W. R. Vandike*. July was a very warm month and was very dry up to the 26th. Pastures getting short and potatoes and vegetables are suffering for rain.

BELMONT.—*Geo. P. Hardwick*. High average temperature but only one extremely hot day. The deficiency of moisture is severe on crops on dry lands. The quality of wheat, barley and oats is the best of many years.

BRIT.—*L. M. Goodman*. The month was very pleasant and favorable to growing crops, except that a little more moisture was needed. There were no bad storms.

BURLINGTON.—*Max E. Poppe, Jr.* The Mississippi river is only 3 inches above the low water mark of 1864. Several parties have waded across the river at this point, where it is from five-eighths to seven-eighths of a mile wide.

CHARITON.—*C. C. Burr*. Harvest is finished in fine shape, and some threshing done; showing yields above the average. All vegetation is suffering for rain and pastures are very short. Early corn looks fairly well, but wilts every day.

CHARLES CITY.—*E. W. McGann*. The days were warm and bright and the nights, with a few exceptions, cool. The marked features were the remarkably long drouth which continued during the month; the low humidity; the large number of fair or partly cloudy days, and the high percentage of sunshine. There were 7 feeble thunderstorms and the greatest precipitation accompanying these was only 0.14 inch. The deficiency of rainfall for the month was 3.15 inches, and for the season, March 1st, to close of the month, 13.95 inches.

CLINTON.—*Luke Roberts*. The streams are low and the ground dry. Much injury has been done to plant life by high temperatures and dry weather. The Mississippi river is only 0.5 foot above the low water mark and the lowest since 1864.

DAVENPORT.—*J. M. Sherier*. Although the total precipitation of 2.86 inches was not decidedly below the average, most of the rain fell in one storm on the 14th, when 2.01 inches were recorded between 11:13 a. m. and 12:55 p. m. During the same storm 1.59 inches were registered in the 22 minutes ending at 11:59 a. m., which is the heaviest rainfall for such a short period of time on record at the Davenport station. The lightning that attended the storm was sharp and close, instantly killing Alonzo Twiggs of Davenport, who had sought shelter under a pile of lumber, and David Gerhardt, a tinner, working on the roof of a building on the farm of Colonel George W. French, about three miles east of Bettendorf, Iowa. As a rule, the month was dry and warm, with more than the normal amount of sunshine.

DUBUQUE.—*J. H. Spencer*. The past month was the driest July during the past 37 years, except July, 1894. At the close of the month gardens and pastures were drying up for lack of rain, and it was feared that corn might be injured if the drouth continued.

ELLIOTT.—*Henry Barnes*. Vegetation, except meadows, pastures and potatoes made good progress in spite of lack of rain. Splendid weather for grain and hay harvest. Small grain is in excess of average and of prime quality.

FAIRFIELD.—*Prof. R. Monroe McKenzie*. The month has been very hot and dry, but the soil has been in good condition to withstand the drouth. The nights have been cool and there has been much dew so that corn is in good condition at the end of the month.

FOREST CITY.—*J. A. Peters*. Only one cloudy day during the month. Corn is tasseling. Haying and harvesting about finished and no rain to interfere with work.

GRAND MEADOW (Postville P. O.)—*F. L. Williams*. The month was very dry with hot days and cool nights. Pasturage is short and all growing crops need rain. Small grain is all cut and is of excellent quality. Corn is clean and has a good color.

GRINNELL.—*D. W. Brainard*. Complaint of the dry, hot weather was general throughout the month, but taken as a whole the month was quite favorable for crops generally in Poweshiek County.

INWOOD.—*F. B. Hanson*. A good month but showers were a little too frequent for haying and harvest. Harvest and shock threshing finished and half of stacking done. The condition of corn is above normal.

KEOKUK.—*Fred. Z. Gosewisch*. The conditions for the month of July have been ideal for agriculture. Rains at the right time have furnished sufficient moisture for crops. The rains have been gentle, coming largely at night, and not interfering with harvesting. A fair crop of hay, of excellent quality, has been safely housed. Wheat has been harvested under most favorable conditions; threshing is well advanced and the crop exceeds earlier estimates both in quality and yield. The crop of oats has exceeded the normal, and the prospect for corn never was better. A large crop of cucumbers and tomatoes for packing, has been grown on bottom lands, which are usually subject to overflow.

KEOSAUQUA.—*J. H. Landes*. The weather was dry and hot most of the time, but the month was an ideal one for harvesting. Corn is looking fine.

POCAHONTAS.—*F. E. Hronek*. Ideal weather prevailed during the month for haying and harvesting. Harvesting is all done.

RIDGEWAY.—*Arthur Betts*. The month was the driest and the 16th was the hottest day on record at this station; the maximum being 108°. The grass is all dried up and dead. Only 0.76 inch of rain for June and July and the drouth is terrible.

SHELDON.—*A. W. Beach*. Corn is well up to the average for August 1st. Harvest was done under the best of conditions and shock threshing progressing. Early potatoes poor, but late potatoes are good.

SIoux CITY.—*Harry O. Geren*. The weather during July was so nearly normal that there is very little to say about it; the mean temperature and total precipitation almost exactly equalling the normals for the month. The precipitation was well distributed throughout the month, with an excessive rainfall of 2.11 inches during the night of the 13-14th. The sunshine was a little above the normal.

#### AUGUST.

The drouthy conditions which had prevailed since May, continued until the middle of August, when copious and fairly well distributed showers occurred; and during the latter half of the month the rainfall was generally above the normal which gave an excess for the month over the northern and central districts. There was a deficiency in the southern district, notwithstanding the fact that the heaviest rainfall in the state was reported from the southwestern counties. At Atlantic, 4.97 inches of rain fell between 2 a. m. and 10 a. m. of the 13th, and 4.03 inches fell

between 3 p. m. of the 28th and 7:30 a. m. of the 29th. At Pacific Junction 7.98 inches fell between 6 p. m. of the 28th and 7 a. m. of the 29th. At several stations in the central portion of the southern district the total rainfall for the month was less than half an inch.

The temperature was very nearly normal; there being a positive departure of only 0.1°. The month as a whole was considered cool although on the 1st, 11th, 12th, 21st and 22d the day temperatures were generally above 90°, and at several stations were up to 100° on the 1st or the 22d. The night temperatures were moderately low during the most of the month; the lowest being on the 26th, when minimum temperatures below 40° were recorded at several stations. The lowest temperature reported was 36°, at Plover, Washta and Woodburn. A trace of frost was observed on the morning of the 26th on low ground in some localities, but no damage was done to vegetation.

The dry weather during the first half of the month was favorable for threshing, but was injurious to pastures, meadows and late potatoes, and in some sections, to corn. Over the northeastern and some of the central and southwestern counties, where the showers did not come at the proper time, corn was injured to some extent, but for the state at large, the crop held its own remarkably well and was in fine condition at the close of the month. The rains during the latter half of the month were very beneficial to pastures, meadows, potatoes and late corn, and at the close of the month the indications were favorable for more than an average yield of corn, in spite of the long continued drought.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 114 stations, was 71.9°, which is 0.1° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 70.3°, which is the normal; Central section, 72.3°, which is 0.4° above the normal; Southern section, 73.1°, which is 0.2° below the normal. The highest monthly mean was 75.2°, at Ottumwa, Wapello County, and the lowest monthly mean, 66.8°, at Sibley, Osceola County. The highest temperature reported was 104°, at Bedford, Taylor County, on the 22d; the lowest temperature reported was 36°, at Plover, Pocahontas County, Washta, Cherokee County, and Woodburn, Clarke County, on the 26th. The average monthly maximum was 96°, and the average monthly minimum was 43°. The greatest daily range was 47°, at Decorah, Winneshiek county, and at Elkader, Clayton County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 124 stations, was 3.88 inches, which is 0.11 inch below the normal. By sections the averages were as follows: Northern section, 3.80 inches, which is 0.28 inch above the normal; Central section, 4.51 inches, which is 0.46 inch above the normal; Southern section, 3.32 inches, which is 1.08 inches below the normal. The greatest amount, 11.22 inches, occurred at Atlantic, Cass County, and the least, 0.37 inch, at Chariton, Lucas County. The greatest amount in twenty-four hours, 7.98 inches, occurred at Pacific Junction, Mills County, on the 28th and 29th. Measurable precipitation occurred on an average of eight days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 10; cloudy, 6. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 75 at Charles City; 70 at Davenport; 60 at Des Moines; 54 at Dubuque; 63 at Keokuk, and 74 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 65 miles per hour from the north, at Sioux City, Woodbury County, on the 2d.

#### OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell*. Both temperature and rainfall was a little below the normal, yet it has been quite favorable weather for corn.

ALBIA.—*J. I. Shenoweth*. The immediate vicinity had only .55 inch of rain during the month, although the surrounding country had several good rains that did not reach the town. Corn is doing a great deal better than was reported a month ago, and the yield will be equal to that of last year.

ALGONA.—*Dr. F. T. Seeley*. On the whole August was a very good month. Shock threshing about completed and fall plowing is well advanced.

ALTA.—*David E. Hadden*. August was an ideal summer month. The rainfall was a little below the normal but sufficient for corn.

ATLANTIC.—*Thos. H. Whitney*. On the 13th a rainfall of 4.98 inches was registered and on the 29th, 4.03 inches. These rains were the heaviest for some years, but fortunately were not accompanied by winds or severe lightning.

BONAPARTE.—*Hon. B. R. Vate*. August was a cool, pleasant month with no storms. It was, however, a little dry.

CHARITON.—*C. C. Burr*. Almost continuous sunshine during the month. No surface water and pastures are dry and meadows are brown. Cattle are being sold at reduced prices and many farmers are now feeding stock.

CLINTON.—*Luke Roberts*. Streams and springs are unusually low, and corn and other unripe products of the soil were injured by the drouth, but the late rains have materially bettered the conditions.

CORYDON.—*Clara Miller*. The month has been extremely dry and pastures are bare, but the corn prospect is good in spite of the drouth.

CRESTON.—*O. J. Colby*. The rains came in time to help make a good corn crop, and the rain on the 28th is making plenty of fall feed in pastures.

DAVENPORT.—*J. M. Sherier*. The first two weeks of August were marked by an abnormal amount of sunshine and by a decided deficiency in rainfall, only 0.13 inch of precipitation being recorded during that period. These drouthy conditions which had prevailed, with but few interruptions, since the last of May, were broken by copious showers on the 15th, and the latter half of the month showed a considerable excess in precipitation. Growing crops, especially corn and late potatoes, and pastures, all of which had suffered from lack of moisture, were greatly benefited, though

neither corn nor potatoes is expected to make a full crop. On the 9th, and from the 11th to the 15th, the river was at a stage of 0.2 foot, the lowest during any August since 1894. River traffic between Davenport and points to the northward remains suspended.

DUBUQUE.—*W. W. Christman*. The severe drouth which lasted from the latter part of June until the middle of August was much less serious in its results than had been feared. The rainfall of the 17th, 18th and 20th soaked deep into the ground, and late potatoes and corn were greatly benefited. Lawns which had turned brown during the drouth, were green again a few days after the first rain. There were several electrical storms, but none of a serious nature. The month as a whole was very favorable and at the close the soil is in fine condition for fall plowing and the prospect for a good corn crop is excellent. River conditions were very much the same as during July. None of the packets were able to run owing to low water. The Mississippi at Prairie du Chien and Dubuque rose slowly during the month, chiefly as the result of heavy rains in Wisconsin, but it did not reach a one foot stage on any date. The lowest stage of the Mississippi from Dubuque to LaCrosse was one or two tenths above the lowest stage of 1864.

ELLIOTT.—*Henry Barnes*. The drouth was broken by 5.70 inches of rain on the 13th, after which all kinds of vegetation improved, especially pasturage. The rain was, however, too late for potatoes.

FOREST CITY.—*J. A. Peters*. A light frost occurred on very low land on the morning of the 26th, but no damage was done. It will require 30 days of good weather to mature the corn.

GRAND MEADOW (Postville P. O.)—*F. L. Williams*. The month was favorable for corn and pastures. Threshing is nearly done and large yields of grains are reported.

HUMBOLDT.—*Henry S. Wells*. The frequent light showers have sustained the corn crop.

INWOOD.—*F. B. Hanson*. August was a very good month generally. Rain has been sufficient for corn, potatoes and plowing. All crops have held their own and pastures are now in normal condition. Grain yields are above the normal.

KEOKUK.—*Fred Z. Gosewisch*. The month of August has been dry with temperature slightly below the normal. The rainfall, with the exception of the storm of the 20th, was in light showers. The storm of the 20th was accompanied by unusually large hail; some measuring over 9 inches in circumference, however, the damage was not great as the storm covered only a small area and the quantity was small. The weather was ideal for threshing, which has been completed, and wheat and oats have yielded well both in quantity and quality of the grain. The prospect for corn is excellent, although the crop is about 10 days behind the season, and will require the whole of September to be beyond the danger from frost. Pastures are dry, necessitating the feeding of stock in many places; streams have been low and there has been a scarcity of water for stock in some localities. The ground being dry and hard but little plowing has been done during the month.

KEOSAUQUA.—*J. H. Landes*. With the exception of a rainfall of 2.57 inches on the evening and night of the 20th it was a dry month, with rather cool nights. Pasturage is short, but corn has done fairly well.

NORTHWOOD.—*Chas. H. Duelle*. The worst electrical and wind storm of the season occurred on the 20th.

ONEBOLT.—*E. Starner*. White frost was observed on the morning of the 26th.

OLIN.—*M. H. Crissman*. The drouth was broken on the 18th. Pastures picked up quickly, corn was greatly helped and what is left of late potatoes are doing well.

PACIFIC JUNCTION.—*H. H. McCartney*. A remarkably heavy rain fell on the night of the 28th-29th. .42 inch fell between 6 p. m. and 7 p. m. of the 28th and 7.56 inches fell between 10 p. m. of the 28th and 7 a. m. of the 29th making a total of 7.98 inches in practically 10 hours. Excessive thunder and lightning attended the shower.

POCAHONTAS.—*F. E. Hronek*. Corn is 6 to 10 days later than last year and not more than 30 per cent of it will be out of the way of frost by Sept. 15th. 80 per cent of the threshing is done. The ground is in excellent condition for plowing and there is plenty of fall feed.

SHELDON.—*Dr. A. W. Beach*. Fall plowing and threshing are well advanced.

STOCKPORT.—*C. L. Beswick*. A hail storm on the evening of the 20th did \$12,000 to \$13,000 damage. Pastures have freshened up since the middle of the month, but there has not been sufficient moisture for fall plowing. Corn is retarded by the damp, cool weather.

WAUKEE.—*Samuel F. Foft*. Rains during the middle and last of the month have improved corn prospects considerably, and pastures are beginning to look green again. Fall plowing in progress.

WEST BEND.—*Phil. Dorweiler*. The month was favorable for haying and threshing but gardens and pastures suffered for want of rain.

#### SEPTEMBER.

Although the mean temperature was below and the average rainfall was above the normal, the month was very favorable for farm operations and other outdoor pursuits and for maturing the late crops.

The average temperature was only 0.5° below the normal, and the deficiency was quite uniform over the state. The 17th was generally the warmest day, when maximum temperatures of 90° or above were recorded at most stations over the southern half of the State. The highest recorded during the month, 99°, occurred, however, at Creston on the 15th. The 2d, 5th, 7th, 11th, 18th and 30th were also warm days. The coolest days of the month were the 9th, 10th and 27th. Light frost occurred at several stations, on low ground, on the 9th and 10th, and heavy to killing frost on the 27th. Freezing temperatures occurred at several stations in the extreme western counties on the latter date, but no material damage was done except to tender vines and garden truck as the low tem-

perature was of short duration and the corn was generally far enough advanced toward maturity to escape injury.

The precipitation was well distributed throughout the month and fairly well distributed geographically although the largest amounts were recorded in the western, central and south central counties, and the heaviest showers occurred on the 15, 22, 23, or 26th, when excessive amounts were recorded at several stations. The rains have revived pasturage and aftermath in meadows, replenished the water supply for stock, put the soil in fine condition for plowing and started the growth of fall sown grain. Threshing was practically finished and more seed corn was gathered than ever before during the month of September. There has been a decided increase in the acreage sown to winter grains, especially fall wheat. Fall pasturage is in excellent condition and much more than the usual amount of corn has been cut for fodder and ensilage on account of the shortage in the hay crop. Late potatoes were materially benefited by the August and early September rains, but the crop will be short.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 113 stations, was 63.2°, which is 0.5° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 61.4°, which is 0.7° below the normal; Central section, 63.3°, which is 0.3° below the normal; Southern section, 64.8°, which is 0.7° below the normal. The highest monthly mean was 67.4°, at Ottumwa, Wapello County, and the lowest monthly mean, 58.6°, at Estherville, Emmet County. The highest temperature reported was 99°, at Creston, Union County, on the 15; the lowest temperature reported was 30°, at Sheldon, O'Brien County, on the 27th; and at Woodburn, Clarke County, on the 10th. The average monthly maximum was 58°, and the average monthly minimum was 36°. The greatest daily range was 49°, at Creston, Union County; and at Corning, Adams County. The average of the greatest daily ranges was 38°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 122 stations, was 3.59 inches, which is 0.18 inch above the normal. By sections the averages were as follows: Northern section, 2.90 inches, which is 0.51 inch below the normal; Central section, 4.04 inches, which is 0.80 inch above the normal; Southern section, 3.84 inches, which is 0.27 inch above the normal. The greatest amount, 7.43 inches, occurred at Afton, Union County, and the least, 1.18 inches, at Elma, Howard County. The greatest amount in twenty-four hours, 3.76 inches, occurred at Afton, Union County, on the 16th. Measurable precipitation occurred on an average of 9 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 14; partly cloudy, 7; cloudy, 9. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 67 at Charles City; 63 at Davenport; 53 at Des Moines; 54 at Dubuque; 50 at Keokuk; and 60 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 39 miles per hour from the northwest, at Sioux City, Woodbury County, on the 4th.

## OBSERVERS' REMARKS.

**AFTON.**—*N. W. Rowell.* Light frost on low land on the 27th and 28th. Corn is ripening slowly and irregularly which is probably due to the poor seed imported last spring.

**ALBIA.**—*J. I. Chenoweth.* Light frost occurred on low land on the 27th. 3.02 inches of rain during the month has started fall pasturage. Corn is out of danger of frost. A great quantity of corn is being cut up.

**ALTA.**—*David E. Hadden.* September, 1910, was an ideal month. Corn is entirely out of danger of frost at the close of the month. Light frost occurred on the 27th but there was no damage, even to tender vines.

**AMANA.**—*C. Schadt.* The weather was generally fine. Corn had ample time for ripening as there was no frost.

**ATLANTIC.**—*Thos. H. Whitney.* The frost of the 27th did not particularly affect upland vegetation but checked the growth of corn. Pastures are in fine condition at the close of the month and the ground is in excellent shape for cultivation.

**AUDUBON.**—*Geo. E. Kellogg.* Most too much rain for drying out late corn but the light frost on the 27th retarded its growth and 75 per cent is now out of danger of freezing weather.

**BAXTER.**—*W. R. Vandike.* A fine month for ripening corn. Copious showers during second and third decades broke the drouth, relieved wells that were getting low and revived pastures.

**BEDFORD.**—*E. E. Healy.* Light frost occurred on the 10th, 27th and 28th but no damage was done.

**BELLE PLAINE.**—*S. P. Vandike.* Light frost occurred on the 10th.

**BELMOND.**—*Geo. P. Hardwick.* Moderate temperature and rainfall with no serious storms made ideal weather for farm operations. Corn ripening naturally without frost. Much corn fodder secured in good condition in lieu of hay which like potatoes is a short crop.

**BONAPARTE.**—*B. R. Vale.* September was a nice month for work but was too dry for plowing.

**BRITT.**—*L. M. Goodman.* The month was favorable for late potatoes and pastures. Corn is maturing nicely with no killing frost.

**CHARITON.**—*C. C. Burr.* The silos have been filled, and a large acreage of corn is in shock, ready for the shredder. The meadows are now getting green, for the first time since harvest. A large area of wheat has been sown.

**DAVENPORT.**—*J. M. Sherier.* While the rainfall was somewhat below the average, it occurred in well distributed showers that greatly improved pasturage. Owing to the nearly normal amount of sunshine and the absence of frost, the conditions were also favorable for the maturing of the late crops. Although the Mississippi was higher than during August, the average stages in the Davenport river district were lower than in any September since 1898. Through traffic over the Le Claire Rapids remains suspended.

**DUBUQUE.**—*James H. Spencer.* The month was exceptionally favorable for farming operations. At the close nearly all the corn was beyond danger from frost, and the soil is in splendid condition for fall plowing. The rainfall was abundant but not excessive. The month was characterized by an absence of frosts, severe local storms and warm weather. The rivers of this district averaged about 0.6 of a foot higher than during August, except in the Mississippi from LaCrosse to St. Paul, where it was less. At Dubuque the maximum stage was 2.0 feet on the 13th, and the minimum, 0.8 on the 5, 6, and 7th. Navigation remained practically suspended during the month, owing to low water making three months continuously that steamboats have been unable to run between St. Louis and St. Paul.

**ELLIOTT.**—*Henry Barnes.* The month ends with most of the corn out of the way of frost. Pastures are in good condition. Increased acreage of fall plowing, seeding and cutting of corn fodder.

**FOREST CITY.** *J. A. Peters.* Light frost on 9, 10 and 27th but no damage was done. Corn is maturing nicely.

**GRAND MEADOW (Postville P. O.).**—*F. L. Williams.* The month was favorable for finishing the corn crop which is very large. Pasturage is growing finely and plowing is well advanced. There has been no killing frost and forest trees are coloring gloriously.

**HOPEVILLE (Murray P. O.).**—*M. T. Ashley.* All corn practically safe from frost, but would be injured by severe freeze. Prospects are fine for good quality this year.

**INWOOD.**—*F. B. Hanson.* The first killing frost in September since 1902 occurred this year on the 27th but no damage was done to corn as the frost was only sufficient to hasten the drying process. Vines of all kinds and garden truck were, however, killed. Threshing is nearly done and silos filled.

**KEOKUK.**—*Fred Z. Gosewisch.* The precipitation, although 1.96 inches below the normal, came in well distributed showers throughout the month, and was sufficient for the growth of vegetation. Wheat is coming up well, and grass is making good growth, affording excellent fall pasturage. The corn crop is perfectly safe and is the largest for many years. Tomatoes, grown for large packing houses, are abundant, and on account of the low stage of the river throughout the season, a large yield is being gathered from lands which are usually overflowed. On the morning of the 27th a very light trace of frost could be detected in some exposed places with a minimum temperature of 43 degrees.

**NORTHWOOD.**—*Chas. H. Dwelle.* A severe electrical storm occurred on the 26th.

**PELLA.**—*John H. Ver Steeg.* The droughty conditions that prevailed during the summer were broken on the 23d and 24th when 2.86 inches of rain fell. Corn was practically safe from frost at the end of the month.

**POCAHONTAS.**—*F. E. Hronek.* The month was very fine for all kinds of farm work and for maturing corn, 95 per cent of which is now safe from frost. Much fall plowing has been done. Fall pastures are good. No damage done by frost.

**SHELDON.**—*Dr. A. W. Beach.* No killing frost and corn is all ripe. Fall plowing is well advanced and ground is in splendid condition. Potatoes being dug and yield about 65 per cent of a crop.

**SIoux CITY.**—*G. K. Greening, Jr.* Temperatures slightly below normal prevailed and more than the average amount of precipitation occurred during September. More than two-thirds of the entire rainfall for the month occurred in two thunder-storms on the 4th and 22d, when excessive amounts were recorded. In all 8 thunder-storms occurred, which is unusual for the month of September. Light frost was observed the morning of the 9th and heavy on the 27th. Sunshine was about normal. Crops of all kinds are far enough advanced to stand a killing frost, unless it be some very late corn.

**STOCKPORT.**—*C. L. Beswick.* A fine month for pastures, fall grain seeding and aftermath in meadows. 90 per cent of corn is safe from a reasonable frost. Almost twice as many farmers sowing wheat as usually sow.

**WAPELLO.**—*G. W. Schofield.* There has been only one light frost and no damage done. Corn is ripening nicely and most of it is out of the way of frost. Fall seeding is mostly done.

**WEST BEND.**—*Phil Dorweiler.* September was a pleasant month and favorable for farm work and corn. There has been no killing frost.

#### OCTOBER.

October, 1910, was unusually warm and pleasant even for Iowa where Indian Summer weather generally prevails at that time of the year. It was the warmest October since 1900 and the driest since 1895, and there have been only three warmer months of that name during the past 21 years. With the exception of light showers between the 3d and 5th, clear and generally warm weather prevailed until the 18th with 4 partly cloudy and only 6 cloudy days during the month. The 2d was generally the warmest day, but at a few stations the highest temperature for the month was recorded on the 10, 11, 15 or 16th. A cool wave passed over the state on the 6th and 7th that caused light frost in all sections and freezing temperatures at some stations in the extreme northern counties, but no damage resulted to crops. The temperature was abnormally high between the 11th and 18th, during which time the daily maximum temperatures were very near or above 80° in all parts of the state and the weather was clear and balmy. Light rain began in the western counties during the late afternoon of the 18th, spreading over the state on the 19th, 20th and 21st, with a decided drop in temperature which resulted in freezing temperatures and killing frosts in northern and western counties on the 22d and heavy frost over the southeastern counties, but the coldest period of the month was on the 28th and the 29th when the minimum temperatures were below the freezing point and killing frost occurred at all stations. The first snow of the season fell in the form of light flurries on the 27th and 28th.

The warm, dry weather was very favorable for ripening the corn crop, finishing threshing, digging potatoes and for all outdoor operations, ex-

cept that the soil was too dry for satisfactory plowing and in many places the surface water supply was scarce and the water in shallow wells was low. Corn-husking began during the third week and became general during the fourth week of the month. The large acreage of fall wheat was in excellent condition at the close of the month. Home-grown strawberries were on the market at Dubuque until the closing week of October and a few boxes were picked at some time during the month at many places in the eastern and southern counties.

**TEMPERATURE.**—The monthly mean temperature for the state, as shown by the records of 113 stations, was 55.2°, which is 3.3° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 53.7°, which is 3.6° above the normal; Central section, 55.3°, which is 3.5° above the normal. Southern section, 56.6°, which is 2.8° above the normal. The highest monthly mean was 60.1°, at Ottumwa, Wapello County, and the lowest monthly mean was 51.7°, at Northwood, Worth County. The highest temperature reported was 93°, at Inwood, Lyon County, on the 10th, and at Ottumwa, Wapello County, on the 16th; the lowest temperature reported was 10°, at Woodburn, Clarke County, on the 29th. The average monthly maximum was 86°, and the average monthly minimum was 18°. The greatest daily range was 56°, at Keosauqua, Van Buren County, on the 30th. The average of the greatest daily ranges was 40°.

**PRECIPITATION.**—The average precipitation for the state, as shown by the records of 122 stations, was 0.77 inch, which is 1.58 inches below the normal. By sections the averages were as follows: Northern section, 0.81 inch, which is 1.46 inches below the normal; Central section, 0.77 inch, which is 1.67 inches below the normal; Southern section, 0.74 inch, which is 1.61 inches below the normal. The greatest amount, 1.73 inches, occurred at Fort Dodge, Webster County, and the least, a trace, at Chariton, Lucas County. The greatest amount in twenty-four hours, 1.32 inches, occurred at Fort Dodge, Webster county, on the 19th. Measurable precipitation occurred on an average of 4 days.

**SNOW.**—The average depth of unmelted snowfall was 0.1 inch, nearly all stations reported at least a trace; the greatest depth was 2.0 inches, at Algona, Kossuth County.

**SUNSHINE AND CLOUDINESS.**—The average number of clear days was 21; partly cloudy, 4; cloudy, 6. The duration of sunshine was about 10 per cent above the normal, the percentage of the possible amount being 71 at Charles City; 72 at Davenport; 73 at Des Moines; 66 at Dubuque; 72 at Keokuk, and 77 at Sioux City.

**WIND.**—South winds prevailed. The highest velocity reported was 46 miles per hour from the north, at Sioux City, Woodbury County, on the 27th.

#### OBSERVERS' REMARKS.

**ALMA.**—*J. I. Chenoweth.* October was a remarkably fine month with only two rainy days. The first killing frost occurred on the 22d.

**ALLESTON.**—*Mrs. George Shriver.* The ground is too dry for fall plowing.

ALTA.—*David E. Hadden.* October, 1910, was ideal in every particular; generally clear skies and Indian Summer weather prevailed during the greater portion of the month. Rain would, however, be beneficial as the ground is getting dry and water in wells is low.

ATLANTIC.—*Thos. H. Whitney.* October was a fine month with many beautiful days. Frost held off till corn and other fall crops were safe; corn considered fully matured at close of month and general preparation made for gathering. Fall pastures in fine condition.

BAXTER.—*W. R. Vandike.* October was a beautiful month and flowers were blooming in the open until late in the month.

BEDFORD.—*E. E. Healy.* The first killing frost occurred on the 22d and the first snow of the season fell on the 27th.

BELMOND.—*Geo. P. Hardwick.* The weather was fine until the 27th and the corn leaves were green until nearly to end of month.

BUCKINGHAM, (Traer P. O.)—*J. S. Gwynn.* On the night of the 28th ice three-eighths of an inch thick formed on the watering trough.

CHARITON.—*C. C. Burr.* The month has been unseasonably warm and grass is still growing. There is no surface water and the soil is very dry. Fall wheat looks fine. Farmers are cribbing corn.

CHARLES CITY.—*E. W. McGann.* The principal features of the month were its unusually high temperature, the large number of clear and fair days and the great deficiency of precipitation, the total being 0.36 inch which is 1.67 inches below the normal for the month. The first heavy frost occurred on the morning of the 6th, but did no injury whatever. The first killing frost occurred on the morning of the 22d, 12 days later than last year and is the latest on record for this vicinity. The first flurry of snow came on the 27th. The last few days of the month were cool.

DAVENPORT.—*J. M. Sherier.* The month of October just passed was one of the driest and warmest in the history of the local station. While a light frost formed at some places in the open country on the morning of the 7th, the tenderest vegetation escaped damage until the 22d, when light frost was more general. The temperature was below the freezing point on the 27th, 28th and 29th, with a killing frost on the last named date, or about a week later than usual. At the close of October, the Mississippi was slightly lower at all stations in the Davenport river district than at the end of the preceding month.

DUBUQUE.—*J. H. Spencer.* The tenderest vegetation was unharmed up to the 22d, and a freeze did not occur until the 29th, or about 2 weeks later than the usual date. The late fall was exceptionally favorable for the ripening of potatoes, pumpkins, squash, grapes, etc., and for all fall work. Home grown strawberries were on the market until the closing week of October.

The growing season this year was of remarkable length. Vegetation started into growth early in March, and at the close of March, spring flowers were in bloom, and elms, soft maples, box elders, larches, and some other varieties of trees were green or rapidly becoming so. Apple,

cherry, and other fruit trees were in bloom on April 10th, and were caught by the freeze later in the month, which gave all vegetation a severe setback. With the exception of one week in April, there were nearly eight months of good growing weather this year.

The Mississippi River changed very little during the month from Dubuque to St. Paul, and it was the fourth month of extremely low water. The maximum stage at Dubuque was 1.4 feet on the 2d and the minimum stage, 0.9 foot from the 10th to the 15th inclusive. At the close of the month the Mississippi was falling slowly from Dubuque to St. Paul. Navigation on the Upper Mississippi remained practically closed, owing to the low water, making four months continuously that steamboats have been unable to run from St. Louis to St. Paul. The Wisconsin River was slightly higher during October than for several months previous.

ELKADER.—*Chas. Reinecke.* This was the warmest October since 1900.

ELLIOTT.—*Henry Barnes.* October was a grand month for cribbing of corn and general farm work. The many clear days were enjoyed by every one.

FAIRFIELD.—*Prof. R. Monroe McKenzie.* The month was above the average in temperature, below in precipitation and unusual in the amount of sunshine. Frost did not come until late so it has been very favorable for the corn harvesting and for winter plowing.

FOREST CITY.—*J. A. Peters.* The first killing frost of the season occurred on the 6th, but there was no damage done to corn. There has been much corn cribbed. The weather has been too dry for fall plowing and pastures are not as green as usual at this season of the year.

GRAND MEADOW (Postville P. O.)—*F. L. Williams.* The month was very favorable for ripening corn and all crops were out of the way before the hard freeze on the 29th. Fall work is well advanced.

GREENFIELD.—*R. B. Oldham.* October was a month of very clear fine weather. A good start was made in corn picking.

GRINNELL.—*D. W. Brainard.* October was a remarkable month, without any unpleasant weather.

HUMBOLDT.—*Henry S. Wells.* Corn husking begun and the crop is in good condition. Potatoes are all harvested and are keeping well.

INWOOD.—*F. B. Hanson.* October was a fine month. The first 17 days were clear with a total of 24 clear days during the month. Threshing was finished and potatoes dug with yields varying from 20 to 245 bushels per acre. Corn husking began on the 20th and became general about the 26th or 27th.

KEOKUK.—*Fred Z. Goswolsch.* The first killing frost was on the morning of the 22d and the first snow fell in light flurries on the 28th, the amount falling being unappreciable. Wheat is looking well but pastures are getting dry and in some sections water is becoming scarce. The lateness of the first killing frost, and the low water of the Mississippi River allowing the cultivation of the rich bottom lands, which are usually overflowed, has resulted in the largest crop of tomatoes for several years and canning works have been taxed to their utmost to put up the crop.

KEOSAUQUA.—*J. H. Landes.* A beautiful month for maturing and drying corn, which is now about ready for being cribbed. Pasturage is fine and fall grain looks well.

PELLA.—*John H. Ver Steeg.*—It was warm and dry during the month and favorable for farm work. The first killing frost occurred on the 22d and snow flurries on the 19th, 27th and 28th.

POCAHONTAS.—*F. E. Hronek.* October was a very dry month. Shallow wells are going dry. The weather was fine for husking corn which is in progress. The first killing frost occurred on the 22d which is the latest date for many years.

RIDGEWAY.—*Arthur Betts.* The past month was the warmest October since 1900 and the driest in 13 years. The first killing frost since May 5th occurred on the 22d.

ROCK RAPIDS.—*W. C. Wyckoff.* Corn picking began on the 24th.

SHELDON.—*A. W. Beach.* October was a splendid fall month. Corn was all matured and seasoned and husking was begun. Late potatoes were better than expected and the soil was in good condition to get them free from mud.

STOCKPORT.—*C. L. Beswick.* Very dry weather has made pasturage short and water low. Corn is ready for crib at the end of month and the yield will be about 50 bushels per acre.

WAUKEE.—*Samuel F. Foft.* Corn husking began about the 25th. The quality of corn is good and the yields range from 30 to 60 bushels with an average of 40 to 45 bushels per acre. Potatoes all dug with fair yield but acreage planted was short.

WEST BEND.—*Phil Dorweiler.* October was a fine month, but there was not enough rainfall. Wells are low and creeks are dry.

WHITTEN.—*Dr. F. P. Butler.* The first killing frost occurred on the morning of the 22d. Corn was safe and the yield will be large.

#### NOVEMBER.

There was a great contrast between the weather in November, 1909, and November, 1910. Last year both the temperature and precipitation were decidedly above the normal which was unprecedented; the average temperature being 6.5° above and the average precipitation, 4.00 inches above the normal. The snowfall was also much above the normal, the monthly amounts ranged from 8 to 29.5 inches. The heavy rains caused high stages in all streams and rivers and much of the bottom lands were flooded and the heavy snow prevented the harvesting of about 35 per cent of the corn crop.

The weather during November, 1910, was, on the whole, very pleasant and exceptionally favorable for outdoor work, the temperature and the precipitation both being below the normal. The deficiency of temperature was, however, due to uniformly low maxima rather than to abnormally low minimum temperatures. In fact, the minimum temperatures were above the normal and while there were several days on which mod-

erately low temperature prevailed in some parts of the state, the first general cold wave of the season did not occur until the last day of the month.

The precipitation was much below the normal at all stations except at Cumberland, Cass County, where there was a slight excess due to a heavy shower of rain on the 4th when 1.02 inches fell. The average snowfall was also much below the normal and 18 of the 121 reporting stations did not have even a trace of snow during the month.

Owing to the dry weather, rapid progress was made in gathering the corn crop and at the end of the month about 90 per cent of the crop had been harvested and the corn was in unusually good condition. Dry weather has not been favorable for pasturage and fall grain and the latter is not in as good condition as it was at the close of November, 1909.

All streams and shallow wells are abnormally low and the scarcity of water is becoming serious in many sections. Press dispatches indicate that several railroads are experiencing considerable trouble in supplying their engines with water. Some of the reservoirs along the line of the Burlington road are dry or nearly so, and many trains have been carrying two tenders with which to supply the water, one being entirely inadequate where such a great distance has to be covered between the water stations. The Iowa Central railroad has also experienced considerable trouble, engines are barely able to make terminals for water, the supply in the smaller towns along the line having become exhausted. This is especially true over the southeastern divisions of the road.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 113 stations, was 33°, which is 2.5° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 30.9°, which is 2.8° below the normal; Central section, 33.5°, which is 2.2° below the normal; Southern section, 35.9° which is 2.3° below the normal. The highest monthly mean was 38.4°, at Council Bluffs, Pottawattamie County, and the lowest monthly mean, 28.0°, at Estherville, Emmet County. The highest temperature reported was 76°, at Council Bluffs, Pottawattamie County, on the 8th; the lowest temperature reported was 5°, at Jefferson, Greene county, on the 3d. The average monthly maximum was 61°, and the average monthly minimum was 12°. The greatest daily range was 54°, at Council Bluffs, Pottawattamie County. The average of the greatest daily ranges was 35°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 121 stations, was 0.34 inch, which is 1.05 inches below the normal. By sections the averages were as follows: Northern section, 0.22 inch, which is 1.09 inches below the normal; Central section, 0.35 inch, which is 1.08 inches below the normal; Southern section, 0.45 inch, which is 0.99 inch below the normal. The greatest amount, 1.03 inches, occurred at Cumberland, Cass County, and the least, a trace at Carroll, Carroll County, Chariton, Lucas County, Denison, Crawford County, Forest City, Winnebago County, Sac City, Stuart, Guthrie County, and

at Whitten, Hardin County. The greatest amount in twenty-four hours, 1.02 inches, occurred at Cumberland, Cass County, on the 4th. Measurable precipitation occurred on an average of 3 days.

**SNOW.**—The average depth of unmelted snowfall was 0.7 inch. The greatest depth was 3.8 inches, at Ridgeway, Winneshiek County; 18 of the 121 reporting stations had no snow during the month.

**SUNSHINE AND CLOUDINESS.**—The average number of clear days was 13; partly cloudy, 9; cloudy, 8. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 47 at Charles City; 45 at Davenport; 56 at Des Moines; 50 at Dubuque; 44 at Keokuk; and 56 at Sioux City.

**WIND.**—Northwest winds prevailed. The highest velocity reported was 49 miles per hour from the southeast, at Sioux City, Woodbury County, on the 3d.

Thunderstorms occurred as follows: At Pacific Junction on the 20th; at Clinton, Fort Madison, and at Ridgeway on the 26th; at Amana, Delaware, Elkader, Grand Meadow, and at Independence, on the 27th; and at Dubuque on the 26th and 27th.

#### OBSERVERS' REMARKS.

**AFTON.**—*N. W. Rowell.* This has been a fine month for harvesting corn, and at the close of the month the cribs are generally full and the fields empty, allowing cattle to get in the stalks before any snow.

**ALBIA.**—*J. I. Chenoweth.* Another fine month but only .47 inch of precipitation. Water supply is falling and the ground is too dry to freeze.

**ALGONA.**—*Dr. F. T. Seeley.* This has been a dry and rather cool month. Corn husked in good shape. Many wells have given out and the scarcity of water is becoming serious especially to farmers who have a large number of cattle.

**ALLENTON.**—*Mrs. George Shriver.* The weather has been extremely dry. Corn about all husked, quality and yield good.

**ALTA.**—*David E. Hadden.* November, 1910, was very dry and with one exception, viz., 1892, was the driest November in 20 years, but the month was ideal for farm work and at its close almost all of the corn crop was picked.

**ALTON.**—*W. S. Stagle.* The roads are hard and smooth and in fine condition. New corn is being shelled and marketed freely. The river is frozen over and skating is fine.

**AMANA.**—*C. Schadt.* The weather was favorable for all kinds of farm work as well as for conveying farm produce to the market.

**ATLANTIC.**—*Thos. H. Whitney.* November was a favorable month. The days were generally more or less cloudy but little precipitation was recorded. The roads were fine throughout the month. Corn was practically all in crib at close of the month and is fully up to average in yield and quality.

**BELMOND.**—*Geo. P. Hardwick.* Although there was much cloudiness, only .33 inch of precipitation was recorded. It was an ideal month for harvesting corn, all of which is secured. Corn stalks, like grain straw, is in the best condition for feed.

**CHARITON.**—*G. C. Burr.* The month has been ideal for farm operations, except that the soil has been too dry to plow. There is no surface water.

**CHARLES CITY.**—*E. W. McGann.* The mean temperature for the month, 29.2°, is 3.8° below the normal and 10° lower than November of last year. The total precipitation, 0.29 inch, is 1.10 inches below the normal for the month and came in measureable quantity on only 2 days. Light furies of snow occurred on the 14th, 20th, 26th, and 30th, but were all too small to measure. Cloudy weather predominated; the percentage of sunshine being 47.

**DAVENPORT.**—*J. M. Sherier.* Nearly the entire month was cooler than the average although no notably low temperatures were recorded. The 7th, 9th, 26th, and the 23d to the 27th, were the only days that were warmer than the normal. While there were 11 days with a trace, or more, of precipitation, there were only 4 days with .01 inch or more, and the total precipitation of .22 inch was the lowest for any November since the establishment of the Davenport station, with the single exception of the same month in 1904, when the total was but 0.18 inch.

**DECORAH.**—*F. H. Baker.* This has been the driest November and the driest year since this station was established, 19 years ago.

**DUBUQUE.**—*J. H. Spencer.* The temperature was below the normal every day from the 1st to the 22d, inclusive, with two exceptions. It was above the normal from the 23d to the 27th, inclusive. It was the coldest November at this station in 18 years, and one of the coldest on record. It was colder by about 12° daily than during November of last year. The month, however, was characterized by continuous cold and not be extremely cold weather for any period or date. The rivers of this district changed very little during the month, and continued at a low stage. The highest stage at Dubuque was 1.0 foot on the first 20 days of the month; the lowest was 0.8 of a foot on the 24th. The Mississippi at Prairie du Chein froze over on the 30th. At Dubuque there was shore or floating ice after the 20th.

**EARLHAM.**—*Geo. Phillips.* A fine November. Corn is all gathered. Stock water is getting scarce.

**FOREST CITY.**—*J. A. Peters.* Very pleasant weather prevailed during the month. Corn is practically all cribbed. Ground frozen up at end of month but is very dry.

**INWOOD.**—*F. B. Hanson.* November was the finest month for corn husking on record, no halt on account of bad weather from start to finish, and with a few exceptions the crop is all picked. Yields reported vary from 22 to 64 bushels per acre. Water in wells is getting scarce.

**KEOKUK.**—*Fred Z. Gosewisch.* Winter wheat is looking fairly well considering the lack of moisture. All streams are very low, many cisterns empty, and the scarcity of water for stock is being felt in localities distant from running streams.

KEOSAUQUA.—*J. H. Landes.* Splendid weather for husking the big crop of corn, which is now nearly all in the crib. Too dry for pasture and fall grain and a scarcity of water is being felt.

LARRABEE.—*H. B. Strever.* The month has been an ideal one for gathering the corn crop. There was very little frost in the ground during the entire month.

STOCKPORT.—*C. L. Beswick.* There has been 14.18 inches less of precipitation during the past 11 months than there was during the same period of 1909 and not quite the amount of June, 1905. The supply of surface water is very short for winter to set in. Corn nearly all in crib.

#### DECEMBER.

December, 1910, will go on record as the driest month of that name on record since state-wide observations began in 1890. The average precipitation was only 0.37 inch, which is 0.82 inch below the normal and 1.81 inches less than the average amount in December, 1909. Except over the south-eastern counties where rain fell on the 28th or 29th, nearly all of the precipitation was in the form of snow and most of it fell on the 5th, 6th, 9th, 10th, 18th and 22d, but the amounts were too small to afford any relief from the effects of the long continued drouth and at the close of the month the ground was bare except over the northern counties where the snow was about 2 inches in depth.

The mean temperature was very nearly normal, there being a deficiency of only 0.2 of a degree. The month was characterized by the uniformly moderately low temperatures and the absence of severe storms, and to the fact that there were only one or two cold waves. The 8th and 24th were the coldest days but the temperature on those dates was only 2 or 3 degrees below zero in the southern and from 5 to 14 degrees below in the northern counties.

The weather was ideal for finishing the corn harvest and all of the crop was secured in excellent condition. Cattle lived in the pastures and stalk fields nearly all of the month, thereby, allowing a great saving of hay and grain. The dry weather has not, however, been favorable for fall wheat or young August sown alfalfa, and the drouth has caused many shallow wells and small streams to go dry. The scarcity of water has been serious in many localities, and in some instances farmers have been obliged to sell their stock on account of lack of facilities for watering it.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 117 stations, was 23.4°, which is 0.2° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 20.9°, which is normal; Central section, 23.5°, which is 0.3° below normal; Southern section, 25.7°, which is 0.5° below the normal. The highest monthly mean was 28.8°, at Keokuk, Lee County, and the lowest monthly mean, 18.2°, at Elma, Howard County, and Forest City, Winnebago County. The highest temperature reported was 57°, at Baxter, Jasper County, on the 26th; the lowest temperature reported was—14°, at Britt, Hancock County, on the 24th. The average monthly maximum was

50°, and the average monthly minimum was —5°. The greatest daily range was 54°, at Iowa City, Johnson County, and at Keosauqua, Van Buren County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 123 stations, was 0.37 inch, which is 0.82 inch below the normal. By sections the averages were as follows: Northern section, 0.32 inch, which is 0.71 inch below the normal; Central section, 0.38 inch, which is 0.32 inch below the normal; Southern section, 0.41 inch, which is 0.92 inch below the normal. The greatest amount, 1.39 inches, occurred at Burlington, Des Moines County, and the least, 0.01 inch, at LeMars, Plymouth County. The greatest amount in twenty-four hours, 1.12 inches, occurred at Burlington, Des Moines County, on the 28th. Measurable precipitation occurred on an average of 3 days.

SNOW.—The average depth of unmelted snowfall was 3.0 inches. By sections the averages were as follows: Northern section, 3.5 inches; Central section, 3.2 inches; Southern section, 2.2 inches. The greatest depth was 8.0 inches at Elkader, Clayton County; and the least, 0.1 inch, at LeMars, Plymouth County.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 7; cloudy, 9. The duration of sunshine was about the normal, the percentage of the possible amount being 55 at Charles City; 58 at Davenport; 54 at Des Moines; 50 at Dubuque; 64 at Keokuk; and 47 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 44 miles per hour from the south, at Sioux City, Woodbury County, on the 30th.

#### OBSERVER'S REMARKS.

ALMA.—*J. I. Chenoweth.* Another dry month. Very little surface water and wells are going dry.

ALGONA.—*Dr. F. T. Sealey.* This month ends the driest year on record at this station.

ALTA.—*David E. Hadden.* The month was warm and very dry. Snow that fell soon melted and the roads were excellent. The year 1910 was the driest ever recorded at this station. The precipitation of 17.49 inches being about 1.00 inch below the dry year of 1894.

ALTON.—*W. S. Slagle.* The ice harvest began December 19, with ice 13 inches thick.

AMANA.—*C. Schadt.* December was dry, with the precipitation 1.21 inches below and the temperature 1.9° above the normal. The Iowa river is lower than ever before known at this season of the year. The roads are in very good condition and afford excellent transportation facilities.

ATLANTIC.—*Thos. H. Whitney.* A fine month. Stock well maintained by dry fall pasturage, allowing great economy of hay and grain. Moisture is needed for spring as ground water is getting low.

BAXTER.—*W. R. Vandike.* The drought continued through the month, there being only .27 inch of precipitation. The weather, however, was very pleasant.

**BELMONT.**—*Geo. C. Hardwick.* At the end of the month the ice was 15 inches thick in rivers and ponds. There were no serious storms and stock lived in stalk fields about all of the month. Water is getting low and many of the shallow wells are dry.

**BONAPARTE.**—*Hon. B. R. Vale.* Total precipitation for the year, 21.13 inches, which is the next lowest to 1901, with 16.34 inches, which is the lowest in southeastern Iowa during the last 40 years. During the four crop months—April to July inclusive—there was 11.82 inches as compared with 5.84 inches for the same period in 1901.

**BRITT.**—*L. M. Goodman.* The ground is very dry and many shallow wells are dry or nearly so.

**BURLINGTON.**—*Max E. Poppe, Jr.* The stage of the river is very low. A new low water mark set. Ice cutting progressing.

**CHARLTON.**—*C. C. Burr.* There were no severe storms during the month. Wells are falling and in some cases stock is suffering for water. Feed is plentiful, but the price is high.

**CLINTON.**—*Luke Roberts.* The Chicago & Northwestern Railway is harvesting ice 14 inches thick.

**COUNCIL BLUFFS.**—*B. W. Crossley.* December was favorable for outdoor work and we have been busy digging post holes, making fence, cleaning the feed lots and building concrete foundations under buildings. Stock cattle have run on the cured grass and have been fed hay only 4 days. Winter wheat does not look very promising and does not stand the dry cold as well as does the rye. The dry weather has also been hard on the young August sown alfalfa. The wells and streams in our Missouri Loess type of soil have shown no tendency to lessen in flow and are still drawing on the copious rainfall of a year ago.

**CRESTON.**—*O. J. Colby.* The month of December was ideal for finishing the corn harvest and also for all outdoor mechanical work, and many buildings were rushed to completion.

**DAVENPORT.**—*J. M. Sherier.* Although the month was colder than the normal, there was a notable absence of marked falls in temperature, until the 23-24th, when the first cold wave of the season occurred, during which the temperature fell 25° and to the minimum of the month, -1°. Another cold wave occurred on the 29th-30th, the temperature falling 22° and to a minimum of 10° on the morning of the 30th.

Owing to the formation of ice gorges on the LeClaire Rapids, a further fall in the Mississippi River began on the 2d, a stage of -1.2 feet, the lowest on record at the Davenport station, being observed on the morning of the 5th. The stream became closed on the night of the 11-12th and at the end of the month the average thickness of the ice was about 11 inches.

**DUBUQUE.**—*J. H. Spencer.* There were no severe storms during the month and only one cold wave occurred (that of the 24th), and it was not severe. The month in general was very pleasant for December and the precipitation was the lightest at this station during December in 10 years, and all that fell was snow. The Mississippi froze over at Dubuque on the night of the 7th-8th, or several days earlier than the average date. The

water fell from 0.9 of a foot on the 1st to -0.6 of a foot on the 6th, or the lowest stage ever reached at this station. This low stage was not caused by natural conditions, however, but was due to ice gorges above Prairie du Chien, Wis. The low water at Dubuque partially cut off the water supply of the Union Electric Company for several days, and it was only with difficulty that their plant could be kept running. The water cut through the gorges on the 6th and by the morning of the 7th the water at Dubuque had arisen to 0.7 of a foot. At the close of the month the ice in the Mississippi River was 10 inches thick and dealers were beginning to put up their annual supply.

**EARLHAM.**—*Geo. Phillips.* The month closed with the ground bare and dry. Stock water is scarce.

**ELLIOTT.**—*Henry Barnes.* December, 1910, was a very pleasant month for business or pleasure; there being no violent storms and but few windy days.

**ELMA.**—*H. A. Moore.* This has been a splendid month. There were no bad storms and the roads were good. The ice harvest began with ice 18 inches thick and clear.

**FOREST CITY.**—*J. A. Peters.* An exceptionally pleasant December. Very little snow. Fine weather for cattle to run in stalks and there has been a big saving of hay on this account. Water is getting low in some wells.

**FORT MADISON.**—*Miss L. A. McCready.* The past month was very dry; water was getting scarce and the ground was extremely dry and dusty prior to the 27th.

**GRAND MEADOW (Postville P. O.).**—*F. L. Williams.* The month was dry with moderate temperature and the roads were perfect during the entire month. The weather was fine for all kinds of stock.

**GREENFIELD.**—*R. B. Oldham.* A very pleasant winter month with dry and dusty most of the time.

**GRINNELL.**—*D. W. Brainard.* December was a delightful winter month and very favorable for the care of live stock and the closing of the season's farm work.

**HAMPTON.**—*E. C. Grenelle.* The total precipitation for 1910 was less than for any year during the past 22 years. The ground is very dry, and many streams, wells and cisterns are low or dry. The weather, during the fall and winter thus far has, however, been ideal. All rough feed in fields has been available for stock, which will help a great deal in the hay shortage.

**INWOOD.**—*F. B. Hanson.* December was a beautiful month, with moderate temperature, no rain and little snow, thereby making the conditions favorable for saving a vast amount of feed for stock and making travel on roads excellent. The total precipitation for the year 1910 was 18.94 inches, which is 17.53 inches less than the total amount for 1909 and 11.37 inches below the normal.

**KEOKUK.**—*Fred Z. Gosewisch.* Winter wheat has suffered considerable damage from the prolonged drought and in many places the soil has been blown away from the roots, leaving them exposed. The scarcity of water



DATES OF KILLING FROSTS, 1910.

STATIONS	Killing Frosts		STATIONS	Killing Frosts		STATIONS	Killing Frosts	
	Last in Spring	First in Autumn		Last in Spring	First in Autumn		Last in Spring	First in Autumn
Alton	April 20	Oct. 22	Elma	May 14	Oct. 6	Northwood	May 5	Oct. 22
Albia	April 25	Oct. 13	Estherville	May 26	Oct. 21	Odeholdt	May 13	Oct. 22
Algon	May 13	Oct. 6	Fairfield	April 25	Oct. 21	Olin	May 14	Oct. 22
Allerton	May 25	Oct. 22	Fayette	May 26	Oct. 6	Omaha, Neb.	April 21	Oct. 23
Alton	May 4	Oct. 21	Forest City	May 4	Oct. 6	Onawa	May 4	Oct. 22
Alton	May 13	Sept. 27	Fort Dodge	May 4	Oct. 6	Osage	May 5	Oct. 22
Anna	May 5	Oct. 22	Grand Mendon	May 5	Oct. 22	Oskaloosa	May 14	Oct. 22
Annes	May 14	Oct. 22	Greene	May 14	Oct. 22	Ottumwa	May 25	Oct. 22
Atlantic	May 27	Oct. 22	Greenfield	May 13	Oct. 22	Pacific Junction	April 13	Oct. 22
Audubon	May 4	Oct. 22	Grundy	April 24	Oct. 22	Peoria	May 13	Oct. 22
Baxter	May 13	Oct. 22	Grundy Center	May 4	Oct. 22	Pella	May 13	Oct. 22
Bellevue	May 13	Oct. 22	Guthrie	May 4	Oct. 22	Plover	May 13	Oct. 22
Bell Plaine	May 4	Oct. 22	Guthrie Center	May 4	Oct. 22	Pocahontas	May 13	Oct. 22
Bellwood	May 13	Oct. 22	Hampton	May 13	Oct. 22	Ridgeway	May 5	Oct. 22
Benson	May 13	Oct. 22	Hancock	May 13	Oct. 22	Rock Rapids	May 5	Sept. 27
Bonaparte	May 25	Oct. 22	Harlan	May 13	Oct. 22	Rockwell City	May 13	Oct. 21
Boone	May 13	Oct. 22	Hopewille	May 25	Oct. 21	Sac City	May 4	Oct. 21
Britt	May 13	Oct. 22	Humboldt	May 26	Oct. 21	Saint Charles	April 25	Oct. 22
Burlington	May 13	Oct. 22	Independence	May 14	Oct. 22	Sibley	May 16	Oct. 21
Carrroll	May 13	Oct. 22	Indianola	May 12	Oct. 22	Sigourney	May 13	Sept. 27
Cedar Rapids	May 25	Oct. 22	Inwood	May 25	Sept. 27	Sioux Center	May 13	Oct. 22
Chariton	May 13	Oct. 22	Iowa City	April 25	Oct. 22	Sioux City	May 13	Sept. 27
Charles City	May 4	Oct. 22	Iowa Falls	May 14	Oct. 6	Storm Lake	May 5	Oct. 22
Charinda	May 4	Oct. 22	Jefferson	April 25	Oct. 22	Stuart	May 4	Oct. 22
Clear Lake	May 5	Oct. 22	Keokuk	April 25	Oct. 22	Tipton	May 13	Sept. 27
Clinton	May 5	Oct. 22	Keosauqua	May 13	Oct. 22	Toledo	April 25	Oct. 22
Clifton	May 25	Oct. 22	Knoxville	April 25	Oct. 22	Wapello	April 25	Oct. 22
Columbus Junction	April 25	Oct. 22	Knoxville	May 13	Oct. 22	Washington	May 13	Oct. 22
Corning	April 25	Oct. 22	Larabee	May 13	Oct. 22	Washita	May 25	Oct. 22
Corning	April 25	Oct. 22	Le Mars	May 13	Oct. 22	Waterloo	May 25	Oct. 22
Council Bluffs	April 25	Oct. 22	Leona	May 13	Oct. 22	Waukee	May 3	Oct. 22
Creston	May 13	Oct. 22	Leon	April 25	Oct. 22	Webster City	May 5	Oct. 22
Davenport	May 25	Oct. 22	Little Sioux	May 13	Oct. 22	West Bend	May 14	Oct. 22
Decorah	May 14	Oct. 22	Logan	May 29	Sept. 27	Whittem	May 13	Oct. 22
Delaware	May 5	Oct. 22	Marshalltown	May 5	Oct. 6	Winnetts	May 13	Oct. 22
Denison	May 13	Oct. 22	Mason City	May 14	Oct. 6	Woodburn	April 21	Oct. 22
Des Moines	May 13	Oct. 22	Mount Ayr	April 25	Oct. 22			
De Soto	May 25	Oct. 22	Mount Pleasant	April 25	Oct. 22			
Drubque	May 13	Oct. 22	New Hampton	May 4	Oct. 22			
Earlham	May 14	Oct. 22						
Elkader	May 13	Oct. 22						
Elliott	May 13	Oct. 22						

CLIMATE AND CROP REVIEW.

Crop Season of 1910.

Extremely low temperatures prevailed during the first decade of January, with two notably heavy snowstorms during the first half of the month. The first being on the 4th-5th and the second on the 12th-13th. The snowfall was unusually heavy and caused a great deal of delay in railroad traffic, and the accumulating of snow caused considerable damage to buildings, especially in the northern part of the state. The roofs of numerous structures collapsed as a result of the weight of snow; the damage to property in Dubuque being estimated at about \$10,000. Snow flurries occurred at frequent intervals during the latter half of the month but the amounts of snow were small and only tended to prolong the good sleighing which began on December 5th or 6th, 1909. The ground was thoroughly covered with snow during the entire month in the northern, and most of the time in the southern districts, and as a result fall grains suffered no injury from the effects of the cold weather. The 6th and 7th were the coldest days, the lowest temperature occurring generally on the 6th, when the minimum ranged from -8° to -33° over the southern, and -18° to -35° over the northern counties.

The weather during February was exceptionally pleasant; there being no severe storms and a very small amount of precipitation. The average precipitation being only 0.46 inch which is 0.60 inch below the normal. At many stations it was the driest February in over 30 years. The temperature was, however, below the normal although the weather was moderate during most of the month. The ground was practically bare of snow over the southern counties, except from the 20 to the 24th, but over the northern counties the ground was covered with snow during the whole month. Some progress was made in gathering last year's corn but there was over 15 per cent of the crop left in the fields at the close of the month.

March, 1910, will long be remembered as having furnished more pleasant weather than any other March in the history of the state. It was the warmest and driest March on record. It gave the largest amount of sunshine; the least number of cloudy days; the least number of days with appreciable precipitation; the least number of days with freezing temperature, and less snowfall than any other March since state-wide observations began. The temperature was uniformly high and above the normal every day of the month. The highest temperature occurred generally on the 23d, and ranged from 81° to 87° over the northern, 81° to 90° over the central, and from 82 to 92° over the southern counties. There was no snowfall in excess of a trace and the rainfall was abnormally light. On the 1st of the month there was 6 to 8 inches of snow on the ground in the northern part of the state, but it had all melted by

the 9th, and as there was practically no frost in the ground the soil dried rapidly, and farmers were in the field early in the month gathering the remainder of last year's corn crop, plowing and seeding small grain. The greater portion of the corn was gathered by the 15th, and by the end of the month nearly all of the wheat and nearly 50 per cent of the oats had been seeded and considerable ground had been prepared for corn. The season at the close of the month was about 4 weeks in advance of the normal and from 5 to 6 weeks ahead of last year. Spring flowers were in bloom; elms, soft maples, and box elders were green or becoming so, even in the extreme northern part the state. Plum, cherry and apple trees were in bloom in the southern counties. Pastures and meadows were green, and some of the early sown grain was up before the end of the month. Fall grain, clover and alfalfa were generally in good condition, but there had been considerable damage by winter killing in western and southern districts.

The first half of April, like the whole of March, was dry and generally warm, but the latter half was very changeable and erratic; the temperatures fluctuating from one extreme to another, and the precipitation from rain to snow. A cold spell set in on the evening of the 14th, attended by moderate showers which changed to snow on the 15th and continued until the 18th, over the larger part of the state; the minimum temperatures on the 16th, 17th and 18th being from 3° to 12° below the freezing point in all districts, and the amounts of snowfall ranged from a trace in the southern to over 5 inches at some stations in the northeastern counties. The freezing temperatures severely damaged fruit, as apple, cherry and plum trees were in full bloom in the northern part of the state by the 10th of the month. The damage done, however, was small as compared with the damage resulting from the freeze of the 23d and 24th, when the minimum temperatures were 10° to 12° below the freezing point in the southern counties. The ground froze hard on the morning of the 23d and the 24th, and ice one inch thick formed in tubs of water. Few trees or shrubs escaped injury, and the foliage and new growth on some varieties, such as soft maples, box elders, wisteria, Virginia creeper, etc., were frozen and at the close of the month the dead leaves were falling off. After the 24th the temperature rose rapidly and the highest temperature ever recorded in the state during April was noted on the 28th, when the maximum temperatures ranged from 90° to 99° in the western counties. Practically all small grain was seeded and some corn planted before the middle of the month.

May was abnormally cold, and except over the extreme southern counties was unusually dry. Freezing temperatures occurred on one or more days in nearly all parts of the state, but as practically all the fruit was killed during April, there was little damage done. The rainfall was light and below the normal. Owing to poor seed (account of severe freezing weather on October 12th and 13th, 1909) and continuous cold weather, much of the corn failed to germinate and, notwithstanding the fact that many fields were re-planted the second and some the third time, the stand of corn was poor. The cold weather retarded the growth of vegetation and the drouthy conditions reduced the prospects of a hay

crop. At the end of the month the foliage on shade and fruit trees was about as far advanced as on April 15th.

The most notable climatic features of June were the unusually cool weather during the first half, and the high temperatures during the latter half of the month; the excessive amount of sunshine; the low percentage of humidity; the great deficiency of rainfall; the high wind velocities, and the small number of thunderstorms. It was the driest June on record. Corn made slow growth during the first half of the month, and owing to poor seed, cold weather and the activity of moles, cut and wire worms, much more replanting was done than usual. During the latter half of the month corn made rapid growth as the fields were clean and the soil was in the best of condition to withstand the effects of dry weather. On the whole June was a favorable month, although the condition of all crops at its close was somewhat below the average of the past 10 years; hay, pastures and early potatoes showed the greatest damage from the drouthy conditions.

The drouthy condition that prevailed during the latter half of June continued over the larger part of the state during the entire month of July, but the month as a whole, was in many respects ideal for agricultural pursuits. There was very few windstorms, and while it was excessively dry over the larger part of the state, the clear weather was very beneficial for haying, harvesting and threshing. Hay and all small grain was secured in excellent condition, and although the hay crop was lighter than usual, it was of the very best quality. The yield of small grain was above the average and the quality was also excellent. Corn made rapid growth and at the end of the month was strong and vigorous and earing nicely, except in the northeastern and some localities in the central and southwestern counties where the drouth had been the most severe. Pastures and potatoes were, however, severely damaged by lack of moisture. Pastures were practically bare and early potatoes were nearly a failure. Small streams and shallow wells were dry and the stage of the rivers was lower than for many years.

The drouthy conditions which had prevailed since May, continued until the middle of August, when copious and fairly well distributed showers occurred. During the latter half of the month the rainfall was generally above the normal. The temperature was normal although temperatures of 90° or above were recorded on several days between the 1st and 22d. A trace of frost was observed in some localities on the 26th, but no damage was done. The dry weather during the first half of the month was favorable for threshing, but was injurious to pastures, meadows and late potatoes, and in some sections, to corn.

Although the mean temperature was below and the average rainfall was above the normal, the month of September was favorable for farm operations and other outdoor pursuits and for maturing the late crops. Light frost occurred on low ground at several stations on the 9th and 10th and heavy frost on the 27th. Freezing temperatures occurred at several stations in the extreme western counties on the latter date, but no material damage was done except to tender vines and garden truck as the low temperature was of short duration and the corn was generally far

enough advanced toward maturity to escape injury. The precipitation was slightly above the normal and fairly well distributed. The rains stimulated the growth of grass, replenished the water supply, put the soil in fine condition for plowing and started the growth of fall sown grain. Threshing was practically finished and more seed corn was gathered than ever before during the month of September.

October was unusually warm, dry and pleasant. Corn husking began during the third week and became general during the fourth week of the month. The temperature was sufficiently high to ripen strawberries in many localities. The first general killing frost with freezing temperatures did not occur until the 28th-29th.

November and December were pleasant and dry with the temperature slightly below the normal. The corn harvest was finished early in December and all of the crop was secured in excellent condition.

Notwithstanding the fact that 1910 was the driest year on record and the spring months were abnormal, the year as a whole was a profitable one to the farmers in the state. The yields of corn and small grain were considerably above the average but the yield of hay and potatoes were materially reduced by the drouthy conditions and practically all fruit was killed by the severe freezing temperatures in April.

COMPARATIVE DATA FOR THE STATE—ANNUAL.

	Temperature				Precipitation				
	Mean Annual	Highest	Date	Annual	Annual	Greatest Annual	Least Annual	Average Snow Fall	
1890	48.0	110	July 13	-27	January 22	31.30	45.74	15.00	
1891	47.3	109	August 9	-31	February 4	33.90	49.05	23.48	
1892	46.6	104	July 11	-38	January 10	30.58	48.77	24.78	34.2
1893	45.7	102	July* 13	-36	January 14	27.59	33.27	19.19	37.2
1894	49.7	109	July 25	-37	January 25	21.04	39.31	15.65	19.2
1895	47.3	104	May 28	-33	February 1	26.77	35.25	18.77	26.0
1896	48.6	104	July 3	-29	January 4	37.23	51.00	28.68	22.6
1897	47.8	109	July* 23	-30	January 25	26.08	36.18	20.21	38.8
1898	47.7	103	August 20	-25	December 31	31.34	55.47	19.51	40.3
1899	47.3	104	September 6	-40	February 11	28.68	42.06	21.79	33.4
1900	49.3	103	August 3	-27	February 15	35.05	47.33	25.05	35.5
1901	49.0	113	July 23	-31	December 15	24.41	37.69	16.35	38.5
1902	47.7	98	July 20	-31	January 27	43.82	58.80	20.14	28.0
1903	47.2	101	August 24	-27	December 13	35.39	50.53	26.41	19.4
1904	46.3	100	July 17	-32	January 27	28.51	38.93	19.34	29.2
1905	47.2	104	August 11	-41	February 2	36.56	52.26	24.66	38.3
1906	48.4	102	July 21	-32	February 10	31.69	44.34	26.63	32.8
1907	47.4	102	July 5	-31	February 5	31.61	43.90	19.63	24.0
1908	49.5	101	August 3	-18	January 29	35.39	49.98	24.11	22.7
1909	47.4	103	August* 15	-26	February* 15	40.01	53.43	27.30	40.0
1910	48.6	108	July 16	-35	January 7	19.87	27.99	12.11	23.4

\* And other dates

## ANNUAL NORMALS FOR IOWA.

1890—1910.

Normal annual temperature, 47.8°.

Warmest year, 1894, with mean temperatures of 49.7°.

Coldest year, 1893, with mean temperatures of 45.7°.

Normal annual precipitation, 31.58 inches.

Wettest year, 1902, with total precipitation of 43.82 inches.

Driest year, 1910, with total precipitation of 19.87 inches.

Average annual snowfall (unmelted), 30.1 inches.

Greatest annual snowfall, 49.0 inches in 1909.

Least annual snowfall, 19.2 inches in 1894.

Average number of days with 0.01 inch or more of precipitation, 82.

Prevailing wind, direction, northwest.

Average number of clear days, 164; partly cloudy, 104; cloudy, 97.

## CLIMATE AND CROP BULLETINS.

*Summaries of Weekly Bulletins Issued in the Season of 1910.*

BULLETIN No. 1.—*Week Ending April 10, 1910.* After a winter of unusually heavy snowfall and steady cold weather, the crop season of 1910 opens under very favorable conditions, and from 4 to 5 weeks earlier than last year. The larger part of the state was covered with ice and snow from December 5, 1909, to the end of February, which afforded good protection to grasses and winter grains and prevented the soil from freezing, except on the surface. Although the snow melted rapidly during the last two or three days of February and the first week of March, most of the water was absorbed by the soil. The last month was the warmest and probably the driest March in the history of the state. The temperature was continuously and, most of time, abnormally high; and as there was no snow and only a little rain, farm operations began much earlier than usual. The remaining 20 per cent of last year's corn crop was gathered, most of the spring wheat and fully 50 per cent of the oats were sown; plum trees were coming in bloom, many of the forest trees, pastures and meadows were green; much of the corn ground had been plowed; gardens made and some vegetables up by the end of the month.

Since the first of April the weather has continued favorable for farm work. The seeding of small grain is nearly completed and rapid progress has been made in preparing the ground for corn. During the last week the temperature was above the normal, although light frosts occurred on the 6th and 7th.

Copious sowers occurred over the southern and eastern counties, but fair weather continued over the northwestern districts, and in the latter sections the surface soil is becoming dry. Spring wheat and oats show a good stand except in western and northwestern counties, where oats sown broadcast and not well covered, are germinating unevenly. Winter grains, pastures and meadows are generally in good condition, but re-

ports indicate some winter killing, especially in western and southern counties. The indications are favorable for an increased acreage of oats. Many potatoes have been planted. Good seed corn is scarce.

BULLETIN No. 2.—*April 17.* The first half of the week was warm with occasional light to moderate, but well distributed showers. The latter part was much colder, ending with the temperature 8 to 15 degrees below the freezing point and general snow flurries. The precipitation was timely and very beneficial especially in western sections where drouthy conditions had prevailed for seven weeks, but there was not enough of it to materially interfere with field work until Saturday. As yet it is not possible to ascertain the extent of damage caused by freezing weather to fruits, garden truck and early seeded cereals, but fruits and garden truck are undoubtedly seriously injured. The soil is in fine working condition, and rapid progress was made in plowing and preparing for corn planting. Considerable corn was planted in nearly all sections of the state and some of it is up. Grass and all small grains were doing well until Saturday, but the snow and freezing temperature will check the growth of grass, and has to some extent injured the grain crops.

BULLETIN No. 3.—*April 24.* The week opened and closed with abnormally cold weather; the minimum temperatures on four days were 3 to 12 degrees below the freezing point. The precipitation was decidedly below the normal and nearly all of it was in the form of snow. High winds and northwest gales prevailed on several days and there was a great deficiency of sunshine. In fact it was one of the most unfavorable weeks, from an agricultural standpoint, we have had in many years. Fruits and garden truck were practically all killed, except possibly some of the latest varieties. Reports vary as to whether or not small grain has been injured by the freezing weather, but there is no doubt but what the vitality of the plants has been seriously taxed, and their growth has been given a setback. The high winds certainly caused a great deal of damage to small grains, especially in the northwestern counties. Corn planting has been discontinued but fair progress has been made in preparing corn ground and 75 to 80 per cent of the plowing has been done. While pastures and meadows are in good condition, the grass is growing very slowly and warm soaking rains are needed at once to insure a normal hay crop.

BULLETIN No. 4.—*May 1.* The fore part of the week was unseasonably cold, with freezing temperature and snow flurries over the larger part of the state, but Thursday and Friday were excessively hot with high winds. The maximum temperature of those days ranged from 90 to 98 degrees, which caused an excess of temperature for the week. The precipitation was very light and at many stations, especially in the western portion of the state, it was nil. Reports indicate that the hot, dry winds and general drouthy condition, following so closely after the severe freezing weather, are affecting the grass and small grain crops in the western districts where the drouth has been the most severe. But for the state at large, those crops are in good condition generally. Rain is, however, needed in all districts to soften the surface soil and to start

the growth of the plants. The late varieties of fruit seem to have escaped serious damage from the recent freezing temperature and garden truck is recovering under the effect of warm weather. Practically all of the corn ground is ready for the planter, and planting will become general during the coming week. The season is still far in advance of the average and the general crop outlook is very promising.

BULLETIN No. 5.—*May 8.* The past week was unseasonably cool, with less than the usual amount of sunshine. The daily average temperature was about 8 degrees below the normal; light frosts were reported in the southern, and freezing temperature in the northern districts on the 3d and 4th, doing further damage to the fruit crops. The rainfall was excessive in the extreme southeast, heavy in the south and southwest; moderate in the northwest and central; and light in the north and north-eastern counties. The rains were very beneficial and oats and other small grain generally show an improvement; but there are numerous reports that some of the late sown oats have not yet germinated in the northwest and northern counties on account of the surface soil having been too dry and the grain not properly covered. Considerable corn was planted during the week, but the work was interrupted by rain in the southern and is held back in northern districts owing to the cold weather; farmers being afraid to risk planting under unfavorable conditions. Grass in pastures and meadows has made slow growth, but shows some improvement in condition in western and southern counties where the rainfall was the heaviest. For the state at large the conditions are promising and the week closes with indications of warmer and more favorable weather.

BULLETIN No. 6.—*May 15.* The past week was unseasonably cool, and except in the extreme southeastern county it was abnormally dry prior to the 15th. Frost occurred generally on the 12th, 13th and 14th with freezing temperature on the last date in northern districts. There was, however, more than the average amount of sunshine and rapid progress was made in corn planting. Fully 70 per cent of the corn has been planted with the ground generally in excellent physical condition, but owing to the cold weather the seed is germinating very slowly, and considerable replanting will be done especially in southern districts where the ground is damp from the heavy rains of the previous week. Small grain and grass, while making slow growth, are doing as well as could be expected under the unfavorable conditions and some improvement is reported. Early potatoes which were frozen in April are coming up again and are looking well. The prospects for fruit are very poor. The week closes with rain falling in all parts of the state.

BULLETIN No. 7.—*May 22.* Continued cool weather has prevailed during the last seven days, but the rainfall, for the state as a whole, has been much heavier than during any previous week of the season. The temperature was from one to five degrees below the normal and light frost was reported from several localities on the 18th. Copious rains fell in the central and northeastern districts where amounts from one to over three

inches were reported. The rain has been very beneficial to grass, small grain, potatoes and garden truck and with warm weather would hasten the germination of corn. Practically all the corn acreage has been planted, but owing to poor seed and cold weather there will be much more replanting done than usual. The rains have also been beneficial to the berry crops and the indications are now favorable for one-fourth to one-half crop of strawberries. Many apple, cherry, plum trees and grape vines are again putting forth new blossoms.

**BULLETIN No. 8.—May 29.** The past week was unseasonably cold with little or no rain until Saturday when light to moderate showers occurred over the larger part of the state. The daily mean temperature was about 7 degrees below the normal, and light frost occurred in many localities on two or three mornings, but the damage was inconsiderable except that the low temperature prevents the germination and growth of corn. Replanting is general and some fields have been planted three times. Good seed corn is exhausted and the prospects for an average stand are very unfavorable. In addition to the damaging effects of the low temperature, cut and wire worms are becoming very active, especially on sod ground. All small grain, grass and potatoes have made considerable improvement during the last seven days, due to the copious rains of the previous week and those crops are generally in good condition except that grass in meadows and pastures is short for the season of the year and the hay crop will be much lighter than for the past two or three years. All fruit crops will be light.

**BULLETIN No. 9.—June 5.** Another cool and dry week has been added to the record of this erratic season. The mean temperature was about 9 degrees below the normal with a decided deficiency of rainfall and less than the usual amount of sunshine. While light showers occurred in nearly all sections of the state the amounts of rainfall were insufficient to be of much benefit except to retard the further drying of the surface soil. Replanting of corn is still in progress and the late planting is showing a better stand than was expected, but on account of poor seed, cold weather and the ravages of moles, cut and wire worms, there will not be over 65 per cent to 75 per cent of an average stand. The cold weather has also retarded the growth of corn and cultivation is only just beginning in the early planted fields. Small grain and especially oats has made satisfactory progress and are still in good condition. Rye is in bloom in southern, and early potatoes are in blossom in the northern districts. Grass in meadows and pastures is short, but otherwise in fairly good condition. The soil is in exceptionally fine tilth and with a good soaking rain and a few days of warm weather all crops would improve rapidly although it is now too late to expect an average crop of hay, even with the most favorable weather. Tree fruits will be nearly a failure.

**BULLETIN No. 10.—June 12.** The average temperature of the past week was about 7 degrees below the normal with light frost in northern counties on the 7th, but yet it was the most favorable week, for crop growth, we have had this season. Copious showers occurred over the larger part of the state and the last three days were moderately warm. The rainfall

was quite heavy and above the normal over about two-thirds of the state; the heaviest being in the Des Moines valley and especially in the northern half, where the weekly amounts ranged from 2.00 to over 3.00 inches. The rainfall was extremely light over the northeastern and extreme southwestern counties. Grass, small grain, and potatoes have improved under the effect of the recent rains and corn shows better color and is growing more rapidly since the advent of warm weather. Cultivation of early planted cornfields is general, but replanting still continues in all sections of the state. Winter grains are in bloom in central and are heading nicely in southern districts. Spring seeding is showing up well and gives promise of a good stand. Timothy is heading short and the hay crop will be light.

**BULLETIN No. 11.—June 19.** The weather during the past week was ideal for the growth and cultivation of corn. The temperature was about 5 degrees above the normal and while there was a total absence of rainfall over the larger part of the state, there was a decided excess of sunshine. Under these favorable conditions the entire week was devoted to work in the cornfields, which are now generally clean. The stand of corn has been improved by replanting and the crop as a whole, is improving rapidly. Rain is however needed, especially over the eastern and extreme western counties where the showers were light during the previous week. All small grains have made good progress and are heading nicely. Oats especially, are in exceptionally good condition and give promise of a large yield although the straw is short. Preparations are being made to begin the harvest of the light hay crop, at an early date. Potatoes are holding their own and the early ones are now ready for market.

**BULLETIN No. 12.—June 26.** Another week of ideal corn weather has caused a decided improvement in the condition of that crop. The plants have made an abnormally rapid growth; the fields were never cleaner at this time of the year and the soil is in the very best physical condition to withstand the effects of dry weather. Some of the early planted corn, in southern counties, is "knee high" and will be laid by during the coming week. The average temperature was about 8 degrees above the normal, and the maximum temperatures were above 90 degrees every day of the week. There was also an excessive amount of sunshine, but the rainfall was much below the normal. In fact the precipitation was practically nil over a large part of the state. There were, however, light and widely scattered showers over the central counties during the last three days which will be of great benefit in the localities where they occurred. All small grains are doing remarkably well but will soon need rain. Pasture and early potatoes are showing the effect of the drouthy conditions more than any other crops. Clover hay harvest has begun and some timothy has been cut in southern counties and the reports indicate a fairly good yield of the former, but the latter crop will be light in all parts of the state.

**BULLETIN No. 13.—July 3.** Excessively high temperatures continued during the past seven days with nearly 100 per cent of sunshine and very little or no rain. Late reports, however, show that the showers,

during the last two days of the previous week, were more general and the rainfall heavier than was indicated in the last bulletin. Corn has made rapid progress and is now up to the normal stage of growth for July 4th. Much of it has been laid by with the fields clean and the soil in good condition. Hay making is in progress and the crop, although lighter than for the past few years, is being secured in good condition. Small grain is holding its own against the drouthy conditions and with the exception of a few localities where showers have not occurred, is in very good condition and gives promise of good yields. Winter wheat harvest has begun in some of the southern counties and many fields of barley and early oats will be ready for the binder during the coming week. Pastures and early potatoes have been seriously injured by the dry weather and late potatoes would be improved by rain.

**BULLETIN No. 14.—July 14.** The weather during the past seven days has been ideal for haying, harvesting, and laying by the remainder of the corn crop; the general conditions being somewhat more favorable than during the previous week. The excessive temperature was not as great and showers were more general although the rainfall was very light over the larger part of the state, and practically nil over the eastern counties until Saturday evening. Copious to heavy and well distributed showers occurred over the northwestern and north central districts on the 6th and again on the 9th, and reports indicate much improvement in crop conditions in those sections. While the drouth has continued over the larger part of the state, corn and small grain have made considerable advancement. Small grain is filling and ripening nicely except in a few localities where the drouth has been of long duration. Corn has made rapid growth and shows little or no effect of dry weather. It has, however, reached that stage of development where it will require more moisture to keep up its normal growth than it has had in the past few weeks. Good progress has been made in haying and the conditions have been favorable for securing an excellent quality of hay, although the yield is below the average. The bulk of the winter wheat is in shock and many fields of barley and early oats have been cut, with prospects of fair to good yields and excellent quality of all small grain. Potatoes and pastures need rain badly.

**BULLETIN No. 15.—July 17.** Though the maximum temperatures on the 16th were up to or near the century mark, the mean temperature of the past week was about 2 degrees below the seasonable average. The rainfall was decidedly below the normal although heavy showers occurred in the northwestern, the extreme east central and southeastern counties, and light to moderate showers were reported from all other sections except the northeastern counties where the drouth has been the most severe. With the exception of the northeastern counties the rainfall has been sufficient to keep up the rapid growth of corn but not enough to interfere with the hay and small grain harvest nor for pastures and potatoes except in the localities where heavy showers occurred. Early corn is beginning to tassel and practically all of the late corn has been laid by with the fields clean and the soil in fine tilth. Haying and small grain harvest are

progressing rapidly under ideal weather conditions and threshing has begun in southern districts. Winter wheat, early oats and barley are practically in shock and late oats and spring wheat are nearly ready to cut. The quality of hay is excellent, but the yield is light although meadows that were not pastured in the spring are producing more than was anticipated. No returns have been received from threshers, but fair to good yields of small grain are indicated generally. Pastures and potatoes need rain badly. Stock water is getting low in many localities.

**BULLETIN No. 16.—July 24.** The mean temperature for the past week was slightly below the normal, the days being bright and hot and the nights moderately cool. The rainfall was much below the average and badly distributed, a few localities reporting copious showers while the bulk of the state received little if any relief, and the drouth is unbroken. The heaviest rainfall, as in the past two weeks, was reported from the northwestern counties, but copious showers occurred in some localities in the northeastern district. Corn has held its own remarkably well and up to date has suffered little if any damage, but the crop has reached the danger line and will begin to retrograde if rain does not come soon. In some localities where showers have not occurred recently, the plants wilt and the leaves curl during the day but still maintain a healthy color. The bulk of the hay and small grains have been cut and secured in excellent condition. Threshing is becoming general and early reports indicate a full average yield. The quality of all grain is far superior to anything we have had for several years. Pasturage is so short that stock feeding is necessary in many localities. The potato crop continues to deteriorate except where heavy showers have occurred.

**BULLETIN No. 17.—July 31.** The average temperature for the past seven days was very near the normal, but the rainfall was decidedly below the average for the last week in July, although showers occurred on the 25th and 29th in all but the northeast part of the state. At many stations in the Des Moines, Iowa and Skunk Valleys the amount of rainfall exceeded one inch; the largest being 3.97 inches at Keosauqua. Corn on low ground and deep soil, and where the showers were heavy, still holds its own and has made satisfactory progress, but over the northeastern counties where there has been little or no rain and in many other localities where the soil is thin and the rainfall has been light, there are indications of firing. Three-fourths of the crop, however, is in excellent condition and can stand another week of dry weather, but the other fourth needs rain at once. Conditions have been favorable for haying, harvesting and threshing. Preliminary reports from thrashers indicate that the quality of small grain is excellent and the yield will be considerably above the average of past years. Except where the rainfall has been the heaviest, pastures are practically bare and afford but little feed for cattle. Stock water is getting scarce in many localities. A heavy and general rain is needed badly in all parts of the state.

**BULLETIN No. 18.—August 7.** Light to heavy showers occurred over nearly all parts of the state on the night of August 2d, but in some localities the rainfall was not heavy enough to afford more than tempor-

ary relief from drouthy conditions. The showers were, however, timely and beneficial and in a few sections where rains have been frequent and heavy, the corn crop is now assured. On the other hand, the crop has deteriorated over the northeastern counties and in many localities of small area in the central districts where the showers have been few and the rainfall light. The bright sunshiny days and moderate temperatures have been favorable for thrashing and this work has progressed rapidly with very satisfactory results, both as to yield and quality of grain. The bulk of the shock thrashing is completed and early reports indicate that the average yield of oats will be about forty bushels per acre; wheat, twenty-five bushels; barley, thirty-two bushels, and timothy seed, four bushels. Pastures, meadows and potatoes are suffering for moisture and rain is needed for all growing crops and for fall plowing in southern counties.

BULLETIN No. 19.—*August 14.* The temperature was slightly and the rainfall decidedly below the normal, except over about twenty of the southwestern counties where heavy rains fell during Friday night and Saturday morning; the amounts of rainfall in that section ranged from one to nearly six inches. Light to moderate showers occurred over the central and northwestern counties, but little or no rain fell in the eastern districts. Owing to moderate temperature, light wind velocity, partly cloudy weather and scattered showers; corn has held its own remarkably well, and over two-thirds of the state is still in good condition, but rain would be beneficial in all sections. Over the northeastern, and in many localities in the central counties, the crop has been materially damaged by the drouth. There are many barren stalks and the ears that have started show poor development. The late corn is also shooting slowly. In some of the earliest planted fields, corn is now in the roasting-ear stage. Thrashing is progressing rapidly under favorable weather conditions, and reports continue to indicate very good yields and excellent quality of all small grains. There has been practically no growth of grass in pastures and meadows and fall plowing is being retarded on account of lack of moisture. Potatoes and garden truck are suffering for rain and stock water is getting low in many sections.

BULLETIN No. 20.—*August 21.* The past week was very favorable for corn and other growing crops. The mean temperature was about 3 degrees above normal, and there was an excess of rainfall over the larger part of the state. Copious and well distributed showers occurred on several days over all but the south central and southeastern counties, and the drouth is practically broken. The rains have been of great benefit to corn, especially in the late planted fields. Grass has revived and pastures and meadows are again looking green. The second crop of clover is growing rapidly and the indications are favorable for a good yield of seed. Two-thirds of the corn is in excellent condition, and, with normal weather until the end of September, will produce considerably more than an average crop. The remaining third of the crop has been injured, to some extent by the long continued drouth, but most of it will make decided improvement during the next week or ten days on account of the late rains. The rains came too late to be of benefit to most of the potatoes.

Fall plowing is progressing rapidly, with the soil in fine tilth, and the indications are favorable for an increased acreage of winter wheat. Thrashing and stacking was delayed somewhat during the first part of the week by showers.

BULLETIN No. 21.—*August 28.* The fore part of the week was excessively warm, but the latter half was cool and pleasant. A trace of frost was observed, on low ground, on the morning of the 26th in several localities in the central, western and northern districts, but no damage was reported. Last year the first light frost occurred on August 29th. The rainfall was light and considerably below the normal except over the east central counties where copious to heavy showers occurred on Wednesday night. A severe rain and hail storm passed over portions of Henry and northern Van Buren counties on the night of the 20th which did a great deal of damage to crops. Over the larger part of the state corn is holding its own and the early planted fields are making satisfactory progress towards maturity, but in other localities, comprising about one-third of the state, there has been some loss on account of lack of moisture. The crop as a whole is a week to ten days later than the average for the last week in August. Fall plowing is progressing rapidly in localities where rains have been heavy enough to soften the ground. Thrashing is nearing completion in many sections, and reports continue to show good yields and excellent quality of all small grains.

BULLETIN No. 22.—*September 4.* The past seven days were generally cloudy and damp, with the average temperature one to three degrees below the normal. Rain fell in some part of the state every day of the week, and as nearly all sections have received more or less moisture, there has been a decided improvement in crop and soil conditions. Pasturage and aftermath in meadows have made rapid growth and are now furnishing sufficient feed for stock, and thereby checking the rush of cattle to market. Fall plowing is progressing rapidly. Some of the late potatoes will be benefitted by the rains, but the crop as a whole will be far below the average. There has been enough moisture over the larger part of the state to mature the corn crop, but warm sunshiny weather is needed for the next four weeks to place the whole of the crop beyond danger of frost. Thrashing was delayed in the western counties where the rainfall was the heaviest. Reports continue to indicate more than the average yield of grain.

BULLETIN No. 23.—*September 11.* The fore part of the week was warm and generally cloudy, with showers over the larger part of the state, but Friday and Saturday were unseasonably cool. Light frost occurred on low ground, in all sections, on the morning of the 10th, but no damage was done to corn although the temperature was below the freezing point in many places. Corn has made fair progress toward maturity and probably a third of the crop would not be seriously injured by a heavy frost. More than the normal amount of corn will be harvested for fodder and silage and seed corn will be selected earlier than usual. Plowing is progressing and the seeding of fall grain has begun in southern counties. Potatoes have improved since the late rains and pastures are generally

in good condition. The latest thrashing returns give promise of a total yield of about 170,000,000 bushels of oats.

BULLETIN No. 24.—*September 18.* Until Saturday the weather was cool and generally cloudy with frequent and fairly well distributed showers. The rainfall exceeded two inches over most of the central and south central counties, and in some localities the rain for the week was the heaviest since May. Corn has made good progress toward maturity notwithstanding the cool, cloudy weather, and from 65 to 70 per cent of the crop is safe from injury by an ordinary heavy frost. Much of it would, however, be damaged by severe freezing weather. Considerable seed corn has been picked and much more than the usual amount of corn is being cut for fodder and silage, to offset the shortage of the hay crop, especially in the northeast counties. Late potatoes continue to improve and while the crop will be much below the average in yield, the quality will be good. Fall plowing and seeding winter grains are progressing rapidly under favorable conditions. The acreage of winter wheat will be increased materially. The week closes with much higher temperature and the weather chart indicates good ripening weather for several days at least.

BULLETIN No. 25.—*September 25.* The first three days of the week were clear and very warm, but the last four were cloudy and cool with generally heavy rain on the 22d and 23d. Corn made rapid progress toward maturity during the early part of the week and about 85 to 90 per cent of the crop is now safe from an ordinary frost. Much of the remainder will require ten days to two weeks to be safe from damage from heavy frost, and would be seriously injured by freezing temperature within that time. Rapid progress was made during the early part of the week in cutting corn and filling silos. The late rains have put the ground in fine condition for fall plowing and that work, together with seeding fall grain, is progressing rapidly, with a large increase in the acreage of wheat. The early sown winter wheat is up and is growing nicely. Considerable hay was put up, especially on the Missouri river bottoms. Late potatoes continue to improve where the vines were not killed by the drouth, but the crop will be light. Pastures are in excellent condition for fall and winter feed.

BULLETIN No. 26.—*October 2.* The week was very favorable for ripening corn and the crop is now practically safe from any damage by frost. There is, however, a small percentage of the crop in the late-planted fields that will need another week of good weather to fully mature. With the exception of the 26th and 27th the weather was ideal. Light rain fell on the 26th and light to heavy frost occurred on the 27th, but no material damage was done. A great deal of interest is being taken in the selection of seed corn and more seed was harvested in September than ever before. The rains of the previous week and the early part of the past week were very beneficial for fall plowing, pastures, meadows and winter grains. Most of the silos have been filled and much more than the usual amount of corn has been put in shock. Fall grains are up and growing nicely. In spite of the severe freezing weather in April and May and the

drouth during the summer months, the harvest has been profitable, and with a few exceptions very bountiful. Tree fruits were practically killed and berries seriously injured by the late frosts of spring and the hay and potato crops were shortened by the drouth, but the small grains were above the average in quality and yield. Corn was damaged considerably by the lack of moisture, but the average yield will be above the normal and the total yield will probably be over 300,000,000 bushels. The shortage of the hay crop has been made up largely by the extra amount of corn cut for fodder and the excellent condition of fall pastures. The potato crop will be smaller than usual, but the quality will be fairly good.

#### IOWA CROP REPORT, JUNE 1, 1910.

##### *Acreage of Farm Crops, Estimated Condition of Staple Crops, Fruits and Live Stock.*

The crop season of 1910 opened much earlier than usual. March and the first half of April was warm, dry and abnormally pleasant, affording an unusual opportunity for field work and favorable conditions for the growth of vegetation. At the end of March nearly all of the wheat and about 50 per cent of the oats had been seeded and a large acreage of ground had been prepared for corn. By the middle of April all small grain had been sown and considerable corn had been planted. The latter half of April and all of May was exceptionally cold and generally dry so that by the end of May the season, so far as the growth of vegetation was concerned, was 10 days to 2 weeks behind the average.

CORN.—Owing to the fact that much of the meadows, pastures and fall grains were winter killed and to the favorable conditions for preparing the ground, the acreage of corn has been increased about 2 per cent. The stand is, however, from 25 to 30 per cent below the average on account of poor seed, activity of cut and wire worms, and the continued cold weather which prevented germination, and the growth of the plants so that the condition on June 1st was 79 per cent. Last year at corresponding date the condition was rated at 94 per cent. The soil is in exceptionally fine physical condition and with favorable weather during June the condition of corn will improve rapidly.

WINTER WHEAT.—There has been a decrease of about 9 per cent in the acreage of winter wheat owing to winter killing, so the estimated acreage on June 1st was 91 per cent and the condition 88 per cent. Last year the condition was 92 per cent.

SPRING WHEAT.—Acreage decreased 1 per cent, making present acreage 99 and the average condition, 96 per cent. Last year the condition on June 1st was 94 per cent.

OATS.—The acreage of oats is placed at 100 per cent and the condition at 94, as compared with a condition of 90 per cent last year.

**BARLEY.**—Acreage seeded, compared with last year, 93 per cent, and the average condition, 93 per cent. Last year the condition was 94 per cent.

**RYE.**—Acreage, 94; estimated condition, 90 per cent as compared with 94 per cent last year.

**FLAX.**—Area seeded, 97 per cent; condition, 90 per cent.

**POTATOES.**—Acreage planted, 100 per cent; condition, 97 per cent. Last year condition 96 per cent.

**MEADOWS.**—There has been a reduction of about 3 per cent in the area of meadows, the acreage being 97 per cent. The condition 79 per cent, as compared with 97 per cent last year. Grass started early this spring but the condition has been reduced by drouth and much freezing weather during April and continued subnormal temperature during May.

Pastures are about 99 per cent in acreage and 81 per cent in condition as compared with a condition of 97 per cent, last year.

**POP CORN.**—The acreage is 100, and the condition is 85 per cent.

**SWEET CORN FOR CAN.**—Acreage 102; condition 82 per cent.

**CONDITION OF FRUIT.**—As compared with an average crop.—Apples, 12 per cent; plums, 7; peaches, 2; grapes, 31; cherries, 8; strawberries, 46; raspberries, 32; blackberries, 48 per cent.

**CONDITION OF LIVE STOCK.**—Cattle, 97 per cent; hogs, 97; horses, 99; sheep, 98; foals, 93; spring pigs, 91 per cent.

The acreage of crops cannot be tabulated until the returns of the township assessors are received from all the counties. The complete report of acreage will be published in July.

#### IOWA CROP REPORT, JULY 1, 1910.

Following is a summary of reports received from crop correspondents of the Iowa Weather and Crop Service, showing the estimated conditions of staple crops July 1, 1910, as compared with the average condition on that date in past years: Corn, 89 per cent; winter wheat, 87; spring wheat, 92; oats, 92; rye, 92; barley, 90; flax, 85; hay, 68; pastures, 70; potatoes, 86; popcorn, 92; sweet corn for can 89; apples 6; plums, 4; grapes, 30.

Condition July 1, 1909, corn, 92 per cent; winter wheat, 96; spring wheat, 95; oats, 91; rye, 96; barley, 94; flax, 94; hay 100; pastures, 103; potatoes, 100; apples, 76; plums, 68; grapes, 85.

July 1st average of the past ten years: corn 90 per cent; winter wheat, 94; spring wheat, 93; oats, 90; rye, 95; barley, 93; flax, 92; hay, 90; pastures, 8; potatoes, 98.

#### IOWA CROP REPORT, AUGUST 1, 1910.

Following is a summary of reports from crop correspondents of the Iowa Weather and Crop Service, showing the estimated condition of staple crops August 1, 1910, as compared with the average condition on that date in past years. There has been a decided improvement in the condi-

tion of corn during the past month, over the larger part of the state and especially over the northwestern, southeastern and many of the southern counties where showers have been timely and rainfall sufficient to keep the plants growing rapidly. On the other hand the condition has declined over the northeastern and some of the southwestern counties, due to a deficiency of moisture. The average condition of corn for the four quarters of the state are as follows: Northwest quarter, 97 per cent; northeast, 80 per cent; southeast, 96 per cent, and southwest, 89 per cent, which makes an average for the state of 90.5 per cent. The average condition for the western half of the state, which has 57 per cent of the corn acreage, is 93 per cent as compared with 88 per cent for the eastern half.

The average condition of spring wheat was 102 per cent; oats, 101; barley, 99; flax, 88; hay, 70; pastures, 59; potatoes, 63; apples, 4; grapes, 28; pop corn, 87; sweet corn for can, 85 per cent.

The condition on August 1 1909 was: Corn, 91 per cent; spring wheat, 92; oats, 92; barley, 87; flax, 93; hay, 101.5; pastures, 102; potatoes, 92; apples, 65; grapes, 80 per cent.

August 1st average of the past 10 years: Corn, 86.5 per cent; oats, 85; spring wheat, 87; barley, 88; flax, 88; hay, 93; pastures, 92; potatoes, 97; apples, 57; and grapes, 82 per cent.

#### IOWA CROP REPORT, AUGUST 25, 1910.

Following is a summary of the August 25th reports received from crop correspondents of the Iowa Weather and Crop Service. The average condition of the corn crop was estimated as 89 per cent, which is 1.5 per cent lower than on August 1st.

It was estimated that with normal weather, about one-third of the corn would be safe from frost by September 15th; 60 per cent on the 25th; 75 per cent on the 30th, and 95 per cent on October 10th.

The average condition of late potatoes was 53 per cent or 10 per cent less than on August 1st.

About two-thirds of the threshing has been completed and preliminary reports indicate average yields as follows: Winter wheat, 23 bushels per acre; spring wheat, 21; oats, 39; barley, 30; rye, 21, and timothy seed, 3.6 bushels. The average yield of grain is subject to change after the receipt of final and more complete reports at the end of the season.

#### FINAL REPORTS FOR THE STATE—TOTAL YIELD OF SOIL PRODUCTS—VALUE AT FARM PRICES, DECEMBER 1, 1910.

Following is a summary of reports from crop correspondents of the Iowa Weather and Crop Service and Threshermen, showing the average yield per acre and total yields of staple soil products, and the average prices at the farms or nearest stations, December 1, 1910. The value gained by feeding farm crops for production of live stock, poultry and dairy products, is not taken into consideration in this report.

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**CORN.**—The estimated acreage of the corn crop is 8,940,300 acres and, notwithstanding the fact that the average precipitation for the state for the 9 months, January to September, inclusive, was only 18.41 inches, which is 8.72 inches below the normal and the least amount for a like period in the past 21 years except in 1894, when the total for the same months was 17.40 inches, the average yield is 39.7 bushels per acre, and the total output for the state appears to be 354,506,500 bushels. This is the largest yield with one exception ever credited to the state. In 1906 the total yield was 388,348,920 and the average yield was 41 bushels per acre. At the average farm price, 36 cents per bushel, this year's corn crop is valued at \$127,622,340.00. Nearly all of the crop is now in cobs and the condition of the corn was never better.

**OATS.**—Average yield, 38.9 bushels per acre; total crop, 162,228,970 bushels; farm price, 27 cents; total value, \$45,421,822.00.

**SPRING WHEAT.**—Average yield per acre, 20.2 bushels; total yield, 5,920,100; farm value at 86 cents per bushel, \$5,141,286.00.

**WINTER WHEAT.**—The average yield of winter wheat was 22.3 bushels per acre; total yield, 4,125,820 bushels; average farm price, 86 cents per bushel; value of crop, \$3,548,205.00.

**BARLEY.**—Average per acre, 30.5 bushels; total yield, 16,294,850 bushels; farm price, 56 cents per bushel; total value, \$9,125,116.00.

**RYE.**—Average yield 18.8 bushels per acre; total crop 738,840 bushels; farm price, 61 cents; total value, \$450,692.00.

**FLAX SEED.**—Average per acre, 10.2 bushels; total product, 172,840 bushels; total value at \$2.28 per bushel, \$394,075.00.

**POTATOES.**—Average yield per acre, 79 bushels; total product, 10,776,000 bushels; average farm price, 48 cents; total value \$6,250,080.00.

**HAY.**—Average per acre, 1.15 tons; total yield, 4,903,300; farm price on December 1, \$9.75; total value, \$47,807,175.00.

TABULATED CROP SUMMARY.

Corn	354,506,500 Bu.	\$ 127,622,340.00
Oats	162,228,970 Bu.	45,421,822.00
Spring wheat	5,920,100 Bu.	5,141,286.00
Winter wheat	4,125,820 Bu.	3,548,205.00
Barley	16,294,850 Bu.	9,125,116.00
Rye	738,840 Bu.	450,692.00
Flax	172,840 Bu.	394,075.00
Potatoes	10,776,000 Bu.	6,250,080.00
Hay	4,903,300 Tons	47,807,175.00
Pastures and grazing	Estimated	94,500,000.00
Timothy and clover seed	Estimated	1,000,000.00
Alfalfa and millet	Estimated	610,000.00
Sweet corn	Estimated	700,000.00
Pop corn	Estimated	400,000.00
Fruit crops	Estimated	3,000,000.00
Garden truck	Estimated	5,000,000.00
Miscellaneous crops	Estimated	12,000,000.00
<b>Total value</b>		<b>\$ 369,470,791.00</b>

IOWA CROPS, 1910—NUMBER OF ACRES BY COUNTIES

Counties	Corn Acres	Oats Acres	Spring Wheat Acres	Winter Wheat Acres	Barley Acres	Rye Acres	Flax Acres	Potatoes Acres	Hay Acres	Pastures Acres	Alfalfa Acres	Pop Corn Acres	Sweet Corn Acres
Adair	167,569	27,340	2,330	95	2,819	30		1,039	30,493	114,256	30	45	
Adams	30,850	30,850	1,240	2,250	2,070	50		1,000	40,250	90,850	75		60
Adair	65,000	32,000	900	2,700	15,000	400	45	1,000	40,250	130,000	20	5	
Adair	48,500	32,000	400	2,000	8,000	35		400	40,000	80,000	45		
Adair	32,000	32,000	5,000	1,115	12,500	35		1,000	22,400	315,000	20		2,000
Adair	335,000	62,123	3,000	60	12,500	1,000	70	2,500	40,000	100,000		110	1,500
Adair	80,000	51,000	1,000	60	1,300	2,250		1,300	40,000	77,500	55	10	
Adair	112,700	51,000	1,010	1,130	1,310	1,300		1,300	40,300	68,000		130	1,140
Adair	60,000	50,000	130	183	4,000	500	10	1,300	55,500	102,300		2	800
Adair	85,300	50,000	270	110	1,870	10	12	1,500	43,700	73,000	70	130	140
Adair	98,500	74,300	400	60	2,720	60	50	2,000	35,100	80,400	25	10	210
Adair	97,500	70,000	280	60	2,000	60	15	2,000	32,700	72,700	40		
Adair	81,000	81,000	230	110	2,000	60	30	1,300	42,250	100,800	05	130	400
Adair	114,000	33,000	6,000	173	6,300	680		1,300	47,800	98,400			200
Adair	136,000	55,000	10,770	3,076	5,730	30		1,300	50,000	77,200			
Adair	102,500	31,000	1,300	1,500	13,700	130	210	1,700	41,800	81,300	90		
Adair	91,500	70,500	400	230	2,000	10	800	2,000	42,000	70,100			
Adair	69,000	69,000	900	40	6,000	300		1,300	50,000	80,700	30		
Adair	65,300	26,800	800	30	6,000	100		800	50,000	80,700	30		
Adair	65,300	26,800	800	30	6,000	100		800	50,000	80,700	30		
Adair	22,300	22,300	400	600	15,750	100	160	1,750	61,300	132,100	30		350
Adair	108,000	32,200	1,000	600	15,750	100	160	1,750	61,300	132,100	30		350
Adair	114,000	38,800	1,440	1,153	9,300	1,150		1,300	63,000	132,000	940	110	40
Adair	148,000	51,500	17,230	510	10,000	1,400		2,300	53,500	133,300	150	10	40
Adair	115,500	47,400	1,570	1,450	1,450	1,400		2,300	53,500	133,300	940	110	40
Adair	55,800	16,000	40	3,070	40	710		700	43,800	130,800	30		
Adair	62,500	19,000	50	2,800	30	330		300	39,300	113,500	30		
Adair	70,800	38,400	210	50	13,000	1,300		1,140	52,100	106,000	15	20	35
Adair	65,000	21,010	370	7,640	800	645	610	1,200	35,400	87,000	10	40	130
Adair	41,000	30,000	870	81	3,100	100		870	33,000	50,000			
Adair	65,500	46,250	600	190	2,000	230		1,970	35,010	141,300			
Adair	45,000	35,400	450		2,430	30	420	700	36,530	69,000			
Adair	85,500	56,500	700	189	13,100	450		1,600	40,000	144,000	30	110	540
Adair	75,000	66,000	55	55	13,100	640	1,880	1,600	40,000	144,000	30	110	540
Adair	95,500	82,700	610	140	4,300	200	70	2,100	45,700	81,100	30	50	15





Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley		Rye		Flax Seed		Potatoes		Hay	
	Bushels per acre	Total Bushels	Total per acre	Total Tons														
Polk	42	4,478,000 41	1,402,200 21	130,200 22	57,200 32	46,400 23	4,600	45	131,100	1.9	44,200							
Pottawattamie	38	7,029,000 35	1,333,500 18	411,200 23	85,800 25	161,900 17	5,400	52	132,000	1.6	50,600							
Poweshiek	45	4,452,500 47	1,833,000 20	53,000 38	8,400 32	174,400 21	2,300	100	97,000	1.2	50,100							
Ringgold	38	2,337,000 30	711,000 16	2,100 17	45,900 30	2,400 17	1,700	76	20,000	1.1	50,600							
Sac	43	4,876,200 48	3,048,000 22	15,200 22	5,500 38	140,000	11.7	235	135	140,000	1.1	48,200						
Scott	43	3,263,000 13	905,500 17	33,000 22	100,500 22	620,000 20	31,800	103	875,500	1.0	37,000							
Shelby	33	4,639,000 21	1,119,100 18	189,000 22	5,000 20	420,000 20	1,800	58	75,400	0.8	33,300							
St. Louis	45	7,029,000 35	2,361,000 23	283,400 30	17,400 25	500,000 18	300	12.0	420	88	154,000	0.9	45,400					
Story	47	5,607,100 43	2,385,500 20	30,400 25	30,800 24	31,200 24	4,300	13.5	300	115	114,000	1.4	58,900					
Tama	45	5,709,000 41	2,683,500 23	81,400 22	4,200 32	335,000 15	5,500	79	222,800	1.2	66,000							
Taylor	37	2,771,300 35	707,000 20	7,500 19	84,200 27	23,000 17	2,200	62	39,400	1.0	30,800							
Union	43	2,415,000 31	582,800 13	9,200 16	9,000 20	35,700 15	1,200	60	48,000	1.3	46,300							
Van Buren	42	2,538,500 28	506,200 18	1,400 18	112,500 22	3,300 14	10,000	60	18,000	1.4	49,000							
Wapello	42	2,108,400 37	555,000 20	8,000 22	81,400 20	18,500 19	9,500	65	55,200	1.4	43,400							
Warren	23	3,524,500 30	672,000 22	73,900 25	33,700 34	42,200 25	750	103	91,800	1.1	46,000							
Washington	44	4,356,000 37	1,530,800 21	38,800 22	52,800 25	31,500 20	8,400	64	46,100	1.5	58,500							
Wayne	34	2,587,400 33	891,000 18	1,000 18	29,700 30	7,500 18	1,800	73	16,100	1.1	63,800							
Webster	47	5,313,900 44	2,779,200 23	66,200 24	4,100 21	24,200 16	1,100	13.5	1,000	96	125,800	1.4	77,600					
Winnebago	38	1,797,000 30	1,296,700 20	137,600	30	152,700	11.5	6,670	52	51,200	1.2	49,700						
Winneshek	34	2,478,600 35	3,170,000 26	134,400 24	3,100 25	470,000 18	3,200	12.0	31,120	68	86,100	1.2	71,600					
Woodbury	40	6,280,000 40	2,153,600 19	164,900 20	274,000 32	396,500 17	700	13.2	490	65	122,800	1.1	51,100					
Worth	39	1,305,000 28	1,383,200 23	85,100 23	800 29	145,000 18	600	11.0	14,300	97	68,000	1.2	48,400					
Wright	42	4,179,000 43	3,190,600 24	30,000 36	2,100 21	85,000 18	350	12.0	1,820	58	73,100	1.3	60,500					
Total for state		254,506,500	168,228,970	5,920,100	4,125,820	16,294,850	738,810	172,840	10,776,000	1.15	4,908,200							
Average per acre	39.7	38.1	20.2	22.3	30.5	18.8	10.2	79	1.15	1.15	1.15							

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BIENNIAL REPORT

OF

OIL INSPECTIONS

Including Receipts and Expenditures

1908-1910

COMPILED BY

W. C. HAYWARD, Secretary of State

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