

U. S. DEPARTMENT OF AGRICULTURAL
WEATHER BUREAU

IN CO-OPERATION WITH THE

Iowa Weather and Crop Service

ANNUAL REPORT FOR 1915

GEO. M. CHAPPEL, Director

DES MOINES
ROBERT HENDERSON, STATE PRINTER
J. M. JAMIESON, STATE BINDER
1916

ANNUAL REPORT, 1915

LETTER OF TRANSMITTAL

TO HIS EXCELLENCY, GEORGE W. CLARKE,
Governor of Iowa.

Sir: In compliance with the requirements of the law, I have the honor to submit herewith the twenty-sixth Annual Report of the Iowa Weather and Crop Service, for the year 1915.

I have the honor also to submit an article pertaining to fungus diseases in Iowa for the year 1915, by Dr. L. H. Pammel, which I respectfully ask to have printed and embodied in this report.

Very respectfully,

GEO. M. CHAPPEL,
Director.

March 15, 1916.

The summaries of the monthly and weekly bulletins issued by the Iowa Weather and Crop Service, in co-operation with the Weather Bureau of the U. S. Department of Agriculture, are embodied in this report for convenient reference and comparison with past and future years.

As in past years meteorological reports have been received regularly each month from the regular U. S. Weather Bureau Stations at Des Moines, Davenport, Dubuque, Charles City, Keokuk and Sioux City, Iowa, and Omaha, Neb., and from 114 co-operative meteorological stations. Crop reports were received on the first of June, July, August, September and December, from about 1,400 correspondents, and weather-crop reports were received weekly from April to September, inclusive, from 150 correspondents who are well distributed over the state.

The Chief U. S. Weather Bureau has furnished thermometers, thermometer supports, raingauges and instrument shelters to keep the equipment of the substations up to the standard.

This office distributed 23,400 copies of the monthly Climatological Reports, and 30,000 copies of the weekly Weather-Crop Bulletins. Four hundred and fifty of the monthly reports are distributed each month through the Weather Bureau, U. S. Department of Agriculture to scientific institutions and libraries in this and foreign countries.

The daily weather forecasts were distributed by telegraph at the expense of the U. S. Weather Bureau to 70 towns, by mail to 1,060 addresses, by rural delivery to 509 addresses, and by free telephone to 80,998 subscribers.

Special frost warnings were sent during the fruit blooming season to all orchardists in the state, who were prepared to use orchard heaters in case of frost or injurious temperatures.

In addition to the regular monthly crop reports a special report was made each month during the growing season showing the condition and probable output of apples. This report was made in co-operation with the Horticultural Department, Iowa Experiment Station.

CLIMATOLOGY OF THE YEAR, 1915

GENERAL SUMMARY.—Comparing the meteorological conditions that prevailed during the year 1915 with the normal conditions, it is found that the average temperature for the state was 47.8°, or 0.4° higher than the normal. The average precipitation (rain and melted snow) was 39.53 inches, or 7.56 inches more than the normal. The average snowfall (unmelted) was 31.3 inches, or 0.9 inch less than the normal. But these differences do not give a fair idea of the actual conditions that prevailed during the year just closed. The striking features of the year were the remarkably cool summer; the frequency of showers during the crop season, the excessive cloudiness, the killing frost and freezing temperatures over the northeastern counties in August and the fact that frost occurred at some place in the state every month of the year. The summer was the coolest of record, there being an average deficiency of temperature of 4.8° per day from May 1st to September 30th, inclusive. Showers were frequent and many of them heavy, which delayed corn planting and replanting, washed out many acres of corn, prevented or interfered with haying and harvesting and ruined much of the hay and grain that had been cut. The cool, wet and cloudy weather prevented the normal development of corn, and as a result two-thirds of the crop was not fully matured at the time of the first killing frost. The yield of practically all crops was, however, nearly up to the normal, but the quality of staple field crops was far below the normal, so that the year, as a whole was one of the worst, if not the worst in the history of the state.

BAROMETER (Reduced to sea level).—The average pressure of the atmosphere for the year was 30.61 inches. The highest pressure was 30.69 inches, at Sioux City, on March 26th; the lowest pressure was 29.21 inches, at Sioux City, on February 4th. The average for the state was 1.48 inches.

TEMPERATURE.—The mean temperature for the State was 47.8°, or 0.4° higher than the normal. The highest annual mean was 52.2°, at Keokuk, Lee County. The lowest annual mean was 43.6°, at Estherville, Emmet County. The highest temperature reported was 99° at Clarinda, Page County, on May 14th. This is the first time that the highest annual temperature has been below 100° since 1902, and only the second time in 25 years. The lowest temperature reported was -32°, at Iowa Falls, Hardin County, on January 28th. The range for the state was 121°.

PRECIPITATION.—The average amount of rainfall and melted snow for the year was 39.53 inches, or 7.56 inches more than the normal and 8.60 inches more than the average in 1914. With two exceptions, 1902 and 1909, it was the wettest year since state-wide observations were begun in 1890. The greatest amount at any station was 51.15 inches, at Creston.

Union County, and the least amount was 27.29 inches, at Lake Park, Dickinson County. The greatest monthly precipitation was 15.83 inches, at Corning, Adams County, in July. The least amount was a trace, at Chaffin, Lucas County, in December, and at Leon, Decatur County, in October. The greatest amount in any 24 consecutive hours was 6.98 inches, at Onawa, Monona County, on September 28th. Measurable precipitation occurred on an average of 103 days, 12 more than in 1914.

SNOWFALL.—The average amount of snowfall was 31.3 inches. The greatest amount reported from any station was 55.0 inches, at Algona, Kossuth County, and the least amount was 9.0 inches, at Stockport, Van Buren County. The greatest monthly snowfall was 25.0 inches, at Charles City, Floyd County, in February.

WIND.—The prevailing direction of the wind was northwest. The highest velocity reported was 64 miles an hour from the northwest, at Sioux City, Woodbury County, on May 7th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 144; partly cloudy, 105; cloudy, 116, as against 166 clear days, 102 partly cloudy days and 97 cloudy days in 1914. Less than the normal amount of sunshine was experienced.

MONTHLY SUMMARIES

JANUARY.

The principal features of the month were the mild weather that prevailed during the first and second decades, the low temperatures that obtained from the 23d to the 29th, inclusive, the severe rain, sleet, snow and high wind storm on the 30th and 31st, and the number of days on which precipitation occurred. With the exception of two or three days, the temperature was continuously above the normal until the 19th, but from the 20th to the 29th, inclusive, readings near or below zero were general. The deficiency during this period was sufficient to make the average temperature for the month slightly below the normal. There was 55 per cent more precipitation than the normal, but only a slight excess in the amount of snowfall. There was, however, enough snowfall to make good sleighing most of the month in the northern counties, and the fall grains were well protected during the period of severely cold weather. No storm of importance occurred until the last day of the month and up to that time there had been little or no interference with business, but the rain, ice, sleet, snow and wind storm on that day seriously crippled telegraph, telephone, street car and railroad services and especially in the northeastern counties.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 30.67 inches; the highest recorded was 30.62 inches, at Sioux City, on the 27th, and the lowest was 29.27 at Des Moines, on the 16th.

TEMPERATURE.—The monthly mean temperature for the State, 113 stations reporting, was 17.5°, or 0.4° lower than the normal for Iowa. Only

seven months of the same name in the last 25 years have been colder. The average temperature for the northern three tiers of counties was, however, above the normal. With the exception of only a few days the temperature was continuously above the normal until the 19th, but no exceptionally high readings were recorded during that time. From the 19th to the 29th the daily minimum temperatures were near or below zero in all parts of the State; the coldest day being the 28th, and the lowest temperature reported, 32° below zero, occurred at Iowa Falls. The lowest monthly mean was 12.4° at Forest City, and the highest monthly mean was 23.2 at Keokuk. The highest temperature reported was 59° at Keokuk.

HUMIDITY.—The average relative humidity for the State at 7 a. m. was 86.6 per cent, and at 7 p. m. it was 81.4 per cent. The mean for the month was 84.0 per cent, or about 2 per cent more than the normal. The highest monthly mean was 88 per cent at Charles City, and the lowest, 78 per cent at Des Moines.

PRECIPITATION.—The average precipitation for the State, 114 stations reporting, was 1.63 inches, or 0.58 inch more than the normal. Number of days on which 0.01 inch or more of precipitation occurred exceeded all previous records. The greater part of the precipitation came in the form of rain, but quite general and heavy snow fell on the 16th and smaller amounts on the 3d, 19th, 22d, 26th, 30th and 31st.

On the 30th and 31st rain, sleet and snow fell in all parts of the state. The rain froze as it fell, and everything was covered with ice, which caused slippery streets and walks and badly crippled all telegraph, telephone, street car and railroad service.

The average snowfall was 7.3 inches, or 0.4 inch more than the normal. The greatest amount reported was 21.7 inches, at Sac City; and the least, 1.6 inch, at Rock Rapids. Measurable precipitation occurred on an average of 8 days, which is one more than ever before recorded for the month of January.

WIND.—The prevailing direction of the wind was from the northwest. The greatest velocity recorded was at the rate of 47 miles per hour, from the northwest, at Sioux City, on the 16th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 49 per cent, or about 2 per cent more than the normal. The average number of clear days was 13; partly cloudy, 3; cloudy, 10.

MISCELLANEOUS PHENOMENA.—Sleighting.—Frequent snow flurries on top of what remained on the ground at the end of December made exceptionally good sleighting.

Ice in Rivers.—Thickness of ice in the Mississippi River at Dubuque averaged about 12 to 13 inches for the month, but at the end of the month it was 20 inches. The ice harvest at Keokuk was finished by January 20th, the ice averaging from 12 to 14 inches in thickness. In the Missouri River at Sioux City, the ice increased from 12 to 20 inches in thickness during the month. All ice harvested was of good quality.

COMPARATIVE DATA FOR THE STATE—JANUARY.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Deepest	Greatest	Snowfall	With average falling 0.1 in.	Clear	Partly cloudy	Cloudy	
													Departure	Deepest	Greatest	Snowfall
1890	19.7	+1.5	61	-17	2.00	+0.96	2.40	0.30	.....	.....	.....	.....
1901	20.0	+8.1	68	-4	1.75	+0.70	2.59	0.61	.....	.....	.....	.....
1895	15.3	-2.0	76	-38	1.59	+0.98	2.12	0.13	.....	.....	.....	.....
1891	9.3	-8.6	54	-34	0.74	-0.23	2.12	0.13	.....	.....	.....	.....
1894	19.3	+1.4	80	-27	1.09	+0.94	2.24	0.31	.....	.....	.....	.....
1895	11.6	-4.3	66	-31	0.83	+0.99	2.24	0.31	.....	.....	.....	.....
1896	23.4	+5.5	68	-20	0.48	+0.29	2.65	0.99	.....	.....	.....	.....
1897	17.2	-0.7	70	-30	2.01	+0.96	2.19	0	.....	.....	.....	.....
1898	23.4	+5.3	69	-28	0.58	+0.77	2.19	0	.....	.....	.....	.....
1899	19.8	+1.9	62	-11	1.60	+0.55	3.22	0	.....	.....	.....	.....
1890	23.6	+5.7	70	-20	0.50	+0.77	1.15	0	.....	.....	.....	.....
1892	23.7	+5.8	60	-23	0.74	+0.21	3.54	0.98	.....	.....	.....	.....
1893	22.4	+4.5	62	-21	0.88	+0.32	2.47	0	.....	.....	.....	.....
1894	22.0	+5.1	60	-12	0.58	+0.17	2.83	0.19	.....	.....	.....	.....
1894	14.0	-3.9	57	-32	1.18	+0.77	1.46	0	.....	.....	.....	.....
1895	11.2	-6.7	56	-30	0.91	-0.14	1.85	0.12	.....	.....	.....	.....
1896	19.8	+0.9	68	-19	1.22	+0.47	4.71	0.28	.....	.....	.....	.....
1897	24.9	+7.0	60	-15	0.44	+0.47	5.20	0.80	.....	.....	.....	.....
1898	23.2	+5.2	72	-25	0.52	+0.61	1.56	0.90	.....	.....	.....	.....
1899	18.1	+3.2	70	-25	1.66	+0.61	3.74	0.41	.....	.....	.....	.....
1901	20.2	+2.3	66	-25	0.57	+0.62	3.15	0.59	.....	.....	.....	.....
1902	19.9	+3.0	62	-25	0.67	+0.36	3.75	0.11	.....	.....	.....	.....
1903	4.2	-10.7	49	-47	0.53	-0.50	1.91	0	.....	.....	.....	.....
1904	20.9	+3.0	62	-25	0.77	+0.28	2.05	0.04	.....	.....	.....	.....
1905	27.8	+9.0	64	-10	0.88	+0.17	2.24	0.27	.....	.....	.....	.....
1905	17.3	-0.4	59	-32	1.63	+0.36	3.15	0.10	.....	.....	.....	.....
Normal	17.9	63	-26	1.05	3.06	0.16	6.9	5	13	8	10

T indicates an amount too small to measure, or less than .005 inch precipitation, and less than .05 inch snowfall.

FEBRUARY.

The month was characterized by warm, wet and cloudy weather. It was the warmest February since 1882; the wettest since state-wide observations began in 1890, and there was more cloudiness than in any other February since 1892. The month was also characterized by one of the worst and the most damaging sleet storms of record. The storm referred to in the last report as having begun on the last day of January continued until the second of February, and was very destructive over the northeastern and central portions of the state. (See report of storm on page 9.) Another storm of considerable severity occurred on the night of the 22d. It was attended by wet, heavy snow and high winds which did much damage to telegraph and telephone wires and poles. The continued moderately high temperature and the heavy rains of the 13th and 14th caused the ice in rivers, in the southern and central sections, to break up and pass out between the 15th and 20th of the month, with high stages of water and ice gorges in southern sections. This is much earlier than usual. At the end of the month most of the frost was out of the ground and the soil was well saturated with moisture. The rains and melting snow made the roads almost impassable after the 15th.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 30.04 inches; the highest recorded was 30.52 inches at Dubuque, on the 5th, and the lowest was 29.21 inches at Sioux City on the 4th.

TEMPERATURE.—The monthly mean temperature for the state, 105 stations reporting, was 29.1°, or 8.5° higher than the normal for Iowa, and one degree higher than the previous highest monthly mean for February, which occurred in 1892. By sections (three tiers of counties to the section) the mean temperatures were as follows: Northern, 25.8°, or 5.5° higher than the normal; Central, 29.2°, or 8.5° higher than the normal; Southern, 32.5°, or 8.9° higher than the normal. While maximum temperatures were not as high as in some of the years gone by the minimum temperatures were considerably higher, the monthly minimum, -9, being higher than ever before recorded. The coldest day was the 8th and the highest readings were recorded on the 11th, 13th, 14th, 17th and 20th. The highest temperature recorded was 62°, at Keokuk, on the 11th.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 88.0 per cent, and at 7 p. m. it was 80.7 per cent. The mean for the month was 84.4 per cent, or about 4.8 per cent more than the normal. The highest monthly mean was 89 per cent at Charles City and Sioux City, and the lowest was 82.5 per cent at Keokuk.

PRECIPITATION.—The average precipitation for the state, 131 stations reporting, was 2.93 inches, or 1.88 inches more than the normal. By sections the averages were as follows: Northern, 3.29 inches, or 2.35 inches more than the normal; Central, 3.10 inches, or 1.90 inches more than the normal; Southern, 2.41 inches, or 1.06 inches more than the normal. Heavy snow and sleet fell on the 1st and 2d over the central and northern districts. Heavy rain fell on the 12th and 13th, and one of the wettest snows ever experienced in this section fell on the night of the 22d. By daybreak on the 23d there was from three to six inches of snow on the ground and it was nearly saturated with water. Measurable precipitation occurred on an average of nine days, or two more than ever before recorded in February, and four more than the average. The average snowfall for the state was 5.4 inches, or 2.0 inches more than the normal. The greatest amount, 25.0 inches, occurred at Charles City, and there was none at Bloomfield.

WIND.—The prevailing direction of the wind was from the southeast. This is the first time in twenty-five years that the prevailing direction for February was from the southeast. The greatest velocity recorded was at the rate of 55 miles an hour, from the northwest, at Sioux City, on the 5th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was only 38 per cent, or about 18 per cent less than the normal. The average number of clear days was 9; partly cloudy, 5; cloudy, 14.

MISCELLANEOUS PHENOMENA.—Ice in the Mississippi River at Dubuque was about 18 to 20 inches thick on the 17th. After that date it began

to rot, and measurements were impracticable. By the 20th it had broken away from the shore in places and moved down stream several hundred feet. The river rose four feet, to 19.3 feet, from the 13th to the 24th, due to melting snows and heavy rain. In spite of this, however, the ice at the close of the month had not moved down stream. The river was, however, clear of ice south of Clinton.

COMPARATIVE DATA FOR THE STATE—FEBRUARY

YEAR	Temperature				Precipitation				Number of Days					
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With average fallow (in. or less)			Cloudy	
										Clear	Partly	o-aly		
1880	30.9	-5.5	65	-24	0.86	-0.22	3.18	0.11						
1881	30.4	-1.1	70	-31	1.16	-0.11	2.41	0.50						
1882	29.7	-7.8	68	-28	1.20	-0.24	2.36							
1883	30.4	-1.1	60	-29	1.20	+0.15	2.28	0.12	3.0	0	0	0	7	10
1884	30.7	-0.8	60	-29	0.80	-0.16	2.01	0.66	8.1	0	0	0	19	8
1885	30.4	-4.1	70	-33	0.49	-0.36	1.34	0.05	2.3	0	0	0	8	4
1886	31.4	+6.9	74	-27	0.71	-0.24	2.40	0.04	5.4	4	12	9	8	8
1887	28.7	-9.8	61	-32	0.80	-0.16	1.81	0.23	8.8	0	0	0	10	9
1888	28.2	-7.1	65	-38	1.30	+0.15	3.50	0.30	7.8	6	6	0	10	12
1889	32.2	+3.3	75	-29	0.80	-0.10	4.32	0.12	7.1	5	13	10	7	9
1890	31.8	-1.7	60	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1891	31.2	-2.3	65	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1892	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1893	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1894	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1895	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1896	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1897	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1898	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1899	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1900	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1901	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1902	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1903	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1904	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1905	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1906	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1907	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1908	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1909	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1910	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1911	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1912	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1913	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1914	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1915	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1916	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1917	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1918	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
1919	31.8	-1.7	60	-27	1.00	-0.04	3.90	0.12	9.7	4	15	7	6	9
1920	31.5	-2.0	65	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10	10
Normals	29.5		64	-25	1.95		3.00	0.18	7.4	2	12	7	9	

Y indicates an amount too small to measure, or less than .00 inch precipitation, and less than .05 inch snowfall.

STORM OF JANUARY 30-FEBRUARY 2, 1915, DUBUQUE

BY J. H. SPENCER, LOCAL FORECASTER, U. S. WEATHER BUREAU.

The storm of rain, sleet, snow and high wind that began on the morning of January 30th, continuing until February 2d, was one of the worst on record in this section. Snow and sleet fell on the 30th, but no damage resulted. On Sunday, January 31st, the atmosphere was saturated all day, with a temperature of about freezing; vapor condensed and froze on stone and brick buildings until they looked like marble. During the intervals that sleet did not fall, there was a fine, drizzling rain, and it froze on all objects about as soon as it fell. These were the conditions, followed by 5 inches of heavy, wet snow, falling temperature, and high winds on Monday, February 1st, that resulted in so much damage.

Sidewalks, the rails of street car lines, telegraph and telephone poles, etc., were covered with ice throughout Sunday, January 31st, and the telephone company began to experience serious trouble in the surrounding territory by Sunday afternoon and night, and on Monday morning many country and long distance lines out of Dubuque were down, although in the city of Dubuque the telephone company experienced little or no trouble.

The trouble experienced by the street car company on Sunday, January 31st, due to icy rails, was not serious. By Sunday night, however, many streets in low localities had become covered with several inches of rain, sleet, and melted snow, and the temperature fell sufficiently at night and on Monday, February 1st, to freeze this water and slush solid. Sleet also fell during Sunday night. Miles of street railway in Dubuque were therefore covered with several inches of solid ice. Added to this, 5 inches of heavy, wet snow fell during the morning of February 1st, making the situation much more difficult to handle. Soon after the snow storm began at 7:10 a. m., hardly a street car was running in the city. Irregular traffic was maintained on some lines during the afternoon, but a portion of the Eighth street line, the principal line in the city, was not open at all on Monday. Gangs of men worked all day and all night clearing the tracks of ice and snow, and by Tuesday morning traffic was in fairly good condition, although portions of two or three lines were closed as late as Wednesday night, February 3d.

All wires of the Western Union were down between Dubuque and Chicago, due chiefly to broken poles and wires east of Galena, Ill., especially near Rockford, Ill. The North American Telegraph Company also suffered heavy losses between Oelwein, Iowa, and Chicago, and all east and west communication was interrupted for several days. About 100 poles of this company were broken off. The local manager of this company states that losses due to this storm would probably aggregate \$25,000 in this section. There was comparatively little trouble to telegraph lines running north and south in the Mississippi Valley, due to the protection from high wind.

Telegraph and telephone wires in this section were not heavily covered with ice; most of the trouble was caused by the bending and breaking of ice covered poles.

Telegraph lines are still in very bad condition at this writing (February 4th).

Railroads, especially the I. C. and C. M. & St. P., experienced a large amount of trouble. Through trains were not delayed as a rule to such an extent as during exceptionally heavy snow storms of the past, but in some instances branches were abandoned altogether until after the close of the storm, and some trains on the branch lines were stuck in the snow and ice for many hours. It is reported that on one branch line twenty miles of railroad track were encased in several inches of solid ice, and had to be chopped out—a long and tedious job.

The high wind badly drifted the snow of February 1st, making country roads impassable, so that rural carriers have had to temporarily abandon their routes.

It is too early to estimate the damage in this section, but it will be heavy—many thousands of dollars, perhaps \$50,000.

MARCH.

The month was cold and dry, with an excess of cloudiness and an absence of high winds and blustery weather. The wind movement was exceptionally low for March. The deficiency of temperature was due to uniformly low maximum temperatures rather than to any extremely low minima. The uniformity in temperature was well marked. The absolute range at Davenport was only 27 degrees, and the difference between the highest and lowest minimum was only 14 degrees. Most of the precipitation came in the form of snow between the 4th and 7th, but snow flurries occurred on several days between the latter date and the 20th. Yet the month, as a whole, was favorable for outside work, and building operations progressed rapidly. On account of the soil freezing nearly every night, there was little or no field work done, except in the southern counties. These conditions were, however, beneficial in preventing the snow from melting rapidly and the consequent high stages of the rivers. Most of the snow water was absorbed by the soil, which is in fine condition for plowing and seeding. Practically all of the spring wheat and a large percentage of oats were sown in the southern part of the State.

PRESSURE.—The mean pressure (reduced to sea level) for the State was 30.15 inches; the highest recorded was 30.69 inches at Sioux City, on the 26th; and the lowest was 29.56 inches, at Keokuk, on the 5th.

TEMPERATURE.—The monthly mean temperature for the State, 104 stations reporting, was 29.3°, or 4.0° lower than the normal for Iowa, and only 6.2° higher than the mean for February. By divisions (three tiers of counties to the division) the mean temperatures were as follows: Northern, 27.1°, or 3.4° lower than the normal; Central, 29.6°, or 4.0° lower than the normal; Southern, 31.3°, or 4.6° below the normal. As in February the maximum temperatures were lower and the minimum temperatures were higher than usual. The monthly maximum temperature for the State was 4° lower than was ever before recorded in March. The 24th was the warmest day generally, and the 8th and 9th were the coldest days. The highest temperature recorded was 61°, at Burlington, on the 20th, and the lowest was -5°, at Inwood, on the 8th.

HUMIDITY.—The average relative humidity for the State at 7 a. m. was 85.7 per cent, and at 7 p. m. it was 74.7 per cent. The mean for the month was 80.2 per cent, or about 5.5 per cent more than the normal. The highest monthly mean was 85 per cent at Charles City and Sioux City, and the lowest was 71 per cent at Dubuque.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 106 stations, was 0.96 inch, or 0.81 inch less than the normal. By divisions the averages were as follows: Northern, 0.77 inch, or 0.76 inch less than the normal; Central, 1.01 inches, or 0.86 inch less than the normal; Southern, 1.10 inches, or 0.82 inch less than the normal. The greatest monthly amount, 2.12 inches, occurred at Monroe, Jasper county; and the least, 0.17 inch, at Waverly, Bremer county.

SNOW.—The average depth of snowfall for the State was 8.5 inches, or 3.4 inches more than the normal. The greatest amount, 21.0 inches, occurred at Little Sioux, Harrison county, and the least, 1.7 inches, at Ottumwa, Wapello county. Measurable precipitation occurred on an average of 5 days.

WIND.—The prevailing direction of the wind was from the northwest. The greatest velocity recorded was at the rate of 36 miles an hour, from the northwest, at Sioux City, on the 19th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 47 per cent, or about 9 per cent less than the normal. There was, however, an excess of sunshine in the northeastern counties. The average number of clear days was 8; partly cloudy, 9; cloudy, 14.

MISCELLANEOUS PHENOMENA.—Ice in the Mississippi River at Dubuque began breaking up about the middle of the month. At the end of the month the river was open from Dubuque to La Crosse, Wisconsin, and the stage was moderate. Navigation opened at Davenport on the 27th. Robins were observed as far north as Forest City on the 22d.

COMPARATIVE DATA FOR THE STATE—MARCH

YEAR	Temperature				Total	Precipitation				Number of Days			
	Mean	Departure	Highest	Lowest		Departure	Greatest	Least	Snowfall	With precipi- tation (1/16 in.)	Clear	Partly cloudy	Cloudy
1860	28.0	-5.3	75	-24	1.57	-0.20	3.97	0.32		10	4	11	11
1861	21.9	-1.4	86	-19	2.00	+0.85	4.56	1.23		8	11	8	11
1862	21.9	-1.4	86	-19	2.22	+0.45	4.26	0.53	2.9	8	11	8	11
1863	31.8	-1.5	84	-8	2.14	+0.27	4.40	0.64	4.9	6	12	10	12
1864	34.9	-7.7	94	-5	2.55	+0.20	4.32	0.26	2.7	7	12	9	12
1865	34.4	-7.7	94	-5	2.55	-0.94	2.00	0.22	2.9	9	12	9	12
1866	30.9	-2.4	81	-12	1.19	-0.97	3.90	0.10	5.4	8	12	9	12
1867	22.0	-1.3	71	-22	2.20	+0.62	6.10	0.29	5.5	8	9	9	12
1868	27.5	-2.2	72	-17	1.54	+0.17	6.23	0.23	2.7	8	12	9	12
1869	37.5	+4.2	72	-10	1.62	-0.19	5.90	0.37	8.0	6	11	10	12
1870	30.7	-5.6	81	-15	2.06	+0.29	5.15	0.45	6.0	7	10	9	12
1871	34.2	-0.9	76	-8	2.64	-0.32	4.33	0.13	1.2	11	11	11	12
1872	39.1	+5.8	89	-6	1.38	-0.29	3.90	0.19	2.9	10	11	11	12
1873	38.8	+5.5	89	-6	1.45	+0.62	3.70	0.30	4.4	8	12	10	12
1874	34.5	+1.5	78	2	1.18	+0.41	4.27	0.20	4.1	7	8	8	12
1875	41.5	+8.2	84	1	2.04	+0.57	4.55	0.46	8.9	10	8	8	12
1876	39.6	+7.3	92	-4	2.54	+0.27	4.74	0.45	11.1	6	11	11	12
1877	37.1	+4.2	84	7	1.33	-0.42	5.93	0.23	4.1	6	13	7	12
1878	39.6	+7.3	92	-4	2.54	-0.19	5.24	0.45	11.1	6	12	10	12
1879	37.9	+4.6	86	8	1.96	+0.24	5.09	0.28	9.5	9	10	10	12
1880	32.5	-0.8	71	-15	1.52	-1.00	1.32	0.00	2	1	13	10	12
1881	48.9	+15.6	92	2	0.92	-0.84	4.84	0	1.9	1	12	9	12
1882	36.4	+8.1	84	-10	0.17	+0.71	5.28	0.74	5.5	6	11	8	12
1912	31.9	-1.4	78	-23	2.48	-0.28	3.84	0.28	1.8	8	10	9	12
1914	34.7	+1.4	78	5	1.69	-0.81	3.12	0.17	8.5	6	11	9	12
1915	29.3	-4.0	61	-5	0.96					8	6	11	9
Normals	33.2		78	-10	1.77		4.43	0.39	8.4	6	11	9	12

T indicates an amount too small to measure, or less than .06 inch precipitation, and less than .30 inch snowfall.

APRIL

The conditions during April were almost ideal for farm and other outdoor work. All small grain was sown, the bulk of the spring plowing was finished and much corn was planted. At the beginning of the month vegetation was ten days or two weeks behind the normal, due to the continuously cold weather during March. Warm weather began on the 4th, however, and after that date the growth of vegetation was unusually rapid; at the close of the month it was about a week in advance of the average of past years. The development of fruit blossoms was especially rapid. The early varieties began to show color in the southern counties about the 17th and by the 25th plums, cherries and apple trees were in full bloom in the northern counties, and the development in those sections was apparently as far advanced as in the southern part of the state.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 30.00 inches; the highest recorded was 30.48 inches, at Davenport and Dubuque, on the 13th; and the lowest was 29.59 inches, at Sioux City, on the 26th; the range for the state being .89 inches.

TEMPERATURE.—The monthly mean temperature for the state, 106 stations reporting, was 57.2°, or 8.5° higher than the normal for Iowa. By divisions (three tiers of counties to the division) the mean temperatures were as follows: Northern, 55.6°, or 8.9° higher than the normal; Central, 57.5°, or 8.6° higher than the normal; Southern, 58.6°, or 8.9° higher than the normal. Highest monthly mean was 60.6°, at Ottumwa, and the lowest was 54.9°, at Estherville and Rock Rapids. The highest temperature reported was 95°, at Logan on the 28th, and the lowest was 18°, at Rock Rapids, on the 1st. The first three days were moderately cold, but after that date there were only two days on which the temperature was generally below the normal. Readings above 80° were recorded in the northern counties on several days between the 14th and 28th; the 28th being the warmest day generally. As a whole, it was the warmest April of record, the average temperature being 2.7° higher than ever before recorded.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 77.5 per cent and at 7 p. m. it was 53.6 per cent. The mean for the month was 65.5 per cent, or about 1.6 per cent less than the normal. The highest monthly mean was 76 per cent at Charles City, and the lowest was 59 per cent at Dubuque.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 112 stations, was 1.41 inches, or 1.45 inches less than the normal. By divisions the averages were as follows: Northern, 1.39 inches, or 1.29 inches less than the normal; Central, 1.41 inches, or 1.45 inches less than the normal; Southern, 1.44 inches, or 1.61 inches less than the normal. The greatest monthly amount, 4.02 inches, occurred at Whitten, and the least, .05, at Maquoketa and Lake Park. With the exception of April, 1907, the month just closed was the driest April of record. While there were scattered showers on several days, there were no general or heavy rains until the 26th, and as a result the growth of grass and small grain was retarded for the lack of moisture. Measurable precipitation occurred on an average of 7 days.

The only snowfall reported was a trace at 12 station.

WIND.—The prevailing direction of the wind was from the south. The greatest velocity recorded was at the rate of 42 miles an hour from the northwest, at Sioux City, on the 10th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 69 per cent, or about 9 per cent more than the normal, the percentage of the possible amount being 67 at Charles City; 78 at Davenport, 72 at Des Moines, 66 at Dubuque, 74 at Keokuk, and 61 at Sioux City. The average number of clear days was 15; partly cloudy, 10; cloudy, 5.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on the 7, 8, 9, 10, 11, 13, 14, 19, 20, 21, 22, 23, 24, 25, 26, 27, and 28. Hail occurred at Perry on the 11th and at Baxter, Corydon, Grinnell, Monroe and Okaloosa on the 28th. Sleet occurred on the 4th and light frost occurred on the 29th and 30th.

RIVERS.—The Missouri River, low at the first of the month, rose slowly to within 2.1 feet of flood stage on the 12th, then receded till the 17th, since which time it has varied but little. The Mississippi River rose during the second and third weeks of the month from Dubuque to La Crosse, reaching a stage of 10.3 feet at Lansing on the 18th, 11.2 feet at Prairie du Chien on the 20th, and 12.1 feet at Dubuque on the 21st. By the second week in April all rivers in the Dubuque River District were free from ice.

COMPARATIVE DATA FOR THE STATE—APRIL

YEAR	Temperature					Precipitation				Number of days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precip-itation of in.	Clear	Partly cloudy	Cloudy
1800	51.8	+3.1	88	13	1.80	-1.06	4.46	0.38	-----	6	24	6	6
1801	50.6	+1.9	93	15	2.15	-0.71	5.06	0.59	-----	9	14	5	7
1802	45.4	-3.3	88	24	4.79	+1.80	6.38	2.43	8.5	10	8	9	13
1803	45.5	-3.2	90	12	4.23	+1.35	8.51	1.24	6.0	10	8	9	13
1804	51.7	+2.0	93	12	3.07	+0.21	6.91	0.55	0.2	9	11	11	9
1805	54.2	+4.5	98	8	2.02	-0.24	5.88	0.28	2.1	9	11	9	10
1806	54.5	+4.8	94	10	5.02	+1.10	9.07	2.55	4.8	11	9	9	10
1807	47.9	-0.8	86	19	2.55	+2.69	9.80	3.22	7	11	10	10	10
1808	48.1	-0.6	91	14	2.56	-0.30	4.82	0.27	7	8	12	10	10
1809	48.9	+0.2	89	1	2.40	-0.48	5.78	0.58	2.9	7	15	11	10
1800	52.2	+2.6	89	29	2.67	-0.23	6.82	0.45	9.9	6	12	11	10
1801	49.9	-1.2	90	15	1.79	-1.07	2.47	0.05	2.0	6	14	8	10
1802	48.5	-0.5	90	9	1.71	-1.35	4.15	0.49	7	7	15	9	10
1803	49.8	+1.1	86	17	2.98	+0.12	6.00	0.74	0.8	9	14	6	10
1804	44.1	-4.0	86	15	3.65	+0.77	8.07	1.52	1.4	7	15	6	10
1805	47.5	-1.2	90	10	3.58	+0.17	6.49	0.63	1.2	6	12	10	10
1806	50.5	+1.8	94	22	2.42	-0.44	5.55	0.55	0.6	8	14	10	10
1807	41.5	-2.2	80	10	1.32	-1.34	2.23	0.24	2.7	6	12	11	10
1808	50.5	+1.8	91	8	2.24	-0.62	4.50	0.57	0.8	8	14	10	10
1809	48.8	-0.8	86	14	4.58	+1.12	4.43	0.83	2.1	12	9	11	10
1800	48.8	-0.8	86	13	1.45	-1.38	4.86	1.09	2.6	7	9	11	10
1801	52.5	+3.8	90	5	2.99	+0.23	6.04	1.20	2.6	9	11	10	10
1802	49.9	-1.0	84	20	2.06	-0.20	6.60	0.78	1.1	6	13	8	10
1803	50.2	+1.5	88	16	3.28	+0.42	7.43	1.12	2.7	9	10	10	10
1804	48.0	-0.1	86	11	2.52	-0.34	5.03	0.37	0.2	7	15	10	10
1805	57.2	+8.5	95	18	1.41	-1.45	4.02	0.65	7	7	15	10	10

MAY

The month was cold, wet and cloudy, and was characterized, during the last decade by frequent and excessive rains, which caused many streams to overflow their banks and flood bottom lands, thereby resulting in much damage to crops. From the 1st to the 18th, inclusive, the weather was fairly favorable for farm work. While there were frequent showers from the 1st to the 8th, and the 11th to the 15th, the amounts of rainfall were generally light and considerable work was done, but, after the 18th showers were of almost daily occurrence, and the rainfall was heavy to excessive which prevented any field work being done. Temperatures below or near the freezing point on the 7th and 9th in all parts of the state and again from the 17th to the 19th injured garden truck, strawberries and cherries, and retarded the growth of corn and other vegetation. At the end of the month there was probably 12 to 15 per cent of the corn land that had not been planted and about 15 per cent that would have to be replanted.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 29.86 inches; the highest recorded was 30.26 inches, at Dubuque, on the 19th; and the lowest was 29.35 inches, at Sioux City, on the 24; the range for the state being 0.91 inch.

TEMPERATURE.—The monthly mean temperature for the state, 108 stations reporting, was 56.1°, or 4.4° lower than the normal, and 1.1° lower than the average for April. By divisions (three tiers of counties to the division) the mean temperatures were as follows: Northern, 54.1°, or 4.9° lower than the normal; Central, 56.1°, or 4.6° lower than the normal; Southern, 58.2°, or 3.5° lower than the normal. The highest monthly mean was 60.7°, at Ottumwa, and the lowest was 51.8°, at Esterville. The highest temperature reported was 99°, at Clarinda, on the 14th and the lowest was 25°, at Alton and Waushta, on the 9th. The temperature was below the normal every day of the month, except on the 1st, from the 10th to the 15th, inclusive, and on the 25th, the coldest days being the 7th, 9th, 17th, 18th, and 19th, and the warmest were the 11th, 12th, 13th and 14th. Readings above 90° were general in the southern and central division on the 11th, 12th, 13th and 14th, and generally above 85° in the northern division on the 11th and 12th.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 52 per cent and at 7 p. m. it was 66 per cent. The mean for the month was 74 per cent, or about 7 per cent more than the normal. The highest monthly mean was 84 per cent at Charles City, and the lowest was 70 per cent, at Davenport.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 115 stations, was 7.24 inches, or 2.77 inches more than the normal. By divisions the averages were as follows: Northern, 7.02 inches, or 2.54 inches more than the normal; Central, 7.50 inches, or 2.91 inches more than the normal; Southern, 7.50 inches, or 2.86 inches more than the normal. The greatest monthly amount, 13.21 inches, occurred at Afton, and the least, 3.82 inches, at Alton. There have been

only three wetter Mays in the last 26 years, viz: 1968, 1963 and 1881. The greatest rainfall of record for May is 8.77 inches in 1892. Measurable precipitation occurred on an average of 14 days.

A trace of snowfall was reported from 10 stations and 0.2 inch fell at Postville.

WIND.—The prevailing direction of the wind was from the northwest. The greatest velocity recorded was at the rate of 64 miles an hour from the northwest, at Sioux City, on the 7th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 52 per cent, or about 13 per cent less than the normal, the percentage of the possible amount being 57 per cent at Charles City, 57 at Davenport, 52 at Des Moines, 38 at Dubuque, 38 at Keokuk, 41 at Sioux City, and 49 at Omaha, Neb. The average number of clear days was 9; partly cloudy, 9; cloudy, 13.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on every day of the month except the 1st, 5th, 6th, 7th, 8th, 9th, 16th, 17th, 18th, 19th, 20th, 31st. Hail occurred on the 2d, 3d, 13th, 14th, 25th, 26th, 27th, 28th. Heavy and in some places killing frost occurred on the 7th, 9th, 17th, 18th, 19th.

Rivers.—Heavy to excessive rains on the 25th, 26th and 27th caused high to flood stages in all streams, especially in the southern half of the state, flooded bottom and flat lands and washed hill lands. Railroad beds were softened and in some places washed out and crops were seriously damaged.

COMPARATIVE DATA FOR THE STATE—MAY.

YEAR	Temperature				Precipitation			Number of Days					
	Mean	Departure	Highest	Lowest	Total	Deepest	Greatest	Least	Snowfall	With precipitation of in.	Clear	Partly cloudy	Cloudy
1880	57.7	-2.8	90	30	3.56	-1.01	6.44	1.01	-----	9	10	12	9
1881	58.5	-2.3	94	21	2.18	-1.79	7.10	1.40	-----	8	14	11	7
1892	54.0	-6.5	88	20	8.77	+4.23	12.94	4.87	-----	10	9	11	11
1893	56.0	-2.9	90	28	2.43	-1.12	5.37	1.65	0	9	13	9	4
1894	61.1	+3.6	97	31	1.87	-1.70	4.77	0.33	0	6	17	17	4
1895	61.7	+4.2	104	24	3.19	-2.28	5.79	0.84	0	8	15	11	4
1896	65.5	+5.0	100	34	6.09	+2.12	11.79	3.49	0	12	10	10	4
1897	58.5	-2.9	90	20	1.92	-2.65	3.30	0.21	0	5	16	10	3
1898	59.6	-1.8	87	28	4.87	+0.19	7.82	2.22	0	12	9	12	3
1899	60.2	-0.3	90	25	6.23	+1.66	11.47	3.69	0	10	9	11	4
1900	63.2	+2.7	98	20	3.21	-1.28	6.98	0.98	0	8	16	9	3
1901	60.7	+0.2	95	25	2.25	-2.12	4.37	0.72	0	10	12	11	3
1902	62.8	+2.3	97	25	3.29	+0.82	18.04	0.87	0	13	10	9	3
1903	61.6	+1.1	91	24	8.55	+3.98	15.45	2.88	0	16	9	11	3
1904	59.6	-0.9	93	27	3.78	-0.79	8.15	1.50	0	8	12	11	4
1905	58.2	-2.2	88	29	5.95	+1.38	10.83	2.57	0	11	13	10	4
1906	60.8	+0.3	95	24	2.54	-1.93	10.72	0.89	0	11	13	10	4
1907	55.2	-7.0	80	14	2.48	-1.07	7.98	0.71	1.0	10	11	11	11
1908	59.4	-1.1	93	13	8.34	+3.77	13.31	1.25	0	15	9	10	4
1909	57.9	-2.6	97	18	4.34	-0.23	7.85	2.88	0.1	9	13	12	4
1910	55.4	-5.1	89	18	3.41	-1.16	8.91	1.39	2	10	15	11	4
1911	64.8	+4.4	98	23	3.76	-0.81	8.73	0.43	0.7	6	10	11	4
1912	62.7	+2.7	97	29	3.33	-1.24	6.41	0.72	0	10	11	11	4
1913	59.4	-1.1	102	20	8.24	+1.67	10.25	2.14	0	10	14	11	4
1914	62.2	+1.7	98	25	2.33	-1.20	6.30	0.30	0	14	9	11	4
1915	66.1	+4.4	90	35	7.34	+2.77	13.23	3.82	2	14	9	11	4

JUNE.

The cold, wet and cloudy weather that was so general in May continued during the greater part of June. With one exception the month was the coolest June of record. At numerous stations both the monthly mean and the absolute maximum temperature for the month were lower than ever before recorded in June. The average rainfall was less than the normal, yet the month was generally considered as being much wetter than usual, owing to the fact that the soil was thoroughly saturated with moisture in May and the frequent showers kept the ground wet during nearly all of June. There was, however, considerable field work done between showers, and at the close of the month corn fields were generally fairly clean. Harvest of fall wheat, rye and hay was begun in the southern counties and hay was yielding much better than was thought possible in May. On several dates, the showers were accompanied by hail, heavy rain and some wind squalls which did considerable damage to grain and other crops. The most destructive storm reported occurred on the 12th in Fayette, Clayton and Allamakee counties, a report of which appears on page fifty-eight.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 29.95 inches; the highest recorded was 30.28 inches at Davenport on the 14th, and the lowest was 29.29 inches, at Sioux City, on the 12th, the range for the state being 0.89 inch.

TEMPERATURE.—The mean temperature for the state, as shown by the records of 110 stations, was 65.1°, or 4.9° below the normal, and the coolest June since 1903. By divisions (three tiers of counties to the division) the mean temperatures were as follows: Northern, 63.2°, or 4.4° below the normal; Central, 65.2°, or 4.1° below the normal; Southern, 66.9°, or 3.4° below the normal. The highest monthly mean was 69.2°, at Lamoni, and the lowest was 60.4°, at Estherville. The highest temperature reported was 91°, at Clarinda, on the 25th, which is the lowest absolute maximum for June in the last 25 years. The lowest temperature reported was 31°, at Washta, on the 9th, which is the lowest absolute minimum reported in June since 1897, when the minimum was 25° at Decorah and Lansing on the 1st. The warmest days were the 6th, 12th, 24th, 25th, 26th, 27th and 28th, but the temperature was up to 90° at only five stations.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 53 per cent, and at 7 p. m. it was 56 per cent. The mean for the month was 74 per cent, or about 6 per cent more than the normal. The highest monthly mean was 80 per cent at Charles City and the lowest was 70 per cent, at Dubuque.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 117 stations, was 4.16 inches, or 0.22 inch less than the normal. By divisions the averages were as follows: Northern, 4.19 inches, or 0.24 inch less than the normal; Central, 3.52 inches, or 0.89 inch less than the normal; Southern, 4.76 inches, or 0.37 inch more than the normal. The greatest amount, 9.99 inches, occurred at Keokuk, and the least, 1.72 inches, at Jefferson. The greatest amount in any

24 consecutive hours, 2.90 inches, occurred at Algona, on the 22d. Measurable precipitation occurred on an average of 11 days. Many local downpours resulted in considerable damage to soil and crops.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 64 per cent, or about 5 per cent less than the normal. The percentage of the possible amount being 59 per cent at Charles City; 71 at Davenport; 68 at Des Moines; 55 at Dubuque; 75 at Keokuk; 54 at Sioux City, and 65 at Omaha, Neb. The average number of clear days was 12; partly cloudy, 12; cloudy, 6.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on every day at the month except the 1st, 2d, and 8th. Hail occurred on the 5th, 10th, 12th, 15th, 16th, 23d and 28th. Light frost occurred on the 8th, 9th, 15th and 23d. Aurora Borealis was visible over the northern half of the state on the night of the 16th-17th.

Rivers.—All rivers maintained a good stage during the month but were considerably lower than at the end of May.

COMPARATIVE DATA FOR THE STATE—JUNE

YEAR	Temperature				Precipitation			Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With precip-itation 01 in.	Clear	Partly cloudy	Cloudy
1880	72.7	+3.6	106	44	7.76	+3.38	16.30	1.57	11	15	29	8
1891	69.1	0.0	99	37	5.39	+1.01	19.88	1.08	11	6	12	11
1892	69.2	+0.1	102	42	5.19	+0.81	14.16	0.57	10	11	11	11
1893	71.2	+2.1	104	40	3.91	-0.47	7.56	1.30	8	19	11	4
1894	71.2	+2.1	104	34	2.97	-1.71	6.30	0.57	7	16	19	4
1895	69.7	+0.6	102	34	4.22	-0.05	9.78	0.98	10	11	11	6
1896	69.1	0.0	100	40	3.11	-1.27	7.80	0.81	9	10	22	4
1897	69.1	0.0	102	39	2.51	-0.37	2.81	1.05	9	13	19	7
1898	71.4	+2.3	99	42	4.77	+0.54	12.48	1.93	9	13	19	7
1899	70.7	+1.6	100	43	5.04	+0.95	11.99	1.19	10	12	15	7
1900	69.7	0.6	102	38	3.98	-0.40	12.35	0.57	8	17	19	7
1901	72.3	+3.2	106	40	3.71	-0.67	7.84	1.05	9	15	11	7
1902	69.2	-2.9	97	32	7.15	+2.78	15.04	1.46	14	8	11	11
1903	64.8	-4.3	96	30	2.80	-1.52	6.94	0.75	10	13	19	7
1904	67.1	-2.0	94	35	3.45	-0.93	3.25	0.43	7	13	19	7
1905	69.9	+0.8	100	36	5.53	+1.13	14.80	1.80	10	12	11	7
1906	69.5	-2.6	98	36	5.35	+0.97	9.23	2.07	11	14	9	7
1907	67.1	-2.0	94	35	5.09	+1.28	11.88	1.77	13	12	9	7
1908	67.9	-1.2	99	37	3.92	-0.40	8.27	1.48	8	13	19	7
1909	69.1	0.0	96	36	5.35	+0.97	9.23	2.07	11	14	9	7
1910	69.5	+0.4	100	36	5.53	+1.28	11.88	1.77	13	12	9	7
1911	75.7	+6.6	108	33	1.99	-2.30	5.51	0.60	7	18	7	7
1912	66.2	-2.9	103	34	2.74	-1.04	5.71	0.78	7	17	9	7
1913	71.5	+2.4	103	33	3.33	-1.07	8.05	0.74	7	17	14	7
1914	72.2	+3.1	109	40	6.57	+1.19	13.24	1.17	13	17	14	7
1915	69.1	-4.0	91	31	4.16	-0.29	9.99	1.72	11	17	15	7

TORNADOES OF JUNE 12, 1915.

By J. H. Spencer, Local Forecaster U. S. Weather Bureau, Dubuque, Iowa.
Destructive tornadoes visited northeast Iowa and southwest Wisconsin on Saturday afternoon, June 12, 1915, at about 5:30 p. m. and later. They occurred in the southeastern quadrant of a well-defined area of

low pressure that was central in extreme eastern Nebraska at 7 a. m. of June 12th and around St. Paul, Minn., at 7 p. m. of the same date.

Apparently starting in the vicinity of West Union, Payette county, Iowa, a tornado moved northeastward and crossed the Mississippi river about eight miles south of Lansing, Iowa, reaching the Wisconsin shore, with increased violence, about two miles below Ferrysville, Wisconsin.

Seven persons were killed and over twenty-five injured in the vicinity of Ferrysville, Wisconsin, and two were killed and three injured in the vicinity of Lansing, Iowa. Another tornado at Reedsburg, Wisconsin, on the same afternoon killed one person and injured fifteen. Property loss in northeast Iowa and southwest Wisconsin was at least \$200,000.

The path of the Lansing-Ferrysville tornado was not less than 50 miles in length. Its width varied from 400 feet to possibly one-fourth mile. It crossed the Mississippi river at a point where the distance from bluff to bluff is about three miles, ninety per cent of which is water at this season of the year. It is stated by eye-witnesses that "when the tornado crossed the Mississippi it seemed to whirl large sheets of water into the cloud."

Rainfall at Lansing was 1.13 inches. The tornado was also accompanied by hail and occasional lightning. Hailstones were as small as peas. Debris was scattered in every direction, according to the observers. A funnel-shaped cloud was distinctly seen.

Detailed reports on the tornadoes are as follows:

By Chas. R. Serene, Lansing, Iowa: Time of occurrence, about 5:30 p. m. Cloud is described as funnel-shaped, resembling smoke pouring out of a large stack, small at bottom and spreading at top. It was accompanied by a roaring noise. All who witnessed the tornado say it seemed to strike the ground, bouncing into the air, and then down again. Lightning and small hail followed the storm. Rainfall, 1.13 inches. Tornado moved from southwest to northeast, and there was a decided whirl. Width of path about 400 feet. Debris was scattered in every direction. White oak trees two feet in diameter were twisted off, and in places pulled out by the roots. John Leppard and Florence Leppard were killed; three others were injured. Estimated loss of property in this vicinity, \$50,000.

By W. T. Robertson, Ferrysville, Wisconsin: Time of occurrence, 5:30 p. m. Tornado was accompanied by a steady, continuous roar. Cloud was funnel-shaped; color very dark, tinged with green. There was lightning in the storm cloud, but not frequent. Small hail occurred. The storm came from the southwest. There was a whirl, but trees were lying in all directions. Path was about one-fourth mile in widest place. Five were killed, as follows: Mrs. John Finley, Mrs. Tim Finley's baby, Wm. Sheely, Mrs. F. McManus, and five-year-old child. Twenty to fifty were injured. Estimated loss of property in this vicinity, \$75,000.

By Postmaster, Reedsburg, Wisconsin: Time of occurrence, about 5:35 p. m. Cloud was black; funnel not seen. A deep, loud roar accompanied the storm. There was lightning, but no hail. Storm came from southwest, moving northeast. There was no whirl in the first half-mile, but after that distance there was. The general direction in which trees and

debris pointed was northeast; on either side they pointed toward the central part of the path of the storm. Length of path in this vicinity, ten miles; width, about thirty rods. Wm. Shoman was killed and fifteen were injured. Estimated loss of property, \$50,000.

JULY.

In comparing the conditions that prevailed during the month just passed with those of July, 1914, it is found that nearly every feature shows an opposite extreme. July, 1914, was, with one exception, the warmest July of record; while the month now under discussion was, with one exception, the coolest July of record. July, 1914, was a very drouthy month, while this year the month was, with one exception, the wettest July during the climatological history of the State. Last year, at the close of the month, haying and the harvesting of small grain were practically completed and threshing was begun, while this year haying and harvesting were not half done at the close of the month, nor could they be completed on account of wet, soft fields. Much of the uncut grain was abandoned on account of fields being too soft and wet to work a binder, and much of the shocked grain was badly damaged by sprouting and moulding. A large acreage of corn was drowned out over the southern part of the State.

The month was not only cool and wet but it was characterized by severe hall and windstorms in many localities which did much damage. During a typical tornado of small proportions that struck New London, Des Moines County, on the night of the 10th, Mrs. Milton McCabe was killed and others were seriously injured and much property destroyed. On the night of the 6th severe wind storms occurred near Logan, Harrison County, and Garwin, Tama County. A press dispatch indicates that damage amounting to \$100,000 was done to corn and oats near Stern Lake, on the 17th by hail. The most damage was caused, however, by excessive rains, accompanied by severe wind squalls, in the southwestern counties, between the 11th and 14th. Corn and grain were beaten to the ground, rivers were out of their banks and all low bottom lands were flooded.

PRESSURE.—The mean pressure (reduced to sea level) for the State, was 29.94 inches; the highest recorded was 30.51 inches, at Sioux City, on the 26th, and the lowest was 29.44 inches, at Omaha, Neb., on the 7th.

TEMPERATURE.—The mean temperature for the State, as shown by the records of 108 stations, was 69.5°, or 4.6° below the normal, and only 1.0° higher than the mean for July, 1891, which is the lowest of record for the month in question. The highest monthly mean was 73.0°, at Mt. Pleasant, and the lowest was 66.5°, at Postville. The highest temperature reported was 92°, at nine stations, on the 13th or 15th. This is seven degrees lower than the absolute maximum for the month in 1891 and 1902, which were the lowest ever before recorded. The lowest temperature reported was 49° at Washta, on the 5th. The warmest days were the 12th to the 15th, inclusive, and the coldest were from the 3d to the 5th, inclusive. The range for the State was 52°.

HUMIDITY.—The average relative humidity for the State at 7 a. m. was 86.6 per cent, and at 7 p. m. it was 67.6 per cent. The mean for the

month was 71.1 per cent, or about 9.5 per cent more than the normal. The highest monthly mean was 81 per cent at Charles City, and the least was 75.1 per cent at Omaha, Neb.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 116 stations, was 8.32 inches, or 4.26 inches more than the normal. By divisions (three tiers of counties to the division) the average amounts were as follows: Northern, 5.68 inches, or 1.80 inches more than the normal; Central, 8.17 inches, or 4.19 inches more than the normal; Southern, 11.12 inches, or 7.10 inches more than the normal. The greatest amount, 15.83 inches, occurred at Corning, and the least, 3.86 inches, at Spencer. The greatest amount in any 24 consecutive hours, 4.16 inches, occurred at Clarinda on the 12th. Measurable precipitation occurred on an average of 14 days.

WIND.—The prevailing direction of the wind was from the northwest. The highest velocity was at the rate of 44 miles an hour from the west, at Sioux City on the 29th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 56 per cent, or about 18 per cent less than the normal. The percentage of the possible amount being 46 per cent at Charles City; 63 at Davenport; 58 at Des Moines; 45 at Dubuque; 69 at Keokuk; 56 at Sioux City; and 60 at Omaha, Neb. The average number of clear days was 10; partly cloudy, 12; cloudy, 9.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on every day of the month, except the 5th, 8th, and 22d. Hail occurred on the 3d, 11th, 17th, 18th, 23d, and 24th. Light frost was observed at Lake Park, Dickinson County, on the 4th and 5th.

COMPARATIVE DATA FOR THE STATE—JULY.

YEAR	Temperature					Precipitation			Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With precipi- tation (31 in.)	Clear	Partly cloudy	Cloudy
1880	75.8	+1.5	110	45	1.98	-1.96	5.00	0.37	3	16	12	5
1881	69.9	-5.6	99	41	4.22	+0.20	8.20	1.67	8	12	13	5
1882	72.9	-1.1	104	38	5.29	+1.20	13.86	1.71	9	10	10	5
1883	75.9	+0.9	102	47	3.32	-0.60	8.84	1.49	7	19	10	2
1884	78.4	+2.9	109	29	6.57	+0.28	12.38	0.56	7	15	12	1
1885	72.1	-2.9	104	35	3.40	-0.56	10.39	0.45	7	15	12	1
1886	72.6	-2.9	104	42	6.90	+2.94	12.67	1.81	9	14	11	6
1887	75.5	+1.5	106	42	3.26	-0.70	7.96	1.61	8	28	10	3
1888	73.1	-0.7	102	42	2.98	-0.38	12.38	0.56	7	15	12	1
1889	72.1	-1.9	101	29	3.07	-0.80	8.90	0.42	7	15	10	5
1890	72.4	-0.7	102	27	6.15	+2.19	15.45	1.80	9	10	10	5
1891	62.4	+8.3	115	46	2.34	-1.62	5.97	0.77	11	23	9	1
1892	73.1	-2.0	102	41	8.57	+4.71	12.59	4.82	12	14	10	7
1893	72.9	-1.2	100	40	4.85	+0.87	12.73	0.94	9	17	9	4
1894	70.0	-3.3	100	28	4.41	+0.45	11.97	1.28	10	16	9	6
1895	70.5	-2.5	102	40	2.91	-1.60	7.98	0.69	9	14	10	7
1896	70.5	-2.5	102	42	2.94	-0.32	7.55	0.29	8	18	10	3
1897	73.7	-0.4	102	41	7.27	+3.31	15.90	0.97	13	16	11	4
1898	73.9	-1.1	102	42	3.60	-0.30	9.21	2.70	8	16	10	5
1899	75.5	-1.5	102	40	4.77	+0.81	12.20	1.29	10	15	8	8
1900	74.9	+0.6	106	42	1.80	-0.10	5.60	0.12	7	19	8	4
1901	70.5	-1.4	111	38	2.37	-1.09	6.02	0.96	7	18	10	3
1902	74.4	+0.5	102	28	1.71	-0.25	7.56	1.17	10	17	10	4
1903	70.1	+2.0	106	45	1.82	-2.14	0.25	7	6	31	8	2
1904	70.6	+2.5	106	43	2.27	-1.09	6.50	0.44	5	20	12	3
1905	69.5	-4.7	95	40	8.22	+4.26	15.83	2.68	14	10	12	9

AUGUST.

August, 1915, was the coolest month of that name in the climatological history of the state. The monthly mean temperature and the monthly extremes were all lower than was ever before recorded, and the daily means were below the normal on all but four or five days during the month. The cool weather culminated in almost general frost, and in the north central and northeastern counties by freezing temperatures on the 30th. Frost occurred in localities where it had never before occurred in August. There was less than the normal amount of rainfall notwithstanding that rain fell at some station in the state on every day of the month except the 31st. Severe local electrical, wind, hail and rain storms did considerable damage to buildings and crops in various parts of the state, and the frequent showers and continuous cool weather retarded the maturity of corn and rains delayed and interfered with threshing and haying. Corn was never known to be as backward at the end of August as it is this year. There is none of it beyond the roasting ear stage and much of it is only in the pimple stage. Corn on low ground in the northeastern counties was seriously injured by frost on the 26th.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 29.61 inches, the highest recorded was 29.59 inches at Charles City on the 18th, at Dubuque on the 27th and at Sioux City on the 30th, and the least was 29.71 inches, at Sioux City, on the 23d.

TEMPERATURE.—The mean temperature for the state, as shown by the means of 195 stations, was 65.9°, or 5.9° lower than the normal. It was 7.8° lower than the mean for August, 1914, and 2.5° lower than ever before recorded for the month of August. By sections the mean temperatures were as follows: Northern, 64.9°, or 5.5° below the normal; Central, 65.9°, or 5.8° below the normal; Southern, 66.9°, or 6.3° below the normal. The highest monthly mean was 69.2° at Lamoni, and the lowest was 62.8° at Postville. The highest temperature reported was 91° at six stations, on the 6th, 15th or 16th, and the lowest was 36° at Mason City on the 30th. The temperature was down to the freezing point or lower at eight stations on the 30th. The range for the state was 61°.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 85.9 per cent, and at 7 p. m. it was 64.9 per cent. The mean for the month was 75.4 per cent, or about 4 per cent more than the normal. The highest monthly mean was 79 per cent at Charles City and the least was 73 per cent at Des Moines.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 111 stations, was 2.81 inches, or 0.87 inch less than the normal. By sections the averages were as follows: Northern, 3.05 inches, or 0.43 inch less than the normal; Central, 2.54 inches, or 1.23 inches less than the normal; Southern, 2.83 inches, or 0.95 inch less than the normal. The greatest amount, 9.14 inches, occurred at Clinton, and the least, 0.27 inch, at Cedar Rapids. The greatest amount in any 24 consecutive hours, 5.93 inches, occurred at Thurman, Fremont county, on the 17th. Measurable precipitation occurred on an average of 8 days.

WIND.—The prevailing direction of the wind was from the northwest. This is the first time in the history of the climatological service that the prevailing direction for August was from the northwest. The highest velocity was at the rate of 41 miles an hour from the west, at Sioux City, on the 22d.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 6 per cent, or about 6 per cent less than the normal. The percentage of the possible amount being 58 per cent at Charles City; 70 at Davenport; 71 at Des Moines; 61 at Dubuque; 76 at Keokuk; 63 at Sioux City and 65 per cent at Omaha, Neb.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on every day of the month, except the 4th, 5th, 9th, 19th, 20th, 21st, 24th, 25th, 27th, 29th, 30th and 31st. An aurora was observed at Alta and Washta on the 6th. Frost occurred in a few localities in exposed places, on the 19th, 25th and 27th and in nearly all sections on the 30th, being heavy in the north central and northeastern counties where it did great damage to corn on low ground.

COMPARATIVE DATA FOR THE STATE—AUGUST.

YEAR	Temperature				Totals	Precipitation			Number of Days			
	Mean	Departure	Highest	Lowest		Departure	Greatest	Lowest	With precipi- tation (in in.)	Clear	Partly (cloudy)	Cloudy
1890	66.3	-3.4	102	36	3.41	-0.27	6.44	1.03	8	13	10	6
1891	69.1	-0.7	106	34	4.24	+0.50	13.02	1.23	8	13	12	6
1892	73.4	-0.4	102	40	2.24	-1.34	4.69	0.65	5	18	9	4
1893	69.4	-2.9	101	30	2.32	-1.26	6.72	0.40	5	19	9	5
1894	74.6	+2.8	108	38	1.58	-2.10	4.52	T	4	21	8	2
1895	71.9	+0.1	105	37	4.43	+0.75	10.93	0.67	7	17	9	5
1897	71.7	-0.1	104	34	3.52	-0.19	12.23	0.86	8	15	11	5
1898	66.9	-2.9	104	23	1.86	-1.82	4.98	0.47	6	15	11	5
1899	71.2	-0.6	103	30	3.44	-0.24	10.55	0.58	6	17	9	4
1899	74.4	+2.6	100	41	2.98	0.00	10.45	1.12	7	17	10	3
1900	77.4	+5.6	103	44	4.05	+0.37	10.43	1.38	6	18	10	2
1901	69.4	-2.9	101	30	2.32	-1.26	6.72	0.40	T	5	20	2
1902	69.1	-2.7	98	27	6.58	-2.30	4.46	T	5	20	2	
1903	69.1	-2.7	101	41	6.64	-2.96	17.74	2.55	13	12	10	9
1904	66.1	-2.7	97	25	3.43	-0.29	6.75	0.86	7	17	8	6
1905	74.3	+1.9	104	41	4.65	+0.37	8.47	1.04	9	16	9	8
1906	74.1	+2.5	105	33	3.95	+0.27	10.81	0.95	7	17	9	5
1907	71.1	-0.7	99	27	4.32	-0.55	9.87	1.05	9	17	9	5
1908	70.0	-1.6	102	38	4.77	-1.00	10.55	1.25	9	17	9	5
1909	70.1	+4.2	102	32	1.81	-1.87	6.21	T	5	21	8	2
1910	74.3	+1.9	104	30	2.88	+0.20	11.27	0.37	8	15	10	6
1911	71.3	+0.1	104	36	2.32	-0.36	9.47	0.44	9	16	10	5
1912	71.7	-0.1	107	34	2.32	-0.36	9.47	0.44	9	16	10	5
1913	71.9	-0.8	103	49	2.78	+0.10	7.99	0.89	10	15	10	6
1914	76.6	+4.8	106	49	2.68	-1.00	7.13	0.68	6	17	10	4
1914	73.7	+1.9	103	40	2.19	-1.49	4.89	0.45	7	17	10	4
1915	65.9	-5.9	91	30	2.81	-0.87	9.14	0.27	8	16	9	4

RECORD BREAKING COOL WEATHER DURING SUMMER MONTHS OF 1915 OVER PRINCIPAL CEREAL PRODUCING DISTRICTS.

Accompanying this week's issue is a chart showing the average daily departure of temperature from the normal for the fifteen-week period, May 19 to August 31, 1915. Considering the fact that the period covered by this chart is about three and one-half months, the negative departures shown for the interior districts are remarkably large; in fact, not since authentic weather records began, more than 40 years ago, has such unseasonably cool weather been continuous throughout the late spring and summer as has obtained this season over the interior districts of the country.

However, in the northern border states to the eastward of the Rockies, temperature averages for the period under consideration were not as abnormal and moderate plus departures appear in the southeastern states, while in the far west the period on the whole was likewise warmer than normal. As the region of pronounced cool weather was thus limited, obviously the causes contributing to the unusual temperature conditions during the current season have been local.

Other instances of persistent cool summer weather are disclosed by the records for the years 1875, 1882, 1883 and 1907, but in none of these years were the negative departures so pronounced and continuously low as during the summer season of 1915.

The weekly temperature departures for the principal agricultural districts of the country from April to August, inclusive, are shown by diagrams accompanying this bulletin. By referring to these it will be disclosed that in the principal corn and wheat regions the month of April was unusually warm, but beginning about the middle of May cool weather set in, and, save for a few very brief periods of seasonable warmth, the temperature since that time has been continuously below the normal, with marked negative departures in many cases.

However, it will also be seen from the diagrams referred to that the persistent cool weather has been confined mostly to the central and northern districts, the weekly means in the cotton belt neither having been unduly abnormal nor remaining persistently above or below the normal, but on the whole tending to plus departures. In the more northern portions of the belt unseasonably cool weather has from time to time retarded cotton growth, but not to a marked extent.

The cool weather in the principal corn belt, accompanied by an unusual amount of rainfall during much of the season, retarded planting, germination, cultivation and development of the corn crop, and as a result it is unusually late for the season, necessitating for the maturing of much of it that killing frost be delayed beyond the average date of occurrence. —*National Weather and Crop Bulletin*, August 7, 1915.

Average Daily Departure of Temperature, in Degrees Fahr., from the Normal, for the Fifteen-Week Period, from May 19 to August 31, 1915.



SEPTEMBER.

An excess of cloudiness and rainy days with low maximum temperatures made unpleasant weather and unfavorable conditions for maturing the belated corn crop, but contrary to the general opinion of the public, the average temperature for September was above the normal. The first five days gave about the only warm, pleasant weather during the month, although there were several other days when the maximum temperatures were moderately high, notably the 13th, 14th, 23d and 24th. The 21st was the coldest day at practically all stations, the temperature being freezing or lower in some localities in the northern part of the state.

Showers were frequent between the 6th and 30th, and the rainfall was heavy from the 13th to 15th and on the 25th and 26th. The rainfall on the 25th and 26th was especially heavy and caused high water in all rivers, and flood stages in many of the smaller streams. In the north-eastern counties, where the country is hilly, lowlands were flooded, numerous culverts and small bridges were carried away, and much damage was done to country roads, railroad beds, crops, etc.

The continually cloudy, damp weather retarded the maturity of corn, interfered with the cutting and curing of the second crop of clover, caused much damage to potatoes and retarded threshing. There has been no year during the history of the State Crop Service when there was so much immature corn at the end of September as there was this year. An average of nearly 700 reports from experienced crop reporters showed only about 23 per cent of the corn safe from the effects of a killing frost.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 30.00 inches. The highest recorded was 30.37 inches, at Dubuque, on the 23d, and the least was 29.45 inches, at Sioux City, on the 13th. The monthly range was 0.92 inch.

TEMPERATURE.—The mean temperature for the state, as shown by the means of 98 stations, was 63.7°, or 0.3° higher than the normal. By divisions the mean temperatures were as follows: Northern, 61.7°, or 0.1° lower than the normal; Central, 63.7°, or 0.2° higher than the normal; Southern, 65.8° or 0.8° higher than the normal. The highest monthly mean was 68.4°, at Keokuk and the lowest monthly mean was 59.1° at Estherville. The highest temperature reported was 91°, at Keosauqua, on the 8th, and at Cedar Rapids and Burlington on the 13th. The lowest temperature reported was 26° at Rock Rapids, on the 21st. The temperature was down to the freezing point or lower at nine stations on the 21st, which was at most stations the coldest day of the month.

HUMIDITY.—The average relative humidity for the State at 7 a. m. was 88.9 per cent, and at 7 p. m. it was 74.4 per cent. The mean for the month was 81.7 per cent, or about 8 per cent more than the normal. The highest monthly mean was 85 per cent, at Charles City, and the least was 80 per cent, at Dubuque.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 110 stations, was 6.03 inches, or 2.67 inches more than the normal. By divisions the averages were as follows: Northern,

4.98 inches, or 1.93 inches more than the normal; Central, 7.27 inches, or 2.81 inches more than the normal; Southern, 5.83 inches, or 2.29 inches more than the normal. The greatest amount, 12.45 inches, occurred at Marshalltown, and the least, 2.88 inches, at Forest City. The greatest amount in any 24 consecutive hours, 6.98 inches, occurred at Onawa, on the 26th. Measurable precipitation occurred on an average of 11 days.

WIND.—The prevailing direction of the wind was from the south. The highest velocity reported was at the rate of 45 miles an hour from the north, at Sioux City, on the 20th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 56 per cent, or about 9 per cent less than the normal. The percentage of the possible amount being 43 per cent at Charles City; 62 at Davenport; 61 at Des Moines; 52 at Dubuque; 70 per cent at Keokuk; 52 at Sioux City, and 55 per cent at Omaha, Neb.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred somewhere in the state on every day of the month except the 1st, 2d, 3d, 4th, 5th, 27th, 28th and 30th. Heavy frost occurred in many localities on the 15th and was nearly general on the 21st. Much of the corn on low ground in the northern part of the state was badly damaged.

COMPARATIVE DATA FOR THE STATE—SEPTEMBER.

YEAR	Temperature				Precipitation			Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With perceptible fallure (30 in.)	Clear	Partly cloudy	Cloudy
1880	66.2	-4.1	96	36	2.97	-0.39	4.85	1.30	7	12	19	2
1891	67.2	-3.9	104	34	1.23	-2.06	3.09	0.12	4	20	7	3
1892	64.7	+1.2	99	30	1.50	-1.85	4.15	0.16	4	16	8	4
1893	64.7	+1.2	99	30	2.34	-1.15	3.49	0.74	4	20	6	6
1894	60.1	+3.7	100	26	2.57	+0.71	7.43	1.63	8	15	6	4
1895	66.8	+5.4	105	33	3.01	-0.32	7.43	0.85	5	18	5	4
1896	66.3	+4.9	105	33	4.90	+0.73	9.90	1.92	10	11	9	13
1897	68.3	+6.9	102	38	2.94	-1.29	5.98	0.90	4	23	6	5
1898	66.2	+3.9	99	32	3.69	-0.62	8.45	0.41	7	16	8	7
1899	62.5	-0.9	94	35	3.93	-2.43	4.23	T	4	16	9	10
1900	64.4	+1.0	99	30	4.58	+1.02	8.29	2.48	9	15	8	7
1901	68.3	+6.3	102	38	4.77	+1.41	13.02	1.73	12	12	9	8
1902	69.1	+7.1	106	40	4.25	+0.89	10.41	1.41	9	15	7	9
1903	69.8	+7.8	104	38	3.81	+0.45	8.79	1.42	10	14	6	10
1904	64.9	+2.6	94	29	4.78	+0.58	8.27	0.09	7	13	8	9
1905	65.4	+3.4	96	30	2.81	+0.12	11.15	0.59	9	14	8	8
1906	67.2	+5.2	103	37	4.16	+0.80	11.10	0.63	8	14	8	8
1907	62.8	-0.6	98	25	3.75	-1.61	6.09	1.38	8	15	9	6
1908	67.9	+4.5	100	30	1.99	-1.16	3.45	0.95	3	21	6	3
1909	66.4	+3.0	102	30	2.58	+0.52	7.34	1.29	9	16	8	8
1910	63.2	-0.2	95	30	3.59	+0.23	7.45	1.18	0	14	9	7
1911	65.8	+2.4	102	22	5.12	+1.76	11.71	1.10	10	11	9	10
1912	63.1	-1.3	103	24	2.98	+0.02	19.12	0.28	11	12	8	10
1913	64.1	+1.1	107	19	2.31	-0.95	7.44	0.45	0	15	8	7
1914	64.5	+1.1	99	30	7.88	+4.32	16.24	2.49	10	16	7	11
1915	62.1	+0.3	91	29	6.05	+2.67	12.45	2.88	11	11	8	11

OCTOBER

October was, as a whole, a very pleasant month, and the last decade was especially pleasant, with high temperatures and clear skies prevailing. Considerable cloudiness prevailed prior to the 18th, with general showers on the 12th-13th and 16th-17th, and light, scattered showers from the 1st to the 7th. A cool wave spread over the State on the 8th-9th and caused freezing temperatures at all stations and the first general killing frost of autumn, which resulted in great damage to the belated corn crop. Not more than 40 per cent of the crop was fully matured at the time of the first killing frost, and much of it was still in the roasting ear stage. While the last decade of the month was exceptionally favorable for drying corn, there was little or no cribbing done up to the close of the month, on account of there being so much soft corn. All other crops, however, were harvested in good condition and much fall plowing was done.

PRESSURE.—The mean pressure (reduced to sea level) for the State was 30.03 inches. The highest recorded was 30.57 inches, at Sioux City, on the 8th, and the lowest was 29.47 inches at Charles City on the 3d. The monthly range was 1.10 inches.

TEMPERATURE.—The mean temperature for the State, as shown by the means of 107 stations, was 54.4°, or 3.6° higher than the normal for Iowa. By divisions the mean temperatures were as follows: Northern, 52.8°, or 3.8° higher than the normal; Central, 54.4°, or 3.5° higher than the normal; Southern, 56.1°, or 3.5° higher than the normal. The highest monthly mean was 58.2°, at Northboro, and the lowest monthly mean was 49.9°, at Sibley. The highest temperature reported was 86° at Belle Plaine, on the 3d. The lowest temperature reported was 19° at Mason City and Earlham on the 9th.

HUMIDITY.—The average relative humidity for the State at 7 a. m. was 81.5 per cent, and at 7 p. m. it was 61.4 per cent. The mean for the month was 71.4 per cent, or about 1.4 per cent less than the normal. The highest monthly mean was 80 per cent, at Charles City, and the least was 65 per cent at Des Moines.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 112 stations, was 1.31 inches, or 1.15 inches less than the normal. By divisions the averages were as follows: Northern, 1.80 inches, or 0.54 inch less than the normal; Central, 1.31 inches, or 1.18 inches less than the normal; Southern, 0.83 inch, or 1.71 inches less than the normal. The greatest amount, 2.25 inches, occurred at Whittien, and the least, a trace, at Leon. The greatest amount in 24 consecutive days, 2.85 inches, occurred at Whittien on the 3d. Measurable precipitation occurred on an average of five days.

The only snowfall reported was a trace at Fayette, Inwood, Davenport, Dubuque and Whittien.

WIND.—The prevailing direction of the wind was from the south. The highest velocity reported was at the rate of 47 miles an hour from the northwest, at Sioux City, on the 24th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 65 per cent, or about 4.5 per cent more than the normal. The percentage of the possible amounts being 59 per cent at Charles City, 67 at Davenport, 71 at Des Moines, 56 at Dubuque, 72 at Keokuk, 67 at Sioux City and 78 per cent at Omaha, Neb.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred on the 2d, 3d, 4th, 12th, 16th and 17th, being more general over the northern counties. Hail fell at Algona on the 3d, and an aurora was observed at AHA on the 23d. Killing frost occurred in the northern part of the state on the 5th and 8th and was general in all sections on the 9th. The rivers were moderately high for October.

COMPARATIVE DATA FOR THE STATE—OCTOBER.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Departure	Greatest	Least	Snowfall	With general rain in in.	Clear	Partly cloudy	Cloudy	
1860	49.2	-5.0	80	35	2.48	+1.92	6.82	1.50	-----	7	11	11	9
1861	50.0	-4.2	82	39	2.77	+0.21	6.53	0.85	-----	6	18	7	6
1862	54.9	+0.7	95	44	1.28	-0.91	2.58	0.00	0.0	4	21	6	4
1863	52.4	+1.6	94	43	1.28	-1.18	4.56	0.00	0.0	6	16	9	6
1864	51.7	+0.9	90	39	2.67	+0.21	5.23	0.05	0.0	8	14	8	9
1865	47.9	-4.8	83	4	0.43	-1.99	1.28	0.00	T	2	19	8	7
1866	46.9	-5.8	88	12	1.23	+0.67	5.05	1.31	T	8	14	8	9
1867	56.8	+6.0	97	12	1.14	-1.32	2.00	0.00	0.0	5	18	6	7
1868	47.5	-5.3	86	17	3.56	+1.19	5.73	1.27	0.0	4	17	8	6
1869	50.7	-2.9	95	17	1.73	-0.75	4.94	0.15	2.5	5	17	8	6
1870	50.2	+2.5	90	21	0.91	+1.45	8.00	1.39	0.0	6	16	8	9
1871	54.2	+3.4	88	20	1.98	+0.49	4.23	0.45	T	3	16	7	8
1872	57.5	+2.7	81	20	2.54	+0.08	6.66	0.28	T	3	16	7	7
1873	52.2	+1.4	90	16	1.50	-0.51	4.59	0.32	0.0	6	19	6	6
1874	50.1	+2.3	89	16	1.67	-0.73	4.42	0.14	T	6	16	8	9
1875	49.3	-1.6	90	16	5.49	+0.94	5.30	1.39	1.6	6	15	8	8
1876	50.5	+0.3	87	7	1.90	-0.50	4.53	0.50	0.1	8	14	7	10
1877	50.4	-0.4	85	17	1.50	-0.36	2.71	0.30	0.9	5	20	5	6
1878	51.1	+0.3	89	17	7.38	+0.97	8.32	0.56	3.5	8	16	6	9
1879	49.7	-1.1	97	30	2.22	-0.24	4.70	0.48	T	6	18	6	9
1881	55.2	+4.4	93	19	0.77	-1.69	1.73	T	0.1	4	21	4	6
1882	49.7	-2.1	87	14	2.34	+0.58	7.00	0.73	0.6	10	12	8	11
1883	49.2	-1.6	89	-	3.03	+0.37	7.39	0.35	1.2	9	21	2	7
1884	55.9	+5.1	88	14	2.23	+0.77	6.64	0.74	T	9	15	6	9
1885	54.4	+2.6	84	19	1.31	-1.15	2.25	T	T	5	19	6	8

T Indicates an amount too small to measure.

NOVEMBER.

The first week of November was characterized by clear sky and high temperatures, but the remainder of the month gave frequent showers. There were, however, no bad storms, and as the daily amounts of precipitation were small, except on the 10-11th, and the showers were scattered, the month as a whole was exceptionally pleasant and favorable for all outdoor work. The month was also favorable for drying the immature corn that was caught by the early freeze in October. Much husking was done even though but a small portion of the crop

was in condition to be cribbed without carefully sorting out the soft ears, and taking extra precaution to provide ventilators through the cribs. Record-breaking high temperatures prevailed on the 7th, especially over the central and northeastern counties, and the monthly minimum temperatures were as a rule much higher than usual. Measurable amounts of snow fell in the northern counties on the 13th.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 29.96 inches. The highest recorded was 30.49 inches at Sioux City, on the 9th, and the lowest was 29.26 inches, at Davenport, on the 19th. The monthly range was 1.23 inches.

TEMPERATURE.—The mean temperature for the state, as shown by the means of 103 stations, was 46.2°, or 5.2° higher than the normal for Iowa. By divisions the mean temperatures were as follows:

Northern, 37.3°, or 4.5° higher than the normal; Central, 40.4°, or 5.2° higher than the normal; Southern, 43.6°, or 5.9° higher than the normal. The highest monthly mean was 45.6° at Keokuk, and the lowest monthly mean was 34.4°, at Estherville. The highest temperature reported was 83° at Keosauqua on the 7th, and the lowest temperature reported was -5°, at Rock Rapids, on the 14th, the range for the state being 88°.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 78.3 per cent, and at 7 p. m. it was 65.2 per cent. The mean for the month was 71.7 per cent, or about 2.3 per cent less than the normal. The highest monthly mean was 80 per cent, at Charles City, and the least was 65.8 per cent at Omaha, Neb.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 110 stations, was 1.94 inches, or 0.43 inch more than the normal. By divisions the averages were as follows: Northern, 1.93 inches, or 0.58 inch more than the normal; Central, 2.01 inches, or 0.48 inch more than the normal; Southern, 1.82 inches, or 0.24 inch more than the normal. The greatest amount, 4.86 inches, occurred at Rockwell City, and the least, 0.30 inches, at Cedar Rapids. The greatest amount in any 24 consecutive hours, 2.55 inches, occurred at Davenport on the 25th-26th. The average snowfall for the state was 1.2 inches. The greatest amount reported was 8.0 inches at Sioux Center. Measurable precipitation occurred on an average of 6 days.

WIND.—The prevailing direction of the wind was from the northwest. The highest velocity reported was at the rate of 55 miles an hour from the northwest at Sioux City, on the 23d.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 47 per cent, or about 7 per cent less than the normal. The percentage of the possible amounts being 21 per cent at Charles City, 44 at Davenport, 60 at Des Moines, 41 at Dubuque, 59 at Keokuk, 48 at Sioux City and 58 per cent at Omaha, Neb. The average number of clear days was 11; partly cloudy, 10; cloudy, 9.

MISCELLANEOUS PHENOMENA.—Thunderstorms were almost general over the northern part of the state on the 7th, 8th, 10th and 11th, and over the southeastern counties on the 25th-26th. Aurora Borealis was observed at Alta on the 4th; at Altou on the 6th and at Nora Springs on the 5th and 8th.

Sleet occurred at Inwood on the 23d.

River.—The stage of the Mississippi River was exceptionally high for November during the latter half of the month, but the losses from high water were little or none.

COMPARATIVE DATA FOR THE STATE—NOVEMBER.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation			
										inches	in	Clear	Partly cloudy	Cloudy
1880	36.8	+2.6	58	-3	1.46	-0.05	2.50	0.71	.....	1	15	8	7
1881	36.5	+4.3	84	-3	1.70	-0.19	3.64	0.06	.....	1	10	8	7
1882	33.3	-1.7	70	-9	1.10	-0.41	2.36	0.95	1.8	4	11	8	11
1883	34.0	-1.0	80	-11	1.17	-0.34	2.50	0.90	4.4	4	10	8	11
1884	32.7	-2.3	72	5	0.92	-0.50	2.42	.....	.....	4	11	8	6
1885	34.3	-0.7	80	-12	1.51	0.00	3.01	0.45	4.9	4	9	11	10
1886	34.2	-0.8	80	-12	1.85	+0.22	4.51	0.28	2.9	6	9	8	12
1887	35.2	-2.8	78	-17	1.50	-0.01	3.61	0.28	2.7	5	12	8	10
1888	33.0	-1.0	85	8	1.00	-0.31	2.97	0.13	0.5	5	14	8	8
1889	33.0	-1.0	79	-9	0.96	-0.45	3.20	.....	.....	5	12	8	10
1890	35.8	+0.8	77	2	0.85	-0.65	2.30	0.20	2.6	6	12	7	11
1891	41.2	+6.2	79	4	2.13	+0.02	4.19	0.16	1.5	6	11	8	6
1892	34.2	-0.8	70	-4	0.82	-0.95	2.30	0.20	2.8	7	9	8	14
1893	41.9	+6.9	80	-2	0.82	-0.99	1.74	.....	.....	7	9	8	14
1894	38.4	+3.4	70	-12	2.34	-1.36	0.50	0.00	0.5	1	10	0	4
1895	35.4	+0.4	70	-5	2.00	+1.25	0.30	0.90	0.5	5	10	7	7
1896	36.7	+1.7	68	-4	1.02	+0.22	2.60	0.55	4.4	4	9	8	14
1897	39.2	+4.2	80	5	1.56	-0.48	3.27	0.66	0.0	8	9	8	14
1898	42.4	+7.4	84	-3	2.29	+2.88	11.48	3.07	1.4	5	14	7	9
1899	35.4	-1.6	76	5	0.54	-1.17	1.21	.....	.....	8	10	7	13
1900	37.9	+1.7	79	-8	1.42	-0.00	4.90	0.11	1.0	6	11	8	9
1901	40.1	+5.1	79	6	0.98	-0.52	2.40	0.20	0.4	7	11	8	11
1902	44.1	+9.1	70	10	1.18	-0.53	2.20	0.50	7	2	16	8	4
1903	41.0	+6.0	80	4	0.22	-1.29	0.65	0.00	4	8	11	7	12
1904	42.2	+7.2	82	-5	1.94	+0.43	4.80	0.30	1.2	6	11	10	9

T indicates an amount too small to measure, or less than .006 inch precipitation and less than .06 inch snowfall.

DECEMBER.

December was, as a whole, a pleasant winter month, except that it gave an excess of cloudiness. There were no bad storms or cold waves, and as a result much outdoor work was done, and practically all of the corn crop was gathered and cribbed. The first ten days were especially pleasant and mild. A general snowstorm occurred on the 10th and 11th, and sleighing was good over the north central counties during the remainder of the month, but over the southern counties there was practically no snow after the 23d. While there were no cold waves or severely cold weather, moderately low temperatures prevailed on the

13th-14th, 17th to 21st, and from 27th to 30th, inclusive, and readings of zero or lower were observed at northern stations on the 14th, 18th, 19th, 20th, 27th and 28th, the coldest days being the 14th, 20th or 28th. The interior rivers were frozen over about the middle of the month and the Mississippi was frozen over at Lansing, Iowa, on the 17th and at Davenport during the night of the 29th-30th. No ice was harvested during the month.

PRESSURE.—The mean pressure (reduced to sea level) for the state was 30.68 inches. The highest recorded was 30.57 inches, at Dubuque, on the 6th and the lowest was 29.63 inches at Davenport on the 16th. The monthly range was 0.94 inch.

TEMPERATURE.—The mean temperature for the State, as shown by the means of 101 stations, was 25.9°, or 1.1° higher than the normal for Iowa. By divisions, three tiers of counties to the division, the mean temperatures were as follows: Northern, 22.1°, or 0.5° higher than the normal; Central, 24.9°, or 0.5° higher than the normal; Southern, 27.9°, or 1.5° higher than the normal. The highest monthly mean was 31.1°, at Northboro, and the lowest monthly mean was 19.4°, at Mason City. The highest temperature reported was 56°, at Northboro, on the 22d, and the lowest temperature reported was -10°, at six stations, on the 14th, 20th, or 28th, the range for the state being 66°.

HUMIDITY.—The average relative humidity for the state at 7 a. m. was 82.4 per cent, and at 7 p. m., it was 76.9 per cent. The mean for the month was 79.7 per cent, or about 0.7 per cent greater than the normal. The highest monthly mean was 84 per cent at Charles City, and the least was 74.4 per cent at Des Moines.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 198 stations, was 0.69 inch, or 0.53 inch less than the normal. By divisions, the averages were as follows: Northern, 0.79 inch, or 0.28 inch less than the normal; Central, 0.70 inch, or 0.55 inch less than the normal; Southern, 0.59 inch, or 0.76 inch less than the normal. The greatest amount, 1.70 inches, occurred at Storm Lake, and the least, a trace, at Chariton. The greatest amount in any 24 consecutive hours, 1.00 inch, occurred at Storm Lake, on the 11th.

Snow. The average snowfall for the state was 4.6 inches. The greatest amount, 13.5 inches, occurred at New Hampton, and the least, a trace, at Albia and Chariton. Measurable precipitation occurred on an average of 5 days.

WIND.—The prevailing direction of the wind was from the northwest. The highest velocity reported was at the rate of 38 miles an hour from the northwest at Sioux City, on the 26th.

SUNSHINE AND CLOUDINESS.—The average percentage of the possible amount of sunshine was 39 per cent, or about 9 per cent less than the normal. The percentage of the possible amounts being 32 per cent at Charles City and Davenport; Des Moines, 45; Dubuque, 58; Keokuk, 40; Sioux City, 41; and Omaha, Neb., 47 per cent. The average number of clear days was 11; partly cloudy, 8; cloudy, 12.

MISCELLANEOUS PHENOMENA.—Thunderstorms occurred over the southern counties on the 31st. Sleet occurred over the northern three tiers of counties on the 10th, 16th and 31st; over the middle three tiers on the 6th, 10th, 11th, 12th, 15th, 16th, 17th and 31st, and over the southern three tiers on the 6th, 19th, 11th, 15th, 16th, 17th, 29th and 31st.

COMPARATIVE DATA FOR THE STATE—DECEMBER.

YEAR	Temperature				Total	Precipitation				Number of Days			
	Mean	Departure	Highest	Lowest		Departure	Excess	Wet	Snowfall	With precip-itation 0.1 in.	Clear	Partly cloudy	Cloudy
1900	39.1	+3.2	73	-28	0.45	-0.77	1.40	0.00	.....	3	17	8	7
1901	32.3	+2.4	73	-14	2.41	+1.19	4.50	1.21	10.9	6	14	9	8
1902	34.9	-0.0	68	-09	1.05	+0.43	2.04	0.20	10.9	7	10	9	8
1903	30.1	+0.2	70	-21	1.21	+0.00	2.60	0.45	7.5	8	10	8	14
1904	30.4	+1.5	73	-17	0.96	-0.27	1.75	0.25	1.3	8	12	6	10
1905	35.1	+0.9	70	-10	0.65	+0.41	1.74	0.00	4.1	5	11	9	11
1906	33.9	+0.9	70	-10	0.65	-0.27	1.74	0.00	4.1	5	11	9	11
1907	32.9	+0.9	69	-08	1.05	+0.43	2.22	0.62	10.9	6	11	7	13
1908	32.1	+0.9	69	-08	1.05	+0.43	2.22	0.62	10.9	6	11	7	13
1909	32.6	-1.3	70	-19	1.61	-0.74	1.79	T	3.9	3	14	8	8
1910	36.9	+2.0	61	-10	0.45	+0.20	4.38	0.10	4.3	5	12	9	10
1911	30.5	-2.4	64	-21	0.95	-0.29	2.73	0.65	2.4	4	15	6	12
1912	33.1	-2.8	58	-23	2.23	+1.01	5.51	0.62	3.4	6	10	7	12
1913	19.0	-4.3	58	-27	0.41	-0.81	1.92	T	4.2	8	9	8	
1914	22.4	-0.9	67	-19	1.44	+0.22	3.68	0.66	12.5	4	11	9	11
1915	27.0	+1.1	62	-11	0.92	-0.79	1.69	T	4.2	9	12	7	12
1916	35.7	+1.6	65	-9	1.43	+0.21	2.81	0.37	1.4	6	11	6	9
1917	28.8	+4.9	62	-9	1.00	-0.52	2.58	0.05	4.7	8	10	7	13
1918	27.2	+2.3	67	-17	0.57	-0.65	2.07	0.05	2.8	8	10	7	14
1919	35.4	-0.5	60	-09	2.18	+0.96	6.10	0.80	12.7	3	15	8	8
1920	37.9	+4.0	60	-14	0.37	-0.46	1.39	0.01	3.0	3	15	6	16
1921	29.2	+0.3	64	-13	0.74	+1.25	4.43	0.62	12.0	7	13	6	12
1922	32.0	+4.1	65	-11	0.57	+0.48	1.76	0.10	1.1	8	10	7	9
1923	35.7	+4.2	63	-01	1.02	-0.29	4.73	0.00	1.3	4	13	6	11
1924	35.9	+1.1	56	-10	0.90	+0.80	2.24	0.37	11.1	9	10	6	12
1925	35.9	+1.1	56	-10	0.90	-0.52	1.70	T	4.6	5	11	8	12

T indicates an amount too small to measure, or less than .005 inch precipitation and less than .50 inch snowfall.

MONTHLY STATE DATA FOR 1915.

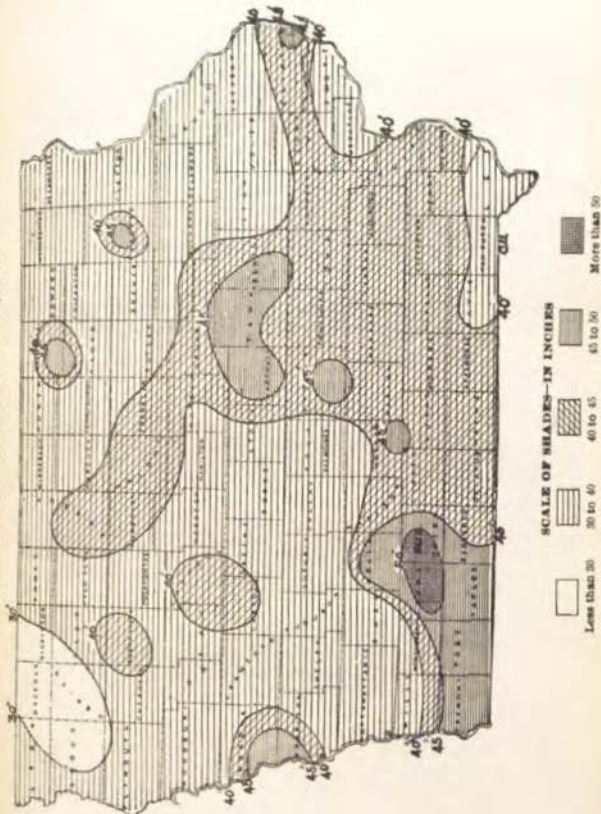
MONTH	Temperature				Precipitation				No. of Days		
	Mean	Departure from normal	Highest	Lowest	Average	Departure from normal	Greatest	Least	Showfall 63 inch or more of precipitation	Partly cloudy	Cloudy by weather observation
January	17.5	-0.4	50	-25	1.63	-0.58	2.15	0.10	7.2	8	13
February	29.1	+8.6	62	-18	2.93	+1.88	5.20	0.45	9.4	8	12
March	59.3	+24.0	81	-5	4.96	+4.81	2.12	0.17	8.8	8	14
April	67.2	+8.5	85	18	1.41	-1.45	4.02	0.00	0.0	7	17
May	66.1	-4.4	90	33	7.33	+2.77	15.21	8.82	9.1	14	14
June	69.1	-4.0	91	31	4.16	-0.22	9.1	1.72	0	11	12
July	69.5	-4.5	97	49	8.22	+4.30	15.82	2.06	0	11	12
August	63.7	-5.9	91	30	2.61	-0.87	9.14	0.37	0	16	16
September	63.7	+0.2	91	30	6.95	+2.67	12.45	2.86	0	11	11
October	54.4	+3.6	89	19	1.31	-1.15	3.25	T	12	9	11
November	40.2	+5.2	81	-5	1.94	+0.55	4.86	0.39	T	12	9
December	35.6	+1.1	56	-10	0.69	-0.53	1.70	T	4.6	11	12
Annual	47.8	+0.4	59	-22	39.53	+7.50	15.80	T	31.5	100	144

COMPARATIVE DATA FOR THE STATE—ANNUAL

Year	Temperature			Precipitation in inches				
	Mean annual	Highest	Lowest	Annual	Greatest amount	Least amount		
1860.	48.0	110	July 13	-27	January 22	31.39	65.74	12.45
1861.	47.3	106	August 9	-31	February 4	29.56	48.77	24.29
1862.	46.6	104	July 11	-38	January 14	23.57	59.27	19.23
1863.	45.7	107	July 11	-37	January 25	23.94	59.81	15.60
1864.	49.7	109	July 30	-36	January 25	28.77	55.25	28.25
1865.	47.2	104	May 28	-33	February 1	28.23	51.00	28.60
1866.	48.6	104	July 2	-30	January 25	39.36	36.18	29.57
1867.	47.8	106	July 22	-30	January 25	31.34	55.47	29.57
1868.	47.7	108	August 20	-25	December 31	28.28	45.96	12.27
1869.	47.5	104	September 6	-49	February 15	25.66	47.33	35.33
1900.	49.5	105	August 2	-37	February 15	34.41	37.69	36.29
1901.	49.0	113	July 22	-31	January 27	43.82	56.80	29.11
1902.	47.7	98	July 21	-31	December 15	45.82	45.96	25.41
1903.	48.2	100	August 24	-27	December 12	28.51	38.92	19.28
1904.	48.2	100	July 17	-22	January 27	36.50	52.26	24.69
1905.	47.2	104	August 11	-32	February 10	31.69	44.24	23.49
1906.	48.4	102	July 21	-31	February 5	31.61	45.96	23.49
1907.	47.4	105	July 5	-31	February 5	25.38	49.96	24.71
1908.	49.5	101	August 2	-18	January 30	40.01	53.48	27.29
1909.	47.4	103	August* 15	-35	February* 15	19.87	37.99	27.29
1910.	48.6	108	July 10	-35	January 3	31.37	49.77	19.13
1911.	49.5	113	July* 2	-35	January 8	38.69	52.13	15.23
1912.	46.4	104	September 8	-47	January 12	29.05	49.15	26.21
1913.	49.7	108	July 19	-25	December 26	31.33	44.11	26.21
1914.	49.1	109	July 12	-23	January 28	39.52	51.13	27.21
1915.	47.8	99	May 14					

*And other dates.

TOTAL PRECIPITATION, YEAR, 1915



MEAN ISOTHERMS AND PREVAILING WINDS, YEAR, 1915



CLIMATE AND CROP REVIEW—SEASON 1915

BY MONTHS.

The principal features that characterized the month of January were the mild weather that prevailed during the first and second decades, the low temperatures that obtained from the 23d to the 29th, inclusive, the severe rain, sleet, snow and high wind storm on the 30th-31st, and the number of days on which precipitation occurred. With the exception of two or three days, the temperature was continuously above the normal until the 19th, but from the 20th to the 29th, inclusive, readings near or below zero were general. The deficiency during this period was sufficient to make the average temperature for the month slightly below the normal. There was 55 per cent more precipitation than the normal, but only a slight excess in the amount of snowfall. No storm of importance occurred until the last day of the month, and up to that time there had been little or no interference with business, but the rain, ice, sleet, snow and windstorm on that day seriously crippled telegraph, telephone, street car and railroad service, especially in the southeastern counties.

The month of February was warm, wet and cloudy. It was the warmest February since 1882, the wettest since state-wide observations began in 1890, and there was more cloudiness than in any other February since 1892. The month was also characterized by one of the worst and most damaging sleet storms of record. The storm that began on January 31st continued until the 2d of February, and was very destructive over the northeastern and central portions of the state. Another storm of considerable severity occurred on the night of the 23d. It was attended by wet, heavy snow and high winds which did much damage to telegraph and telephone wires and poles. The continued moderately high temperature and the heavy rains of the 12th and 14th caused the ice in rivers and in southern and central sections to break up and pass out between the 15th and 20th of the month, with high stages of water and ice gorges in southern sections. At the end of the month most of the frost was out of the ground and the soil was well saturated with moisture.

March was cold and dry, with an excess of cloudiness and an absence of high winds and blustery weather. The wind movement was exceptionally low for March. Most of the precipitation came in the form of snow between the 4th and 7th, but snow flurries occurred on several days between the latter date and the 20th. The month was mostly favorable for outside work and building operations progressed rapidly, but on account of the soil freezing nearly every night there was little or no field work done, except in the southern counties. These conditions were, however, beneficial in preventing the snow from melting rapidly and the consequent high stages of the rivers. Practically all of the spring wheat and a large percentage of the oats were sown in the southern part of the state.

The conditions during April were almost ideal for farm and other outdoor work. All small grain was sown, the bulk of the spring plowing was finished and much corn was planted. At the beginning of the month vegetation was ten days to two weeks behind the normal, but warm weather began on the 4th and after that date the growth of vegetation was unusually rapid, being about a week in advance of the normal at the close of the month. The development of fruit blossoms was especially rapid. The early varieties began to show color in the southern counties about the 17th and by the 25th plums, cherries and apple trees were in full bloom in the northern counties, and the development in these sections was apparently as far advanced as in the southern part of the state.

May was cold, wet and cloudy, and was characterized during the last decade by frequent and excessive rains, which caused many streams to overflow their banks and flood bottom lands, thereby resulting in much damage to crops. The conditions were fairly favorable for farm work from the 1st to the 15th, but during the remainder of the month showers were of almost daily occurrence. Temperatures near or below the freezing point on the 7th and 9th and again from the 17th to the 19th injured garden truck, strawberries and cherries and retarded the growth of corn and other vegetation.

The cold, wet and cloudy weather that was so general in May continued during the greater part of June. With one exception it was the coolest June of record. The rainfall was slightly less than the normal, but frequent showers added to the heavy rainfall of May kept the soil wet during nearly all of the month. There was, however, considerable field work done between showers and the harvesting of fall wheat and hay was begun in the southern counties. On several dates the showers were accompanied by hail, heavy rain and some wind squalls which did considerable damage to grain and other crops. A destructive storm occurred on the 12th of the month, in Fayette, Clayton and Allamakee counties.

The conditions during July were similar to those that prevailed in May and June. With one exception it was the coolest and the wettest July of record. At the close of the month haying and harvesting were not half done, nor could they be completed on account of wet, soft fields. Much of the uncut grain was abandoned on account of being too soft and wet to work a binder, and much of the shocked grain was badly damaged by sprouting and molding. A large acreage of corn was drowned out over the southern part of the state. Storms and wind storms occurred in many localities and resulted in much damage.

August was the coolest month of that name in the climatological history of the state, but there was less than the normal rainfall although rain fell at some station in the state on every day of the month, except the 31st. The cool weather culminated in almost general frost, and in the north central and northeastern counties by freezing temperatures on the 30th. Frost occurred in localities where it had never occurred

in August. Severe local wind, hail, rain and electrical storms were prevalent and did much damage. Frequent showers and continuously cool weather retarded the maturity of corn and rains delayed and interfered with threshing and haying. Corn was never before known to be so backward at the end of August. There was none of it beyond the roasting ear stage and much of it was only in the pimple stage. Corn on low ground in the northeastern counties was seriously injured by frost on the 30th.

An excess of cloudiness and rainy days, with low maximum temperatures made unpleasant weather during September, and unfavorable conditions for maturing the belated corn crop, and unfavorable public opinion the average temperature was above the normal. The cool, damp weather interfered with the cutting and curing of the second crop of clover, caused much damage to potatoes and retarded threshing. There was less corn matured at the end of September than was ever before known.

October was, as a whole, a very pleasant month, with high temperatures and clear skies prevailing during the last decade. A cool wave spread over the state on the 8th-9th, and caused freezing temperatures at all stations and the first general killing frost of autumn. It resulted in much damage to the belated corn crop and, while the last decade was exceptionally favorable for drying corn, there was no cribbing done up to the close of the month, on account of there being so much soft corn.

The first week of November was characterized by clear weather and high temperatures, but showers were frequent during the remainder of the month. The rainfall was, however, light and other showers scattered, so the month, as a whole was very pleasant and favorable for all outdoor work. Much husking was done even though but a small portion of the crop was in condition to be cribbed, unless all soft cars were sorted out and extra precaution taken to have thorough ventilation through the cribs. The first measurable snow fell in the northern counties on the 13th.

December was, as a whole, a pleasant winter month, except that it gave an excess of cloudiness. There were no bad storms or cold waves, and as a result much outdoor work was done, and practically all of the corn crop was cribbed. Considerable snow fell over the north central counties and sleighing was good in that section after the 11th. The interior rivers were frozen over about the middle of the month. The Mississippi river was closed at Lansing on the 17th and at Davenport during the night of the 29th-30th.

CLIMATE AND CROP BULLETINS

SUMMARIES OF WEEKLY BULLETINS ISSUED IN THE SEASON OF 1915.

Bulletin No. 1. For the week ending April 11, 1915.—Favorable conditions prevailed during the winter, and while the season opens a few days later than usual, the prospects at present are promising for a good crop year. The mean temperature for the five months, November, 1914, to March, 1915, inclusive, was 26.5°, or 1.2° above the normal for the state, and 5.1° colder than the same period in the winter of 1914-15. There was considerable more than the normal amount of precipitation, rain and melted snow, and 10.7 inches more than the normal amount of unmelted snow. March was cold and dry, but there was an excess of snowfall. Freezing temperatures occurred nearly every night, which prevented any field work being done, except in the southern counties. April opened cold and dry, but more favorable conditions have prevailed during the last week. The temperature was much higher and showers were general on Thursday and Friday. Farm work was resumed, and the seeding of small grain is practically finished in the southern counties and is well advanced in northern sections except in the north-central district, where the ground is still too wet. The acreage of barley and spring wheat will probably be increased, with about the normal area of oats. Clover, grass and fall-sown grains suffered but little or no damage during the winter, and are now in excellent condition generally. There will be a large acreage seeded to alfalfa this spring. All kinds of live stock came through the winter in fairly good shape, but the supply of feed is getting short in many localities. The spring pig crop is promising and will be larger than last year. Frogs are still dormant and show no signs of winter killing.

Bulletin No. 2. For the eight days ending April 19, 1915.—The conditions have been excellent for farm work, and rapid progress was made toward the completion of seeding small grain and preparing ground for corn. Light frost occurred in many localities on the 15th, but since that date the weather has been unusually warm and dry. The early sown grains are up and show a good stand, and while grass is making a fairly good growth, it needs a soaking rain to insure a hay crop. If the weather continues warm, considerable corn will be planted before the end of the month. Fruit trees are beginning to blossom in the southern part of the state. Much truck has been planted, with the soil in both field and garden in excellent condition.

Bulletin No. 3. For the week ending April 26, 1915.—Ideal conditions continued during the week for farm operations and growth of vegetation. Rapid progress was made in preparing ground for corn planting and considerable planting was done in the southern part of the state. Grass and small grains made good growth under the effects of high temperatures and light showers, but a good, soaking rain is needed to insure a bountiful harvest. All fruit trees, except peaches, show an abundance of bloom. Live stock is in pasture in the southern and central counties.

Bulletin No. 4. For the week ending May 7, 1915.—The first half of the week was warm and dry, but the latter half gave general and copious showers and about normal temperatures. Rapid progress was made in preparing ground for corn and considerable planting was done, especially in the southern counties. The rains will be of great benefit to small grain, pastures, meadows, and truck fields. Small grains and grass made rapid growth and are now in excellent condition generally. A large acreage of potatoes has been planted in the eastern counties, and the crop is doing well. Favorable weather prevailed for the pollination of fruits, most varieties having been pollinated before the recent rains, and the indications are still favorable for an excellent crop.

Bulletin No. 5. For the week ending May 10, 1915.—With the exception of the last day, the week was cool, the average daily deficiency of temperature being about 6°. Light to heavy frost occurred on the morning of the 7th and heavy to killing frost on the 9th. Considerable damage was done to truck, and in some localities fruit was injured, especially on low ground. Ice formed in many localities on the morning of the 9th. Showers occurred on five days, but the rainfall was much below the normal except in the northeastern counties, where the amounts exceeded two inches. Corn planting was retarded by the cool, showery weather, but everything is in readiness for planting and that work will be rushed during the coming week. The wet, cool weather was, however, beneficial to grass and small grain, which are in excellent condition.

Bulletin No. 6. For the week ending May 17, 1915.—The first five days of the week were much warmer than usual for the time of the year, but the last two days were cold. Frost was general on the morning of the 17th and freezing temperatures occurred in many parts of the state. The rainfall was generally light and poorly distributed, the southwestern counties receiving none, while northern Hardin and southern Kosciusko counties received more than an inch. The frost on the 15th and probably the one on the 17th did much damage to garden truck, and in some localities to fruit. The frost, together with high winds on Saturday and Sunday, caused cherries to drop badly, and in most sections the crop will be light. Apples are apparently in good condition. Field work progressed rapidly and about 75 per cent of the corn is planted. Much of the early planted is up and shows a good stand. Oats begin to show the need of moisture in the southern counties and if rain does not come soon all grain will have a tendency to head short. In other sections of the state grain and grass are in good condition, but rain would be beneficial.

Bulletin No. 7. For the week ending May 24, 1915.—The week was cool, cloudy and wet, the average daily deficiency of temperature being about 10 degrees, and the rainfall was much above the normal, the amounts ranging from one to more than three inches. While the cold, wet weather was not favorable for field work and the rapid growth of

corn, the week, as a whole, was highly beneficial to agricultural interests in general and to oats, grass and potatoes in particular. Grass has made a decided improvement, and with seasonable rainfall during the next two or three weeks will make a big crop in northern and a fair crop in southern districts. Winter wheat is beginning to head, and some alfalfa was cut before the rains. The cool, wet weather is causing cutworms to be active in cornfields on sod ground. From present indications the late frosts did but slight damage to fruit, except to cherries, which have fallen badly.

Bulletin No. 8. For the week ending May 31, 1915.—The week was wet and cool, the average daily deficiency of temperature being about 6 degrees. Rain fell every day from the 25th to the 30th, inclusive, and in many localities the amounts of rainfall were excessive. Every part of the state received two inches or more, the greatest amount being 10.28 inches in Union county. All creeks and rivers are out of their banks at some places. Much bottom land is flooded and considerable damage done by washing uplands. No field work was done and there is yet much corn to be planted, and some replanting will be necessary. The rains were, however, highly beneficial to pastures, meadow, fruit and garden truck. Small grain is stooling nicely and is generally doing well, but there is some complaint of damage by Hessian fly in fall wheat in the southern counties and the crop is becoming too rank in many localities. Considerable alfalfa cut before the rains is still in the swath uncurd. The week closes with two days of clear, warm weather and all conditions are more promising.

Bulletin No. 9. For the week ending June 7, 1915.—While the week was more favorable than the two preceding weeks, yet it was too wet to do much field work, and it was too cold for the rapid growth of corn. There was, however, some work done on uplands and corn planting was finished in many localities and some of the early planted fields were cultivated, but there is yet much flat or bottom ground to be planted or replanted, and probably some of it will have to be used for catch crops. Grass has improved materially and small grain is generally in good condition, but it is getting rank in some localities and the Hessian fly is doing considerable damage to winter wheat in some of the southern counties. Potatoes and garden truck are also doing well.

Bulletin No. 10. For the week ending June 14, 1915.—Cool, cloudy weather continued during most of the week with showers on three days, which prevented much field work being done. Considerable corn ground is not yet planted and there is much replanting to be done. The growth of corn that is up and field work are fully two weeks behind the average of last year. Fields on bottom ground are getting grassy and some of them, if not cultivated soon, will be lost; yet, with two or three days of clear, drying weather the condition will be entirely changed for the better. Pastures and meadows have continued to improve and are in good condition, considering the drouth that prevailed

in April and the first half of May. Small grain is generally in good condition, but Hessian fly is still active in some of the southern counties and the straw is getting too rank in many localities. Oats and rye are heading and some fields of fall wheat are beginning to show a slight golden color. Clover is good and will be ready to cut within a week. Cherry harvest has begun in the southern counties with a fair yield.

Bulletin No. 11. For the week ending June 21, 1915.—Continued showery weather has still further delayed planting, replanting and cultivation of corn in many sections of the state, and the prevailing cool weather retarded its growth. But the conditions are more favorable than for several weeks previous. Small grain is generally in good condition, but in some localities both wheat and oats have lodged. Rye and fall wheat are ripening and oats are heading nicely. Clover hay harvest has begun and the yield will be heavy. Grass, truck crops, especially potatoes, and fruits are doing well.

Bulletin No. 12. For the week ending June 28, 1915.—Both the average temperature and the precipitation were below the weekly normal, but heavy and in, some localities, excessive showers occurred, which did considerable damage to growing crops. The greatest rainfall reported was 4.46 inches at Algona on the 23d. Heavy, local showers, accompanied by hail, occurred in the northern part of Poweshiek and Des Moines counties on the 25th. But, as a whole, the week was very favorable for farm work and the growth of corn. Most of the fields have been cleaned, many of them having been plowed twice and a few three times. A few fields on low, flat ground are still wet and weedy, but most of the corn has made rapid growth. Most small grain is doing well, but some damage by lodging, fly and rust is reported. Harvest of fall wheat and rye has begun in the extreme southern part of the state and will become general in southern counties this week. Haying has also begun, with much better yields than were anticipated a month ago. All truck crops are in excellent condition and fruits promising.

Bulletin No. 13. For the week ending July 5, 1915.—The week was unseasonably cool, the average temperature being about 7 degrees below the normal. The rainfall was also less than the normal except in the south central and southeastern counties, where it was heavy and of daily occurrence. The frequent rains prevented haying and harvesting in the southern counties and the cold weather retarded the growth of corn. However, good progress was made in cultivating corn over the central and northern counties and the crop is thrifty though backward, and with warm weather will make rapid growth. Some fall wheat and rye was cut, but over most of the area where the grain is ripe there was too much rain to do any harvesting. Showery weather also retarded ripening of grain and prevented the curing of clover hay. Potatoes, garden truck and fruit, especially apples, are in excellent condition.

Bulletin No. 14. For the week ending July 12, 1915.—Another cool cloudy and wet week has greatly retarded haying, harvesting and the cultivation of corn, and the wet weather and winds resulted in considerable damage to standing grain that is ripe. The average temperature was about 4 degrees below the normal and the rainfall was in excess of the seasonal average in nearly all parts of the state. The last three days, however, were moderately warm and more favorable for corn, which is now making rapid growth, although still small and late. Haying and harvesting progressed in favored localities, but over much of the winter wheat area the fields were too wet and soft for working binders. Farmers are now resorting to cradles and gasoline-driven binders to save one of the largest wheat crops ever produced in the state. Other small grains are filling well, but there is considerable complaint of rust in and lodging of oats. Early potatoes, garden truck and pastures are in excellent condition.

Bulletin No. 15. For the week ending July 19, 1915.—While the week was slightly warmer than the normal, and favorable for corn, the rainfall was heavy to excessive and further delayed haying and harvesting and caused much damage to grain in shock. Showers occurred in the state on every day of the week except Saturday, and many of them were accompanied by high winds and some of them by hail, which did great damage to standing grain. Oats are badly lodged, and in the southern part of the state low, flat land is still too wet and soft for binders to work. In many localities the conditions were critical, both for standing and shocked grain, but the week closes with better conditions and prospects of fair weather for several days at least. Corn made very rapid growth and a few fields are beginning to show tassels. Much of it, however, will be laid by with only two cultivations. Some reports indicate potatoes rotting in the ground, but truck of all kinds is generally in excellent condition. Fruit is also in good condition and pastures were never better.

Bulletin No. 16. For the week ending July 26, 1915.—The average temperature of the week was about seven degrees below the normal; the first four days being clear and moderately warm, and the last three cool and cloudy with frequent showers. On the evening of the 23d heavy rain accompanied by wind and hail storms did great damage to corn and small grain in Marion, Jasper, Mahaska, Poweshiek, Iowa, Tama and Benton counties. The amounts of rainfall ranged from two to seven inches. Low lands were flooded, corn blown down and broken off and small grain was badly lodged. In the north central, northwestern and in some localities in the south central districts the rainfall was light and rapid progress was made in harvesting wheat and early oats. In Montgomery and Adams counties from 5 to 10 per cent of the acreage of wheat and corn will be abandoned on account of fields being too wet. Corn made fair growth but most of it is about two weeks late. Threshing has begun in southern counties and a heavy yield of wheat and oats is reported. With the exception of some rotting of potatoes, all truck crops are fine.

Bulletin No. 17. For the week ending August 2, 1915.—Another week of cool, cloudy and wet weather has again prevented much progress being made with haying, harvesting and threshing. The average temperature was about 2 degrees below the normal, but there was a great excess of rainfall and cloudiness. In some localities the showers were accompanied by high winds, which, together with the heavy rain, lodged more timothy and grain, blew apples from the trees and in a few instances flattened corn. As a whole, the week was very unfavorable except for corn, which made fairly good progress, but the crop is still backward and the general condition is much below the normal. On August 1st the average condition was 74 per cent, or 23 per cent less than on August 1st last year. There still remains much uncut grain, some of which has been ripe two to three weeks, and the continued wet weather has further damaged grain in shock and kept fields too soft to permit binders to work. A large acreage of wheat and oats will be abandoned and much hay has been spoiled. Fruit and truck crops continue in good condition, although there are some complaints of potatoes rotting.

Bulletin No. 18. For the week ending August 9, 1915.—The week brought greatly improved weather conditions for farm operations, but the average temperature was 6 or 7° below the normal. The rainfall was, fortunately, very light and rapid progress was made in finishing the delayed harvest and haying. In the southern districts harvest is completed and is well advanced in the northern counties. Threshing has begun and early reports indicate heavy yields of all small grains and the quality is generally fair to good. Corn made rapid growth during the last four days, and while it is still ten days to two weeks late, sixty days of good, warm weather will mature 75 per cent of the crop. The second cutting of clover will be very heavy.

Bulletin No. 19. For the week ending August 16, 1915.—The week brought the most favorable weather of the season for belated farm work, and for the rapid growth of corn. The days gave about the average amount of sunshine, and the rainfall was considerably less than the normal. While the days were warm the cool nights kept the average temperature for the week down to about normal. Harvesting is practically finished except in the southern counties, where farmers are still trying to save some of the oats that were badly lodged. Shock threshing has begun in all sections and rapid progress was made during the week. Considerable stacking was done, especially in the northern counties.

Threshing returns indicate heavy yields of small grain, but in the southern sections the quality is generally below the normal on account of being damaged by wet weather. Corn made very rapid progress, and in the northern counties, where it was so backward, is beginning to tassel. The second crop of clover will make a heavy hay crop, but it is not forming much seed. Scott county onions are yielding 400 to 900 bushels per acre, but about half of the crop shows signs of rotting.

Fruits, potatoes, gardens and pastures are in good condition and fruits are improving.

Bulletin No. 20. For the week ending August 23, 1915.—Another week of fairly favorable weather has aided the progress of farm work and the growth of corn. The temperature was, however, considerably below the normal, and several nights were very cool. A trace of frost was observed on the morning of the 29th in Audubon and Crawford counties. This is the fourteenth consecutive week that has given an average temperature near or below the normal. For the state, as a whole, the week was comparatively dry, but copious to heavy local showers occurred in many localities, which interfered with farm work for a day or two. Stacking is nearing completion, and shock threshing is progressing as rapidly as the weather will permit. Threshing reports continue to show good yields of small grain generally, but the quality is mostly poor, and the yield of timothy seed is below the normal. Considering the cool weather, corn is doing as well as could be expected, and some of the earliest planted is in the roasting ear stage, but much of the late planted is not yet in tassel. The third crop of alfalfa and the second crop of clover is ready to be cut, and both are heavy. Potatoes, garden truck, fruit and pastures continue in good condition. The soil is in good condition, but no fall plowing has been done on account of other work being more urgent.

Bulletin No. 21. For the week ending August 30, 1915.—The week was favorable for work in most sections, and rapid progress was made with threshing and stacking, but the weather was too cold for corn. The average temperature was about 12° below the normal and light to heavy frost occurred on the morning of the 30th, with freezing temperatures in many localities, especially over the northeastern counties. The rainfall was deficient except in a few sections where copious to heavy local showers occurred. It is too early to determine the amount of damage done by the frost, but it is safe to say that over the greater part of the state the damage was almost inappreciable, but on low ground, over the northeastern and north central counties corn must have been injured some. On account of threshing being delayed, there has been little or no fall plowing done, and as a result the acreage of winter wheat probably will be lessened. Reports continue to indicate large yields of small grain, with quality fair to poor. Pastures, truck and fruit are in good condition generally.

Bulletin No. 22. For the week ending September 6, 1915.—Ideal weather prevailed during the week. The days were practically cloudless, and the nights were moderately warm, which made the best conditions possible for maturing the corn crop, threshing and finishing harrowing. The frost on August 30th and 31st seriously injured corn on low ground in the north central and northeastern counties. Probably 10 per cent of the corn in the northeastern counties was badly damaged. Shock threshing is nearly completed.

Bulletin No. 23. For the week ending September 13, 1915.—The week as a whole was warmer than the average, but frequent and, in many sections, heavy to excessive showers have further delayed threshing and other farm operations. While the rains were beneficial in softening the ground in cornfields, they have kept the crop growing and prevented any material advancement toward maturity. Only the very earliest planted fields are beginning to dent, probably not more than 20 per cent of the crop has passed the advanced roasting ear stage. However, with favorable weather in the future the improvement will be rapid, as soil conditions are now excellent. The rains have also put the ground in fine shape for plowing and considerable of that work was done during the week, and some wheat was sown. Much trouble was experienced in curing the second cutting of clover. Reports of potatoes rotting in the ground are increasing and in some sections the crop has been damaged by blight. Pastures are excellent and there will be an abundance of fall feed.

Bulletin No. 24. For the week ending September 20, 1915.—The average temperature for the week was slightly below the normal, due to prevailing low readings on the last day, which caused frost in many localities on the morning of the 21st. Showers were frequent, and in many sections heavy to excessive, making unfavorable conditions for rapid ripening of corn. The crop is very backward, and not more than 20 per cent of it is dented and not more than 5 per cent is safe from injury by killing frost. The frequent showers also delayed threshing and in some sections plowing and seeding. The harvesting of a very heavy crop of grapes is nearing completion in the western counties, and many apples have been picked. Pastures continue in excellent condition, but reports of potatoes rotting in the ground are still being received.

Bulletin No. 25. For the week ending September 27, 1915.—The average temperature for the week was about 3° below the normal, and light frost occurred over the greater part of the state on the 21st, but no material damage was done except on low ground in the extreme northwestern counties, where the temperature was below the freezing point. More than the average amount of rain fell, except in the southwestern section. In many localities the precipitation was excessive, especially over the northeastern counties. Dubuque reported 5.16 inches, and Waterloo, 4.51 inches. The first half of the week was favorable and the early planted corn made considerable progress toward maturity, but the progress was checked by the wet weather during the last three days. Many fields are sufficiently advanced to furnish good seed for next year's planting, if picked before a frost and kept in a warm, dry place. With favorable weather, 80 per cent of the early planted corn will be safe from injury from frost by October 10th, but this is not half of the crop. Considerable corn was cut and silos are being filled. Rapid progress was made with fall plowing and some wheat was sown prior to the heavy rains of Saturday and Sunday. The potato harvest has begun, and it is found that many tubers have rotted.

Bulletin No. 26. For the week ending October 4, 1915.—The week was cool, cloudy, and over the northern counties showery, although the rainfall was generally less than the normal. The week as a whole was fairly favorable and corn made rapid progress toward maturity, yet an average of more than 600 reports shows only 23 per cent of the crop safe from frost on October 1st. Over the southern half of the state probably two-thirds of the crop is safe from injury except from a hard freeze, but over the northern counties much of the crop is still in the roasting ear stage and not very far advanced in that. Many fields failed to fertilize and have nothing but husks and an embryo cob.

Rapid progress was made during the week in cutting corn, filling silos, digging potatoes and plowing, and much wheat was sown. The potato crop is not up to expectations on account of rot and blight. Grain threshed from stack is of much better quality than that threshed from shock.

October 5th.—Heavy frost occurred this morning in all parts of the state, with freezing temperatures in many localities in central and northern counties.

NOTES OF FUNGUS DISEASES FOR 1915

By L. H. PANNETT.

The past season has been an unusual one in Iowa. The rains were frequent throughout the growing season. In Central Iowa (Ames) the rainfall for May was .7 to .9 inch; for the month of June, 4.6 inches; for July, 7.10 inches; for August, 3.6 inches. This prevented a large percentage of the corn from maturing properly. In spite of the rain and cool weather the yield of oats and wheat was above the average. The amount of rust in small grain was abundant and in some places did serious damage to wheat, especially in southwestern Iowa. In addition to the large rainfall, the weather was cool. The average temperature for May was 56.1°; for June 65.1°; for July 69.5°; for August 65.9°. In some of the northern sections of the state there was a killing frost the 30th of August when the temperature recorded for Hardin county is the frost area was 31° and in Cerro Gordo county 20°.

There was much smut in oats. The percentage varied according to reports from various sections of the state. Mr. Burtlingmaier reported a damage in some fields in Clinton county at 20 per cent. Mr. A. A. Brier reported a damage \$120,000 in Black Hawk county. Mr. D. Fish reports a damage of 10 per cent in Henry county. It is safe to say that the average loss in Iowa was about 10 per cent which would mean a loss of 25,000,000 bushels. Mr. G. R. Bliss reports that about 75-80 per cent of the farmers in Scott county treat their seed, therefore the loss is serious only where seed treatment with formalin is not practiced.

There was considerable rust (*Puccinia coronata* and *P. graminis*) on oats in many sections of the state. Oats lodged badly. Nevertheless, the yield was above the average. There was also some rust of wheat (*Puccinia graminis* and *P. rubro-vera*). Some fields on the Missouri river bottom were not cut on account of rust. There was considerable wheat scab on winter wheat, more than in 1914.

There was much silver top (*Sporotrichum*) in northeastern Iowa, especially in blue grass. Occasionally found on timothy and wheat.

The corn root disease *Fusarium* is again reported serious in Clinton, Scott and Story counties. In some fields in Story county many of the stalks are broken off. The loss here is between 10 and 12 per cent. Many ears are rotting due to the immature condition of the corn. The continued wet weather enabled the corn to produce new roots near the surface of the ground and thus the damage does not appear as great as in 1914.

A similar *Fusarium* disease on sorghum has made its appearance in central Iowa. The cane breaks at the joints. Sometimes every joint is broken. The interior of the cane being reddish and the exterior is covered in some cases by the *Fusarium* mould.

One of the striking diseases this year is the late blight disease of the potato (*Phytophthora infestans*) which was reported from Story, Scott, Mitchell, Muscatine, Warren, Marshall and other counties. There is general complaint in the state that potatoes are rotting. While it has not been established that all of this rotting is due to the presence of the *Phytophthora*, probably much of it is caused by this fungus. Prof. G. R. Bliss states that in Scott county that late potatoes were seriously attacked and completely destroyed within a week, such tubers were rotting. Mr. J. L. Seal found several patches of late potatoes in a similar condition in the vicinity of Ames and Professor Pitch reports the disease serious in several counties. The only other reported outbreak in Iowa occurred in 1903 when the disease was common in many parts of the state.*

The alfalfa spot (*Pseudopeziza medicaginis*) was commonly reported in all parts of the state. In many cases, leaves began to fall early in June. It was noted as early as May 27th. It was equally severe to the second crop of alfalfa. The damage to the crop this year was about 15 per cent. Another fungus was reported on alfalfa namely, the violet root fungus, the *Rhizoctonia medicaginis*. This fungus attacks the roots covering the attacked plants with the violet colored threads of the fungus. Thus far the fungus has only been reported from Scott county near Davenport.

The alfalfa rust (*Uromyces striatus*) was not observed, though not uncommon in 1913 and 1915. The clover rust (*Uromyces trifolii*) on red clover was only abundant on red clover during the month of September. Sorghum Blight (*Bacillus Sorghii*) was abundant on sorghum and broom corn in all sections of the state.

Apple blight (*Bacillus amylovorus*) was common on some varieties of apples, particularly the Transcendent crab apple. It made its appearance in Central Iowa early in June, the earliest record of it was June 12th for Ames and June 16th for Polk county.

Apple scab was abundant everywhere this year. Reports of its injuries came from all parts of the state. The damage of the apple crop has been estimated at 10 per cent. Such varieties as the Fameuse Jonathan, Ben Davis were seriously attacked. The fruit was much smaller and gnarly. The earliest observation was July 2d, on the young branches. In some

*L. H. Pannett and Charlotte M. King, Proc. Ia. Acad. Sc. 1909: 41-97.

cases these branches and leaves looked as though they had been sprayed with some arsenical spray. It was unusually common in Story, Webster, Mills and Scott counties. Comparatively little spraying is done in the state.

Some of the truck crops suffered severely. The cabbage yellow (*Fusarium*) was destructive in the cabbage growing sections of the state as in Muscatine and Scott counties. Lettuce mildew was reported severely attacking lettuce in Nevada and Council Bluffs, chiefly, however, in greenhouses. The bacterial disease of cucumber was severe in Muscatine and Council Bluffs. Mr. L. H. Reams of Council Bluffs lost an entire crop from the attacks of the *Bacillus Solanacearum*. Cabbage rot (*Pseudomonas campestris*) was reported destructive in many sections of Iowa, Muscatine, Scott and Story counties. This organism also attacked the rutabaga and turnips causing almost complete destruction.

Some trouble was also reported on tomatoes due to a spot fungus (*Septoria Lycopersici*) attacking the leaves.

The forest tree diseases were numerous. A fungus attacked the white oak causing the leaves to look as though blighted. This fungus caused premature falling and the blighting of the leaves. The disease was caused by a species of *Gloeosporium* Sycamore blight (*Gaemonia Vectis*), was also common in many parts of the state. The fungus attacks the young shoots causing them to with. The attacks usually occur early in the season, though common later on older leaves.

The powdery mildews were common. The powdery mildew of the cherry (*Podosphaera oryzaeantiae*) was common everywhere in Iowa attacking not only the nursery but orchard trees as well. Another common powdery mildew was the Grape mildew (*Uncinula necator*). The mildew of lilac (*Microsphaera alni*) and the rose mildew (*Sphaerostema pannosa*) were common. The cherry spot disease (*Cylindrosporium padi*) was common everywhere in the state. Early in July some cherry trees in Polk, Jasper and Story counties were defoliated by the fungus Brown rot of the plum (*Sclerotinia fructigena*) was abundant. On the American plum the damage to the plum was 10 per cent. It is noteworthy that plum scab (*Cladosporium carpophilum*) was not observed in Central Iowa.

WEATHER DATA GROWING SEASON, 1915—DES MOINES, IOWA.

DATE	April Temp.			May Temp.			June Temp.			July Temp.			Avg. Temp.			Sept. Temp.		
	Max.	Min.	Prc.	Max.	Min.	Prc.	Max.	Min.	Prc.	Max.	Min.	Prc.	Max.	Min.	Prc.	Max.	Min.	Prc.
	1	61	43	T	67	49	—	70	52	—	84	60	—	86	71	T	78	61
2	45	21	T	65	49	—	77	55	—	74	50	—	73	61	T	81	52	—
3	54	29	T	70	45	—	77	50	—	75	51	—	78	61	T	80	52	—
4	64	44	T	66	48	—	77	50	—	85	60	—	87	73	T	84	62	—
5	74	49	—	66	48	—	75	50	—	87	61	—	89	74	T	84	62	—
6	64	42	—	63	42	—	69	44	—	81	60	—	81	60	—	85	55	—
7	68	47	—	69	48	—	77	52	—	82	58	—	84	64	—	86	64	—
8	66	47	—	75	58	—	77	59	—	84	64	—	84	64	—	86	64	—
9	65	32	—	62	51	—	67	45	—	79	59	—	81	64	—	83	64	—
10	69	47	—	69	49	—	81	55	—	85	60	—	86	69	—	84	64	—
11	61	45	T	64	50	—	77	53	—	85	65	—	87	69	—	86	59	—
12	63	43	—	69	50	—	86	60	—	86	65	—	86	69	—	87	67	—
13	63	39	—	65	51	—	78	58	—	85	65	—	86	69	—	86	69	—
14	74	44	—	69	49	—	69	50	—	83	70	—	84	69	—	87	65	—
15	61	43	—	70	61	—	78	54	—	81	69	—	87	65	—	87	65	—
16	65	36	—	71	53	—	80	66	—	85	70	—	86	69	—	86	69	—
17	51	31	—	67	38	—	70	47	—	85	68	—	87	71	—	86	69	—
18	63	46	—	64	37	—	70	47	—	84	68	—	87	71	—	86	69	—
19	62	54	—	64	37	—	70	47	—	84	68	—	87	71	—	86	69	—
20	60	54	T	59	46	—	68	47	—	85	70	—	85	68	—	86	69	—
21	72	53	—	61	47	—	61	48	—	80	67	—	86	70	—	86	69	—
22	81	56	—	71	50	—	65	49	—	80	67	—	86	70	—	86	69	—
23	78	49	—	63	45	—	72	50	—	82	70	—	86	70	—	86	69	—
24	75	50	T	72	51	—	74	51	—	83	70	—	86	70	—	86	69	—
25	80	58	T	70	63	—	75	60	—	86	70	—	86	70	—	86	69	—
26	76	62	—	78	65	—	82	68	—	84	66	—	86	70	—	86	69	—
27	76	60	—	82	62	—	83	66	—	84	66	—	86	70	—	86	69	—
28	86	57	—	74	48	—	74	64	—	84	66	—	86	70	—	86	69	—
29	90	49	—	65	51	—	71	60	—	85	70	—	86	70	—	86	69	—
30	70	41	—	67	51	—	81	58	—	85	70	—	86	70	—	86	69	—
31	72	48	—	72	48	—	82	66	—	86	70	—	86	70	—	86	69	—
Mean	70.3	48.4	—	66.9	47.7	—	76.6	56.4	—	85.2	69.5	—	86.2	70.5	—	86.2	69.5	—
Total Precip'n	—	—	1.36	—	—	8.31	—	—	—	3.60	—	—	—	—	1.71	—	—	—

IOWA CROP REPORT, JUNE, 1915.

Following is a summary showing condition of crops on June 1st, as compared with the average of past years on that date:

Corn, 87 per cent; oats, 97; spring wheat, 95; winter wheat, 96; barley, 95; rye, 96; flax, 96; potatoes, 96; tame hay and pastures, 97; wild hay, 96; alfalfa, 98; apples, 85; plums, 89; peaches, 15; grapes, 89; strawberries, 87; raspberries, 90; blackberries, 90; cherries, 68; cattle, 98; sheep, 98; hogs, 97; spring pigs, 93; horses, 99; foals, 93 per cent.

Last year on June 1st the conditions were as follows:

Corn, 101; oats, 99; spring wheat, 98; winter wheat, 96; barley, 95; rye, 97; flax, 96; potatoes, 99; tame hay, 92; wild hay, 95; pastures, 97; alfalfa, 101; apples, 56; plums, 75; peaches, 84; grapes, 92; strawberries, 90; raspberries, 89; blackberries, 91; cherries, 87 per cent.

IOWA CROP REPORT, JULY 1, 1915.

Following is a summary showing conditions of crops on July 1st, as compared with the average of past years on that date: Corn, 79 per cent; oats, 98; spring wheat, 96; winter wheat, 97; barley, 97; rye, 97; flax, 92; potatoes, 100; hay, 100; pastures, 103.

A summary of the fruit crop reports for July 1st shows that Iowa will produce about ninety-six per cent of the amount of apples produced in 1913. This would indicate a commercial crop or amount to be harvested of about 2,544,000 bushels.

The reports show that about 16 per cent of the orchards as a whole, are sprayed and that the sprayed orchards have set about 6 per cent larger crop than the unsprayed trees. During the season of 1914, this difference was very much greater, amounting in most instances to from 25 to 75 per cent. The codling moth injury will apparently be very slight according to the reports, less than 39 per cent of the fruit showing wormy at this time in the state as a whole. Whether or not the worms will appear in numbers later is a problem. Many reporters state that there has been no codling moth injury to date.

Scab has developed very rapidly within the past ten days and the reports show at least 29 per cent scabby on July 1st and with warm moist weather in the next few weeks, the damage will be greatly increased so that unsprayed orchards will in all probability produce very little first class fruit.

The general average for plums shows a little over half a full crop. Grapes show an average of 67 per cent for the state. The important grape section of Western and Southwestern Iowa show an average of 74 per cent.

District	Per Cent 1914 Crop Harvested	Per Cent Full Crop Com. Orchards	Per Cent Full Crop Farm Orchards	Per Cent Full Crop Sprayed Orchards	Per Cent Orchards Sprayed	Per Cent Worms	Per Cent Scab	Per Cent Plums	Per Cent Grapes
N. W.	53	96	90	81	13	6	12	38	38
N. C.	83	79	69	81	16	21	14	44	38
N. E.	103	97	66	82	9	18	18	53	38
W. C.	218	100	58	100	39	9	18	53	38
C.	102	99	63	83	13	9	19	57	38
E. C.	88	89	63	77	16	9	20	57	38
S. W.	81	87	70	82	18	14	20	56	38
S. C.	103	64	81	96	12	14	19	56	38
N. E.	97	79	76	86	23	15	15	56	38
Summary for the State as a whole.	96%	71%	69%	79%	10%	39%	20%	56%	67%

IOWA CROP REPORT, AUGUST 1, 1915.

Following is a summary showing condition of crops on August 1st, as compared with the average of past years on that date: corn, 74 per cent; pastures, 108 per cent; potatoes, 102 per cent; flax, 94 per cent. Last year on August 1st, the condition of corn was 97 per cent; pastures, 84 per cent; potatoes, 80 per cent; flax, 91 per cent.

Special reports from fruit growers indicate that the apple crop has improved in the northwestern, east central, southwestern and south central districts since the July 1st report, and has declined in the other

districts since that date. The average for the state shows the present crop to be about 95 per cent of the 1913 crop which would indicate that the commercial crop that will be harvested this year will be about 2,380,000 bushels. The crop will be much freer from worm injury and will also be reasonably clean of scab except in the districts noted below. The worm injury in the July 1st report was 28 per cent normal, while the August 1st report shows it to be only 22 per cent normal. Scab injury increased for the State as a whole, from 20 per cent to 26 per cent. Scab is especially serious in the northeastern, east central, central and southwestern districts and is noticeably light in the southeastern district.

Plums increased from 56 per cent July 1st to 62 per cent August 1st, and grapes from 67 per cent July 1st to 75 per cent August 1st.

IOWA CROP REPORT, SEPTEMBER 1, 1915.

Following is a summary showing condition of crops on September 1st, as compared with the average of past years on that date: Corn, 66 per cent; potatoes, 94; pastures, 197. Corn is in all stages of growth from the pimple to the advanced roasting ear stage, depending on time of planting and the amount of cultivation received. It never showed as many ears as it does this year, and if all of it could mature the yield would be exceptionally heavy. Twenty-five per cent of the crop in the northern counties is so far behind the average that there is no possibility of it maturing, and unless frost holds off much later than usual much of the late planted in the southern counties will not make merchantable corn. The estimates show that only 24 per cent of the entire acreage will be safe from frost on September 20th; 47 per cent on September 30th and 75 per cent on October 15th. The average yield of winter wheat per acre, as shown by preliminary reports is 23 bushels; spring wheat, 18; oats, 42; barley, 33; rye, 19; timothy seed, 3.7 bushels per acre. Only 53 per cent of the threshing was completed on September 1st.

APPLES.—A summary of special reports representing 61 counties indicates an improvement in the crop since August 1st. On August 1st, the crop to be harvested this year was estimated to be about 94 per cent of that of 1913. On September 1st, the estimate is 101 per cent. This will mean about 2,700,000 bushels harvested which would mean a 7,500,000 to an 8,000,000 bushel crop as a whole.

Worms are practically negligible for the state as a whole—only 13 per cent of worms indicated. The infestation is especially light in western Iowa and the heavier in central and eastern Iowa.

The scab situation is less encouraging. Conditions were worse in north central and central Iowa than on August 1st and better in northwest and southeastern where scab is noticeably light. Other sections remain about as on August 1st.

FINAL REPORT OF THE STATE.

TOTAL YIELD OF SOIL PRODUCTS—VALUE AT FARM PRICE,
DECEMBER 1, 1915.

Following is a summary of reports from crop correspondents of the Iowa Weather and Crop Service, showing the average yield per acre, and total yields of staple soil products, and the average price at the nearest station, December 1, 1915:

CORN.—Reports received on June 1st showed that there would be 16,842,600 acres of corn planted in the state, or 2.6 per cent more than was planted in 1914, as shown by the State Census. Later reports indicated that cold weather and excessive rainfall had resulted in a loss of 487,200 acres, which left an estimated acreage of 9,556,400 acres. The average yield per acre, regardless of quality, was 39.9 bushels per acre, making a total yield of 285,433,000 bushels. Of this amount only 25 per cent, or 99,991,550 bushels, was mature, sound corn. Cold, wet weather during the summer prevented normal growth, and the heavy to killing frost and freezing temperatures over the northeastern counties on August 30th caught much of the crop in those sections in the milk stage, and the general and severe freeze on October 9th seriously damaged much of the remainder of the crop. Only corn that was planted in April, before the cold, wet weather began and some that was planted in dry upland soil in early May reached maturity. As a result, the crop, as a whole, was inferior in quality to any crop ever produced in the State. The price ranged from \$3.00 per ton to 75 cents a bushel, the average being 47 cents per bushel, making the total value \$128,444,850.

SMALL GRAINS.—The weather before, during and after the harvest period greatly lessened the prospective yields and seriously damaged the quality of the grain, both before and after being cut. Many acres of winter wheat were abandoned, notwithstanding that farmers resorted to primitive methods of harvesting with cradle and scythe, and continued cutting whenever the weather and conditions of the fields would permit until the middle of August.

OATS.—The estimated area harvested was 5,214,900 acres; average yield 38.6 bushels; total yield 201,446,400 bushels; aggregate value at 22 cents per bushel, \$44,462,848. Last year the average yield was 34 bushels per acre; total yield 172,696,000; aggregate value at 41 cents per bushel, \$70,805,260.

SPRING WHEAT.—Area harvested, 261,955 acres; average yield, 15.9 bushels per acre; total yield, 4,155,150 bushels; price per bushel, 85 cents, total value, \$3,531,877.

WINTER WHEAT.—Area harvested, 627,905 acres; average yield per acre, 21.3 bushels; total yield 13,352,600 bushels; average price 83 cents per bushel; total value, \$11,082,658.

BARLEY.—Average yield per acre, 30.6 bushels; total yield, 8,591,850 bushels; average price, 51 cents; total value, \$4,381,859.

RYE.—Average yield, 18.6 bushels per acre; total yield, 1,301,140 bushels; farm price 77 cents; total value, \$1,001,877.

FLAX SEED.—Average per acre, 9.5 bushels; total product, 127,701 bushels; total value, at \$1.57 per bushel, \$200,491.

POTATOES.—Average yield per acre, 93 bushels; total yield, 8,002,200 bushels; total value at 53 cents per bushel, \$4,241,166.

HAY (TAME).—Average yield, 1.8 tons per acre; total yield, 5,955,080 tons; average price, \$8.94; total value, \$53,238,415.

HAY (WILD).—Average yield, 1.3 tons; total yield, 841,460 tons; average price \$7.41 per ton; total value, \$6,235,218.

ALFALFA.—Area, 149,220 acres; average yield, 3.6 tons per acre; total yield 540,450 tons; average price, \$11.18 per ton; total value, \$6,042,231.

TABULATED CROP SUMMARY.

	Acres	Average Yield	Average Price	Total Yield	Total Value
Corn	9,556,400	39.9 bu.	\$.47	285,433,000 bu.	\$ 128,444,850
Oats	5,214,900	38.6 bu.	.22	201,446,400 bu.	64,462,848
Spring wheat	261,955	15.9 bu.	.85	4,155,150 bu.	3,531,877
Winter wheat	627,905	21.3 bu.	.80	13,352,600 bu.	11,082,658
Barley	260,500	30.6 bu.	.51	8,591,850 bu.	4,381,859
Rye	69,950	18.6 bu.	.77	1,301,140 bu.	1,001,877
Flax seed	13,455	9.5 bu.	1.57	127,701 bu.	200,491
Potatoes	85,140	93.0 bu.	.28	8,002,200 bu.	4,241,166
Hay (tame)	3,243,332	1.8 tons	8.94	5,955,080 tons	53,238,415
Hay (wild)	627,907	1.3 tons	7.41	841,460 tons	6,235,218
Alfalfa	149,220	3.6 tons	11.18	540,450 tons	6,042,231
Pasture and grazing				Estimated	65,000,000
Ensilage				Estimated	4,000,000
Timothy seed				Estimated	1,325,613
Clover seed				Estimated	848,800
Sweet corn				Estimated	600,000
Pop corn				Estimated	375,000
Fruit crop				Estimated	9,300,000
Garden truck				Estimated	4,000,000
Miscellaneous				Estimated	9,500,000
Total value					\$ 408,166,940
The value of soil products for 1914 was					\$ 400,152,686

ANNUAL REPORT OF THE

Counties	Corn Acres	Sorghum Acres	Winter Wheat Acres	Barley Acres	Rye Acres	Flax Acres	Potatoes Acres	Tobacco Acres	Wool Hay Acres	Alfalfa Acres	Pastures Acres
Adair	65,000	65,000	12,000	597,911	904	108	12,740	2,000	11,000	1,000	30,000
Adams	45,000	24,200	2,000	8,000	75	50	26,000	5,000	4,000	1,000	17,000
Allamakee	41,000	26,000	2,000	5,000	15	60	28,000	1,000	4,000	1,000	12,000
Appanoose	37,000	20,000	2,000	9,000	25	2,000	41,000	8,000	1,000	70	102,000
Ashtabula	87,000	55,000	4,800	10,000	25	1,000	29,000	2,000	2,000	8,000	98
Benton	102,000	78,000	4,800	10,000	25	1,000	470,000	1,000	1,000	1,000	75
Black Hawk	157,000	144,000	1,200	1,200	2	5	100,000	10,000	10,000	10,000	82,000
Boone	37,000	24,000	1,200	1,200	1	5	100,000	10,000	10,000	10,000	70
Butler	36,000	61,200	540	2,000	1,000	10	22,500	1,000	1,000	1,000	24,000
Butt	125,000	72,000	1,000	175	1,000	10	1,000	1,000	1,000	1,000	65,000
Butt	125,000	68,750	300	1,000	1,000	129	1,000	1,000	1,000	1,000	62,500
Calhoun	113,000	66,000	4,700	2,000	69	1,000	32,000	1,000	1,000	1,000	72,500
Cass	105,000	38,000	6,000	1,000	69	1,000	55,000	1,000	1,000	1,000	86,000
Cedar Rapids	55,000	86,000	7,000	11,000	300	700	55,000	1,000	1,000	1,000	45,000
Chariton	125,000	81,000	700	2,000	30	100	700,000	2,000	2,000	2,000	84,700
Chickasaw	64,300	61,000	1,000	2,000	16	100	700,000	2,000	2,000	2,000	115,000
Clarke	107,500	75,000	1,000	2,000	16	100	700,000	2,000	2,000	2,000	115,000
Clinton	75,000	62,000	6,000	5,000	120	600	1,770,000	1,000	1,000	1,000	100,000
Crawford	117,000	48,000	3,000	4,000	120	600	400,000	1,000	1,000	1,000	100,000
Delaware	125,000	54,000	1,000	1,000	75	100	1,000	1,000	1,000	1,000	125,000
Des Moines	51,000	24,000	250	10	10	75	140,000	1,000	1,000	1,000	10,000
Diakon	86,000	42,000	190	4,700	2,000	100	860	1,000	1,000	1,000	125,000
Dubuque	79,000	28,000	240	6,000	200	600	12,000	1,000	1,000	1,000	47,500
Emmet	62,000	46,000	1,000	1,000	75	100	1,000	1,000	1,000	1,000	65,000
Franklin	61,000	53,300	1,700	3,700	170	100	2,700,000	1,000	1,000	1,000	150,000
Fayette	46,000	75,000	300	5,000	1,000	100	1,200	1,000	1,000	1,000	150,000
Fremont	106,000	81,000	1,000	1,000	100	100	1,100	1,000	1,000	1,000	60,000
Franklin	106,000	81,000	1,000	1,000	100	100	1,100	1,000	1,000	1,000	60,000

IOWA WEATHER AND CROP SERVICE

Fremont	114,000	1,200	21,000	200	620	620	12,740	2,000	11,000	1,000	30,000
Fulton	91,000	1,200	2,000	8,000	75	50	26,000	5,000	4,000	1,000	17,000
Guthrie	100,000	6,000	5,000	5,000	15	60	28,000	1,000	4,000	1,000	12,000
Hancock	30,000	2,000	2,000	9,000	25	2,000	41,000	8,000	1,000	1,000	75
Harrison	148,000	22,100	47	8,000	200	1,300	12,000	1,000	1,000	1,000	80,000
Harrison	148,000	22,100	47	8,000	200	1,300	12,000	1,000	1,000	1,000	80,000
Hawley	55,000	55,000	700	1,000	200	200	2,000	1,000	1,000	1,000	70,000
Hawley	55,000	55,000	700	1,000	200	200	2,000	1,000	1,000	1,000	70,000
Humboldt	82,000	65,000	1,000	600	110	300	670	1,000	1,000	1,000	100,000
Iowa	38,000	42,000	1,470	5,100	2,000	1,000	64,000	1,250	1,000	1,000	100,000
Jackson	65,000	65,700	1,270	5,100	2,000	1,000	64,000	1,250	1,000	1,000	100,000
Jasper	227,000	65,000	2,700	8,000	200	800	530,000	1,000	1,000	1,000	145,000
Jefferson	61,000	41,000	700	4,000	1,000	1,000	1,000	1,000	1,000	1,000	80,000
Jessie	52,000	54,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	100,000
Jones	82,000	84,000	250	2,500	800	800	1,000	1,000	1,000	1,000	100,000
Knox	57,300	47,000	2,000	2,000	1,120	1,100	1,570	1,000	1,000	1,000	120,000
Lake Park	56,000	12,000	3,000	2,000	7,000	1,100	41,000	1,000	1,000	1,000	120,000
Lee	117,000	20,000	800	3,100	2,100	2,100	1,500	1,000	1,000	1,000	100,000
Linn	64,000	24,700	5,000	9,000	2,100	1,100	15,000	2,000	2,000	2,000	100,000
Linn	64,000	24,700	5,000	9,000	2,100	1,100	15,000	2,000	2,000	2,000	100,000
Lyon	125,000	66,000	9,000	2,000	150	40	1,000	1,000	1,000	1,000	130,000
Madison	80,000	20,000	1,700	1,000	110	40	24,000	1,000	1,000	1,000	100,000
Mahaska	102,000	1,000	2,000	8,000	440	400	450	1,000	1,000	1,000	100,000
Marshall	111,000	65,000	1,700	2,500	90	90	800	1,000	1,000	1,000	80,000
Mills	86,000	17,000	2,000	2,000	240	240	270	1,000	1,000	1,000	100,000
Monroe	40,000	17,000	2,000	2,000	150	150	200	1,000	1,000	1,000	100,000
Montgomery	40,000	13,000	1,800	1,600	240	240	200	1,000	1,000	1,000	100,000
Monroe	40,000	17,000	2,000	2,000	150	150	200	1,000	1,000	1,000	100,000
Osage	114,300	55,000	6,200	2,000	2,200	1,100	1,000	1,000	1,000	1,000	100,000
Osceola	78,000	62,700	430	70	6,000	40	110	1,000	1,000	1,000	100,000
Page	106,000	27,000	1,200	8,000	100	100	1,000	1,000	1,000	1,000	100,000
Polk	105,400	61,700	26,000	4,300	40	40	460	1,000	1,000	1,000	100,000
Plymouth	120,000	70	5,000	1,300	60	60	1,200	1,000	1,000	1,000	100,000
Pocahontas	107,000	42,000	17,000	5,000	220	200	800	1,000	1,000	1,000	100,000
Polk	105,400	61,700	26,000	4,300	40	40	460	1,000	1,000	1,000	100,000
Postville	107,000	42,000	17,000	5,000	220	200	800	1,000	1,000	1,000	100,000
Prentiss	107,000	42,000	17,000	5,000	220	200	800	1,000	1,000	1,000	100,000
Ringgold	117,000	20,000	34,000	5,400	300	300	170	1,000	1,000	1,000	100,000
Scott	75,300	54,000	400	7,200	21,000	2,200	25,000	1,000	1,000	1,000	100,000
Shelby	129,000	55,100	2,200	9,200	820	820	25,300	2,000	2,000	2,000	100,000

IOWA CROPS, 1915. NUMBER OF ACRES BY COUNTIES—CONTINUED.

Counties	Corn Acres	Oats Acres	Spring Wheat Acres	Winter Wheat Acres	Barley Acres	Rye Acres	Flax Acres	Potatoes Acres	Tame Hay Acres	Wild Hay Acres	Alfalfa Acres	Pasture Acres
Sioux	171,390	94,400	22,500	350	15,000	40		1,000	19,480	14,500	1,000	80,800
Story	143,000	69,000	550	1,040	120	50		240	30,000	4,770	110	99,000
Tama	139,000	71,500	1,600	520	7,500	300		1,200	25,000	1,000	175	121,000
Taylor	87,000	23,500	350	25,000	250	400		450	35,000	600	90	103,500
Union	69,000	25,900	900	5,700	150	190		430	32,800	460	80	124,000
Van Buren	56,000	30,500	100	5,800	180	2,300		300	28,000	25	50	101,000
Wapello	54,500	31,000	400	10,500	130	1,700		460	35,000	15	90	104,500
Warren	78,000	30,000	4,400	25,050	670	430		280	35,000	280	110	147,000
Washington	94,500	45,500	450	1,770	670	140		300	47,500	38	60	168,000
Wayne	145,000	107,000	2,300	600	450	25	150	180	50,000	80	50	103,000
Webster	62,500	46,100	6,000	50	2,800	20	1,000	1,000	17,150	19,000	250	90,000
Winnebago	81,000	70,000	3,700	660	12,100	600	475	1,200	35,000	32,300	160	114,000
Winneshek	82,000	65,000	9,300	11,000	3,700	100		1,100	20,000	10,500	15,000	100,000
Woodbury	82,000	35,500	3,500	160	3,400	165	1,000	800	18,800	14,500	90	58,500
Worth	114,000	94,000	1,300	310	1,300	30	300	700	30,000	9,000	200	177,000
Wright												
Totals	9,506,400	5,214,900	261,000	427,900	380,200	90,700	13,450	85,160	3,242,555	627,000	140,200	9,506,400

DATES OF KILLING FROSTS, 1915.

STATIONS		Killing Frosts		STATIONS		Killing Frosts		STATIONS		Killing Frosts	
	Last in Spring	First in Spring		Last in Spring	First in Spring		Last in Spring	First in Spring		Last in Spring	First in Spring
Northern Division											
Algona	April 12	Oct. 30	Oder Rapids	April 1	Oct. 5	Hurlington	April 30	Oct. 30	Clinton	April 12	Oct. 5
Allison	May 17	Oct. 9	Clinton	April 4	Oct. 9	Centerville	April 12	Oct. 5	Davenport	April 12	Oct. 5
Alta	April 12	Oct. 5	Delaware	April 8	Oct. 9	Chariton	April 12	Oct. 5	Delaware	May 17	Oct. 9
Alton	May 17	Sept. 21	Des Moines	May 9	Sept. 21	Charlton	April 12	Oct. 5	Des Moines	May 9	Oct. 9
Belmond	May 9	Oct. 5	Dubuque	April 31	Oct. 9	Chillicothe Junction	April 3	Oct. 9	Dubuque	April 20	Oct. 9
Britt	May 17	Oct. 30	Fort Dodge	April 12	Oct. 9	Corning	May 9	Oct. 9	Corning	May 9	Oct. 9
Charles City	April 12	Oct. 9	Grinnell	April 12	Oct. 5	Craton	May 17	Oct. 5	Craton	May 17	Oct. 5
Decorah	May 19	Aug. 30	Grundy Center	April 12	Oct. 5	Earlimont	May 17	Oct. 5	Earlimont	May 17	Oct. 5
Etherville	May 19	Oct. 9	Guthrie Center	May 9	Oct. 9	Elliott	May 17	Oct. 5	Elliott	May 17	Oct. 5
Elkader	May 17	Oct. 9	Harlan	May 9	Oct. 9	Fairfield	April 12	Oct. 9	Fairfield	April 12	Oct. 9
Fayette	May 17	Aug. 30	Independence	April 12	Oct. 9	Port Madison	Oct.	Oct.	Independence	Oct.	Oct.
Forest City	April 12	Oct. 5	Iowa City	April 3	Oct. 9	Greenfield	April 12	Oct. 9	Iowa City	April 12	Oct. 9
Humboldt	May 18	Sept. 21	Iowa Falls	May 9	Oct. 8	Indianola	April 12	Oct. 9	Iowa Falls	May 9	Oct. 9
Inwood	May 18	Oct. 3	Jefferson	May 9	Oct. 5	Kookuk	April 30	Oct. 9	Jefferson	May 17	Oct. 9
Lake Park	May 18	Oct. 8	Little Sioux	May 17	Oct. 11	Kossuth	May 9	Oct. 9	Little Sioux	May 17	Oct. 9
Le Mars	May 18	Oct. 9	Logan	May 17	Oct. 11	Knoxville	April 12	Oct. 9	Logan	May 17	Oct. 9
Mason City	May 9	Aug. 30	Maquoketa	April 12	Oct. 9	Lamoni	May 9	Oct. 9	Maquoketa	April 12	Oct. 9
New Hampton	May 17	Oct. 9	Marshalltown	April 12	Oct. 9	Lenox	April 12	Oct. 9	Marshalltown	April 12	Oct. 9
New Sparta	May 9	Oct. 5	Keosauqua	April 12	Oct. 9	Leon	April 12	Oct. 9	Keosauqua	April 12	Oct. 9
Northwood	May 12	Oct. 31	Olin	April 12	Oct. 9	Mt. Ayr	May 9	Oct. 9	Olin	May 17	Oct. 9
Pocahontas	May 17	Oct. 8	Osawa	May 9	Oct. 8	Mt. Pleasant	April 12	Oct. 9	Osawa	May 17	Oct. 9
Postville	May 17	Oct. 9	Perry	April 12	Oct. 9	Murray	May 9	Oct. 9	Perry	April 12	Oct. 9
Rock Rapids	May 18	Oct. 31	Rockwell City	May 17	Oct. 11	Northboro	April 12	Oct. 9	Rockwell City	May 17	Oct. 9
Sasboro	May 18	Sept. 21	Sax City	Oct. 5	Oct. 5	Oskaloosa	May 17	Oct. 9	Sax City	May 17	Oct. 9
Sibley	May 18	Oct. 3	Sioux City	April 12	Oct. 9	Ottumwa	May 9	Oct. 9	Sioux City	April 12	Oct. 9
Scott Center	May 18	Oct. 24	Tipston	April 12	Oct. 9	Pella	April 12	Oct. 9	Tipston	April 12	Oct. 9
Spencer	May 18	Oct. 9	Toledo	May 17	Oct. 11	St. Charles	April 12	Oct. 9	Toledo	May 17	Oct. 9
Storm Lake	April 12	Oct. 3	Waterloo	May 17	Oct. 11	Sigourney	May 9	Oct. 9	Waterloo	May 17	Oct. 9
Washita	May 18	Oct. 9	Waukegan	April 12	Oct. 9	Stockport	May 9	Oct. 9	Waukegan	April 12	Oct. 9
Waverly	May 17	Aug. 30	Webster City	May 17	Oct. 11	Thurman	May 9	Oct. 9	Webster City	May 17	Oct. 9
West Bend	May 17	Oct. 5	Whitten	May 17	Oct. 5	Washington	April 12	Oct. 9	Whitten	May 17	Oct. 9
						Winterest	April 12	Oct. 9			
						Omaha, Nebr.	April 9	Oct. 9			
Central Division											
Amama	May 9	Oct. 9	Atton	April 12	Oct. 5						
Arno	May 9	Oct. 31	Albia	May 9	Oct. 9						
Auburn	May 9	Oct. 5	Albion	April 12	Oct. 9						
Baxter	April 12	Oct. 9	Atlantic	May 9	Oct. 5						
Belle Plaine	May 17	Oct. 31	Bedford	May 17	Oct. 9						
Boone	May 9	Oct. 3	Bloomfield	April 12	Oct. 9						
Carroll	Oct. 8	Oct. 8	Boonsparte	May 9	Oct. 11						

1 Date of last temperature of 32° or lower in the spring, or first temperature of 32° or lower in the autumn (as the case may be), when frost was not reported.

FINAL CROP
AVERAGE YIELD PER ACRE AND

Counties	Corn		Oats		Spring Wheat		Winter Wheat	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels
Adair	35	3,325,000	24	900,000	14	88,000	18	230,000
Adams	31	1,350,000	28	477,000	17	8,800	25	616,000
Albany	30	880,000	44	1,000,000	19	12,000	19	17,000
Appanoose	34	1,700,000	16	777,000	16	5,000	22	120,000
Audubon	30	2,630,000	30	1,300,000	19	70,000	22	30,000
Benton	32	4,250,000	41	5,198,000	19	11,400	21	10,200
Black Hawk	31	2,587,000	30	2,100,000	18	5,000	31	27,200
Boone	35	4,580,000	22	1,400,000	20	90,000	27	37,200
Bremert	18	1,200,000	41	2,000,000	20	8,000	12	11,800
Buchanan	22	2,646,000	47	2,621,000	18	4,200	29	14,700
Bussa Vista	32	4,000,000	11	2,187,000	19	39,000	21	14,700
Butler	15	1,500,000	32	2,508,000	39	10,000	18	5,200
Calhoun	27	4,420,000	53	4,303,000	29	9,000	23	12,300
Carrroll	31	3,545,000	39	3,484,000	17	79,000	21	12,200
Cass	36	3,780,000	27	2,116,000	15	94,000	23	160,000
Cedar	30	3,078,000	48	3,051,000	17	3,700	21	4,100
Cerro Gordo	30	1,000,000	11	3,100,000	21	14,700	18	27,000
Cherokee	40	6,000,000	28	3,030,000	19	18,200	20	5,500
Clark	19	642,000	27	1,744,000	14	39,000	15	7,000
Clarke	20	1,587,000	25	487,000	15	700	18	350,000
Clay	23	2,837,000	41	5,198,000	16	24,000	20	6,200
Clayton	25	1,000,000	49	2,014,000	23	10,000	19	9,000
Clinton	25	3,027,000	19	1,610,000	19	9,400	19	37,000
Crawford	40	1,176,000	22	2,106,000	16	106,000	24	54,000
Dallas	49	4,800,000	14	2,376,000	15	21,000	23	300,000
Davis	31	1,234,000	21	744,000	10	2,000	11	1,700
Decatur	14	1,754,000	22	709,000	16	372,000	16	1,200
Delaware	23	1,548,000	30	1,832,000	20	2,300	19	4,800
Des Moines	28	3,010,000	28	1,004,000	18	34,000	29	180,000
Dickinson	28	1,610,000	38	2,014,000	14	22,000	19	1,000
Dubuoque	20	1,864,000	40	2,748,000	17	7,400	21	17,000
Dunn	13	1,264,000	41	2,108,000	18	22,000	29	4,000
Fayette	22	1,806,000	44	5,088,000	13	6,700	25	13,000
Floyd	12	1,029,000	34	2,282,000	16	14,400	18	1,000
Franklin	39	2,428,000	31	2,728,000	14	23,800	23	15,000
Fremont	39	2,446,000	38	780,000	17	21,000	18	82,000
Greene	37	4,625,000	41	2,648,000	13	12,000	27	37,000
Grundy	22	2,334,000	16	1,011,000	18	6,700	28	28,000
Guerra's	34	2,064,000	31	3,115,000	17	8,600	29	23,000
Hamilton	18	1,287,000	38	3,049,000	18	38,000	20	11,000
Hancock	18	2,210,000	42	2,808,000	20	11,800	20	3,000
Hardin	31	4,288,000	31	728,000	14	200,000	19	47,000
Harrison	32	2,800,000	41	1,305,000	19	11,400	25	28,000
Henry	27	2,800,000	19	2,901,000	16	28,000	19	15,000
Howard	38	4,400,000	30	1,000,000	19	7,400	17	15,000
Humboldt	27	2,241,000	42	2,770,000	16	26,000	25	11,000
Ia	36	3,000,000	30	2,951,000	16	28,000	19	15,000
Iowa	34	4,228,000	37	1,518,000	18	16,700	21	30,000
Jackson	35	2,275,000	40	1,011,000	21	12,000	22	17,000
Jasper	30	4,730,000	35	2,305,000	15	25,200	27	31,000
Jefferson	35	2,108,000	34	1,071,000	17	17,000	21	27,000
Johnson	30	2,478,000	30	2,800,000	16	6,000	25	15,000
Jones	30	1,040,000	30	1,206,000	19	5,000	21	45,000
Keokuk	30	3,025,000	44	2,500,000	18	4,300	20	12,000
Kossuth	30	2,300,000	42	6,018,000	17	31,400	20	27,000
Lee	27	2,072,000	41	859,000	14	2,800	23	21,000
Linn	28	2,276,000	48	2,802,000	18	18,200	20	12,000

REPORT, 1915

TOTAL PRODUCT BY COUNTIES.

Counties	Barley		Rye		Flax Seed		Potatoes		Hay-Tame		Hay-Wild		Alfalfa	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons	Tons per acre	Total Tons
Adair	14	41,400	19	1,000	50	42,500	1.5	55,500	1.5	4,800	2.0	400	400	4,800
Adams	25	12,000	36	2,200	42	30,000	1.5	45,000	1.8	5,000	1.9	1,200	1,200	480
Albany	25	317,000	23	12,000	8	400	84	99,000	2.3	41,000	2.0	2,800	2.1	480
Appanoose	30	400	21	42,000	80	17,000	1.6	70,000	1.8	1,800	2.0	140	140	200
Audubon	30	300,000	25	900	63	56,700	1.4	46,000	2.0	6,000	2.0	210	210	210
Benton	32	390,000	31	18,700	85	102,000	2.2	107,000	1.4	4,200	2.3	258	258	258
Black Hawk	32	26,800	18	43,000	120	110,000	1.7	70,000	1.1	8,800	2.3	130	130	130
Boone	30	28,000	30	2,700	73	30,700	1.9	47,000	1.5	15,400	2.1	900	900	900
Bremert	30	20,000	18	22,000	68	84,000	2.0	26,000	1.3	26,000	2.0	230	230	230
Buchanan	29	22,400	30	300	9	120	120	117,000	1.6	68,400	1.6	19,200	2.1	220
Bussa Vista	30	21,800	20	1,400	7	2,400	50	45,000	2.0	45,000	2.0	21,000	2.0	1,000
Butler	30	19,000	15	27,000	38	110,000	2.2	60,000	1.6	18,700	2.2	120	120	120
Calhoun	28	24,000	20	2,000	4	600	22	36,000	1.2	9,800	2.0	330	330	330
Carrroll	30	72,000	23	690	58	78,400	2.0	52,000	1.3	15,800	4.5	2,400	2,400	2,400
Cass	34	221,600	21	2,000	72	50,000	1.8	69,000	1.9	2,100	2.0	250	250	250
Cedar	38	232,000	24	15,000	127	123,000	2.2	114,000	2.0	280	4.6	550	550	550
Cerro Gordo	20	48,000	30	8,000	8	2,000	85	102,000	1.8	51,300	1.2	13,800	2.0	500
Cherokee	30	72,000	23	690	58	78,400	2.0	52,000	1.3	15,800	4.5	2,400	2,400	2,400
Clark	27	77,000	16	16,000	9	1,400	70	46,000	1.7	44,700	1.0	30,000	2.5	75
Clarke	29	1,000	18	1,170	143	17,000	1.7	66,000	1.0	100	2.8	170	170	170
Clay	34	68,000	15	1,000	18	8,400	68	47,000	1.6	36,400	1.1	18,700	2.8	960
Clayton	31	100,000	11	46,000	101	160,000	2.2	143,000	1.2	12,000	1.6	800	800	800
Clinton	23	320,000	23	33,800	20	74,000	1.0	114,000	1.3	4,000	2.0	1,410	1,410	1,410
Crawford	37	180,000	20	2,000	100	100,000	2.0	147,000	2.0	15,000	4.0	19,800	19,800	19,800
Dallas	29	39,100	14	1,390	94	47,000	2.0	31,000	1.4	5,000	2.0	2,000	2,000	2,000
Davis	30	1,500	19	610	19	610	19	610	1.2	62	1.0	120	120	120
Decatur	25	147,000	15	7,800	10	700	71	9,900	1.7	61,000	1.7	930	2.9	670
Delaware	35	147,000	17	48,400	108	108,000	1.7	74,800	1.5	9,500	2.0	240	240	240
Des Moines	31	19,000	21	48,000	113	50,000	1.6	39,000	1.4	40	3,000	800	800	800
Dickinson	37	87,000	1	1,000	8	5,600	90	34,500	1.8	12,000	1.5	5,200	2.2	370
Dubuoque	31	49,000	17	19,700	73	207,000	1.8	90,000	0.8	1,040	2.7	780	780	780
Dunn	29	31,000	12	2,000	8	6,000	88	30,800	1.8	28,000	1.7	14,000	4.3	170
Fayette	31	68,000	30	84,500	9	270,000	12	17,700	1.2	10,000	1.1	12,000	2.4	490
Floyd	30	18,000	16	18,000	6	2,000	93	61,000	1.5	5,200	2.2	370	370	370
Franklin	35	39,000	18	2,300	10	500	78	96,700	1.8	60,100	1.3	15,500	2.6	250
Fremont	36	5,700	20	12,000	98	57,500	1.8	22,200	1.0	3,500	2.8	29,300	29,300	29,300
Greene	30	18,000	16	1,800	98	50,700	1.6	41,000	1.1	8,800	2.2	440	440	440
Grundy	35	126,500	1,500	110	108,000	1,500	110	108,000	1.4	12,000	2.0	50	50	50
Guerra's	30	60,000	3,100	74	80,000	2.0	60,000	1.6	7,000	4.0	300	300	300	
Hamilton	21	9,900	10	300	110	300	110	30,500	1.8	48,000	1.3	11,000	2.5	1,100
Hancock	29	78,000	24	7,800	12	18,000	67	80,400	1.6	39,200	1.1	20,000	2.0	250
Hardin	40	20,000	13	1,800	10	600	75	81,300	1.6	8,800	4.0	670	670	670
Hardin	30	50,000	12	7,700	95	94,000	1.9	21,400	1.7	15,000	2.3	54,000	54,000	54,000
Harrison	30	6,400	17	87,400	123	25,000	1.8	30,300	1.2	400	1.0	1,400	1,400	1,400
Henry	33	16,000	18	8,800	7	2,200	55	38,500	1.4	44,000	1.6	30,000	2.0	760
Howard	28	38,000	1	2,800	8	2,400	74	49,000	1.9	45,100	1.1	11,700	2.5	1,300
Humboldt	32	207,000	700	85	87,800	1.8	45,400	1.1	2,750	3.4	2,000	2,000	2,000	
Ia	30	84,500	8,000	102	102,000	2.2	86,400	2.0	900	4.4	770	770	770	
Iowa	30	60,700	20	8,000	110	115,000	2.0	128						

FINAL CROP

Counties	Corn		Oats		Spring Wheat		Winter Wheat	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels
Louisia	40	2,560,000	56	1,883,000	13	8,300,255	225,500	
Lucas	28	1,288,000	31	601,800	11	2,300,118	107,000	
Lyon	24	3,640,000	15	4,440,000	59	166,000,000	1,200	
Madison	31	4,480,000	32	928,000	14	31,600,322	67,400	
Mahaska	37	3,818,000	29	1,747,000	18	33,700,118	130,000	
Marion	58	3,420,000	38	1,341,000	17	32,800,24	300,000	
Marshall	49	4,460,000	47	3,955,000	18	11,500,20	66,300	
Mills	30	2,660,000	22	544,000	19	67,000,20	146,900	
Mitchell	10	650,000	41	2,351,000	21	46,200,22	4,800	
Monona	32	1,730,000	21	827,000	16	182,000,23	816,000	
Monroe	36	1,040,000	35	817,000	11	19,800,20	14,000	
Montgomery	33	2,870,000	32	371,000	11	38,500,39	508,000	
Muscatine	33	2,649,000	29	819,000	16	5,300,21	7,700	
O'Brien	31	2,611,000	20	3,460,000	20	34,000,29	1,800	
Osceola	25	1,919,000	35	3,723,000	14	7,400,29	1,400	
Paga	30	3,370,000	37	322,000	11	18,700,18	37,000	
Palo Alto	23	2,450,000	29	3,613,000	15	8,700,20	700	
Plymouth	37	6,880,000	27	2,234,000	15	578,000,20	43,000	
Pocahontas	39	3,480,000	23	4,171,000	18	11,200,22	11,200	
Polk	28	3,800,000	22	1,000,000	18	37,800,39	700,000	
Pottawattamie	36	6,020,000	32	1,694,000	15	163,000,20	660,000	
Poweshiek	30	3,880,000	27	1,942,000	16	13,000,25	2,700	
Ringgold	25	1,830,000	23	358,000	12	2,400,14	32,800	
Sac	34	4,350,000	33	2,902,000	18	19,800,32	15,000	
Scott	40	2,008,000	44	1,137,000	18	11,000,28	39,000	
Shelby	58	4,536,000	32	1,667,200	14	124,000,20	46,900	
Sioux	28	6,500,000	44	4,131,000	16	309,000,24	12,800	
Story	37	4,985,000	44	3,083,000	19	9,700,35	49,200	
Tama	37	4,810,000	39	2,780,700	19	34,300,29	36,700	
Taylor	39	2,528,000	32	792,000	15	5,200,20	130,000	
Union	28	1,690,000	27	1,730,000	18	16,300,18	107,000	
Van Buren	34	2,650,000	36	738,000	21	2,500,30	136,000	
Wapello	33	1,600,000	31	651,000	12	6,000,23	41,500	
Warren	35	2,730,000	30	780,000	18	79,200,22	50,500	
Washington	35	3,307,000	40	1,820,000	21	9,000,24	42,000	
Wayne	35	1,750,000	39	720,000	19	400,18	17,000	
Weafer	34	4,360,000	40	4,280,000	14	22,300,18	19,200	
Winnebago	19	1,187,000	39	1,797,000	16	96,000,15	700	
Winneshiek	14	1,124,000	38	2,690,000	15	66,000,22	19,800	
Woodbury	36	5,282,000	33	3,181,000	12	128,000,22	52,000	
Worth	18	648,000	30	1,142,000	16	62,400,21	2,600	
Wright	22	2,598,000	28	3,372,000	19	24,700,15	6,300	
Totals		285,423,000		301,446,400		4,155,136	15,332,000	
Average	36.0		38.6		15.9		31.8	

REPORT, 1915.—CONTINUED.

	Barley		Rye		Flax Seed		Potatoes		Hay—Tame		Hay—Wild		Alfalfa
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons	
27	9,400	14	29,400	146	54,000	1.7	20,700	1.2	470	4.0	840		
28	15	3,700	15	18,000	1.8	60,700	1.3	170	2.5	375			
29	257,000	22	8,300	9	360	97	180,000	1.8	15,300	1.7	20,400	2.3	3,300
30	33,000	26	2,900	59	31,000	1.6	54,400	1.0	1,450	3.0	540		
31	27,000	22	9,700	150	69,700	1.8	70,200	1.6	680	4.0	1,960		
32	66,000	22	5,400	101	42,400	1.7	61,200	1.0	320	2.8	1,000		
33	45,100	15	1,850	108	97,200	2.2	92,000	1.5	840	3.7	925		
34	8,100	24	5,800	87	38,000	2.0	32,800	2.8	8,000	3.5	57,520		
35	129,700	25	3,300	11.3	5,500	102	255,000	2.0	52,400	1.5	3,800	2.0	80
36	24,800	20	3,000	90	11,700	1.6	23,800	1.7	19,000	1.2	50,400		
37	2,240	20	4,800	60	31,700	1.6	33,100	1.3	21	2.5	219		
38	7,300	18	3,000	76	32,000	1.7	41,000	1.0	1,170	3.6	18,000		
39	300,000	19	69,400	100	119,000	1.3	41,300	1.2	900	3.3	1,100		
40	320,800	22	1,250	39	1,100	89	49,800	1.5	13,800	3.8	16,300		
41	600,000	20	960	9.5	4,100	123	117,500	1.8	23,400	1.8	16,000	2.0	230
42	6,000	15	8,400	85	42,500	1.8	59,600	1.2	1,320	3.3	11,650		
43	27,000	18	10,300	9.8	12,500	42	23,100	1.4	20,800	0.9	27,450	3.0	780
44	131,200	20	1,330	9	200	233	112,200	1.7	35,500	1.5	30,000	3.7	33,300
45	12,000	16	2,500	10	4,000	60	51,000	1.6	29,800	1.3	21,800	1.1	250
46	4,000	19	4,300	127	116,800	2.1	61,700	1.6	4,500	5.4	5,720		
47	102,400	20	10,000	76	140,000	1.7	69,300	1.5	14,500	3.6	81,000		
48	42,000	13	3,000	72	51,800	2.2	94,000	1.6	300	3.0	725		
49	1,230	11	2,200	12	12,200	1.7	78,800	1.4	360	3.2	170		
50	181,000	20	1,500	10	290	62	64,400	1.8	53,800	1.2	9,000	3.0	2,910
51	274,000	21	65,100	158	441,000	1.7	56,900	1.4	4,300	3.4	5,400		
52	190,200	20	9,000	100	110,000	1.4	29,300	2.0	10,200	4.0	11,950		
53	429,000	25	950	120	391,000	2.1	49,900	1.5	27,700	3.4	19,200		
54	3,600	18	3,000	87	20,800	1.0	20,000	1.2	5,700	3.2	992		
55	302,500	18	6,500	132	168,200	2.0	106,000	1.8	3,000	3.6	630		
56	10,500	14	7,200	75	33,700	1.3	59,600	1.0	400	2.3	830		
57	3,000	20	2,800	60	28,400	1.7	65,800	1.0	1,500	3.0	804		
58	4,300	17	39,100	87	17,400	1.0	69,800	1.3	22	3.0	1,600		
59	3,200	10	17,000	40	18,400	1.6	52,800	1.5	20	3.6	600		
60	30,100	25	19,700	74	29,700	2.0	79,600	1.5	870	2.8	300		
61	18,240	20	8,800	78	40,800	2.0	85,000	2.0	60	4.0	1,180		
62	1,500	13	6,500	84	15,100	1.7	86,000	1.5	130	3.0	240		
63	30,300	15	370	8.5	7,300	97	51,400	1.9	52,800	1.8	34,300	3.0	750
64	82,000	14	280	7	7,000	63	65,000	2.0	34,800	1.3	29,000	3.0	680
65	330,700	19	10,000	9	4,275	86	106,000	2.3	137,000	1.4	7,800	2.8	450
66	75,000	20	3,000	124	126,400	1.9	40,400	1.4	14,700	3.4	31,000		
67	35,000	31	2,000	8.7	13,900	125	109,000	2.1	45,100	1.3	19,400	3.0	540
68	32,000	17	310	9.8	1,900	94	65,500	1.4	49,000	1.5	11,600	3.0	850
Totals	8,901,200	18.6	1,301,140	9.5	127,701	98	8,002,200	1.8	6,660,000	1.3	841,400	2.0	640,600