U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU AND
BUREAU OF MARKETS AND CROP ESTIMATES

In Co-operation with the

IOWA WEATHER AND CROP SERVICE

Annual Report for 1921

CHARLES D. REED, M. Sc. Agr.

Published by
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Des Moines

LETTER OF TRANSMITTAL.

HON. N. E. KENDALL, *Governor.*

SIR: In compliance with the requirements of the law, I have the honor to submit herewith the thirty-second annual report of the Iowa Weather and Crop Service for the year 1921.

CHARLES D. REED, *Director.*

Des Moines, Iowa, February 10, 1922.

HISTORICAL.

The Iowa Weather and Crop Service was established by an Act passed by the Twenty-third General Assembly, and approved by the Governor April 25, 1890.

The object of the Service is to co-operate with the U. S. Weather Bureau in collecting crop statistics and meteorological data, and more widely disseminate the weather forecasts and storm and frost warnings for the producers and shippers of perishable products, and to promote general knowledge of meteorological science and the climatology of the State.

In accordance with the Act, on the recommendation of the directors of the State Agricultural Society, J. R. Sage was duly commissioned as director by Governor Boies on June 3, 1890, and General Greeley, then Chief Signal Officer, U. S. Army, detailed Dr. George M. Chappel to serve as assistant director of the State Service. Mr. J. R. Sage resigned as director December 31, 1907, and Dr. George M. Chappel was commissioned on January 1, 1908, as director, and served in that capacity until March 31, 1918, when he resigned and was succeeded by Charles D. Reed. Toward the close of the year, 1919, co-operation in estimating acreage and production of crops was begun with the U. S. Bureau of Markets and Crop Estimates of which Mr. Frank S. Pinney is Agricultural Statistician for Iowa.

OFFICE FORCE DECEMBER 31, 1921.

Charles D. Reed, M. Sc. Agr., Meteorologist and Director.
Irvin Buche, Statistician.
Reva Gayle Dutton, Stenographer and Clerk.
Leone Kemmerer, Clerk.

CO-OPERATING ORGANIZATIONS.

U. S. Weather Bureau.

Fred L. Disterdick, Meteorologist and First Assistant.
Arthur J. Haidle and Ethel D. Slaght, Assistants.
Harold A. Carnal, Apprentice.

U. S. Bureau of Markets and Crop Estimates.

Frank S. Pinney, Agricultural Statistician for Iowa.
Hilda Miller, Stenographer and Clerk.

ANNUAL REPORT, 1921.

For convenient reference and comparison with past and future years, this report contains the summaries of the weekly, monthly and annual bulletins of the Iowa Weather and Crop Service in co-operation with the U. S. Weather Bureau and the United States Bureau of Markets and Crop Estimates for the year 1921.

The regular meteorological, climatological and crop statistical work was maintained efficiently. The Thirty-ninth General Assembly placed the supervision of agricultural statistics collected by assessors, under the direction of this office. The work on assessors' books actually began about the middle of May, 1921. The tabulated results were published September 1 and October 1 in a new series of bulletins called "Iowa Monthly Crop Report," copies of which are mailed to all assessors, county auditors, township crop reporters, and such farmers as have made request for them.

Publications were distributed as follows: Monthly Climatological Data, about 18,000 copies; Weekly Weather-Crop Bulletins, about 20,800; Daily Weather Forecast Cards, to 1,581 addresses. Of the new bulletin, "Iowa Monthly Crop Report," about 5,200 copies were distributed each month beginning with September. Five hundred copies of the Monthly Climatological Data are distributed each month through the United States Department of Agriculture, Weather Bureau, to scientific institutions and libraries in this and foreign countries. In co-operation with the U. S. Bureau of Markets and Crop Estimates, about 4,800 mimeographed copies of special monthly crop bulletins were issued to the press.

Daily weather forecasts were distributed by telegraph at the expense of the U. S. Weather Bureau to 67 towns. From these towns the forecasts are made available by free telephone to 37,288 rural subscribers, and 140,053 town subscribers. Much attention was given to accuracy and promptness in the transmission of forecasts by telegraph and telephone. Considerable improvement was noted as compared with recent years.

Frost warnings are sent when necessary during the fruit blooming season to all orchardists in the State prepared to use orchard heaters and who make application in advance for the service.

Increased transportation by automobile and motor truck has created a great demand for information as to the condition of roads.

From April 1 to September 30, daily rainfall reports are telegraphed at the expense of the U. S. Weather Bureau from 26 Iowa towns to the central station at Des Moines. Many local and long-distance calls are received as to desirable detours to avoid wet areas. A special Highway Weather Service was maintained by the U. S. Weather Bureau Offices in Charles City and Dubuque. This is very popular, but cannot be conducted satisfactorily without more funds. In fact, the work was discontinued at Davenport, Des Moines and Sioux City because of the failure of Congress to provide adequate salaries. Frequent resignations of trained employes made it impossible to continue this work.

CLIMATOLOGY OF THE YEAR, 1921.

The mean temperature, 52.2°, is 4.8° above normal and 2.5° warmer than any previous year since State-wide records began in 1890. Every month but November was above normal. January and February were the warmest of record. The highest temperature recorded was 104°, at Clinton, on July 11, 12 and 13. The lowest was —22°, at Washta, on December 25. The annual variation in temperature within the State was 126°. The total precipitation averaged 32.03 inches, or 0.06 inch above normal. Spring advanced too rapidly. Oats were seriously damaged by freezes March 28 and April 15-16. Tree fruits advanced so far that these freezes caused nearly a total loss, particularly in the south half of the State. Oats and potatoes were injured by the excessive heat. Winter wheat did well. Corn, though injured by drouth in July, gave a very good yield. Prices were discouraging.

Barometer (reduced to sea level). The average pressure of the atmosphere for the year was 30.03 inches. The highest pressure was 30.91 inches, at Keokuk, on January 17. The lowest pressure was 29.15 inches, at Sioux City, on March 26. The range for the State was 1.76 inches.

Temperature. The mean temperature for the State was 52.2°, or 4.8° above normal. The highest annual mean was 56.3°, at Keokuk, Lee County. The lowest annual mean was 48.2°, in Dickinson County near Milford. The highest temperature reported was 104°, at Clinton, on July 11, 12 and 13. The lowest temperature reported was —22°, at Washta, Cherokee County, on December 25. The range for the State was 126°.

Precipitation. The average amount of rainfall and melted snow for the year was 32.03 inches, or 0.06 inch more than the normal, and 0.28 inch more than the average for 1920. The greatest amount at any station was 46.47 inches, at Olin, Jones County, and the least amount was 20.44 inches, at Storm Lake, Buena Vista County. The greatest monthly precipitation was 11.95 inches, at Olin, Jones County, in September. The least amount was a trace, at Olin, Jones County, in February and at several southwest stations in November, and at Harlan, Shelby County, in December. The greatest amount in any 24 consecutive hours was 5.26 inches, at Belle Plaine, on September 16. Measurable precipitation occurred on an average of 86 days, 2 days less than in 1920 and one day more than normal.

Snowfall. The average amount of snowfall was 20.7 inches. The greatest amount reported from any station was 37.6 inches at Belmond, Wright County, and the least amount was 3.9 inches at Bonaparte, Van Buren County. The greatest monthly snowfall was 20.0 inches at Bedford, Taylor County, in April.

Wind. The prevailing direction of the wind was from the south. The highest velocity reported was 54 miles an hour from the northwest at Sioux City, Woodbury County, on April 24.

Sunshine and Cloudiness. The average number of clear days was 171; partly cloudy, 99; cloudy, 95; as against 167 clear; 93 partly cloudy, and 106 cloudy days in 1920. The average percentage of the possible amount of sunshine was 59 or about 2 per cent less than the normal.

MONTHLY SUMMARIES.

JANUARY.

The chief characteristic of January, 1921, was the unusually high mean temperature, which was 28.4°, the highest mean since State-wide records began in 1890. This is 10.4° higher than the normal and 0.6° higher than the previous high mean which occurred in 1914. The excess was quite uniform over the State and ranged from slightly more than 12° over portions of the northern division to less than 9° at points in a few of the southern counties. A cold wave occurred over the northern and extreme western portion of the State on the 12th and another, that covered practically the entire State, on the 17th; before and after these dates the temperature was continuously above normal and for the entire State there were less than six days with the temperature below normal.

The precipitation was less than half the normal amount for January, the amounts being less over the northern and western portions and increasing to the southern section. Only four stations in the State showed an excess of precipitation and at Keokuk this is the first time since April, 1920, that there has been an excess in precipitation.

The snowfall was below normal and only two storms of consequence occurred. The principal storm, on the 13th-14th, was accompanied by very little wind, and the snow cover remained on the ground over most of the State the rest of the month; the next storm of importance occurred on the 25th. For the State the ground was snow covered for less than 15 days; over the northwestern and north central districts the snow remained on the ground more than 20 days; but along the Mississippi River, stretches along the Missouri River and some of the southern counties the snow cover was on the ground for less than 10 days.

The weather was favorable for the usual farm activities and stock were able to remain in the open most of the month and were generally in good condition. Very little ice had been harvested at the close of the month and the quality was not good.

Pressure. The mean pressure (reduced to sea level) for the State was 30.15 inches. The highest recorded was 30.91 inches, at Keokuk, on the 17th and the lowest was 29.48 inches, at Sioux City, on the 3d. The monthly range was 1.43 inches.

Temperature. The mean temperature for the State, as shown by the records of 100 stations, was 28.4°, or 10.5° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 25.6°, or 11.0° higher than the normal; Central, 28.9°, or 10.7° higher than the normal; Southern, 30.6°, or 9.7° higher than the normal. The highest monthly mean was 33.9° at Keokuk, and the lowest monthly mean was 23.1°, at Mason City. The highest temperature reported was 67°, at Albia on the 20th, and the lowest was —9°, at Inwood on the 12th, and Mason City on the 17th. The temperature range for the State was 76°.

Humidity. The average relative humidity for the State at 7 a. m. was 83 per cent and at 7 p. m. was 74 per cent. The mean for the month was 78 per cent, which is 4 per cent below normal. The highest mean was 87 per cent, at Charles City, and the lowest, 70 per cent at Keokuk.

Precipitation. The average precipitation for the State, as shown by the records of 104 stations, was 0.51 inch, or 0.54 inch less than the normal. By divisions the averages were as follows: Northern, 0.42 inch, or 0.42 inch less than the normal; Central, 0.40 inch, or 0.71 inch less than the normal; Southern, 0.72 inch, or 0.47 inch less than the normal. The greatest amount, 1.92 inches, occurred at Keokuk, and the least, 0.10 inch, at Storm Lake. The greatest amount in any 24 consecutive hours, 0.80 inch, occurred at Keokuk on the 21st-22d.

Snowfall. The average snowfall for the State was 4.1 inches, or 2.8 inches below the normal. The greatest amount, 9.5 inches, occurred at Lamoni, and the least, 0.4 inch, at Storm Lake.

Wind. The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 53 miles per hour, from the northwest, at Sioux City on the 16th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 44, or 6 per cent less than the normal. The per cent of the possible amount at the several Weather Bureau Stations was as follows: Charles City, 24; Davenport, 50; Des Moines, 53; Dubuque, 43; Keokuk, 55; Sioux City, 38; Omaha, Neb., 44.

Miscellaneous Phenomena. Aurora: 4th. Fog, dense: 1st, 5th, 19th, 20th, 21st, 22d, 28th, 29th. Halos: 10th, 17th, 19th, 20th, 22d, 27th, 28th. Hail: 25th. Meteor: 8th. Rainbow: 4th. Sleet: 19th, 24th, 25th, 27th, 29th, 30th.

COMPARATIVE DATA FOR THE STATE—JANUARY

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	19.7	+1.8	61	—27	2.02	+0.98	2.46	0.35					
1891	26.0	+8.1	58	— 4	1.75	+0.70	3.99	0.61		4	13	7	11
1892	15.3	—2.6	58	—39	1.49	+0.04	3.13	0.10	6.9	5	16	9	6
1893	9.3	—8.6	54	—34	0.74	—0.31	3.20	0.13	6.8	6	11	9	11
1894	19.3	+1.4	60	—27	1.09	+0.04	2.24	0.31	6.0	5	14	9	8
1895	13.6	—4.3	60	—31	0.85	—0.20	2.65	0.09	8.7	4	15	7	9
1896	23.4	+5.5	68	—20	0.48	—0.57	2.19	T.	2.8	3	19	10	11
1897	17.2	—0.7	66	—30	2.01	+0.96	6.16	0.15	8.2	7	12	7	12
1898	22.4	+5.5	52	—11	1.60	+0.55	3.22	T.	12.6	5	15	6	10
1899	19.8	+1.9	68	—34	0.28	—0.77	1.15	T.	1.6	3	15	10	6
1900	25.6	+7.7	66	—20	0.32	—0.53	2.47	T.	2.3	3	16	7	8
1901	23.7	+5.8	60	—21	0.74	—0.31	2.34	0.04	6.2	4	14	9	8
1902	22.4	+4.5	63	—31	0.89	—0.17	2.83	0.19	9.4	4	17	8	6
1903	22.0	+5.1	60	—12	0.28	—0.77	1.46	T.	2.0	4	13	7	11
1904	14.0	—3.9	57	—32	1.18	+0.13	3.66	0.02	6.1	6	12	8	11
1905	11.2	—6.7	56	—36	0.91	—0.14	1.82	0.12	11.1	7	14	7	10
1906	24.8	+6.7	69	—19	1.32	+0.47	4.71	0.28	11.3	5	14	6	11
1907	18.5	+0.9	68	—22	1.32	+0.47	5.30	0.30	6.0	7	8	7	16
1908	24.9	+7.0	62	—18	0.44	—0.61	1.50	0.06	4.6	2	17	8	6
1909	21.2	+3.3	77	—25	1.66	+0.61	3.74	0.41	7.8	6	9	6	16
1910	18.1	+0.2	56	—35	1.57	+0.52	3.15	0.55	12.6	6	15	7	11
1911	20.2	+2.3	66	—35	0.97	—0.08	3.73	0.11	7.3	5	9	8	14
1912	4.3	—13.7	49	—47	0.33	—0.52	1.90	T.	5.5	5	14	7	10
1913	20.9	+2.0	62	—25	0.77	—0.28	2.05	0.04	7.2	5	14	9	8
1914	27.8	+9.9	64	—19	0.88	—0.17	2.94	0.27	5.1	5	11	8	12
1915	17.5	—0.4	59	—32	1.63	+0.58	3.15	0.10	7.8	8	12	8	10
1916	17.8	—0.1	63	—34	2.62	+1.57	6.67	0.85	7.2	10	12	6	13
1917	17.0	—0.9	60	—28	0.83	—0.22	2.07	0.17	7.2	4	17	8	6
1918	8.6	—9.2	53	—35	1.02	—0.03	2.79	0.26	11.2	7	13	8	10
1919	26.8	+8.9	64	—22	0.74	—0.81	0.96	T.	2.8	2	20	5	6
1920	16.7	—1.2	58	—26	0.42	—0.63	1.05	T.	4.6	4	12	8	11
1921	28.4	+10.5	67	— 9	0.51	—0.54	1.92	0.10	4.1	4	11	7	13

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

FEBRUARY.

February is the sixth consecutive month that the mean temperature for the State has been above normal, and a number of new records were established. The mean temperature exceeded the former high figure by nearly two degrees, the maximum for the State has been exceeded but once since 1890, and at a large number of stations in all sections of the State the maximum broke all February records, and some records cover a period of 50 years. The minimum temperature for the State, —5°, is the highest minimum of record, and over a large portion of the State the minimum did not fall below 10°. Another unusual feature was the entire absence of cold periods, at no place was there more than two consecutive days with the temperature below normal, and for the State the average number of days with the temperature below normal was three.

The precipitation was deficient over all divisions of the State, though there were areas in each division that had amounts more than normal, principally in the northern division. Most of the precipitation occurred in the form of snow, in the period 5th to 11th, though at a number of

stations in the central and southern divisions the greatest precipitation occurred on the 22d. The ground was snow covered from a single day at several stations in the southeastern portion to 15 days at Belmond. Over most of the southern division the snow cover was on the ground less than 4 days, over most of the central division less than 9 days and over most of the northern division less than 14 days. The snow was accompanied by very little wind and no drifting occurred that interfered with any kind of traffic. A windstorm occurred from the 15th to 17th that affected the entire State. The principal damage reported occurred at Davenport. On the evening of the 16th a large hangar at the Wallace Aviation Field was completely demolished and several airplanes badly damaged, causing an estimated loss of $10,000.

The weather was unusually favorable for farm activities and at the end of the month considerable plowing had been done and at a few points in the southern division some spring wheat had been sown. Stock was reported in good condition and considering the lack of snow covering winter grains and grasses suffered only slight injury. Country roads were in better condition than usual for the season and except for brief periods, were passable at all times. The ice harvest was light and at Keokuk this is the second time in 50 years that no ice was cut in the Mississippi River.

Pressure. The mean pressure (reduced to sea level) for the State was 30.06 inches. The highest recorded was 30.79 inches, at Sioux City, on the 19th, and the lowest was 29.23 inches, at Sioux City, on the 15th. The monthly range was 1.56 inches.

Temperature. The mean temperature for the State, as shown by the records of 99 stations, was 31.0°, or 10.5° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 27.5°, or 10.4° higher than the normal; Central, 31.1°, or 10.4° higher than the normal; Southern, 34.3°, or 10.7° higher than the normal. The highest monthly mean was 36.7°, at Keokuk, and the lowest monthly mean was 25.6°, at Northwood. The highest temperature reported was 76°, at Pella, on the 15th, and the lowest was —5°, at Washta, on the 7th. The temperature range for the State was 81°.

Humidity. The average relative humidity for the State at 7 a. m. was 82 per cent, and at 7 p. m. it was 68 per cent. The mean for the month was 75 per cent, or 5 per cent lower than the normal. The highest monthly mean was 84 per cent, at Charles City, and the lowest was 68 per cent, at Keokuk.

Precipitation. The average precipitation for the State, as shown by the records of 103 stations, was 0.77 inch, or 0.38 inch less than the normal. By divisions the averages were as follows: Northern, 0.89 inch, or 0.02 inch less than the normal; Central, 0.85 inch, or 0.35 inch less than the normal; Southern, 0.58 inch, or 0.77 inch less than the normal. The greatest amount, 2.00 inches, occurred at Belmond, and the least, a trace, at Olin. The greatest amount in any 24 consecutive hours, 0.98 inch, occurred at Audubon, on the 6th.

Snowfall. The average snowfall for the State was 6.5 inches, or about 6.9 inch less than the normal. The greatest amount, 18.1 inches, occurred at Belmond, and the least, a trace, at Afton, Corning and Olin.

Wind. The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau Station was 52 miles per hour from the northwest, at Sioux City, on the 15th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 52, or 4 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 39; Davenport, 44; Des Moines, 60; Dubuque, 42; Keokuk, 58; Sioux City, 53; Omaha, Neb., 70.

Miscellaneous Phenomena. Birds: (migration of) Boone; robins, bluebirds and wild ducks on 27th; Bedford, wild ducks on 26th, bluebirds and robins on 27th; Corydon, bluebirds on 3d, wild geese on 28th; Earlham, wild ducks on 13th, bluebirds on 16th, robins on 28th; Sigourney, mallard ducks on 17th; Des Moines, wild geese on 18th, robins on 22d, bluebirds on 24th. Fog: 4th, 5th, 9th, 10th, 11th. Hail: 8th. Halos: 2d, 3d, 17th, 18th, 19th, 20th, 21st, 22d, 24th, 25th, 27th, 28th. Meteor: 25th. Parhelia: 19th, 27th. Sleet: 6th, 7th, 8th, 10th, 22d. Thunderstorms: 15th, 16th.

Rivers. The ice in the Mississippi broke up north of Dubuque on the 15th and remained open the rest of the month; at Davenport and Keokuk the river was open the entire month with only light floating and shore ice. Low stages prevailed with very slight fluctuations. On the Missouri moderate stages prevailed and the only rise of consequence occurred about the middle of the month on account of ice gorges. The ice on the interior rivers went out during the first part of the third week and the only changes of consequence were due to ice gorges.

COMPARATIVE DATA FOR THE STATE—FEBRUARY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre., .01 in. or more	Clear	Partly cloudy	Cloudy
1890	26.0	+5.5	67	—24	0.62	—0.32	2.38	0.11					
1891	19.4	—1.1	70	—21	1.56	+0.01	2.41	0.55		3	13	7	8
1892	29.1	+7.6	68	—20	1.20	+0.05	2.18	0.12	5.0	6	6	7	16
1893	16.4	—4.1	62	—38	1.29	+0.24	2.91	0.06	8.1	6	10	8	10
1894	19.7	—0.8	60	—19	0.89	—0.26	2.43	T.	8.4	3	16	8	4
1895	16.4	—4.1	73	—33	0.49	—0.66	1.34	0.02	3.5	4	13	9	6
1896	27.4	+6.9	70	—12	0.71	—0.44	2.46	0.04	5.4	4	12	9	8
1897	24.7	+4.2	61	—24	0.89	—0.26	1.81	0.22	8.0	5	6	10	11
1898	24.2	+3.7	62	—18	1.30	+0.05	2.65	0.10	7.8	5	10	9	9
1899	17.2	—3.3	75	—40	0.89	—0.36	4.32	0.12	7.1	5	11	10	7
1900	14.8	—5.7	60	—27	1.30	+0.15	4.57	0.18	9.9	6	10	8	10
1901	17.5	—3.0	49	—21	1.03	—0.14	2.00	0.12	9.7	4	15	7	6
1902	17.6	—2.9	67	—23	0.73	—0.42	2.39	0.02	2.6	4	13	8	7
1903	19.8	—0.7	56	—21	1.18	+0.02	3.25	0.30	7.9	4	13	7	8
1904	14.8	—5.7	70	—26	0.41	—0.74	1.99	T.	4.5	4	10	9	10
1905	12.8	—7.7	69	—41	1.57	+0.42	2.97	0.44	15.5	7	14	6	8
1906	23.6	+3.1	69	—23	1.29	+0.14	2.91	0.20	6.1	5	14	7	7
1907	25.5	+4.5	65	—31	0.71	—0.44	1.95	0.06	4.6	4	14	9	8
1908	24.3	+3.8	59	—16	1.69	+0.54	3.95	0.23	8.9	6	12	6	11
1909	26.2	+5.7	62	—26	1.54	+0.39	4.72	0.30	7.7	5	11	6	11
1910	17.8	—2.7	58	—21	0.46	—0.69	2.09	T.	4.0	3	14	8	6
1911	27.3	+6.8	71	—12	2.76	+1.61	5.43	0.50	7.0	6	12	6	10
1912	18.1	—2.4	57	—30	1.71	+0.90	2.55	0.04	11.2	5	10	9	10
1913	20.2	—0.3	70	—24	0.82	—0.33	2.39	0.07	7.2	4	14	7	7
1914	16.8	—3.7	59	—29	0.87	—0.28	1.90	0.22	9.2	6	10	9	9
1915	29.1	+8.6	62	— 8	2.93	+1.78	5.20	0.43	9.4	9	9	5	14
1916	19.0	—1.8	62	—32	0.55	—0.60	1.38	0.05	6.0	4	14	8	7
1917	15.2	—5.3	68	—37	0.56	—0.79	1.19	T.	3.5	3	14	8	6
1918	23.0	+2.5	70	—16	0.95	—0.20	2.10	0.09	6.0	5	14	7	7
1919	24.9	+4.4	65	—16	2.42	+1.37	4.12	1.32	9.9	8	11	5	12
1920	24.0	+3.5	59	—22	0.56	—0.59	1.75	0.04	4.1	5	9	6	14
1921	31.0	+10.5	76	— 5	0.77	—0.38	2.00	T.	6.5	5	13	7	8

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

THE WINTER OF 1920-1921.

The mean temperature for the three winter months was 28.6°, which is 7.8° above the normal for the State, and 10.0° higher than the mean for 1919-1920, and 0.5° higher than the mean for 1918-1919, which prior to this winter was the warmest of record. The highest temperature reported was 76°, at Pella, Marion County, on February 15th. The lowest temperature reported was —26°, at Inwood, Lyon County, on December 24th.

The average monthly precipitation for the State was 0.81 inch, and the average total precipitation was 2.44 inches, or 0.98 inch less than the winter normal. The average total snowfall, unmelted, was 18.0 inches, or 2.5 inches less than the normal and 3.5 inches more than the winter of 1919-1920.

The total number of days with .01 inch or more of precipitation was 14, or 1 more than the winter of 1919-1920. The average number of clear days was 34; partly cloudy, 22; cloudy, 34; as compared with 32 clear days, 21 partly cloudy days and 38 cloudy days during the winter of 1919-1920.

MARCH.

The unusually mild weather that has prevailed throughout the winter continued in March. The first cold weather occurred during the latter part of the third week and a severe cold period was ushered in on the 27th that spread over the entire State. The mean temperature, 42.8°, has been exceeded but twice since State-wide records began in 1890 and considering that both January and February of this year had the highest mean temperature of record, the first three months of this year have established a record that will stand for many years. The minimum temperature, 4°, was next to the highest of record.

The precipitation averaged nearly normal, but the amounts varied greatly and over most of the State there was a pronounced deficiency. The excess was confined principally to the southeastern portion, but there were small areas in each division that had a slight excess. At Burlington the total for the month was 6.62 inches, which is the highest ever reported in Iowa in March. The precipitation was practically all rain and only once has there been less snowfall in March.

The mild weather was very favorable for all farm activities. Plowing was possible during practically the entire month and much grain had been seeded by the middle of the month and over much of the southern and central portions oats and spring wheat had a good start. Foliage was advanced to a stage nearly a month in advance of the normal, but the fruit was not injured by the severe freeze on the 28th except in some of the southern counties; however, the sudden change to colder caused much loss to young pigs and lambs.

A large number of general storms passed over the State. During one, on the 26th, a damaging tornado developed about 7:10 p. m. just north of Arthur, Ida County, traveled northeast across Sac County and disappeared somewhere in Pocahontas County several miles northeast of Fonda. The storm was accompanied by the usual freakish performances and many places in its path were not touched. At points in the path the tail of the tornado would recede from the earth for a stretch of as much as three miles, then cause destruction for a short distance and recede again. Most of the path was in a district that was sparsely settled and the damage was confined to stock and farm buildings, but the town of Fonda was directly in its path and here the greatest destruction occurred and the damage to property was estimated at $100,000. No property in the path of the storm escaped damage, but while a number of people were injured, no lives were lost. Every class of property, ranging from light sheds to strong modern buildings, suffered damage. After the storm passed Fonda its principal damage was to occasional farm buildings that happened to be in its path.

Pressure. The mean pressure (reduced to sea level) for the State was 30.01 inches. The highest recorded was 30.82 inches, the highest of record for the State for March, at Sioux City and Omaha, on the 28th, and the lowest was 29.15 inches, at Sioux City, on the 26th. The monthly range was 1.67 inches.

Temperature. The mean temperature for the State, as shown by the records of 99 stations, was 42.8°, or 9.5° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 39.4°, or 8.9° higher than the normal; Central, 43.3°, or 9.7° higher than the normal; Southern, 45.8°, or 9.9° higher than the normal. The highest monthly mean was 49.0°, at Burlington, and the lowest monthly mean was 36.3°, at Northwood. The highest temperature reported was 86°, at Glenwood and Thurman, on the 18th, and Centerville on the 19th. The lowest temperature reported was 4°, at Northwood, on the 28th. The temperature range for the State was 82°.

Humidity. The average relative humidity for the State at 7 a. m. was 78 per cent, and at 7 p. m. it was 60 per cent. The mean for the month was 69 per cent, or about 5 per cent lower than the normal. The highest monthly mean was 78 per cent, at Charles City, and the lowest was 60 per cent, at Omaha, Neb.

Precipitation. The average precipitation for the State, as shown by the records of 103 stations, was 1.57 inches, or 0.20 inch less than the normal. By divisions the averages were as follows: Northern, 1.13 inches, or 0.40 inch less than the normal; Central, 1.61 inches, or 0.26 inch less than the normal; Southern, 1.97 inches, or 0.05 inch more than the normal. The greatest amount, 6.62 inches, occurred at Burlington, and the least, 0.17 inch, at Waverly. The greatest amount in any 24 consecutive hours, 3.50 inches, occurred at Olin on the 13th-14th.

Snowfall. The average snowfall for the State was 0.2 inch, or 5.1 inches less than the normal, and with one exception, the least ever recorded in the State. The greatest amount, 3.2 inches, occurred at Inwood. Over the greater portion of the State no snow, or only traces, occurred.

Wind. The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 53 miles per hour, from the northwest, at Sioux City, on the 26th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 56, or about 2 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 47; Davenport, 51; Des Moines, 61; Dubuque, 47; Keokuk, 58; Sioux City, 58; Omaha, Neb., 67.

Miscellaneous Phenomena. Aurora: 13th, 15th, 17th, 21st, 22d, 26th. Birds (migration of): Corydon, robins on 3d, bluebirds, 14th; Earlham, blackbirds and meadow larks on the 6th; Jefferson, robins on the 2d; Postville, robins and meadow larks on the 11th. Fog: 7th, 8th, 11th, 13th, 14th, 15th, 16th, 24th, 25th, 26th. Hail: 5th, 7th, 26th. Halos: 1st, 5th, 6th, 11th, 16th, 18th, 19th, 20th, 21st, 30th. Parhelia: 2d. Rainbow: 26th. Sleet: 7th, 8th, 13th, 14th, 30th. Thunderstorms: 1st, 5th, 6th, 7th, 8th, 11th, 12th, 13th, 14th, 19th, 20th, 21st, 25th, 26th, 27th. Winds (high): 2d, 4th, 10th, 16th, 18th, 19th, 26th, 26th, 27th, 29th, 31st.

Rivers. The Mississippi River was free of ice except the extreme upper portion. The stage gradually increased during the month, the highest being reached on the last day. The Missouri was open the entire month with moderate stages and very slight fluctuations. On the interior rivers the stage was low most of the month with very little range. The only rise occurred during the last week.

COMPARATIVE DATA FOR THE STATE—MARCH.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With ppn. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	28.6	−5.3	75	−24	1.57	−0.20	3.67	0.32					
1891	26.8	−6.5	66	−19	2.60	+0.83	4.58	1.33		10	6	8	17
1892	31.9	−1.4	84	−6	2.22	+0.45	4.58	0.57	3.9	6	11	8	12
1893	31.8	−1.5	84	−8	2.14	+0.37	4.40	0.64	4.0	8	9	11	11
1894	41.0	+7.7	84	−5	2.03	+0.26	4.52	0.26	2.7	6	15	10	8
1895	34.4	+1.1	94	−11	0.83	−0.94	2.69	0.22	2.9	4	16	8	7
1896	30.9	−2.4	81	−12	1.10	−0.67	3.99	0.16	5.4	5	12	9	10
1897	22.0	−1.3	72	−22	2.39	+0.62	6.16	0.29	5.5	8	9	8	14
1898	37.5	+4.2	72	−7	1.94	+0.17	6.21	0.23	3.7	6	12	9	10
1899	22.0	−10.2	75	−16	1.62	−0.15	5.90	0.37	8.0	6	7	17	7
1900	30.7	−2.6	81	−13	2.06	+0.29	5.15	0.45	6.6	5	12	9	10
1901	34.2	+0.9	76	−2	2.64	+0.87	5.25	0.70	12.6	7	10	8	13
1902	39.1	+5.8	79	−12	1.45	−0.32	4.33	0.13	1.3	7	9	11	11
1903	38.8	+5.5	82	6	1.38	−0.39	3.90	0.15	3.9	7	11	7	13
1904	34.8	+1.5	78	3	2.18	+0.41	4.57	0.50	4.4	7	8	8	15
1905	41.5	+8.2	84	1	2.04	+0.27	3.79	0.89	4.1	7	8	8	15
1906	27.1	−6.2	65	−14	2.34	+0.57	4.55	0.58	8.9	10	8	7	16
1907	40.6	+7.3	92	−7	1.35	−0.42	5.05	0.23	4.1	6	14	7	10
1908	37.9	+4.6	85	−8	1.58	−0.19	3.74	0.45	1.1	6	13	7	11
1909	32.5	−0.8	71	−15	1.53	−0.24	5.00	0.38	9.8	6	12	10	9
1910	48.9	+15.6	92	−10	0.17	−1.60	1.37	0.00	T.	1	23	6	2
1911	39.4	+6.1	83	2	0.93	−0.84	4.84	T.	1.9	5	16	9	6
1912	34.9	−8.4	76	−19	2.01	+0.24	5.25	0.60	19.1	7	15	6	10
1913	31.9	−1.4	78	−23	2.48	+0.71	5.89	0.74	5.2	9	11	10	10
1914	34.7	+1.4	78	−3	1.69	−0.08	3.84	0.39	1.8	7	12	8	11
1915	29.3	−4.0	61	−5	0.96	−0.81	2.13	0.17	8.8	5	8	9	14
1916	35.2	+1.9	80	−18	1.57	−0.20	5.80	0.23	2.9	6	11	9	11
1917	34.6	+1.3	85	−12	1.84	+0.07	4.35	0.57	6.2	6	14	8	9
1918	42.9	+9.6	85	0	0.63	−1.14	2.12	0.02	2.6	3	19	7	5
1919	37.3	+4.2	78	−11	2.23	+0.56	5.49	0.81	1.7	6	15	8	8
1920	38.0	+4.7	80	−21	3.02	+1.25	5.70	0.47	7.4	7	15	7	9
1921	42.8	+9.5	86	4	1.57	−0.20	6.62	0.17	0.2	7	14	8	9

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

APRIL.

April is the eighth consecutive month that the mean temperature for the State has been above the normal. The excess, while not so marked as in the three preceding months, was considerable and general. The month opened warm and pleasant, but after the first week a decided change to cooler occurred with a hard freeze over the entire State and thereafter the changes were rapid, making the month generally subject to great temperature extremes and sudden changes. Periods above and below normal were of short duration. The precipitation for the State as a whole was considerably above normal, though over nearly all of the western half and most of the north central portion there was a decided deficiency. It was well distributed through the month, but the greatest

amounts over most of the State occurred during the storm of the 15th-16th, which began as a general rain and changed to snow, resulting in the worst snowstorm of the season, in the southern and eastern portions and at many points the April snowfall records were broken. All traffic in the affected area was interrupted, many roads had drifts as great as ten feet deep, and telephone and telegraph wires were broken down. Bright sunshine and mild temperature rapidly melted the snow, but drifts remained for more than a week. Practically all the snow fell south of a line drawn from the northern portion of Mills County northeastward to the southwest corner of Allamakee County, the greatest fall occurring in a strip about 75 miles wide from Taylor to Dubuque Counties. Fruit was in full bloom over the southern and central sections and the wet snow froze to the bloom and foliage, which was then broken off by high winds; some trees were nearly stripped. Temperatures as low as 20° followed. All fruit in the central and southern divisions was seriously damaged except some small fruit and late apples, while in the northern division fruit was not sufficiently advanced to be damaged much, the storm was less severe and the temperature did not fall so low. Windstorms were frequent and resulted in damage amounting to many thousand dollars. The chief damage occurred in Woodbury, Dubuque, Johnson, Cedar, Scott, Muscatine and Louisa Counties. Most of the damage was from straight blows and squalls, but undoubtedly some storms had tornadic characteristics. At Dubuque during the storm of the 25th, in the southern and eastern portions of the city, many trees and billboards were blown down and light garages wrecked, the roof of the Illinois Central coal shed, the roof of the roundhouse and the roofs of freight cars standing near, were blown off, and plate glass windows were broken, on lower Main street. At Seventh and White streets, two large piles of lumber were lifted over a one-story building and struck a six-story building, breaking a large number of windows and injuring a number of people. A 60-foot section of the roof of the Chicago Great Western freight house was blown away, some of the timbers being carried as much as 400 feet.

The month was generally favorable for farm operations, but not for the development of vegetation, though pastures were good for the time of year. Over large areas in the drier western portion of the State, dust storms occurred, the soil piled up in drifts along the fences and in depressions and newly seeded grain was blown out of the ground. Oats were injured by the severe freezes, particularly in the south half of the State where as much as 50 per cent of the acreage was reseeded in several counties, and some was seeded the third time. It is thought more reseeding was done than in any other season in the last 31 years. The cold spells and heavy snow were unusually severe on young pigs, lambs and chicks. During the time the ground was snow covered cattle had to be taken to winter quarters.

Pressure. The mean pressure (reduced to sea level) for the State was 29.94 inches. The highest recorded was 30.72 inches, at Omaha, Neb., on the 10th, and the lowest was 29.16 inches, at Sioux City, on the 24th. The monthly range was 1.56 inches.

Temperature. The mean temperature for the State, as shown by the records of 101 stations, was 52.4°, or 3.7° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 51.1°, or 4.4° higher than the normal; Central, 52.8°, or 3.9° higher than the normal; Southern, 53.4°, or 2.8° higher than the normal. The highest monthly mean was 55.7°, at Clinton, and the lowest was 48.9°, at Estherville. The highest temperature reported was 88°, at Little Sioux and Washta, on the 24th, and the lowest was 14°, at Little Sioux, on the 16th, and Waterloo, on the 17th. The temperature range for the State was 74°.

Humidity. The average relative humidity for the State at 7 a. m. was 75 per cent, and at 7 p. m. it was 57 per cent. The mean for the month was 66 per cent, which is the normal. The highest monthly mean was 72 per cent, at Charles City, and the lowest was 60 per cent, at Sioux City.

Precipitation. The average precipitation for the State, as shown by the records of 105 stations, was 3.34 inches, or 0.48 inch more than the normal. By divisions the averages were as follows: Northern, 2.50 inches, or 0.18 inch less than the normal; Central, 3.52 inches, or 0.66 inch more than the normal; Southern, 4.01 inches, or 0.96 inch more than the normal. The greatest amount, 6.99 inches, occurred at Mt. Pleasant, and the least, 0.99 inch, occurred at Sioux City. The greatest amount in any 24 consecutive hours, 2.90 inches, occurred at Bloomfield, on the 14th.

Snowfall. The average snowfall for the State was 3.6 inches, or 1.8 inches above the normal. The average by divisions was: Northern, 0.7 inch; Central, 4.1 inches; Southern, 6.1 inches. The greatest amount, 20.0 inches, occurred at Bedford. Practically all the snow fell during the storm of the 15th-16th.

Wind. The prevailing direction of the wind was from the south. The highest velocity reported from a regular Weather Bureau Station was 54 miles per hour, from the northwest, at Sioux City, on the 24th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 58, or 2 per cent below normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 44; Davenport, 62; Des Moines, 60; Dubuque, 56; Keokuk, 63; Sioux City, 55; Omaha, Neb., 66.

Miscellaneous Phenomena. Aurora: 1st, 6th. Dust storms: 3d, 4th, 8th, 11th. Fog: 21st. Hail: 4th, 6th, 8th, 12th, 16th, 20th, 21st, 24th, 25th, 26th, 27th. Halos (lunar or solar): 1st, 2d, 5th, 7th, 12th, 16th, 19th, 27th. Parhelia: 7th. Rainbow: 5th. Sleet: 9th, 14th, 15th, 16th. Thunderstorms: 4th, 5th, 6th, 7th, 8th, 11th, 13th, 16th, 18th, 20th, 24th, 25th, 27th.

Rivers. The stage of the Mississippi varied but little except at Keokuk, where a material rise occurred, beginning on the 15th and extending till the 24th. A rise set in on the Missouri during the latter part of the first week and rising stages prevailed for several days, after which there was a gradual decline. On the interior rivers moderate stages prevailed with a moderate rise in the lower reaches after the heavy rain and snow of the 15th-16th.

COMPARATIVE DATA FOR THE STATE—APRIL.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prs. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	51.8	+3.1	88	2	1.80	−1.05	4.46	0.38	.....	6	14	9	7
1891	50.6	+1.9	93	12	2.15	−0.71	5.06	0.59	.....	8	14	7	9
1892	45.4	−3.3	88	14	4.75	+1.89	8.38	2.43	5.7	9	8	9	13
1893	45.5	−3.2	90	15	4.21	+1.35	8.51	1.54	6.0	10	8	9	13
1894	51.7	+2.9	93	12	3.07	+0.21	6.91	0.55	0.3	9	11	11	8
1895	54.3	+5.5	98	8	2.62	−0.24	5.88	0.28	2.1	5	14	8	8
1896	54.5	+5.8	94	10	5.02	+2.16	9.67	2.55	4.5	11	11	10	9
1897	47.9	−0.8	89	19	5.35	+2.49	9.80	2.23	T.	11	9	9	12
1898	48.1	−0.6	91	14	2.56	−0.30	4.82	0.27	T.	8	13	9	8
1899	48.9	+0.2	89	1	2.40	−0.46	5.76	0.56	2.0	7	12	11	7
1900	52.2	+3.5	89	19	2.47	−0.19	6.62	0.43	0.9	6	12	9	9
1901	49.9	+1.2	92	15	1.79	−1.07	2.47	0.66	2.0	5	14	8	8
1902	48.2	−0.5	96	9	1.71	−1.15	4.15	0.40	T.	5	14	11	5
1903	49.8	+1.1	86	17	2.98	+0.12	6.00	0.74	0.8	9	11	9	10
1904	44.1	−4.6	86	13	2.63	+0.77	6.97	1.32	1.4	7	15	6	9
1905	47.5	−1.2	90	10	2.03	+0.17	5.49	0.65	1.2	8	12	8	10
1906	52.5	+3.8	94	22	2.42	−0.44	5.55	0.53	6.0	8	14	9	7
1907	41.5	−7.2	80	10	1.32	−1.54	3.22	0.24	2.7	6	12	8	10
1908	50.5	+1.8	91	8	2.24	−0.62	4.59	0.67	0.3	8	14	8	8
1909	43.8	−4.9	86	14	4.58	+1.72	9.43	0.85	3.1	12	9	9	12
1910	53.5	+2.8	99	15	1.48	−1.38	4.86	0.16	3.0	7	14	7	9
1911	46.7	−2.0	86	2	2.99	+0.23	6.04	1.33	3.6	9	11	8	11
1912	49.9	+1.2	84	29	2.66	−0.20	5.66	0.78	1.1	8	13	8	9
1913	50.2	+1.5	88	16	3.28	+0.42	7.43	1.12	2.7	9	15	5	10
1914	48.6	−0.1	88	11	2.52	−0.34	5.02	0.37	0.3	8	10	8	12
1915	57.2	+8.5	96	18	1.41	−1.45	4.02	0.06	T.	7	15	10	5
1916	47.1	−1.6	89	11	2.62	−0.24	5.26	1.13	1.1	10	10	9	11
1917	45.5	−3.2	88	17	4.55	+1.69	7.84	2.05	3.8	11	9	7	14
1918	44.8	−3.9	79	12	2.32	−0.54	4.20	1.01	3.5	9	12	8	10
1919	48.4	−0.3	81	20	4.78	+1.92	9.00	1.94	0.7	14	8	8	14
1920	42.4	−6.3	78	22	4.59	+1.73	7.13	1.95	2.0	12	8	9	12
1921	52.4	+3.7	88	14	3.34	+0.48	6.69	0.99	3.6	10	12	7	10

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

MAY.

Normal April weather continued till the middle of May, though the period 5th to 12th, inclusive, was slightly warmer than the normal. Freezing temperatures occurred in all divisions of the State and frosts were general over most of the State on the 2d, 3d, 4th, 14th, 15th and 16th and ice one-fourth inch thick was reported from many places on the 2d, 3d, 14th and 15th. Truck crops and gardens were injured and small fruit suffered considerably on account of the hard freezes. On the 17th a warm period set in and during the remainder of the month the temperature was continuously above normal, making the mean temperature for the State nearly three degrees above normal and the ninth consecutive month that the mean temperature for the State has been above normal. Temperatures of 90°, or higher, were reported from all portions of the State and at some stations the high record for May was equaled or exceeded.

Precipitation was very unevenly distributed. There was a decided excess over the Northern Division, where every station except Washta had an excess, while in the Central and Southern divisions all but five stations showed a deficiency. Over most of the Southern Division and portions

of the Central Division very little rain fell after the 11th, and at the close of the month drouth had injuriously affected the hay crop and the hot, dry weather had caused small grain to head short and the prospect for a good crop had diminished. The excessive rains in the Northern Division prevented the cultivation of corn and allowed the weeds to get a good start, but over most of the State the cornfields were generally clean. Corn planting progressed favorably, 58 per cent having been planted on May 15th and 97 per cent by June 1st. The greater portion of the corn had been cultivated once at the close of the month and about one-fourth the second time. The stand is unusually good and practically the only replanting necessary is due to the excessive rains over the Northern Division. The percentage condition June 1st, 99.5, is the highest since 1914. Potatoes were in good condition.

A number of violent windstorms were reported. A small tornado occurred on the afternoon of the 9th along the line of Mahaska and Winneshiek Counties. Very little damage resulted, as the base of the funnel touched the earth at only a few places and no buildings were in its path. Violent winds were active on the afternoon of May 24th in some of the northwestern counties and in the vicinity of Pocahontas County tornadic characteristics were present. Considerable damage was done to farm buildings over a large area. On the afternoon of May 26th unusually severe storms occurred over many counties in the northeastern portion of the State, but the greatest damage from the wind, which was accompanied by very heavy rainfall, was in the vicinity of Clear Lake and Plymouth in Cerro Gordo County and Manly in Worth County. Five persons lost their lives, many more were injured, and the property loss was nearly a half million dollars. Violent wind squalls occurred over a large area, but a well-defined tornado developed in the vicinity of Plymouth and Manly and the destruction in the path was nearly complete. Some property loss was also caused by small streams overflowing in the area covered by the windstorms. Strong winds with tornadic characteristics also occurred in the south central division on May 30th. The damage was principally unroofed buildings and uprooted trees.

Pressure. The mean pressure (reduced to sea level) for the State was 30.01 inches. The highest recorded was 30.43 inches, at Sioux City, on the 2d, and the lowest was 29.46 inches, at Sioux City, on the 26th. The monthly range was 0.97 inch.

Temperature. The mean temperature for the State, as shown by the records of 94 stations, was 63.3°, or 2.8° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 61.2°, or 2.2° higher than the normal; Central, 64.6°, or 3.3° higher than the normal; Southern, 64.6°, or 2.9° higher than the normal. The highest monthly mean was 66.7°, at Cedar Rapids, and the lowest was 59.3°, at Estherville. The highest temperature recorded was 95°, at Cedar Rapids, on the 24th, and the lowest was 25°, at West Bend, on the 3d. The temperature range for the State was 74°.

Humidity. The average relative humidity for the State at 7 a. m. was 75 per cent, and at 7 p. m. it was 57 per cent. The mean for the month

was 66 per cent, or about 2 per cent below the normal. The highest monthly mean was 72 per cent, at Charles City, and the lowest was 60 per cent, at Keokuk.

Precipitation. The average precipitation for the State, as shown by the records of 101 stations, was 4.23 inches, or 0.34 inch less than the normal. By divisions the averages were as follows: Northern, 6.35 inches, or 1.87 inches more than the normal; Central, 3.40 inches, or 1.19 inches less than the normal; Southern, 2.93 inches, or 1.71 inches less than the normal. The greatest amount, 9.41 inches, occurred at Algona, and the least, 1.32 inches, at Winterset. The greatest amount in 24 consecutive hours, 3.00 inches, occurred at Northwood, on the 26th.

Wind. The prevailing direction of the wind was from the south. The average hourly velocity was 7.8 miles, or 0.9 mile less than the normal. The highest velocity reported from a regular Weather Bureau Station was at the rate of 48 miles an hour, from the southwest, at Sioux City, on the 18th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 65, or about 3 per cent more than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 49; Davenport, 72; Des Moines, 70; Dubuque, 62; Keokuk, 70; Sioux City, 59; Omaha, Neb., 76.

Miscellaneous Phenomena. Aurora: 3d, 13th, 14th, 15th, 16th, 17th, 25th, 29th, 31st. Fog: 18th. Frost: 2d, 3d, 4th, 14th, 15th, 16th. Hail: 9th, 10th, 12th, 19th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 30th, 31st. Halos: 10th, 11th, 16th, 17th, 18th, 19th, 22d, 25th, 26th. Rainbows: 9th, 24th, 25th, 30th, 31st. Thunderstorms: 1st, 8th, 9th, 10th, 11th, 12th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 29th, 30th, 31st. Tornado: 9th, 24th, 26th, 30th.

Rivers. Moderate stages prevailed on all rivers. The principal rise on the Missouri began during the latter part of the third week and continued till near the end of the month. Two moderate rises occurred on the Mississippi, one at the close of the first week, and the other at the beginning of the third week. On the interior rivers a general and gradual rise began the latter part of the third week and continued till the end of the month.

A Remarkable Aurora. The aurora that occurred on the night of the 14th-15th was beautiful beyond description. The display was unusually brilliant between 9 p. m. and 10 p. m. of the 14th and between 2 a. m. and 3 a. m. of the 15th. The outstanding feature was the converging of a vast system of streamers at a point about 10 degrees south of the zenith that was constantly changing in color, almost continuous in motion, either pulsations or weaving back and forth as if blown by a breeze. The usual brilliant arc was absent during the early part of the display, but an arc of intensely purple color occupied the northern portion of the sky which was replaced by the usual arc of light about 10 p. m. from which violent pulsations radiated till the aurora was too indistinct to be noted. The telegraphic service was almost entirely suspended during

the period of the most intense display. The display was universally observed and was declared to be the most remarkable that was ever observed. Lesser and gradually diminishing displays occurred on the two following nights.

COMPARATIVE DATA FOR THE STATE—MAY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	57.7	−2.8	90	26	3.56	−1.01	6.44	1.61	------	9	10	13	8
1891	58.3	−2.2	94	21	3.18	−1.39	7.10	1.46	------	8	14	9	8
1892	54.0	−6.5	88	29	8.77	+4.20	12.64	4.87	T.	16	5	9	17
1893	56.6	−3.9	96	30	3.45	−1.12	5.82	1.65	0	9	13	9	9
1894	61.1	+0.6	98	32	1.87	−2.79	4.77	0.32	0	6	17	10	4
1895	61.7	+1.2	104	24	3.19	−1.58	5.79	0.84	0	9	11	12	8
1896	65.5	+5.0	100	34	6.69	+2.12	11.79	2.69	0	12	11	12	8
1897	59.5	−2.0	96	29	1.92	−2.65	3.59	0.21	0	5	16	10	5
1898	59.6	−0.9	92	26	4.67	+0.10	7.82	2.22	0	12	9	10	12
1899	60.2	−0.3	90	27	6.23	+1.66	11.47	3.09	0	13	9	12	10
1900	63.2	+2.7	98	22	3.31	−1.26	6.98	0.96	0	8	14	10	7
1901	60.7	+0.2	95	28	2.25	−2.22	4.87	0.72	0	7	16	9	6
1902	63.8	+3.3	97	25	5.39	+0.92	18.04	0.87	0	13	10	12	9
1903	61.6	+1.1	91	24	8.55	+3.98	15.45	2.88	0	16	9	12	10
1904	59.6	−0.9	93	27	3.78	−0.79	8.15	1.50	0	8	13	10	8
1905	58.3	−2.2	88	28	5.95	+1.38	10.88	2.57	0	14	12	11	8
1906	60.8	+0.3	93	24	6.54	−1.03	10.72	0.89	0	11	13	10	8
1907	53.5	−7.0	96	18	3.48	−1.09	7.68	0.71	1.0	10	11	10	10
1908	59.4	−1.1	93	13	8.34	+3.77	14.83	1.33	0	15	9	11	11
1909	57.9	−2.6	97	18	4.34	−0.23	7.85	1.86	0.1	9	12	12	7
1910	55.4	−5.1	89	18	3.41	−1.16	6.01	1.59	T.	10	13	7	9
1911	64.9	+4.4	98	23	3.76	−0.81	8.73	0.43	0.7	9	16	9	6
1912	62.7	+2.2	97	29	3.32	−1.24	6.41	0.72	0	10	14	11	6
1913	59.4	−1.1	102	30	6.24	+1.67	10.35	3.14	0	13	11	8	12
1914	62.5	+1.7	98	25	2.31	−1.26	6.90	0.50	T.	10	14	11	6
1915	55.1	−4.4	99	25	7.34	+2.77	13.21	3.82	T.	14	9	9	13
1916	59.9	−0.6	94	27	4.93	+0.36	10.44	2.14	T.	12	13	10	8
1917	55.1	−5.4	95	18	3.87	−0.70	7.33	1.69	0.6	10	15	8	8
1918	64.9	+4.4	98	25	6.87	+2.30	11.98	2.72	T.	13	13	11	7
1919	58.2	−2.3	93	30	3.11	−1.46	7.14	0.78	0	9	13	11	7
1920	59.4	−1.1	89	29	3.26	−1.31	5.73	0.62	0	8	14	9	8
1921	63.3	+2.8	99	25	4.22	−0.34	9.41	1.32	0	10	14	10	7

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

JUNE.

The outstanding feature of the weather during June was the uniformly high temperature that prevailed during practically the entire month. The temperature was below normal from the 3d to the 6th, but after the 6th a hot period set in and during the rest of the month the temperature was considerably above the normal continuously and the mean for the State was with the exception of 1911, the highest mean of record. At a few stations having long records, the mean was the highest ever recorded in June and the mean for this June was 1.0° less than in 1911. This month makes a total of 10 consecutive months that the mean temperature for the State has been above normal and the average daily excess for the 10-month period has been nearly 5.6°, and the excess during the current year has been 7.1° daily.

The precipitation averaged below normal. Over practically the entire northern division there was a deficiency, and with the exception of two areas centered in Boone and Dallas Counties and from Tama to Jones Counties, the same is true of the central division. Over most of the southern division there was a decided excess with the greatest amounts in Lucas, Marion, Mahaska and Keokuk Counties. The distribution as to time was uniform over most of the State, but the distribution as to amounts was very uneven, the greatest contrast being in the south central portion. The lack of rain in portions of the State had an injurious effect on small grain, particularly oats, which were caused to head short and many fields were not worth harvesting. However, the generally ample supply of moisture and the high temperatures caused corn to make phenomenal growth and it was generally conceded that the condition of that crop was farther advanced on June 30th than it had ever been before on the same date in the history of the State.

High winds were reported from a number of places on the 1st, 15th, 27th and 28th. None had tornadic characteristics, but a small funnel cloud was observed at Knoxville, the base of which did not reach the earth. Considerable damage was done to growing crops and some fields were so badly blown down that it was impossible to harvest. Very little damage was done to farm buildings.

Hailstorms were not as numerous as usual, but an unusually destructive storm on the 28th covered a large area in the northwest portion of the State. The greatest damage was reported from Lyon and Pocahontas Counties. In Lyon County the greatest damage occurred in Centennial, Logan, Larchwood and Sioux Townships. All crops suffered, but the principal damage was to small grain. In Pocahontas County approximately 25 sections in Center, Sherman, Lincoln and Grant Townships were hailed out. The principal damage was to oats and the loss over most of the area was from 25 per cent to 40 per cent of the crop, but on many of the farms the loss to small grain was total. Considerable damage was caused by locally heavy downpours at many places in the southern and central divisions.

Pressure. The mean pressure (reduced to sea level) for the State was 29.95 inches. The highest recorded was 30.45 inches, at Dubuque, on the 4th, and the lowest was 29.56 inches, at Sioux City, on the 15th. The monthly range was 0.89 inch.

Temperature. The mean temperature for the State as shown by the records of 94 stations, was 74.7°, or 5.6° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 73.8°, or 6.2° higher than the normal; Central, 75.1°, or 5.8° higher than the normal; Southern, 75.3°, or 5.0° higher than the normal. The highest monthly mean was 77.5°, at Keokuk, and the lowest was 71.1°, at Postville. The highest temperature reported was 100°, at Alton, on the 28th and 30th, and Clarinda on the 30th, and the lowest was 40°, at Fayette, on the 5th. The temperature range for the State was 60°.

Humidity. The average relative humidity for the State at 7 a. m. was 78 per cent, and at 7 p. m. was 59 per cent. The mean for the month was 68 per cent, or 2 per cent below the normal. The highest monthly mean was 74 per cent, at Charles City, and the lowest was 63 per cent, at Sioux City.

Precipitation. The average precipitation for the State, as shown by the records of 98 stations, was 3.76 inches, or 0.62 inch less than the normal. By divisions the averages were as follows: Northern, 2.68 inches, or 1.75 inches less than the normal; Central, 3.66 inches, or 0.66 inch less than the normal; Southern, 4.93 inches, or 0.54 inch more than the normal. The greatest amount, 8.85 inches, occurred at Knoxville, and the least, 0.56 inch, at Alton. The greatest amount in 24 consecutive hours, 4.71 inches, occurred at Thurman, on the 1st and 2d.

Wind. The prevailing direction of the wind was from the southeast. The highest velocity reported from a regular Weather Bureau Station was 42 miles an hour, from the southwest, at Sioux City, on the 14th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 69 or just about the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 64; Davenport, 71; Des Moines, 68; Dubuque, 63; Keokuk, 65; Sioux City, 76; Omaha, Neb., 77.

Miscellaneous Phenomena. Aurora: 2d, 5th. Fog: 8th, 9th, 27th. Hail: 1st, 15th, 19th, 27th, 28th, 29th, 30th. Halos (lunar or solar): 2d, 15th, 18th, 20th, 21st, 23d, 24th, 29th. Rainbows: 10th, 19th, 20th, 26th, 28th, 30th. Strong winds: 1st, 15th, 28th, 29th. Thunderstorms: All days during the month except on the 4th, 5th, 11th, 12th, 21st, 22d.

Rivers. Gradually decreasing stages prevailed on the Mississippi River, the lowest stage being generally on the last of the month. On the Missouri River there was a gradually increasing tendency till the end of the month except in the upper reaches where the crest stage was reached on the 28th. In the lower reaches the flood stage was nearly reached. On the interior rivers low stages prevailed most of the time, the stage being affected by the locally heavy rains less than is usual in June.

COMPARATIVE DATA FOR THE STATE—JUNE.

YEAR	Temperature				Precipitation					Number of Days		
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	72.7	+2.6	106	44	7.76	+2.38	16.53	1.57	.....	11	12	20	8
1891	69.1	0.0	99	37	5.39	+1.01	19.88	1.68	.....	11	8	20	12
1892	69.2	+0.1	102	42	5.19	+0.81	14.16	0.67	.....	10	12	11	7
1893	71.2	+2.1	100	40	3.91	−0.47	7.56	1.36	.....	8	15	11	4
1894	72.2	+4.1	104	34	2.67	−1.71	6.20	0.57	.....	7	16	10	4
1895	69.7	+0.6	103	34	3.32	−0.96	9.26	0.98	.....	10	11	11	8
1896	69.1	0.0	100	40	5.11	+1.77	7.80	0.81	.....	9	12	12	6
1897	69.1	0.0	103	39	3.61	−0.37	9.38	1.03	.....	10	10	12	8
1898	71.4	+2.3	99	42	4.72	+0.34	12.48	1.90	.....	9	13	10	7
1899	70.7	+1.6	100	42	5.34	+0.96	11.99	1.10	.....	10	12	13	5
1900	69.7	+0.6	102	38	3.98	−0.40	12.25	0.67	.....	5	17	10	3
1901	72.3	+3.2	106	39	3.71	−0.67	7.84	1.05	.....	9	15	11	4
1902	65.2	−3.9	97	32	7.16	+2.78	16.04	1.46	.....	14	8	11	11
1903	64.6	−4.5	96	39	2.98	−1.32	6.04	0.75	.....	10	13	10	7
1904	67.1	−2.0	94	33	3.45	−0.93	8.35	0.44	.....	7	13	10	7
1905	69.9	+0.8	100	36	5.53	+1.15	14.69	1.80	.....	10	12	11	7
1906	67.9	−1.2	99	37	2.92	−0.46	8.27	1.48	.....	8	15	10	5
1907	66.5	−2.6	98	36	5.35	+0.97	9.33	2.07	.....	11	14	9	7
1908	67.1	−2.0	94	35	5.96	+1.28	11.88	1.77	.....	13	12	10	8
1909	69.1	0.0	96	40	6.41	+2.03	13.30	2.80	.....	13	12	10	8
1910	69.5	+0.4	105	33	1.96	−2.39	5.51	0.05	.....	7	18	7	5
1911	75.7	+6.6	108	36	1.92	−2.56	6.29	0.09	.....	5	20	8	2
1912	66.3	−2.9	101	34	3.74	−0.64	5.71	0.78	.....	7	15	9	6
1913	71.5	+3.4	102	33	3.31	−1.07	8.95	0.74	.....	7	19	8	3
1914	72.3	+3.1	101	40	5.37	+1.19	13.24	1.17	.....	13	12	14	4
1915	65.1	−4.0	97	31	4.18	−0.22	9.99	1.72	.....	11	12	12	6
1916	64.8	−4.6	98	38	3.71	−0.67	7.96	1.41	.....	10	13	11	6
1917	66.2	−2.9	101	36	6.48	+2.27	13.82	3.04	.....	12	13	10	7
1918	70.8	+1.7	104	38	5.29	+0.91	10.19	1.55	.....	11	16	10	4
1919	71.9	+2.8	98	41	6.13	+1.75	12.25	1.82	.....	13	12	12	6
1920	70.7	+1.6	99	40	3.06	−0.82	8.48	1.25	.....	9	16	10	4
1921	74.7	+5.6	100	40	2.26	−0.62	8.85	0.56	.....	9	16	10	4

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

JULY.

The chief characteristics of the weather during July, 1921, were the uniformly high temperatures that prevailed practically the entire month and the severe drouth that prevailed over much of the north central and eastern portions of the State.

The mean temperature, 77.9°, has been exceeded but twice since the records for the State as a whole began in 1890. The number of consecutive months with the temperature above normal is now 11, which far exceeds any similar period in the history of the State. The nearest approach to the present record was in 1894, when the temperature was above normal from March to October, inclusive, with an average excess of 5.4°. From October, 1918, till March, 1919, inclusive, there was an excess of 5.8° daily.

The rainfall for the State was only 64 per cent of the normal and the deficiency covered the entire State except most of the southwestern and west central divisions, where there was a decided excess. The continuous high temperatures and the lack of precipitation had a disastrous effect on all vegetation in many counties in the northern and eastern

portion of the State and especially in the north central district. The corn crop which gave unusual promise in June was injured beyond recovery by the continued hot, dry weather and in many fields outside of the drouth-stricken area it was observed that the luxurious stalk growth was at the expense of the ears and at the close of the month the outlook for a crop of corn was about the 10-year average. In the drouth-stricken area the potato crop was a failure, gardens were ruined, pastures and meadows burned brown, and what promised a good crop of berries was nearly a total failure. In areas where there was sufficient precipitation the general crop outlook was good.

Pressure. The mean pressure (reduced to sea level) for the State was 29.98 inches. The highest pressure recorded was 30.25 inches, at Charles City, on the 20th, and the lowest was 29.44 inches, at Sioux City, on the 2d. The monthly range was 0.81 inch.

Temperature. The mean temperature for the State, as shown by the records of 100 stations, was 77.9°, or 3.8° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 77.9°, or 4.3° higher than the normal; Central, 78.1°, or 3.8° higher than the normal; Southern, 78.6°, or 3.4° higher than the normal. The highest monthly mean was 81.8°, at Keokuk, and the lowest was 75.0°, at Milford and Postville. The highest temperature recorded was 104°, at Clinton, on the 11th, 12th and 13th, and the lowest recorded was 41°, at New Hampton, on the 31st. The temperature range for the State was 63°.

Humidity. The average relative humidity for the State at 7 a. m. was 77 per cent, and at 7 p. m. it was 54 per cent. The mean for the State was 66 per cent, or 2 per cent lower than the normal. The highest monthly mean was 70 per cent at Omaha, Neb., and the lowest was 60 per cent at Keokuk.

Precipitation. The average precipitation for the State, as shown by the records of 106 stations, was 2.53 inches, or 1.43 inches less than the normal. By divisions the averages were as follows: Northern, 2.12 inches, or 1.76 inches less than the normal; Central, 2.60 inches, or 1.38 inches less than the normal; Southern, 2.88 inches, or 1.14 inches less than the normal. The greatest amount, 7.45 inches, occurred at Thurman, and the least, 0.42 inch, at Mason City. The greatest amount in 24 consecutive hours was 3.32 inches, at Thurman, on the 1st and 2d.

Wind. The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau Station was 50 miles per hour, from the northwest, at Sioux City, on the 13th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 78, or 4 per cent above the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 76; Davenport, 85; Des Moines, 83; Dubuque, 77; Keokuk, 76; Sioux City, 67; Omaha, Neb., 79.

Miscellaneous Phenomena. Aurora: 15th. Fog: 5th, 23d, 29th 30th. Halos: 4th, 5th, 13th, 17th, 18th, 25th. Hail: 7th, 9th. Rainbows: 4th,

6th, 12th, 16th. Thunderstorms: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 10th, 12th, 13th, 14th, 16th, 17th, 18th, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th. Tornado: 27th.

Rivers. Moderate stages prevailed on the Missouri River and low stages on the Mississippi and all interior rivers. No rises of importance occurred; and during practically the entire month gradually falling stages prevailed.

COMPARATIVE DATA FOR THE STATE—JULY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prec. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	75.6	+1.5	110	45	1.98	−1.98	5.00	0.37	.....	3	13	8	5
1891	68.5	−5.6	99	41	4.32	+0.28	8.20	1.67	.....	8	13	13	5
1892	73.0	−1.1	104	38	5.29	+1.33	12.86	1.71	.....	9	16	10	5
1893	73.0	+0.9	102	47	3.32	−0.62	7.40	1.49	.....	7	19	10	2
1894	76.4	+2.3	109	39	0.63	−3.23	2.50	T.	.....	3	22	8	1
1895	77.1	−2.0	104	35	3.40	−0.56	10.10	0.45	.....	7	15	12	4
1896	73.6	−0.5	104	42	6.90	+2.94	12.67	1.61	.....	9	14	11	6
1897	75.6	+1.5	106	43	2.26	−0.70	7.60	1.01	.....	6	18	10	3
1898	72.4	−0.7	102	47	2.98	−0.98	12.88	0.55	.....	7	19	9	3
1899	73.1	−1.0	101	38	5.07	−0.89	8.00	0.42	.....	7	16	10	5
1900	73.4	−0.7	102	37	6.15	+2.19	18.45	1.80	.....	9	16	10	5
1901	82.4	+8.3	113	46	2.34	−1.67	5.97	0.37	.....	5	21	9	1
1902	73.1	−1.0	99	41	8.67	+4.71	13.57	4.82	.....	13	14	10	7
1903	72.9	−1.2	100	40	4.83	+0.87	13.72	0.94	.....	9	17	9	5
1904	70.6	−3.5	100	38	4.51	+0.45	11.97	1.78	.....	10	16	9	6
1905	70.6	−3.5	107	40	2.91	−1.05	7.08	0.69	.....	9	14	10	7
1906	70.9	−3.2	102	42	3.04	−0.92	7.05	0.76	.....	8	18	10	3
1907	73.7	−0.4	102	41	7.27	+3.31	13.66	3.97	.....	13	18	11	4
1908	73.0	−1.1	100	42	3.66	−0.30	9.21	0.70	.....	8	16	10	5
1909	72.3	−1.8	107	46	4.77	+0.81	12.70	1.20	.....	10	15	8	8
1910	74.5	+0.4	108	43	1.96	−2.10	5.69	0.12	.....	7	19	8	4
1911	75.5	+1.4	111	38	2.27	−1.69	6.62	0.08	.....	7	18	10	3
1912	74.6	+0.5	103	38	3.71	−0.25	7.56	1.17	.....	10	17	10	4
1913	76.1	+2.0	108	45	1.82	−2.14	6.23	T.	.....	5	21	8	2
1914	76.6	+2.5	109	43	2.27	−1.69	6.50	0.44	.....	5	20	8	3
1915	69.5	−4.6	97	40	8.33	+4.26	15.83	3.68	.....	14	10	12	9
1916	70.7	−3.6	105	48	1.78	−2.18	6.87	0.10	.....	5	23	7	1
1917	74.3	+0.2	106	39	2.57	−1.69	6.06	0.23	.....	7	21	8	2
1918	73.1	−1.0	105	40	2.17	−0.79	8.05	0.26	.....	8	19	8	4
1919	77.4	+3.3	104	41	2.96	−1.10	7.82	0.39	.....	6	22	8	1
1920	73.3	−1.8	102	45	4.75	+0.56	7.49	1.11	.....	9	19	9	3
1921	77.0	+3.8	104	41	2.53	−1.43	7.43	0.42	.....	7	19	9	3

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

AUGUST.

August was the twelfth consecutive month with the mean temperature for the State above normal, though the excess was the least since this remarkable condition began last September. The month opened cool and gave promise that the stretch of months with the temperature above normal was at an end, but at the beginning of the fourth week a hot period set in that continued through the rest of the month, and slightly more than offset the previous deficiency over most of the State. Cool weather prevailed over most of the first three weeks, but at a number of stations

in the central and southern divisions the warmest day of the season occurred on the 19th. The excess was not general over the entire State, there being a considerable area in the northeastern corner, the western half of the southeastern section and a stretch reaching from the center of the State to the Missouri River, that had a deficiency.

The precipitation was above normal and was characterized by a number of heavy general rains, the principal one occurring on the first of the month. During this storm nearly every station reported as much as an inch of rain, a large number from two to three inches, and a few stations reported more than four inches. This storm completely broke the serious drouth that prevailed over much of the north central and northeastern portions of the State and greatly benefited all crops, especially the corn crop. The heavy rain was not a benefit over other sections, as the soft condition of the soil caused a great deal of corn to be flattened out by the wind and considerable grain that had not been threshed was damaged by the excessive moisture.

Considerable damage was caused to crops and farm properties by storms of a local character, the principal one occurring on the 5th, in Appanoose and portions of adjoining counties, between 7 and 8 p. m. This storm had all the destructive elements combined. At points there was terrific thunder and lightning, at others a deluge of rain and at others severe hail and destructive winds. The rainfall over most of the storm area was of little consequence, but the damage from hail and wind was very great. The path of greatest destruction was about 4 miles wide and 20 miles long and reached from the northwest to southeast across Appanoose county and the loss to the crops varied from 10 per cent to total destruction. In Johns Township the damage was estimated at $50,000, and practically every window that faced the north was broken. At Jerome and Plano the storm had tornadic characteristics and many buildings were unroofed and trees twisted out of the ground.

Pressure. The mean pressure (reduced to sea level) for the State was 30.00 inches. The highest recorded was 30.40 inches at Dubuque, on the 21st, and the lowest was 29.65 inches, at Keokuk, on the 5th, Sioux City, on the 16th, and Des Moines, on the 17th. The monthly range was 0.75 inch.

Temperature. The mean temperature for the State, as shown by the records of 98 stations, was 72.1°, or 0.3° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 70.6°, or 0.2° higher than the normal; Central, 72.0°, or 0.3° higher than the normal; Southern, 73.7°, or 0.5° higher than the normal. The highest monthly mean was 76.4°, at Clarinda, and the lowest was 67.6°, at Postville. The highest temperature recorded was 102°, at Clarinda, on the 19th, and Spencer, on the 29th, and the lowest was 37°, at New Hampton, on the 8th. The temperature range for the state was 65°.

Precipitation. The average precipitation for the State, as shown by the records of 100 stations, was 5.04 inches, or 1.36 inches more than the normal. By divisions the averages were as follows: Northern, 4.64 inches, or 1.16 inches more than the normal; Central, 5.71 inches, or 2.03

inches more than the normal; Southern, 4.76 inches, or 0.98 inch less than the normal. The greatest amount, 9.04 inches, occurred at Postville, and the least, 2.20 inches, occurred at Cumberland. The greatest amount in 24 hours, 4.40 inches, occurred at Le Claire, on the 2d.

Humidity. The average relative humidity for the State at 7 a. m. was 82 per cent, and at 7 p. m. it was 64 per cent. The mean for the month was 74 per cent, or 2 per cent higher than the normal. The highest monthly mean was 76 per cent, at Davenport, and the lowest was 71 per cent, at Keokuk.

Wind. The prevailing direction of the wind was from the southeast. The highest velocity reported from a regular Weather Bureau Station was at the rate of 40 miles per hour, at Sioux City, from the northwest, on the 16th.

Sunshine. The average per cent of the possible amount of sunshine was 68, or 3 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 63; Davenport, 73; Des Moines, 77; Dubuque, 57; Keokuk, 68; Sioux City, 60; Omaha, Neb., 76.

Miscellaneous Phenomena. Aurora: 2d, 26th. Fog: 2d, 3d, 11th, 13th, 16th, 18th, 20th, 24th, 25th, 28th, 29th. Hail: 5th, 6th, 17th, 19th, 20th, 30th. Halos (lunar or solar): 14th, 15th, 21st. Rainbows: 1st, 15th. Thunderstorms: All days except 7th, 8th, 9th, 12th, 14th, 18th, 21st. Tornado: 5th.

Rivers. Low stages prevailed on the principal rivers with a general falling tendency and the heavy rains affected the stages but little. On the interior rivers a moderate rise occurred after the heavy rain of the 1st, but thereafter low stages prevailed with slight fluctuations.

COMPARATIVE DATA FOR THE STATE—AUGUST.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prs. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	68.4	−2.4	102	36	3.41	−0.27	6.44	1.06	.....	8	15	10	6
1891	69.1	−2.7	106	34	4.24	+0.56	13.02	1.53	.....	8	13	12	6
1892	71.4	−0.4	102	40	2.24	−1.44	4.69	0.65	.....	5	18	9	4
1893	69.4	−2.4	101	30	2.22	−1.58	6.22	0.49	.....	5	19	9	3
1894	74.6	+2.8	108	38	1.58	−2.10	4.52	T.	.....	4	21	8	2
1895	71.9	+0.1	102	37	4.43	+0.75	10.62	0.67	.....	7	17	9	5
1896	71.7	−0.1	104	34	3.32	−0.16	12.75	0.86	.....	8	15	11	5
1897	68.9	−2.9	104	35	1.86	−1.82	4.98	0.47	.....	6	15	11	5
1898	71.2	−0.6	103	40	1.44	−0.24	10.55	0.58	.....	6	17	9	5
1899	74.4	+2.6	100	41	4.08	0.00	10.43	1.12	.....	7	17	10	4
1900	77.4	+5.6	102	44	4.65	+0.57	10.43	1.36	.....	6	18	10	3
1901	73.8	+2.0	105	40	2.29	−2.20	4.46	T.	.....	5	20	9	2
1902	69.1	−2.7	98	37	4.58	+2.90	15.47	1.57	.....	11	11	11	9
1903	69.1	−2.7	101	41	4.64	+2.96	17.74	2.55	.....	11	12	10	9
1904	69.1	−2.7	97	35	1.43	−0.25	6.75	0.06	.....	7	17	8	6
1905	74.3	+2.5	104	44	4.05	+0.37	8.47	1.04	.....	9	16	9	6
1906	74.1	+2.3	101	33	3.95	+0.27	10.51	0.97	.....	9	17	9	5
1907	71.1	−0.7	99	37	4.32	+0.65	9.67	1.05	.....	9	17	9	5
1908	70.9	−1.8	101	28	4.77	+1.09	10.55	1.25	.....	9	17	9	5
1909	76.1	+4.3	103	33	1.81	−1.87	8.31	T.	.....	5	21	8	2
1910	71.9	+0.1	104	36	4.88	+0.70	11.32	0.47	.....	9	18	10	3
1911	71.7	−0.1	107	34	5.22	+1.30	9.47	0.44	.....	9	16	10	5
1912	71.0	−0.8	101	40	5.78	+0.10	7.90	0.89	.....	10	15	10	6
1913	70.6	+4.8	108	40	2.68	−1.00	7.13	0.08	.....	6	17	10	4
1914	73.7	+1.9	103	40	3.19	−1.49	4.99	0.42	.....	7	17	10	4
1915	65.9	−5.9	91	30	1.81	−0.87	9.14	0.27	.....	8	18	8	7
1916	74.0	+2.2	106	35	2.58	−1.10	6.32	0.49	.....	7	18	9	4
1917	69.4	−2.4	102	31	3.29	−0.39	6.31	0.70	.....	7	19	8	4
1918	76.0	+4.2	113	38	3.61	−0.07	8.38	0.54	.....	8	16	10	5
1919	71.5	−0.3	103	38	2.59	−1.09	5.72	0.97	.....	7	19	9	3
1920	69.3	−2.5	98	29	3.35	−0.33	8.52	0.44	.....	7	18	8	5
1921	72.1	+0.3	102	37	5.04	+1.36	9.04	2.39	.....	8	16	11	4

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

SEPTEMBER.

September was warm and wet. Since 1890, when State-wide records began, there have been but three Septembers warmer and only one wetter than the present month. There were no cold periods and at no time during the month were there more than two consecutive days with the temperature normal, or below, and for the entire State the number of days that the temperature was not above normal was less than ten. Every station in the State showed an excess in temperature, being greatest in the central and southern divisions, where there was also the greatest excess in precipitation. Frost was reported from several stations, principally on the 30th, but the damage from this source was of little consequence, as the staple crops were generally out of danger.

The precipitation was unusually heavy over the entire State except along the Missouri River, where a few sections received less than the normal amount. Thunderstorms were unusually prevalent and severe and only two other Septembers have had as many rainy days. One death from lightning occurred near Burlington. The rainfall was well distributed throughout the month with no period of fair weather of more than

a few days, and the greatest amount occurred in the period from the 10th to 20th, inclusive. On the 15th and 16th the amounts were especially heavy over most of the central and eastern portions of the State and as a result of the rains that had fallen previously the soil was thoroughly saturated, causing practically the entire amount to find its way to the small streams, which were soon out of banks, the larger interior rivers reaching flood stages in the lower reaches, and many thousands of acres in the central and eastern portions of the State were under water. The damage was particularly heavy in Tama County, in the vicinity of Traer. In this county and areas adjoining, several hundred cattle and sheep were drowned, many bridges and culverts washed out, farm machinery washed away, and railroad washouts were numerous. Between Traer and Eagle Grove train service was suspended nearly 3 days. The rainfall was also very heavy in a number of counties in the southwestern portion of the State on the 19th, which was accompanied by severe lightning, heavy hail in localities and strong winds. Many farm animals were killed by lightning, much damage resulted to farm buildings, trees, and crops, from wind and hail; and small streams out of banks did considerable damage.

A small tornado developed on the evening of the 4th, at the western edge of Burlington. The path was about 300 feet wide and it moved eastward about 2½ miles across the Mississippi River into Illinois. It unroofed numerous buildings and uprooted a large number of trees in its path.

The excessive rainfall and strong winds had a disastrous effect on the corn crop. As a result of the saturated condition of the soil and the strong winds that accompanied the rain, much of the crop is down and in a bad condition to harvest. Many fields are seriously affected with mold, some fields as much as 50 per cent, and considerable down corn is sprouting. The crop is also seriously injured by the ear worm and many silos will not be filled on account of the unfavorable conditions that have prevailed throughout the month. Pastures were greatly benefited by the rains and were generally in good condition. Early seeded winter grain is mostly up and making excellent growth.

Pressure. The mean pressure (reduced to sea level) for the State was 29.94 inches. The highest recorded was 30.31 inches, at Charles City, on the 12th, and the lowest was 29.39 inches, at Sioux City, on the 28th. The monthly range was 0.94 inch.

Temperature. The mean temperature for the State, as shown by the records of 94 stations, was 67.3°, or 3.9° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 64.8°, or 3.0° higher than the normal; Central, 67.6°, or 4.1° higher than the normal; Southern, 69.4°, or 4.4° higher than the normal. The highest monthly mean was 71.2°, at Clarinda and Keokuk, and the lowest 62.7°, at Estherville. The highest temperature reported was 99°, at Mt. Pleasant, on the 4th, and the lowest was 31°, at Sanborn, on the 30th. The monthly range for the State was 68°.

Humidity. The average relative humidity for the State at 7 a. m. was 83 per cent, and at 7 p. m. it was 68 per cent. The mean for the month

was 76 per cent, or 2 per cent above the normal. The highest monthly mean was 80 per cent, at Charles City, and the lowest was 69 per cent, at Sioux City.

Precipitation. The average precipitation for the State, as shown by the records of 99 stations, was 6.72 inches, or 3.36 inches more than the normal. By divisions, the averages were as follows: Northern, 5.06 inches, or 2.01 inches more than the normal; Central, 7.47 inches, or 4.01 inches more than the normal; Southern, 7.64 inches, or 4.08 inches more than the normal. The greatest amount, 11.95 inches, occurred at Olin, and the least, 1.72 inches, occurred at Le Mars. The greatest amount in 24 consecutive hours, 5.26 inches, occurred at Belle Plaine on the 16th.

Wind. The prevailing direction of the wind was from the south. The highest velocity reported from a regular Weather Bureau Station was at the rate of 43 miles per hour from the northwest, at Sioux City, on the 4th.

Sunshine. The average per cent of the possible amount of sunshine was 62, which is 1 per cent below the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 53; Davenport, 69; Des Moines, 63; Dubuque, 60; Keokuk, 58; Sioux City, 60; Omaha, Nebr., 71.

Miscellaneous Phenomena. Aurora: 1st, 24th, 27th, 28th, 29th, 30th. Fog: 3d, 4th, 6th, 7th, 14th, 19th, 24th. Frost, light: 18th, 26th, 28th, 30th; killing: 30th. Hail: 4th, 9th, 10th, 13th, 15th, 16th, 20th, 24th. Halos: 20th, 22d, 27th. Rainbows: 2d, 13th, 16th, 23d. Thunderstorms: All dates except 6th, 18th, 22d, 26th, 27th, 28th, 30th. Tornado: 4th.

Rivers. Low stages prevailed on the Mississippi River until the end of the second week, after which moderate stages prevailed. On the Missouri River moderate stages prevailed with but little fluctuation. High stages prevailed on the interior rivers after the heavy rains from the 10th to 20th, but during the last week gradually falling stages prevailed. On the smaller streams in the interior of the State severe overflows occurred which caused great loss of property. Salt Creek in Tama County was the highest ever known.

COMPARATIVE DATA FOR THE STATE—SEPTEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prs. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	59.3	—4.1	96	22	2.97	—0.39	4.85	1.56	.....	7	13	10	7
1891	67.3	+2.9	104	28	1.33	—2.03	3.60	0.13	.....	4	23	7	2
1892	64.7	+1.3	99	29	1.52	—1.82	4.15	0.16	.....	4	16	8	6
1893	64.7	+1.3	102	18	2.34	—1.02	5.49	0.74	.....	4	20	6	4
1894	63.1	+1.7	100	26	3.27	+0.71	7.43	0.67	.....	8	15	10	5
1895	66.8	+2.4	103	22	3.05	—0.33	7.43	0.85	.....	5	18	8	4
1896	58.5	—4.9	95	22	4.09	+0.73	9.96	1.82	.....	10	11	9	10
1897	70.9	+7.5	106	26	2.04	—1.32	5.88	0.00	.....	4	23	5	2
1898	65.3	+1.9	99	29	2.69	—0.67	8.45	0.41	.....	7	16	9	5
1899	62.5	—0.9	104	15	0.93	—2.43	4.33	T.	.....	4	16	9	5
1900	64.4	+1.0	99	28	4.98	+1.62	8.82	2.48	.....	9	13	8	9
1901	63.3	—0.1	103	26	4.77	+1.41	13.62	1.71	.....	9	13	9	8
1902	59.1	—4.3	88	23	4.35	+0.99	10.41	1.65	.....	9	15	6	9
1903	62.8	—2.6	94	28	3.81	+0.45	8.79	1.42	.....	10	14	6	10
1904	64.0	+0.6	94	30	*2.78	—0.58	8.33	0.09	.....	7	13	8	9
1905	65.8	+2.4	96	26	3.81	+0.45	13.18	0.50	.....	8	14	8	8
1906	67.3	+3.8	100	27	4.16	+0.80	11.10	0.64	.....	8	16	8	6
1907	62.8	—0.6	98	25	2.75	—1.61	6.06	1.38	.....	8	15	9	6
1908	67.9	+4.5	98	29	1.59	—2.15	3.46	0.25	.....	3	21	6	3
1909	62.4	—1.0	94	30	3.58	+0.22	7.34	1.39	.....	9	14	8	8
1910	62.2	—0.2	99	30	3.59	+0.23	7.43	1.18	.....	9	14	7	9
1911	60.8	+2.4	103	22	5.17	+1.76	13.73	1.19	.....	10	11	9	10
1912	62.1	—1.3	104	24	3.98	+0.62	10.12	0.28	.....	11	12	8	10
1913	64.5	+1.1	107	19	3.31	—0.05	7.44	0.45	.....	9	15	8	7
1914	64.5	+1.1	99	30	7.88	+4.52	16.74	2.48	.....	10	16	7	7
1915	68.7	+0.3	91	30	6.08	+2.67	12.45	2.88	.....	11	11	8	11
1916	65.5	—0.9	98	21	3.89	+0.53	9.71	1.45	.....	7	17	8	5
1917	62.6	—0.8	97	28	2.90	—0.46	8.68	0.39	.....	7	15	7	8
1918	58.6	—4.8	93	20	1.87	—1.49	4.62	0.48	.....	6	16	8	6
1919	67.5	+4.1	99	33	5.34	+1.98	11.82	1.49	.....	8	16	6	8
1920	66.6	+3.1	98	24	3.30	—0.06	7.21	0.69	.....	8	17	8	5
1921	67.3	+3.9	99	31	6.72	+3.36	11.95	1.72	.....	11	14	8	8

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

OCTOBER.

October was, as a whole, a very pleasant month with the temperature considerably above normal and the precipitation somewhat below. The coldest weather during the month occurred during the first twelve days and thereafter the temperature remained continuously above normal except a few days when nearly normal temperature conditions prevailed. This month makes a total of fourteen consecutive months that the mean temperature for the State has been above normal. The first killing frost occurred at a few stations in the northwestern portion on the 3d; on the 4th a number of stations also reported killing frosts; but on the 8th general freezing weather prevailed except over areas in the vicinity of the Mississippi River. Freezing temperatures also occurred generally on the 12th, but the areas that escaped the earlier freezes also escaped this one and at Dubuque this is the first time in 21 years that a killing frost has not occurred in October. After the 12th practically no frost or freezing temperatures occurred in the State. The damage from frost was slight, as the corn crop was beyond injury and truck crops were generally protected. The warm weather during the last two decades, in connection with well-distributed rainfall, resulted in a good crop of potatoes in small areas over the eastern portion of the State. Some potato vines were still green at the close of the month. The warm weather had an unusual effect on plant growth in general. At many points fruit buds swelled to a considerable extent and in some cases trees were in bloom, spring flowers bloomed and reports of ripe strawberries were not uncommon.

The weather was favorable for all outdoor work and the high temperature and strong winds that prevailed on a large number of days caused corn to dry rapidly so that 50 per cent of that crop was gathered and cribbed under favorable conditions by the close of the month.

The precipitation was deficient over the northern and central divisions, but there was a slight excess over the southern division. Over much of the western portion of the State practically no rain fell during the first three weeks and winter wheat had begun to need rain badly, but the general rains that occurred during the last week greatly benefited that crop. Pastures were unusually good for the season.

Pressure. The mean pressure (reduced to sea level) for the State was 29.96 inches. The highest recorded was 30.45 inches, at Keokuk, on the 13th, and the lowest was 29.46 inches, at Sioux City, on the 26th. The monthly mean was 0.99 inch.

Temperature. The mean temperature for the State, as shown by the records of 94 stations, was 54.6°, or 3.8° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 52.7°, or 3.7° higher than the normal; Central, 54.8°, or 3.9° higher than the normal; Southern, 56.4°, or 3.8° higher than the normal. The highest monthly mean was 58.2°, at Thurman, and the lowest was 50.4°, at Postville. The highest temperature reported was 90°, at Clarinda, on the 16th, and the lowest was 21°, at Bedford and Washta, on the 12th. The temperature range for the State was 69°.

Humidity. The average relative humidity for the State at 7 a. m. was 75 per cent, and at 7 p. m. it was 59 per cent. The mean for the month was 67 per cent, or 5 per cent less than the normal. The highest monthly mean was 78 per cent, at Charles City, and the lowest was 58 per cent, at Sioux City. The lowest observed was 24 per cent, at Sioux City, on the 8th.

Precipitation. The average precipitation for the State, as shown by the records of 99 stations, was 1.36 inches, or 0.50 inch less than the normal. By divisions the averages were as follows: Northern, 1.37 inches, or 0.97 inch less than the normal; Central, 1.90 inches, or 0.59 inch less than the normal; Southern, 1.62 inches, or 0.08 inch more than the normal. The greatest amount, 3.61 inches, occurred at Mt. Ayr, and the least, 0.21 inch, at Rock Rapids. The greatest amount in 24 consecutive hours, 2.32 inches, occurred at Greenfield, on the 29th.

Snowfall. Light snow flurries occurred at a number of stations in each division. Only one station, Northwood, reported more than a trace of snow.

Wind. The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 52 miles per hour, from the northwest, at Sioux City, on the 10th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 63, or 1 per cent greater than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 43; Davenport, 70; Des Moines, 69; Dubuque, 54; Keokuk, 68; Sioux City, 67; Omaha, Neb., 73.

Miscellaneous Phenomena. Aurora: 7th, 8th, 9th, 11th. Fog: 10th, 27th, 28th, 31st. Frost (killing): 3d, 4th, 8th, 9th, 10th, 12th. Hail: 6th, 7th, 17th, 28th. Halos (lunar or solar): 1st, 5th, 9th, 14th, 15th, 17th, 18th. Rainbow: 17th. Sleet: 7th. Thunderstorms: 1st, 6th, 7th, 14th, 15th, 17th, 21st, 24th, 25th, 26th, 28th, 29th.

Rivers. Low stages prevailed on all rivers with a general falling tendency. A slight rise occurred on most rivers during the third week and a general, though slight, rise occurred on all rivers during the last few days of the month.

COMPARATIVE DATA FOR THE STATE—OCTOBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	49.2	—1.6	89	16	3.48	+1.02	6.88	1.59	------	7	11	11	9
1891	50.0	—0.8	92	19	2.77	+0.31	6.53	0.85	------	6	18	7	6
1892	54.5	+3.7	90	14	1.55	—0.91	2.58	0.01	0.0	4	21	6	4
1893	52.4	+1.6	94	10	1.38	—1.18	4.51	0.02	0.0	4	16	9	6
1894	51.7	+0.9	90	20	2.67	+0.21	5.25	0.03	0.2	8	14	8	9
1895	46.0	—4.8	88	4	0.47	—1.99	1.38	0.00	T.	2	19	8	4
1896	47.9	—2.9	88	12	2.13	+0.67	5.05	1.51	T.	5	18	6	7
1897	50.8	+0.0	97	12	1.14	—1.32	2.90	0.03	0.0	4	17	8	6
1898	47.8	—3.1	89	17	3.56	+1.10	5.75	1.27	3.6	8	7	9	15
1899	56.7	+5.9	95	17	1.73	—0.73	4.64	0.15	0.0	5	17	8	6
1900	59.3	+8.5	90	21	3.91	+1.45	8.00	1.39	0.0	7	16	7	8
1901	54.2	+3.4	88	20	1.98	—0.48	4.23	0.45	T.	6	17	7	7
1902	52.5	+2.7	82	29	2.54	+0.08	6.06	0.28	T.	5	16	8	7
1903	52.2	+1.4	90	16	1.95	—0.51	4.50	0.32	0.0	5	19	6	6
1904	53.1	+2.3	90	16	1.67	—0.79	4.43	0.14	T.	6	15	8	8
1905	49.2	—1.6	95	16	3.40	+0.94	5.36	1.39	1.6	8	16	6	9
1906	50.5	—0.2	87	7	1.96	—0.50	4.25	0.50	0.1	6	14	7	10
1907	50.4	—0.4	85	19	1.50	—0.96	2.71	0.30	0.0	5	20	5	6
1908	51.1	+0.3	89	17	3.39	+0.92	6.85	0.58	2.6	8	16	6	9
1909	49.7	—1.1	97	10	2.22	—0.24	4.70	0.48	T.	6	16	6	9
1910	55.2	+4.4	93	10	0.77	—1.69	1.73	T.	0.1	4	21	4	6
1911	48.7	—2.1	87	14	3.34	+0.88	7.03	0.73	0.6	10	12	8	11
1912	50.5	+1.4	93	16	2.08	+0.52	5.77	1.03	T.	6	21	3	7
1913	49.2	—1.6	89	—2	3.03	+0.57	7.29	0.35	1.2	9	15	8	8
1914	55.9	+5.1	88	14	3.23	+0.77	6.64	0.74	T.	9	16	6	9
1915	54.4	+3.6	86	19	1.31	—1.15	3.25	T.	T.	5	19	6	6
1916	50.9	+0.1	92	6	2.00	—0.46	4.33	0.20	2.0	8	16	7	8
1917	42.9	—7.9	82	6	1.41	—1.05	4.00	0.15	2.2	6	10	11	10
1918	55.1	+4.3	93	21	2.64	+1.18	7.56	1.06	0.8	7	13	7	11
1919	50.7	—0.1	89	8	2.02	+0.56	8.65	0.45	T.	10	11	8	12
1920	57.7	+6.9	90	11	2.13	—0.33	4.64	0.48	T.	6	19	6	6
1921	54.6	+3.8	90	21	1.96	—0.50	3.61	0.21	T.	6	17	8	6

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

NOVEMBER.

The main feature of the weather during November was a change to subnormal temperature after 14 consecutive months above normal, though over much of the southern portion of the State the temperature continued above normal. The first week was warm and spring-like, but on the 8th a cold period set in that continued generally till the beginning of the last week. The portion of the State that escaped killing frost in October was covered by a general freeze on the 8th.

The month was mostly favorable for all outdoor work and at the end of the month about 90 per cent of the corn crop had been gathered. However, over much of the extreme northern portion of the State, where the ground was snow covered from 15 to 20 days, great difficulty was experienced in gathering corn on account of so much being down. There was much cloudiness and an unusual number of dark, gloomy days when the sun did not shine at all. Fog occurred on a large number of days, especially along the large streams, and the humidity was high. From the 25th to 28th, moisture was continually present on all exposed objects. During this period the temperature fluctuations were very slight and at some stations the daily range was not more than two degrees. Notwithstanding the low temperatures that occurred during the month, a number of places reported that hardy vegetables and flowers in sheltered places, were still vigorous at the end of the month, and dandelions were in bloom generally over the southern and much of the central division of the State. The last day of the month was generally warm and pleasant and it is reported that bees were able to make a good flight.

Precipitation was decidedly below normal, being slightly more than one-third of the average for the State. Only one station, Sioux Center, reported an amount greater than the normal. Over the northern division nearly all the precipitation was in the form of snow and in the central and southern divisions more than half was snow. The lack of precipitation apparently had no bad effect on the growth of winter grain, as it was generally reported in good condition. Pastures were unusually good considering the deficient precipitation and the time of year.

Pressure. The mean pressure (reduced to sea level) for the State was 30.09 inches. The highest was 30.55 inches, at Dubuque, on the 22d, and at Sioux City, on the 28th, and the lowest was 29.55 inches, at Sioux City, on the 30th. The monthly range was 1.00 inch.

Temperature. The mean temperature for the State, as shown by the records of 97 stations, was 33.6°, or 1.4° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 30.0°, or 2.8° lower than the normal; Central, 34.0°, or 1.1° lower than the normal; Southern, 36.8°, or 0.3° lower than the normal. The highest monthly mean was 40.3°, at Keokuk, and the lowest was 27.8°, at Milford. The highest temperature recorded was 70°, at Clarinda and Mount Ayr, on the 4th, Greenfield, on the 7th and 9th, and Lamoni, on the 5th and 7th, and the lowest was 5° below zero, at Sanborn, on the 20th. The temperature range for the State was 75°.

Humidity. The average relative humidity for the State at 7 a. m. was 87 per cent and at 7 p. m. 75 per cent. The mean for the month was 81 per cent, or 5 per cent above the normal. The highest mean was 88 per cent, at Charles City, and the least was 76 per cent, at Des Moines.

Precipitation. The average precipitation for the State, as shown by the records of 100 stations, was 0.58 inch, or 0.93 inch less than the normal. By divisions, the averages were as follows: Northern, 0.79 inch, or 0.62 inch less than the normal; Central, 0.63 inch, or 0.90 inch less than the normal; Southern, 0.33 inch, or 1.25 inches less than the normal. The greatest amount, 1.61 inches, occurred at Clinton, and the least, a trace, at Bedford, Clarinda, Corning, Glenwood, Lenox, Mt. Ayr and Thurman. The greatest amount in 24 consecutive hours, 1.15 inches, occurred at Grinnell on the 8th.

Snowfall. The average snowfall for the State was 3.4 inches, or 0.9 inch more than the normal. The first general fall occurred on the 8th, but it soon melted. Another storm that was general over most of the State occurred on the 10th and 11th. This snow remained on the ground till the middle of the month. The ground was also snow covered for short periods during the third and fourth week over the greater portion of the State. The greatest snowfall reported was 13.0 inches, at New Hampton. Several stations in the southern division reported no snowfall.

Wind. The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 32 miles per hour, from the south, at Sioux City, on the 15th.

Sunshine. The average per cent of the possible amount of sunshine was 39, or 15 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 26; Davenport, 33; Des Moines, 45; Dubuque, 34; Keokuk, 35; Sioux City, 35; Omaha, Neb., 39.

Miscellaneous Phenomena. Aurora: 1st. Fog: 7th, 15th, 16th, 17th, 18th, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th. Hail: 12th, 18th. Halos: 7th, 10th, 12th, 13th, 14th, 20th, 21st. Sleet: 7th, 8th, 13th, 17th, 18th, 23d, 27th. Thunderstorms: 7th, 8th, 10th.

Rivers. Low stages with but slight fluctuations and a general falling tendency prevailed on all rivers. The Mississippi River froze along the extreme northern border on the morning of the 25th, and the Missouri at Sioux City on the 24th.

COMPARATIVE DATA FOR THE STATE—NOVEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation of .01 inch or more	Clear	Partly cloudy	Cloudy
1890	38.6	+3.6	78	— 2	1.46	—0.05	3.55	0.71	.....	3	15	8	7
1891	30.5	—4.5	84	—24	1.70	+0.19	3.64	0.66	.....	7	10	8	12
1892	33.3	—1.7	70	— 3	1.19	—0.41	3.16	0.05	1.8	4	11	8	11
1893	34.0	—1.0	80	—13	1.17	—0.34	2.56	0.05	4.6	4	16	8	6
1894	32.7	—2.3	72	— 5	0.92	—0.59	2.42	T.	0.4	4	9	11	10
1895	34.3	—0.7	86	—12	1.51	0.00	3.61	0.45	4.9	6	9	8	13
1896	29.6	—5.4	82	—15	1.83	+0.32	4.51	0.16	2.9	6	9	8	13
1897	34.3	—0.7	81	—19	0.66	—0.85	2.24	T.	1.2	3	12	8	10
1898	32.2	—2.8	78	—17	1.50	—0.01	2.61	0.33	8.7	6	14	8	8
1899	43.9	+8.9	86	8	1.39	—0.31	3.97	0.13	0.3	5	12	8	10
1900	33.5	—1.5	79	— 6	1.06	—0.45	3.38	T.	3.7	6	12	7	11
1901	35.8	+0.8	77	2	0.86	—0.65	2.30	0.20	2.6	3	18	6	6
1902	41.2	+6.2	79	4	2.13	+0.62	4.19	0.16	1.8	7	9	7	14
1903	34.2	—0.8	76	— 5	0.92	—0.99	1.74	T.	1.1	3	13	8	9
1904	41.0	+6.0	80	4	0.15	—1.36	0.50	0.00	0.5	1	20	6	4
1905	38.4	+3.4	70	—12	2.84	+1.33	5.30	0.90	0.6	5	16	7	7
1906	35.4	+0.4	76	— 5	2.05	+0.52	3.86	0.35	4.4	8	9	7	14
1907	36.7	+1.7	68	— 4	1.03	—0.48	2.27	0.05	0.9	4	17	6	7
1908	39.3	+4.3	80	5	1.56	+0.06	3.31	0.21	1.4	5	14	7	9
1909	42.4	+7.4	84	2	3.29	+2.88	11.48	2.07	6.8	10	10	7	13
1910	33.4	—1.6	76	— 5	0.34	—1.17	1.03	T.	0.7	3	13	9	8
1911	29.9	—5.1	79	— 8	1.42	—0.09	4.29	0.11	1.6	6	11	8	11
1912	40.1	+5.1	77	6	0.98	—0.53	2.38	0.00	T.	2	18	8	4
1913	44.1	+9.1	78	10	1.18	—0.33	3.49	0.20	0.4	6	11	7	12
1914	41.0	+6.0	80	— 4	0.22	—1.79	0.95	0.00	T.	2	19	6	5
1915	40.2	+5.2	83	— 5	1.94	+0.43	4.98	0.39	1.2	6	11	10	9
1916	37.3	+3.3	80	— 8	1.61	+0.10	3.65	0.05	3.6	5	16	6	8
1917	40.7	+5.7	77	2	0.28	—1.23	1.02	T.	1.4	3	14	6	10
1918	39.9	+4.9	76	0	2.11	+0.60	5.10	0.70	4.4	7	13	5	12
1919	33.6	—1.4	68	—12	2.40	+1.89	6.22	1.97	6.3	8	11	7	12
1920	35.4	+0.4	71	2	2.13	+0.67	4.43	0.72	1.2	8	10	5	15
1921	32.6	—1.4	70	— 5	0.58	—0.93	1.61	T.	3.4	5	10	5	15

T. indicates an amount too small to measure, or less than .006 inch rainfall, and less than .05 inch snowfall.

DECEMBER.

The principal feature of the weather during December was the return to temperature conditions above normal, making 11 months during the year that the mean temperature for the State was above normal, and the mean for the year was by far the highest ever experienced in the State since records have been kept. The month for the most part was very pleasant and the first 16 days were, with the exception of one or two days, continuously above normal and the mean for this period averaged nearly 10 degrees above normal. As a result of this favorable condition outside work was possible during nearly the entire month and by the end of December practically the entire corn crop had been gathered. Very little frost was in the ground and plowing was reported from all parts of the State till the general rain and snowstorm on the 16th and 17th. During this mild period grass made perceptible growth and dandelions bloomed profusely till the beginning of the third week and flowers were reported in bloom almost to the northern border. The last half of the month was almost continuously below normal till the 28th, when another mild period set in that continued through the month.

The precipitation was below normal except over the east central and southeastern sections and mostly was in the form of rain. The ground was bare till the 16th over the entire State, but winter grain and grasses were apparently uninjured, as there were no hard freezes during the time that the ground was bare, and during the latter part of the month when the low temperatures prevailed the ground was generally protected by an ample snow cover. Sleet occurred at many places on the 22d and 23d, but very little damage or inconvenience resulted. Snowfall was decidedly below normal and the average was less than half the usual amount for December. There was some drifting over the northern half of the State, but not sufficient to delay railroad traffic or interfere with ordinary wagon and automobile travel. The thickness of ice increased gradually till the close of the month and a good ice harvest is in prospect. Live stock is wintering well and the health is generally good, hog cholera having subsided somewhat.

Pressure. The mean pressure (reduced to sea level) for the State was 30.11 inches. The highest recorded was 30.71 inches, at Sioux City, on the 21st, and the lowest was 29.32 inches, at Davenport, on the 1st. The monthly range was 1.39 inches.

Temperature. The mean temperature for the State, as shown by the records of 99 stations, was 28.2°, or 4.3° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 24.7°, or 3.5° higher than the normal; Central, 28.8°, or 4.7° higher than the normal; Southern, 31.2°, or 4.8° higher than the normal. The highest monthly mean was 33.0°, at Burlington and Keokuk, and the lowest was 21.4°, at Inwood. The highest temperature recorded was 69°, at Logan and Thurman, on the 13th, and Washta, on the 14th, and the lowest was 22° below zero, at Washta, on the 25th. The temperature range for the State was 91°.

Humidity. The average relative humidity for the State at 7 a. m. was 81 per cent, and at 7 p. m. it was 72 per cent. The mean for the month was 76 per cent, which is 5 per cent below the normal. The highest monthly mean was 86 per cent, at Charles City, and the lowest was 72 per cent, at Des Moines.

Precipitation. The average precipitation for the State, as shown by the records of 100 stations, was 1.02 inches, or 0.20 inch less than the normal. By divisions the averages were as follows: Northern, 0.61 inch, or 0.46 inch less than the normal; Central, 1.42 inches, or 0.17 inch more than the normal; Southern, 1.04 inches, or 0.31 inch less than the normal. The greatest amount, 3.72 inches, occurred at Davenport, and the least, a trace, at Harlan. The greatest amount in 24 consecutive hours was 2.40 inches, at Tipton, on the 16th.

Snowfall. The average snowfall for the State was 2.9 inches, or 3.3 inches less than the normal. The greatest amount, 9.1 inches, occurred at Inwood, and the least was a trace at Afton, Atlantic, Chariton, Denison, Harlan and Webster City.

Wind. The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 53 miles per hour, from the northwest, at Sioux City, on the 30th.

Sunshine and Cloudiness. The average per cent of the possible amount of sunshine was 49, or 1 per cent greater than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 38; Davenport, 42; Des Moines, 58; Dubuque, 36; Keokuk, 52; Sioux City, 50; Omaha, Neb., 67.

Miscellaneous Phenomena. Aurora: 26th. Fog: 1st, 6th, 12th, 15th, 16th, 25th, 27th. Halos (lunar and solar): 3d, 6th, 7th, 9th, 10th, 11th, 12th, 13th, 14th, 21st, 24th. Parhelia: 3d, 29th, 31st. Sleet: 11th, 16th, 19th, 22d, 23d. Thunderstorms: 16th.

Rivers. Moderate stages prevailed on the Missouri River and low stages on the Mississippi and all interior rivers. Most streams were open till after the middle of the month. Most interior streams were frozen by the 20th and the Missouri and Mississippi were frozen over from the 21st to 25th, with ice from eight to ten inches thick.

COMPARATIVE DATA FOR THE STATE—DECEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prec. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	29.1	+5.2	72	−13	0.45	−0.77	1.40	0.00	.....	3	17	7	7
1891	32.3	+8.4	72	−14	2.41	+1.19	4.50	1.23	.....	6	14	9	8
1892	18.9	−5.0	58	−29	1.65	+0.43	3.04	0.20	10.9	8	9	8	14
1893	22.0	−1.9	70	−21	1.31	+0.09	2.80	0.46	7.6	7	10	9	12
1894	20.1	+6.2	73	−17	0.95	−0.27	1.75	0.25	1.3	3	15	6	10
1895	25.4	+1.5	63	−16	1.62	+0.41	5.74	0.00	4.1	5	11	9	11
1896	30.8	+6.9	70	−10	0.95	−0.57	1.79	T.	1.6	4	10	8	13
1897	18.6	−5.9	60	−25	1.65	+0.43	3.22	0.61	15.9	6	11	7	13
1898	18.1	−5.8	66	−25	0.48	−0.74	1.79	T.	3.9	3	15	8	8
1899	27.6	−1.2	75	−19	1.61	+0.39	4.28	0.10	4.3	5	12	9	10
1900	26.9	+3.0	63	−10	0.45	−0.77	1.79	T.	2.4	4	13	6	12
1901	20.5	−2.4	64	−31	0.93	−0.29	2.75	0.05	5.4	6	10	9	12
1902	20.1	−3.8	59	−20	2.22	+1.01	5.51	0.67	12.9	8	9	6	16
1903	19.6	−4.2	58	−27	0.41	−0.81	1.96	T.	2.7	4	11	9	11
1904	23.4	−0.5	67	−19	1.44	+0.22	2.58	0.06	12.3	5	12	7	12
1905	27.0	+3.1	62	−11	0.32	−0.70	1.09	T.	4.3	3	19	6	6
1906	25.7	+1.8	65	− 9	1.43	+0.21	2.81	0.37	1.4	6	11	7	13
1907	28.8	+4.9	62	− 9	1.00	−0.22	2.28	0.05	4.7	5	10	7	14
1908	27.2	+3.3	67	−17	0.57	−0.65	2.07	0.05	3.8	3	15	8	8
1909	18.1	−5.8	60	−28	2.18	+0.96	6.10	0.89	15.7	11	10	5	16
1910	23.4	−0.5	57	−14	0.37	−0.85	1.39	0.01	2.0	3	15	7	9
1911	27.9	+4.0	60	−24	2.57	+1.35	4.43	0.62	12.6	7	13	6	12
1912	29.2	+5.3	64	−13	0.74	−0.48	1.75	0.10	1.1	3	18	7	6
1913	22.0	+8.1	65	−13	1.02	−0.20	4.72	0.00	1.3	4	15	5	11
1914	15.7	−8.2	62	−31	1.30	+0.08	2.94	0.37	11.1	9	10	6	15
1915	25.0	+1.1	56	−10	0.60	−0.53	1.70	T.	4.6	5	11	8	12
1916	18.7	−5.2	67	−25	1.04	−0.18	2.60	0.35	6.7	6	15	8	8
1917	14.5	−9.4	62	−40	0.56	−0.66	1.70	0.14	6.7	6	10	9	12
1918	22.7	+8.8	68	− 7	1.30	+0.08	3.30	0.27	5.1	8	9	8	14
1919	13.0	−8.9	52	−36	0.54	−0.68	1.55	0.08	5.8	4	11	7	13
1920	28.4	+4.5	65	−26	1.16	−0.06	2.64	0.58	7.4	5	10	8	13
1921	28.2	+4.3	69	−22	1.02	−0.20	3.72	T.	2.9	4	14	9	8

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

MONTHLY STATE DATA FOR 1921.

MONTH	Barometric Pressure, Inches (Sea level): Mean	Highest	Date	Lowest	Date	Temperature, Degrees, F.: Mean	Departure from normal	Highest	Lowest	Rel. Humidity, Per Cent: 7 a. m.*	12 noon‡	7 p. m.*	Departure from normal¶	Lowest	Precipitation, Inches: Average	Departure from normal	Greatest	Least	Snowfall	Number of Days: With .01 inch or more precipitation	Clear	Partly cloudy	Cloudy	Sunshine: Per cent of the possible amount	Departure from normal	Wind: Average hourly velocity	Departure from normal	Prevailing direction
January	30.15	30.91	17	29.48	3	28.4	+10.5	67	−9	86	71	74	−4	25	0.51	−0.54	1.92	0.10	4.1	4	11	7	13	44	−6	7.9	−0.8	nw.
February	30.06	30.79	19	29.23	15	31.0	+10.5	76	−5	92	68	68	−5	27	0.77	−0.28	2.00	T.	6.5	5	13	7	8	52	−4	8.4	−0.9	sw.
March	30.01	30.82	28	29.15	26	42.8	+ 9.5	86	4	78	59	60	−5	24	1.57	−0.20	6.62	0.17	0.2	7	14	8	9	56	−2	10.1	+0.2	nw.
April	29.94	30.70	10	29.16	24	52.4	+ 3.7	88	14	75	54	57	0	12	3.34	+0.48	6.99	0.99	3.6	10	13	7	10	58	−2	10.2	+0.3	s.
May	30.01	30.43	2	29.46	26	63.2	+ 2.8	99	29	75	54	57	−2	24	4.23	−0.34	9.41	1.34	0	10	14	10	7	65	+ 3	7.8	−0.9	s.
June	29.95	30.45	4	29.56	15	74.7	+ 5.6	100	40	78	55	59	−2	27	3.76	−0.62	8.85	0.56	0	9	16	10	4	69	0	5.9	−1.7	se.
July	29.98	30.25	20	29.44	7	77.9	+ 3.8	104	41	77	52	54	−2	23	2.52	−1.42	7.45	0.42	0	7	19	9	3	78	+ 4	5.9	−0.8	sw.
August	30.00	30.41	21	29.65	5‡	72.1	+ 0.3	102	37	83	59	64	+2	33	5.04	+1.36	9.04	2.2?	0	8	16	11	4	68	−2	6.6	+0.2	se.
September	29.94	30.31	12	29.29	28	67.3	+ 3.9	99	31	86	58	68	+2	19	6.72	+3.30	11.95	1.72	0	11	14	8	8	62	−1	7.1	−0.1	s.
October	29.96	30.45	13	29.45	25	54.6	+ 5.8	90	23	75	50	59	−5	24	1.96	−0.50	3.61	0.21	T.	6	17	8	6	63	+ 1	8.3	+0.2	nw.
November	30.09	30.55	22*	29.55	30	33.6	− 1.4	70	−5	86	70	75	+5	32	0.58	−0.92	1.61	T.	3.4	5	10	5	15	39	−15	7.4	−0.8	nw.
December	30.11	30.71	21	29.32	1	28.2	+ 4.3	69	−22	91	67	72	−5	32	1.02	−0.30	3.72	T.	2.9	4	14	9	8	49	+ 1	9.0	+0.9	nw.
Means and extremes	30.03	30.91	Jan. 17	29.15	Mch. 26	52.2	+ 4.8	104	−22	80	60	64	−2	12	32.03	+0.06	11.95	T.	20.7	86	171	99	95	59	−2	7.9	−0.3	nw.
Normals and records	30.02	31.09	Jan.† 1905	28.69	Feb.‡ 1902	47.4		113	−47	81		66		5	31.97		19.88	0.00	30.7	85	166	101	98	61		8.2		nw.

*Also on 28th. ‡Also 16th and 17th. †25th. ‡9th. §Local mean time. *Normal central time. ¶7 a. m. and 7 p. m. observations only.

COMPARATIVE DATA FOR THE STATE—Annual.

Year	Temperature: Mean annual	Highest	Date	Lowest	Date	Precipitation in Inches: Annual	Greatest annual	Least annual	Av. snowfall
1890	48.0	110	July 12	−27	January 22	31.30	45.74	16.00	......
1891	47.3	106	August 9	−31	February 4	32.90	49.05	23.48	......
1892	46.6	104	July 11	−28	January 19	36.58	48.77	24.78	34.2
1893	45.7	102	July* 12	−36	January 14	27.59	33.27	19.19	37.2
1894	49.7	109	July 26	−37	January 25	21.94	29.81	15.65	19.2
1895	47.2	104	May 28	−33	February 1	26.77	35.25	18.57	26.0
1896	48.6	104	July 3	−20	January 4	37.22	51.60	28.68	22.6
1897	47.8	106	July* 23	−30	January 25	26.98	36.18	20.21	28.8
1898	47.7	102	August 30	−25	December 31	31.34	53.47	19.51	40.3
1899	47.3	104	September 6	−40	February 11	28.68	42.06	21.79	23.4
1900	49.3	103	August 3	−27	February 15	33.05	47.49	25.06	25.8
1901	49.0	113	July 22	−31	December 15	24.41	37.69	16.25	28.5
1902	47.7	98	July 20	−31	January 27	42.92	58.80	30.14	28.0
1903	47.2	101	August 24	−27	December 12	35.39	50.53	26.41	19.4
1904	46.3	100	July 17	−32	January 27	28.51	38.93	19.24	29.2
1905	47.2	104	August 11	−41	February* 2	36.56	57.30	24.66	26.2
1906	48.4	107	July 21	−32	February 10	31.60	44.24	20.63	32.8
1907	47.4	102	July 5	−31	February 5	31.61	43.90	19.93	24.0
1908	49.5	101	August 2	−18	January 29	35.28	49.98	24.11	22.7
1909	47.4	103	August* 15	−30	February* 15	40.01	53.48	27.20	49.0
1910	48.6	106	July 16	−25	January 7	19.87	27.99	12.11	21.4
1911	49.5	111	July* 3	−35	January 3	31.37	40.77	19.74	33.2
1912	46.4	104	September 8	−47	January 12	28.89	33.12	15.25	29.5
1913	49.7	108	July* 16	−25	January 8	29.55	45.18	20.31	25.4
1914	49.1	109	July 12	−31	December 26	31.93	44.11	22.30	27.5
1915	47.8	99	May 14	−32	January 28	39.23	51.15	27.29	31.3
1916	47.2	106	August 4	−34	January 13	28.90	40.34	22.48	29.5
1917	44.8	106	July 29	−40	December 29	27.81	36.00	20.78	32.4
1918	49.2	112	August 4	−36	February 4	32.78	47.33	25.03	33.4
1919	48.6	104	July* 30	−36	December 10	36.76	48.16	29.58	39.6
1920	48.2	102	July 23	−29	January* 4	31.75	44.00	20.95	21.7
1921	52.2	104	July* 11	−22	December 23	32.03	46.47	20.41	30.7

*And other dates.

DATES OF KILLING FROSTS, 1921.

STATIONS	Killing Frosts		
	Last in Spring	First in Autumn	
Northern Division			
Algona	May 10	Oct.	31
Alton	May 10	Oct.	4
Alta	May 14	Oct.	6
Alton	May 15	Oct.	4
Belmond	May 15	Oct.	4
Britt	May 15	Oct.	21
Charles City	April 10	Oct.	22
		Oct.	31
Decorah		Oct.	31
Estherville	May 10	Oct.	24
Fayette	May 10	Oct.	4
Forest City	May 10	Oct.	4
Hampton	May 10	Oct.	4
Inwood	May 14	Oct.	4
Le Mars	May 15	Oct.	4
Mason City	May 15	Oct.	4
Milford (near)	May 10	Oct.	4
Northfield	May 10	Oct.	4
Nora Springs	May 10	Oct.	4
Northwood	May 15	Oct.	31
Pocahontas	May 2	Oct.	41
Postville	May 15	Oct.	4
Rockford	May 15	Sept.	30
Sanborn	May 10	Sept.	30
Sioux Center	May 14	Oct.	4
Spencer	May 14	Oct.	47
Storm Lake	May 10	Oct.	4
Wall Lake	May 10	Oct.	4
Waterloo	May 21	Oct.	4
West Bend	May 15	Oct.	2
Central Division			
Ames	May 10	Oct.	31
Audubon	May 10	Oct.	47
Boone	May 14	Oct.	6
Buck Falls	May 10	Oct.	4
Boone	May 15	Oct.	4
Carroll	May 15	Oct.	21
Cedar Rapids	April 10	Oct.	22
Davenport		Oct.	31
Dubuque	May 10	Oct.	24
Delaware	May 10	Oct.	4
Denison	May 10	Oct.	4
Des Moines	May 10	Oct.	4
Fairport	May 14	Oct.	4
Fort Dodge	May 15	Oct.	4
Grinnell	May 15	Oct.	4
Grundy Center	May 10	Oct.	47
Guthrie Center	May 10	Oct.	4
Hamburg	May 10	Oct.	31
Independence	May 15	Oct.	31
Iowa City	May 2	Oct.	41
Iowa Falls	May 15	Oct.	4
Jefferson	May 10	Sept.	30
Le Mars	May 15	Oct.	4
Logan	May 14	Oct.	4
Marshalltown	May 10	Oct.	4
Monroe	May 14	Oct.	47
Otis	May 10	Oct.	4
Osage	May 15	Oct.	4
Rockwell City	May 15	Oct.	4
Sac City	May 15	Oct.	4
Sioux City	April 10	Oct.	4
Tipton	May 10	Oct.	4
Toledo	May 10	Oct.	4
Waterloo	May 10	Oct.	4
Waukee	May 3	Oct.	4
Webster City	May 10	Oct.	4
Williamsburg	May 21	Oct.	4

STATIONS	Killing Frosts	
	Last in Spring	First in Autumn
Southern Division		
Afton	May 21	Oct.
Albia	May 21	Oct.
Atlantic	May 10	Oct.
Bedford	April 17	Oct.
Bloomfield	April 10	Oct.
Bonaparte	April 10	Oct.
Burlington	April 10	Oct.
Centerville	April 10	Oct.
Charlton	May 4	Oct.
Chariton	April 10	Oct.
Clarinda	April 21	Oct.
Clarinda Junction	May 21	Oct.
Corning	May 10	Oct.
Corydon	May 10	Oct.
Creston	April 17	Oct.
Fairfield	May 21	Oct.
Glenwood	May 10	Oct.
Greenfield	April 17	Oct.
Indianola	May 10	Oct.
Keokuk	May 20	Oct.
Knoxville	May 10	Oct.
Lamoni	April 10	Sept.
Lenox	May 10	Oct.
Mount Ayr	April 17	Oct.
Mount Pleasant	May 3	Oct.
Oakland	April 18	Oct.
Oskaloosa	April 10	Oct.
Ottumwa	April 29	Oct.
Pella	April 10	Oct.
Red Oak	May 10	Oct.
Stockport	May 10	Oct.
Thurman	May 10	Oct.
Washington	May 10	Oct.
Winterset	April 17	Oct.
Omaha, Neb		Nov.

†Date of last temperature of 32 or lower in the spring, or first temperature of 32 or lower in autumn, as the case may be; when frost was not reported.

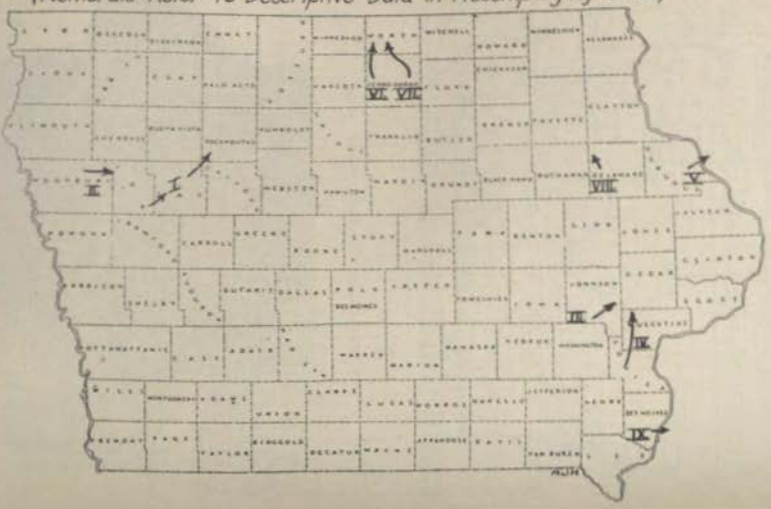
MEAN ISOTHERMS AND PREVAILING WINDS

TOTAL PRECIPITATION, YEAR, 1921

SCALE OF SHADES IN INCHES

TORNADO PATHS IN IOWA DURING THE YEAR, 1921.

(Numerals Refer to Descriptive Data in Accompanying Table.)



TORNADOES IN IOWA DURING THE YEAR 1921.

Storm No.	Nearest towns	Date	Hours	Storms moved from	Length of path	Persons killed	Persons injured	Estimated damage
I	Arthur to Fonda	March 26	7:10 p. m.	S. W. to N. E.	28 miles	0	14	$100,000
II	Correctionville	April 25	12:00 midnight	W. to E.	Short	0	0	2,000
III	Iowa City	April 25	11:00 p. m.	S. W. to N. E.	Short	0	0	6,000
IV	Muscatine	April 25	12:00 midnight	S. W. to N. E.	20 miles	0	0	20,000
V	Dubuque	April 25	12:00 midnight	S. W. to N. E.	6 miles	0	0	50,000
VI	Clear Lake to Hanlontown	May 26	2:45 p. m.	S. to N.	11 miles	2	2	200,000
VII	Plymouth to Manly	May 26	3:30 p. m.	S. E. to N. W.	5 miles	2	4	200,000
VIII	Manchester to Greene	May 26	4:00 p. m.	S. E. to N. W.	Short	0	0	2,000
IX	Burlington	September 4	5:20 p. m.	W. to E.	2 miles	0	0	3,500
				Totals	72 miles	4	20	$583,500

IOWA WINTERS

(December, January and February.)

Winter	Temperature				Precipitation			Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Snowfall	Wind precip. .01 in. or more.	Clear	Partly cloudy	Cloudy
1890-91	24.8	+ 4.0	72	—31	3.36	—0.66	.....	10	43	21	26
1891-92	25.2	+ 4.4	76	—28	4.79	+1.28	.....	17	36	25	30
1892-93	14.9	— 5.9	68	—34	2.78	+0.30	25.9	20	30	25	30
1893-94	20.3	— 0.5	70	—31	3.39	—0.13	22.0	15	40	26	24
1894-95	20.0	— 0.8	72	—23	2.29	—1.13	13.3	11	43	22	25
1895-96	25.4	+ 4.6	78	—20	2.82	—0.60	12.5	13	35	26	30
1896-97	24.2	+ 3.4	70	—30	2.56	+0.13	17.8	16	39	25	27
1897-98	21.9	+ 1.1	62	—25	4.45	+1.07	36.3	16	36	22	32
1898-99	16.7	— 4.1	75	—40	1.65	—1.77	12.5	11	41	28	21
1899-00	21.0	+ 0.2	75	—27	3.44	+0.02	16.5	14	38	24	28
1900-01	22.7	+ 1.9	62	—27	2.39	—1.22	18.3	12	42	22	26
1901-02	20.3	— 0.6	64	—31	2.54	—0.88	17.4	14	40	25	25
1902-03	21.0	+ 0.2	60	—21	3.69	+0.27	22.8	16	35	21	35
1903-04	16.1	— 4.7	70	—32	2.09	—1.42	14.3	14	33	23	32
1904-05	15.8	— 5.0	69	—41	3.92	+0.50	38.9	19	40	20	31
1905-06	25.1	+ 4.3	69	—32	3.55	—0.09	21.6	13	47	19	31
1906-07	23.2	+ 2.4	68	—31	2.66	—0.24	12.9	17	33	26	37
1907-08	20.0	+ 5.7	62	—18	3.13	—0.59	18.2	13	39	21	31
1908-09	24.9	+ 4.1	72	—26	3.77	+0.35	19.3	14	35	20	35
1909-10	17.6	— 2.8	60	—35	4.31	+0.79	30.3	20	37	20	33
1910-11	23.6	+ 2.8	71	—25	4.10	+0.64	17.3	14	36	21	33
1911-12	16.7	— 4.1	69	—47	4.31	+0.89	29.3	17	37	22	32
1912-13	23.4	+ 2.6	70	—25	2.32	—1.10	15.6	12	46	22	31
1914-14	25.5	+ 4.7	65	—28	2.77	—0.65	15.6	15	36	22	32
1914-15	20.8	0	63	—32	5.86	+2.44	27.8	26	22	19	30
1915-16	20.6	— 0.2	63	—34	3.86	+0.44	17.8	19	37	22	32
1916-17	17.0	— 3.8	68	—37	2.23	—1.19	17.4	13	46	24	30
1917-18	18.4	— 5.4	70	—40	2.53	—0.89	22.9	18	37	24	30
1918-19	28.1	+ 7.3	68	—22	3.95	+0.53	17.9	18	40	18	32
1919-20	18.6	— 2.2	59	—38	1.52	—1.90	14.5	13	32	21	34
1920-21	28.6	+ 7.8	76	—25	2.44	—0.98	18.0	14	34	27	34
1921-22	23.9	+ 3.1	70	—29	3.50	+0.08	9.5	13	45	22	23

Thrashing

Thrashing in Iowa, regardless of the weather, has shown a marked tendency toward earliness, though this tendency has been less in wet seasons than in dry ones. In the last ten years correspondents of the Iowa Weather and Crop Service have shown the per cent of the total thrashing done on September 1 as follows:

1912, 33; 1913, 75; 1914, 86; 1915, 53; 1916, 85; 1917, 80; 1918, 80; 1919, 89; 1920, 91; 1921, 94; Average, 77.

This year, 1921, 94 per cent finished is the greatest of record and 17 per cent more than the average of the last ten years. The 6 per cent remaining undone is practically all stacked grain. The tendency to shock thrashing has gone hand in hand with the tendency toward earliness. This year there was considerable weather damage to shocked grain in the general storm of August 1st and 2nd in which the shocks were uncapped or scattered by the wind and then soaked with excessive rains.

*WEATHER AND CROP REVIEW.

The mildest of 31 winters preceded the crop season of 1921. Winter grains and grasses, clover and fruits suffered very little winter killing. Spring opened very early. A little spring wheat seeding was done in the southern counties in February and considerable seeding of oats, spring wheat and clover was done in March.

Sudden and severe freezes, March 28, April 9-10 and 16-17 froze out the oats the worst in over 30 years. At least 50 per cent of the acreage had to be reseeded and some of this was seeded the third time. Many thin stands of oats were allowed to grow because of the clover seed sown therewith, that would otherwise have been plowed up for corn. It appears that germinating oats that had not yet showed above ground were damaged more than those that were two inches high. The latter, though frozen down, mostly recovered.

Tree fruits advanced too rapidly and were practically a total loss from the spring freezes, except in the northern counties where they were not so far advanced and temperatures were not so low. The warm and sunny May was favorable for young pigs, lambs and chicks. The litters of pigs were large and strong.

Plowing for corn was favored by the warm, dry spring. By May 1 most farmers had their ground ready for the planter and were waiting for a safe date. Some planting had been done in the extreme south and the corn was up and looking well. By May 15, 58 per cent of the corn had been planted and by June 1, 97 per cent.

Abnormal heat in June with ample soil moisture caused corn to make phenomenal growth. In many fields it was knee high by the middle of June and too tall to cultivate by June 21. Potatoes made a great growth of tops, but the set of tubers was disappointing. The weather was too warm for setting out commercial cabbage plants. The heat was too great for proper filling of spring grains. Oats suffered greatly and spring wheat was nearly a failure. Many horses died from overheating.

Winter wheat harvest was nearly completed by July 4. Though rain interfered somewhat in the west central and southwest counties, harvest weather was generally favorable, except that it was too hot for horses and men. Corn began to tassel early and by July 16, 75 per cent was silked. Drouth became serious in the north central counties and southeast to the boundaries of the State during July. In several counties the July rainfall was less than 20 per cent of normal, while the heat was intense. Potatoes were injured beyond recovery. Thrashing was well under way during the last ten days of July. Winter wheat turned out better than expected and only about one bushel below the ten-year average. Spring wheat and oats were disappointing.

Copious rains, August 1-2, broke the drouth. Corn made a remarkable recovery; potatoes that had not died recovered somewhat. Thrashing

*All reference to the effect of weather on crops in this publication is the result of co-operation between the United States Weather Bureau and the Iowa Weather and Crop Service.

was considerably delayed by rains, especially in the southwest district, but by September 1, 94 per cent of the thrashing had been completed, which is 17 per cent more than normal and the greatest of record. Shocked grain was considerably damaged by wind and rainstorms. Much of it sprouted. These wind and rainstorms tangled and prostrated much of the corn in the south and east portions of the State.

This made fodder cutting and silo filling difficult and in some cases impossible. More wind and heavy rain in September added to the difficulty of husking later. During the third week in September the warm, humid, cloudy weather caused much down corn to sprout, mold and rot. The warm season matured the corn early. Excellent samples of mature corn were gathered as early as August 23. There were no frosts of importance till the first week in October. Only about 2 per cent of the corn was immature at that time.

Generous and timely rains in August and September made soil conditions generally excellent for fall plowing and preparation for winter wheat seeding and a considerable increase in acreage has been reported.

October and November were mostly favorable for corn husking and other fall work. Corn dried out well. Reports from elevators having moisture testers showed that corn averaged to contain 16 per cent of moisture during the last week in October and the same in the last week in November. By November 1, 50 per cent of the corn was husked and by December 1, 90 per cent. Nearly 8 per cent of the crop was "hogged down."

Winter wheat is entering the winter in excellent condition. On December 1, 92 per cent of the acreage seeded had made good growth and become well established; 7 per cent had germinated, but made little showing; and only 1 per cent had not germinated.

As a whole the crop season was favorable for corn and hot weather crops and unfavorable for spring grain, potatoes and other cool weather crops. Prices have been discouraging, resembling those of 20 or more years ago. The gross return per acre of corn, based on December 1 price, is only $12.90, while oats is less than half that. Three large corn crops in succession have greatly overdone corn production, especially in view of the decreased live stock production. On two other occasions, 1898-1900 and 1904-1906, three big yields of corn have occurred in succession and in each case a low yield followed. It may follow this time and might be a blessing in disguise. The total value of Iowa crops in 1921, based on December 1 prices, is $305,459,429, which is more than a quarter billion less than in 1920 and less than one-third of 1919.

Bulletin No. 1, April 12, 1921—

The mildest of 31 winters preceded the crop season of 1921, the mean temperature for the State, 28.6 degrees, being 7.8 degrees above normal and 0.5 degree higher than the winter of 1918-1919, which was heretofore the warmest of record. This was equivalent to moving the entire State south two-thirds of the way over Missouri. As a result, there was almost no winter-killing of winter wheat, rye, grasses, clover and fruits. Plowing, mostly sod, was done in each of the winter months.

Unseasonably warm weather with deficient precipitation continued since, though sudden and severe freezes occurred March 28th and April 9th and 18th. The former damaged peaches, plums, pears, apricots and early apples in the southern tier of counties and considerably damaged oats that were just germinating. Oats that were well up, though frozen to the ground, will mostly recover. The extent of the damage from the recent freeze is yet problematic.

Spring seeding was far advanced by the close of March. In fact, spring wheat seeding was practically finished. At this date it is probable that for the State as a whole 85 per cent of the oats are seeded, in striking contrast with last year, when oats seeding was prolonged by unfavorable weather and soil conditions till as late as May 15th in some southeastern counties. Considerable reseeding of oats was done the past week in the south half of the State.

Plowing for corn is about half done, and about as far advanced as it was a month later last year. The favorable soil and weather conditions have enabled farmers to distribute the preparation of corn ground through several weeks so that much was accomplished without hired labor. This will have a tendency to maintain the corn acreage at about the usual. More than the usual seeding of clover and grasses has been done. Some of the new seeding has been damaged by the freeze of March 28th and by drouth and high winds.

Livestock wintered in excellent condition. Feed was abundant, as there was not much cash market for it. The mild weather brought pastures out rapidly and stock has been on pasture in the southern half of the State for a week or ten days. More rain is needed in a good many counties for pastures and small grains.

Young pigs were killed in some sections by the cold wave of March 28th, but in general the pig crop is good. The number of brood sows is slightly less than a year ago, but the litters are generally large and strong.

Bees are believed to have wintered well generally. During the mild weather of March apiarists gave their colonies several good flys. The outlook is promising.

Bulletin No. 2, April 19, 1921—

Rainy weather and falling temperature set in early in the week over most of the State, though in the northwest portion the rains were very deficient. A large general storm center moving eastward through Missouri on the 15th-16th caused heavy rains over the southern and eastern portions of the State with high winds shifting from the east through the northeast to northwest and steadily falling temperatures. The rain turned to snow which ranged from almost none in the north part of the State to a foot or more in the south, being the heaviest April snowfall in nearly 40 years at some stations. It was drifted 5 feet or more high in places and greatly impeded rail and highway traffic. Correspondents refer to it as the worst "blizzard" of the winter and in some cases the worst since February, 1912. The temperature rose rapidly on the 18th and only a few drifts of snow will remain by the evening of the 19th.

Temperatures of 16 to 20 on the mornings of the 16th and 17th have undoubtedly damaged the fruit crop seriously in the central and southern parts of the State. Foliage, blooms and buds were frozen stiff and blown from the trees by the high winds. Small fruits probably fared better. Blooms are not open generally in the northern part and temperatures did not average as low.

Farm work was generally retarded by the cold, snow and rain, but the moisture was beneficial and the northwestern part of the State badly needs more rain. In this section gales drifted the dry soil and small grains. Otherwise small grains are generally in good condition though much reseeding of

oats has been necessary in the southern half of the State, amounting in some localities to as much as 50 per cent of the acreage.

Plowing and preparation for corn planting is far advanced. Most farmers are only waiting for warm weather to start their planters. A few, in Ringgold and Mahaska counties had planted some before the rains began on the 13th.

Spring pigs, lambs and chicks suffered greatly from the cold and storm unless unusually well protected. Otherwise livestock is in excellent condition and on grass in most of the State. During the storm all stock had to be taken into winter quarters and fed. In nearly all sections there is insufficient stock for the pasturage but farmers hesitate to stock up under present unfavorable marketing conditions.

There are some reports that bees wintered better out of doors in chaff hives than in the cellar. This was doubtless due to the mildness of the winter. The mild weather has advanced brood rearing rapidly.

Bulletin No. 3, April 26, 1921—

Temperatures rose from about freezing at the beginning of the week to well up in the 80's Sunday afternoon the 24th. Showers occurred on the 20th, 21st and 25th, but more rain is badly needed in the northwest portion of the State.

Good progress was made with field work except in some southern and eastern counties where the soil remained too wet from the heavy rain and snow of last week.

Not in the previous 31 years of record has so much reseeding of oats been reported as a result of freezing temperatures. The prompt reseeding will probably maintain the acreage at a slight increase over last year. The second seeding is up and showing green in some sections and the outlook for this crop is, after all, better than at this time last year. In some instances three seedings have been done. Gales on the 23d and 24th again drifted the dry soil in the northwest counties, uncovering the seeded oats and blowing them away.

Dry weather, high winds and severe freezes have seriously damaged spring seeded clover in many western counties this spring. There is considerable complaint of clover leaf weevil in Henry and Mills Counties. Alfalfa was considerably nipped by the freezes but is recovering rapidly and promises a good crop. Meadows and pastures are very good for the time of year where moisture is sufficient but would be greatly benefited by rains in the northwest portion.

A little more corn planting was done toward the close of the week in the central and south portions. The earliest planted is up and looking well in Ringgold County. Preparations for corn planting are unusually far advanced for the time of year. Farmers are mostly waiting for a safe date before starting their planters, though recent high temperatures have warmed the soil and put it in fine condition except in some southern counties where snow drifts remained till near the close of the week. Seed corn tests have been generally satisfactory.

Spring and winter wheat, barley and rye are all making good progress though delayed some by the cold and snow of last week.

Gardens that survived the freezes, made excellent progress under the warm sunshine of Saturday and Sunday. Plums burst into bloom in the northern part of the State and cherries are beginning to bloom. Fruits in the northern districts do not seem to be much injured. Late apples will probably survive in the central portion. A few late apples are believed to have withstood the freezes in the southern counties and a few peaches in Scott County. Small fruits have suffered greatly in the south half of the State. Strawberries have been damaged but promise a fair crop in some sections.

Livestock is deriving an unusual amount of forage from pastures for the time of year. Reports of the pig crop continue good and about the normal amount of pork will be raised this year. Bees are in unusually good condition generally.

Bulletin No. 4, May 3, 1921—

Deficient temperature, excessive rainfall and in some sections deficient sunshine have retarded field work and growth of vegetation during the past week.

Though the ground is generally ready, corn planting is mostly awaiting warmer weather. Planting is most advanced in Fremont County where the weather has been drier and about one-third of the intended acreage has been planted. Some planting is reported as far north as Pocahontas and Sioux Counties where the spring has been drier.

Discouraging reports on oats continue. In the south half of the State the stand is thin and the fields look bad. Much reseeding has been done where clover was not sown with the oats and where freezing, high wind, or other unfavorable conditions have damaged the clover beyond recovery. In many cases the presence of the clover, an unusually large acreage of which was seeded, has caused farmers to risk a poor stand of oats. In other cases, the hopelessness of both oats and clover was not fully apparent till so late that reseeding was impracticable and the land will be plowed and planted to corn. In this way it now looks as though the corn and oats acreage will be divided on about the same basis as last year, in spite of the general intention to increase oats and decrease corn acreage.

Wheat, rye, barley, meadows and pastures are in good condition. However, pastures are generally understocked. Rye is reported 18 inches high in Scott County.

The Secretary of the State Horticultural Society gives the following preliminary figures on the condition of fruit May 1, just as this bulletin goes to the printer. A slight revision may be necessary. The figures are in per cent of a full crop. Apples, north half of State, 76; south half, 49; State average, 59. Cherries, north half, 54; south, 28; State, 38. Grapes, north, 87; south, 66; State, 73.

Figures on other fruits are not yet available but will be published next week. However, it is feared that the freezes and frosts of April 28th, 29th and 30th and May 3d, in the northern part of the State have damaged plums and cherries which were in full bloom. Apples in the north are still believed to be safe.

Bulletin No. 5, May 10, 1921—

Corn planting was retarded at the beginning of the week by cold weather and by wet soil in the central and south central districts. With the coming of warm weather on Thursday, Friday and Saturday, planting was pushed rapidly in the drier north central and northwest counties, where in some cases 30 to 50 per cent of the acreage has been planted. At least a beginning has been made in all counties, except in the extreme northeast. Further delay was caused by the rains of the 8th, 9th and 10th, but these rains were warm and will be generally beneficial.

Oats improved somewhat, also winter and spring wheat and other small grains, though winter wheat is reported as too rank in Mills County and showing yellow areas in Marion County. Pastures and hay crops have been retarded by the cold weather.

Frosts continued each night till the 5th, yet fruit prospects in the northern districts are considered good. Early potatoes are up in all sections.

The advance of the season is now about normal, though the beginning was fully a month in advance of the normal.

The Secretary of the State Horticultural Society reports condition of the fruit crop for May 1, based on 100 per cent as a full crop, as follows:

"Apples, 58; Americana plums, 40; cherries, 35; pears, 16; strawberries, 75; grapes, 72; red raspberries, 69; black raspberries, 71; blackberries, 76; gooseberries, 58; currants, 59; peaches, 22; domestica plums, 35; Japanese plums, 22.

"The condition in the south half of the State is as follows: Apples, 43; Americana plums, 13; cherries, 24; pears, 10; strawberries, 72; grapes, 64; red raspberries, 61; black raspberries, 64; blackberries, 71; gooseberries, 42; currants, 42; peaches, 18; domestica plums, 12; Japanese plums, 8.

"The condition in the north half of the State is as follows: Apples, 77; Americana plums, 65; cherries, 53; pears, 40; strawberries, 80; grapes, 85; red raspberries, 83; black raspberries, 82; blackberries, 86; gooseberries, 78; currants, 77; peaches, 57; domestica plums, 62; Japanese plums, 46."

Bulletin No. 6, May 17, 1921—

Heavy rains of the 9th, 10th and 11th, in the east and south portions of the State delayed corn planting and preparation therefor, but aside from this, these rains were generally beneficial. Corn planting is as much as 90 per cent completed in several north central and northwest counties and as little as 15 per cent in some south central counties. A belt of relatively late planting extends from southwest to northeast across the State, nearly coinciding with the belt of heavy snow in the storm of April 15-16. For the State as a whole, 58 per cent of the corn planting is done, as compared with 36 per cent on the 15th last year and 40 per cent the year before. Corn cultivating has begun in Pocahontas County and the rows are beginning to show in Woodbury.

Oats are looking well over most of the north half of the State but in the south half the stand is thin and patchy, the plants are not stooling well and in some localities are yellow, due to freezing and wet soil.

A large acreage of potatoes has been planted in Mitchell County and this work is nearing completion. The early potatoes are coming up. Setting out early cabbage will begin this week, but a decreased acreage is indicated. Strawberries are in full bloom and promise a good crop, though some injury may have resulted from the freezes in the northwest part of the State from the 14th to the 16th. Cherries are also believed to have been slightly injured in that portion of the State and tender garden truck in a number of localities.

A large decrease in sugar beet acreage is indicated.

Recent cold, wet weather has been unfavorable for lambs and pigs. Considerable mortality is reported. Sheep shearing is nearing completion in some southeast counties.

Bulletin No. 7, May 24, 1921—

Temperatures rose from the frost point over much of the State on the 16th and 17th to summer heat with maximum temperatures in the 90's on the 23d. Rather heavy rains fell on the 17th and 18th in several north and west counties. In the southern and east central districts sunshine was much above normal.

Under these conditions corn planting made unusual progress except where delayed by heavy rains in some northeast counties. In some localities, the week was described as the best corn planting week in many years. For the State as a whole about 93 per cent of the corn has been planted. In Mitchell, Floyd, Chickasaw and Fayette Counties from 70 to 80 per cent is completed.

Early planted corn is up; stand good; and cultivation well under way in nearly all portions of the State. That planted in the last week is needing more moisture for best germination in the south half of the State. The fields are free from weeds and the outlook for corn on this date is far ahead of that in recent years.

Oats and newly seeded grasses are suffering from drouth and baked soil in some southern counties. Winter wheat, rye, old, deeply rooted grass, clover and alfalfa are looking well generally, but the hay crop is probably being shortened in the south half of the State by each day without rain. In some counties it is estimated that as much as 50 per cent of the acreage of newly seeded grasses and clover has been killed by the freezes and drouth. Alfalfa is reported as excellent and will soon be ready to cut. Rye is well headed out in the southeast district.

Raspberries and blackberries are blooming profusely in the southern districts. Strawberries are ripening a fair crop in the extreme south and promise well in most sections. Rain would greatly benefit all small fruits and garden truck in the south half of the State.

Bulletin No. 8, May 31, 1921—

Temperatures were abnormally high—in the 90's in the afternoons; sunshine was considerably above normal; and rainfall was above normal and in some places excessive in the north half of the State, but continued deficient in the south portion. Severe local storms and tornadoes in Cerro Gordo, Mitchell, Pocahontas, Plymouth and Worth and other counties did considerable general damage, but as usual the damage to crops was relatively small except from excessive rains.

Corn planting is practically completed except in the wet localities in the north and in some southern localities where the soil is too dry and baked and where cut worms and white grubs have made replanting necessary. In Floyd county probably 1,000 acres of corn will have to be replanted as a result of erosion and flooding and considerable of the same trouble is reported from other northern counties. Cultivation is progressing rapidly in most sections of the State, but in many fields the weeds have made a wonderful start due to the excellent growing weather. The stand of corn for the State as a whole is better than usual.

Abnormal heat and abundant moisture caused rank growth of oats in the north half of State. Winter wheat was forced rapidly into heading and in the drier southern counties where the acreage is greatest, the yield has probably been reduced by the accompanying dry weather. Rye is mostly in full head and is being cut for hay in some localities.

Clover is coming into bloom rapidly. All hay crops are being shortened by the unusual heat and drouth in the south half of the State.

Gales blew considerable fruit from the trees, though to some extent this is probably an unusually large and early "June drop," due to the spring freezes. Canker worms are unusually bad especially in unsprayed orchards. Cherries are generally a failure.

The weather has been too hot for setting out commercial cabbage and tomato plants and much replanting will be necessary. The acreage of sweet corn will be greatly reduced and only a few of the canning factories are expected to run this season.

Bulletin No. 9, June 7, 1921—

Rains occurred in all portions of the State, May 31 to June 2. In Cass, Adair and Union counties and in adjacent territory in other counties the rains were excessive but the thirsty soil absorbed most of them and not much damage resulted. The drouth that began May 10 in the southern part of the State was relieved. Streams overflowed in several northeast counties last week, the soil continues saturated and soggy and the outlook is discouraging. Sunshine for the week was about normal. Temperatures ranged from nearly 90 at the beginning of the week to low in the 40's on the morning of June 5. Sunshine averaged about normal.

Corn has made excellent progress. On June 1, reports from more than 800 correspondents show the average condition to be 99.5 per cent which is the highest June 1 condition since 1914 when it was 101 per cent. The same

correspondents show that on May 15, 58 per cent of the crop had been planted and on June 1, 97 per cent. Some planting remains to be done in the northeast district where the soil has been too wet. Weeds are getting a good start where rains prevented cultivation, but fields are generally clean, the bulk of the crop has been cultivated once and about one-fourth has been cultivated the second time.

Small grains profited from the moist, cool weather, though oats continue considerably below normal in the south, where all small grain is heading on short straw. Oats and wheat are stooling nicely in the north. Rye is ripening in the south third of the State. Barley is beginning to head in the central and southern districts.

First crop alfalfa is being cut in the central and southern districts and cutting will begin to the north line of the State this week. In the southern district the yield is less than the first cutting last year. All hay will yield below normal in the south half of the State but a good crop is indicated in the northern counties.

Potatoes and other cool weather crops have made good progress. A good crop of early potatoes seems assured. The condition of the crop for the State as a whole on June 1 was 96 per cent which is one per cent below the 10-year average. Cabbage planting is in progress but the acreage will be less than last year. Strawberries are ripening throughout the State and a fair crop is being harvested.

The Secretary of the State Horticultural Society reports the condition of fruit on June 1, in per cent of a full crop, as follows: "Summer apples, 35; fall apples, 33; winter apples, 36; Americana plums, 12; cherries, 11; pears, 3; strawberries, 67; grapes, 71; black raspberries, 72; red raspberries, 66; blackberries, 83; gooseberries, 28; currants, 27; peaches, 15; Domestica or European plums, (few grown) 3; Japanese plums, (few grown) 2. The average of all fruits for the State is 39 per cent as compared with 76 per cent last year.

"The canker worm has been unusually bad in many places in southern Iowa. It is now too late to spray for this insect pest. The first and second sprays, namely the pink bud and calyx sprays are the most important for its control."

Bulletin No. 10, June 14, 1921—

Abnormally warm weather with an abundance of moisture and sunshine rushed the development of all crops. Temperatures were of the mid-summer type, being high in the 90's in the afternoons toward the close of the week. More rain is needed, however, in Henry county and adjacent territory.

Corn made excellent growth. The second cultivation is nearing completion, except in the northeast district where the soil continued too wet. Fields are generally clean. The plants average 9 inches high in the north and the earliest is above "knee high" in many portions of the State. This unusually fine development of the crop at this time of the year should not raise hopes too high for a bumper crop. Past records show that a high percentage condition July 1 is often followed by a poor yield. The abnormally rapid growth early in the season seems to unfit the corn to withstand drought and other vicissitudes which are almost sure to intervene before maturity.

Small grains have improved in appearance generally in the southern districts where oats in particular have not been very promising. Many fields of oats in these districts continue to look poor and probably can never fully recover from the freezes and drouth. Early oats are fully headed except in the northern counties and late oats are beginning to head. Winter wheat looks good everywhere but has been extensively attacked by red rust on the blades. This will reduce the yield somewhat though not seriously. No black stem rust has been reported. The crop is well headed generally and turning in the extreme southeast where cutting will begin soon. During the next ten days small grains will need cooler weather for best development and filling, otherwise a premature harvest is indicated.

A heavy crop of alfalfa has been harvested in most sections of the State, but considerable damage resulted from heavy and frequent rains while the crop was being cured. The second growth following cutting is excellent. Some medium red clover has been cut. Aside from this the hay crop will be short except in the northern counties.

Potatoes have apparently withstood the hot weather and are looking well, though leaf hoppers and beetles are causing considerable damage where not treated. New potatoes are being used in some southern counties. About half of the commercial cabbage crop has been set out, but the hot, sunny weather has been unfavorable for this work. A decided decrease in the commercial crop of sweet corn is indicated.

About the only fruit crops that promise well in Iowa this year are blackberries and raspberries.

Bulletin No. 11, June 21, 1921—

Hot weather continued the past week with afternoon temperatures generally in the 90's and abnormally warm nights. Men and horses suffered greatly from the heat and field work was thus somewhat delayed. Some horses died from overheating. Rains were generally ample and in the Raccoon and Des Moines Valleys they were heavy. In portions of Wright, Hardin, Benton, Madison, Wayne and Taylor counties more rain is needed. Generous rains in the southeastern counties have effectually broken the drouth.

Corn has made wonderful growth. Not in many years has the crop been so far advanced on this date. The largest, in the central and southern districts is too tall to cultivate and some has been "laid by" with only two cultivations. In general the third cultivation is in progress and in some cases the fourth. If warm, moist weather continues, the bulk of the crop will be "laid by" at the close of June. As pointed out last week, this is not necessarily an indication of a bumper crop. Much depends upon the weather at the critical silking and tasseling period which from indications will come earlier than usual and much earlier than last year.

Winter wheat looks well and is turning color rapidly over the southern half of the State. Cutting has begun in the extreme southeast and will begin toward the close of the current week as far north as Warren county. Though the appearance of the crop is good, experience has shown that high temperatures such as have prevailed during the past three weeks are unfavorable for filling. There are numerous reports of red rust which ordinarily is not serious and a few reports of smut which is more serious. Riding past the fields the smell of smut is noticeable.

Oats have continued to improve in the backward southern districts. Heading is general. Prospects are for a fair crop if the hot weather does not continue too long. There are complaints of heading on short straw, but these are about balanced by reports of rankness and lodging so it is believed that the general condition is about normal.

Rye is in shock in the southern counties. Spring wheat is heading but is seriously affected by red rust and smut in some sections. Barley prospects are fair.

Potatoes have gone largely to top under the influence of the long continued hot weather. However, moisture has been abundant in most sections and a good crop of early potatoes would set on rapidly with ten days of cool weather. New potatoes of good size and quality are being used in scattered localities in the southern third of the State.

Haying is coming on early and will receive proper attention due to the fact that corn cultivation will be out of the way. The hot weather has been decidedly detrimental to the yield of hay. Considerable medium red clover

has been cut. In some sections it is found to contain considerable seed but little effort is being made to save the seed.

Bulletin No. 12, June 28, 1921—

For the third consecutive week temperatures were above normal though not so high this week as last week. A tropical storm first observed in the Carribean Sea on June 16, struck the Texas coast on the 22d, turned northward and caused showers in southern Iowa by the night of the 23d and showers continued over much of the State over Sunday and Monday. The rains were heaviest over the southern and eastern districts.

Corn plowing, harvesting and haying were greatly delayed in the rainy districts. In most fields the corn is so tall that cultivation cannot be resumed and in some the soil is too wet and soft. For the State as a whole, at least 75 per cent of the corn has been "laid by" with the fields fairly clean of weeds. The color of the corn is a deep rich green. The tallest fields are considerably above the tops of the fence posts. There are a few reports of tasseling.

Winter wheat is ready to cut in practically all sections of the State. Cutting has begun as far north as Woodbury County and half of the crop is in shock in some of the drier localities. Harvesting will proceed rapidly if the weather permits. The fields look good but there are some reports that the heads are not well filled and this is to be expected from the high temperatures that prevailed through the critical blooming and filling period. Spring wheat is badly affected by red rust and scab and only a moderate crop is indicated. It has not begun to change color yet. Oats look fairly well but the hot weather has not been favorable for the best filling. Some early fields have been cut in the extreme south but in general the crop is green yet.

Much clover hay was spoiled in the making, over the rainy south and east portions of the State and the yield in the south was rather small. Timothy promises better. Second crop alfalfa is coming along nicely.

Potatoes, garden truck, raspberries and blackberries were benefited by the rains. An abundance of raspberries of excellent quality is on the market about ten days earlier than usual.

The flow of honey in June has been good and where the colonies of bees have been strong enough considerable honey has been secured. Past records show that a good honey flow in June is indicative of a good flow in July.

Bulletin No. 13, July 5, 1921—

The past week was the hottest of a series of hot weeks. Temperatures high in the 90's occurred on several afternoons. The highest reported was 100 at Clarinda on July 1. Many horses died from overheating in the harvest fields and men suffered greatly. Rains have been generally ample, except in some west central counties. Severe local hail, wind and rain storms occurred in the vicinities of Glenwood, Le Mars, Madrid, Oskaloosa and Pocahontas. Crops were seriously damaged in four townships in Pocahontas county on June 28 and Mahaska county on the afternoon of July 4.

Corn continued to advance rapidly. It is now practically all laid by; tasseling is general in the central and south and beginning in the northern tier of counties, ears are beginning to shoot and silk will soon appear. Hot, dry weather has caused corn to curl in the heat of the day in the west central counties.

Winter wheat harvest is nearly completed in the principal producing districts, though showery weather has been rather unfavorable. Thrashing has begun in the extreme south. The quality is reported good but the yield is below the average. Early oats harvest is well under way in the southern districts and beginning in central. Hot weather and rust have materially reduced the yield. Barley is being harvested. Spring wheat harvest is

beginning in the south and west central counties and the crop is turning color in the northern tier of counties. Hot weather and diseases have seriously affected spring wheat.

Commercial tomatoes are considerably ahead of normal, filled with blossoms and fruit is setting. Some commercial cabbage was set out the past week, though the hot weather has been unfavorable for that crop. Blackberries are beginning to ripen a good crop and will probably be the best fruit crop in Iowa this year. The drouth in the west central counties is cutting down the flow of honey.

The Secretary of the State Horticultural Society reports the condition of fruit on July 1, as follows, 100 per cent being a full crop: "Summer apples, 24; fall apples, 25; winter apples, 18; Americana plums, 11; cherries (final crop), 5; pears, 4; strawberries (final crop), 45; grapes, 78; black raspberries, 68; red raspberries, 71; blackberries, 78; gooseberries (final crop), 31; currants (final crop), 32; peaches, 23; Domestica or European plums, 12; Japanese plums, 5.

"The June drop has been unusually bad this year on account of the late spring freezes. Out of above one hundred who reported on this question, 86 reported a heavy drop, 24 a normal drop and 16 a light drop. Apple scab is reported as more serious than normal in the northern portion of the State, while in the southern portions of the State, scab, except for a few localities, is reported not serious. Codling moth, worms and other insects, with the exception of Curculio, appear to be no more numerous than ordinarily. However, in orchards which are not sprayed well, a larger percentage of fruit is apt to be infected because of the small amount of fruit."

Bulletin No. 14, July 12, 1921—

Another intensely hot week has been added to an already hot season. Afternoon temperatures of 100 or higher were reported on the 10th and 11th at a number of stations in the central and northeast portions of the State. Many horses died from overheating in the harvest fields and men suffered greatly.

Corn advanced rapidly. About one-half of the crop is tasseled; shooting of ears is well begun and silking is reported in a few localities. The crop is approaching the critical period. A general rain is needed during the next week to insure pollination. Curling of leaves due to intense heat was reported from a number of localities.

Wheat, barley and early oats are all harvested. Considerable thrashing of winter wheat has been done. The quality is reported as good and the yield fair. Other small grains are disappointing. Considerable oats have been prematurely ripened by the heat and have fallen down due to a peculiar weakness of the straw. In some localities small grains will not pay for the twine and thrashing. The price of oats to the farmer is only 15 to 18 cents per bushel. Late oats harvest is well begun. Thrashing crews will nearly all be at work in a few days which is unusually early.

Haying is far advanced. The yield is none too good and the quality is not of the best due to rapid and premature ripening. Second crop alfalfa is being cut; yield light but quality good.

Potatoes have been greatly injured by the heat and to some extent by drouth. The early crop is yielding light and the late crop must have rain and cooler weather soon. Commercial cabbage has suffered greatly from the continued heat. Tomatoes are still doing well but will soon need rain. The heat and abundant sunshine have been favorable to the honey flow. Pastures are still very good for the time of year, due mostly to the fact that they are understocked, but they are beginning to need rain.

Bulletin No. 15, July 19, 1921—

Another hot week with afternoon temperatures generally above 90 and in the southeastern portion of the State around 100 at the beginning of the week, has added to the accumulated excess of temperature. In the last six

weeks temperatures have averaged 7 degrees above normal and scarcely a day in that time has been below normal. Generous rains in the western third of the State this week have lessened the effects of the extreme heat. In the central portion showers were general but insufficient; and in the southeastern district they were very light and scattered.

Corn in general has made good progress, silking is far advanced in all sections; the earliest fields are in the milk stage and a few roasting ears are reported. The crop is badly needing rain over the southeastern district where some curling and firing has occurred on thin uplands. A good soaking rain would be of great benefit in all sections at this time. In general the crop is at least two weeks ahead of last year on this date.

The weather has been too hot for rapid progress in thrashing. That which has been done indicates that the yield of winter wheat is up to the average and somewhat better than expected; quality good; price $1.00 to $1.05 and, all in all, will probably be the best paying crop of the Iowa farms this year.

Oats are very disappointing; both yield and quality light; and price far below the cost of production. In many localities there are fields that will not pay for the cost of harvesting and thrashing. These will be fed to live stock on the farms. Some will be plowed under as it is not worth cutting. The yields so far reported run from 16 to 35 bushels per acre, testing as low as 20 pounds per bushel. Unfortunately the acreage in oats is one of the largest in the history of the State. The condition of clover and timothy seeded with oats is very good in most sections due to the rather thin stand of oats. Thrashing reports of spring wheat are also disappointing.

Timothy seed harvest made good progress during the past week. The yield over most of the State is good to excellent, but in Wayne County which is the center of timothy seed production in the United States, the crop is reported as light.

Potatoes have suffered further injury by heat and drouth. The early crop was much diminished and the late crop will be a failure if hot weather continues. Pastures, onions, cabbage and garden truck generally deteriorated the past week.

Bulletin No. 16, July 26, 1921—

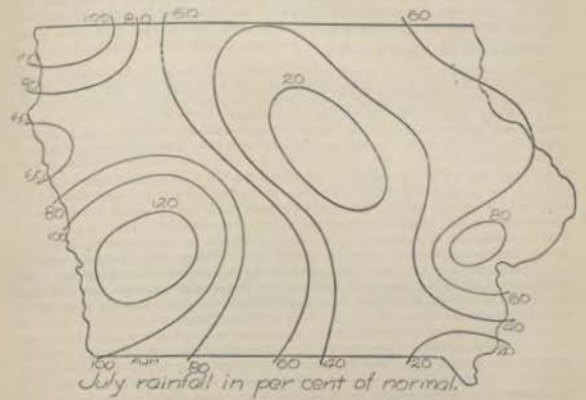
Though good rains occurred over most of the State on Monday, July 18, effective amounts since then have been confined to a few northeastern counties and from Polk southwest to Cass county. For the State as a whole the average rainfall for the week ending this morning is one-fourth of the normal and far under the amount required for best development of corn most of which has just passed the critical pollination stage. Fortunately, temperatures averaged about 3 degrees lower this week than last week, though still slightly above normal and around the 90 mark in the afternoons toward the close of the week.

While to the casual observer riding through the country, corn generally presents an appearance unequaled in many years at this season, it is really on the verge of severe injury from drouth due to a general deficiency of soil moisture. A few more days without rain and with temperatures of 100 or higher would reduce corn to a calamitous condition. A "bumper crop" is far from "assured." It may be said, however, that conditions in Kansas are not such as usually precede a "hot wind" in Iowa. Considerable curling and firing is reported from many localities. Many things might happen between now and the time of maturity. If the usual compensation for the abnormally high temperatures of the past ten months in this State should come in the next 45 days, the only thing that would be "assured" would be that half or more of the crop would be soft, unmerchantable and almost valueless.

Thrashing returns on oats continue very unsatisfactory. The average yield so far reported is about 24 bushels which is the lowest in 15 years and the average test is only about 24 pounds per bushel. Spring wheat is almost a failure. Winter wheat averages so far about 19 bushels per acre or about one bushel below the average of the last ten years; quality good, testing about 60 pounds to the bushel. Thrashing in general is 60 to 75 per cent completed which is unusual for this time of year.

Late potatoes, commercial onions and cabbage promise a poor crop generally. Pastures are failing rapidly.

A good, general, soaking rain is badly needed for all crops.



Bulletin No. 17, August 2, 1921—

Light, scattered showers occurred through the week, but not until Monday, August 1, was the rain in the drouth-stricken area of the State sufficient to bring relief. The weather turned appreciably cooler on July 30-31.

Further damage to corn has been arrested by these changed weather conditions. The exact amount of the damage can not now be estimated, for it is difficult to say how much the crop can recover if future weather is favorable. The yield has almost certainly been reduced below the ten-year average which is 38 bushels per acre, though a much larger yield was indicated a month ago. For the State as a whole, moisture has been deficient ever since the corn was planted, amounting to only 76 per cent of the normal from May 1 to July 31. However, in a number of counties in the southern part of the west central district, in the northern part of the southwest district, and, in the extreme northwest counties, the rainfall has been above normal in that period and also in the critical July period. The area most seriously affected includes all of the north central district and extends southeast to the limits of the State. Bordering this area over several counties extending to Woodbury on the west and the Mississippi River on the east, many localities have suffered. In Wright, Franklin, Hardin, Grundy, Marshall and Tama counties and portions of adjacent counties the July rainfall has been less than 20 per cent of the normal and at Marshalltown the least in the 28 years of record. For the State as a whole the July rainfall was only 59 per cent of the normal. Firing and curling have been noticeable over much of the State to the casual observer. Closer inspection shows that many ears show dry weather tips and that the luxuriant growth of stalks has been at the expense of ears, many stalks being barren.

Thrashing made good progress except where delayed by rains. It is probable that nearly 90 per cent of the shock thrashing is done and there has been less stacking than usual. Grain has moved freely to market, much of it direct from the thrashing machines. Elevators are filled to capacity and the excess of cars for shipment has been largely absorbed. Nothing new or encouraging can be said of late thrashing returns. Much oats will not be thrashed.

Potatoes, truck and pastures have suffered seriously from the heat and drouth. The rain and cooler weather will greatly benefit them but most of the potatoes are damaged beyond recovery, the tops having died.

Bulletin No. 18, August 9, 1921—

Rains on August 1-2 measured from nearly one inch in the extreme western counties to about five inches in some extreme eastern counties and the drouth was effectually broken. Scattered showers also occurred on the 5th. The weekly mean temperature, 69, is 5 degrees below normal. This is the first week with temperatures below normal since the week ending June 7. The nights were cool. In the northwest counties temperatures in the 40's were reported.

Though too cool for the best development of corn under usual circumstances, it is probable that following the long period of heat and drouth over much of the State, the cool weather was more advantageous than otherwise, for it, together with the copious rains, gave corn a chance to rally and fill out the stunted ears. It is probably too late for the unusually large number of barren stalks to shoot ears. There will be many nubbins and ears with unfilled tips. The crop is far advanced for the season. Reports collected from the main fields of 83 farmers at random and well distributed over the State show that the average date of planting these fields was May 12, the average date when silking began was July 8, and the average date when 75 per cent of this corn was silked was July 16th, a total of 65 days from planting to 75 per cent silked. Much of the corn is now in the dough stage and the earliest is beginning to dent. Some correspondents state that with normal weather corn will be safe from frost early in September. This cannot be, however, if the next three weeks are as cool as the past week. Compensation for the abnormally high temperatures of the 11 months ending with July would seem most probable.

The heavy rains of the 1st-2nd and high winds of the 5th prostrated many corn fields in the southeast one-fourth of the State. These storms were quite destructive in portions of Jasper, Poweshiek, Appanoose, Wayne and Van Buren counties.

Thrashing was brought to a halt by the heavy rains. Much grain standing in shocks started to sprout and a good many shocks and stacks were scattered by local windstorms. Reports on oats continue discouraging. Final reports will probably show the oats crop to be one of the poorest in yield and quality in the history of the State. As low as 16 cents per bushel is being paid for oats, which is the lowest since 1897.

The soil soaking rains made conditions very favorable for plowing and a good beginning was made. With this good start and the satisfactory yield and price of winter wheat as compared with oats, several correspondents are reporting prospects of an increase in the acreage to be seeded to winter wheat.

Pastures, truck, melons and such late potatoes as survived the heat and drouth, showed great improvement this week. Inspection of sweet corn fields shows that the yield will be considerably below expectations. Canning will begin soon, but the acreage will be only a small fraction of the usual.

The Secretary of the State Horticultural Society reports the condition of fruit August 1st in per cent of a full crop as follows: "Summer apples(final crop), 22; fall apples, 21; winter apples, 15; Americana plums, 9; pears, 5; grapes, 73; black raspberries, 57; red raspberries, 54; blackberries, 64; peaches, 19; Domestica or European plums (few grown), 6; Japanese plums (few grown), ½ per cent. Apple scab did not show much increase during July. Considerable injury has been done by the curculio. Codling moth worms on account of the short apple crop are doing a lot of damage to the scattering apples, especially where spraying was not done very thoroughly."

Bulletin No. 19, August 16, 1921—

Rain occurred in nearly all portions of the State this week but was light in some localities and heavy in others. Temperatures averaged 72 degrees, or one degree below normal. High winds accompanying the rains in some places blew the corn down. Further reports of damage to corn by hail and wind on August 5 have been received from the southeast one-fourth of the State.

Corn made rather slow progress, due to the cool weather. Considerable of the crop is still in the milk stage, but at least half has reached the hard dough stage. Further reports of careful examinations in the fields of the area that was stricken by drouth, confirm the earlier adverse reports. Many ears that at first glance appear large are found to be short, the apparent length and size resulting from unusual development of husks. Unfilled dry-weather tips and barren stalks are all too frequent. On the other hand the crop is remarkably good in some of the west-central and southwest counties, which will be the corn producing center of the United States this year.

Further delay to thrashing has been caused by the frequent rains. Grain in shocks, amounting to about 5 per cent of the crop, is sprouting and rotting. In the drier localities thrashing is reported finished except for a few jobs of stack thrashing. Fall plowing has made unusual progress as a result of the rains which have put the soil in good condition. Conditions for seeding and germination of alfalfa have been very favorable and from the numerous reports received it is believed there has been a considerable increase in the acreage. Spring seeded clover and grasses, where the stand was not injured by spring freezes, have made good progress. Second crop clover for hay and for seed has done well where not injured by drouth. Third crop alfalfa cutting is in progress.

Cabbage and such potatoes as have survived, have been greatly benefited by the cool, moist weather. The prospect for cabbage is much better than seemed possible a few weeks ago. Not more than half of a normal crop of potatoes is now possible. The honey flow was greatly cut in the drouth area, and the prospect for a satisfactory fall flow is not good.

Bulletin No. 20, August 23, 1921—

Temperatures of the week averaged 1 degree below normal but ranged from as low as 45 at some stations in the northern part of the State to above 90 over most of the State on the afternoon of the 19th. In the southwestern part the temperatures were near or above 100 on that date and the highest of the season. Heavy rains occurred over most of the State, particularly in the upper Raccoon River Valley. The average rainfall for the State was 1.4 inches, or 0.6 inch above normal. Sunshine averaged 72 per cent, or 2 per cent above normal.

Corn made good progress and shows considerable recovery where injured by previous drouth and heat, yet a "bumper crop" is clearly impossible. In the earliest fields many ears are well dented and with favorable weather will be practically safe from frost by September 1, but the bulk of the crop will probably need normal weather till the 10th of September. The maturity and size of ears in the same field even in the same hill are unusually variable, ranging from the milk stage to dry and opening husks, and from nubbins to large, well formed ears. Corn cutting for silage and fodder has begun in a number of localities and will become general in about a week.

Fall plowing is unusually far advanced over most of the State due to the generous rains but in the east-central district scarcely a beginning has been

made. Preparation for winter wheat seeding has been extensive and the acreage in some localities will be doubled over that seeded last fall. Seeding has already begun in Adair County.

Second crop clover harvest is in progress and the yield is good where not injured by the drouth. A slight increase in the acreage hulled for seed is indicated and the heads are generally well filled. Third crop alfalfa harvest continues though the weather has been generally unfavorable for curing.

Melons and truck crops made good progress during the week, but potatoes are mostly dead and recovery of those not dead is improbable. The honey flow is reported good in the western part of the State, but fair to poor elsewhere. Onions are mostly harvested; yield fair to good and quality good.

Bulletin No. 21, August 30, 1921—

Hot and almost rainless weather with abundant sunshine prevailed. The temperature averaged 78 degrees, or 8 degrees above normal, with 90 degrees or higher on some afternoons.

Corn advanced rapidly toward maturity. Nearly half of the crop is well dented; many ears show drying husks and probably 15 to 20 per cent of the crop would not be injured for commercial purposes by a moderate frost now. The bulk of the crop will need dry, warm weather through the first week of September. If such weather continues till September 15 there will be very little soft corn. Silo filling and fodder cutting are well under way. The crop is nearly a month ahead of last year. Considerable corn was blown down by local windstorms on August 22. In some places this will prevent or greatly interfere with silo filling and fodder cutting. In these places ears are reported rotting on the ground and "hogging down" is already beginning.

Plowing has made unusual advancement. The intended acreage has already been finished in several localities. Winter wheat seeding has been rather extensive in the Big Sioux and Missouri Valleys. There is some complaint, however, that the soil is too dry. Reports of increased acreage of winter wheat continue to come in.

Canning of corn and tomatoes is going forward rapidly. The yield and quality of sweet corn is fair but the acreage is greatly reduced.

Many conflicting reports have been received as to acreage of clover and timothy for seed. It now seems that the total production of each will be about the same as last year. Considerable hulling of both first and second crop clover has been done and the yields reported have been about the average.

Pastures and truck crops are beginning to need rain. Potatoes are a poor crop generally and there will be a large demand in Iowa for potatoes to be shipped in. Cabbage is being marketed; price fair and quality not very good.

Bulletin No. 22, September 6, 1921—

Abnormally hot weather prevailed with afternoon temperatures in the 90's. A decided change to cooler spread over the State the night of the 4th. Heavy rains occurred over much of the northern two-thirds of the State but in the southern third showers were mostly light.

Corn was rushed toward maturity by the heat, strong breezes and ample sunshine. More than half of the crop is safe from a moderate frost and considerable would not be injured by a freeze. Seed corn selection is a pleasure and much has been done. Nothing but neglect can prevent the saving of an ample supply of excellent seed. This would be a good year to provide a double supply for emergencies. Silo filling and fodder cutting are progressing rapidly and in some places nearing completion. Considerable of the corn is so badly lodged and tangled that cutting is almost impossible.

In localities where this condition is worst and where the hay crop is large, the acreage cut for fodder and silos will be considerably reduced. The general outlook for corn production at the close of August was considerably better than seemed possible at the close of July, yet a record crop is not indicated. There is some complaint that late corn has been matured too rapidly for best results.

Preparations for winter wheat seeding have been delayed by the soil becoming too dry in a good many counties in the southern third of the State where the acreage is usually the largest. There is yet plenty of time, for best results usually follow from seeding about September 15. Considerable seeding has already been done. The favorable soil conditions and price will probably cause an increased acreage of rye.

Recent rains have improved pastures and revived such late potatoes as were not dead. Sugar beets have taken on a new growth which will be desirable if not prolonged till too late in the season. Commercial tomatoes are yielding well and the quality is generally good. Watermelons and muskmelons have yielded abundantly, except where attacked by a peculiar disease which in some cases swept over large fields in a single day. A fair crop of grapes has nearly all been harvested about three weeks earlier than usual.

Bulletin No. 23, September 13, 1921—

Temperatures averaged 68 degrees or about 2 degrees above normal. On the 8th afternoon temperatures were about 90 in the southern part of the State, but by the morning of the 11th temperatures of 40 degrees were reported from Lyon county. Rains were copious to excessive over most of the State but rather light in the far northwest and northeast counties. High winds on the 4th and during the night of the 9th-10th blew down considerable corn.

Corn made satisfactory progress toward maturity. At least 70 per cent of the crop would not now be injured by frost. Reports from hundreds of correspondents reporting to this office and the U. S. Bureau of Markets and Crop Estimates under date of September 1, show that with normal weather 83 per cent of the crop will be safe from frost on September 20 and 93 per cent on September 30. These are the largest per cents so reported since 1914. The wet weather has delayed silo filling and fodder cutting but in some localities this work has been finished and in others the corn has been beaten down by wind and rain so that cutting is impossible and the ears are rotting on the ground. Hogs have been turned in to save the crop. Reports from township correspondents September 1 indicate an average yield of 41.6 bushels per acre.

Thrashing was 94 per cent completed on September 1, which is the largest per cent of record. The average yields so far reported are oats, 26.8; spring wheat, 12.3; winter wheat, 18.8; barley, 24.1; and rye, 15.5. It is believed that final reports on oats and barley will show slightly smaller yields.

Pastures have been greatly improved by the rains. Sugar beets have begun new growth which is all very well if not prolonged till too late by continued rains. Very late potatoes which survived are improving. Sorghum cane cutting and molasses making has begun. Clover seed hulling has been delayed by the rains; also seeding of fall wheat. Fall plowing is farther advanced than usual. The honey flow has been very good in the west central counties where as much as 250 pounds of surplus per colony of bees has been received in some apiaries, but this is far above the average for the State. In the counties affected by the July drouth, there has been very little surplus honey.

Bulletin No. 24, September 20, 1921—

Among wet September weeks, the past week was the wettest for several years over most of the state. It is also the wettest this season. Temperatures were generally above normal, but a considerable change to cooler came

Saturday night, the 17th, and light frosts, sufficient to kill melon vines and other tender vegetation, were reported in Boone and Pocahontas counties on Sunday morning.

Frequent, copious to excessive rains accompanied by strong winds beat down still more of the corn. On lowlands, fields were flooded and shocks of fodder stood in the water. In some cases corn cut and lying on the ground in bundles was caught by the rains and has been ruined by flooding and mud. Ears near or touching the ground have molded, rotted and started to germinate. Aside from this, corn is far along toward maturity. Some localities report all safe from frost, the husks open and the stalks and leaves too dry for fodder or silage. Husking or snapping for feeding has begun and the yields so far have not been up to expectations.

Though a little winter wheat and rye seeding was done the past week, fields have been generally too wet. The earliest seeded wheat is three to four inches high and the fields are green. Reports of an intended increase in acreage continue to come in, but unless the weather becomes drier in the near future, some of the increase will be cut down or the seeding will be too late for best results.

Pastures, very late potatoes and late truck crops show improvement. Late cutting of alfalfa and clover has been delayed or damaged by the rains. Clover hulling also has been delayed. Potato digging has made good progress in Mitchell county where the crop is selling for $1.00 per bushel. The retail price in southern Iowa is about $2.40 to $2.80 per bushel. Sorghum molasses making is progressing well.

Bulletin No. 25, September 27, 1921—

Heavy rains continued into the early days of the past week over much of the State, and again toward the close of the week in a few localities in the eastern districts. The average for the State was 0.7 inch, or 0.1 inch above normal. Sunshine averaged 13 per cent above normal. Temperatures averaged 66 or 5 degrees above normal. On Sunday morning temperatures were around 40 degrees and there were scattered reports of light frosts on the lowlands.

Corn suffered farther deterioration from wet weather and wet soil. Practically all down corn is seriously damaged and not in many years has there been so much damage of this kind reported. In some cases ears that stand up straight have started to sprout. Practically all corn is now safe from frost. In fact, a light frost would hasten the drying of the crop. In many localities the wet weather and tangled corn have prevented silo filling till too late and the silos will stand empty. Cribbing has already begun, at an unusually early date, in several places, but the ears are so moist that they have heated badly in the cribs. Old corn has been marketed freely in the last few weeks.

Winter wheat and rye seeding which has been interrupted by frequent heavy rains during most of September was resumed during the last few days and is being pushed rapidly to completion where the soil is dry enough. A considerable increase in acreage of winter wheat over last year is still indicated. Early sown wheat has made rank growth under the influence of the recent warmth and moisture.

Potato digging is progressing rapidly, but the yields continue disappointing.

As a whole the season has been full of disappointments to the farmer. The total value of the 1921 crops will probably be little more than half that of 1920.

CROP SEASON WEATHER, 1921, BY WEEKS

Average rainfall, mean temperature and mean sunshine with departures from the normal, as derived from the records of 24 selected stations.

Week ending	Rainfall (Inches)		Temperature (Deg. Fahr.)		Sunshine	
	State average	Departure	Mean	Departure	Per cent	Departure
April 5	0.1	—0.6	54	+10	84	+25
April 12	0.6	—0.1	48	0	58	— 3
April 13	1.4	+0.6	46	— 5	45	—21
April 19	0.9	+0.2	61	+ 8	57	— 5
April 26	1.0	+0.2	49	— 7	53	— 9
May 3	0.9	—0.1	58	0	58	+ 6
May 10	0.4	—0.6	55	— 4	61	+ 2
May 17	0.6	—0.4	74	+12	75	+11
May 24	1.4	+0.3	75	+10	77	+13
May 31	1.0	—0.1	66	— 2	66	— 1
June 7	0.9	—0.2	77	+ 8	68	— 1
June 14	1.0	—0.1	79	+ 8	73	+ 8
June 21	0.8	—0.2	77	+ 5	63	— 8
June 28	0.9	—0.1	81	+ 8	81	+ 9
July 5	0.2	—0.7	80	+ 6	89	+16
July 12	0.9	0.0	80	+ 6	79	+ 5
July 19	0.2	—0.6	76	+ 1	76	+ 3
July 26	2.4	+1.5	74	0	59	—13
August 2	0.2	—0.6	69	— 4	70	— 1
August 9	0.8	0.0	72	— 1	68	— 3
August 16	1.4	+0.6	70	+ 3	72	+ 2
August 23	†	—0.7	78	+ 8	72	+ 4
August 30	1.4	+0.6	75	+ 7	68	+ 2
September 6	1.8	+0.9	68	+ 3	58	— 5
September 13	3.3	+2.5	69	+ 5	44	—21
September 20	0.7	+0.1	66	+ 5	75	+13
September 27						
For season	25.2	+2.4	68.2	+ 3.3	67.5	— 0.4

+ excess; — deficiency.
† Not more than .05 inch.

MONTHLY PERCENTAGE CONDITION OF CROPS, 1921, AND YIELD PER ACRE

Crops	April 1	May 1	June 1	July 1	Aug. 1	Sept. 1	Oct. 1	Yield per acre
Corn			99.5	102	97	92	91	43.0 bu.
Oats			90	82	63	63		26.0 bu.
Spring wheat			90	81	65	64		10.3 bu.
Winter wheat	94	95	90	88				19.2 bu.
Barley			94	89	75	79		23.5 bu.
Rye	96	97	93	92				16.1 bu.
Flax				87	75	75	83	8.7 bu.
Potatoes			96	88	50	45	48	43.0 bu.
Tame hay		93	85	85	89			1.39 tons
Wild hay		93	85	85	89			1.16 tons
Alfalfa			94	93	94			2.97 tons
Pastures		92	92	90	77	88	97	

FINAL CROP REPORT OF THE STATE, 1921.

The following estimates of acreage, yield and value of the crops of the State, derived from the reports of hundreds of correspondents well distributed in each county, are the result of the joint effort of the U. S. Bureau of Markets and Crop Estimates, of which Mr. Frank S. Pinney is Agricultural Statistician, and the Iowa Weather and Crop Service. The table showing the total value of crops does not include or take into account live stock products.

Corn.—The estimated acreage was 10,330,000; average yield, 43.0 bushels per acre; total yield, 444,190,000 bushels; average price, $0.30 per bushel; total value, $133,257,000. Only 2 per cent of the crop was reported to be soft or immature and 90 per cent had been husked on December 1. About 8 per cent was hogged down. The quality is fairly good, though there was unusual damage from down corn which molded, sprouted and rotted. That which came to the elevators during the last week in November had a moisture content of 16 per cent. The gross value per acre was $12.90, which is the lowest since 1904.

Shrinkage from storage of such corn would be very small if suitable storage were available. Unfortunately, as a result of overflowed storage, millions of bushels are exposed to weather and rats in improvised cribs or piles on the ground. Such corn would serve a better purpose as a substitute for high-priced coal than as rat food or fodder for the caprice of the elements. The cost of rat and weather-proof cribs is not warranted by the low price of corn.

Oats.—The estimated area harvested was 5,960,000 acres; average yield, 26.0 bushels; total yield, 155,077,000 bushels; average price, $0.23; total value, $35,667,710.

Spring Wheat.—Area harvested, 114,000 acres; average yield, 10.3 bushels per acre; total yield, 1,174,000 bushels; price per bushel, $0.87; total value, $1,021,380.

Winter Wheat.—Area harvested, 465,000 acres; average yield per acre, 19.2 bushels; total yield, 8,928,000 bushels; average price, $0.90 per bushel; total value, $8,035,200.

Barley.—Area harvested, 166,000 acres; average yield per acre, 23.5 bushels; total yield, 3,901,000 bushels; average price, $0.42 per bushel; total value, $1,638,420.

Rye.—Area harvested, 39,544 acres; average yield, 16.1 bushels; total yield, 636,657 bushels; price per bushel, $0.73; total value, $464,760.

Flax Seed.—Area harvested, 10,840 acres; average yield, 8.7 bushels; total yield, 94,300 bushels; total value at $1.53 per bushel, $144,279.

Timothy Seed.—Area harvested, 243,000 acres; average yield, 4.47 bushels; total yield, 1,086,000 bushels; total value at $2.31 per bushel, $2,508,660.

Clover Seed.—Area harvested, 125,000 acres; average yield, 1.6 bushels; total value at $9.72 per bushel, $1,944,000.

Potatoes.—Area harvested, 96,500 acres; average yield, 43 bushels; total yield, 4,149,500 bushels; average price, $1.40; total value, $5,809,300.

Hay, Tame, not including Alfalfa.—Average yield, 1.39 tons per acre; total yield, 4,104,000 tons; average price, $9.08 per ton; total value, $37,264,320.

Hay, Wild.—Average yield, 1.16 tons; total yield, 551,000 tons; average price, $7.47; total value, $4,115,970.

Alfalfa.—Area harvested, 187,000 acres; average yield, 2.97 tons; total yield, 555,000 tons; average price, $12.92 per ton; total value, $7,170,600.

TABULATED CROP SUMMARY, 1921.
IOWA

Crop	Acres	Average Yield	Total Yield	Average Price	Gross Value Per Acre	Total Value
Corn	10,330,000	43.0 bu.	444,190,000	$ 0.30	$12.90	$133,257,000
Oats	5,960,000	26.0 "	155,077,000	0.23	5.98	35,667,710
Spring Wheat	114,000	10.3 "	1,174,000	0.87	8.96	1,021,380
Winter Wheat	465,000	19.2 "	8,928,000	0.90	17.28	8,035,200
Barley	166,000	23.5 "	3,901,000	0.42	9.87	1,638,420
Rye	39,544	16.1 "	636,657	0.73	11.75	464,760
Flax Seed	10,840	8.7 "	94,300	1.53	13.31	144,279
Timothy Seed	243,000	4.47 "	1,086,000	2.31	10.33	2,508,660
Clover Seed	125,000	1.6 "	200,000	9.72	15.55	1,944,000
Potatoes	96,500	43.0 "	4,149,500	1.40	60.20	5,809,300
Hay, tame, excluding Alfalfa	2,961,000	1.39 tons	4,104,000	9.08	12.62	37,264,320
Hay, wild	475,000	1.16 "	551,000	7.47	8.67	4,115,970
Alfalfa	187,000	2.97 "	555,000	12.92	38.37	7,170,600
Pasture and Grazing, estimated	19,025,000			5.56		55,794,000
Ensilage, estimated	207,000	8.00 "	1,656,000	2.50	20.00	*4,140,000
Sweet Corn, commercial crop	15,000	3.1 "	46,500	7.00	21.70	325,500
Pop Corn, estimated	13,000	26.0 bu.	338,000	2.54	66.04	858,520
Buckwheat, estimated	5,000	15.0 "	75,000	0.78	11.70	58,500
Fruit Crop, estimated						4,000,000
Garden Truck, estimated						3,000,000
Miscellaneous, estimated						2,380,710

Total value not including live stock products for the year, 1921 ..... $305,450,429
1920 580,460,628
1919 960,656,002
Most recent year with crop value as low as this year, 1905 302,286,212

*Ensilage, acreage, production and value, is included in corn and therefore excluded from grand total.

Frank S. Pinney, Agricultural Statistician,
U. S. Bureau of Markets and Crop Estimates.

Charles D. Reed, Director,
Iowa Weather and Crop Service.

CROP DAMAGE.

The United States Bureau of Crop Estimates collects from its correspondents data on the various causes that reduce crop yields. Averages of all available records for the years 1909 to 1920 are given in the following table, in which 100 represents a full crop.

CAUSES AND EXTENT OF ANNUAL CROP LOSSES IN IOWA

Crop	Deficient moisture	Excessive moisture	Floods	Frosts or freeze	Hail	Hot winds	Storms	Winterkill	Not specified	Total weather	Plant diseases	Insect pests	Animal pests	Defective seed	Other and unknown	Total loss
Corn	8.8	4.2	0.5	4.1	0.2	1.8	0.5	0.6	0.2	20.5	0.1	1.7	0.1	1.0	0.2	23.8
Oats	5.8	2.4	0.2	0.2	0.5	1.5	0.4	0.6	0.2	12.7	1.7	0.4	†	0.1	0.5	15.9
Wheat	4.5	2.9	0.2	0.2	0.2	1.8	0.2	4.9	0.3	14.9	4.8	0.7	†	0.1	0.6	21.1
Barley	5.2	2.2	0.2	0.2	0.2	1.5	0.2	0.6	0.2	11.2	1.6	0.2	†	0.1	0.8	13.9
Flax	7.0	2.4	0.7	0.4	0.4	1.5	0.2	0.0	0.4	12.7	1.7	0.7	†	0.1	1.6	16.8
Potatoes	22.7	3.6	0.2	0.2	0.1	1.1	†	0.0	0.4	28.7	4.6	2.5	†	0.1	1.2	37.5
Hay	14.2	1.4	0.2	0.2	0.1	0.6	0.1	2.0	†	19.0	0.1	0.4	†	†	0.3	19.9
Apples	8.2	1.2	0.1	9.4	1.0	1.4	1.4	3.4	1.2	27.4	5.8	4.4	0.1	†	12.7	50.4
Berry fruits	11.9	1.2	0.1	2.0	0.4	1.2	0.2	2.7	1.9	21.8	1.4	0.7	0.2	†	2.9	26.8

† Not more than .05.

IOWA CROPS, 1921, ESTIMATED NUMBER OF ACRES BY COUNTIES

Counties	Corn	Oats	Spring Wheat	Winter Wheat	Barley	Rye	Flax	Potatoes	Tame Hay	Wild Hay	Alfalfa	Pastures
Adair	117,000	50,000	610	4,000	6,000	60		920	26,500	2,400	310	117,800
Adams	73,000	29,000	140	5,600	1,900	110		460	23,900	1,720	680	92,700
Allamakee	44,000	43,000	2,050	1,240	3,750	430	20	1,150	51,800	1,400	20	182,100
Appanoose	53,000	21,000	190	6,000	60	640		190	31,000	1,060	100	140,400
Audubon	90,000	53,000	1,700	1,050	7,400	40		805	26,500	1,250	1,900	74,500
Benton	143,000	97,000	400	680	4,210	950		1,070	45,500	2,100	120	118,800
Black Hawk	102,000	65,000	360	370	2,050	2,050		1,116	30,000	7,200	550	90,800
Boone	130,000	84,000	250	700	540	50		568	19,000	5,400	900	80,500
Bremer	70,000	57,000	190	80	640	470	15	1,587	18,700	18,800	80	70,700
Buchanan	102,000	71,000	120	60	1,100	690		1,035	33,600	10,800	100	109,500
Buena Vista	142,000	89,000	100	20	70	70	70	1,035	21,700	6,600	940	67,700
Butler	100,000	86,000	210	10	530	770	20	1,380	25,500	11,700	50	93,400
Calhoun	140,000	109,000	20	60	130	50	40	678	18,000	2,600	500	82,600
Carroll	139,000	78,000	2,330	700	1,200	90	50	1,610	29,000	7,300	550	80,300
Cass	122,000	45,000	920	15,000	7,200	400		667	28,000	900	1,000	99,700
Cedar	106,000	42,000	570	2,700	7,400	420		770	49,200	120	80	109,800
Cerro Gordo	103,000	80,000	240	50	1,110	70	300	1,311	27,500	11,100	80	76,700
Cherokee	132,000	85,000	30		600	5	10	954	22,000	7,400	2,850	78,500
Chickasaw	61,000	55,000	880	120	620	160	250	1,000	26,500	15,500	10	86,500
Clarke	63,000	22,000	10	5,800	90	110		92	27,000	190	30	115,000
Clay	110,000	87,000	120	60	530	20	250	552	23,000	11,200	500	75,100
Clayton	75,000	72,000	1,380	1,630	4,000	310		2,242	65,000	1,200	70	193,200
Clinton	124,000	51,000	4,550	3,700	4,500	1,720		632	54,000	1,750	200	142,300
Crawford	141,000	73,000	7,520	1,800	2,800	120		1,725	45,400	4,700	7,900	129,500
Dallas	133,000	71,000	110	9,000	600	170	10	230	19,200	2,100	680	101,000
Davis	58,000	18,000	70	4,900	30	440		437	35,900	20	50	150,500
Decatur	69,000	23,000	40	9,000	10	300		172	34,000	300	140	151,500
Delaware	85,000	66,000	310	120	2,900	1,400	10	1,024	41,000	5,400	40	107,000
Des Moines	71,000	21,000	190	10,000	270	590		805	23,000	150	330	99,900
Dickinson	70,000	52,000	370	40	830	20	200	540	14,200	11,200	220	50,800
Dubuque	68,000	48,000	1,810	600	2,000	100		2,003	64,000	500	90	154,000
Emmet	78,000	63,000	20	30	430	120	190	494	17,100	6,100	130	81,200
Fayette	104,000	85,000	890	200	3,500	380	50	1,590	55,400	12,400	10	164,300
Floyd	85,000	78,000	270	50	550	440	120	1,280	35,000	4,900	80	77,800
Franklin	115,000	92,000	140	10	620	70	100	1,541	21,000	8,000	60	81,700
Fremont	140,000	15,000	140	21,000	130	340		748	11,200	4,200	9,700	73,300
Greene	143,000	86,000	80	320	270	10		460	25,000	4,200	300	72,700

Grundy	100,000	88,000	70	160	860	20	5	1,610	25,300	5,600	20	73,400
Guthrie	117,000	62,000	880	2,000	1,590	110		426	28,000	3,000	560	115,700
Hamilton	130,000	100,000	200	100	460	10	30	805	22,000	4,200	290	67,100
Hancock	109,000	92,000	550	30	700	70	300	1,012	26,000	14,800	100	83,900
Hardin	121,000	87,000	140	190	770	10	20	1,380	26,300	4,500	100	76,600
Harrison	163,000	39,000	13,180	20,000	2,240	300	10	1,024	7,400	6,300	21,370	96,200
Henry	71,000	29,000	100	3,950	140	570		483	30,560		110	100,100
Howard	56,000	84,000	760	90	1,300	140	700	920	31,000	17,000	30	84,600
Humboldt	95,000	77,000	80	130	1,090	40	50	345	17,200	4,300	300	40,800
Ida	100,000	60,000	330	90	1,250	10		892	25,000	1,800	2,000	58,800
Iowa	98,000	47,000	560	1,500	800	190		1,000	33,000	500	20	113,300
Jackson	62,000	36,000	1,630	1,800	870	650		1,092	64,000	1,200	100	190,400
Jasper	145,000	66,000	1,550	5,400	120	290		460	43,000	700	120	143,300
Jefferson	69,000	27,000	60	4,400	80	200		368	36,000		80	116,100
Johnson	100,000	49,000	370	1,950	600	800		966	45,200	950	260	127,200
Jones	78,000	43,000	420	350	2,050	650		1,150	49,000	220	40	144,000
Keokuk	108,000	41,000	990	2,200	380	360		690	39,200	100	60	123,000
Kossuth	198,000	104,000	110	80	1,650	150	1,420	1,518	36,000	28,000	250	119,000
Lee	65,000	18,000	160	15,500	190	4,400		1,035	36,000	50	460	149,200
Linn	127,000	77,000	330	450	920	1,040		1,380	54,000	2,700	100	140,800
Louisa	72,000	25,000	110	12,000	400	2,100		402	31,700	180	70	81,700
Lucas	50,000	18,000	50	7,800		150		138	27,200	40	170	116,300
Lyon	130,000	114,000	260	40	2,300	10	60	1,840	12,100	10,200	3,400	63,600
Madison	96,000	32,000	240	15,000	1,800	120		345	22,800	1,250	400	140,000
Mahaska	120,000	51,000	520	6,500	130	130		600	20,100	200	90	121,800
Marion	95,000	31,000	1,630	15,300	530	230		368	20,900	450	240	132,000
Marshall	121,000	71,000	380	1,200	390	120		690	38,800	550	90	90,500
Mills	106,000	20,000	820	16,000	470	210		656	10,500	3,300	11,700	66,400
Mitchell	71,000	72,000	380	40	820	140	750	7,820	32,000	3,300	10	71,900
Monona	131,000	37,000	11,000	20,000	1,140	60		794	8,400	12,900	17,200	101,100
Monroe	48,000	19,000	450	9,780	100	430		184	33,200	240	40	126,900
Montgomery	92,000	27,000	320	16,500	1,300	570		460	29,800	570	5,300	64,100
Muscatine	73,000	25,000	550	6,300	1,900	3,000		1,472	23,000	240	400	74,600
O'Brien	130,000	95,000	90	30	2,200	4	50	1,092	21,900	6,900	1,280	74,000
Osceola	83,000	75,000	30	30	560	25	250	805	14,200	8,100	220	46,600
Page	114,000	25,000	170	27,000	370	550		678	26,000	840	5,360	108,400
Palo Alto	110,000	97,000	40	30	530	450	770	564	16,700	17,800	250	63,900
Plymouth	202,000	106,000	16,000	1,000	3,200	190	30	1,633	21,700	17,700	15,000	112,000

IOWA CROPS, 1921, ESTIMATED NUMBER OF ACRES BY COUNTIES—Continued.

Counties	Corn	Oats	Spring Wheat	Winter Wheat	Barley	Rye	Flax	Potatoes	Tame Hay	Wild Hay	Alfalfa	Pastures
Pocahontas	132,000	113,000	90	20	250	480	50	702	19,200	7,280	200	57,600
Polk	112,000	55,000	1,510	18,000	130	870	------	1,082	22,600	2,600	690	81,600
Pottawattamie	205,000	62,000	2,940	18,400	9,000	580	------	1,865	27,300	6,360	23,000	128,900
Poweshiek	111,000	55,000	460	540	400	10	------	851	26,000	120	120	119,800
Ringgold	80,000	34,000	80	4,300	220	180	------	230	22,600	300	70	127,290
Sac	130,000	83,000	60	120	1,950	20	------	1,000	27,500	3,900	850	71,000
Scott	78,000	96,000	1,780	14,150	17,800	1,700	------	2,520	21,000	1,500	1,140	84,700
Shelby	129,000	62,000	2,600	740	6,800	180	------	1,365	21,000	3,500	5,100	90,500
Sioux	190,000	122,000	3,900	920	6,400	30	40	1,506	18,600	14,200	7,600	79,600
Story	140,000	82,000	40	480	60	180	------	230	25,800	2,000	270	64,500
Tama	125,000	82,000	1,340	740	1,650	160	------	1,365	50,600	900	70	147,800
Taylor	98,000	31,000	100	11,000	270	400	------	978	27,000	350	800	114,600
Union	69,000	28,000	70	2,500	790	220	------	345	22,300	1,050	60	104,000
Van Buren	61,000	18,000	70	6,300	30	490	------	490	25,100	30	200	135,900
Wapello	67,000	20,000	130	10,200	120	280	------	428	22,200	------	120	103,000
Warren	92,000	30,000	270	28,000	300	200	------	310	29,000	670	360	132,800
Washington	100,000	48,000	140	1,800	70	140	------	610	34,000	10	90	107,800
Wayne	84,000	33,000	20	5,000	50	220	------	91	39,000	40	70	117,500
Webster	159,000	135,000	1,120	190	450	10	60	874	24,300	850	730	86,800
Winnebago	69,000	63,000	1,400	40	1,400	40	920	920	18,700	19,300	48	54,700
Winneshiek	90,000	76,000	3,790	520	8,000	380	680	1,311	53,600	5,200	20	152,900
Woodbury	190,000	73,000	5,340	8,400	1,400	70	------	1,438	17,400	10,000	25,000	103,300
Worth	50,000	62,000	1,420	80	700	200	2,860	1,000	21,100	15,000	30	63,500
Wright	120,000	95,000	240	40	890	50	80	920	26,500	5,700	120	62,500
State	10,230,000	5,960,000	114,000	465,000	166,000	39,544	10,840	96,500	2,961,000	475,000	187,000	10,035,000

AVERAGE AND TOTAL YIELDS OF IOWA CROPS, 1921, BY COUNTIES—PART I.

Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels
Adair	44	5,148,000	24	1,200,000	11	6,710	20	80,000	23	138,000
Adams	41	2,993,000	24	696,000	15	2,100	19	106,400	21	21,000
Allamakee	42	1,848,000	25	1,075,000	11	22,550	15	18,800	20	75,000
Appanoose	35	1,855,000	22	462,000	12	2,290	15	90,000	25	1,500
Audubon	47	4,230,000	24	1,248,000	12	20,400	25	26,250	29	214,600
Benton	45	6,435,000	27	2,619,000	13	5,300	24	19,220	27	113,670
Black Hawk	49	4,998,000	25	1,625,000	12	2,600	14	5,180	23	47,150
Boone	46	5,980,000	24	2,016,000	11	3,850	19	13,300	25	13,500
Bremer	45	3,150,000	23	1,311,000	10	1,900	18	1,440	21	13,440
Buchanan	34	3,468,000	22	1,562,000	10	1,200	14	840	29	31,900
Buena Vista	45	6,390,000	30	2,670,000	9	900	15	300	25	1,750
Butler	36	2,670,000	25	2,150,000	9	1,800	16	160	18	9,540
Calhoun	49	6,860,000	24	2,616,000	10	200	16	960	25	3,250
Carroll	47	5,640,000	23	1,794,000	9	20,970	17	11,900	23	29,900
Cass	43	5,002,000	25	1,125,000	11	10,120	20	300,000	25	180,000
Cedar	44	4,400,000	30	1,260,000	14	7,980	22	60,720	20	148,000
Cerro Gordo	37	3,811,000	23	1,840,000	10	2,400	17	850	19	21,090
Cherokee	45	5,940,000	32	2,720,000	11	330			27	16,200
Chickasaw	46	2,898,000	21	1,155,000	9	7,920	15	1,800	21	13,020
Clarke	42	2,640,000	22	506,000	16	160	18	104,400	26	2,340
Clay	39	4,290,000	22	2,784,000	12	1,440	16	990	31	16,430
Clayton	50	3,750,000	27	1,971,000	12	16,560	16	26,080	23	92,000
Clinton	45	5,580,000	26	1,226,000	11	50,050	21	77,700	18	81,000
Crawford	46	6,486,000	24	1,752,000	12	90,240	20	36,000	24	67,200
Dallas	49	6,517,000	25	1,775,000	11	1,210	25	225,000	24	14,400
Davis	39	2,262,000	23	414,000	11	770	14	68,600	35	1,050
Decatur	35	2,415,000	20	460,000	9	300	16	144,000	30	200
Delaware	45	3,825,000	24	1,584,000	12	3,720	17	2,040	19	55,100
Des Moines	45	3,266,000	25	525,000	13	2,470	21	210,000	25	6,750
Dickinson	37	2,590,000	28	1,456,000	14	5,180	10	400	21	17,430
Dubuque	35	2,380,000	28	1,344,000	9	10,290	21	12,600	18	36,000
Emmet	42	3,276,000	28	1,764,000	11	220	15	450	20	8,600
Fayette	44	4,576,000	24	2,040,000	10	890	10	3,000	22	77,000
Floyd	39	3,315,000	24	1,872,000	6	1,620	15	750	23	14,950
Franklin	42	4,830,000	23	2,116,000	8	1,120	21	210	15	9,300
Fremont	40	5,600,000	29	435,000	12	1,680	18	378,000	35	6,300
Greene	47	6,674,000	23	1,978,000	11	880	16	6,080	25	6,750
Grundy	42	4,200,000	28	2,464,000	10	700	20	3,200	23	19,320
Guthrie	42	4,914,000	25	1,550,000	11	9,680	21	42,000	27	42,930
Hamilton	45	5,850,000	24	2,400,000	11	2,200	18	1,800	22	10,120
Hancock	40	4,360,000	28	2,576,000	11	6,050	17	240	27	18,900
Hardin	45	5,445,000	25	2,175,000	10	1,400	17	3,230	35	19,250
Harrison	43	7,009,000	23	897,000	10	121,800	18	360,000	26	58,240
Henry	41	2,911,000	24	696,000	15	1,500	22	80,300	20	2,800
Howard	37	2,072,000	21	1,344,000	11	8,360	10	900	17	22,100
Humboldt	47	4,465,000	29	2,233,000	9	720	16	2,080	18	19,080
Ida	48	4,800,000	31	1,860,000	12	4,560	20	1,800	27	47,250
Iowa	46	4,508,000	26	1,222,000	12	6,720	19	27,000	26	20,800
Jackson	48	2,976,000	26	936,000	11	17,960	23	41,400	25	21,730
Jasper	45	6,525,000	25	1,650,000	12	18,000	21	112,400	20	2,600
Jefferson	41	2,829,000	28	756,000	11	660	16	70,400	22	1,700
Johnson	47	4,700,000	29	1,421,000	14	5,180	20	29,000	26	15,600
Jones	51	3,978,000	26	1,118,000	14	3,880	20	7,000	26	53,300
Keokuk	45	4,968,000	23	943,000	12	11,180	29	44,000	20	7,600
Kossuth	41	8,118,000	25	4,100,000	8	880	20	1,000	24	39,600
Lee	44	2,820,000	23	414,000	13	2,080	18	297,000	22	4,180
Linn	42	5,334,000	26	2,002,000	12	3,960	20	9,000	23	21,390
Louisa	45	3,240,000	25	625,000	12	1,320	19	228,000	24	9,600
Lucas	36	1,800,000	23	414,000	14	700	17	132,000		
Lyon	39	5,070,000	34	3,876,000	14	5,040	15	600	26	39,800
Madison	48	4,608,000	27	864,000	13	3,120	26	390,000	11	19,800
Mahaska	44	5,280,000	22	1,166,000	14	7,280	21	136,500	22	4,600
Marion	40	2,800,000	21	651,000	10	16,300	19	290,700	17	9,010
Marshall	43	5,200,000	24	1,704,000	14	5,320	24	25,800	20	7,800
Mills	40	4,240,000	24	520,000	10	8,300	18	238,000	30	14,100

AVERAGE AND TOTAL YIELDS OF IOWA CROPS, 1921, BY COUNTIES—PART I—Con.

Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels
Mitchell	38	2,698,000	28	2,016,000	15	5,700	17	680	23	18,860
Monona	40	5,360,000	33	851,000	8	88,000	16	480,000	26	37,200
Monroe	43	2,064,000	22	418,000	10	4,500	20	195,000	23	2,990
Montgomery	38	3,496,000	23	621,000	19	2,800	19	313,500	23	29,900
Muscatine	42	3,150,000	32	832,000	12	7,150	21	132,300	23	45,885
O'Brien	44	5,720,000	32	3,040,000	12	1,080	20	600	24	74,880
Osceola	44	3,652,000	35	2,625,000	11	330	14	420	25	34,000
Page	41	4,674,000	29	725,000	12	2,040	18	486,000	22	36,300
Palo Alto	41	4,510,000	26	2,522,000	12	480	17	340	27	34,155
Plymouth	34	6,868,000	27	2,862,000	9	144,000	18	16,000	29	82,800
Pocahontas	46	6,072,000	26	2,968,000	16	1,440	15	300	28	10,360
Polk	40	5,152,000	35	1,376,000	11	16,620	23	414,000	21	2,730
Pottawattamie	43	8,815,000	34	1,512,000	12	35,280	22	404,800	25	225,000
Poweshiek	45	4,905,000	33	1,365,000	12	5,520	20	10,800	25	14,300
Ringgold	39	3,120,000	22	748,000	12	960	20	96,000	16	3,520
Sac	47	6,110,000	30	2,490,000	14	840	18	2,160	28	54,320
Scott	48	3,744,000	32	832,000	10	17,800	24	329,000	21	275,400
Shelby	48	6,192,000	27	1,674,000	10	26,600	20	14,800	25	170,000
Sioux	42	7,980,000	36	4,392,000	11	42,900	19	17,480	21	158,400
Story	42	6,132,000	23	1,886,000	14	560	21	10,080	21	1,320
Tama	47	5,875,000	37	2,214,000	14	18,760	21	15,540	23	37,260
Taylor	33	3,234,000	24	1,344,000	11	1,100	20	220,000	25	6,250
Union	41	2,788,000	34	672,000	9	630	19	47,500	22	15,400
Van Buren	41	2,501,000	32	896,000	9	630	16	100,800	24	1,920
Wapello	42	3,814,000	27	540,000	14	1,820	18	185,600	23	2,760
Warren	44	4,048,000	32	960,000	10	2,700	17	476,000	22	6,806
Washington	44	4,400,000	28	1,344,000	14	1,960	15	27,000	20	1,440
Wayne	40	3,360,000	21	693,000	12	240	16	80,000	21	1,050
Webster	48	7,632,000	34	3,740,000	13	14,560	16	3,040	23	10,580
Winnebago	39	2,691,000	28	1,764,000	9	12,600	16	640	24	33,600
Winneshiek	51	4,590,000	23	1,748,000	9	34,110	14	7,280	18	144,000
Woodbury	38	7,220,000	34	1,702,000	11	58,740	20	168,000	23	32,200
Worth	34	2,006,000	34	1,428,000	9	12,780	9	720	21	14,700
Wright	39	4,680,000	25	2,375,000	13	3,120	12	480	28	24,360
State	43.0	444,190,000	26.6	155,077,000	10.2	1,174,000	19.2	8,028,000	23.3	1,901,000

BRAZIL

Corn is by far the most important cereal produced in Brazil. According to an estimate prepared by the Statistical Department of the Ministry of Agriculture (Directoria geral de Estatistica de Ministerio da Agricultura) there are now under cultivation in corn 7,566,000 acres producing annually 122,228,000 bushels. The principal corn-producing states are Minas Geraes, 1,881,000 acres; Rio Grande de Sul, 1,483,000; Sao Paulo, 1,116,000; Parana, 617,000; Rio de Janeiro, 526,000.

(Consular Letter.)

UNITED KINGDOM (SCOTLAND)

A cablegram to the Bureau of Markets and Crop Estimates received October 19, from its Agricultural Commissioner at London gives the following preliminary government report for Scotland's crops for 1921; figures for 1920 are in parenthesis: Wheat acreage 65,000 (54,000); barley 171,000 (204,000); oats 1,011,000 (1,032,000); rye 6,000 (7,000); potatoes 154,000 (162,000).

URUGUAY

An unofficial estimate for Uruguay for 1921-22 gives the wheat area as 989,000 acres.

AVERAGE AND TOTAL YIELDS OF IOWA CROPS, 1921, BY COUNTIES—PART II.

Counties	Rye		Flax Seed		Potatoes		Hay, Tame		Hay, Wild		Alfalfa	
	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	10	600			36	32,130	1.3	43,300	1.00	2,400	2.80	868
Adams	16	1,760			61	28,060	0.9	21,500	.94	1,617	2.12	1,442
Allamakee	15	6,450	5	100	35	49,250	1.6	82,800	1.47	2,058	2.50	50
Appanoose	14	8,960			64	12,160	.09	27,900	1.19	1,261	2.25	275
Audubon	18	540			58	42,805	1.6	42,400	1.38	1,998	2.60	5,700
Benton	22	20,900			49	32,430	1.5	68,200	1.39	2,730	2.42	410
Black Hawk	17	28,700			72	41,760	1.6	49,000	1.31	9,422	3.00	1,950
Boone	15	750			72	45,649	1.4	36,000	1.29	6,960	3.00	2,700
Bremer	15	7,050	6	90	30	31,740	1.6	29,000	1.08	19,304	4.00	320
Buchanan	18	12,400			25	25,875	1.5	50,400	1.21	13,068	3.40	240
Buena Vista	14	980	8	560	37	38,255	1.7	36,300	1.33	7,999	3.67	3,450
Butler	18	12,960	9	180	28	38,640	1.7	43,400	1.38	12,870	2.00	100
Calhoun	15	750	8	320	33	22,374	1.2	21,000	.92	3,418	2.00	1,500
Carroll	15	1,440	9	450	44	70,840	1.6	47,300	1.31	11,023	3.00	1,785
Cass	16	6,400			74	49,258	1.2	33,600	1.24	1,116	2.50	3,500
Cedar	21	9,240			25	19,250	1.3	64,000	1.29	144	3.37	270
Cerro Gordo	16	1,120	10	3,000	44	57,684	1.4	38,500	1.33	14,763	2.00	160
Cherokee	16	80	12	120	38	36,252	1.9	41,800	1.30	9,020	3.55	10,118
Chickasaw	18	2,880	6	1,500	17	17,000	1.4	37,100	.96	14,880	3.10	31
Clarke	20	2,200			69	6,348	0.9	24,300	1.25	237	2.00	90
Clay	14	280	7	1,750	22	12,144	1.3	29,900	.86	10,640	3.23	1,705
Clayton	17	5,270			54	109,296	1.6	100,000	1.75	900	3.17	221
Clinton	18	21,960			17	10,744	0.8	48,300	.92	1,610	2.00	320
Crawford	19	2,280			37	62,825	1.6	72,900	1.40	6,580	3.39	26,781
Dallas	18	3,060	9	90	73	16,790	1.5	28,800	1.31	2,751	3.42	2,226
Davis	9	2,900			81	30,270	1.2	43,100	.75	15	1.75	88
Decatur	12	4,320			75	12,900	1.3	44,200	1.20	360	2.00	420
Delaware	15	21,000	7	70	56	56,804	1.4	57,400	1.20	6,480	3.25	90
Des Moines	18	10,080			74	39,270	1.3	59,000	1.20	1,000	3.00	960
Dickinson	14	500	10	2,000	54	18,360	1.4	19,000	.96	10,752	2.40	528
Dubuque	16	1,800			49	102,557	1.4	90,400	1.00	500	3.00	270
Emmet	16	1,920	8	1,520	29	14,326	1.4	23,900	.93	5,612	2.80	304
Fayette	15	5,700	6	300	22	34,980	1.4	77,500	.94	11,056	2.50	25
Floyd	17	7,480	8	900	38	52,440	1.6	56,000	1.02	4,998	2.25	180
Franklin	11	770	8	800	37	57,017	1.4	43,400	1.12	8,960	2.00	120
Fremont	16	5,440			74	65,392	1.1	52,300	1.50	6,450	2.75	24,675
Greene	16	160			40	18,400	1.4	29,300	1.13	4,704	3.00	900
Grundy	25	750	8	40	40	64,400	1.6	40,000	1.50	7,500	3.50	70
Guthrie	15	1,950			58	24,708	1.2	33,600	1.31	3,880	2.33	1,966
Hamilton	19	200	7	210	50	40,250	1.6	36,900	1.12	4,816	3.20	928
Hancock	12	840	8	2,400	28	28,336	1.3	52,800	1.00	14,800	3.00	300
Hardin	12	120	8	160	29	52,920	1.4	36,900	1.12	5,040	3.10	310
Harrison	20	6,000	10	100	58	80,360	1.0	14,000	1.75	10,850	3.00	64,710
Henry	18	10,260			22	22,701	1.4	42,700	.47		4.00	440
Howard	14	1,960	5	2,500	17	13,040	1.6	49,000	1.04	17,680	2.00	60
Humboldt	14	560	9	450	27	9,315	1.4	24,000	.81	3,481	2.45	735
Ida	15	150			45	38,700	1.6	38,200	1.17	2,106	2.90	8,497
Iowa	17	3,230			43	41,000	1.3	42,900	1.00	500	2.00	40
Jackson	18	11,700			61	65,612	1.1	70,400	1.17	1,404	1.95	195
Jasper	16	6,240			45	29,700	1.5	64,500	1.50	1,050	2.50	260
Jefferson	15	2,400			41	15,088	1.7	43,200			2.50	280
Johnson	15	12,000			66	61,756	1.4	62,360	1.15	1,092	2.75	715
Jones	12	7,200			39	31,350	1.5	73,500	1.00	220	2.80	112
Keokuk	12	4,320			38	26,220	1.4	54,000	1.20	120	4.00	240
Kossuth	12	1,800	11	15,620	30	45,540	1.2	43,200	1.00	28,000	2.25	8,125
Lee	15	60,000			48	49,980	1.2	46,800	1.15	57	2.85	1,300
Linn	14	14,500			31	42,780	1.3	64,800	1.15	3,366	3.00	300
Louisa	22	60,500			52	23,300	1.3	41,200	1.25	225	3.50	345
Lucas	13	1,950			35	7,560	1.4	38,000	1.29	48	2.50	425
Lyon	17	170	7	420	31	57,040	1.9	33,000	1.50	15,300	3.20	10,880
Madison	14	1,680			49	16,905	1.4	31,900	1.25	1,562	3.00	1,200
Mahaska	22	2,860			69	41,400	1.4	28,100	1.33	348	3.75	338
Marion	12	2,760			52	19,136	1.5	30,900	1.20	582	2.50	600
Marshall	20	2,400			57	29,538	1.7	66,000	1.50	825	2.75	248
Mills	18	2,700			50	22,800	1.7	37,800	1.50	4,950	2.80	22,700

AVERAGE AND TOTAL YIELDS OF IOWA CROPS, 1921, BY COUNTIES—PART II—Continued.

Counties	Rye		Flax Seed		Potatoes		Hay, Tame		Hay, Wild		Alfalfa	
	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
Mitchell	22	3,080	10	7,500	42	238,440	1.5	48,000	1.30	2,860	2.00	
Monona	10	600	.....	.....	74	58,756	1.7	14,300	1.46	18,250	3.37	20
Monroe	14	6,020	.....	.....	64	11,776	1.5	29,800	1.25	300	3.00	61,400
Montgomery	18	10,260	.....	.....	57	26,220	0.9	18,700	1.00	570	2.46	120
Muscatine	15	45,000	.....	.....	41	40,352	1.5	29,900	1.00	240	2.62	13,154
O'Brien	18	72	8	400	24	26,208	1.8	39,400	1.50	19,395	2.79	7,404
Osceola	15	375	9	2,250	25	20,125	1.5	21,300	1.40	11,340	2.66	4,855
Page	18	9,900	.....	.....	66	44,748	0.9	23,400	.88	739	2.21	585
Palo Alto	17	7,650	9	6,880	26	14,664	1.4	21,400	1.07	19,048	2.32	11,300
Plymouth	15	2,850	9	270	30	48,990	1.5	32,600	1.19	21,063	2.52	672
Pocahontas	11	5,280	8	400	29	20,358	1.4	26,900	1.05	7,923	2.50	37,800
Polk	18	6,660	.....	.....	54	58,986	1.5	29,400	1.12	2,912	3.16	1,032
Pottawattamie	20	11,600	.....	.....	76	148,580	1.5	41,000	1.19	7,568	2.73	2,986
Poweshiek	12	120	.....	.....	44	37,444	1.3	46,800	1.30	156	2.17	62,750
Ringgold	12	2,300	.....	.....	64	14,720	1.2	42,400	1.25	375	2.25	260
Sac	15	300	.....	.....	37	37,000	1.5	41,200	1.00	3,900	3.22	184
Scott	18	27,200	.....	.....	50	126,500	1.7	52,700	1.60	1,500	3.82	2,592
Shelby	19	2,420	.....	.....	62	78,420	1.4	43,400	1.40	4,200	2.75	4,532
Sioux	15	450	9	360	37	59,722	1.8	33,500	1.20	17,040	3.38	14,022
Story	17	3,060	.....	.....	29	8,970	1.4	37,500	1.12	2,240	2.83	23,880
Tama	18	2,880	.....	.....	68	86,020	1.7	80,000	1.00	900	4.12	780
Taylor	16	6,400	.....	.....	53	51,834	1.1	29,700	1.25	687	1.50	1,335
Union	15	3,300	.....	.....	65	22,425	1.0	22,300	1.38	1,449	2.17	198
Van Buren	13	6,370	.....	.....	62	39,380	1.0	35,100	1.20	36	2.50	951
Wapello	12	3,360	.....	.....	49	17,640	1.2	38,800	.....	.....	3.00	580
Warren	14	2,800	.....	.....	44	13,640	1.2	34,800	1.38	924	2.12	702
Washington	20	2,800	.....	.....	51	31,110	1.5	51,000	1.25	12	3.00	270
Wayne	11	2,420	.....	.....	66	6,072	1.0	39,000	1.30	52	2.00	140
Webster	20	200	7	420	35	30,590	1.8	43,700	1.40	1,190	3.00	2,130
Winnebago	15	600	9	8,280	39	35,880	1.4	26,200	1.13	21,809	3.06	122
Winneshiek	17	6,120	6	4,080	30	39,330	1.5	80,400	1.37	7,124	4.00	80
Woodbury	20	1,400	.....	.....	49	70,462	1.4	24,400	1.00	10,000	2.83	70,750
Worth	12	2,400	9	25,740	24	24,000	1.6	30,700	1.21	18,150	2.58	75
Wright	17	890	12	960	34	31,280	1.4	37,100	1.09	8,700	2.66	420
State	16.1	636,657	8.7	94,300	43.0	4,149,500	1.39	4,104,000	1.16	551,000	2.97	553,000

WORLD CROP SUMMARY.

(Incomplete, based upon the best information available up to December 14, 1921.)

Crop	Production (millions of bushels).				
	Number of Countries	1921-22.	1920-21.	Average 1914-18.	Average 1909-13.
Wheat	23	2,650	2,501	2,500	2,498
Rye	16	538	443	552	570
Oats	19	2,526	3,058	2,972	2,804
Barley	11	777	722	768	736
Corn	8	3,368	3,466	2,987	2,966
Potatoes	12	1,809	2,191	2,333	2,604
Cotton (bales)	7	9	15	14	14
Flax	6	25	26	38	32

MISCELLANEOUS TABLE.

Corn husked, corn "hogged," corn moisture. Prices of buckwheat, flax seed, apples, sorghum syrup. And wages of farm labor.

District	Corn			Average Price, December 1, 1921				Wages of Male Farm Labor, 1921					
								(a) average rate per month when hired by the year		(b) average wage per day for day labor for harvest work		(c) average wage per day for day labor other than harvest work	
	Husked Dec. 1 per cent	Hogged down per cent	Moisture in corn marketed Nov. 21-30	Buckwheat per bushel of 48 pounds	Flaxseed per bushel of 56 pounds	Apples per bushel of 48 pounds	Sorghum Syrup per gallon	(1) With board	(2) Without board	(1) With board	(2) Without board	(1) With board	(2) Without board
Northwest	84	6	16	$0.59	$1.55	$2.46	$1.07	$40.59	$53.73	$2.90	$3.76	$2.27	$ 3.04
North Central	91	8	16	.77	1.56	2.55	1.11	39.78	53.11	2.90	3.60	2.25	3.00
Northeast	92	8	18	.68	1.50	2.71	1.16	41.53	56.46	2.92	3.48	2.40	3.02
West Central	89	6	16	.....	.....	2.74	1.09	39.07	53.31	2.71	3.27	2.13	2.87
Central	90	7	18	1.39	1.60	2.94	1.10	39.63	55.80	2.87	3.50	2.22	2.78
East Central	93	8	18	1.19	.....	2.77	1.06	42.76	55.23	2.85	3.42	2.39	2.68
Southwest	92	8	16	1.09	.....	2.68	1.04	37.97	50.49	2.68	3.18	2.03	2.52
South Central	91	7	19	.50	.....	2.90	1.00	35.44	49.28	2.43	3.07	2.00	2.49
Southeast	89	9	18	1.19	.....	2.76	1.02	39.12	51.31	2.62	3.23	1.97	2.49
State	90	7.5	16	$0.78	$1.53	$2.74	$1.06	$39.35	$52.40	$2.76	$3.37	$2.25	$ 2.72

AVERAGE PRICE OF FARM PRODUCTS DECEMBER 1, 1921, BY COUNTIES.

Counties	Corn per bu. of 70 lbs. in ear or 56 lbs. shelled	Oats per bushel of 32 pounds	Spring Wheat per bu. of 60 pounds	Winter Wheat per bu. of 60 pounds	Barley per bushel of 48 pounds	Rye per bushel of 56 pounds	White Potatoes (Irish) per bu. of 60 pounds	Tame Hay (loose) per ton of 2,000 lbs.	Wild Hay (loose) per ton of 2,000 lbs.	Alfalfa (loose) per ton of 2,000 lbs.	Timothy Seed per bu. of 45 pounds	Clover Seed per bu. of 60 pounds	Popcorn per bu. of 70 lbs. in ear or 56 lbs. shelled	Cream per lb. of butter fat	Butter per pound	Chickens (live wgt.) per pound	Eggs per dozen	Honey (Per lb.) Comb in sections	Extracted (less cost of container)	In bulk
Adair	$ .30	$ .22	$ .78	$ .82	$ .34	$ .62	$ 1.40	$ 8.90	$ 5.50	$15.00	$ 1.94	$10.33	$ 2.00	$ .39	$ .40	$ .16	$ .46	$ .27	$ .15	$ .12
Adams	.29	.22	.94	.80	.44		1.36	8.71	6.12	12.00	2.29	9.00	3.50	.37	.39	.17	.49	.23	.17	.18
Allamakee	.38	.29	.94	.95	.44	.59	1.55	13.39	12.67	18.00	2.58	10.55	3.00	.46	.46	.15	.49	.28	.28	.29
Appanoose	.37	.28	.87	.80		.60	1.38	9.28	6.33	12.00	1.94	8.80	2.00	.33	.38	.17	.43	.28	.21	.19
Audubon	.31	.22	.80	.88	.38		1.45	6.50	5.50	8.67	2.29	9.30		.36	.38	.17	.48	.25	.20	
Benton	.32	.24	.82	.87	.40	.76	1.47	12.00	10.38		2.22	8.77		.38	.30	.16	.48	.21	.10	.10
Black Hawk	.30	.22			.47	.70	1.28	7.12	7.00		1.83	9.67		.48	.49	.15	.49	.25	.25	
Boone	.31	.23	.89	.93	.42	.71	1.31	11.50	9.00	14.12	3.24	9.33	2.67	.38	.41	.15	.47	.26	.23	.15
Bremer	.32	.21	.95	1.05	.40	.58	1.40	9.37	7.14	12.00	2.67	11.33	3.27	.42	.48	.16	.53	.30	.20	.22
Buchanan	.26	.20			.40	.80	1.44	9.67	5.25		1.83	11.00		.42	.46	.15	.52	.30		
Buena Vista	.29	.22		.80	.39	.60	1.58	11.33	9.00	17.33	2.96	12.00	2.82	.33	.38	.18	.46	.24	.17	.17
Butler	.30	.21	.90	.90	.40	.50	1.32	9.75	6.58		1.65	10.00	3.25	.41	.44	.15	.50	.20	.20	.10
Calhoun	.32	.23	.75				1.45	10.14	8.33	13.00	2.75	9.33		.39	.39	.15	.48	.21	.20	.19
Carroll	.31	.22	.88	.98	.37	.70	1.48	9.60	6.50	15.00	2.00	10.00	1.40	.42	.46	.16	.44			
Cass	.30	.22	.90	.92	.42	.77	1.33	9.00	8.88	15.75	2.06	8.40	2.74	.39	.41	.16	.49			
Cedar	.30	.22	.86	.87	.46	.70	1.36	10.37		16.30	2.23	10.05		.39	.42	.15	.47	.22	.20	.18
Cerro Gordo	.32	.22	1.00		.42		1.50	10.00	6.00	15.00	2.25	10.00		.49	.48	.16	.57	.28	.25	.20
Cherokee	.30	.23					1.33	9.22	8.17	11.17	2.17	12.67		.36	.40	.13	.42			
Chickasaw	.27	.20	.88	.95	.45	.70	1.35	9.75	7.50		1.80			.40	.48	.17	.51	.35	.18	.16
Clarke	.28	.22	.85	.87		1.02	1.34	8.45			1.83	9.17	2.14	.37	.35	.16	.48	.28	.23	.21
Clay	.30	.21			.42	.75	1.99	7.00	5.83	12.50	2.32	11.00	1.08	.38	.42	.14	.49	.21	.23	.14
Clayton	.36	.27	.88	.95	.44	.75	1.38	11.37		18.00	2.33	10.58	3.50	.45	.48	.16	.50	.19	.21	.15
Clinton	.34	.26	.87	.90	.40	.71	1.43	11.80	8.00		2.50	9.50		.43	.40	.15	.51			
Crawford	.29	.27	.91	.98	.35		1.17	8.16	7.00	9.00	2.19	9.50	2.10	.39	.40	.14	.41	.23	.18	.14
Dallas	.30	.21	.78	.91	.35	.75	1.41	10.29	9.00	16.00	2.50	11.30	2.80	.40	.30	.15	.47	.38		.30
Davis	.34	.29	.75	.84		.60	1.47	10.00			2.90	9.20	2.50	.39	.45	.16	.50	.29		
Decatur	.30	.22	.76	.82		.88	1.44	7.44	5.00	20.00	1.75	9.06	2.12	.37	.37	.16	.49	.27	.29	.22
Delaware	.28	.24	1.20	1.18	.43	.76	1.36	10.29	8.00	22.50	2.32	10.67	1.87	.47	.49	.18	.50	.30	.25	.20
Des Moines	.32	.26	.93	.98	.39	.73	1.47	12.50	9.00	18.00	2.22	9.06	2.07	.36	.39	.16	.49	.30	.24	.21
Dickinson	.28	.20	.75		.41		1.38	7.17	6.07		3.63	8.50	3.00	.31	.30	.13	.49	.18	.16	.14
Dubuque	.35	.24	.92	1.02	.48	.68	1.36	14.43	8.50		2.07	7.50	2.50	.43	.44	.16	.51	.15	.13	.18
Emmet	.30	.21		.95		1.00	1.40	7.92	5.25		4.07	8.67	2.80	.40	.42	.14	.49	.25		
Fayette	.34	.21	.85	1.01	.41		1.47	10.50	7.00		1.84	10.00	4.20	.44	.42	.16	.46	.22	.17	.14
Floyd	.27	.22	1.00	1.00	.38	.68	1.25	9.90	6.29		2.05	10.80	3.67	.42	.46	.15	.48	.26	.26	.22
Franklin	.28	.22	.80	.90	.44	.65	1.34	7.28	4.80	10.00	2.02	9.75	3.50	.40	.41	.14	.48	.29	.27	.22
Fremont	.32	.23	.86	.88		.87	1.41	10.00	8.00	11.33	2.83	10.00		.42	.38	.16	.44	.27	.17	.17
Greene	.30	.23	.75	.88	.37		1.47	9.56	8.60		2.69	10.00		.37	.41	.16	.44	.35	.24	.18
Grundy	.31	.22	1.00	1.02	.48		1.20	7.78	5.33		1.99	9.40		.42	.46	.15	.49	.30	.29	.16
Guthrie	.31	.23	.84	.88	.38	.85	1.64	9.12	7.67	13.50	1.73	9.14	3.25	.36	.42	.16	.44	.27	.18	.12
Hamilton	.31	.24	1.00	1.04	.37	.82	1.56	10.71	8.50	14.00	2.83	9.38	5.50	.37	.34	.15	.49	.18	.19	.19
Hancock	.28	.20	1.09	.95	.52	.90	1.49	7.71	6.38		3.25	10.33	1.50	.45	.45	.14	.50	.24	.18	.15
Hardin	.29	.22	.80	.94			1.59	8.57	8.23	16.00	2.30	10.33		.39	.40	.16	.47	.29	.20	.20
Harrison	.29	.23	.84	.86	.35	.70	1.27	9.00	8.00	9.00			2.50	.38	.38	.15	.48	.30		.12
Henry	.31	.24	.87	.88	.39	.72	1.42	10.21		8.00	1.89	8.75	2.80	.38	.37	.15	.52	.24	.20	.19
Howard	.32	.24	.90	.90	.38	.68	1.43	9.60	6.00		1.80	9.90	2.38	.44	.43	.15	.50	.28	.24	.22
Humboldt	.32	.23	.90	.90			1.52	6.90	4.50		2.00	10.00	1.00	.41	.42	.14	.48	.25	.25	.20
Ida	.30	.23	.90	.90	.43		1.43	7.83	9.00	10.75	2.25	10.00	.85	.40	.39	.16	.43	.18		
Iowa	.29	.25	.88	.90	.49	.71	1.37	12.25	10.83		2.44	9.90		.38	.39	.16	.48	.20	.16	.14
Jackson	.34	.26	.89	.95	.47	.95	1.46	14.37	9.00	18.50	2.50	11.86		.41	.44	.15	.44	.30	.12	
Jasper	.30	.24	.86	.93	.50	.75	1.55	9.37	7.40		3.17	8.19	1.92	.40	.49	.15	.49	.27	.22	.24
Jefferson	.30	.22	.92	.94	.45	.70	1.28	8.75	8.00	10.50	1.91	9.14	5.00	.39	.41	.16	.49	.22	.20	.18
Johnson	.29	.23	.95	1.00	.48	.70	1.40	12.42	13.00	18.00	2.05	9.85	2.25	.38	.40	.16	.50	.30	.19	.20
Jones	.34	.26			.43	.75	1.48	11.00	11.00		2.67	9.33	5.25	.43	.46	.16	.48		.20	
Keokuk	.28	.23	.80	.85	.45	.75	1.27	10.00			2.30	10.50		.34	.40	.17	.48	.25	.20	.18
Kossuth	.30	.22	1.00	.91	.39	.72	1.42	8.67	6.64	11.50	2.94	9.75	3.25	.42	.43	.14	.49	.28	.25	.25
Lee	.32	.27	1.00	.92		.74	1.32	11.70		16.67	2.30	9.00	3.50	.37	.39	.17	.50	.24	.20	.14
Linn	.30	.23	.86	.89	.43	.67	1.32	11.88	8.75	11.08	2.38	10.60	1.76	.42	.43	.15	.52	.33	.22	.23
Louisa	.29	.24	.91	.91			1.42	9.58			2.06	11.81		.40	.38	.16	.44	.28	.30	.29
Lucas	.30	.25	.90	.87			1.50	10.00			2.08	9.36		.38	.41	.16	.49	.28	.21	.29
Lyon	.29	.23	.97		.35		1.27	6.83	6.17	10.00	2.00	9.00		.36	.42	.14	.43	.29	.18	.18
Madison	.29	.22	.82	.83	.37	.64	1.28	9.33	6.00	12.50	2.21	9.05	2.50	.36	.37	.14	.44	.30	.20	.22
Mahaska	.32	.25	.85	.88			1.35	12.20	10.00		2.26	9.44		.38	.38	.15	.48	.25	.25	.25
Marion	.31	.25	.87	.92	.37	.58	1.40	9.56	8.00	12.00	2.20	9.03		.40	.38	.15	.49	.21	.16	.15
Marshall	.31	.25	.89	.90			1.64	8.23	8.00	10.00	1.96	8.79	3.50	.39	.40	.16	.47	.30	.28	.25
Mills	.30	.23	.85	.93	.41	.68	1.07	8.25	7.20	9.40	2.50	11.00		.39	.38	.15	.44	.25	.21	.15
Mitchell	.30	.25	.83	.87	.33	.90	1.05	9.00	7.00		2.44	10.00	2.95	.45	.44	.14	.50	.26	.21	.20
Monona	.29	.20	.91	.88	.40	.80	1.27	7.00	5.25	7.15	2.51	12.00	1.00	.41	.43	.14	.46	.21	.16	.16
Monroe	.32	.24	.82	.85	.48	.53	1.29	10.42	10.00		1.87	9.60	5.00	.37	.33	.16	.48	.32	.20	.18
Montgomery	.29	.22	.93	.98	.50	.70	1.45	10.80	12.00	12.00	2.47	9.80	2.00	.35	.40	.16	.47	.30	.23	
Muscatine	.31	.24	.89	.94	.44	.76	1.31	11.67	7.75	16.00	2.33	9.57	2.20	.43	.42	.16	.52	.29	.27	.20
O'Brien	.28	.21	.84		.44	1.00	1.54	6.98	6.12	8.33	2.29	11.00		.40	.45	.15	.42	.22	.18	.15
Osceola	.29	.22			.40		1.49	8.00	5.70	9.00	2.17	8.50		.38	.43	.15	.48	.25	.18	.12
Page	.32	.23	.89	.90	.36	.78	1.41	11.90	11.00	15.40	2.64	10.27	1.50	.36	.35	.15	.44	.26	.24	.22
Palo Alto	.29	.20	.80		.38	.83	1.44	7.08	5.38	11.00	2.02	8.62	2.00	.43	.42	.15	.46	.20	.20	.20
Plymouth	.30	.23	.84	.95	.38	.75	1.36	6.50	6.17	7.17	3.50	10.00	1.25	.39	.39	.14	.43	.20	.20	.16
Pocahontas	.30	.21	.82	.85	.42	.60	1.46	6.33	4.50	15.00	2.25	9.80		.39	.37	.15	.44	.19	.18	.15

AVERAGE PRICE OF FARM PRODUCTS DECEMBER 1, 1921, BY COUNTIES—Continued

Counties	Corn per bu. of 70 lbs. in ear or 56 lbs. shelled	Oats per bushel of 32 pounds	Spring Wheat per bu. of 60 pounds	Winter Wheat per bu. of 60 pounds	Barley per bushel of 48 pounds	Rye per bushel of 56 pounds	White Potatoes (Irish) per bu. of 60 pounds	Tame Hay (loose) per ton of 2,000 lbs.	Wild Hay (loose) per ton of 2,000 lbs.	Alfalfa (loose) per ton of 2,000 lbs.	Timothy Seed per bu. of 45 pounds	Clover Seed per bu. of 60 pounds	Popcorn per bu. of 70 lbs. in ear or 56 lbs. shelled	Cream per lb. of butter fat	Butter per pound	Chickens (live wgt.) per pound	Eggs per dozen	Honey (Per lb.) Comb in sections	Honey (Per lb.) Extracted (less cost of container)	Honey (Per lb.) In bulk
Polk	.31	.24	.92	.91	.40	.80	1.38	10.59	8.00	12.60	2.60	9.31	2.25	.41	.43	.15	.50	.26	.24	.20
Pottawattamie	.31	.24	.86	.87	.39	.67	1.37	9.28	8.27	11.50	2.39	9.41	1.85	.38	.37	.15	.46	.25	.21	.19
Poweshiek	.30	.24	.92	.94	.48	.75	1.34	9.57	8.79	11.50	2.22	8.08	5.50	.35	.42	.17	.51	.23	.30	.22
Ringgold	.31	.21	.85	.91	.38	.72	1.42	9.75	7.25	15.00	2.16	10.00	5.00	.36	.36	.16	.49	.20	.24	.21
Sac	.31	.21	----	----	.43	----	1.36	6.62	5.83	12.90	3.19	10.25	.77	.35	.39	.15	.43	.22	.18	.16
Scott	.33	.22	.87	.90	.45	.79	1.10	12.90	9.83	18.00	2.58	10.11	2.50	.40	.40	.16	.53	.30	.25	.22
Shelby	.30	.22	.88	.91	.40	.60	1.42	8.94	7.50	12.14	1.61	8.31	2.80	.39	.43	.15	.44	.22	.30	----
Sioux	.28	.21	.88	1.00	.40	----	1.34	7.17	7.00	10.00	2.00	10.00	----	.42	.40	.14	.42	.18	----	----
Story	.29	.22	.91	.92	.42	.62	1.42	13.12	9.33	17.31	2.47	9.58	.90	.43	.41	.16	.48	.24	.19	.18
Tama	.32	.24	.88	.94	.46	----	1.45	9.50	8.00	15.00	2.07	8.75	3.50	.37	.43	.16	.49	----	----	----
Taylor	.28	.24	.90	.91	.38	.65	1.47	10.97	10.00	15.00	2.01	11.17	----	.37	.38	.15	.48	.25	.20	.25
Union	.28	.23	.80	.93	.31	.80	1.29	10.38	7.75	----	1.83	9.77	1.64	.34	.35	.16	.48	.27	.20	.20
Van Buren	.33	.28	.90	.88	----	.82	1.53	8.36	----	12.00	1.95	9.34	2.25	.38	.39	.16	.48	.24	.16	.19
Wapello	.29	.20	.80	.74	----	----	1.66	10.50	----	13.50	1.75	9.50	----	.42	.46	.14	.50	.22	.26	.20
Warren	.32	.24	.82	.86	.45	.80	1.28	9.57	7.40	13.55	2.04	10.06	3.38	.34	.39	.15	.49	.22	.19	.16
Washington	.30	.24	.83	.89	.40	.75	1.54	10.00	8.00	15.50	2.28	9.33	2.60	.39	.40	.16	.45	.27	.20	.18
Wayne	.28	.22	.91	.91	----	.78	1.41	8.19	6.50	11.00	1.77	9.50	3.00	.36	.33	.15	.47	.24	.24	.19
Webster	.32	.24	1.00	----	----	----	1.51	11.37	9.00	14.72	2.00	9.50	2.50	.33	.42	.15	.48	.27	.16	.16
Winnebago	.30	.22	.82	----	.78	----	1.29	8.00	6.75	12.00	2.75	----	----	.50	.45	.12	.49	.29	----	----
Winneshiek	.33	.27	.86	.98	.46	.81	1.47	12.33	11.00	----	3.01	14.00	----	.45	.46	.16	.50	.25	.20	.13
Woodbury	.30	.21	.84	.85	----	----	1.55	8.50	7.50	7.75	2.00	10.00	1.50	.37	.41	.15	.42	.16	.12	.10
Worth	.24	.20	.82	.90	.38	.65	1.29	10.00	8.67	----	2.02	11.00	4.50	.47	.47	.13	.48	.35	----	----
Wright	.28	.21	.85	----	.43	.87	1.55	9.06	7.19	17.50	3.20	17.00	3.27	.40	.41	.16	.49	.25	.19	.20
State	$ .30	$ .22	$ .87	$ .90	$ .42	$ .73	$1.40	$9.08	$7.47	$12.92	$2.31	$9.72	$2.54	$ .39	$ .40	$ .15	$ .48	$ .25	$ .21	$ .19

WINTER WHEAT AND RYE

Preliminary Estimate of Acreage Seeded in the Fall of 1921 in Iowa and the Percentage Condition, December 1, 1921.

Counties	Winter Wheat Condition	Winter Wheat Acres	Rye Condition	Rye Acres
District No. 1—				
Buena Vista	----	----	99	50
Cherokee	----	----	92	5
Clay	----	----	91	15
Dickinson	----	----	96	15
Emmet	----	----	91	100
Lyon	89	40	92	10
O'Brien	----	----	101	5
Osceola	----	----	71	20
Palo Alto	----	----	93	400
Plymouth	88	670	91	170
Pocahontas	90	20	94	290
Sioux	95	660	92	25
For District	90	1,390	92	1,105
District No. 2—				
Butler	----	----	98	710
Cerro Gordo	----	----	94	55
Floyd	----	----	100	300
Franklin	----	----	73	45
Hancock	----	----	98	60
Humboldt	97	100	81	30
Kossuth	----	----	101	125
Mitchell	90	50	93	100
Winnebago	----	----	96	35
Worth	----	----	93	175
Wright	92	50	101	40
For District	92	200	94	1,735
District No. 3—				
Allamakee	98	1,700	94	285
Black Hawk	95	420	96	1,750
Bremer	90	90	97	385
Buchanan	----	----	81	600
Chickasaw	100	110	99	120
Clayton	91	1,800	86	290
Delaware	92	110	95	1,130
Dubuque	95	520	96	175
Fayette	100	420	101	310
Howard	100	100	101	110
Winneshiek	98	900	101	285
For District	95	6,220	96	5,410
District No. 4—				
Audubon	95	1,400	91	35
Calhoun	92	90	98	45
Carroll	90	660	96	75
Crawford	102	2,760	96	100
Greene	92	430	91	10
Guthrie	94	4,800	97	95
Harrison	87	25,300	99	220
Ida	92	130	98	10
Monona	91	29,840	101	65
Sac	100	150	101	15
Shelby	90	1,240	101	150
Woodbury	85	17,280	81	30
For District	92	90,900	96	850
District No. 5—				
Boone	95	500	98	40
Dallas	96	19,700	99	140
Grundy	95	220	93	25
Hamilton	95	110	97	10
Hardin	96	230	98	10
Jasper	98	6,180	100	335
Marshall	95	600	99	100
Polk	93	21,840	100	285
Poweshiek	96	550	100	10
Story	103	250	90	150
Tama	95	640	90	135
Webster	96	70	90	10
For District	96	50,890	98	1,245
District No. 6—				
Benton	94	700	99	785
Cedar	96	2,920	96	310
Clinton	100	2,420	100	1,550
Iowa	96	1,740	97	290
Jackson	97	2,550	100	410
Johnson	95	1,150	101	605
Jones	97	140	106	535
Linn	92	70	97	805
Muscatine	98	6,400	97	2,510
Scott	102	18,770	99	1,270
For District	97	36,920	99	9,110
District No. 7—				
Adair	90	5,000	93	35
Adams	84	11,790	101	100
Cass	92	20,000	98	330
Fremont	98	22,820	99	295
Mills	96	20,330	99	175
Montgomery	98	28,420	101	485
Page	93	35,400	97	400
Pottawattamie	92	22,570	99	480
Taylor	90	12,980	91	340
For District	92	180,310	97	2,840
District No. 8—				
Appanoose	87	5,420	87	460
Clarke	94	6,530	83	80
Decatur	95	10,130	98	300
Lucas	99	9,240	94	155
Madison	91	16,300	101	190
Marion	94	23,520	99	170
Monroe	93	9,780	94	290
Ringgold	96	6,530	95	215
Union	94	3,030	91	185
Warren	94	28,770	99	150
Wayne	96	6,290	96	225
For District	94	125,370	94	2,330
District No. 9—				
Davis	99	5,520	99	340
Des Moines	99	14,170	101	470
Henry	97	6,380	99	465
Jefferson	90	2,850	92	135
Keokuk	95	3,120	101	395
Lee	98	17,300	101	3,490
Louisa	97	15,370	99	1,600
Mahaska	100	7,840	91	110
Van Buren	96	8,100	92	370
Wapello	98	10,200	96	210
Washington	98	1,700	99	70
For District	97	92,530	96	7,575
For the State	94	588,000	95	22,000

UNITED STATES CROP SUMMARY, DECEMBER 1, 1921.

The December estimates of the Crop Reporting Board of the Bureau of Markets and Crop Estimates of the ACREAGE, PRODUCTION and VALUE (based on prices paid to farmers on December 1) of the important farm crops of the United States in 1921, 1920 and 1919, based on the reports of the correspondents and agents of the Bureau, are as follows (revisions based upon Census report for 1919).

Crop		Acreage	Production			Farm Value Dec. 1	
			Per Acre	Total	Unit	Per Unit	Total
						Cents	Dollars
Corn	1921	103,850,000	29.7	3,081,351,000	Bu.	47.4	1,305,624,000
	1920	101,699,000	31.8	3,230,582,000	Bu.	67.1	2,166,798,000
	1919	97,179,000	29.0	2,816,218,000	Bu.	134.4	3,785,516,000
Winter Wheat	1921	42,702,000	13.7	587,022,000	Bu.	95.2	558,725,000
	1920	40,016,000	15.3	610,597,000	Bu.	148.6	907,291,000
	1919	36,494,000	15.1	760,677,000	Bu.	210.5	1,601,425,000
Spring Wheat	1921	19,706,000	10.5	207,861,000	Bu.	85.8	178,343,000
	1920	21,127,000	10.5	222,430,000	Bu.	130.4	289,972,000
	1919	25,200,000	8.2	207,802,000	Bu.	230.9	479,751,000
All Wheat	1921	62,408,000	12.7	794,883,000	Bu.	92.7	737,068,000
	1920	61,143,000	13.6	833,027,000	Bu.	143.7	1,197,263,000
	1919	75,694,000	12.8	968,279,000	Bu.	214.9	2,080,686,000
Oats	1921	44,826,000	23.7	1,060,737,000	Bu.	30.3	321,540,000
	1920	42,491,000	35.2	1,496,281,000	Bu.	46.0	688,318,000
	1919	40,359,000	29.3	1,184,089,000	Bu.	70.4	833,927,000
Barley	1921	7,240,000	20.9	151,181,000	Bu.	42.2	63,788,000
	1920	7,600,000	24.9	189,332,000	Bu.	71.3	135,062,000
	1919	6,720,000	22.0	147,998,000	Bu.	120.6	178,080,000
Rye	1921	4,228,000	13.7	57,918,000	Bu.	70.2	40,680,000
	1920	4,409,000	13.7	60,400,000	Bu.	126.8	76,602,000
	1919	6,307,000	12.0	75,542,000	Bu.	133.1	100,582,000
Buckwheat	1921	671,000	21.0	14,079,000	Bu.	81.2	11,438,000
	1920	701,000	18.7	13,142,000	Bu.	128.3	16,863,000
	1919	692,000	20.7	14,295,000	Bu.	146.4	20,928,000
Flax Seed	1921	1,165,000	7.0	8,113,000	Bu.	144.6	11,732,000
	1920	1,737,000	6.1	10,774,000	Bu.	176.7	19,039,000
	1919	1,503,000	4.8	7,256,000	Bu.	438.3	31,802,000
Potatoes	1921	3,815,000	90.9	346,823,000	Bu.	111.1	385,192,000
	1920	3,657,000	110.3	403,296,000	Bu.	114.5	461,778,000
	1919	3,342,000	97.2	322,867,000	Bu.	159.5	514,855,000
Sweet Potatoes	1921	1,066,000	92.6	98,660,000	Bu.	88.1	86,910,000
	1920	992,000	104.8	103,925,000	Bu.	113.4	117,834,000
	1919	941,000	103.2	97,120,000	Bu.	134.4	130,514,000
Hay, tame	1921	58,742,000	1.30	81,567,000	Tons	$12.13	989,693,000
	1920	58,103,000	1.51	87,855,000	Tons	$17.76	1,560,225,000
	1919	56,889,000	1.32	86,359,000	Tons	$20.08	1,734,085,000
Hay, wild	1921	15,483,000	.96	15,295,000	Tons	$ 6.62	101,082,000
	1920	15,787,000	1.11	17,460,000	Tons	$11.35	198,115,000
	1919	17,150,000	1.07	18,401,000	Tons	$16.50	302,639,000
All Hay	1921	74,225,000	1.30	96,862,000	Tons	$11.27	1,090,776,000
	1920	73,890,000	1.43	105,315,000	Tons	$16.70	1,758,350,000
	1919	74,039,000	1.41	104,760,000	Tons	$19.45	2,037,724,000
Cotton	1921	31,427,000	*126.9	8,340,000	Bales	*16.2	674,877,000
	1920	35,878,000	*178.4	13,439,000	Bales	*13.9	933,658,000
	1919	33,500,000	*161.5	11,420,762	Bales	*35.6	2,034,456,000

UNITED STATES CROP SUMMARY DECEMBER 1, 1921—Continued.

Crop		Acreage	Production			Farm Value Dec. 1	
			Per Acre	Total	Unit	Per Unit	Total
						Cents	Dollars
Cotton Seed	1921	----------	----------	3,704,000	Tons	$29.15	107,972,000
	1920	----------	----------	5,970,000	Tons	$26.00	155,220,000
	1919	----------	----------	5,074,000	Tons	$72.65	368,626,000
Clover Seed	1921	869,000	1.6	1,411,000	Bu.	$10.37	14,488,000
	1920	1,082,000	1.8	1,944,000	Bu.	$11.95	23,227,000
	1919	942,000	1.6	1,484,000	Bu.	$26.75	39,700,000
Sugar Beets	1921[1]	809,435	9.49	7,677,877	Tons	$ 6.30	48,402,000
	1920	872,376	9.80	8,546,128	Tons	$11.63	99,426,000
Beet Sugar	1921	809,426	2,561	2,024,784,000	Lbs.	----------	----------
	1920	872,376	2,499	2,180,242,000	Lbs.	----------	----------
Sorghum Sirup	1921	518,000	87.8	45,470,000	Gals.	63.0	28,627,000
	1920	536,000	92.4	49,505,000	Gals.	106.9	52,943,000
	1919	487,000	79.7	38,837,000	Gals.	110.9	43,062,000
Beans (7 states)	1921	771,000	11.8	9,118,000	Bu.	$ 2.66	24,298,000
	1920	838,000	10.8	9,077,000	Bu.	$ 2.95	26,806,000
	1919	1,000,000	12.6	13,349,000	Bu.	$ 4.26	56,811,000
Kafirs (10 states)	1921	4,052,000	24.7	115,110,000	Bu.	39.3	45,260,000
	1920	5,120,000	25.8	137,406,000	Bu.	92.9	127,629,000
	1919	5,000,000	26.5	133,878,000	Bu.	127.5	170,671,000
Onions (22 states)	1921	55,829	226.6	12,652,000	Bu.	213.1	26,966,000
	1921	64,650	362.5	22,435,000	Bu.	129.6	20,377,000
Cabbage (25 states)	1921	94,035	6.4	606,274	Tons	$48.02	29,116,000
	1920	115,838	8.9	1,029,662	Tons	$33.99	35,001,000
Apples, total	1921	----------	----------	90,881,000	Bu.	168.5	153,215,000
	1920	----------	----------	223,677,000	Bu.	114.8	256,690,000
	1919	----------	----------	142,066,000	Bu.	183.6	260,959,000
Apples, com'r'l	1921	----------	----------	20,068,000	Bbls.	$ 4.63	92,908,000
	1920	----------	----------	33,905,000	Bbls.	$ 3.74	126,800,000
	1919	----------	----------	26,150,000	Bbls.	$ 5.34	139,669,000
Peaches	1921	----------	----------	28,733,000	Bu.	159.4	52,176,000
	1920	----------	----------	45,620,000	Bu.	210.4	95,970,000
	1919	----------	----------	52,178,000	Bu.	189.0	100,485,000
Pears	1921	----------	----------	10,700,000	Bu.	171.3	18,342,000
	1920	----------	----------	16,806,000	Bu.	165.8	27,863,000
	1919	----------	----------	15,101,000	Bu.	184.4	27,852,000
Soy Beans	1921	196,000	15.1	2,815,000	Bu.	216.0	6,080,000
	1920	150,000	14.6	2,278,000	Bu.	204.0	4,926,000
	1919	155,000	13.2	2,045,000	Bu.	332.2	6,814,000
Cow Peas	1921	1,293,000	7.5	9,581,000	Bu.	177.0	16,960,000
	1920	1,000,000	8.2	8,904,000	Bu.	233.4	20,786,000
	1919	959,000	6.3	6,023,000	Bu.	274.4	16,533,000
Total[2]	1921	848,236,000	----------	----------	----------	----------	5,675,877,000
	1920	349,067,000	----------	----------	----------	----------	9,075,388,000
	1919	333,739,000	----------	----------	----------	----------	13,089,397,000

*Pounds per acre, and cents per pound.
[1]Including beets grown in Canada for United States factories. Details by states will appear in the December "Monthly Crop Reporter."
[2]Some crops omitted from body of table for lack of space.

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In Cooperation with the

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