

Nova Scotia—Board of Game Commissioners, Chief Game Commissioner, J. A. Knight, K. D., St. Paul Building, Halifax; Associate Commissioners, A. O. Pritchard, New Glasgow; C. R. Kelley, Yarmouth.

Ontario—Department of Public Works, Game and Fisheries Branch. Minister, J. O. Reaume, Parliament Buildings, Toronto; Superintendent of Game and Fisheries, E. Tinsley, Parliament Buildings, Toronto; Kelly Evans, Commissioner, 503 Empire Building, 64 Wellington Street west, Toronto.

Prince Edward Island—Game Inspector, E. T. Carbonell, Box 83, Charlottetown.

Quebec—Department of Colonization, Mines and Fisheries, Fisheries and Game Branch. Minister, Charles Devlin, Quebec; Deputy Minister, J. Dufault, Quebec; Special (expert) Officer, E. T. D. Chambers, Quebec; General Superintendent of Fisheries and Game, Hector Caron, Quebec; Assistant Superintendent of Fisheries and Game, Eug. Hamel, Quebec; General Inspector of Fisheries and Game, J. A. Bellisle, Quebec.

Saskatchewan—Department of Agriculture. Minister of Agriculture, W. M. Motherwell, Regina; Deputy Minister, A. F. Mantle, Regina; Acting Chief Game Guardian, Fred Bradshaw, Regina.

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

IN CO-OPERATION WITH THE

Iowa Weather and Crop Service

ANNUAL REPORT FOR 1912

GEO. M. CHAPPEL, Director

PRINTED BY ORDER OF THE GENERAL ASSEMBLY

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LETTER OF TRANSMITTAL

March 15, 1913.

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

Dear Sir:—In accordance with the requirements of the law, I have the honor to submit herewith the twenty-third annual report of the Iowa weather and crop service for the year 1912.

I am, sir, very respectfully your obedient servant,

Geo. M. CHAPPEL,
Director.

ANNUAL REPORT, 1912

The meteorological and statistical data contained in this annual report have been compiled from the monthly and weekly bulletins issued by the Iowa Weather and Crop Service, in co-operation with the Weather Bureau of the United States Department of Agriculture. The data have been condensed, and it is believed that the matter will be valuable and convenient for reference and comparison in future years.

Reports have been received regularly each month from 118 co-operative meteorological stations, and from the U. S. Weather Bureau stations at Des Moines, Davenport, Dubuque, Charles City, Keokuk, and Sioux City, Iowa, and Omaha, Neb.

The instrumental equipment has been kept up to a high standard. This office distributed 28,400 copies of the Monthly Review of the Iowa Weather and Crop Service, and 65,000 copies of the Weekly Weather Crop Bulletins. The daily weather forecasts were distributed daily to 243,000 telephone subscribers. Daily forecasts were also distributed by rural mail to 2,000 addresses and by ordinary mail to 1,850 addresses. Daily forecast messages were sent to 78 towns by telegraph at expense of the U. S. Weather Bureau, and special warnings of the approach of cold waves and heavy storms were also distributed whenever issued. Arrangements were made through the Horticultural Department of the Iowa State College to send frost warnings, during the fruit blooming season, to all orchardists in the state who were prepared to use orchard heaters in case of frost or injurious temperatures.

CLIMATOLOGY OF THE YEAR, 1912.

The climatic records for the year 1912 show some very unusual conditions. January was the coldest month on record in Iowa, and the average temperature for the first three months was the lowest on record since the establishment of the weather service. Those months also gave more snow

than any like period. The monthly mean temperature was below the normal from June to October, inclusive, except in July, which gave a slight excess, and the precipitation was deficient from April to August, inclusive. Heavy snow fell over the southern and eastern counties on April 17th; freezing temperatures were general over the larger part of the state on May 14th, and light frost occurred in some of the northern counties on June 7th. Notwithstanding these unusual conditions, and the fact that seed corn was poor, and cut and wire worms were more destructive than usual, it is remarkable that the yield of crops, as a whole, was the largest in the history of the state. The year closed mild and pleasant; from about the middle of October to December 31st there was a great excess of temperature and a deficiency of precipitation. The deficiency of snowfall during this period was especially marked, and the great number of clear, mild days was probably unprecedented.

BAROMETER (reduced to sea level).—The average pressure of the atmosphere for the year 1912 was 30.03 inches. The highest observed was 30.86 inches at Sioux City, Woodbury County, on January 12th. The lowest pressure observed was 29.19 inches at the same station on April 13th. The range for the state was 1.67 inches.

TEMPERATURE.—The mean temperature for the state was 46.4° or 1.1° below the normal. The highest annual mean was 50.6° at Keokuk, Lee County. The lowest annual mean was 42.3°, at Northwood, Worth County, and at Sibley, Osceola County. The highest temperature reported was 104° at Ottumwa, Wapello County, on September 8th. The lowest temperature reported was -47° at Washta, Cherokee County, on January 12th. The range for the state was 151°.

PRECIPITATION.—The average amount of rain and melted snow for the year, as shown by the complete records of 107 stations was 28.89 inches, or 3.76 inches less than the normal, and 2.48 inches less than the average amount in 1911. The greatest amount recorded at any station was 38.13 inches at Guthrie Center, Guthrie County, and the least amount was 15.25 inches at Inwood, Lyon County. The greatest monthly precipitation was 10.12 inches at Audubon, Audubon County, in September. There was no precipitation at Rock Rapids, Lyon County, in November. The greatest amount in any consecutive 24 hours was 5.50 inches at Olin, Jones County, on August 19th.

The average amount of snowfall was 39.5 inches. The greatest amount recorded at any station was 77.2 inches at Earlham, Madison County, and the least amount was 10.2 inches at Clear Lake, Cerro Gordo County. The greatest monthly snowfall was 52.5 inches at Earlham, Madison County. Measurable precipitation occurred on an average of 84 days. This is 3 less than for 1911.

WIND.—The prevailing direction of the wind was northwest. The highest velocity reported was 52 miles an hour from the northwest at Sioux City, Woodbury County, on January 8th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 181; partly cloudy, 96; cloudy, 89; as against 165 clear days, 99 partly cloudy, and 101 cloudy days in 1911. Considerably more than the normal amount of sunshine was experienced.

MONTHLY SUMMARIES

JANUARY.

January, 1912, was probably the coldest month ever experienced in Iowa since its settlement. The monthly means for the larger part of the state were lower than ever before recorded. Not only were the monthly means the lowest on record, but the monthly minimum and maximum temperatures were lower than shown by previous records at most stations, and the duration of the extremely cold period exceeded anything of the kind in the history of the state. The longest record we have for a station still in operation is for Dubuque, and the official in charge, Local Office, U. S. Weather Bureau, at that place, says: "The record for mean temperature dates back 61 years, and is complete, with the exception of 2 or 3 years. The monthly mean temperature for January, 1912, is about 1.5° lower than ever before recorded at this station for any month. There were 16 consecutive days with the lowest temperature below zero. The average temperature for the first 12 days was 7.1° below zero. For the 8 days from the 5th to the 12th, inclusive, the average was 10.4° below zero, and for the first 21 days the average was 2.1° below zero. There were 21 days with the minimum of zero or below, or 2 more than ever before recorded during any one month. There were 6 days with the maximum temperature below zero, or 2 more than ever before recorded in any one year. On the 5th the temperature remained about 18° below zero during the hours of daylight. It was 19° below zero at noon with full sunshine.

A station was maintained at Monticello, Jones County, from 1854 to 1906, inclusive, and the lowest monthly mean temperature at that station during that time was 4.6°, in January, 1862, which is 2.2° higher than the mean for the past month at Olin, which is in the same county and about 18 miles south of Monticello. At Iowa City, we have a record since 1858, and the mean for the past month (4°) is 3° lower than in January, 1883, which is the lowest previous record. At Logan, in Harrison County, the mean for the past month is 6.5°, which is 0.6° lower than ever before recorded, and the records date back to 1867. The lowest monthly mean recorded at Muscatine, between 1839 and 1900, was 6.2° in January, 1857.

The first 21 days of the month were extremely cold, and the daily minimum temperatures were below zero over the larger part of the state on the first 16 days, and the maximum temperatures were also below zero on several of those days. The coldest period was from the 5th to the 13th. The last decade was considerably milder, but the minimum temperatures were below zero on several of those dates over the northern half of the state.

Although it was the coldest month ever recorded in the state there was an entire absence of severe winter storms. Nearly all of the precipitation was in the form of snow; the only rainfall was a light mist over the southern half of the state on the 25th and 28th, and as the temperature was below freezing, the rain froze as it fell, covering everything with a coat of ice. Snow flurries were frequent between the 7th and 18th, but the daily amounts were generally small.

The amount of snowfall was considerably below the normal, and the wind movement was comparatively light. There was, however, so little thawing weather the snow remained dry, and even though the wind movement was light, the snow drifted badly and this, together with the severe cold weather during the first and second decades greatly interfered with railroad traffic. Passenger trains were delayed and freight service was completely demoralized. In the cities and towns numerous water pipes, and in some instances, water mains were frozen, causing much loss and great inconvenience. Sleighing was excellent throughout the month, except in the southern tier of counties, where the snow was nearly gone at the close of the month. The ground being covered with a heavy mantle of snow, fall sown grains were thought to be in good condition, but peach trees are reported to be seriously damaged by the severe cold. All live stock is in good condition, and, fortunately, most farmers secured sufficient corn fodder last fall to feed the stock during the winter, but in some localities the supply of feed is getting short and hay is very high price. The ice harvest is nearly completed and the quality is unusually fine. At the close of the month at Davenport the ice was 14.5 inches thick; at Des Moines, 21.0 inches; at Dubuque and Sioux City, 20 inches; and at Keokuk, 12 inches. Except for the extremely low temperature, the month was unusually pleasant for a winter month.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 114 stations, was 4.2°, which is 15.1° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 0.1°, which is 16.1° below the normal; Central section, 4.3°, which is 14.9° below the normal; Southern section, 8.3°, which is 14.1° below the normal. The highest monthly mean was 11.8, at Keokuk, Lee County, and the lowest monthly mean, -3.0, at Elma, Howard County. The highest temperature reported was 49°, at Denison, Crawford County, on the 22d; the lowest temperature reported was -47°, at Washta, Cherokee County, on the 12th. The average monthly maximum was 39°, and the average monthly minimum was -33°. The greatest daily range was 52°, at Chariton, Lucas County. The average of the greatest daily ranges was 38°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 120 stations, was 0.53 inch, which is 0.52 inch below the normal. By sections the averages were as follows: Northern section, 0.69 inch, which is 0.13 inch below the normal; Central section, 0.66 inch, which is 0.44 inch below the normal; Southern section, 0.25 inch, which is 0.99 inch below the normal. The greatest amount, 1.90 inches, occurred at Rockwell City, Calhoun County, and the least, a trace at Elliott, Montgomery County. The greatest amount in any twenty-four hours, 0.80 inch,

occurred at Rock Rapids, Lyon County, on the 28th. Measurable precipitation occurred on an average of 5 days.

Snow.—The average fall was 5.5 inches. The greatest amount was 19.0 at Rockwell City and the least was a trace at Elliott.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 14; partly cloudy, 7; cloudy, 10. The duration of sunshine was above the normal, the percentage of the possible amount being 66 at Charles City; 45 at Davenport; 63 at Des Moines; 60 at Dubuque; 46 at Keokuk; and 45 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 52 miles an hour from the northwest, at Sioux City, Woodbury County, on the 8th.

JANUARY NORMALS FOR IOWA, 1890-1912.

Normal temperature for January, 19.1°.

Warmest January, 1891, with mean temperature of 26°.

Coldest January, 1912, with mean temperature of 4.2°.

Normal precipitation for January, 1.07 inches.

Wettest January, 1890, with total precipitation of 2.03 inches.

Driest January, 1899, with total precipitation of 0.28 inch.

Average depth of snowfall for January, 6.9 inches (1892 to 1912 inclusive).

Greatest snowfall in January, 12.6 inches, in 1898 and 1910.

Average number of days with 0.01 inch or more of precipitation, 5.

Prevailing direction of wind, northwest.

Average number of clear days, 13; partly cloudy, 8; cloudy, 10.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenovert.* The month just passed was the coldest January since record has been kept at this place. Twenty-one consecutive days with temperature below zero. There was only 0.20 inch of precipitation, but sleighing was good all of the month.

ALGONA.—*Dr. F. T. Sealey.* January, 1912, broke all records for cold weather. There were 23 days with the temperature down to or below zero.

ALTA.—*David E. Hadden.* The first 3 weeks were intensely cold and the minimum of -36° on the 12th was the lowest temperature recorded at this station during the past 22 years. The ground was covered with snow all of the month to a depth of more than 15 inches.

AMANA.—*C. Schadt.* The first and second decades of January, with the exception of 2 or 3 days, were intensely cold. All records of former winters of continuity of cold weather appears to be broken. Of the 4 inches of snow left over from the old year, about 2 inches are still on the ground, a little more than 2 inches having fallen this month. Apple trees have bursted from the intense and continuous cold.

ATLANTIC.—*Thos. H. Whitney.* The first half of the month was very cold, but the ground was well protected by snow. Making allowance for the increase of 100 feet in the elevation of the instruments, since previous record of 35° below zero was made, the minimum of 34° below zero on the 12th was fully as cold or colder than ever recorded here.

AUBURN.—*Geo. E. Kellogg.* January was the coldest month in the history of this station.

BELMONT.—*Geo. P. Hardwick.* The temperature was the lowest ever recorded here. Two feet of snow have fallen thus far this winter. Feed for stock is getting scarce and is high in price.

BONAPARTE.—*B. E. Vale.* The first 15 days of the month gave an average daily maximum temperature of 4°, and an average minimum of -9.3°.

BRITT.—*L. M. Goodman.* This has been a notably severe winter month; there being only 4 days during the first half of the month with the maximum temperature above zero, the highest being 9° on the 13th and 14th. There was much snow and it drifted badly.

BURLINGTON.—*M. E. Poppe, Jr.* A slight earthquake shock was felt on the 2d. The river channel was closed on the 5th. Ice at the close of the month was 12 to 20 inches thick.

CHARITON.—*C. C. Burr.* January, 1912, made a new record for low temperature and for the number of consecutive days with the temperature below zero. Stock has stood the cold well, but feed is scarce and high in price. Many farmers are buying corn.

CLINTON.—*Luke Roberts.* January, 1912, was the coldest month on record since observation began in 1861. There was, however, very little precipitation.

CRESTON.—*O. J. Colby.* The mean temperature for the first 21 days was 3.8° below zero.

DAVENPORT.—*U. S. Weather Bureau.* The mean temperature of 8.0° for the month just passed is the lowest monthly mean temperature recorded at this station since its establishment in 1871. The means during the first 16 days were continuously and decidedly below the normal, and minimum temperatures below zero were also recorded daily throughout that period, except on the 3d, when the lowest temperature was 0.8°. Only one other January, that of 1872, when the total precipitation was 0.13 inch, was drier than the past month. The Mississippi River became closed during the night of the 4th-5th. On the evening of the 29th the thickness of the ice was 14.5 inches, though the average thickness on the evening of the 22d was 20.3 inches. Automobiles crossed the river between Davenport and Rock Island on a number of days when the ice was thickest.

DEBUIQUE.—*U. S. Weather Bureau.* The monthly mean temperature was 1.7° lower than ever before recorded at this station for any month. It was 2.8° lower than previously recorded in January. The record for mean temperature at this station began in 1851, but is broken for several

of the earlier years. The minimum temperature was below zero 16 consecutive days, or 1 more than previously recorded. The average temperature for the first 12 days was 7.1° below zero; for the 8 days from January 5th to 12th, it was 10.4° below zero; for the first 21 days it was 2.1° below zero. There were 21 days during the month with a minimum of zero or below or 2 more than ever before recorded during any one month. There were 6 days with a maximum temperature below zero, or 2 more than ever before recorded in any one year. On the 5th the temperature remained about 18° below zero during all the hours of daylight. It was 19° below zero at noon, with full sunshine. Although it was the coldest month ever recorded here, there was an entire absence of severe winter storms. The winds were light for January. During the first 3 weeks the extreme cold greatly interfered with traffic on all the railroads in this section. Passenger trains ran very late, particularly from the 5th to the 12th, while freight service was completely demoralized. In the cities and towns of this section numerous water pipes and in some instances water mains were frozen, causing much loss and great inconvenience. Sleighing was excellent throughout the month. At the close of the month all rivers of the district were frozen, and at Dubuque the ice was 29 inches thick. The ice harvest is about completed, and the quality is unusually fine. Three slight but distinct tremors of an earthquake were felt at 10:22 A. M. of the 2d.

ELMA.—*H. A. Moore.* There were 26 days during the month on which the temperature was below zero. There is 24 inches of snow in the timber.

FAIRFIELD.—*Prof. R. Monroe McKenzie.* The first half of the month gave abnormally low temperatures, but the month was very dry and the ground was protected by a good covering of snow.

FOREST CITY.—*J. A. Peters.* January was the coldest month on record at this station and the 12th with a minimum temperature of 35° below zero was the coldest day on record. The month was very stormy and blustery.

GRAND MEADOW (Postville P. O.)—*F. L. Williams.* The month was free from bad storms but it was the coldest on record at this station and the 12th with a minimum of 35° below zero was the coldest day in the history of the station.

GREENFIELD.—*R. B. Oldham.* January was a very cold month, but it was free from bad storms.

GWINNELL.—*D. W. Brainard.* January was the coldest month on record at this station.

INDIANOLA.—*Prof. John L. Tilton.* Very marked sun dogs on the 20th. One north and one south of the sun and a streak of light upward from the sun between 8 and 9 A. M.

INWOOD.—*F. B. Hanson.* The month started in cold and continued without any relief until the 21st. A minimum temperature of 46° below zero was observed on the 12th, which is the coldest on record at this station.

IOWA CITY.—*Prof. Arthur G. Smith.* This has been the coldest and driest month known in many years. It was the coldest month since observations began at this station in 1858. The temperature was below zero at the minimum, 26 out of the first 21 days.

JEFFERSON.—*Ora M. Hall.* Had not the farmers cut up a great deal of corn last fall, there would now be a scarcity of feed as the hay crop last year was very small, and is now selling at \$20 per ton.

KEOKUK.—*U. S. Weather Bureau.* The temperature averaged 20° below the normal for the first 20 days. The month was the coldest January during the forty years this station has been in operation. The previous lowest mean was 14.2°. There were sixteen days on which the temperature was below zero which is two more than ever before recorded. There was a light covering of snow on the ground until the 21st. After that date the ground has been mostly bare, except in a few sheltered places. The severe cold stopped the work of the Mississippi River Power Company from the 1st to the 20th, but work was resumed on the 21st and continues at the close of the month.

KEOSAUQUA.—*J. H. Landes.* The first three weeks were exceptionally cold. The whole month was characterized by good roads. An abundance of fine river ice has been harvested.

LAMONI.—*Prof. T. J. Fitzpatrick.* Old settlers believe this month to have been the coldest in 30 years.

LOGAN.—*Glenn H. Stern.* January, 1912, was the coldest month on record at this station and observations began in May, 1865. The mean for the past month is 6.5°. The next coldest month was January, 1886, with a mean of 7.1°.

MONROE.—*J. A. Dibel.* The roads have been poor all of the month on account of snowdrifts. Stock has required more feed during the month of January.

NORTHBORO.—*J. M. Darby.* The temperature on the 12th —29° below zero, was the lowest recorded here since January 5, 1884, when it was 34° below zero. The peach trees are dead. Snow is nearly gone.

RIDGEWAY.—*Arthur Betts.* January was the coldest month on record. The temperature was below zero on 21 days. First half of the month was extremely cold. Only one January has been drier. The month was fine with much sunshine and no bad storms, and the cold was not generally felt.

SIoux CITY.—*U. S. Weather Bureau.* The daily minimum temperature was below zero every day from December 27, 1911, to January 15, 1912. This is the longest period of extremely low temperatures ever recorded at this office.

WEST BEND.—*Phil Dorweiler.* This has been the coldest month on record. The temperature was below zero on 22 days. Sleighing was very good.

FEBRUARY.

With the exception of the low temperatures during the first 12 days, and the abnormally heavy snow storm over the southern and eastern counties on the night of the 25th and the 26th, February, 1912, was a very pleasant winter month. For the state, as a whole, the temperature was slightly below and the precipitation slightly above the normal, but the excess of precipitation was due to the abnormally heavy snow on the 25th-26th, which was confined to the southern and eastern counties; the northwestern third of the state reporting a decided deficiency of precipitation. Over the southern and especially the extreme southwestern counties, the storm broke all former records as to amount and the short time in which it fell. More than 20 inches fell in Fremont and Page counties and most of it fell in about 12 hours. The high winds that obtained during the storm caused the snow to drift badly, and as a result, traffic on highways and railroads was delayed and many highways were blocked for two or three days.

During the first 12 days of the month, low temperatures prevailed, after which milder weather obtained until the 26th. The maximum temperatures ranged between 40° and 50°, the highest being recorded at most stations on the 23d. The 2d, 3d, 4th and 9th were the coldest days, the minimum temperatures varying from —10° to —20°. The ground was covered with snow during the entire month over the northern, central and northeastern counties, but over the southern and western counties the ground was practically bare between the 19th and 24th, and in the extreme northwestern counties there was little or no snow on the ground after the 20th. Winter grains are thought to be in good condition. Stock has wintered well notwithstanding the severe cold weather, but feed is getting scarce and hay is high in price.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 113 stations, was 18.1°, which is 1.1° below the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 15.9°, which is 0.3° below the normal; Central section, 17.7°, which is 1.9° below the normal; Southern section, 20.6°, which is 1.2° below the normal. The highest monthly mean was 23.4°, at Northboro, Page County, and the lowest monthly mean, 13.4°, at Charles City, Floyd County, and at Forest City, Winneshiek County. The highest temperature reported was 57°, at Keokuk, Lee County, on the 23d; the lowest temperature reported was —20°, at Decora, Winneshiek County, on the 3d. The average monthly maximum was 45°, and the average monthly minimum was —15°. The greatest daily range was 53°, at Sibley, Osceola County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 121 stations, was 1.21 inches, which is 0.15 inch above the normal. By sections the averages were as follows: Northern section, 0.46 inch, which is 0.48 inch below the normal; Central section, 1.21 inches, which is 0.13 inch above the normal; Southern section, 1.95 inches, which is 0.80 inch above the normal. The greatest amount, 3.25 inches, occurred at Lenox, Taylor County, and the least, 0.04 inches, at

Inwood, Lyon county. The greatest amount in twenty-four hours, 2.00 inches, occurred at Northboro, Page County, on the 25th-26th. Measurable precipitation occurred on an average of 5 days.

SNOW.—The average fall was 11.2 inches. The greatest amount was 33.5 inches at Clarinda, Page County; the least amount was 0.5 inch at Inwood and Rock Rapids, Lyon County.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 10; partly cloudy, 9; cloudy, 10. The duration of sunshine was slightly below the normal, the percentage of the possible amount being 63 at Charles City; 40 at Davenport; 64 at Des Moines; 44 at Dubuque; 41 at Keokuk; and 51 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was 41 miles per hour from the north, at Sioux City, Woodbury County, on the 1st.

FEBRUARY NORMALS FOR IOWA—1890-1912.

Normal temperature for February, 29.6°.

Warmest February, 1892, with mean temperature of 28.1°.

Coldest February, 1899, with mean temperature of 12.2°.

Normal February precipitation, 1.11 inches.

Wettest February, 1911, with total precipitation of 2.76 inches.

Driest February, 1904, with total precipitation of 0.41 inch.

Average depth of snowfall, 7.3 inches, (1892 to 1912 inclusive).

Greatest snowfall in February, 15.5 inches in 1905.

Least snowfall in February, 2.6 inches in 1902.

Average number of days with 0.01 inch or more of precipitation, 5.

Prevailing wind direction, northwest.

Average number of clear days, 12; partly cloudy, 8; cloudy, 8.

THE WINTER OF 1911-1912.

The mean temperature for the three winter months is 16.7°, which is 5.2° below the normal for the state. The highest temperature reported was 60°, at Keokuk, Lee County, on December 10th. The lowest temperature reported was -47°, at Washta, Cherokee County, on January 12th. The average monthly precipitation for the state was 1.44 inches, and the average total precipitation was 4.31 inches, or 0.91 inch above the winter normal. The average total snowfall, unmelted, was 29.3 inches, or 12.0 inches more than for the winter of 1910-1911. The average number of days with .01 inch or more of precipitation was 17, or 3 more than for the previous winter. The average number of clear days was 37, partly cloudy, 22; cloudy, 32, as compared with 36 clear, 21 partly cloudy, and 33 cloudy days during the winter of 1910-1911. The winters of 1892-3; 1903-4; and 1904-5 were colder than the past winter. The average temperatures for those winters were 14.9°, 16.1°, and 15.8° respectively, but January, 1912, was much colder than any month on record.

OBSERVER'S REMARKS.

ALBIA.—*J. I. Chenoaeth.* February was another cold month with the temperature below zero on 8 days, with a total of 14.5 inches of snowfall. The worst blizzard of the winter was on the 25th-26th, when 10 inches of snow fell, with high wind which drifted the snow badly and delayed railroad trains 12 hours.

ALTA.—*David E. Hadden.* February was a very cold month with the ground covered to a depth of nearly 1.5 feet of snow the major part of the time.

ATLANTIC.—*Thos. H. Whitney.* The ground was well covered with snow until the last few days of the month. There were no severe storms except on the night of the 25th-26th, and this was of short duration.

BAXTER.—*W. R. Vandike.* We have had sleighing since December 26, 1911, and it is still good on March 1, 1912. There has been an unusual amount of moisture in the snow this winter.

BEDFORD.—*E. E. Healy.* There is more snow on the streets of Bedford than was ever known before.

BELMONT.—*Geo. P. Hardwick.* The temperature was low but there were no severe storms. There were slight thaws during the third week but there was little running water. The shortage of last crop of roughage feeds, followed by hard winter makes expensive wintering of farm animals.

BURLINGTON.—*M. E. Poppe, Jr.* On the 11th the ground was frozen to a depth of 3 feet and 10 inches, in a place where the sun could shine on it all day. On the night of the 25th a heavy snowstorm occurred, accompanied by high winds which drifted the snow badly, the drifts being several feet deep and all trains were late.

CENTERVILLE.—*Gordon Peacock.* Very high wind with 16 inches of snow on the 26th.

CHARLTON.—*C. C. Burr.* February was an unusually cold month and closes with the temperature below zero. Stock doing well but feed is getting scarce and high in price. The highways are badly drifted with snow.

CHARLES CITY.—*U. S. Weather Bureau.* The marked feature of the month was the intensely cold weather that prevailed during the first ten days; the maximum temperatures ranging from 5° below to 20° above zero, and the minimum temperatures from 5° to 20° below zero.

DAVENPORT.—*U. S. Weather Bureau.* The only heavy snow of the present season occurred on the 25th-26th, when the total fall amounted to 7.9 inches. Owing to the strong wind that prevailed at the time, the snow was drifted badly and traffic was brought to a standstill. The Mississippi remains closed, the ice averaging about 16 inches in thickness.

DUBUQUE.—*U. S. Weather Bureau.* The storm that began about midnight of the 25th was the only storm of much importance during the

winter to date. The total snowfall during the 12 hours ending at noon of the 26th was 14.5 inches; of this amount, 9.8 inches fell up to 6:30 a. m. of the 26th. No storm of such short duration for many years has produced so much snow. High winds prevailed during the storm, drifting the snow badly. Drifts 3 to 4 feet were common. Street railway traffic was much interfered with and was kept open only with great difficulty. Passenger trains were delayed on all railroads both on the 26th and 27th, and some of them ran several hours late.

All rivers in the Dubuque district remained frozen at the end of the month. The ice at Dubuque averaged about 21 inches during the month. It was about 20 inches at the close of the month and becoming honey-combed.

GRAND MEADOW.—(P. O. Postville.) *F. L. Williams.* The month was cold but there were no bad storms. Stock wintering fairly well.

INWOOD.—*F. B. Houston.* The month gave an unusually small amount of precipitation, and the weather was fairly good for February. The fine weather on the 14th to 18th with a few warm days since melted practically all the snow.

KEOKUK.—*U. S. Weather Bureau.* Frequent very light snow flurries during the month, leaving the ground covered but lightly until the deep snow of the 25th-26th. Rivers remained frozen during the month, the ice reaching a thickness of 20.5 inches on the 12th, with 14 inches remaining at the close of the month.

Work on the Mississippi River Power Dam has been pushed whenever the temperature permitted, and has made fair progress notwithstanding the severe winter.

MONROE.—*J. A. Dibel.* Snow on the ground has caused the farmers to lose the feed in the fields which has made it necessary for them to buy a lot of hay.

NORTHBORO.—*J. M. Darby.* The storm of the 25th-26th gave the heaviest fall of snow we have had in 42 years. All travel was suspended on account of the roads being blockaded with snow.

PACIFIC JUNCTION.—*H. H. McCartney.* The month gave more snow and the worst drifting since 1889.

PERRY.—*S. J. Brumfield.* The ground has been well covered with snow since December 26th.

STIOUX CITY.—*U. S. Weather Bureau.* The ice in the Missouri River continues solid at 17 to 24 inches.

STOCKPORT.—*C. L. Bewick.* A good month for feeding stock. The only storm was on the 25th-26th when heavy snow and high wind stopped railroad trains for 3 days and rural mail service for a week on some east and west roads.

WAUKEE.—*Samuel F. Foff.* There have been 75 consecutive days with the temperature at or below the freezing point, and there has been only one day since December 16th when it did not freeze. The ground is still covered with snow but there is very little frost in the ground.

MARCH.

With the exception of March, 1899, the month was the coldest March of which we have a record in this state. The average temperature of the past month for 113 stations is 24.9°, and while the mean of the records of 125 stations for March, 1899, was 23°, the average temperature of the regular weather bureau stations at Charles City, Davenport, Des Moines, Dubuque, Keokuk, Omaha, and Sioux City, where the thermometers and their location have remained practically the same, is 0.4° lower for the past month than it was for March, 1899. The records at Dubuque, which are complete for 60 years, except for 1857, 1872 and 1873, show the month just closed to have been 0.6° colder than any other March in the history of the station. The first half of the month was remarkable for the persistency of low temperatures, the means being from 10° to 25° below the normal almost daily. The latter half of the month was milder, but on only one or two days was the mean temperature above the normal or the minimum temperature above the freezing point. However, a decided change to spring-like conditions set in toward the close of the month, during which time the snow melted rapidly and by the 31st it had practically disappeared, except where it lay in drifts. Some frost remained in the ground at the close of the month, but the amount was inconsiderable. Nearly all of the precipitation was in the form of snow, and while there were four principal storm periods, the storms of the 14th-15th and 20th were the only ones of importance. That of the 20th, when more than a foot of snow fell generally, was one of the heaviest March snow storms on record. It was not, however, as injurious to railroad traffic as the storm on the 14th, when all cuts were drifted full of snow and many trains were delayed from 10 to 24 hours, and on some of the branch lines trains were abandoned for one or two days. Ice in the rivers, in the southern half of the state went out between the 24th and 28th, but in the extreme northern counties the ice was still intact. All rivers and creeks were rising rapidly at the close of the month, and in the southern counties were out of their banks. No field work was practicable, but fall sown grains were showing up in good condition after the disappearance of the heavy snow, which had covered the fields since December 17th.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 113 stations, was 24.9°, which is 9.1° below the normal for Iowa. By sections, the mean temperatures were as follows: Northern section, 23.6°, which is 7.6° below the normal; Central section, 24.5°, which is 9.7° below the normal; Southern section, 26.6°, which is 10.1° below the normal. The highest monthly mean was 29.8°, at Keokuk, Lee County, and the lowest monthly mean, 21.6°, at Estherville, Emmet County. The highest temperature reported was 70°, at Mount Ayr, Ringgold County, on the 30th; the lowest temperature reported was -19°, at Corning, Adams County, on the 9th. The average monthly maximum was 58°, and the average monthly minimum was -5°. The greatest daily range was 50°, at Keosauqua, Van Buren County. The average of the greatest daily ranges was 35°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 121 stations, was 2.01 inches, which is .09 inch above the normal. By sections the averages were as follows: Northern section, 1.46 inches, which is 0.27 inch below the normal; Central section, 2.30 inches, which is 0.32 inch above the normal; Southern section, 2.26 inches, which is 0.21 inch above the normal. The greatest amount, 5.25 inches, occurred at Earlham, Madison County, and the least, 0.60 inch, at Clear Lake, Cerro Gordo County. The greatest amount in twenty-four hours, 1.59 inches, occurred at Guthrie Center, Guthrie County, on the 20th. Measurable precipitation occurred on an average of 7 days.

SNOW.—The average snowfall was 19.1 inches. By sections the averages were as follows: Northern, 12.8 inches; Central, 22.2 inches; Southern, 22.4 inches. The greatest monthly amount reported was 52.5 inches at Earlham, Madison County.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 6; cloudy, 10. The duration of sunshine was above the normal, the percentage of the possible amount being 70 at Charles City; 54 at Davenport; 63 at Des Moines; 59 at Dubuque; 53 at Keokuk, and 59 at Sioux City.

WIND.—Northeast winds prevailed. The highest velocity reported was 36 miles per hour from the northwest, at Sioux City, Woodbury County, on the 17th.

MARCH NORMALS FOR IOWA—1890-1912.

Normal temperature for March, 34.2°.

Warmest March, 1910, with mean temperature of 48.9°.

Coldest March, 1899, with mean temperature of 23.0°.

The mean temperature for March, 1912, was 24.9°.

Normal March precipitation, 1.74 inches.

Wettest March, 1901, with total precipitation of 2.64 inches.

Driest March, 1910, with total precipitation of 0.17 inch.

Average depth of snowfall, 5.4 inches (1892 to 1912, inclusive.)

Greatest snowfall in March, 19.1 inches, in 1912.

Least snowfall in March, trace, in 1910.

Average number of days with 0.01 inch or more of precipitation, 6.

Prevailing direction of wind, northwest.

Average number of clear days, 12; partly cloudy, 8; cloudy, 11.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenoweth.* March can be classed as a genuine winter month. There were 16.5 inches of snow and many drifts remain on the ground. Severe blizzards occurred on the 14th and 20th, which interfered with traffic and delayed trains from 16 to 16 hours.

AMANA.—*C. Schadt.* March was a very cold month, with not one warm and pleasant day. Several snowstorms occurred, the heaviest of which was on the 20th. There are no signs of vegetable life visible at the end of the month. No work could be done in the fields. With regard to cold,

snow and backwardness of the season, the month seems to stand without a precedent.

ALTA.—*David E. Hadden.* The first three weeks were cold and stormy, but the last week was warmer and the snow melted rapidly. The ground was well covered with snow nearly the entire month.

AMES.—*Iowa State College.* The ground was nearly free of snow on the 26th, for the first time since the 17th of December, 1911.

ATLANTIC.—*Thos. H. Whitney.* The snowfall of the month has been equaled only once since station was established in 1890, and greatly prolonged the winter. The roads were in very bad shape throughout the month, but high winds and sudden changes were not as prevalent as usual.

BAXTER.—*W. R. Vandike.* With 26.4 inches of snow in March we have had a total of 70.3 inches of snowfall during the winter, with three and a half months of sleighing. We have not had as much snow in any one winter in over 56 years.

BELMOND.—*Geo. P. Harwick.* March gave much cloudy weather but no severe storms. We have had 90 days of sleighing with a total snowfall for the winter of 49.3 inches. River, where bare of snow froze 35 to 40 inches. Stock feed is now very scarce.

BONAPARTE.—*B. R. Vale.* Many snow drifts still in evidence at close of month, making a late spring.

BOONE.—*Carl Frit Henning.* Ice going out of the Des Moines river on March 27th, 28th and 29th, and river out of its banks on the 30th.

BERLINGTON.—*Max E. Poppe, Jr.* In 1911 the ice bridge went out on February 16th, and in 1912, on March 24th. The ice bridge was used 79 days during the past winter. No seeding or planting done yet, but winter wheat is in good condition and doing well.

CHARITON.—*C. C. Burr.* The month has been abnormally cold and unfavorable from the farmer's viewpoint. No oats sown yet. Many snow drifts still visible, and the soil is very wet and frost is not yet all out of the ground. Stock wintered well but feed is about gone and value high.

CHARLES CITY.—*U. S. Weather Bureau.* The most marked feature of the month was the remarkably low temperature recorded on the morning of the 22d, 6° below zero. This is the lowest temperature recorded during the last decade of March for the past 22 years.

COLUMBUS JUNCTION.—*J. B. Johnston.* Robins were seen for the first time this season on the 19th. Ice in the Iowa River broke up on the 28th.

CORYDON.—*May C. Miller.* Blue birds, robins and meadow larks came on the 18th, black-birds and frogs on the 30th, and a red bird has been seen for the past month. Wild geese have been flying north for the past week. Stock is looking well, but feed is getting scarce. Frost is not quite all out of the ground in some places.

DAVENPORT.—*U. S. Weather Bureau.* Heavy snow fell on the 14th and 15th, when the total fall amounted to 11.2 inches. A heavy snow and sleet storm occurred on the 20th and 21st, during which the estimated amount of snowfall was 3.5 inches, and the estimated amount of sleet, 1.7 inches. The month was the coldest March on record at this station, the temperature having been above the normal only three days, the 17th, 19th and 31st.

RIVER.—The ice on the Mississippi did not show any signs of breaking up at this point until the 25th, when it began to move on the LeClaire rapids, near Bettendorf. Ice remained on most of the reach of river from LeClaire northward to Dubuque, with moderate stages above Davenport.

DUBUQUE.—*U. S. Weather Bureau.* The average temperature was 25.2°, or 8.0° below normal. It was the lowest mean by 0.6° ever recorded at this station in March, and the record is complete for 60 years, except for 1857, 1872 and 1873. The average temperature was 14° lower than last year and 23° lower than in March, 1910. The daily minimum temperature was above freezing only on the 31st. Total amount of unmelted snow, 16.7 inches, which is the greatest amount recorded at this station in March since 1891, and few months have ever produced a greater amount. There was 5.2 inches on the ground on the 15th, and a trace at the close of the month, except in drifts. Five inches of snow fell on the 14th and 8.0 inches on the 20th and 21st. Drifts 2 to 4 feet deep were common. Railroad traffic was interfered with, and some main line trains were delayed several hours.

RIVERS.—The ice in the Mississippi River at Dubuque was about 20 inches thick up to the middle of the month, after which it was very thin near the shore and unsafe to measure. In the harbor it was 16 to 28 inches on the 25th, and the ice was heavy. The river was rising quite rapidly at the close of the month and the field of ice was covered with water and beginning to break up.

ELKADER.—*Charles Reinecke.* Ice went out of the Turkey river on the 19th.

ESTHERVILLE.—*A. O. Peterson.* A thunderstorm occurred on the morning of the 31st with rain turning to sleet and later to snow.

FAIRFIELD.—*Prof. R. Monroe McKenzie.* An exceedingly cold month with a very unusual amount of snow for March.

FAYETTE.—*R. Z. Latimer.* The ice broke up and went out of the streams on the 19th. Maple sap was running and robins were seen on the 27th. Snow is all gone at the end of the month, except in drifts.

FOREST CITY.—*J. A. Peters.* No seeding done. Snow still in some fields. Hay is very scarce and high price, \$16.00 per ton, yet cattle and horses have been well wintered.

HARLAN.—*C. A. Reynolds.* High winds prevailed on the night of the 7th-8th which drifted the roads full of snow.

IOWA CITY.—*Prof. Arthur G. Smith.* Ice in the Iowa River did not go out until the 30th.

KEOKUK.—*U. S. Weather Bureau.* Total snowfall, (unmelted), 10.5 inches, but about 4 inches of snow not considered as it melted as it fell. The ground was covered with snow until the 16th, but it has been bare since that date. No farming operations have been possible as water stands in the fields. Ice partially out of the river on the 18th, with heavy gorge south. From the 18th to the 25th the lowlands along the Des Moines river, and along the Mississippi south of the Des Moines were flooded. Trains between Keokuk and Quincy were abandoned.

KEOSAUQUA.—*J. H. Landers.* March was a cold, winterish month, closing with no farm work done. Many farmers are out of hay and are having it shipped in at prices ranging from \$16 to \$22 per ton.

LARRABEE.—*R. C. Carnahan.* The first ducks of the season went north on the 28th.

LEMARS.—*G. A. C. Clarke.* Snow was still on the ground on the 31st, in the form of drifts, on the north side of hedges, buildings, etc.

LENOX.—*J. L. Hurley.* There was no snow on the ground after the 26th except in the form of drifts, some of which were 5.5 feet deep.

MONROE.—*J. A. Dibel.* Very little frost in the ground at the close of the month. Winter wheat is looking well. Roads in bad condition.

MURRY.—*Milton T. Ashley.* Snow is all gone at the close of the month, except some of the larger drifts. Some frost still in the ground.

SIOUX CITY.—*U. S. Weather Bureau.* Light snow was scattered throughout the first half of the month, and the fall of the 20th (13.2 inches) was the heaviest 24 hour fall in the past 10 years. Only a trace remained on the ground on the 28th. Flood stage has been reached on Floyd River today (28th). The ice on the Missouri remains intact with thickness varying from 20 to 30 inches. It is becoming honey-combed and may be expected to break up soon. Latest previous breaking up since 1904, March 8th.

APRIL.

The average temperature and precipitation varied but little from the normal for April; the temperature being only 1.4° above and the precipitation 0.14 inch below the normal. The excess of temperature, however, occurred during the first half of the month, which was moderately warm, except on the first three days when the minimum temperatures were near or below the freezing point; the 3d being the coldest day of the month and the 5th the warmest. Warm periods prevailed on the 4th and 5th and from the 10th to the 12th. The latter half of the month was cool. The precipitation was well distributed throughout the month; the 3d being the only day on which no precipitation was recorded in the state. An unusually heavy snow storm for April prevailed over the southern and eastern counties on the 17th. Thirty-six stations within the area of the storm reported an average of 4.0 inches of snowfall; the greatest amount being 12.0 inches at Wapello.

The prevailing wind velocities were much greater than usual for April, and exceeded those for March. Several destructive wind storms occurred, the most damaging ones reported being in the vicinity of Earlham and Boone, on the 13th.

As a whole the month was quite favorable for farm operations, but owing to the fact that no field work was done during March, spring plowing, seeding and planting were delayed and seeding was not completed until the close of the month, and no corn planting was done. At the end of the month the early sown oats were up, and showed a good stand, grass was improving and some stock was in pasture. Cherries and plum trees were beginning to bloom in the southern counties, but in the remainder of the State the buds were still dormant or just beginning to swell.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 114 stations, was 49.9°, which is 1.4° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 48.5°, which is 1.7° above the normal; Central section, 50.1°, which is 1.6° above the normal; Southern section, 51.2°, which is 0.5° above the normal. The highest monthly mean was 53.0°, at Keokuk, Lee County, and the lowest monthly mean, 46.4°, at Estherville, Emmet County. The highest temperature reported was 84°, at Inwood, Lyon County, on the 5th; the lowest temperature reported was 20°, at Decorah, Winneshiek County, on the 3d. The average monthly maximum was 75°, and the average monthly minimum was 27°. The greatest daily range was 45°, at Cedar Rapids, Linn County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 122 stations, was 2.66 inches, which is 0.17 inch below the normal. By sections the averages were as follows: Northern section, 2.51 inches, which is 0.04 inch above the normal; Central section, 2.51 inches, which is 0.36 inch below the normal; Southern section, 2.97 inches, which is 0.20 inch below the normal. The greatest amount, 5.66 inches, occurred at Creston, Union County, and the least 0.78 inch, at Waverly, Bremer County. The greatest amount in twenty-four hours, 1.83 inches, occurred at Northwood, Worth County, on the 13th. Measurable precipitation occurred on an average of 8 days.

SNOW.—A measurable amount of unmelted snowfall occurred at 36 stations, the average fall being 4.0 inches. Practically all the snow for the month fell on the 17th. The average for the State was 1.1 inches. By sections the averages were as follows: Northern, 0.1 inch; Central, 1.4 inches; Southern, 1.8 inches.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 13; partly cloudy, 8; cloudy, 9. The duration of sunshine was nearly normal, the percentage of the possible amount being 70 at Charles City; 60 at Davenport; 72 at Des Moines; 64 at Dubuque; 52 at Keokuk; and 56 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 48 miles per hour from the south, at Sioux City, Woodbury County, on the 25th.

APRIL NORMALS FOR IOWA—1890-1912.

Normal temperature for April, 49.0°.
 Warmest April, 1896, with mean temperature of 54.5°.
 Coldest April, 1907, with mean temperature of 41.5°.
 Normal April precipitation, 2.94 inches.
 Wettest April, 1897, with total precipitation of 5.35 inches.
 Driest April, 1907, with total precipitation of 1.32 inches.
 Average depth of snowfall in April, 2.0 inches, (1892 to 1912, inclusive).
 Greatest snowfall in April, 6.0 inches, in 1893.
 Least snowfall in April, trace, in 1897, 1898, and 1902.
 Average number of days with 0.01 inch or more of precipitation, 8.
 Prevailing direction of wind, northwest.
 Average number of clear days, 12; partly cloudy, 9; cloudy, 9.

OBSERVERS' REMARKS.

ALBIA.—*J. I. Chenoweth.* There were 12 rainy days and farm work was delayed two weeks or more by moisture. Very little ground prepared for corn. Small grain and grass doing well. Trees, buds and blossoms were dormant until the last of the month.

ALGONA.—*Dr. F. T. Seeley.* Fruit trees are not in blossom yet, and forest trees are only beginning to leaf out. Grass, where not fed down too short last season, is making good start.

AMANA.—*Conrad Schaal.* The Iowa River reached its highest stage thus far this season on the first of April. The rainfall and temperature did not deviate much from the normal, and farm work was well advanced at the close of the month. No fruit trees are yet blooming.

ALTA.—*David E. Hadden.* The month was cool with frequent rains which put the ground in excellent condition for spring work and seeding. Grass growing well during the last decade of the month.

ALTON.—*W. S. Slagle.* Leaves first appeared on maple and elder trees on April 22d.

AUDUBON.—*Geo. E. Kellogg.* April was an ideal month for farming operations considering the lateness of the season. Small grain is mostly up and shows an even stand. Plowing for corn is nearly completed and some early planting will be done May 1st.

BELLE PLAINE.—*S. P. VanDyke.* On the 17th there was 3.5 inches of snow, melting almost as fast as it fell.

BELMONT.—*Geo. P. Hardwick.* Excessive cloudiness, brisk to high winds and week-end rains prevailed. No fruit bloom at end of month. There are only a few apple buds, but plum trees are full. Grain crops seeded in best of condition. Subsoil yet too dry on dry land.

BLOOMFIELD.—*Albert Power.* Oats are up and looking fine. The ground is thoroughly wet and will insure a good hay crop with normal rainfall in the future.

CHARITON.—*C. C. Burr.* All vegetation making slow growth, but oats showing fairly well. Fifty per cent of the corn ground is plowed and the soil works well. Fruit prospects are good. Some garden stuff is up but makes poor showing.

CHARLES CITY.—*U. S. Weather Bureau.* The most marked feature of the month was the frequent high winds that prevailed; on the 25th and 26th, the extreme velocity recorded was 40 miles per hour. The general weather conditions were favorable for all agricultural pursuits; at the close of the month the seeding of oats was about completed and plowing for corn begun.

CORYDON.—*May C. Miller.* Some very high winds. Snow, sleet and misting rain fell all day on the 17th. The snow and sleet melted as it fell during the day but the ground was white, in sheltered places, on the morning of the 18th.

DAVENPORT.—*U. S. Weather Bureau.* The heaviest snow storm on record at this station for the month of April occurred on the 17th and 18th, when the total depth of snow was 7.8 inches. The total precipitation during the storm was 1.17 inches, which was all in the form of snow. Rather high stages prevailed throughout the Davenport river district during the early part of April, but the highest gauge readings were everywhere considerably below the flood stage. At the close of the month the readings were from 2 to 5 feet lower than those reached at the time of the crest of the rise.

DUREQUE.—*U. S. Weather Bureau.* The temperature was somewhat above the normal during the first half of the month, and slightly below during the latter half. A heavy, wet snow fell on the 17th; the total amount 5.0 inches, was greater than previously recorded in a single April snow storm of the past 20 years. The snow caused some damage to trees, and considerable damage to telephone and telegraph wires. Frosts have been frequent, but no damage to vegetation has resulted. At the close of the month trees were green or rapidly becoming so, and the season is nearly as far advanced as the normal. The snow melted without causing a serious rise in the rivers in this district; the highest stage was 12.2 feet on the 4th, and the lowest was 9.0 feet on the 28th.

FAYETTE.—*R. Z. Latimer.* The month has been cold and backward and frost was slow in coming out of the ground. Seeding did not begin until the 9th, and was not finished until the 25th or later.

FOREST CITY.—*J. A. Peters.* The temperature and rainfall were about normal. Seeding of small grain began on the 8th but it was all in at the close of the month, and plowing for corn begun. Pastures do not afford feed yet, and foliage is coming very slowly.

GRAND MEADOW (Postville P. O.)—*F. L. Williams.* Field work began on the 8th. Small grain all seeded by the end of the month. The ground worked fairly well. Pasturage is short and grass is growing slowly.

IOWA CITY.—*Prof. Arthur G. Smith.* Heavy snow fell all day on the 17th, amounting to 5.0 inches. The latter half of the month was cold, and grass and buds are backward.

NORTHBOBO.—*J. M. Darby.* Winter wheat is badly damaged; some fields damaged 6 per cent, while others are in fairly good condition. Oats coming up fine. Stock is in pasture but feed is short. Everything late. Cherry and plum trees blooming fully a month late.

NORTHWOOD.—*Chas. H. Duclie.* Seeding of small grain is about three-fourths done. Winter wheat, foliage and grass is coming slowly.

OLIN.—*Frank W. Port.* One of the heaviest snow storms of the season began on the night of the 16th and continued all day of the 17th.

POCAHONTAS.—*F. E. Hronek.* Small grain seeding was finished about the 20th. The bulk of the ground is ready for corn planting, and is in good condition. Small grain is doing well.

RIDGEWAY.—*Arthur Betts.* Only four Aprils during the past 15 years have been warmer than the past month. Plenty of thunder showers. No freezing temperature since the 7th.

WAUKEE.—*Samuel F. Foft.* The month has been cool and trees, shrubs, and vegetation are rather backward, but fall grain and pastures look fine. Meadows need more rain. Small grain all sown with ground in good condition. Early garden stuff is up.

WEST BEND.—*Phil Dorweiler.* The month was favorable and farm work is well advanced. Trees are leafing, oats are coming up, and farmers are getting ready to plant corn. The ground is in good condition.

TORNADO IN MADISON AND BOONE COUNTIES.

The following is taken from the reports of the storm published in the Madison and Boone County papers:

On the afternoon of Saturday, April 13th, a storm of tornadic character occurred near Earlham, Madison County. Shortly before three o'clock dense black clouds were seen southwest of Earlham, soon developing into a terrific electrical storm, which passed about one mile east of the town, moving almost northward. It was accompanied by heavy hail and high winds, the latter increasing to tornadic force and demolishing barns and other farm buildings east and north of the town. That the storm had the funnel cloud formation of a tornado cannot be proved by actual observation, but its effects show conclusive evidence of rotary motion. Roofs were torn from hog houses and deposited in a pile inside the foundations, trees were blown down in various directions and their limbs were twisted off as if by a revolving wind. The worst damage was done at Allen Kenworthy's farm, where a barn was totally wrecked, a wood-hed reduced to kindling wood and about 50 fruit trees blown down. The woodshed on this farm was not more than ten feet from the house, yet not even a pane of glass was broken in the house. More or less damage was done to barns and outhouses on the farms of Mrs. M. J. Wilson, W. H. Epperly, F. Bilderback, Clyde McKibben, W. H. and O. L. Taylor, C. O. Clements and Mrs. Lawson Miller. Damage to the extent of several thousand dollars was done to barns, outbuildings, fruit trees, etc., but no damage is reported to live stock nor were there any human lives lost. The track of the storm extended about a mile north of Earlham.

STORM IN BOONE COUNTY.

About four o'clock, or one hour after the storm near Earlham, a funnel cloud was observed approaching Moingona from a little west of south and another from a little east of south. At that time no noise could be heard, but the two storm clouds soon united, forming a huge funnel about 40 yards wide which swept everything before it. The cloud was inky black and the air was suddenly filled with debris. Trees snapped off, roaring noises could be heard, and it seemed as if everything in the track of the storm would be destroyed, but fortunately, it raised and passed over Moingona. It soon descended to the ground, however, and moved in a zig-zag course to the top of the hill west of Moingona and a short distance east of the top of the Coal Valley hill, where it struck and demolished the home of Charles Ford. After it passed the Ford place, the storm moved directly north and passed over the top of the bluff, down the hillside, across the river and headed for the C. J. McCall buildings, but when one-fourth of a mile south of the McCall house, the funnel suddenly turned toward the east and north, wrecking trees, sheds and barns. It crossed the river near the Boone County bridge and after going up the east side of the ravine for a short distance, spent itself and disappeared. The worst damage done by the storm was the wreck of the home of Charles Ford, which was a new and modern house. The debris from the building was scattered over the fields nearly a mile distant. How the members of the Ford family escaped injury cannot be told, even by the people themselves. When the storm hit, the house was lifted up into the air. People living down the valley to the northwest and north say that the house went up fully 300 feet, whirling as rapidly as the fury of the storm could make it. It was not carried a great distance until after the breaking up and this occurred in mid air. Mrs. Ford and her son, Ejner, were in the house at the time it was struck. Immediately after the storm Mrs. Ford was found sitting in a chair in the yard, between the heavy kitchen range and a six-foot piece of brick chimney, with scarcely room between for the chair. Had either the stove or chimney been turned the least bit from their path in falling, Mrs. Ford would probably have been killed. The son dropped into a plowed field northwest of where the house had stood. He was also unscratched. Mr. Ford was in the yard, and while the house and barn were wrecked he was uninjured and only one of his horses that were in the barn at the time it was blown away was injured, and that one only received a few scratches. Considerable damage was done to trees and to outbuildings on the farms of Geo. McNeil, Wm. Rose, Blaine Livingston, John Sparks and Ralph Swain.

MAY.

May was warm and moderately dry, but on the whole the conditions were favorable for agricultural pursuits. The average temperature was 2.6° above normal, and the rainfall, 1.17 inches below the average of past years. The rainfall was, however, well distributed throughout the month, and fairly well distributed geographically, the only sections reporting less than an inch being Carroll, southeastern Harrison, northern Cass and Mills Counties. Over a part of Cherokee and Buena Vista Counties the monthly amount exceeded 6.00 inches, but more than half of it came in a

heavy downpour on the 26th-27th. Over the central and south-central counties, heavy showers occurred on the 10th or 11th, during which several stations received more than 3.00 inches. The heavy rainfall in Cherokee County on the 26th-27th did considerable damage by washing plowed fields and taking out several bridges. The temperature was above the normal except from the 11th to 17th, inclusive, and on the 28th and 29th. The lowest temperatures generally occurred on the 14th, when the minimum was near or below the freezing point in all but the extreme southern counties, and heavy frost occurred in many localities, but no material damage was done except to prevent the germination of corn that had been planted. Rapid progress was made in plowing, planting and re-planting. Owing to poor seed, cold weather, cut and wire worms, considerable replanting was necessary, but at the close of the month nearly all of the corn was planted and the early planting was up, and showed a fair to good stand. The cool weather and frequent showers were beneficial to all small grains and grasses. Spring seeding of timothy and clover were especially in good condition. Fruits were only in fair condition. Apple trees failed to produce the usual amount of bloom, due probably to over-bearing and the drought of last year. Cherries will be about two-thirds of a crop, but plums will yield well.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 111 stations was 62.7°, which is 2.6° above the normal for Iowa. By sections the mean temperatures were as follows: Northern section, 60.1°, which is 1.6° above the normal; Central section, 63.0°, which is 1.6° above the normal; Central section, 63.0°, which is 2.8° above the normal; Southern section, 64.9°, which is 4.8° above the normal. The highest monthly mean was 66.6°, at Keokuk, Lee County, and the lowest monthly mean, 57.6°, at Estherville, Emmet County, and at Sibley, Osceola County. The highest temperature reported was 97°, at Pacific Junction, Mills County, on the 26th; the lowest temperature reported was 29°, at Council Bluffs, Pottawattamie County, on the 14th, at Decorah, Winneshiek County, on the 14th, at Pacific Junction, Mills County, on the 14th, and at Washta, Cherokee County, on the 17th. The average monthly maximum was 88° and the average monthly minimum was 34°. The greatest daily range was 45°, at Council Bluffs, Pottawattamie County, and at Fort Dodge, Webster County. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 118 stations, was 3.33 inches, which is 1.17 inches below the normal. By sections the averages were as follows: Northern section, 3.60 inches, which is 0.95 inch below the normal; Central section, 3.22 inches, which is 1.25 inches below the normal; Southern section, 3.17 inches, which is 1.30 inches below the normal. The greatest amount, 6.41 inches, occurred at Alta (near) Buena Vista County, and the least, 0.72 inches, at Atlantic, Cass County. The greatest amount in twenty-four hours, 4.42 inches, occurred at Des Moines, Polk County, on the 10th-11th. Measurable precipitation occurred on an average of 10 days.

SNOW.—No snowfall was reported.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 14; partly cloudy, 11; cloudy, 6. The duration of sunshine was slightly above

the normal, the percentage of the possible amount being 77 at Charles City, 68 at Davenport, 77 at Des Moines; 62 at Dubuque, 68 at Keokuk, and 67 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 43 miles an hour from the south, at Sioux City, Woodbury County, on the 26th.

MAY NORMALS FOR IOWA, 1890-1912.

Normal temperature for May, 59.8°.
 Warmest May, 1896, with mean temperature of 65.5°.
 Coldest May, 1907, with mean temperature of 53.5°.
 Normal May precipitation 4.48 inches.
 Wettest May, 1892, with total precipitation of 8.77 inches.
 Driest May, 1894, with total precipitation of 1.87 inches.
 Average number of days with 0.01 inch or more of precipitation, 10.
 Prevailing direction of wind, southeast.
 Average number of clear days, 12; partly cloudy, 11; cloudy, 8.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* May has been unusually warm and very favorable for all crops.

ALFA.—*J. I. Chenoeweth.* The first half of the month was too wet for continuous field work, but the lost time was made up during the latter half. Corn is nearly all planted and the early planting shows a fairly good stand. Small grain doing well.

ALGONA.—*Dr. F. T. Seclery.* On the whole, we have had a very good month for field work, and plenty of moisture for growing crops. A large percentage of the corn has been cultivated once, and oats never looked better.

ALTA.—*David E. Hadden.* May was a very favorable month for growing vegetation. A very heavy rainfall occurred on the evening of the 26th, when 3.57 inches of rain fell.

ALLERTON.—*Mrs. George Shriver.* Meadows and pastures are good and oats look well.

ALTON.—*W. S. Slagle.* May was an excellent month for starting crops of all kinds, and we have never had a better prospect.

AMANA.—*Conrad Schadt.* The weather during May was very favorable, both for farm work and for crops. No killing frost occurred.

ATLANTIC.—*Thos. H. Whitney.* The month was characterized by light rainfall and many windy days. At the close of the month rain was falling and badly needed for meadows and unsprouted corn.

BONAPARTE.—*B. R. Vale.* May was a very favorable month for agriculture. We have had 7.54 inches of rainfall this year to date as compared with 13.04 inches for the same period last year but there is more moisture in the sub-soil this spring.

CHARITON.—*C. C. Burr.* The month has been about normal, as to temperature and rainfall. All vegetation made wonderful growth, and corn is now generally up and making a good showing, but there is some corn to plant yet.

CHARLES CITY.—*U. S. Weather Bureau.* The last killing frost of the season occurred on the morning of the 14th, when tender vegetation was considerably injured especially in low places. The last heavy frost occurred on the 17th, but no damage was done.

COUNCIL BLUFFS.—*B. W. Crossley.* Frost on the 14th froze clover and alfalfa.

DAVENPORT.—*U. S. Weather Bureau.* Although an appreciable amount of rain fell on 13 days, the showers were generally light. The temperature was continuously above the normal from the 1st to the 10th, and from the 18th to the 28th; it was lower than the average from the 11th to the 17th. Very light frost formed on the 14th, but no damage was reported.

On account of heavy rains in the upper Mississippi watershed early in May, the stages in the Davenport river district at the close of the month, while not seriously high, were on the average, about 2 feet above those reported at the end of April.

DUBUQUE.—*U. S. Weather Bureau.* A heavy thunderstorm occurred on the morning of the 20th, during which 1.01 inches of rain fell, and another storm on the evening of the 20th gave 1.36 inches, making a total of 2.37 inches for the day. During a thunderstorm on the afternoon of the 26th 1.00 inch of rain fell in an hour, and of that amount .85 inch fell in 25 minutes. Streets were damaged by washing.

The Mississippi River was quite high throughout the month; the maximum stage being 11.8 feet on the 21st and 28th, and the minimum, 8.6 feet on the 10th and 11th.

EARLHAM.—*Geo. Phillips.* Corn is very small for this time of the year, and there is some planting to be done yet.

ELLIOTT.—*C. H. Westrope.* Latter half of the month was very dry, and part of the time was quite cool.

FOREST CITY.—*J. A. Peters.* Heavy frost on the 14th damaged garden truck but did not injure field crops. Pastures are extra good. Small grain made big growth and is well stooled. Corn is all planted and some early fields cultivated. Wire and cut worms are bad in some fields.

GRINNELL.—*D. W. Brainard.* The cool nights have been unfavorable to planted corn, but quite favorable to the small grain and the potato crop. The stand of corn, however, will be fair. Strawberries and cherries will be good crops.

INWOOD.—*B. F. Hanson.* Cool weather has prevailed the greater part of this month with a deficiency of sunshine, which has been favorable to small grain and grasses, but has retarded the growth of corn.

IOWA CITY.—*Prof. Arthur G. Smith.* Cherry and plum trees were in full blossom on the 4th.

JEFFERSON.—*Ova M. Hall.* May was rather dry for a spring month, but all crops are doing well. Corn is being plowed the first time, and oats are from 6 to 12 inches high.

LARRABEE.—*R. C. Carrahan.* Heavy rain and thunderstorm on the 27th. Fields were badly washed in places.

MONROE.—*J. A. Dibel.* Fifteen per cent of corn was replanted, due to some poor seed but mostly on account of cut and wire worms. Small grain is making rapid and rank growth.

RIDGEWAY.—*Arthur Betts.* No frost during May except in low places on the 14th.

WASHTA.—*H. L. Fetter.* A heavy downpour of rain on the 26th did considerable damage by washing plowed fields and flooding low lands. The duration of the storm was about 1 hour and 10 minutes, during which time 2.72 inches of rain fell.

JUNE.

The first and second decades of the month were unusually cool and cloudy, but the last decade was generally clear and dry with the temperature considerably above the normal. The average temperature for the month was, however, 2.6° below the average of June for past years. Light frost occurred on low ground in a few localities in the northern counties on the 7th but no damage was done. The 1st, 2d and 4th were also exceptionally cool days; the lowest temperature reported being 34° at Alton, Sioux County, on the 4th, and at Larrabee, Cherokee County, on the 7th. Higher temperatures prevailed after the 20th, the highest occurring between the 26th and 29th, when all but one station in the state reported maximum readings of 90° or higher, the highest being 101° at several stations. Showers were frequent, quite well distributed, but generally light during the first and second decades. After the 20th the weather was very dry, only a few light and widely scattered showers being reported during the last 4 days.

From an agricultural view point, the month was very favorable, notwithstanding the fact that the weather was too cool for corn during the first 20 days. Small grain, grass and potatoes made rapid growth, and at the close of the month, rye, fall wheat, and early oats were beginning to ripen in the southern counties, and all grains were headed out and filling nicely in the northern counties. The warm, dry weather during the last week or ten days was very beneficial to small grain in checking the development of rust and smut. It was also beneficial to corn which made rapid growth but was still uneven in stand and size. There was more than the usual amount of replanting done on account of poor seed, cool weather and cut and wire worms. Considerable clover and some timothy was put up in fine condition during the last 7 days. The yield of cherries and strawberries were not up to the average, but the size and quality of cherries were much better than usual. At the close of the month all crops are in good condition, but late potatoes, late planted corn, pastures, garden truck and fruit, especially bush berries, would be benefited by rain.

TEMPERATURE.—The mean monthly temperature for the State, as shown by the records of 113 stations, was 66.2°, which is 2.6° below the normal for Iowa. By sections the mean temperatures were as follows: Northern Section, 64.4°, which is 3.0° below the normal; Central Section, 65.3°, which is 2.7° below the normal; Southern Section, 67.8°, which is 2.2° below the normal. The highest monthly mean was 70.8°, at Tipton, Cedar County, and the lowest monthly mean, 62.4°, at Sibley, Osceola County. The highest temperature reported was 101°, at Baxter, Jasper County, on the 28th, at Forest City, Winnebago County, on the 29th, at Odebolt, Sac County, on the 27th, and at Pacific Junction, Mills County, on the 27th and 28th; the lowest temperature reported was 34°, at Alton, Sioux County, on the 4th, and at Larrabee, Cherokee County, on the 7th. The average monthly maximum was 95°, and the average monthly minimum was 42°. The greatest daily range was 48°, at Washta, Cherokee County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 121 stations, was 2.74 inches, which is 1.78 inches below the normal. By sections the averages were as follows: Northern Section, 2.26 inches, which is 2.31 inches below the normal; Central Section, 3.17 inches, which is 1.20 inches below the normal; Southern Section, 2.80 inches, which is 1.82 inches below the normal. The greatest amount, 5.71 inches, occurred at Harlan, Shelby County, and the least 0.78 inch at Rock Rapids, Lyon County. The greatest amount in twenty-four hours 3.04 inches occurred at Harlan, Shelby County, on the 13th. Measurable precipitation occurred on an average of 7 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 9; cloudy, 6. The duration of sunshine was above the normal, the percentage of the possible amount being 86 at Charles City; 75 at Davenport; 74 at Des Moines; 73 at Dubuque; 66 at Keokuk; and 64 at Sioux City.

WIND.—Southeast winds prevailed. The highest velocity reported was 36 miles an hour from the south, at Sioux City, Woodbury County, on the 2nd.

JUNE NORMALS FOR IOWA—1890-1912.

Normal temperature for June 69.4°.

Warmest June, 1911, with a mean temperature of 75.7°.

Coldest June, 1903, with mean temperature of 64.6°.

Normal precipitation for June, 4.37 inches.

Wettest June, 1890, with total precipitation of 7.76 inches.

Driest June, 1911, with total precipitation of 1.82 inches.

Average number of days with 0.01 inch or more of precipitation, 9.

Prevailing direction of wind, southeast.

Average number of clear days, 13; partly cloudy, 10; cloudy, 7.

OBSERVERS' REMARKS.

ALTON.—*N. W. Rowell.* The temperature was below the normal for June, yet all vegetation, except corn, made rapid growth. There is but little corn that is knee high at this time, but the last 10 days have been favorable for a good corn crop.

ALBA.—*J. I. Chenoiceth.* The greater part of the monthly rainfall came on the 5th. The latter part of the month was too dry for gardens and berries, but small grain is excellent and crops are generally in fine condition.

ALLETON.—*Mrs. George Shriver.* Corn is growing nicely, and the oats crop promises well. Clover is about all harvested, and wheat is ready to cut. The ground is getting very dry, and rain is needed.

ALTA.—*David E. Hadden.* June, 1912, was cool with sufficient precipitation for all growing vegetation, but during the last week dry, hot days with clear skies prevailed, and rain is needed at the close of the month.

ATLANTIC.—*Thos. H. Whitney.* The weather prevailed cool and cloudy until the 20th, enabling pastures and small grain to recover from the May drought; closing decade hot and dry. Corn is backward and uneven, but recovering rapidly.

BELMONT.—*Geo. P. Hardwick.* Cloudy and cool until the last week, which was clear and hot. Corn is thin and late, but comparatively clean and advancing. A few apple trees died from the effects of last year's drought. Farm crops are up to the average, and potatoes are good.

BELLE PLAINE.—*S. P. Van Dike.* The rain of June 20th was accompanied by hail and wind, but only slight damage was done to crops.

BONAPARTE.—*B. R. Vale.* June was a cool month, but was favorable to grasses and cereals, and good for cleaning corn fields.

CHARTON.—*C. C. Burr.* Corn is small, but growing rapidly, and the fields are clean. Wheat is a good crop, and ready for the binder. A fine crop of clover has been saved, and pastures are better than usual.

COUNCIL BLUFFS.—*B. W. Crossley.* The temperature and rainfall are about right for growing crops.

CRESTON.—*O. J. Colby.* The first half of the month was good for small grain and grass, and the latter half, though the rainfall was deficient, was good corn growing weather.

DAVENPORT.—*U. S. Weather Bureau.* Except during the last week, the month was generally cooler than the normal, with temperatures continuously below the average from the 4th to the 10th, and from the 16th to the 23d. The maximum temperature was below 90° on only one of the 6 days from the 25th to the 30th, inclusive. While showers were frequent during the first 20 days, most of the rain fell on the 13th and 14th, total amount of 2.33 inches having been recorded on those dates. There was no appreciable rainfall during the last decade of the month. The river remained nearly stationary during the first 10 days, with an average stage in the Davenport of nearly 10 feet. The stream fell rapidly after that time, with gauge readings at the close of the month as follows: Clinton, 3.8 feet; LeClaire, 1.7; Davenport, 3.4; Muscatine, 4.2 feet. There is still sufficient water for the purposes of navigation, although the channel of the river must now be followed closely.

FOREST CITY.—*J. A. Peters.* Oats and wheat are heading. A very few fields of corn will be "knee high," by the 4th of July. Pastures are good.

but need rain. There was a light frost on the 17th, but no damage was done.

GRINSELL.—*D. W. Brainard.* The month was quite favorable to the best interest of the farmer, gardener, and fruit raiser. There was no destruction by bad storms and but little from lightning. The nights have been comfortable. Rain was deficient during the latter half of the month.

INWOOD.—*F. B. Hanson.* Cool, cloudy weather prevailed the first part of the month, but after the thunder shower on the 20th, a change took place, and warm weather with a deficiency of rainfall continued until the end of the month.

LARRABEE.—*R. C. Carnahan.* All of the corn has been plowed the second time, and early oats are about all headed out. Tame hay will be about an average crop. Potatoes are looking well as yet, but are in need of rain.

NORTHBOBO.—*J. M. Darby.* Corn is doing well, and the fields are clean. Oats will be light. Some wheat harvested, and the crop is good and of fine quality. Early planted potatoes are fair, but late planted are suffering from rain.

PELLA.—*John H. VerSteeg.* The first three weeks were too cool for corn, but with higher temperature during the past few days, it is making rapid advancement, but the stand is light and very uneven.

SIOUX CITY.—*U. S. Weather Bureau.* Except for 5 days, the mean temperature was below the normal till the 23d, the average deficiency for the period being 6°. In addition to rains on the 1st and 5th, totalling 1.00 inch, general showers throughout this section of the State from the 8th to the 15th insured a sufficiency of moisture for the next few weeks. On the 20th, a heavy local rain and hail storm did some damage to truck and fruit, but was not widespread.

STOCKPORT.—*C. L. Beswick.* Considerable hay was put up during the lost week of June, and the yield was much above expectation. Rain is needed for all vegetation.

JULY.

From the view point of the agriculturist, July, 1912, was an exceptionally favorable month. The average temperature was 1.2° above the normal and the rainfall was only 0.73 inch below the average of past years.

The temperature was generally above the normal during the first decade of the month, and was below the seasonable average most of the time after the 15th, although there were one or two days during that period when the day temperatures approached very near to or slightly above the century mark. The coldest period was between the 15th and 19th, inclusive, when the minimum temperatures were generally below 50° over the northern and central districts, the lowest being 38° at Rock Rapids on the 17th.

The rainfall came in the form of local showers generally accompanied by thunder and lightning, and in a few localities by hail and wind squalls. The showers were, however, well distributed throughout the month and

fairly well distributed geographically, but the greater amounts of rainfall were reported from the northern and central counties, and the least from the southwestern counties. The only sections reporting less than 2.00 inches were in Cass, Adair, Taylor, northern Montgomery, Wayne, Appanoose and Delaware counties. From there the amounts increased to 6.60 inches in Washington County and 7.40 inches in Mitchell County, the average for the state being 3.71 inches, which is 1.44 inches more than was reported for July, 1911, and 1.85 inches more than in July, 1910. All parts of the state received enough moisture to keep growing crops in prime condition, except in a few localities in some of the southern counties where late corn, pastures and potatoes would have been benefited by a more generous supply.

As most of the showers occurred at night, rapid progress was made in haying and harvesting, and the bulk of the hay and small grain crops were secured in fine condition. Threshing was well advanced by the end of the month, in the southern, and good progress was made in the central districts. Early reports from threshers indicated an abnormally large yield of all small grain, except in the southeastern counties where winter wheat was light on account of winter killing. Corn made an exceptionally rapid growth, and in spite of the late spring, poor seed, and the ravages of cut and wire worms, which necessitated much re-planting, the crop was only a few points below the average of past years on July 31. All of the crop is strong and vigorous and gives promise of a large yield. Potatoes and pastures were generally in good condition.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 116 stations, was 74.6°, or 1.2° above the normal for Iowa. By sections the means were as follows: Northern, 72.7°, or 0.6° above the normal; Central, 74.7°, or 1.0° above the normal; Southern, 76.5°, or 2.0° above the normal. The highest monthly mean was 78.7°, at Northboro, Page County; and the lowest mean was 70.0°, at Sibley, Osceola County. The highest temperature was 103°, at Little Sioux, Harrison County, on the 14th, and at Clarinda, Page County, on the same date; the lowest temperature reported was 38° at Rock Rapids, Lyon County, on the 17th. The average monthly maximum was 88°, and the average monthly minimum, 49°. The greatest daily range was 44°, at Decora, Winneshiek County, and at Spencer, Clay County. The average of the greatest daily ranges was 36°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 123 stations, was 3.71 inches, or 0.73 inch less than the normal. By sections the averages were as follows: Northern, 4.68 inches, or 0.40 inch more than the normal; Central, 3.60 inches, or 0.91 inch less than the normal; Southern, 2.85 inches, or 1.69 inches less than the normal. The greatest amount, 7.56 inches, occurred at Grand Meadow, Clayton County, and at Guthrie Center, Guthrie County; and the least, 1.17 inches, at Greenfield, Adair County. The greatest amount in 24 consecutive hours, 3.43 inches, occurred at Washington, Washington County, on the 20th. Measurable precipitation occurred on an average of 10 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 17; partly cloudy, 10; cloudy, 4. The duration of sunshine was about that usually experienced, the percentage of the possible amount being 76 at Davenport, 80 at Des Moines, 75 at Dubuque, 72 at Keokuk, and 71 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 40 miles an hour from the northwest, at Sioux City, Woodbury County, on the 14th.

JULY NORMALS FOR IOWA, 1890-1912.

Normal temperature for July, 73.6°.

Warmest July, 1901, with mean temperature of 82.4°.

Coldest July, 1891, with mean temperature of 68.5°.

Normal July precipitation, 3.95 inches.

Wettest July, 1902, with total precipitation of 8.67 inches.

Driest July, 1894, with total precipitation of 0.63 inch.

Average number of days with 0.01 inch or more of precipitation, 8.

Prevailing direction of wind, southwest.

Average number of clear days, 17; partly cloudy, 10; cloudy, 4.

OBSERVERS' REMARKS.

AFTON.—*N. W. Rowell.* As a whole the month was favorable for the farmer. Sufficient rain to keep the corn growing and yet not enough to interfere with the harvest. A fine crop of small grain and hay has been put up, and corn promises to be a good crop.

ALBIA.—*J. I. Chenoweth.* July was a fine summer month with only one day on which the temperature was above 100°. All of the small grain has been harvested and quite a quantity threshed without rain. Wheat was never better; averaging 40 bushels per acre, and oats, 45 bushels. Corn is making good growth, but rain would be beneficial for gardens and late corn.

ALGONA.—*Dr. F. T. Seclery.* Haying and harvesting are about completed, and threshing will be in full progress next week.

ALTA.—*David E. Hadden.* An ideal summer month, harvesting of all small grains and haying was carried on, and finished under excellent weather conditions. All crops doing well.

AMANA.—*Conrad Schadt.* The month was warm and dry, but with generally cool nights. Small grain harvested and the yield is fair. Corn and potatoes are in good condition.

ATLANTIC.—*Thos. H. Whitney.* The month was favorable though much deficient in rainfall. Showers, however, were frequent, and corn made fine progress. Hay and small grain harvested in excellent condition, but pastures and meadows are in need of rain at close of the month.

AUDUBON.—*Geo. E. Kellogg.* July was an ideal month for all farming, and the grain crops are the best ever harvested. Corn promises a record yield unless early frost appears. Much of the corn is now in silk.

BAXTER.—*W. R. Vandike.* The largest yield of fall wheat on record in this vicinity was harvested this month. All small grain is good. Corn doing well. No bad storms to blow down the grain.

BELMOND.—*Geo. P. Hardwick.* A few electric storms with high winds during first part of the month. One on the 9th was quite severe, and accompanied by hail, and lodged grain badly. Farm crops are generally above the average of recent years. The surface of the soil is moist, but the subsoil is quite dry from prolonged deficiency of moisture.

BONAPARTE.—*B. R. Vale.* The total rainfall for the month was 2.23 inches as against 3.75 inches last July. We are shy 5.72 inches up to August 1st, as compared with the same period last year.

CHARITON.—*C. C. Burr.* Corn has made great advancement during the month, and the prospect is flattering. All small grains show good yields, and prices are fair. Pastures are fine and stock is in good condition.

CORYDON.—*May C. Miller.* July has been a very dry month. Pasturage is short and gardens are dried up. Corn and oats have done well, and wheat and timothy fairly well.

DAVENPORT.—*U. S. Weather Bureau.* The temperature was generally above the normal during the first decade of the month, and was continuously below the normal from the 15th to the 22d, inclusive, with the greatest departure, 12°, on the 19th. While there was a deficiency in rainfall, the showers were frequent and well distributed throughout the month. The river stages throughout the Davenport district were somewhat higher at the end of the month than at the close of June and were amply sufficient for the purpose of navigation.

DENISON.—*W. C. VanNess.* Nearly every rainstorm was accompanied by lightning.

DUBUQUE.—*U. S. Weather Bureau.* From the 3d to the 9th was the hottest week, but the month was cool for July, there being an average daily deficiency of 1.5°. From the 14th to the 22d the minimum temperature was 60° or below each day. There were 7 days with a temperature of 90° or higher; the maximum being 94° on the 9th. The precipitation was abundant and well distributed throughout the month. There was 75 per cent of the possible amount of sunshine, or 6 per cent above the normal. The average stage of the river was 4.2 feet; the highest being 5.5 feet on the 22d, and the lowest, 3.4 feet on the 9th. Considerable damage was done by lightning during a local thunderstorm on the 28th.

GRAND MEADOW (Postville P. O.).—*F. L. Williams.* Considering the number of days it rained there was a great deal of sunshine. Small grain all in shock and some stacking done. Pastures are good, corn is doing well.

GREENFIELD.—*R. B. Oldham.* This has been a seasonable month, with the exception of a deficiency of rainfall. Corn has, however, made good progress in spite of the drought, and promises a good crop.

GRINNELL.—*D. W. Brainard.* July was a very favorable month for all kinds of work. All maturing crops secured in excellent condition. There

were no severe losses from violent storms. Harvesting is finished and threshing begun.

HARLAN.—*C. A. Reynolds.* On the 9th, the temperature dropped from 90° at 6 p. m., to 65° during the hour following.

INWOOD.—*F. B. Hanson.* The fore part of the month was warm and very favorable for growth of corn, but the last week was rather cool. Enough rain fell to supply the needs of all growing vegetation.

JEFFERSON.—*Ora M. Hall.* Harvesting is all done and threshing begun. Oats are turning out from 40 to 45 bushels per acre.

KEOSAUQUA.—*J. H. Landes.* July was a fine month for saving the big oats crop and the good hay crop, but the latter half of the month was too dry for the promising corn crop.

LITTLE SIOUX.—*Geo. H. Gibson.* A small tornado passed 4 miles north of here on the 9th, moving from the southwest to the northeast. The only damage done was, one barn blown down and one dwelling and a school house moved from their foundations.

MONROE.—*J. A. Dibel.* Thirty-five per cent of threshing done. Oats yield from 30 to 77 bushels per acre; timothy seed, 6; wheat, 18 to 38 bushels. Ninety per cent of the hay has been put in good shape, and considerable straw is being baled. Most new meadows looking fine. Corn is 10 days late.

NORTHBORO.—*J. M. Darby.* The weather has been very dry, and the drought is telling on corn. Winter wheat is yielding from 25 to 30 bushels per acre. Oats all harvested and will give a fair yield. The hay crop was light, and the spring sown clover has been about killed out by the dry hot weather. Potatoes are good.

NORTHWOOD.—*Chas. H. Dwell.* A succession of severe storms passed over this vicinity on the 9th. No less than six occurred, accompanied by wind, hail and severe electrical displays.

PELLA.—*John VerSteeg.* Corn is tasseling and shooting nicely but is fully two weeks later than usual. Light hail fell on the 10th and 15th, but no damage done. Pastures are good.

RIDGEWAY.—*Arthur Betts.* The average temperature was 1° below the normal, but the month was very pleasant, with 78 per cent of sunshine. Hazy and smoky skies were general throughout the month. Thunderstorms occurred on 10 days. There was no July drought this year.

SIOUX CITY.—*U. S. Weather Bureau.* The temperature readings were generally high during the first half of the month, and, except from the 22d to the 25th, low during the second half. No appreciable rain fell during the first week, but showers were well scattered throughout the rest of the month.

WAUKEE.—*Samuel F. Foft.* Harvesting done, and threshing in progress. Heavy yields are reported and the quality is good. Corn is doing fine, and is up to the average for the time of year. The hay crop was heavy, and put up in fine condition. Plums are also heavy.

WEST BEND.—*Phil Dorweiler.* A good month for harvesting and haying, but the last two weeks were quite cool. Oats were lodged badly.

AUGUST.

The temperature was generally below the normal during the first 15 days, but was above the average during the latter half of the month. The average rainfall was but slightly below the normal, the deficiency being only 0.21 inch. All of the precipitation came in the form of local showers and practically all of them were accompanied by thunder and lightning, and in a few instances by wind squalls. The showers were fairly well distributed throughout the month, and with the exception of an abnormally heavy downpour over Dubuque, and nearby counties on the night of the 18th and 19th, and heavy showers in the west central counties during the third week, and a deficiency of moisture over the southeastern counties, the rainfall was well distributed geographically. The frequent showers interfered with threshing and stacking small grain, and damaged some of it in shocks, but they were of material benefit to late corn, potatoes and pastures. Under the effects of a plentiful supply of moisture and the high temperatures that prevailed during the latter half of the month, and especially the last week, corn made very rapid progress toward maturity; but owing to the large amount of replanting done, the crop as a whole is 10 days or two weeks later than usual, and will require most favorable conditions to fully mature before the 10th of October.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 111 stations, was 71.0°, or 0.8° less than the normal. By sections the mean temperatures were as follows: Northern, 68.9°, or 1.4° less than the normal; Central, 71.2°, or 0.7° less than the normal; Southern, 72.8°, or 0.5° less than the normal. The highest monthly mean was 75.0°, at Northboro, Page County, and at Ottumwa, Wapello County. The lowest monthly mean was 65.8°, at Grand Meadow, Clayton County. The highest temperature reported was 101°, this occurring at 8 stations, and with one exception, on the 25th, the lowest temperature reported was 40°, at 4 stations, on the 3d, 4th or 14th. The average monthly maximum was 95°, and the average monthly minimum was 47. The greatest daily range was 46°, at Little Sioux, Logan and Spencer. The average of the greatest daily ranges was 34°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 120 stations, was 3.78 inches, or 0.21 inch less than the normal. By sections the averages were as follows: Northern, 4.60 inches, or 1.08 inches more than the normal; Central, 3.81 inches, or 0.24 inch less than the normal; Southern, 3.01 inches, or 1.39 inches less than the normal. The greatest amount, 7.90 inches, occurred at Fayette, Fayette County, and the least, 0.89 inch, at Washington, Washington County. The greatest amount in twenty-four consecutive hours, 5.50 inches, occurred at Olin, Jones County, on the 19th. Measurable precipitation occurred on an average of 10 days.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 15; partly cloudy, 10; cloudy, 6. The duration of sunshine was less than the normal, the percentage of the possible amount being 65 at Charles City; 69 at Davenport; 64 at Des Moines; 64 at Dubuque; 61 at Keokuk; and 73 at Sioux City.

Southwesterly winds prevailed. The highest velocity reported was 39 miles an hour from the south, at Sioux City, Woodbury County, on the 11th.

AUGUST NORMALS FOR IOWA, 1890—1912.

Normal temperature for August, 71.7°.
 Warmest August, 1900, with mean temperature of 77.4°.
 Coldest August, 1890, with mean temperature of 68.4°.
 Normal August precipitation, 3.61 inches.
 Wettest August, 1903, with total precipitation of 6.64 inches.
 Driest August, 1901, with total precipitation of 1.29 inches.
 Average number of days with 0.01 inch or more of precipitation, 7.
 Prevailing direction of wind, south.
 Average number of clear days, 16; partly cloudy, 10; cloudy, 5.

OBSERVER'S REMARKS.

AFTON.—*N. W. Rowell.* The rainfall has not been excessive, but frequent showers have delayed threshing. Most of the grain was, however, stacked.

ALBIA.—*J. I. Chenowith.* Small grain and hay were harvested with very little loss by rain. Early corn is denting and late corn will be safe from frost by September 30th. Pastures need more moisture.

ALLETON.—*Mrs. George Shriver.* Threshing shows a heavy yield of oats and wheat. Corn is doing well.

ALTA.—*David E. Hadden.* August, 1912, was cool and wet, except during the third decade. Threshing and stacking were delayed somewhat by frequent showers, but otherwise the month was very favorable for all growing vegetation.

ATLANTIC.—*Thos. H. Whitney.* The first ten days of the month were dry and cool, but the balance of the month was warm and sufficient rain fell to benefit late corn and pastures and put ground in condition to plow. Corn made rapid progress toward normal stage, but rain was again needed at the close of the month.

AUDUBON.—*Geo. E. Kellog.* A splendid month for threshing and maturing corn, but the bulk of the corn needs three more weeks of drying weather to be beyond danger of hard frost.

BONAPARTE.—*B. R. Vale.* Rain, 2.44 inches in 9 different showers as against 2.47 inches in 6 showers last August. There has been 5.75 inches less rain this year to date than for the same period in 1911 and only 3.76 inches more than during the first 8 months of the phenomenally dry year of 1901.

CHARITON.—*C. C. Burr.* There was no excess of rain during the month, but frequent showers and cloudy days retarded threshing and damaged grain. The yield of grain was never better. Corn is immense. Pastures are good, and stock is in fine condition, and prices high.

CHARLES CITY.—*U. S. Weather Bureau.* The most marked feature of the month was the cool weather that prevailed from the 1st to the 10th inclusive.

During the first 5 days the average daily deficiency was 14". The rains, mostly in the form of thundershowers, were well distributed, and very beneficial to vegetation as well as putting the ground in fine condition for fall plowing.

CRESTON.—*O. J. Colby*. The average temperature and precipitation were very near the normal, making the month fine for corn, late potatoes and pastures.

DAVENPORT.—*U. S. Weather Bureau*. Showers were frequent during the 1st and 2d decades of the month, but the only rainfall of any importance occurred on the 19th, when the total amount was 2.10 inches. The ground was very dry at the end of the month. The temperature was continuously below the normal from the 1st to the 11th, inclusive, and was above the average from the 17th to the 31st, except on 6 days. Good boating stages prevailed in the Mississippi throughout the month. The excessive rains in northeastern Iowa on the 19th caused a rapid rise in the Maquoketa River, which flooded the pumping station in the city of Maquoketa and put the water works out of commission, leaving that place without water for nearly a day. The electric light plant was also forced to shut down on account of the flood.

The maximum stages in the Mississippi, from below Dubuque to Muscatine, were as follows: Clinton, 8.6 feet on the 22d; LeClaire, 5.1, on the 22d; Davenport, 8.2, on the 22d and 23d; Muscatine, 9.2, on the 23d.

DENISON.—*W. C. VanNess*. Every rain storm during the month was accompanied by thunder.

DUBUQUE.—*U. S. Weather Bureau*. The temperature during the first 16 days was continuously below the normal, and it looked as though the month would be a record breaker for low temperature. The latter half, however, averaged decidedly above the normal. The total rainfall, 6.79 inches, is more than twice the normal amount for August.

The rivers of the district were high for August. Navigation on the Upper Mississippi was excellent throughout the summer. The maximum stage for the month at Dubuque was 8.1 feet on the 20th; minimum, 3.7 feet on the 12th; mean, 5.6 feet.

GRAND MEADOW (Postville P. O.) *F. L. Williams*. The month was cool and showery, making fine pasturage. The second crop of clover is very heavy, but most of it is being cut for hay. Barley is a lighter crop than was expected, but wheat is extra good.

INWOOD.—*F. B. Hanson*. Rain coming in light scattered showers served to freshen up vegetation, but did not help soil for plowing. The highest temperature, 101°, on the 25th, is the maximum for this season.

NORTHBORO.—*J. M. Darby*. August has been a fine month for corn and the prospect is good for a large crop.

RIDGEWAY.—*Arthur Betts*. The month was cool, but August 1903 and 1911 were both cooler. Rainfall was plentiful and well distributed.

SAC CITY.—*E. N. Bailly*. There has been sufficient moisture for plowing and to keep pastures in good condition. Corn is denting, and 25 days without frost will make a bumper crop.

SIoux CITY.—*U. S. Weather Bureau*. The average temperature during the first 16 days of the month was below the normal except on the 12th, while there was an excess of temperature during the latter half of the month. The total rainfall, 7.93 inches, was the heaviest August precipitation in the history of the station. The excessive rainfall occurred on 16th and 17th when 3.94 inches fell in 6 hours. This is the heaviest 12 hour rainfall recorded here. The storm was general in northwestern Iowa, and while some damage was done by washing, and railroad traffic was tied up in places for a few days, the injury to crops was slight.

STOCKPORT.—*C. L. Beswick*. August, 1912, was dry and hot. Pastures generally short and all vegetation is in need of moisture. Corn is ripening and some is almost safe from frost.

WAUKEE.—*Samuel F. Fost*. The month ends with small grain practically all threshed, with an average yield of oats, 63.7 bushels per acre; winter wheat, 38.7. Corn is doing fine and denting.

WEST BEND.—*Phil Dorweiler*. The month was favorable, and corn is doing well, but rather too much rain for threshing and stacking.

HEAVY RAINSTORM AT DUBUQUE, IOWA.

The rainfall during a storm of Sunday night, August 18th, was the heaviest in twelve hours ever recorded here by the Weather Bureau. 5.17 inches fell from 6:52 p. m. of the 18th, to 6:15 a. m. of the 19th. 1.88 inches fell from 7 to 8 p. m. of the 18th, and of this amount one-half inch fell in five minutes. 1.15 inches fell from 9 to 10 p. m.

There was much damage to city streets, estimated at \$10,000 or more. An immense amount of macadam, brick, stones, etc., was carried down West Eighth and Hill Streets, and Julian Avenue. In the vicinity of the Wales Hotel the street was practically impassable to teams for several blocks. In some cases stones weighing one hundred pounds or more were carried down from the side hills and deposited in the streets. Debris was carried down West Eighth Street to below Main. Besides the streets mentioned, Couler, Kauffman, and Eagle Point Avenues were among those most damaged. Kenety & Lee, contractors, were improving Kauffman Ave and they lost heavily from the storm.

The Union Electric Company experienced heavy loss. Car service was suspended in many parts of the city during a large portion of the night of the storm, owing to the condition of the streets. In some cases the tracks were buried in macadam and other debris. There was much damage at Union Park. The creek that runs through this beautiful park became a raging torrent. The water quickly overflowed its banks, and tore up beds of flowers and shrubs by the roots. Benches and other paraphernalia were carried down stream and in some cases destroyed. The water rushed through the theater, and rose nearly to the stage. One track to the park was buried for a mile or more in debris from the side hills. The loss to the company in the city and at the park will be several thousand dollars. The damage from lightning in the city and county was considerable. Several houses and barns were struck, and damage resulted estimated at about \$5,000.

The Illinois Central R. R. and the Chicago-Great Western R. R. were crippled for about 24 hours by washouts in this vicinity. For a few hours freight and passenger service was nearly at a standstill in this immediate section. Cellars were flooded in all sections of the city.

The Mississippi River rose about 2 feet at Dubuque during the storm, and another foot on the day following. Government contractors supplying brush for river improvements lost quite heavily, as the islands upon which they were working were flooded.

The wind accompanying the storm was not severe, and damage to crops was not heavy.

J. H. SPENCER.

SEPTEMBER.

The period of high temperatures that began on August 30th continued until September 9th, the temperature gradually increasing, and culminating with readings above the century mark at several stations in the southern section on the 8th and 9th. The highest temperature reported was 104° at Ottumwa on the 8th. Much cooler weather prevailed after the 9th, and the temperature was below the normal nearly every day after the 12th; the lowest occurring generally on the 26th or 29th, when heavy to killing frosts with temperatures near or below the freezing point were reported from all sections of the state. Showers were frequent and the amounts of rainfall were fairly well distributed, except over Jefferson, Wapello, Davis and Appanoose Counties, where the total for the month was considerably less than one inch. The greatest amounts are reported from the west-central counties. Rain fell somewhere in the State on every day of the month except the 30th; and as a result threshing was delayed and considerable grain in shock and stacks was damaged. The rains, however, put the ground in excellent condition for fall plowing and seeding, and were very beneficial to pastures and meadows. Corn made unusually rapid progress toward maturity during the first 12 days of the month, but the cool weather following checked the rapid development, and about 20 per cent of the crop was more or less damaged by the killing frosts and freezing temperatures during the last week. The total yield will, however, be greater than was ever before produced in the State.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 109 stations, was 62.1°, or 1.6° less than the normal. By sections the mean temperatures were as follows: Northern, 60.3°, or 1.8° less than the normal; Central, 62.2°, or 1.4° less than the normal; Southern 63.7°, or 1.8° less than the normal. The highest monthly mean was 67.4°, at Keokuk, Lee County, and the lowest monthly mean was 57.6°, at Rock Rapids, Lyon County, and at Sibley, Osceola County. The highest temperature reported was 104°, at Ottumwa, Wapello County, on the 8th; the lowest temperature reported was 24°, at Bedford, Taylor County, on the 26th and 30th. The average monthly maximum was 95°, and the average monthly minimum was 30°. The greatest daily range was 47°, at Bedford. The average of the greatest daily ranges was 34°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 119 stations, was 3.98 inches, or 0.57 inch greater than the

normal. By sections the averages were as follows: Northern, 3.09 inches, or 0.32 inch less than the normal; Central, 5.14 inches, or 1.90 inches more than the normal; Southern, 3.70 inches, or 0.13 inch more than the normal. The greatest monthly amount, 10.12 inches, occurred at Audubon, Audubon County, and the least, 0.28 inch, at Centerville, Appanoose County. The greatest amount in 24 consecutive hours, 4.10 inches, occurred at Guthrie Center, Guthrie County, on the 2d. Measurable precipitation occurred on an average of 11 days.

SNOW.—A trace of snow occurred at Marshalltown on the 18th, at Northwood, on the 26th and at Storm Lake on the 17th.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 12; partly cloudy, 8; cloudy, 10. The duration of sunshine was somewhat less than the normal, the percentage of the possible amount being 63 at Charles City, 60 at Davenport, 52 at Des Moines, 58 at Dubuque, 63 at Keokuk and 56 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 40 miles an hour from the west, at Sioux City, Woodbury County, on the 5th.

SEPTEMBER NORMALS FOR IOWA, 1890-1912.

Normal temperature for September, 64.1°.

Warmest September, 1897, with mean temperature of 70.9°.

Coldest September, 1896, with mean temperature of 58.5°.

Normal September precipitation, 3.19 inches.

Wettest September, 1911, with total precipitation of 5.12 inches.

Driest September, 1899, with total precipitation of 0.93 inch.

A trace of snow fell in the State during September, 1908, 1911 and 1912.

Average number of days with 0.01 inch or more precipitation, 7.

Prevailing direction of wind, south.

Average number of clear days, 15; partly cloudy, 8; cloudy, 7.

OBSERVERS' REMARKS.

ALTA.—*David E. Hadden.* The first decade of September was warm, but the remainder of the month was cool and showery. The first killing frost of autumn occurred on the morning of the 26th, and was followed by several cool and frosty nights.

ATLANTIC.—*Thos. H. Whitney.* The first 10 days were hot and rainy, followed by cloudy, damp and increasing cooler weather during the balance of the month. Corn was prevented from maturing as fast as usual and suffered damage on low lands from frost on three nights at close of month.

BELMOND.—*Geo. P. Hardwick.* Much cloudy and cool weather. The first killing frost occurred on the 26th, and damaged 25 per cent of the corn crop. Many silos not yet filled, and but little corn cut for fodder.

BLOOMFIELD.—*Albert Power.* September was a dry month, the total rainfall being only .96 inch. Pastures are dried out and short, and the ground is too dry to plow. Corn has done remarkably well and is about all fully matured.

CHARITON.—*C. C. Burr.* The month was showery, which delayed threshing and injured the quality of the grain. The first frost was heavy and killed vegetation, but injured corn only on the low land.

CHARLES CITY.—*U. S. Weather Bureau.* The first frost of the season occurred on the morning of the 21st but did no injury. The first heavy frost occurred on the night of the 25th, and the first killing on the morning of the 26th, 25 days earlier than last year. All tender vegetation and vine truck were killed and late planted corn seriously injured. On this date a self registering minimum thermometer suspended two inches above sod, registered 26° at 6:00 a. m.

DAVENPORT.—*U. S. Weather Bureau.* There was an appreciable amount of rain on 9 days but the only heavy precipitation was 1.36 inches on the 14th and 15th, though 0.59 inch was recorded on the 20th and 21st. The remaining 7 showers were very light. The most remarkable period of extreme heat, in point of duration, since the establishment of this station in May, 1871, extended from the last two days of August through the first decade of September, during which time the average daily excess in temperature was about 14°. A maximum temperature of 97° was recorded on the 8th and 9th. The last six days of the month were decidedly cooler than the normal, with heavy frost on the 26th, 29th and 30th.

Good stages of water prevailed throughout the Davenport district during the entire month, with gauge readings decidedly above the normal during the middle decade. At the end of September the river was slightly lower than at the close of August.

DURQUE.—*U. S. Weather Bureau.* The first 15 days were very warm, with the temperature normal or above every day. The last 15 days were very cool for the season, averaging nearly 8° daily below the normal. The maximum on the 9th was 94°, or the warmest in September in 12 years. There were four days with the temperature of 90° or above, or the greatest number in September in 14 years. The 30th, with a mean temperature of 40°, was one of the coldest September days ever reported here. It was the wettest September in 16 years, with one exception. There was light frost on the 26th, 28th and 30th, and heavy on the 29th. On the latter date the temperature was down to 32.7°. Only the tenderest vegetation was killed some of the late corn was damaged. On the whole, however, the crop season in this county was one of the best ever known.

The highest stage of the Mississippi River was 10.7 feet on the 15th; in the city, but in the surrounding country garden truck was killed, and lowest, 4.5 feet on the 30th; mean, 6.9 feet.

GREENFIELD.—*R. B. Oldham.* September was a very cool, cloudy month, which retarded the ripening of corn. About 25 per cent of the crop will be injured by the frost. Fall pastures are good.

GRINNELL.—*D. W. Brainard.* As a whole the month was favorable. The frosts of the last five days did no particular damage. The ground is in excellent condition for approaching winter, and fall feed is abundant.

HUMBOLDT.—*J. P. Peterson.* In general September was a very cool month, but corn was practically mature before the first killing frost.

INWOOD.—*F. B. Hanson.* High temperatures prevailed during the first decade, but the latter half of the month was cool, with a deficiency of moisture. Killing frost occurred on the 26th, but most of the corn was mature and beyond danger.

IOWA CITY.—*Prof. Arthur Smith.* The month was marked by the excessive heat during the first ten days, and the unusual number of rainy days. Heavy frost on the 26th did some damage.

JEFFERSON.—*Ora M. Hall.* This has been an exceptionally wet month, but the excess of moisture has put pastures in fine shape.

KEOKUK.—*U. S. Weather Bureau.* The hottest and driest spell of the season prevailed from September 1st to the 10th, when the ground was too hard for plowing. Occasional good showers after the 12th put the ground in good condition, and at the end of the month the usual amount of fall plowing had been done, and a large acreage seeded with wheat. The first frost of the season was on September 26th, and was heavy, with another heavy frost on the 40th. No material damage resulted from these frosts, all except very late planted corn being beyond danger, and some new corn being on the market. The tomato crop has been large, and fruit of excellent quality. Packers report the largest crop for many years, and at this date (October 3d) tomatoes are still coming in plentifully.

KEOSAUQUA.—*J. H. Landes.* The first ten days were characterized by high temperatures, the maximum for the season being recorded on the 8th, viz.: 99 degrees. The first frost occurred on the 26th and was killing in its effect. Some corn was injured.

LARRABEE.—*R. C. Carnahan.* Most of the corn was out of the way of the first killing frost.

LITTLE STOUX.—*Geo. H. Gibson.* The minimum temperature on the 26th was 30°, but there was no frost as the weather was cloudy, and there was very little freezing. There was no material damage done.

MARSHALLTOWN.—*Jacob Eige.* A very few snow flakes fell on the morning of the 18th.

MONROE.—*J. A. Dibel.* Thirty per cent more of winter wheat sown than in past years. Late corn hurt by the freeze on the 26th. A great deal of seed corn was gathered between the 15th and 25th.

NORTHBORO.—*J. M. Darby.* September was a dark, cloudy month. The frost on the 26th caught a great deal of the late corn. Ice formed on the 26th and 30th. It was a fine month for fall seeding, and some wheat is looking fine.

NORTHWOOD.—*Chas. H. Duelle.* Seventy-five per cent of the corn matured before the first frost. Small grain is good, but much of the grain in shocks was damaged by rain.

OLIN.—*Frank W. Port.* Ice formed on the 26th, but 80 per cent of the corn crop was fully matured.

PELLA.—*John H. VerSteeg.* About 80 per cent of the corn was matured when killing frost occurred on the morning of the 26th. Considerable of the late planted had not dented and will be unmerchantable.

POCAHONTAS.—*F. E. Hronek.* Heavy to killing frosts during the last week of the month caused considerable damage to late corn and garden truck. About 80 per cent of the corn was ripe before frost occurred. Some shock threshing to be done yet, and the grain is badly damaged by rain and cloudy weather. There has been very little corn fodder cut as yet. Pastures and meadows are fine.

RIDGEWAY.—*Arthur Betts.* There have been four wetter Septembers during the past 15 years. The first killing frost since April 7th occurred on the 26th. Only five times in 15 years has killing frost occurred in September.

SAINT CHARLES.—*R. D. Minard.* Tomato and other vines were not hurt by the late frosts.

WAUKEE.—*Samuel F. Foft.* The month has been wet. Only about 65 per cent of the corn out of the way of frost. The balance was damaged by the heavy frost on the 26th and 29th, as all corn blades were killed. The ground is in fine condition for fall plowing.

WEST BEND.—*Phil Dorweiler.* Too much rain during the first half of the month interfered with threshing. Frost occurred on the 26th, 27th and 30th, but not much harm done.

OCTOBER.

October, 1912, was characterized by an unusually long period of fine Indian summer weather during the latter half of the month; there being only one storm period, of short duration during that time. The first half of the month, however, gave an excess of rainfall, but most of it came during a few heavy showers, so the month, as a whole, was exceptionally pleasant and favorable for farm operations and other out-door work. The mean temperature was about normal, there being an excess of only 0.3°. There was no very cold weather until the 23d, when freezing temperatures occurred in all parts of the state, being the first killing frost in the counties adjacent to the Mississippi River. Another and generally colder period occurred near the close of the month; the lowest temperature at most stations being recorded on the 30th.

While rain fell on an average of 6 days, most of the rain came between the 9th and 11th, and was much heavier in the southern than in the northern counties. A few flakes of snow, being the first of the season, were observed at numerous stations in the southern half of the state on the 30th or 31st. Considering the season of the year and the comparatively few rainy days there was more than the usual number of thunderstorms. A very destructive electric storm occurred in the vicinity of Dubuque on the afternoon of the 20th, during which considerable property was destroyed by fire.

The dry, clear weather was very favorable for drying out the corn crop and harvesting potatoes. Corn was not quite dry enough at the end of the month for cribbing, although considerable husking was done during the last decade of the month. Fall plowing progressed rapidly and winter grains and pastures are in fine condition.

TEMPERATURE.—The monthly mean temperature for the State, as shown by the records of 114 stations, was 52.2°, or 0.3° above the normal for Iowa. By sections the mean temperatures were as follows: Northern, 50.3°, or 0.2° above the normal; Central, 52.2°, or 0.4° above the normal; Southern, 54.0°, or 0.2° above the normal. The highest monthly mean was 56.6°, at Bloomfield, Davis County, and the lowest monthly mean 46.4°, at Rock Rapids, Lyon County. The highest temperature reported was 92°, at Bonaparte, Van Buren County, on the 6th; the lowest temperature reported was 16°, at Inwood, Lyon County, on the 30th. The average monthly maximum was 85°, and the average monthly minimum was 24°. The greatest daily range was 52°, at Keosauqua, Van Buren County. The average of the greatest daily ranges was 38°.

PRECIPITATION.—The average precipitation for the State, as shown by the records of 120 stations, was 2.97 inches, or 0.62 inch more than the normal. By sections the averages were as follows: Northern, 1.88 inches, or 0.39 inch less than the normal; Central, 3.33 inches, or 0.89 inch more than the normal; Southern, 3.71 inches, or 1.36 inches more than the normal. The greatest amount, 5.77 inches, occurred at Bloomfield, Davis County, and the least, 1.03 inches, at Decorah, Winneshiek County. The greatest amount in 24 consecutive hours was 2.60 inches on the 11th, at Bloomfield, Davis County. Measurable precipitation occurred on an average of 6 days.

SNOW.—The first snowfall of the season occurred on the last day of the month, being confined to the southern half of the state. Only two stations reported more than a trace.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 21; partly cloudy, 3; cloudy, 7. The duration of sunshine was considerably above the normal, the percentage of the possible amount being 72 at Charles City; 74 at Davenport; 75 at Des Moines; 67 at Dubuque; 71 at Keokuk; and 75 at Sioux City.

WIND.—South winds prevailed. The highest velocity reported was 48 miles an hour from the south, at Sioux City, Woodbury County, on the 28th.

OCTOBER NORMALS FOR IOWA—1890-1912.

Normal temperature for October, 51.8°.

Warmest October, 1900, with mean temperature of 59.3°.

Coldest October, 1895, with mean temperature of 46.0°.

Normal October precipitation, 2.32 inches.

Wettest October, 1900, with total precipitation of 3.91 inches.

Driest October, 1895, with total precipitation of 0.47 inches.

Normal snowfall for October, 0.4 inch.

Two stations reported measurable amounts, and several reported a trace of snowfall on October 31, 1912, all of which were in the southern part of the state.

Greatest snowfall in October, 3.6 inches in 1898.

Average number of days with 0.01 inch or more precipitation, 6.

Prevailing direction of wind, northwest.

Average number of clear days, 16; partly cloudy, 7; cloudy, 8.

OBSERVERS' REMARKS.

ALGONA.—*Dr. F. T. Seeley.* This has been a fine month for October; 24 clear days and a majority of them with 95 to 100 per cent of sunshine. Corn husking is in full progress.

ALTA.—*David E. Hadden.* October was an ideal autumn month, skies were generally clear and Indian summer weather prevailed the greater part of the month.

AMANA.—*Conrad Schadt.* The weather during the month was generally pleasant; the mean temperature being 2° above and the rainfall about normal. On the 23d a killing frost put a stop to the growth of nearly all vegetation, and most all trees are bare at the close of the month. Corn husking has begun.

ATLANTIC.—*Thos. H. Whitney.* The first ten days were unusually rainy and most of the precipitation of the month fell in that decade. Remainder of the month was prevailing clear and favorable. No frost until the 22d. Gathering of corn begun at close of the month but condition regarded as sappy. Pastures and fall wheat in fine condition.

BEDFORD.—*E. E. Healy.* The first snow of the season came on the 30th.

BELLE PLAINE.—*O. C. Burrows.* Corn dried slowly and very little was picked until the last week of the month.

BELMONT.—*Geo. P. Hardwick.* Bright sunshine and dry air matured corn, much of which, on account of poor seed was of second planting. Stock pasturage was good to the end of the month. Corn husking and plowing are well advanced.

BONAPARTE.—*B. R. Vale.* Rainfall, 3.90 inches or 1.50 inches more than in October, 1911. The month was seasonable but corn ripened slowly.

CHARITON.—*C. C. Burr.* The month has been fine for all farm operations. Fall seeding makes a good showing. Many are cribbing corn.

COUNCIL BLUFFS.—*B. W. Crossley.* An ideal month for drying out corn in the fields.

DAVENPORT.—*U. S. Weather Bureau.* Both the temperature and precipitation were above the normal. A total rainfall of 2.03 inches was recorded on the 11th. The first killing frost of the season occurred on the morning of the 23d, when the minimum temperature was 31°. This was the only thermometer reading below the freezing point during the month. At the close of October the river stages in the Davenport district were somewhat lower than at the close of September but there was still abundant water for boating purposes. Through navigation has been suspended, however, in order that the work on the Keokuk dam may be expedited.

DUBUQUE.—*U. S. Weather Bureau.* The latter half of the month was characterized by fine Indian summer weather, and it was interrupted only by one storm period. The month was fine for work on the farm, such as harvesting corn, potatoes, etc. The first killing frost of the season occurred in the city on the morning of the 23d, or ten days later than the average date. Up to that date tender vegetation had not been damaged by frost in the

city, but there was a killing frost in country districts on September 29th. Severe and damaging thunderstorms occurred on the afternoon of the 20th. The rivers of the Dubuque district have remained at a moderately low stage throughout the month; the highest at Dubuque being 4.4 feet on the 1st, and the lowest, 3.4 feet on the 11th.

FOREST CITY.—*J. A. Peters.* An excellent month for farm work. Corn is not dry enough for cribbing, though farmers are busy husking. Much fall plowing done. Pastures are good at close of month.

GREENFIELD.—*R. B. Oldham.* October was a month of fine fall weather, and farmers have made a good start in cribbing corn.

INWOOD.—*F. B. Hanson.* October has been a rather windy month, with dry weather which has been favorable for drying out the corn crop.

IOWA FALLS.—*J. B. Parmelee.* The sky was perfectly cloudless from the 13th to the 19th inclusive.

MARSHALLTOWN.—*Jacob Eige.* Heavy rain fell all night of the 9th, accompanied by severe electric and thunder storms. All low lands were flooded and small creeks overflowed their banks. A very few flakes of snow fell at about 8:30 a. m. on the 31st.

MONROE.—*J. A. Dibel.* Fall wheat is doing well. Some corn was husked as early as the 21st. Corn is drying out nicely and standing well.

MOUNT Ayr.—*Alex Maxwell.* October had more clear days and more thunderstorms than any month this year. Corn is about dry enough for cribbing. Pastures are still in fine condition.

POCAHONTAS.—*F. E. Hronck.* The month gave the greatest number of clear days since records began at this station, and the weather was favorable for all kinds of farm work. Corn cribbing in progress.

NOVEMBER.

November, 1912, was an ideal month for gathering the largest corn crop ever produced in this state, and for all other outdoor work: The weather was mild and dry, with a great excess of sunshine, there being an average of 18 clear days, 8 partly cloudy, 4 cloudy, and an average of only 2 days with an appreciable amount of precipitation. During the past 23 years, there have been only four Novembers that gave a higher mean temperature than obtained during the past month, and only one with a smaller number of rainy days. While a few of the nights were moderately cold, the days were generally mild and pleasant, and corn husking was interfered with on only one day, so that rapid progress was made in that work, and at the close of the month nearly all of the crop had been harvested. With the exception of a rather severe thunderstorm at Clarinda on the 5th, no storms of consequence were reported, and but little snow fell; the average snowfall being a trace in the northern and central sections of the state, and 0.1 inch in the southern section. The greatest monthly snowfall was 1.0 inch at Stockport, Van Buren County.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 112 stations, was 40.1°, or 4.2° higher than the normal

for Iowa. By sections the mean temperatures were as follows: Northern, 38.0°, or 4.3° higher than the normal; Central, 40.3°, or 4.6° higher than the normal; Southern, 41.9°, or 3.7° higher than the normal. The highest monthly mean was 44.4°, at Keokuk, Lee County; and the lowest monthly mean, 34.7°, at Rock Rapids, Lyon County. The highest temperature reported was 77°, at Northboro, Page County, on the 11th; and the lowest temperature reported was 6°, at Inwood, Lyon County, on the 24th. The average monthly highest was 69°; and the average monthly lowest was 14°. The greatest daily range was 47°, at Lake Park, Dickinson County, and at Rock Rapids, Lyon County. The average of the greatest daily ranges was 37°.

PRECIPITATION.—The average precipitation for the state, as shown by the records of 123 stations, was 0.98 inch, or 0.41 inch less than the normal. By sections the averages were as follows: Northern, 0.95 inch, or 0.36 inch less than the normal; Central, 1.03 inches, or 0.40 inch less than the normal; Southern, 0.96 inch, or 0.48 inch less than the normal. The greatest amount, 2.38 inches, occurred at Storm Lake, Buena Vista County, and there was none, at Rock Rapids, Lyon County. The greatest amount in any 24 consecutive hours, 2.38 inches, occurred at Storm Lake, on the 12th. Measurable precipitation occurred on an average of 2 days.

SNOW.—The average fall for the Northern Section was a trace, for the Central a trace, and for the Southern 0.1 inch. For the state the average was a trace. Stockport, Van Buren County, reported the greatest monthly snowfall, 1.0 inch.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 13; partly cloudy, 8; cloudy, 4. The duration of sunshine was much above the normal, the percentage of the possible amount being 69 at Charles City; 66 at Davenport; 81 at Des Moines; 57 at Dubuque; 69 at Keokuk, and 74 at Sioux City.

WIND.—Northwest winds prevailed. The highest velocity reported was at the rate of 48 miles an hour from the northwest, at Sioux City, Woodbury County, on the 22d.

NOVEMBER NORMALS FOR IOWA—1890-1912.

Normal temperature for November, 35.8°.

Warmest November, 1899, with mean temperature of 43.9°.

Coldest November, 1896, with mean temperature of 29.6°.

Normal precipitation for November, 1.45 inch.

Wettest November, 1909, with total precipitation of 5.39 inches.

Driest November, 1904, with total precipitation of 0.15 inch.

Average depth of snowfall for November, 2.4 inches (1892 to 1912 inclusive).

Greatest snowfall in November, 8.7 inches in 1898.

Least snowfall in November, trace in 1912.

Average number of days with 0.01 inch or more of precipitation, 5.

Prevailing direction of wind, northwest.

Average number of clear days, 13; partly cloudy, 8; cloudy, 9.

OBSERVERS' REMARKS.

ARTON.—*N. W. Rowell.* This has been the finest November for many years. There were 22 clear, 5 partly cloudy, and only 3 cloudy days. It could not have been better for gathering corn. Many farmers have finished husking.

ALTA.—*David E. Hadden.* November, 1912, was one of the finest fall months experienced in years. Two inches of rain fell on one day, the 12th, and roads soon dried up and were in good condition all the rest of the month. An ideal month for farming operations.

ATLANTIC.—*Thos. H. Whitney.* A remarkably fine month. Only one rainy day. Corn gathered under exceptionally good conditions, and quality improved by dry, freezing weather.

BELLE PLAINE.—*O. C. Burrows.* Typical Indian summer weather. Warm and dry, and ideal for gathering corn and many farmers have finished harvesting.

BELMOND.—*Geo. P. Hardwick.* But one rainy day in month, allowing full time for field work. Corn nearly all harvested in good condition. Stalk and other pasturage is good but shortage of stock will utilize feeds.

BONAPARTE.—*B. R. Vale.* November was a pleasant month. Only a little plowing done, but corn mostly cribbed. Stock on pastures all month.

CHARITON.—*C. C. Burr.* The month was about all that could be desired from the farmer's viewpoint. All farm work well advanced, but soil is very dry, and there is no surface water. Some hog cholera prevails but all other stock in fine condition.

DAVENPORT.—*U. S. Weather Bureau.* The temperature was continuously above the normal from the 4th to the 14th, and from the 16th to the 23d. Only two days, the first and second, were much colder than the average. All of the appreciable precipitation occurred in two storms, one on the 5th and 6th, and the other on the 12th and 13th. The first snow flurry of the season occurred on the 1st.

The Mississippi river is from 0.5 foot to 1.0 foot lower than at the close of October, from below Dubuque to Muscatine. Although good boating stages still prevail throughout the Davenport river district, navigation has been suspended until the spring of 1913. The last freight and passenger boat, the steamer Blackhawk, arrived from Muscatine on the 17th and departed on the same day for her winter quarters below Davenport.

DEBUQUE.—*U. S. Weather Bureau.* The month was warm and dry, with an abundance of Indian summer weather during the first half. There were no storms of importance, except that of the 12th-13th. The month could not have been better for work on the farm, cement construction work, building, etc.

RIVERS.—They were open at the close of the month, with thin ice running in the more northern sections. The Mississippi River fell slowly during the month, the highest stage being 3.6 feet on the 1st, lowest, 2.6 feet on the 28th.

FOREST CITY.—*J. A. Peters.* Considerable corn is still in the fields. Ground is not frozen at close of the month. A beautiful November and ideal for gathering in the corn.

DECEMBER.

December, like November and the latter half of October, was unusually mild and pleasant, with high average temperatures, deficiency of precipitation, excess of sunshine and no storms of importance. It was the warmest December since 1896, and the mean temperature has been exceeded only twice, December, 1891, and 1896, since state-wide observations began in 1890. The 12th was generally the coldest day, but the lowest temperature recorded in the state, -13° , occurred at Inwood, Lyon County, on the 6th.

The precipitation was light, there being only 62 per cent of the normal amount and most of it came during the first five days. After the 5th, only light snow flurries occurred at most stations. The amount of snowfall was also very light, and especially so over the central and southern districts, where the average amount for the month was only 0.6 inch. The greatest amounts of snowfall were reported from the extreme north central counties. The clear, mild and dry weather was favorable for all kinds of out-door work, but the ground is very dry and more snow is needed for fall sown grains.

TEMPERATURE.—The monthly mean temperature for the state, as shown by the records of 115 stations, was 29.2° , or 5.6° higher than the normal for Iowa. By sections the mean temperatures were as follows: Northern, 26.3° , or 5.4° higher than the normal; Central, 29.8° , or 6.0° higher than the normal; Southern, 31.6° , or 5.4° higher than the normal. The highest monthly mean was 34.8° , at Ottumwa, Wapello County; and the lowest monthly mean, 21.6° , at Rock Rapids, Lyon County. The highest temperature reported was 64° , at Keokuk, Lee County, on the 5th; the lowest temperature reported was -13° , at Inwood, Lyon County, on the 6th. The average monthly highest was 55° , and the average monthly lowest was zero. The greatest daily range was 46° , at Inwood, Lyon County. The average of the greatest daily range was 38° .

PRECIPITATION.—The average precipitation for the state, as shown by the records of 122 stations, was 0.74 inch, or 0.45 inch less than the normal. By sections the averages were as follows: Northern, 0.91 inch, or 0.12 inch less than the normal; Central, 0.71 inch, or 0.49 inch less than the normal; Southern, 0.59 inch, or 0.74 inch less than the normal. The greatest amount, 1.75 inches, occurred at Northwood, Worth County, and the least, 0.10 inch, at Lake Park, Dickinson County, and at Sheldon, O'Brien County. The greatest amount in any 24 consecutive hours, 1.30 inches, occurred at Chariton, Lucas County, on the 1st. Measurable precipitation occurred on an average of 3 days.

SNOW.—The average snowfall for the state was 1.1 inches. By sections the averages were as follows: Northern, 2.2 inches; Central, 0.4 inch; Southern, 0.8 inch. The greatest monthly amount, 11.0 inches, occurred at Northwood, Worth County.

SUNSHINE AND CLOUDINESS.—The average number of clear days was 18; partly cloudy, 7; cloudy, 6. The duration of sunshine was much above the normal, the percentage of the possible amount being 64 at Charles City; 71 at Davenport; 73 at Des Moines; 55 at Dubuque; 66 at Keokuk; and 67 at Sioux City.

WIND.—Southwest winds prevailed. The highest velocity reported was 47 miles an hour from the north, at Sioux City, Woodbury County, on the 1st.

DECEMBER NORMALS FOR IOWA—1890-1912.

- Normal temperature for December, 24.4° .
- Warmest December, 1891, with mean temperature of 32.3° .
- Coldest December, 1909, with mean temperature of 15.5° .
- Normal precipitation for December, 1.20 inches.
- Wettest December, 1911, with total precipitation of 2.57 inches.
- Driest December, 1910, with total precipitation of 0.37 inch.
- Average depth of snowfall for December, 6.2 inches (1892 to 1912 inclusive).
- Greatest amount of snowfall in December, 15.9 inches in 1897.
- Least amount of snowfall in December, 1.1 inches in 1912.
- Average number of days with 0.01 inch or more of precipitation, 5.

OBSERVERS' REMARKS.

BEDFORD.—*E. E. Healy.* December has been a very fine month with excellent roads.

BONAPARTE.—*B. R. Valc.* An exceptionally fine month. Roads were never better. Total precipitation for the year, 23.97 inches, which is the least in 22 years, except in 1901 and 1910.

BRITT.—*L. M. Goodman.* This has been an exceptionally pleasant December. The temperature has been below zero only twice during the month.

CORYDON.—*May C. Miller.* December was a month of delightful weather. The roads were never better. Christmas day was perfect—no wind and no clouds.

DAVENPORT.—*U. S. Weather Bureau.* The Mississippi River was frozen at LeClaire, Iowa, on the 12th, but it remains open below that station.

DUBUQUE.—*U. S. Weather Bureau.* The month was very mild and pleasant, with 55 per cent of the possible, or 13 per cent more than the normal amount of sunshine. The winds were light for the winter season. Christmas, with a maximum temperature of 49° , was the warmest here in 31 years. The monthly relative humidity was 76.5 per cent. The Mississippi River in this vicinity closed on the 12th, and remained partially closed until the end of the month. Ice, however, was only 1 to 3 inches thick and soft most of the time. At the close of the month the river was frozen over only in places. There was much shore and floating ice.

IOWA CITY.—*Prof. Arthur G. Smith.* High wind and a sudden fall in temperature occurred at 5:45 p. m. on the 5th. There was no measurable amount of precipitation after the first day. No December so free of storm and cold observed at this station since observations have been made here.

KEOKUK.—*U. S. Weather Bureau.* The month was unusually mild and dry; the only appreciable precipitation was light rain on the 1st and 3d. There were, however, light spits of snow on several days, the snow not being heavy enough to cover the ground, and consequently winter wheat was without covering during the entire month, and suffered from lack of moisture. Water for stock also became very low. Streams were generally open, although the Mississippi and Des Moines rivers had variable amounts of floating ice during the greater part of the month.

WAUKEE.—*Samuel F. Foft.* The month ends with remarkably fine winter weather. Roads are fine. Winter grain seems to be in good condition.

DATES OF KILLING FROSTS, 1912

STATIONS	Killing Frosts		STATIONS	Killing Frosts		STATIONS	Killing Frosts	
	Last in spring	First in autumn		Last in spring	First in autumn		Last in spring	First in autumn
Alton	April 7	Sept. 26	Earlham	May 14	Sept. 26	Murray	April 19	Sept. 29
Albia	April 19	Sept. 26	Elkader	May 14	Sept. 26	New Hampton	April 27	Sept. 26
Algona	April 27	Sept. 26	Elletts	April 7	Sept. 26	Northboro	April 17	Sept. 26
Algonquin	April 19	Sept. 26	Ellettsville	April 27	Sept. 26	Northwood	April 27	Sept. 26
Alta	May 14	Sept. 26	Fairfield	April 17	Sept. 26	Oskaloosa	April 27	Sept. 26
Alta (near)	May 14	Sept. 26	Fayetteville	April 17	Sept. 26	Oskaloosa	April 27	Sept. 26
Alton	April 30	Sept. 26	Fayetteville	April 17	Sept. 26	Oskaloosa	April 27	Sept. 26
Ames	April 27	Sept. 26	Fayetteville	April 17	Sept. 26	Oskaloosa	April 27	Sept. 26
Athletic	May 17	Sept. 26	Fort Dodge	April 27	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Atlantic	April 27	Sept. 26	Fort Madison	April 27	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Aurora	April 27	Sept. 26	Fort Madison	April 27	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bedford	May 17	Sept. 26	Fort Madison	April 27	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bellevue	May 17	Sept. 26	Fort Madison	April 27	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Belle Plaine	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bloomfield	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bloomfield	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bonaparte	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Bonaparte	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Britt	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Britt	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Buckingham	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Burlington	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Burlington	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Cedar Rapids	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Centerville	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Centerville	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Charlton	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Charlton	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Clear Lake	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Clear Lake	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Columbus Junction	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Corning	April 20	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Corning	April 20	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Corning	April 20	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Creston	April 13	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Creston	April 13	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Creston	April 13	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Cumbersland	April 17	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Cumbersland	April 17	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Decatur	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Decatur	April 27	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Denison	May 17	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Denison	May 17	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Dubuque	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26
Dubuque	April 19	Sept. 26	Greenfield	April 19	Sept. 26	Oswayo, Neb.	April 15	Sept. 26

*Date of last temperature of 32 degrees or lower in spring, or first temperature of 32 degrees or lower in autumn, as the case may be, when frost was not recorded.

COMPARATIVE DATA FOR THE STATE—ANNUAL.

	Temperature				Precipitation in inches				
	Mean annual	Highest	Date	Lowest	Annual	Greatest annual	Least annual	Av. snowfall	
1890.	48.0	110	July 13	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	38	January 19	36.58	48.77	24.78	34.2
1893.	45.7	102	July* 12	36	January 14	37.59	33.27	19.19	37.2
1894.	49.7	109	July 30	37	January 29	21.94	39.81	15.65	19.2
1895.	47.2	104	May 28	33	February 1	29.77	35.25	18.57	26.8
1896.	48.6	104	July 3	30	January 4	37.23	51.09	28.68	22.6
1897.	47.8	106	July* 23	30	January 25	26.98	36.18	20.21	38.8
1898.	47.7	103	August 29	25	December 31	31.34	55.47	19.61	40.3
1899.	47.3	104	September 6	40	February 11	23.68	42.06	21.79	23.4
1900.	49.3	108	August 3	37	February 15	33.05	47.33	25.05	26.8
1901.	49.0	112	July 22	31	December 15	34.41	37.09	16.35	38.5
1902.	47.7	98	July 30	31	January 27	43.82	68.80	20.14	28.0
1903.	47.2	101	August 24	27	December 13	33.39	50.53	25.41	19.4
1904.	46.3	100	July 17	32	January 27	22.51	33.93	19.54	39.2
1905.	47.2	104	August 11	41	February 2*	36.56	62.96	24.66	38.3
1906.	48.4	102	July 21	32	February 10	31.90	44.34	20.63	32.8
1907.	47.4	102	July 5	31	February 5	31.61	43.90	19.63	24.0
1908.	49.6	101	August 3	18	January 29	35.26	49.98	24.11	22.7
1909.	47.4	103	August* 15	26	February* 15	40.01	53.48	27.20	49.0
1910.	48.6	108	July 16	35	January 7	19.87	27.99	12.11	23.4
1911.	49.5	111	July* 2	35	January 3	31.87	46.77	19.74	33.3
1912.	46.4	104	September 8	47	January 12	28.89	38.13	15.25	39.6

*And other dates.

ANNUAL NORMALS FOR IOWA—1890-1912.

Annual normal temperature, 47.8.

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

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

Annual normal precipitation, 31.45 inches.

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

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

Average annual snowfall, 30.8 inches.

Greatest annual snowfall, 49.0 inches in 1909.

Least annual snowfall, 19.2 inches, in 1894.

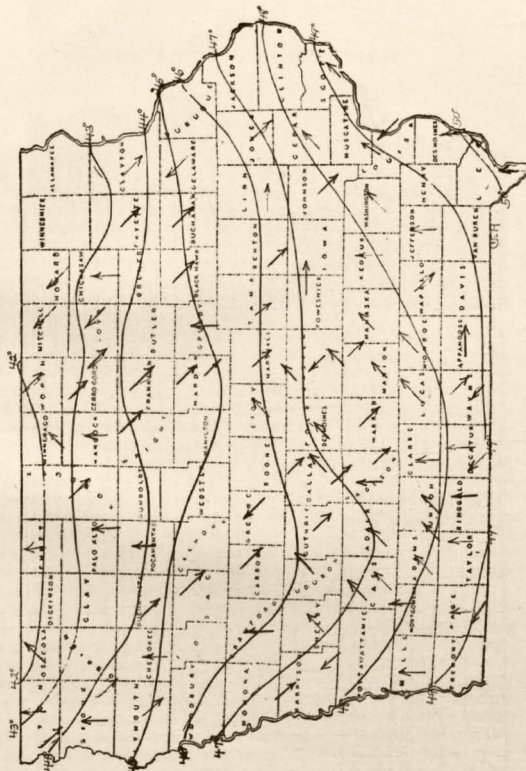
Average number of days with 0.01 inch or more precipitation, 81.

Prevailing direction of wind, northwest.

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

MEAN ISOTHERMS AND PREVAILING WINDS OF 1912.

Lines pass through points of equal temperature. Arrows fly with the wind.



ern counties the ice was intact on the 31st. Practically all of the frost was out of the ground by the close of the month. No field work was practicable, but fall sown grains were showing up in good condition after the disappearance of the heavy snow, which had covered the fields since December 17th.

The most important features of April were the destructive wind storms at Earlham and Boone, on the 13th, and the unusually heavy snowstorm over the southern and eastern counties on the 17th. Thirty-six stations within the area of the storm reported an average of 4.0 inches of snowfall; the greatest amount being 12.0 inches at Wapello. As a whole, the month was quite favorable for farm operations, but owing to the fact that no field work was done in March, spring seeding was not completed until the close of the month. At the end of the month the early sown oats were up, grass was improved and some stock was in pasture. Cherry and plum trees were beginning to bloom in the southern counties, but in the remainder of the state the buds were still dormant or just beginning to swell.

May was warm and moderately dry, but on the whole the conditions were favorable for agricultural pursuits. The average temperature was above the normal, but freezing temperatures occurred in all but the extreme southern counties on the 14th, though no material damage was done except to prevent the germination of corn that had been planted. Owing to poor seed, cold weather, cut and wire worms, considerable replanting was necessary, but at the close of the month nearly all of the corn was planted and the early planting was up. The cool weather and frequent showers were beneficial to small grains and grasses.

From an agricultural viewpoint, June was a very favorable month, notwithstanding the fact that the weather was too cool for corn during the first 20 days. The average temperature and rainfall were below normal, but temperatures ranging from 90° to 101° were recorded between the 26th and 29th, and light showers were frequent prior to the 20th. After the 20th the weather was very dry. All vegetation made rapid growth, however, and at the close of the month small grains were beginning to ripen in the southern and were headed out and filling nicely in the northern part of the state.

The temperature was generally above the normal during the first decade of July, and was below the seasonable average most of the time after the 15th, although there were one or two days during that period when the day temperatures approached, or were slightly above, 100°. The showers were generally light, but all parts of the state received enough moisture to keep growing crops in prime condition except in a few localities in the southern counties, where late corn, pastures and potatoes would have been benefited by a more generous supply. As most of the showers occurred at night, rapid progress was made in haying and harvesting, and the bulk of the hay and small grain crops were secured in fine condition. Threshing was well advanced by the end of the month in the southern, and good progress was made in the central districts.

The temperature was generally below the normal during the first 15 days, and above the average during the latter half of August. Although the average rainfall was slightly below the normal, showers were frequent and fairly well distributed. The frequent showers interfered with threshing

and stacking small grain, and damaged some of it in shocks, but they were of material benefit to late corn, potatoes and pastures. Corn made rapid progress toward maturity, but owing to the large amount of late planted corn, the crop as a whole was 10 days to two weeks later than usual.

The first 10 days of September were excessively warm, but much cooler weather prevailed after that date with killing frosts and temperatures near or below the freezing point on the 26th and 29th. Rain fell somewhere in the state on every day of the month, except the 30th, and as a result threshing was delayed and considerable grain in shock and stacks was damaged. The rains, however, put the ground in excellent condition for fall plowing and seeding, and were very beneficial to pastures and meadows. Corn made unusually rapid progress during the first 12 days, but the cool weather following checked the rapid development, and from 20 to 30 per cent of the crop was more or less damaged by the killing frosts and freezing temperatures during the last week.

The first half of October was wet, but the remainder of that month and all of November and December was dry and pleasant, with much Indian Summer weather during the early part of the period. There being no storms of importance after the middle of October, rapid progress was made during October and November in gathering the largest crop of corn ever produced in the state, and practically all of the crop was in cribs by the 10th of December. The contrast between the first three and last three months of 1912 was very marked. The first three months were abnormally cold with an excessive amount of snow, while most of the last three was mild and pleasant with a great excess of clear days.

CLIMATE AND CROP BULLETINS

Summaries of Weekly Bulletins Issued in the Season of 1912.

BULLETIN No. 1.—For the week ending April 14.—The winter was severely cold and of long duration, and the amount of snowfall was the greatest on record. The larger part of the state was covered with snow nearly all of the time from December 20th to about March 25th. The snow went off rapidly after March 20th, but as there was but little frost in the ground, the larger part of the water was absorbed by the soil, yet all streams were at a high stage at the close of the month, and much bottom ground, especially in the southern counties, was flooded. The heavy mantle of snow afforded a good protection to fall-sown grains and grasses and they are now in good condition, except in the counties along the Mississippi River from Scott county southward, where the snow covering was light during the cold weather in January and most of February. The past week has been favorable for field work, and much seeding, plowing and disking has been done with the soil in excellent tilth. The acreage of winter wheat is much greater than it was last year, but the extent of spring seeding depends largely on the conditions during the next few days, as only about one-half to two-thirds of the acreage intended for small grain has yet been seeded. Many potatoes have been planted and gardens made. Fruits have remained nearly dormant as yet, and except peaches and pears, are reported to have been uninjured by the low winter temperatures. Live stock came through the winter in fairly good condition, but in most sections the supply of hay and rough feed has been entirely or nearly exhausted. While the season opens a little later than usual, the conditions at present are favorable for a good crop year.

BULLETIN No. 2.—For the week ending April 21.—The third week in April was colder than usual, the average daily deficiency in temperature being about 5 degrees. Freezing temperature was reported from the larger part of the state on several mornings, and one of the heaviest April snowstorms on record in this state occurred over the southern and eastern counties on the seventeenth. Several stations reported from seven to eight inches of snowfall, but crops and fruit were not far enough advanced to receive damage from the snow or freezing temperature. The heavy showers on the afternoon and night of the twentieth gave an excess of precipitation for the week. Farming operations were somewhat retarded in the counties where the snowfall was heaviest, but in the larger part of the state fair progress has been made in seeding and plowing, with the soil in the working condition. Seeding of small grain is nearly finished in northern and western counties, but in the eastern and southeastern counties only about 75 to 80 per cent of that work has been done. Late reports

show that there was more fall wheat winter killed in southern and eastern sections than was indicated last week. Many fields are spotted and some of them will be plowed up and replanted to other crops, but for the state as a whole, fall-sown grains are in fine condition. Grass is starting nicely, and in some localities stock is in pasture.

BULLETIN No. 3.—For the week ending April 28.—While the temperature was only slightly below the normal, the nights were cool. Frost was general, and freezing temperature occurred on one or two nights in the northern counties. The weather was, however, favorable for field work; the only precipitation being light showers on the twenty-fifth, and light to moderately heavy rains on Sunday, the twenty-eighth, over the southern and western sections. Seeding is practically finished, most of the early potatoes have been planted and much ground has been plowed, preparatory to corn planting. The cool weather has retarded the growth of vegetation, but early-sown oats are up and show a good stand. Grass is improving and in many localities stock is in pasture. Cherries and plums are beginning to blossom in the southern counties, but in the remainder of the state the buds are still dormant or just starting to swell. The spring pig crop suffered severe loss during March on account of the cold, wet weather, but April pigs are doing well.

BULLETIN No. 4.—For the week ending May 5.—The past week was warmer than usual, the daily excess of temperature ranging from 2 to 5 degrees, and weather conditions were generally favorable for rapid progress in farming operations. Heavy rains on April 28th, and frequent showers during the week did, however, delay field work to some extent in southern counties. Light to copious showers occurred in nearly all parts of the state on the 2d, 3d or 4th, and gave ample moisture for present needs. The warm rains, and the high temperatures during the last four days have caused an unusually rapid growth of all vegetation. Most of the trees are green, fruit trees are in blossom, and grass and small grain have made a decided improvement. All fruit trees, except apples, show an abundance of bloom. Spring sown grain and grasses have made a good start, and show a strong, vigorous stand. Much ground has been prepared for corn, and some planting was done in many localities during the latter half of the week. With favorable weather planting will be general during the coming week. Most of the live stock is in pasture and obtaining sufficient feed.

BULLETIN No. 5.—For the week ending May 12.—The weather during the first five days of the week was ideal for field work and the growth of vegetation. The average temperature was above the normal, though no unusually high temperatures prevailed, and the precipitation was deficient until Friday night and Saturday when heavy, and in many localities, excessive rains fell; the greatest amounts of rainfall being reported from the southern and central counties. All vegetation made rapid growth, and good progress was made in preparing corn ground. Considerable corn was planted in nearly all sections of the state with the soil generally in fine tilth, but the late rains and the cool weather prevailing at the close of the week will retard planting for a day or two. Meadows and pastures

have made a decided improvement, and where the rainfall was heavy, a fair to good crop of hay is assured. Oats are beginning to stool nicely and all small grain is in good condition. Reports continued to show a deficiency of bloom on apple trees, but other fruits, except peaches, give promise of good yields.

BULLETIN No. 6.—For the week ending May 19.—The week was cool, and cloudy, with a decided deficiency in the rainfall. There was, however, considerable excess of moisture in the southern and central district caused by heavy rains near the close of the preceding week which retarded corn planting for several days. Light to heavy frosts occurred on two or three mornings in all parts of the state, with freezing temperature in many localities on the 14th. The frosts did little or no damage to fruit, but tender garden stuff was slightly injured on low ground. The germination of corn was, however, retarded and in a few places the seed is reported to have rotted in the ground. Fair progress was made in planting corn during the latter half of the week, but only about two-thirds of the crop is in. Some of the early planted corn is up and shows a fairly good stand. All of the early and some of the late potatoes have been planted. Spring seeding of grass and clover is in prime condition. Pastures and meadows are making good growth, and small grain crops are doing well. Cherries are not setting as well as indicated by the heavy bloom. Plums give promise of full crop, and apples are setting fairly well considering the small amount of bloom. Generally the crop conditions are fairly good, needing higher temperatures and occasional warm rains to make the outlook bright and satisfactory.

BULLETIN No. 7.—For the week ending May 26.—The week was warm and generally dry. The temperature ranged from normal in northern to 9 degrees above the normal in southern counties and the rainfall was decidedly deficient except in the vicinity of Dubuque where 2.59 inches fell. Almost ideal conditions prevailed during the week for field work, and the time was well improved. Corn planting is finished in many localities and all of it that has been planted since the 11th inst., is coming up nicely and shows a fairly good stand. Much of the early planting has been replanted on account of cold weather, weak seed and the ravages of wire worms. The fields are generally clean and the soil is in good condition. Small grain, grass in pastures and meadows, potatoes and garden truck have made good progress under the effects of high temperature and abundance of sunshine, but now need more moisture to keep up normal growth. Rye is heading in southern, and fall wheat is two feet high in central districts. The following report by the Secretary, State Horticultural Society shows the condition of fruit: "Apples, 35 per cent; pears, 61; American plums, 80; cherries, 55; grapes, 65; red raspberries, 57; black raspberries, 65; blackberries, 35; currants, 72; gooseberries, 86; strawberries, 70 per cent of a full crop. Ben Davis, Jonathan and Wealthy apple trees will not bear much fruit this year. Ben Davis trees are in very poor condition. There was some winter killing of blackberry and raspberry canes."

BULLETIN No. 8.—For the week ending June 2.—The past week was exceptionally favorable for field work, notwithstanding the fact that ex-

cessive rain fell over some of the northwestern counties on May 26th and 27th, and heavy showers occurred in the southwestern and west central districts on Friday night, and light to copious showers occurred in all other parts of the state some time during the week. Considerable damage was done in Cherokee county by the heavy downpour of rain. Fields were badly washed and several bridges were taken out by high water. The average temperature was about normal, although the nights were cool. Planting and replanting of corn is nearly finished. The late planting is coming up and shows a fair to good stand. The first cultivation has begun, and the fields are generally clean and in good condition. Small grain and grass have continued to make rapid progress except in a few localities, especially in the southwestern and southeastern counties where the rainfall was deficient prior to the last week. The late rains will, however, be of great benefit in all sections. Winter wheat and rye are heading in northern, and the first cutting of alfalfa was harvested in southwestern counties. Most of the late planted potatoes are up and give promise of a good crop. Strawberries are beginning to ripen in southern districts with prospects of fair to good yields.

BULLETIN No. 9.—For the week ending June 9.—The past week was unseasonably cold, and over the larger part of the state much drier than usual. The daily mean temperature ranged from 6 to 8 degrees below the normal. Light frost occurred on low ground in the northern counties on the morning of the 7th, but no material damage was done. The rainfall was generally light, but copious to heavy showers occurred in the Des Moines valley on the 5th. The conditions were favorable for field work, and rapid progress was made in cultivating corn. Practically all of the early planting has been plowed once, and much of it the second time. Small grain and grass, especially spring seeding of timothy and clover have made good growth, but the hay crop will not be up to the normal. Clover cutting will begin in the southern counties during the coming week, with prospects of a light yield. Cherries and plums promise a fairly good crop, but the "June Drop" of apples is heavy on some varieties.

BULLETIN No. 10.—For the week ending June 16.—This has been the best growing week of the season. The average temperature has been about normal, and while the sunshine was somewhat deficient, the rainfall was generally above the average. Showers were frequent and fairly well distributed, but the amounts of rainfall varied from .01 inch in southern Taylor County to 4.44 inches in Calhoun County. The rainfall was also heavy in Wayne and Decatur Counties, where severe local storms occurred, accompanied by high winds and some hail, which, with the heavy rain, did considerable damage to fields and crops. All crops have made good progress, but in many localities, oats and some fall wheat, on rich ground, are getting rank and have a tendency to lodge if wet weather continues. Corn has improved during the past few days, and the cultivation of the fields is being rushed as rapidly as possible. The fields are generally clean, and the soil is in fine condition. Pastures are unusually good. In fact there is more grass in some sections than is needed for the small number of cattle on hand. While

the hay crop will not be quite up to the average, it will be much better than last year. Potatoes are fine, and in many localities there has been sufficient rainfall to mature the early crop. Homegrown strawberries of excellent quality are on the market. Cherries are ripening, and are larger and of better quality than last season. Plums give promise of good yield.

BULLETIN No. 11.—For the week ending June 23.—The first four days of the week were abnormally cool and generally cloudy with frequent, but very light scattered showers. The last three days were moderately warm, clear and pleasant, but the average temperature was about 8 degrees below the weekly normal. The rainfall was also much below the average, but the rains of the previous week were sufficient to keep the ground in fine condition. It has been too cool for the rapid growth of corn, but the crop is doing as well as could be expected. It is, however, small for the season, and very uneven in height. Some of it is just coming up, while some is nearly knee high, and is being cultivated the third time. The fields are generally very clean. Small grain is doing exceptionally well, though in a few localities some rust is reported in winter wheat and smut in oats. Rye is beginning to ripen in the southern counties, but for the state as a whole the small grain harvest will be about a week later than usual. Blue grass is much better than for the past several years, but timothy and clover is variable; some sections reporting very good crops, while in many localities they are light, and the average yield of hay will be a little below the average. Potatoes continue very promising. Berries and cherries are of extra fine quality, but the yields are below normal. Plums will be much above, and apples below the average.

BULLETIN No. 12.—For the week ending June 30.—The past week was very warm and unusually dry; the only rainfall reported being a few local and generally light showers in the southwestern and southeastern counties on one day. The high temperatures and bright sunshine have been favorable for the rapid advancement of corn and curing clover hay. Corn has made very rapid growth, but it is still uneven in height. Some of it has been laid by, and all of the fields are clean. Some of the late planted corn is beginning to show the effect of the dry weather, but if rain comes within the next week or ten days it will continue to make good progress. Early corn is in fine condition; the root system being sufficiently developed to reach moist soil. The dry weather has also been generally favorable for small grain in checking the development of rust and smut, and stiffening the straw, thereby lessening the possibility of lodging. Oats and other small grains have headed in all parts of the state, and are filling well. Rye, fall wheat and early oats are beginning to ripen in the southern counties and with favorable conditions the harvest will begin during the coming week. Considerable clover and some timothy hay were put up in fine condition, and haying will be general in a few days. While all crops are still in good condition, late potatoes, late planted corn, pastures, garden truck and fruit would be benefited by rain.

BULLETIN No. 13.—For the week ending July 7.—The weather during the past seven days was exceptionally favorable for farming operations, and in most sections for the growth of crops. The average temperature was about 5 degrees above the normal, and while the rainfall was decidedly below the average, many localities received light to copious, and in a few sections, moderately heavy showers. The warm, dry weather, and the excessive sunshine were very beneficial for haying and harvesting. Much hay was put up in the best condition; the yield being somewhat below the normal. Most of the rye and winter wheat, and many early oats are in shock in the southern counties, and harvest has begun in central and northern sections. All small grains give promise of good to extra good yields, but late oats need rain to fill to the best advantage. Considerable rust is reported, but probably no more than usual. Corn continued to make rapid growth, and half of it is nearly up to the normal height for this season of the year. Some of the earliest planted fields in the extreme southeastern counties are beginning to tassel, while much of the late planted corn is less than 12 inches high. Pastures remain generally good, but are beginning to dry up and should have rain at once. Corn, potatoes, late oats, fruit and garden truck also need rain. Much of the timothy, especially in the southern counties, will be saved for the seed.

BULLETIN No. 14.—For the week ending July 14.—Under the effect of high temperatures and frequent and fairly well distributed copious showers all crops have made rapid progress. There was, however, considerable damage done in some localities by hail, heavy rains and high winds in lodging grain, but this will be more than counterbalanced by the benefit received by corn, late grains, spring seeding of timothy and clover, pastures, potatoes, gardens and fruits. Corn made very rapid growth, and a large portion of it is now up to the normal for the middle of July. Many of the early fields in the southern counties are beginning to tassel, and all of it has a good color. Owing to the fact that in most localities the showers came at night, rapid progress was made in haying and harvesting. About all of the rye, fall wheat and early oats in the southern counties are in shock, and threshing will begin in that section of the state during the coming week, with prospects of good to heavy yields. About half of the hay has been put up in fine condition. The quality of timothy is extra good, and while the yield is not quite up to the average, it is much better than last year. Reports continue to indicate that much of the timothy will be saved for seed, especially in southern counties. All field crops are now in prime condition, and with occasional good showers give promise of large yields.

BULLETIN No. 15.—For the week ending July 21.—The past week was unusually cool; the average daily deficiency of temperature ranging from 6 to 10 degrees. The average precipitation was much above the normal, except over the three southern tiers of counties, where it was very dry up to Saturday night. In the three northern tiers of counties, and in portions of the central sections the rainfall was heavy; nearly all stations reporting more than 2.00 inches, and several more than 3.00 inches. The first four days of the week were, however, clear and dry, and rapid

progress was made in haying and harvesting. Threshing is now general in the southern counties, and early reports indicate yields much in excess of the average of past years. In the northern sections where the late rains were heavy, oats are badly lodged and will be difficult to harvest. The rains will also prevent work in the fields in that section for two or three days, but they have been of great benefit to corn, pastures, potatoes, spring sown grasses, gardens and fruits. Corn made good growth during the week, even though the weather was cool, and the crop is in good condition and improving daily.

BULLETIN No. 16.—For the week ending July 28.—The conditions during the past week were almost ideal for growing crops, and for haying, harvesting and threshing. The temperature was about normal, and while the rainfall was generally deficient, nearly all parts of the state received light to copious showers. Some localities in the southern districts, however, need rain badly for corn, potatoes and pastures, but for the state as a whole all crops are in excellent condition. Haying is nearly finished, and the crop has been put up in fine shape. The yield of hay is better than anticipated and the quality is extra good. The small grain harvest has progressed rapidly, and the bulk of it will be completed by the end of the coming week. Early reports show some exceptionally large yields and fine quality of grain. The yield of winter wheat ranges from twenty-five to fifty bushels per acre; oats thirty to sixty-five and barley, twenty-two to thirty bushels. No timothy has yet been threshed, but a large acreage has been cut for seed. Corn has made rapid growth, and the early fields are shooting nicely, but the crop as a whole is not yet quite up to the normal in size and development; although the prospects are good for better than an average yield if favorable weather continues. Potatoes are generally in good condition and give promise of a large crop.

BULLETIN No. 17.—For the week ending August 4.—The past week was cool and dry; the average daily deficiency of temperature being about 6 degrees, and only a few light and widely scattered showers occurred. The conditions were fine for harvesting, stacking and threshing, but were too cool and dry for corn, and too dry for pastures and potatoes. Nearly all of the small grain has been secured in fine condition, and rapid progress is being made in threshing. The yields of wheat, oats, rye and barley are exceptionally large except in the southeastern counties where the winter wheat is very light. Corn is still in good condition, but needs rain and warmer weather. Pastures are drying up in many localities, and potatoes also need rain.

Following is a summary of reports from crop correspondents on August 1st. Much of the late and replanted corn is still backward, but all of it is strong and vigorous. The average condition of the crop is placed at 93 per cent or four points better than on July 1st. The estimated condition of pastures is 92 per cent and potatoes 94 per cent, showing a loss of three and four points respectively during the past month. On August 1, 1911, corn was rated at 69 per cent, potatoes 34 and pastures 38 per cent. Threshing has not yet become general in all parts of the state, but early reports indicate an average yield of twenty-five bushels

per acre of winter wheat; spring wheat, 18; oats, 40; barley, 32; rye, 21. These figures are subject to change, but if maintained by final reports, yield per acre of rye and winter wheat will exceed all previous records and the yields of spring wheat, oats and barley have been exceeded only once during the past 22 years.

BULLETIN No. 18.—For the week ending August 11.—The past week was cool and showery, with an excess of cloudiness and humidity. The average daily deficiency of temperature was about eight degrees, and while the average rainfall was about normal, many localities reported an excess of moisture. In some sections showers occurred every working day of the week, which delayed threshing and stacking, but the bulk of shock threshing is finished in the southern, and is well advanced in the northern districts. Reports continue to show large yields of small grain. Corn is still doing well, and with favorable weather in the future will make one of the largest crops ever produced in this state. Many of the early planted fields in southern and central counties are now in the roasting ear stage, and the late planted fields are making rapid growth, but would do better with warmer weather. Pastures and potatoes are improving, and are generally in good condition. Fall plowing for winter wheat has begun in southern sections.

BULLETIN No. 19.—For the week ending August 18.—Showery weather continued during the week, with the average temperature about normal, but the week closes with much warmer weather. Showers were frequent, and the rainfall heavy over the western two-thirds of the state; the largest amounts of rainfall being reported from the Missouri Slope, where many stations received more than three, and a few more than four inches. Slow progress was made in threshing and stacking, and some grain in shocks was more or less damaged by wet, cloudy weather. Corn has made fair growth, and over the western half of the state has received sufficient moisture to mature the crop. Pastures and aftermath in meadows have been revived, and are now in fine condition. Late potatoes also give promise of a good crop. Telegraphic reports indicate heavy rains in northeastern part of the state during the 24 hours ending 7 a. m., August 19th. Dubuque reports 5.16 inches, and Waterloo, Black Hawk county, 4.00 inches.

BULLETIN No. 20.—For the week ending August 25.—The weather conditions were much more favorable during the past week than they were during the preceding two weeks. The temperature was above the normal, and very few showers occurred after the 20th. The rainfall was, however, excessive in a few localities on the night of the 18th, and especially over the northern counties of the east central district. Dubuque reported 5.23 inches; Delaware, 4.82 and Waterloo, 4.00 inches. A heavy shower also occurred in the southern part of Page county on the 20th. Rapid progress has been made in stacking and threshing, since the 21st, but considerable grain, in shock and stack, has been damaged by the wet weather of the previous week. Under the effect of high temperatures, corn made rapid growth, and much of it, in early planted fields, has passed the roasting ear stage and is beginning to dent. The late planted fields are in fine condi-

tion, but will require warm, dry weather during all of September, to fully mature. Pastures are in excellent condition, and meadows promise a fair second crop of hay. Early apples, early grapes and plums are being harvested. Plums and grapes are plentiful, but the apple crop is unusually light. A large acreage is being plowed for winter wheat.

BULLETIN No. 21.—For the week ending September 1.—In respect to temperature and moisture the past week was about all that could be desired for the advancement of corn and for general farm work. The lack of moisture is, however, beginning to retard plowing in some parts of the state. The temperature was considerably above, and the rainfall below the normal until Saturday night when copious showers occurred in many localities. Corn made very rapid progress toward maturity, and gives promise of an exceptionally large yield if no damaging frost occurs before October 10th, which is the average date of the first killing frost of autumn at Des Moines. The effect of dry weather was beginning to show on pastures and potatoes, but the showers on the night of August 31, and September 1st, will be of great benefit. Good progress was made in stacking and threshing, and practically all of the small grain is now in stock or has been threshed.

BULLETIN No. 22.—For the week ending September 8.—The past week was one of the hottest of the season, with abundant sunshine, and a high percentage of humidity. Showers were frequent during the first half of the week, and were quite general, although the rainfall was very light in the southeastern and northwestern counties. The heaviest rainfall occurred over the southwestern quarter of the state, and copious showers were reported from the central and northeastern districts. More than five inches of rain fell in Audubon and Guthrie counties, and more than four inches in Shelby county. The weather was unusually favorable for forcing the maturity of corn, but the crop will require four more weeks of dry, warm weather to put it beyond danger of killing frost. Much of the corn is dented, but a large portion of the crop is only in the roasting ear stage. Considerable threshing was done, except where the rainfall was the heaviest, and there rapid progress was made in plowing and seeding fall grains. Pasturage is generally in good condition and late potatoes are doing fairly well.

BULLETIN No. 23.—For the week ending September 15.—The first two days were very warm, but the latter half of the week was cool, with temperatures near the frost line in the northern counties on the morning of the 14th. More than the usual amount of cloudiness prevailed, and showers were frequent, although the southeastern part of the state received very little moisture until Saturday night when heavy rain fell. Corn made very satisfactory progress, and the early planted fields, in the southern counties, are now being cut for silage and fodder. The abnormally high temperatures during the first ten days of the month caused corn to mature rapidly, and probably fifty per cent of the crop is safe from a moderate frost, but the late fields need two or three weeks of good warm, dry weather, to put them beyond danger of injury of even a heavy frost. Considerable corn was gathered for seed during the week, and most farm-

ers will probably secure their seed at the earliest date possible. Threshing has been further delayed by showers, but pastures, meadows and late potatoes were greatly benefited by the needed moisture. The showers have also been of great benefit to fall plowing and sowing, and that work is being rushed.

BULLETIN No. 24.—For the week ending September 22.—The third week in September was abnormally cold, with an excess of cloudiness and frequent showers. The average daily temperature was about 7 degrees below the normal, and light frost occurred in exposed places on the 19th and 21st, but no damage was done. Showers occurred in some parts of the state on five days, and while the rainfall was fairly well distributed it was generally below the normal although many localities received a slight excess. The rapid maturing of corn was retarded by cool, wet and cloudy weather, but it made considerable progress and 65 to 75 per cent of the crop is beyond injury by a moderately heavy frost. The remainder of the crop needs ten days of warm, drying weather to make it safe, and three weeks to put it beyond danger of a hard freeze. Silos are being filled and considerable corn put in shocks. Seed corn is being secured in many localities, and that work will be general during the coming week. The wet weather has also prevented much threshing being done, and considerable grain in shocks and stacks is reported to be badly damaged. The soil is in excellent condition for plowing, and where the rainfall was not too heavy fall seeding progressed rapidly. Pastures, meadows and late potatoes are doing well.

BULLETIN No. 25.—For the week ending September 29.—The damp, cloudy and cold weather which prevailed during the third week of the month continued during the past seven days. Heavy to killing frosts were general, and freezing temperatures occurred in many localities on two or three mornings. Variable reports are received as to the damaging effect of the recent frosts on the late-planted corn, but the extent of injury will not be fully determined until after the crop has been harvested. Probably 20 per cent of the crop was somewhat damaged, but as a whole, the crop is remarkably large and sound in view of the fact that the spring was late, and at many times during the season the weather was not considered to be favorable. Probably 80 to 85 per cent of the total yield will be sound and merchantable, and the balance will possess much feeding value. That there was not more damage done by the frosts is due to the fact that over the large part, if not all of the state, the weather became cloudy early in the morning after each frost and remained so during the day. The final reports for the season will show that Iowa has produced one of the largest, if not the largest crops of corn and small grain in the history of the state. In fact, all crops have been good except apples. The frequent and well-distributed showers have put the ground in excellent condition for fall plowing, and considerable winter wheat was sown during the past week. Pastures are in fine condition and stock is generally healthy except some hog cholera prevailing in the southwestern counties.

IOWA CROP REPORT, JUNE 1, 1912.

Acreage of Farm Crops, Estimated Condition of Staple Crops, Fruit and Live Stock.

Reports received June 1st, from county and township correspondents of the Iowa Weather & Crop Service, show the following results as to the acreage and average condition of staple farm crops; also the condition of fruit and live stock.

CORN.—The estimated number of acres of corn planted is 9,199,610, or an increase of 336,286 acres, as compared with the area reported by the township assessors for 1911. The average condition of corn on June 1st was placed at 92 per cent, as against 105 per cent on June 1, 1911.

OATS.—The area of oats is estimated to be 4,655,100, or about 2 per cent less than the area harvested last year. The average condition is the same as on June 1, 1911, 100 per cent.

WHEAT.—The area of winter wheat is placed at 333,710 acres, and spring wheat, 509,650, making a total wheat acreage of 840,360 acres, or a decrease of about 6 per cent as compared with the acreage reported by the township assessors for 1911. The estimated condition of spring wheat is 96 per cent, and winter wheat, 90 per cent, as compared with 100 per cent for both in 1911.

BARLEY.—Acreage sown, 294,935 acres; condition, 99 per cent, or 1 per cent less than last year.

RYE.—Acreage of rye sown, 42,970; condition of the crop, 95 per cent, or 2 points less than on June 1, 1911.

FLAX.—The acreage of flax is 37,305, which is a decrease of 5 per cent from last year. Condition, 99 per cent.

POTATOES.—The acreage of the potato crop is estimated to be 124,030 acres, which is 1,296 acres less than the area planted in 1911. Condition of crop, 98 per cent.

HAY.—The acreage of tame and wild hay is 3,682,359, or a decrease of 248,122 acres. Condition, 95 per cent as compared with 88 per cent last year.

ALFALFA.—Area, 32,780 acres, which is an increase of 7 per cent over last year. The condition on June 1st was 94 per cent, as compared with 100 per cent last year.

PASTURES.—The acreage is about 97 per cent, and the condition is 99 per cent or the same as last year.

Condition of fruit based on an average condition of past years:

Apples, 37 per cent; plums, 79; peaches, practically nothing; cherries, 60; grapes, 70; strawberries, 75; raspberries, 70; blackberries, 45 per cent.

Condition of Live Stock.—Cattle, 95 per cent; sheep, 97; hogs, 95; spring pigs, 81; horses, 97; foals, 92 per cent.

IOWA CROP REPORT JULY 1, 1912.

The following is a summary of reports from crop correspondents showing the estimated condition of staple crops, July 1, 1912, as compared with the average condition on that date in past years: Corn, 89 per cent; oats, 100; spring wheat, 95; winter wheat, 90; barley, 99; rye, 96; flax, 96; potatoes, 98; hay, 86; pastures, 95 per cent. On July 1, 1911, the conditions were as follows: Corn, 102 per cent; oats, 72; spring wheat, 80; winter wheat, 88; rye, 89; barley, 79; flax, 84; potatoes, 53; hay, 57; pastures, 60. The Secretary, Iowa State Horticultural Society reports condition of fruit as follows: Summer apples, 21 per cent; fall apples, 20; winter apples, 17; pears, 25; American plums, 77; cherries, 50; red raspberries, 51; black raspberries, 65; blackberries, 40; grapes, 69; currants, 70; gooseberries, 72 per cent of a full crop.

IOWA CROP REPORT, AUGUST 1, 1912.

Following is a summary of reports from crop correspondents on August 1. Much of the late and replanted corn is still backward but all of it is strong and vigorous. The average condition of the crop is placed at 93 per cent or four points better than on July 1st. The estimated condition of pastures is 92 per cent and potatoes 94 per cent, showing a loss of 3 and 4 points respectively during the past month. On August 1, 1911, corn was rated at 69 per cent, potatoes 34 and pastures 33 per cent, reports indicate an average yield of 25 bushels per acre of winter wheat; spring wheat, 18; oats, 40; barley, 32; rye, 21. These figures are subject to change, but if maintained by final reports, the yield per acre of rye and winter wheat will exceed all previous records, and the yields of spring wheat, oats and barley have been exceeded only once during the past 22 years.

IOWA CROP REPORT, SEPTEMBER 1, 1912.

Reports made on September 1st by crop correspondents of the Iowa Weather and Crop Service, show that the condition of corn was 95 per cent, as compared with the average on that date in past years, or a gain of 2 per cent since August 1st, and 20 per cent better than on the same date last year. On a basis of prospective yield, with dry warm weather until the middle of October, the present condition would be considerably above 100 per cent, as the crop is heavily eared, and if it matures before frost comes the yield will be the largest on record in the state. It is estimated that with normal weather conditions about 30 per cent of the crop will be safe from frost on September 15th; 54 per cent on September 25th; 72 per cent on September 30th; 87 per cent on October 10th, and 96 per cent on October 15th; but with dry, warm weather until the middle of October, practically all of the crop will be out of danger.

The average condition of late potatoes was 90 per cent, or a loss of 4 points since August 1st, due to dry weather and blight in some sections of the state.

The reports indicate that only about one-third of the threshing has been done, and up to the present time, the average yields per acre of small grains are as follows:

Winter wheat, 25 bushels; spring wheat, 18; oats, 46; barley, 33; rye, 22; and timothy seed, 4.8 bushels. The estimated acreage of timothy cut for seed is 308,800 acres, or 82,000 acres more than were harvested last year. If the above average of 4.8 bushels per acre is maintained until all of the crop has been threshed, the total yield will be about 1,493,000 bushels, but all figures as to average yields are subject to change when the final report for the season has been tabulated.

FINAL REPORT FOR THE STATE—TOTAL YIELD OF SOIL PRODUCTS—VALUE AT FARM PRICE, DECEMBER 1, 1912.

Following is a summary of reports from crop correspondents of the Iowa Weather & Crop Service, showing the average yield per acre and total yields of staple soil products, and the average price at the farms or nearest stations, December 1, 1912:

As a whole, the crop season of 1912 was the most productive one in the history of Iowa. The total yield of corn, oats and winter wheat was far in excess of any previous year, and all other crops, except apples, were nearly up to the maximum of production. Notwithstanding the fact that the average price of soil products is much below the prices prevailing on December 1, 1911, the total value of this year's crop exceeds that of last year by about \$3,429,514, and if good seed corn had been used last spring an additional \$10,000,000 could have been added to the value of this year's crop.

CORN.—The revised estimate of the acreage of corn is 9,199,610 acres, or 336,286 acres more than was planted last year, as shown by the report of the township assessors. The average yield per acre for the state this year is 45.8 bushels, making a total yield of 421,368,400 bushels, or 33,019,480 bushels more than was ever before produced in the state in one year, the next largest yield being 388,348,920 bushels in 1906. The average farm price on December 1st was 36 cents per bushel, making the aggregate value \$151,698,624. Last year the estimated yield was 32.9 bushels per acre, aggregate yield 281,366,600 bushels; average farm price was 54 cents per bushel, making the aggregate value \$151,937,964 or \$239,340 more than the value of this year's crop. Fully one-third of this year's crop is either soft or chaffy, due to the fact that much of the crop was not fully matured when the severe killing frosts, and in many sections of the state, freezing temperatures, occurred between the 26th and 29th of September. The weather has, however, been generally favorable since October 11th, and husking is now completed in many localities and will be practically completed within the next week.

OATS.—The area harvested was 4,665,100 acres; average yield, 44.4 bushels per acre; total yield, 206,949,700 bushels; aggregate value at 27 cents per bushel, \$55,876,419, or \$3,408,984 less than the value of last year's

crop. The total yield this year was, however, 86,741,400 bushels more than was produced in 1911, and 5,349,700 bushels in excess of the big crop of 1895.

SPRING WHEAT.—Area harvested, 506,650 acres; average yield 18.7 bushels per acre; total yield, 9,486,700 bushels; price per bushel, 76 cents; total value, \$7,209,892.

WINTER WHEAT.—Area harvested, 333,710 acres; average yield per acre, 24.3 bushels; total yield, 8,133,530 bushels; average price, 78 cents per bushel; total value, \$6,344,153.

BARLEY.—Average per acre, 32.5 bushels; total yield, 9,587,760; farm price, 50 cents; total value, \$4,793,880.

RYE.—Average yield, 20.7 bushels per acre; total crop, 888,530 bushels; farm price, 61 cents; total value, \$542,903.

FLAX SEED.—Average per acre, 11.3 bushels, total product, 423,060 bushels; total value at \$1.31 per bushel, \$554,208.

POTATOES.—Average yield per acre, 104 bushels; total yield, 12,904,500 bushels; average price, 44 cents; total value, \$5,677,980.

HAY (Tame).—Average yield, 1.6 tons; total yield, 4,287,600 tons; average price, \$9.89; total value, \$42,404,364.

HAY (Wild).—Average yield, 1.4 tons; total yield, 1,085,440 tons; average price, \$7.43; total value, \$8,054,819.

TABULATED CROP SUMMARY.

Corn	421,368,400 Bu.	\$151,698,624
Oats	206,949,700 Bu.	55,876,419
Spring wheat	9,486,700 Bu.	7,209,892
Winter wheat	8,133,530 Bu.	6,344,153
Barley	9,587,760 Bu.	4,793,880
Rye	888,530 Bu.	542,903
Flax seed	423,060 Bu.	554,208
Potatoes	12,904,500 Bu.	5,677,980
Hay (Tame)	4,287,600 Tons	42,404,364
Hay (Wild)	1,085,440 Tons	8,054,819
Pasture and grazing	Estimated	85,000,000
Ensilage	Estimated	4,000,000
Timothy seed	Estimated	2,300,000
Clover seed	Estimated	516,736
Alfalfa and millet	Estimated	1,200,000
Sweet corn	Estimated	1,137,500
Pop corn	Estimated	600,000
Fruit crops	Estimated	5,200,000
Garden truck	Estimated	1,500,000
Miscellaneous crops	Estimated	7,500,000
Total value		\$302,420,698
The estimated value of soil products for 1911 was		\$288,991,184

IOWA CROPS, 1912—NUMBER OF ACRES BY COUNTIES

COUNTIES	Corn Acres	Oats Acres	Spring Wheat Acres	Winter Wheat Acres	Barley Acres	Rye Acres	Flax Acres	Potatoes Acres	Tame Hay Acres	Wild Hay Acres	Alfalfa Acres	Pastures Acres	
Adair	88,000	30,500	4,300	750	1,570	125		1,150	42,000	3,300	40	114,800	
Adams	21,800	21,800	1,200	3,800	600			380	32,200	1,600	45	61,000	
Allamakee	41,300	37,400	2,100	980	14,400	860	40	1,120	37,100	1,180	18	144,500	
Appanoose	40,700	15,300	1,500	2,400	70	20		200	34,100	1,000		91,700	
Audubon	87,000	27,000	7,000	300	4,000	130		1,100	20,400	2,400	90	72,000	
Benett	120,000	29,400	2,350	600	1,070	500		1,070	22,500	4,500	35	96,200	
Black Hawk	105,000	57,000	1,050	1,000	2,950	2,500		1,530	29,000	9,600	35	99,000	
Boone	118,000	60,300	2,500	630	920	50	35	1,100	16,200	13,400	40	70,000	
Bremer	65,000	51,600	2,300	730	200	900		1,370	18,000	30,000	20	61,200	
Buchanan	85,000	52,600	1,100	1,100	2,600	1,080		1,280	37,000	12,500		103,000	
Buena Vista	105,000	75,000	1,000	320	700	125	680	1,750	19,200	17,300		68,200	
Butler	104,300	65,500	1,300	470	1,100	2,000	50	1,450	22,600	10,400		80,200	
Calhoun	134,000	102,000	2,800	350	500	15	370	1,900	19,400	13,800	30	57,100	
Carroll	106,000	61,400	6,600	400	2,580	39	10	2,100	21,500	9,800	20	69,000	
Cass	104,000	36,400	11,700	7,900	1,300	40		1,350	27,800	1,700	125	104,200	
Oedar	107,000	38,300	3,100	3,500	5,400	480		1,100	39,000	300	20	58,300	
Cerro Gordo	97,000	72,600	2,100	500	2,000	240		1,300	37,000	18,000	30	37,000	
Cherokee	117,000	74,500	1,250	250	2,700	20	20	1,720	23,000	9,700	240	81,500	
Chickasaw	65,000	32,200	4,400	400	4,540	500		1,080	26,400	12,000		73,000	
Clarke	54,000	19,000	200	2,300	100	25		580	37,200	150		97,000	
Clay	100,000	70,000	2,000	65	1,000	75		1,200	670	22,600	21,400	25	81,100
Clayton	67,000	62,000	2,000	2,000	14,100	1,900		1,840	59,600	1,270	25	161,100	
Clinton	112,000	43,300	3,200	7,400	6,000	1,800		1,050	55,000	3,200	55	143,000	
Crawford	136,000	54,000	18,300	1,300	4,940	60		1,950	6,300	6,300	104	104,000	
Dallas	115,000	50,000	3,500	3,700	700	70		70	26,300	4,500		87,300	
Davis	58,400	19,800	150	4,900	15	130		380	36,800	70	20	228,000	
Decatur	64,000	21,100	165	4,300	15	110		220	34,400	400	50	107,400	
Delaware	46,500	880		10,400	1,580	20		1,380	6,700	6,700	5	116,000	
Des Moines	64,500	32,500	1,600	2,800	500	200		1,000	20,800	300	40	82,400	
Dickinson	48,000	34,700	4,900	20	500	30	1,500	50	8,900	18,300	25	49,000	
Dubuque	62,000	31,300	1,250	300	3,800	700		200	50,000	650	65	134,000	
Emmet	49,000	38,000	4,100	35	1,700	35	1,500	200	14,300	15,000		45,500	
Fayette	96,000	71,800	2,100	600	7,100	1,450	230	1,600	44,000	13,000	22	154,000	
Floyd	84,000	72,200	2,900	280	1,750	1,050	330	1,300	56,000	5,200	10	61,500	
Franklin	107,000	84,100	2,650	450	1,570	90		490	28,300	13,500	25	84,000	
Fremont	132,000	13,200	6,700	17,500	1,900	150		12,400	12,600	5,700	2,700	62,000	
Greene	130,000	62,000	1,070	300	820	35	160	890	27,300	10,700	20	81,300	
Grundy	105,000	68,900	1,100	750	5,120	90		3,900	23,100	7,400	15	69,000	
Guthrie	97,000	45,000	3,700	750	1,070	750		540	32,400	4,400	35	113,300	
Hamilton	111,500	73,000	2,150	1,170	1,125	10		800	26,800	13,900	45	80,500	
Hancock	87,500	69,000	6,200	270	3,440	90	910	1,110	20,800	10,800	15	71,000	
Hardin	67,800	27,800	2,300	1,050	1,050	80		1,300	25,000	10,800	80	80,500	
Harrison	137,000	22,600	26,800	12,000	1,500	180		980	14,200	10,100	5,000	83,000	
Henry	79,000	28,700	650	3,300	80	230		420	23,000	6,700	5	72,500	
Howard	55,000	49,000	4,270	910	1,900	370	2,400	930	30,400	9,500	30	88,200	
Humboldt	80,800	57,500	5,200	280	1,100	45	760	770	19,300	14,000	40	46,500	
Ia	98,000	41,600	3,000	1,600	1,850	350		970	25,100	2,300	35	60,200	
Iowa	67,000	33,000	2,900	2,800	3,400	3,300		1,350	31,300	870	22	99,600	
Jackson	142,000	32,000	9,100	4,300	3,400	120		1,180	60,000	2,400	35	165,500	
Jasper	60,000	22,600	1,800	6,400	340	150	75	1,020	41,300	1,300	15	148,900	
Johnson	88,000	38,000	2,600	4,000	960	500		340	30,000	780	20	53,000	
Jones	82,000	34,800	1,250	500	2,800	750	200	1,200	40,000	800	15	104,000	
Keokuk	10,000	34,300	4,700	2,800	750	30		780	44,600	600	20	115,000	
Kossuth	142,000	115,000	10,500	350	3,000	30	2,700	830	47,000	140	15	120,000	
Lee	55,100	19,000	55	7,500	250	1,800		2,300	20,000	56,000	12	110,000	
Linn	106,000	53,000	3,200	1,300	4,000	100		800	30,500	180	25	108,000	
Louisia	59,500	17,800	1,200	1,300	2,300	1,000		1,880	43,000	3,000	15	119,300	
Lucas	50,000	18,600	1,830	4,300		30		3,400	14,400	700	15	52,000	
Lyon	707,000	79,000	5,900	330	11,500	50	240	5,500	11,100	11,000	100	100,000	
Madison	82,000	16,000	2,800	3,400	1,600	290		2,300	20,000	20,000	9	56,600	
Mahaska	97,000	34,700	4,800	2,800	820	200		820	31,200	1,450	30	108,700	
Marion	98,000	26,400	7,000	7,300	1,720	850	20	700	27,400	1,800	25	102,000	
Marshall	117,000	61,600	6,000	6,000	380	120		1,700	36,400	1,180	35	104,200	
Mills	84,000	29,000	10,700	2,250	1,000	25		1,800	870	29,000	5	85,100	
Mitchell	70,000	73,700	9,500	480	2,600	200		460	12,400	6,300	3,700	54,000	
Monona	141,000	26,500	19,000	28,700	2,000	300		1,760	24,000	2,420	10	59,700	
Monroe	39,300	19,800	5,000	4,300	30	110		80	14,000	40,800	4,500	115,000	
Morgan	90,000	16,000	2,300	13,000	240	200		240	28,000	80	5	104,300	
Montgomery	71,000	19,000	2,900	4,000	3,500	2,400		530	30,000	870	600	66,000	
Muscatine	105,000	76,000	4,000	200	8,500	50		500	24,400	900	75	77,700	
O'Brien	64,000	16,000	2,000	150	6,800	25	2,500	1,800	9,000	9,000	20	77,000	
Oceola	109,000	19,100	5,000	62,000	1,000	100		1,190	13,000	9,700		45,000	
Page	75,000	53,500	1,800	3,200	190	630		1,300	22,200	1,300	230	99,500	
Palo Alto	171,000	81,000	35,800	800	6,200	15	115	3,700	55,000	33,000	5	62,000	
Plymouth	116,200	86,200	1,250	250	650	60	180	60	1,000	38,800	1,800	107,000	
Pocahontas	70,000	34,200	10,500	12,000	700	100	1,800	1,230	15,400	23,000	40	64,000	
Polk	197,000	41,600	31,200	13,200	2,200	620		1,440	26,400	4,600	60	75,000	
Pottawattamie	108,000	42,600	4,400	700	1,400	200		1,030	33,500	300	6,670	118,000	
Poweshiek	116,500	23,000	100	3,000	100	100		710	53,000	200		111,000	
Ringold	116,500	74,500	1,500	170	3,300	35	470	1,330	27,000	9,800	180	76,000	
Scott	78,000	23,000	4,500	3,000	19,000	2,000		2,700	27,600	2,700	125	77,600	
Shelby	105,000	45,000	14,200	900	7,500	1,400		1,300	31,400	5,700	280	84,000	
Sioux	125,000	88,000	24,000	850	18,300	10	550	1,900	18,700	19,000	440	81,000	
Story	119,000	62,000	2,300	1,900	320	75	60	700	31,300	7,000	70	69,900	

IOWA CROPS, 1912—NUMBER OF ACRES BY COUNTIES—CONTINUED

COUNTIES	Corn Acres	Oats Acres	Winter Wheat Acres	Spring Wheat Acres	Barley Acres	Rye Acres	Flax Acres	Potatoes Acres	Tame Hay Acres	Wild Hay Acres	Alfalfa Acres	Pastures Acres
Tama	125,000	69,000	6,000	1,600	6,200	230	---	2,000	38,000	3,000	---	115,000
Taylor	71,000	22,200	1,050	6,700	370	100	---	550	36,200	500	40	93,800
Union	63,000	23,000	800	530	215	150	---	740	35,200	1,000	15	89,700
Van Buren	48,000	18,100	140	5,500	180	110	---	330	34,300	100	70	131,600
Wapello	56,000	18,300	1,000	8,000	330	300	---	780	21,600	100	---	87,000
Warren	87,000	21,000	5,700	14,200	400	400	---	870	35,800	650	25	118,000
Washington	90,000	38,300	2,800	3,400	250	220	---	600	34,000	---	15	87,500
Wayne	65,500	26,800	110	2,000	---	85	---	200	42,800	60	---	98,500
Webster	132,000	91,100	4,800	450	270	40	650	1,140	27,300	25,000	60	96,000
Winnebago	67,000	32,900	17,600	20	2,900	50	2,100	790	15,500	26,500	---	57,700
Winneshek	74,000	63,800	13,200	430	18,800	800	1,500	1,240	43,600	6,100	5	139,000
Woodbury	178,000	55,000	13,300	12,000	3,300	50	100	1,800	24,200	13,500	3,400	99,000
Worth	62,000	45,300	17,200	120	3,000	320	4,000	670	17,200	20,800	20	56,500
Wright	101,500	76,500	31,000	400	1,100	120	---	580	30,100	12,500	7	70,900
Totals	9,199,600	4,665,100	506,650	333,710	294,935	42,970	37,305	124,030	2,901,100	781,259	32,780	9,117,100

FINAL CROP REPORT, 1912
AVERAGE YIELD PER ACRE AND TOTAL PRODUCT—BY COUNTIES

Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley		Rye		Flax Seed		Potatoes		Hay—Tame		Hay—Wild	
	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	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons		
Adair	42	4,116,000	39	1,189,500	19	817,000	33	24,000	23	44,000	18	2,200	---	78	87,400	1.3	54,600	1.0	3,300	
Adams	44	3,015,000	42	915,600	19	22,800	28	106,400	29	17,400	27	3,400	---	75	28,500	1.5	46,300	1.3	2,100	
Allamakee	48	1,982,400	45	1,683,000	17	35,700	19	18,620	26	374,400	18	15,480	10	400	117	131,000	1.3	48,200	1.5	1,800
Appanoose	38	1,546,600	40	1,008,000	12	1,800	19	45,600	23	1,700	17	340	---	38	7,600	1.2	40,900	0.8	800	
Audubon	41	3,567,000	38	1,406,000	16	112,000	26	13,000	32	132,000	18	2,300	---	105	115,500	1.4	28,500	1.5	3,600	
Benton	51	6,732,000	44	3,498,000	16	37,600	26	15,600	31	232,500	19	20,300	---	93	120,800	1.3	41,600	1.3	5,900	
Black Hawk	49	5,047,000	46	2,622,000	7	28,300	28	28,000	30	88,600	22	48,400	---	98	149,900	1.5	43,500	1.1	10,500	
Boone	46	5,428,000	45	2,713,000	19	47,500	32	20,200	35	7,700	20	1,800	10	350	80	88,000	1.5	39,300	1.2	16,000
Bremer	43	2,709,000	36	1,839,600	16	36,800	20	14,600	42	9,700	18	16,200	---	97	123,200	1.3	23,400	1.0	20,000	
Buchanan	40	3,520,000	39	1,978,000	20	22,000	25	27,500	33	66,000	17	18,400	10	100	112	143,300	1.5	55,500	1.5	18,700
Buena Vista	45	4,725,000	44	3,300,000	9	19,000	24	5,300	35	24,500	18	2,300	11	7,500	96	168,000	1.6	39,900	1.4	24,200
Butler	46	4,793,200	45	2,947,500	18	23,400	19	9,000	31	34,100	20	58,000	5	300	127	184,200	1.6	36,200	1.3	13,500
Calhoun	51	6,324,000	48	4,806,000	24	9,100	27	9,400	39	19,500	20	300	8	3,000	82	169,800	2.0	38,800	1.2	17,000
Carroll	43	4,876,000	47	2,855,800	18	118,800	26	10,400	36	92,800	17	500	10	100	115	241,500	1.6	34,400	1.6	15,700
Cass	38	3,952,000	36	1,310,400	15	175,500	30	287,000	32	41,600	25	1,000	---	77	103,000	1.4	52,900	2.0	3,000	
Cedar	54	5,778,000	47	1,800,000	16	49,000	18	63,000	37	347,800	20	14,500	---	101	111,100	1.4	54,600	1.5	300	
Cerro Gordo	46	4,462,000	48	3,484,800	18	37,000	23	11,500	30	87,000	20	4,800	16	20,800	139	196,800	1.6	43,200	1.1	14,300
Cherokee	46	5,382,000	49	3,650,500	16	18,300	29	5,700	40	108,000	20	400	20	400	95	164,300	1.7	39,100	1.4	13,600
Chickasaw	54	3,510,000	42	2,292,400	17	74,800	22	6,500	35	188,000	20	14,700	10	5,000	123	132,500	1.5	39,600	1.3	16,600
Clarke	44	2,376,000	38	722,000	15	3,000	27	55,100	24	2,400	23	600	---	78	45,200	1.3	48,400	0.8	120	
Clay	51	4,340,000	55	3,850,000	17	34,000	21	970	36	54,000	24	1,800	13	27,300	101	98,000	1.6	31,200	1.3	27,500
Clayton	48	3,339,400	37	2,294,000	8	36,000	19	38,000	30	423,000	17	32,300	---	140	237,600	1.5	75,900	1.5	1,900	
Clinton	52	5,824,000	48	1,645,400	16	51,200	17	125,800	34	204,000	18	23,400	---	120	120,000	1.1	58,300	1.2	3,840	
Crawford	52	6,968,000	43	2,322,000	1	384,300	30	36,000	25	123,500	18	700	---	67	123,500	1.5	69,700	1.2	7,600	
Dallas	51	5,865,000	50	2,500,000	22	77,000	35	129,500	29	27,300	24	1,700	---	98	68,600	1.7	41,700	1.4	6,300	
Davis	36	1,856,400	40	945,700	12	1,800	12	58,800	25	400	15	1,950	---	74	28,100	1.3	47,800	1.1	80	
Decatur	42	2,688,000	39	838,500	25	4,100	29	124,700	28	420	22	2,400	---	64	14,000	1.4	47,000	0.8	320	
Delaware	45	3,987,000	36	1,633,200	18	15,900	25	6,500	27	280,800	18	28,400	---	84	81,600	1.4	53,200	1.6	10,700	
Des Moines	48	3,096,000	38	908,200	5	24,000	15	42,000	37	17,600	16	3,200	---	102	102,000	1.1	32,900	1.5	460	
Dickinson	39	1,872,000	47	1,639,900	12	58,800	17	240	37	92,500	28	840	11	16,500	124	64,500	1.3	11,600	1.2	22,000
Dubuque	42	2,688,000	36	1,846,800	1	26,200	24	7,200	34	129,200	18	13,700	---	124	248,000	1.1	55,000	0.5	325	
Emmet	40	1,960,000	47	1,786,000	13	53,300	20	500	27	45,900	13	450	9	17,100	124	111,600	1.7	21,200	1.0	15,300
Fayette	39	3,744,000	35	2,496,500	10	21,000	18	11,700	29	206,900	19	27,500	12	2,600	151	241,600	1.2	52,800	0.9	11,700

FINAL CROP REPORT, 1912

AVERAGE YIELD PER ACRE AND TOTAL PRODUCTION—BY COUNTIES

Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley		Rye		Flax Seed		Potatoes		Hay—Tame		Hay—Wild	
	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	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
Floyd	47	3,948,000	2,743,000	55,100	7,000	54,200	23,100	3,600	157,300	1.7	44,200	1.2	6,300							
Franklin	49	5,243,000	2,448,100	42,000	9,000	46,500	2,400	186,700	1.6	43,300	1.5	30,700								
Fremont	36	3,900,000	4,336,000	87,100	24,000	3,900	3,000	162	53,000	0.9	11,300	1.4	8,000							
Greene	46	5,080,000	2,418,000	19,000	7,300	26,300	70	1,000	80,100	1.7	46,400	1.3	13,900							
Grundy	50	5,295,000	3,307,000	25,300	21,700	1,600	113	372,500	1.5	33,000	1.1	24,300								
Guthrie	45	4,265,000	1,845,000	70,300	35,300	32,300	1,300	111	26,000	1.9	61,500	1.5	6,700							
Hamilton	45	5,017,000	2,701,000	38,700	28,300	3,700	250	8	2,800	107	85,000	1.7	45,500							
Hancock	51	4,465,000	3,834,000	124,000	6,200	180,700	2,400	12	16,900	126	174,200	1.4	29,100							
Hardy	47	4,315,000	2,638,800	49,000	27,600	31,900	12	900	110	160,800	1.5	37,500								
Harrison	42	4,754,000	838,800	375,300	276,200	42,100	3,600	—	—	—	88,300	2.0	28,400							
Henry	29	2,925,000	1,004,500	9,900	16,100	2,300	14	70	29,400	1.4	42,300	—	—							
Howard	58	1,973,000	2,678,000	68,300	17,700	273,000	7,000	13	28,300	120	111,000	1.6	48,000							
Humboldt	32	4,301,600	2,760,000	98,800	7,000	42,500	900	6	4,600	108	98,600	1.6	39,000							
Ida	48	4,416,000	2,162,000	54,200	3,700	211,500	21	680	600	126	97,500	1.5	37,000							
Iowa	51	4,743,000	1,747,300	48,000	31,900	48,600	8,000	—	127	176,500	1.4	48,000								
Jackson	42	2,814,000	1,387,000	33,100	33,200	165,400	75,000	—	124	158,000	1.4	70,000								
Jasper	49	6,938,000	2,305,000	118,300	129,400	19,000	3,400	10	750	114	116,300	1.6	70,000							
Jefferson	20	2,880,000	1,926,000	36,600	128,200	6,000	3,000	110	37	37,400	1.3	39,000								
Johnson	44	3,872,000	1,666,000	37,700	70,000	35,000	19,000	—	85	115,000	1.2	48,000								
Jones	48	4,022,400	1,430,800	21,600	11,600	328,000	26,400	—	—	82,700	1.3	68,000								
Keokuk	48	4,776,000	1,368,000	75,300	38,800	16,500	6,900	—	75	62,500	1.5	70,500								
Kossuth	48	6,816,000	5,710,000	11,500	8,000	50,000	50,000	12	22,400	143	328,500	1.8	54,000							
Lee	42	2,630,400	912,000	1,000	40,200	6,500	28,700	8	78	70,300	1.5	45,800								
Linn	46	4,870,000	2,885,000	41,800	28,400	63,500	28,400	—	92	172,000	1.3	55,000								
Louisia	39	2,320,500	623,000	14,400	66,000	2,700	18,200	—	63	214,300	1.1	15,800								
Lucas	45	2,250,000	706,800	32,000	116,000	2,000	184	—	118	10,100	1.6	36,000								
Lyon	42	4,031,000	3,634,800	3,600	33,000	373,500	1,000	13	3,100	100	82,700	1.6	17,800							
Madison	50	4,320,000	1,444,000	30,000	119,300	53,000	7,500	—	781	91,000	1.6	49,900								
Mahaska	48	4,656,000	1,561,500	81,000	67,500	34,800	7,300	12	240	98	68,900	1.6	43,800							
Marion	50	1,160,000	1,214,400	112,000	232,500	68,500	31,200	—	82	59,800	1.6	46,400								
Marshall	54	6,318,000	2,838,000	68,000	138,000	12,000	3,400	—	116	188,700	1.6	48,200								
Mills	39	3,276,000	870,000	88,500	267,300	8,500	3,600	—	60	37,600	1.0	12,400								
Monroe	41	2,870,000	3,242,800	192,000	9,100	179,800	2,500	12	44,600	178	224,300	1.5	36,000							
Monona	42	5,922,000	736,000	285,000	688,800	62,000	5,000	13	1,000	88	88,000	1.9	26,000							
Monroe	45	1,768,000	411,600	105,000	137,600	840	2,400	—	65	15,600	1.2	33,000								
Montgomery	43	3,870,000	572,000	148,800	338,000	14,600	2,800	—	80	42,400	1.2	30,000								
Muscataine	52	3,692,000	722,000	40,000	66,000	80,500	3,000	—	70	91,000	0.9	1,700								
O'Brien	49	5,145,000	4,028,000	8,000	4,400	137,500	2,000	—	70	91,000	0.9	900								
Osceola	45	3,105,000	2,915,500	34,000	2,300	224,400	1,000	16	8,800	120	216,000	1.3	27,700							
Page	45	4,905,000	725,800	84,000	6,000	31,400	6,000	—	16,000	114	153,600	1.5	19,500							
Palo Alto	51	3,825,000	2,621,500	15,000	1,000	25,800	2,300	13	33,000	139	120,900	1.7	15,900							
Plymouth	43	7,333,000	2,709,000	58,600	4,000	229,400	5,000	—	116	126,800	2.0	52,800								
Pocahontas	54	5,300,000	4,426,800	34,600	4,300	22,700	1,300	—	130	240,400	1.5	38,400								
Pottawattamie	39	7,685,000	1,831,300	339,200	218,800	1,900	29	160	95	153,300	1.7	36,300								
Plymouth	43	5,835,000	1,673,800	175,300	384,000	1,900	14	—	150	134,300	1.6	37,800								
Polk	59	5,300,000	49,000	21,000	53,200	49	5,800	—	116	168,700	1.1	41,500								
Pottawattamie	39	7,685,000	1,831,300	339,200	218,800	1,900	29	160	95	153,300	1.7	36,300								
Poweshiek	58	2,813,000	871,300	15,300	72,000	6,000	21	—	930	83,500	1.3	43,500								
Sac	46	6,359,000	2,906,500	1,035,000	72,000	1,000	50	9	4,200	162	135,600	1.7	49,100							
Scott	54	4,212,000	1,470,000	1,470,000	19,800	210,000	50,000	—	134	750,000	1.3	35,900								
Shelby	41	5,286,000	3,066,000	3,066,000	408,000	25,000	2,000	—	78	100,400	1.2	37,700								
Sioux	47	7,332,000	2,822,000	41,800	57,000	5,000	200	10	5,500	140	276,000	1.6	29,000							
Story	50	5,950,000	46,000	102,000	45,300	210,800	1,600	10	600	110	77,000	1.9	59,400							
Tama	43	6,633,000	3,174,000	19,000	187,300	12,300	2,200	—	138	276,000	1.4	53,200								
Taylor	53	3,653,000	1,065,000	1,500	17,000	6,400	3,200	—	81	44,500	1.8	65,300								
Union	45	2,833,000	687,800	1,500	21,000	195,200	7,600	24	53	30,700	1.3	44,600								
Van Buren	41	1,968,000	687,800	131,100	497,000	10,000	10,400	—	60	45,000	1.6	34,000								
Wade	51	2,856,000	933,000	30,400	66,000	6,200	1,500	—	163	89,000	1.8	64,400								
Warren	49	4,362,000	1,800,000	2,900	48,000	6,200	18	—	112	67,200	1.2	40,800								
Washington	47	4,230,000	1,800,000	1,045,200	35,000	11,300	7,000	3,000	—	101	30,200	1.4	50,900							
Wayne	38	2,644,500	3,579,200	2,924,400	7,300	63,400	700	10	21,000	172	114,000	2.0	54,600							
Webster	45	2,837,000	1,800,000	2,218,000	232,000	105,600	1,000	11	18,000	21,000	127,200	2.1	91,500							
Winnebago	41	3,760,000	2,424,400	138,000	1,800	84,000	6,400	10	1,100	88	136,400	1.7	41,100							
Winneshiek	45	6,942,000	2,088,500	486,000	9,200	33,000	2,400	12	7,000	97	92,100	1.8	25,800							
Woodbury	43	2,526,000	2,383,500	—	—	—	—	—	—	—	—	—	—							
Worth	43	4,911,500	—	—	—	—	—	—	—	—	—	—	—							
Wright	47	4,911,500	—	—	—	—	—	—	—	—	—	—	—							
Totals		421,308,400	806,949,700	18,7	9,486,700	24.3	8,133,330	32.5	9,687,700	20.7	888,580	11.3	423,000							
Averages	45.8		44.4									104	12,904,900	1.6	4,287,600	1.4	1,085,440			

ANNUAL REPORT OF THE

IOWA WEATHER AND CROP SERVICE