

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

IN CO-OPERATION WITH THE

Iowa Weather and Crop Service

ANNUAL REPORT FOR 1905

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Local Forecaster, Asst. Director.

JOHN R. SAGE,
Director.

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LETTER OF TRANSMITTAL.

STATE OF IOWA.

OFFICE OF THE IOWA WEATHER AND CROP SERVICE.

DES MOINES, July 20, 1906.

To His Excellency, ALBERT B. CUMMINS, Governor of Iowa:

SIR:—In accordance with the requirements of the law, we have the honor to submit herewith the sixteenth annual report of the Iowa Weather and Crop Service for the year 1905.

We are, sir, very respectfully,

Your obedient servants,

JOHN R. SAGE,
Director.

GEO. M. CHAPPEL,
Local Forecaster, U. S. Weather Bureau,
Assistant Director.

ANNUAL REPORT, 1905.

This report is a compilation of climatic data and statistics of soil products, for the year 1905, in convenient form for reference and comparison.

During the year meteorological reports were received from the regular United States Weather Bureau stations at Des Moines, Davenport, Dubuque, Keokuk, Charles City, Sioux City and Omaha, Neb. In addition to these regular stations, reports have been received from 135 stations, in charge of cooperative observers, who have generously volunteered to perform this service for benefit of the public.

This office issued during the year about 70,000 copies of weekly Climate and Crop Bulletins, 31,300 copies of the Monthly Review of the Climate and Crop Service, and 4,500 copies of the annual report for 1904.

There has been a notable increase in the dissemination of daily weather forecasts by telephone and rural mail. Distribution by telephone now reaches the total of 76,200 patrons of rural lines, mainly farmers. And forecast cards are sent by rural mail to 8,100 families and 1,054 cards are sent by ordinary mail. In addition to this there is a very large dissemination of forecasts through the daily press. Many evidences are given of the public appreciation of the value of this service.

CLIMATOLOGY OF THE YEAR 1905.

BAROMETER—The mean pressure for the year was 30.04 inches. The highest observed pressure was 31.09 inches on January 25th, at Sioux City; lowest pressure, 29.12 inches on January 1st at Keokuk. Range for the state 1.97 inches.

TEMPERATURE.—The mean temperature for the state was 47.3°, which is 0.4° below normal. The highest temperature reported was 104° on August 11th at Waukeg. The lowest temperature reported was 41° below zero on February 2d, at Galva and Ida Groves. Range for the year 145°.

PRECIPITATION.—The average amount of rain and melted snow for the year, as shown by complete records of 107 stations, was 36.51 inches, which is 4.79 inches above the normal, and 7.77 inches above the average amount

in 1904. The greatest amount recorded at any station for the year was 52.26 inches at Thurman. Least amount recorded 24.66 inches at Little Sioux. The greatest monthly rainfall was 14.89 inches at Keosauqua in June; least monthly amount, trace at Estherville and Rock Rapids in December. The greatest amount in any 24 consecutive hours was 12.10 inches, at Bonaparte, June 10th. The average number of days on which .01 of an inch or more of rain fell was 97.

WIND AND WEATHER.—The prevailing direction of the wind was Northwest. Highest velocity reported, 59 miles an hour, in Sioux City, from the Northwest on May 3d. Average daily movement, 201 miles. There were 164 clear days, 98 partly cloudy, and 103 cloudy days; as against 164 clear days 97 partly cloudy, and 105 cloudy days in 1904.

MONTHLY CLIMATOLOGICAL SUMMARIES.

JANUARY.

The weather records for the state at large show but one colder January, and that was January, 1893, when the mean for the state was 9.3°. This year the mean was 11.2°, which is 7.0° below normal. Since the first day of the month there has been practically no temperature high enough to lessen the height of the massive snowdrifts, and the fields in all parts of the state were well protected from damaging effects of the extreme cold. Winter grain and grasses suffered no material damage. Generally sleighing was good in all parts.

The monthly mean temperature for the state, as shown by records of 118 stations, was 11.2°, which is 7.0° below normal. By sections the mean temperatures were as follows: Northern section 7.7°, which is 9.7° below normal; central section 11.2°, which is 7.3° below normal; southern section 14.6°, which is 8.2° below normal. The highest monthly mean was 19.6°, at Keokuk; lowest monthly mean, 4.2°, at Payette. The highest temperature reported was 55°, at Keokuk, on the 1st; lowest temperature reported was 30°, at Inwood, on the 25th. The average monthly maximum was 43.8°; average monthly minimum, 18.9°. Greatest daily range, 48° at Audubon; average of greatest daily ranges, 35.4°.

The average precipitation for the state, as shown by records of 125 stations, was .91 of an inch, which is .06 of an inch below normal. The averages by sections were as follows: Northern section, .07 inch, which is .11 inch below normal; central section, 1.07 inches, which is .04 inch above normal; southern section, .97 inch, which is .09 inch below normal. The largest amount reported was 1.82 inches at Lacona; least amount reported, .12 inch, at Storm Lake. The greatest daily rainfall reported was .90 inch, at Lacona, Ridgeway, Northwood, on the 11th and 12th respectively. Average number of days on which .01 of an inch or more was reported, 6. Prevailing direction of the wind, southwest; highest velocity reported, 33 miles per hour, from the northwest, at Sioux City, on the 5th. Average number of clear days, 13; partly cloudy, 8; cloudy, 10.

OBSERVERS' NOTES.

ALTA—*David E. Hadden.* January, 1905, was very cold, the mean temperature being lowest in 15 years, with one exception. January, 1893, which was about half a degree colder.

BONAPARTE—*B. R. Vale.* A pleasant and seasonable month; nine days temperature was below zero, the lowest being 11° below on 14th and 25th; frequent light snows.

BRITT—*Geo. P. Hardwick.* Second and fourth weeks were very cold; 7° lower than average of last nine Januaries.

CLINTON—*Luke Roberts.* The mean temperature of the month was 14.7°, being the same as in January 1904, and 3.5° below the normal for past 27 years. The warmest day was the 1st, with a mean of 41.2°; and the coldest day was the 24th, with a mean of 4.5° below zero. There was a stout wind of 26 miles an hour, and blizzard conditions. Precipitation of the month only .79 of an inch of water, coming mainly in form of snow.

GRAND MEADOW—*P. L. Williams.* Month extremely cold; 19 days at zero or below; the 24th was an extremely bad day.

GREENE—*J. L. Cole.* Ice in Shell Rock river 24 inches thick; no thaw in January.

INWOOD—*G. M. Larsen.* Coldest month of the winter; more snow than for many years.

OLIN—*N. Potter.* A real winter month with no general thaw.

RIDGWAY—*Arthur Betts.* Coldest January in 7 years, but a very agreeable month; 200 hours of sunshine; no bad storms; sleighing all the month; thawing temperature on 3 days.

SHELDON—*A. W. Beach.* Best sleighing in years; some sunshine every day but 2; splendid winter weather.

WAUKER—*E. J. Leonard.* First day of January was above freezing all day; almost steady cold since; 13 days reached zero or lower.

FEBRUARY.

The month was abnormally cold, the mean temperature for the state being 12.8°, which is 6.8° below the normal, making it the coldest February since 1890. The first half was a continued period of intense cold weather with more than usual snowfall and strong drifting winds. This rendered ordinary farm work, and especially the care of stock, quite difficult. There was enough snow, however, to serve as a protection to winter grain and grasses. The latter half was milder and at the close of the month the snow had mostly disappeared in the larger part of the state. The monthly mean temperature for the state, as shown by records of 115 stations, was 12.8°, which is 6.8° below normal. By sections the mean temperature were as follows: Northern section 10.06°, which is 5.9° below normal; central section 12.7°, which is 7.6° below normal; southern section 15.1°, which is 6.4° below normal. The highest monthly mean was 18.0° at Keokuk; lowest monthly mean, 8.1° at Forest City. The highest temperature reported was 69° at Glenwood and Onawa on the 28th; lowest temperature reported, 41° below zero at Galva and Ida Grove on the 2d. The average monthly maximum was 57.2°; average monthly minimum—30.6°. Greatest daily

range 57° at Sibley; average of greatest daily ranges, 40.0°. The average precipitation for the state, as shown by records of 125 stations, was 1.57 inches, which is 0.53 of an inch above normal. The averages by sections were as follows: Northern section, 1.35 inches, which is .46 of an inch above normal; central section, 1.68 inches, which is .02 of an inch above normal; southern section, 1.67 inches, which is 0.53 of an inch above normal. The largest amount reported was 2.97 inches at Belle Plaine; least amount reported, 0.44 of an inch, at Sioux City. The greatest daily rainfall reported was 1.10 inches at Ottumwa, on the 24th. Average number of days on which .01 of an inch or more was reported, 7. The prevailing direction of the wind was northwest; highest velocity reported, 49 miles per hour, from the northwest, at Sioux City, on the 14th. Average number of clear days was 14; partly cloudy, 7; cloudy, 7.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. First half of February was intensely cold, later half pleasant, and closing days were quite spring like; snow thawed rapidly and none remained at end of month.

AMANA—*C. Schadt*. Mercury fell to -32° on 13th; snow fell to depth of 15.7 inches and drifted badly; but little left at close of month.

BOONE—*Carl Fritz Henning*. First robin heard on 25th; geese flying northward on 26th.

BONAPARTE—*B. R. Vale*. First half of month incessantly cold, the lowest in many years; last week warm, and roads were muddy.

BRITT—*Geo. P. Hardwick*. First half very cold; snow drifted badly; much ground bare at end of month.

CLINTON—*Luke Roberts*. The mean temperature of February was 14.6° which is 7° below normal. There has been one colder February and that was in 1885, with a mean of 8.3°. The coldest day was the 13th, with a mean of 13.7° below zero. The minimum for that day was 27° below zero. This was the coldest registered since February 9, 1899, on which day it was 28° below zero. The total snowfall during the month was 18 inches, giving some good sleighing. The aggregate precipitation was 2.44 inches. Total for the winter 5.98 inches, which is 0.41 of an inch above the normal for past 26 years.

ELKADER—*Chas. Reinecke*. Total snowfall for winter months, 46 inches. Lowest temperature, 30 below zero on February 15th.

FOREST CITY—*J. A. Peters*. Coldest weather of record on the 13th, temperature 31° below zero. Snow drifted badly; the railway traffic was abandoned 3 days; coldest February of record here.

MARCH.

March 1905 was phenomenally warm, breaking all previous records of high average temperature for the state at large. The monthly mean temperature for the state, as shown by records of 122 stations, was 41.5 degrees, which is 9.1 above normal. By sections the mean temperatures were as follows: Northern section 38.3°, which is 8.7° above normal; central section 41.3°, which is 9.1° above normal; the southern section 44.9° which is 9.0°

above normal. The highest monthly mean was 47.2° at College Springs and Sidney; lowest monthly mean, 35.9° at Cresco. The highest temperature reported was 84° at Onawa on the 27th; lowest temperature reported 1°, at Fayette, Grand Meadow, Osage and Ridgeway on the 11th. The average monthly maximum was 75.6°; average monthly minimum 8.6°. Greatest daily range, 52° at Monticello; average of greatest daily ranges, 38.2°. The average precipitation for the state, as shown by records of 132 stations, was 2.04 inches, which is .20 of an inch above normal. The averages by sections were as follows: Northern section, 1.97 inches, which is .31 of an inch above normal; central section, 2.23 inches, which is .35 of an inch above normal; southern section, 1.93 inches, which is .04 of an inch above normal. The largest amount reported was 3.70 inches at Inwood; least amount reported, .39 of an inch, at Glenwood. The greatest daily rainfall reported was 3.00 inches at Inwood on the 18th. Average number of days on which .01 of an inch or more was reported, 8. The prevailing direction of the wind was south; highest velocity reported, 52 miles per hour, from the south, at Sioux City, on the 27th. Average number of clear days, 8; partly cloudy, 8; cloudy, 15.

OBSERVERS' NOTES.

ALTA. *David E. Hadden*. About all precipitation of month fell in the middle decade; balance of month, spring like.

AMANA. *C. Schadt*. Season about three weeks early; seeding wheat and oats well advanced.

BONAPARTE. *B. R. Vale*. Rain 2.03 inches; all fell the last half of month: some sod plowing and very little oats sown last week of month.

BOONE. *Carl Fritz Henning*. Ice went out of Des Moines river March 2d; seeding spring wheat and oats was begun the last week.

BRITT. *Geo. P. Hardwick*. Latter half of March was like April weather with advance growth of grass and soft maple in bloom.

CHARITON. *C. C. Burr*. More than average amount of farm work was done in March; soil in good tilth.

CLINTON. *Luke Roberts*. March temperature 6.5° above normal; rainfall slightly in excess of normal; frost out of ground by the 20th and much plowing was done.

POCAHONTAS. *F. E. Hronek*. Old proverb failed; March came and went out like a lamb; seeding begun, and ground in fine condition.

RIDGWAY. *Arthur Belts*. One of the warmest of Marches; 156 hours of sunshine: spring work began on 27th; snow on the 13th and 14th.

SHELDON. *A. W. Beach*. Seeding commenced on the 20th, and wheat, about 75 per cent sown on 31st; soil condition good.

APRIL.

The monthly mean temperature of the state as shown by records of 123 stations, was 47.5°, which is 1.8° below normal. By sections the mean temperatures were as follows: Northern section, 45.3°, which is 2.0° below normal; central section, 47.5°, which is 1.3° below normal; southern section,

49.6°, which is 2.6° below normal. The highest monthly mean was 52.6° at Keokuk; lowest monthly mean, 42.9° at Sibley. The highest temperature reported was 90°, at Clarinda on the 9th; lowest temperature reported, 10°, at Inwood and Sibley on the 14th. The average monthly maximum was 79.3°; average monthly minimum, 19.5°. Greatest daily range, 58°, at Iowa City; average of greatest daily ranges, 40.7°.—Average precipitation for the state, as shown by records of 135 stations, was 3.03 inches, which is 0.14 of an inch above normal. The averages by sections were as follows: Northern sections, 2.09 inches, which is 0.53 of an inch below normal; central section, 3.07 inches, which is 0.17 of an inch above normal; southern section, 3.94 inches, which is 0.83 of an inch above normal. The largest amount reported was 5.49 inches at Leon; least amount reported, 0.61 of an inch, at Sibley. The greatest daily rainfall reported was 3.25 inches at Ottumwa on the 20th. Average number of days on which .01 of an inch or more was reported, 8.—Prevailing direction of the wind, northwest; highest velocity reported, 54 miles per hour, from the north, at Sioux City, on the 3d. Average number of clear days, 12; partly cloudy, 8; cloudy, 10.

OBSERVERS' NOTES.

AMANA—*C. Schadt*. Weather was favorable for farm work, and the season about two weeks early; at close of month plums and cherries were in full bloom.

BONAPARTE—*B. R. Vale*. A cool wet and backward month; no preparation for corn planting except plowing sod; grass started nicely in March. Rainfall, 4.60 inches.

BRITT—*Geo. P. Hardwick*. Vegetation started early but was checked by cool weather; grain was put in fine condition; pastures good at end of month.

CHARITON—*C. C. Burr*. Season ten days earlier than average; fruit trees covered with bloom; plums and strawberries badly injured by frost.

CLINTON—*Luke Roberts*. April temperature was normal and rainfall .75 of an inch in excess; low temperature on the 5th, 6th, 7th, 15th, 16th and 17th checked growth of vegetation; month lost some of the advantages it had at outset.

CRISTON—*W. L. Gaston*. Robins were with us from the first of month; box elder trees showed leaves on 5th; hail did some damage to fruit trees and gardens.

ELLIOTT—*Henry Barnes*. April 30th, apples, cherries and plums in bloom; recent rains started growth of grass and grain.

RIDGEWAY—*Arthur Betts*. A nice month; 264 hours sunshine, or 65 per cent; crops are looking fine; soil did not freeze over 8 inches in depth last winter.

SHELDON—*A. W. Beach*. Farm work well advanced; early gardens damaged by freezing on morning of 30th.

MAY.

The monthly mean temperature for the state, as shown by records of 123 stations, was 53.3°, which is 2.1° below normal. By sections the mean temperatures were as follows: Northern section, 59.0°, which is

3.3° below normal; central section, 58.6°, which is 1.6° below normal; southern section, 60.4°, which is 1.6° below normal. The highest monthly mean was 63.6°, at Keokuk; lowest monthly mean, 53.2°, at Sibley. The highest temperature reported was 88°, at Glenwood and Wilton Junction on the 3d and 29th; lowest temperature reported, 28°, at Washta on the 26th. The average monthly maximum was 82.2°; average monthly minimum, 34.3°. Greatest daily range, 49°, at Carroll; average of greatest daily ranges, 36.9°.—The average precipitation for the state, as shown by records of 132 stations, was 5.95 inches, which is 1.82 inches above normal. The averages by sections were as follows: Northern section, 7.60 inches, which is 3.68 inches above normal; central section, 5.88 inches, which is 1.79 inches above normal; southern section, 4.38 inches, which is .03 of an inch above normal. The largest amount reported was 10.83 inches at Hanlontown; least amount reported, 2.57 inches at Bonaparte. The greatest daily rainfall reported was 3.48 inches at Onawa on the 11th. Average number of days on which .01 of an inch or more was reported, 14.—Prevailing direction of the wind, northwest, highest velocity reported, 59 miles per hour, from the south, at Sioux City, on the 3d. Average number of clear days, 12; partly cloudy, 11; cloudy, 8.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. May was cloudy, cool and wet; rainfall about double the normal amount; only exceeded once in last 16 years, and that was in May, 1892; temperature about 3° below normal.

AMANA—*Conrad Schadt*. Though May had 16 rainy days, the farmer found ample time to plant corn, which was mostly finished by close of month.

BONAPARTE—*B. R. Vale*. First half of month very wet, and month was unusually cold; no severe storms; precipitation 2.27 inches, while last year we had 4.17 inches.

BRITT—*Geo. P. Hardwick*. Rain 8.10 inches, with excessive cloudiness; corn planting retarded. On night of 10th a small tornado passed through southeast part of county and destroyed a few buildings.

CLINTON—*Luke Roberts*. Mean temperature for May was 60.6°; rainfall, 5.95 inches; per cent of sunshine only 50. The central portion of the month was cooler than the commencing or ending. There were 12 stormy days.

IOWA FALLS—*J. B. Parmelee*. Rainfall in May 7.73 inches, has been exceeded but once in thirteen years, and that was in 1896, when the amount was 7.76 inches.

RIDGEWAY—*A. Betts*. Coldest May on record here. No frost since April 21; sunshine 253 hours, or 55 per cent; 8 days were perfect; some severe thunderstorms but no gales.

JUNE.

The monthly mean temperature for the state, as shown by records of 121 stations, was 69.9°, which is 0.3° above normal. By sections the mean temperatures were as follows: Northern section, 67.9°, which is 0.2°

below normal; central section, 70.2°, which is 0.7° above normal; southern section, 71.7°, which is 0.5° above normal. The highest monthly mean was 71.5° at Red Oak; lowest monthly mean, 64.5° at Sibley. The highest temperature reported was 100° at Red Oak on the 9th; lowest temperature reported, 36°, at Washta on the 22d. The average monthly maximum was 92.1°; average monthly minimum, 45.7°. Greatest daily range, 48° at Washta; average of greatest daily ranges, 33.9°. The average precipitation for the state, as shown by records of 131 stations, was 5.53 inches, which is 1.00 inch above normal. The averages by sections were as follows: Northern section, 5.39 inches which is .71 of an inch above normal; central section, 4.78 inches, which is .22 of an inch above normal; southern section, 6.43 inches, which is 2.07 inches above normal. The largest amount reported was 14.89 inches at Keosauqua; least amount reported, 1.80 inches at Forest City. The greatest daily rainfall reported was 12.10 inches at Bonaparte on the 10th. Average number of days on which .01 of an inch or more was reported, 10. The prevailing direction of the wind was south, southeast, southwest; highest velocity reported, 49 miles per hour, from the northwest, at Sioux City, on the 18th. Average number of clear days, 12; partly cloudy, 11; cloudy, 7.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. Temperature and rainfall in June were above normal; heaviest rainfall occurred during closing days of month.

AMANA—*Conrad Schadt*. Weather generally favorable for crops; no destructive storms during the month. Rye harvest begun on 30th.

BAXTER—*W. T. Thorp*. Fifty per cent of corn crop was laid by at close of June.

BONAPARTE—*B. R. Vale*. A normal June, except the phenomenal downpour of 12.10 inches of rain on the 10th, causing much damage to crops, soil and bridges.

BRITT—*Geo. P. Hardwick*. On the 18th a tornado passed from southwest to northeast, through center of county, causing loss of a few buildings in its track.

CLINTON—*Luke Roberts*. The mean temperature of June was 1.5° above normal; rainfall, 4.02 inches, was .41 of an inch below normal; conditions good for crops and a fine harvest is promised.

KEOSAUQUA—*J. H. Landes*. The rainfall, 11.23 inches, on night of 9th breaks the record for this place; much damage was done to crops on low lands by overflow, and on high lands by washing the soil; eighty-nine county bridges were taken out.

OLIN—*N. Potter*. June was an ideal month for cultivating corn, which is a high average.

RIDGEWAY—*Arthur Betts*. Warmest June since 1901; 285 hours of sunshine, or 62 per cent; copious rainfall.

STOCKPORT—*C. L. Bisswick*. On the 9th about 8 p. m. a gentle rain began and by morning the amount was 10.63 inches—the heaviest ever recorded here.

WAUKEN—*E. J. Leonard*. Month favorable the first half, but very wet the latter part.

JULY.

The monthly mean temperature for the state, as shown by records of 117 stations, was, 70.6°, which was 3.8° below normal. By sections the mean temperatures were as follows: Northern section, 69.5°, which is 3.7° below normal; central section, 71.8°, which is 3.5° below normal; southern section, 71.4°, which is 4.3° below normal. The highest monthly mean was 73.4°, at Keokuk; lowest monthly mean, 67.4°, at Sibley. The highest temperature reported was 102°, at Waukeo, on the 16th; the lowest temperature reported, 40°, at Washta, on the 25th. The average monthly minimum, 49.0°. The greatest daily range, 41°, at Waukeo; average of greatest daily ranges, 31.6°. The average precipitation for the state, as shown by records of 128 stations, was 2.91 inches, which is 1.44 inches below normal. The averages by sections were as follows: Northern section, 2.00 inches, which is 2.21 inches below normal; central section, 3.19 inches, which is 1.09 inches below normal; southern section, 3.54 inches, which is 1.08 inches below normal. The largest amount reported was 7.08 inches at Albia; least amount reported, 0.69 of an inch, at Washta. The greatest daily rainfall reported was 4.00 inches, at Grinnell, on the 19th. Average number of days on which .01 of an inch or more was reported, 9. The prevailing direction of the wind was northwest; highest velocity reported, 39 miles per hour, from the northwest, at Sioux City, on the 4th. Average number of clear days, 14; partly cloudy, 10; cloudy, 7.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. Mean temperature of July was about 3.5° below normal; rainfall 3 inches less than the 15-year average.

ALTON—*W. S. Slagle*. Very good month for growth of crops; wheat and corn doing well; no rust damage yet.

AUDUBON—*Geo. E. Kellogg*. Hail on 24th destroyed crops in small area.

BONAPARTE—*B. R. Vale*. First half of July cloudy and wet; very hot 14th to 18th inclusive; cool the balance of month, farm work retarded.

BOONE—*Carl Fritz Henning*. Splendid month for oats, wheat and corn.

BRITT—*Geo. P. Hardwick*. Excessive cloudiness and fog in July; extremes of temperature; corn uneven and late; oats and hay crops above average.

CHARITON—*C. C. Burr*. Corn developing rapidly; no severe storms in July, but hay was badly damaged by showers.

CLINTON—*Luke Roberts*. July was over 2° below normal; deficiency in rainfall 2.69 inches; and yet all growing crops were in fine condition at close of month.

CRESCO—*L. G. Krumm*. At Bonair on 17th hail did much damage; surface very dry at close of month.

CRESTON—*W. L. Gaston*. July was unusually cool; good hay weather during latter part of month.

RIDGEWAY—*Arthur Betts*. Month cool and similar to July, 1904, but not so pleasant; 319 hours of sunshine, or 39 less than average; hot weather 14th to 19th.

SHELDON—*A. W. Beach*. Best harvest weather in years; hay all put up without a drop of rain; harvest was late and corn is a week behind.

STOCKPORT—*C. L. Beswick*. No clear days between June 26 and July 13, and rain every day those dates except July 7th.

WAUKEE—*E. J. Leonard*. Rain in first week hindered haying and corn plowing; generally favorable during remainder of month; grain nearly all in shock at close of July.

AUGUST.

The monthly mean temperature for the state, as shown by records of 125 stations, was 74.3°, which is 2.3° above normal. By sections the mean temperatures, were as follows: Northern section, 73.1°, which is 2.4° above normal; central section 74.4°, which is 2.8° above normal; southern section 75.4°, which is 1.8° above normal. The highest monthly mean 78.0° at Waukeg; lowest monthly mean, 70.6° at Fayette. The highest temperature reported was 104°, at Waukeg, on the 11th; lowest temperature reported 44°, at Rock Rapids, on the 6th. The average monthly maximum was 95.5°; average monthly minimum, 52.9°. Greatest daily range, 46° at Rock Rapids; average of greatest daily ranges, 31.1°. The average precipitation for the state, as shown by records 136 stations, was 4.05 inches, which is 0.50 of an inch above normal. The averages by sections were as follows: Northern section, 4.06 inches, which is 0.96 of an inch above normal; central section, 3.48 inches, which is 0.24 of an inch below normal; southern section, 4.61 inches, which is 0.71 of an inch above normal. The largest amount reported was 8.47 inches at Plover; least amount reported, 1.04 inches at Vinton. The greatest daily rainfall reported was 3.74 inches at Allerton, on the 14th. Average number of days on which .01 of an inch or more was reported, 9.

WIND AND WEATHER.—The prevailing direction of the wind was south; highest velocity reported, 48 miles per hour, from the northeast, at Sioux City, on the 20th. Average number of clear days, 16; partly cloudy, 9; cloudy, 6.

OBSERVERS' NOTES.

AMANA—*Conrad Schadt*. The days were generally hot and nights mainly cool with fog; ground too dry for plowing near close of the month.

BAKTER—*W. T. Thorp*. Weather was favorable for corn; too much rain for threshing and oats were damaged by being left in shock.

BONAPARTE—*B. R. Vale*. Rain 7.93 inches; a wet month with normal temperature; vegetation vigorous; subsoil full of water.

BRITT—*Geo. P. Hardwick*. No serious storms, but damp and excess of cloudiness; grain left to thresh from shock badly damaged; corn made rapid advancement.

CLINTON—*Luke Roberts*. Rain, 4.11 inches; or 79. of an inch above normal. Month exceptionally fine for crops and work in fields. Greatest amount of rainfall in any 24 consecutive hours, 1.06 inches on 13th and 14th. No windstorm heavy enough to prostrate corn or other crops.

CRESCO—*L. G. Krumm*. On the 7th corn was badly riddled by hail in a narrow strip half a mile wide.

ELLIOTT—*Henry Barnes*. Corn was somewhat damaged by windstorms on 17th and 21st. Old corn nearly all sold, and there has been a free movement of small grain to market.

FOREST CITY—*J. A. Peters*. August was an exceptionally good month for corn and for threshing small grain.

GRAND MEADOW—*F. L. Williams*. A wet harvest and much damp grain in shock or stack; oats extra heavy; corn practically safe and crop heavy; pastures excellent.

GRINNELL—*A. O. Price*. Seldom better pasture or bigger aftermath in meadows; at end of month corn was glazing and promised a big yield.

RIDGEWAY—*Arthur Betts*. Warmest August since 1900; hard hail 7th and 8th and some damage done; sunshine 302 hours, or 70 per cent.

SEPTEMBER.

The monthly mean temperature for the state, as shown by records of 124 stations, was 65.8°, which is 2° above normal. By sections the mean temperatures were as follows: Northern section, 64.2°, which is 1.9° above normal; central section, 65.8° degrees, which is 2.5° above normal; southern section, 67.3°, which is 1.5° above normal. The highest monthly mean was 69.2, at Red Oak; lowest monthly mean, 62°, at Hanlontown. The highest temperature reported was 96°, at Mt Ayr and Ottumwa, on the 1st lowest temperature reported, 36° at Washta, on the 4th. The average monthly maximum was 88.0°; average monthly minimum, 44.0°. Greatest daily range, 48°, at Massena; average of greatest daily ranges, 34.1°. The average precipitation for the state, as shown by records of 130 stations, was 3.81 inches, which is .50 of an inch above normal. The averages by sections were as follows: Northern section, 3.23 inches, which is .16 of an inch below normal; central section, 3.08 inches, which is .17 of an inch below normal; southern section, 5.11 inches, which is 1.81 inches above normal. The largest amount reported was 13.18 inches at Thurman; least amount reported, .50 of an inch, at Clear Lake. The greatest daily rainfall reported was 6.10 inches at Alta on the 18th. Average number of days on which .01 of an inch or more was reported, 8. The prevailing direction of the wind was southeast; highest velocity reported, 50 miles an hour, from the southeast, at Sioux City, on the 15th. Average number of clear days, 14, partly cloudy, 8; cloudy, 8.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. On the 18th, 6.10 inches of water fell in the twenty-four hours ending 11 P.M. of the 18th. The month as a whole was ideal; no frosts; corn made rapid progress and at the close was out of danger.

AMANA—*C. Schadt*. Weather fine and agreeable during the month; no frost and corn had ample time to mature.

BONAPARTE—*B. R. Vale*. Early half showery and cloudy; latter half bright, warm and good for corn.

BRITT—*Geo. P. Hardwick*. Month exceptionally fine, without frost. Half of corn crop up to average.

CLINTON—*Luke Roberts*. A fine month for ripening corn, with no frost; temperature 2° above normal; rainfall, 3.81 inches, over a half inch above average: of this amount 3.04 inches fell on the first day.

INDIANOLA—*John L. Tilton*. On the 14th a severe thunderstorm occurred at Indianola. Lightning struck the center poles of a tent on the fair grounds. The county fair was in progress and the tent was filled with people; four persons were killed and several were severely injured by the shock. The storm was unusually severe over a wide area. A livery barn was struck and set on fire, but the property was saved by strenuous work. The telephones were burned out and rendered useless. It was a sad calamity to the people of the town and county.

INWOOD—*Geo. M. Larsen*. A fine month and better than was expected for benefit of corn crop; no frost; corn badly lodged by wind.

IOWA FALLS—*J. E. Parmalee*. This is the fourth time September has escaped a killing frost in the last fourteen years.

RIDGEWAY—*Arthur Belts*. Warmest of all Septembers; 239 hours sunshine, or 64 per cent; no soft corn this year.

SHELDON—*A. W. Beach*. An ideal month for ripening all late corn which is now safe; sunshine was noted every day but two.

OCTOBER.

The monthly mean temperature for the state, as shown by records of 116 stations, was 49.2° degrees, which is 3.3° below normal. By sections the mean temperatures were as follows: Northern section, 46.9°, which is 4.0° below normal; central section, 49.5°, which is 2.3° below normal; southern section, 51.1°, which is 3.6° below normal. The highest monthly mean was 54.8° at Keokuk; lowest monthly mean, 42.4°, at New Hampton. The highest temperature reported was 95°, at Inwood and Sheldon, on the 4th; lowest temperature reported 16°, at Decorah, Elkader, Maquoketa and Inwood, on the 28th, 29th and 30th. The average monthly maximum was 84.7°; average monthly minimum, 20.4°. Greatest daily range, 53°, at Keosauqua; average of greatest daily ranges, 38.7°. The Average precipitation for the state, as shown by records of 125 stations, was 3.40 inches, which is 0.98 of an inch above normal. The averages by sections were as follows: Northern section, 3.15 inches, which is .96 of an inch above normal; central section, 3.58 inches, which is 1.13 inches above normal; southern section, 3.46 inches, which is .85 of an inch above normal. The largest amount reported was 5.86 inches at Iowa City; least amount reported, 1.20 inches, at Sioux Center. The greatest daily rainfall reported was 3.14 inches at Clinton on the 16th and 17th. Average number of days on which .01 of an inch or more was reported, 8. The Prevailing direction of the wind, was northwest; highest velocity reported, 47 miles per hour, from the south, at Sioux City, on the 8th. Average number of clear days, 16; partly cloudy, 6; cloudy, 9.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. First killing frost on morning of the 10th; corn entirely safe; first snow on the 19th, but soon turned to rain; month as a whole pleasant.

AMANA—*Conrad Schadt*. Fine weather, with balmy days during a great part of the month; rains moistened the grounds thoroughly, which had been very dry.

ATLANTIC—*J. W. Love*. First frost on 10th; first ice on 12th; severe thunderstorms 16th and 17th; wild fowls flying southward on 27th; snow on 29th.

BONAPARTE—*B. R. Vale*. A pleasant and profitable month; corn husking began about the 20th; much fall plowing done; fall grain doing nicely.

CLINTON—*Luke Roberts*. October, 1905, was 1° colder than normal, and 5° above the coldest October during the last 27 years; 8° below the warmest October. Rainfall, 4.46 inches; was 2.12 in excess of normal.

OLIN—*Nathan Potter*. October was a good month, the first half being warm and dry, and latter half wet enough to moisten the ground for plowing.

RIDGEWAY—*Arthur Belts*. First decade of the month delightful; we had in the month 212 hours of sunshine, or 62 per cent; first killing frost on 11th; first snow on 19th.

SHELDON—*A. W. Beach*. First half of month warm and clear; latter half cool and disagreeable, with two snowstorms.

STOCKPORT—*C. L. Beswick*. First killing frost October 12th; latest frost in spring, April 22d; giving; 173 frostless days; 95 to 98 per cent of corn was well ripened.

WALKER—*E. J. Leonard*. Except about ten days near the middle of month October was favorable; first frost on 12th, and snow on 30th; crops all matured without damage.

NOVEMBER

The monthly mean temperature for the state, as shown by records of 123 stations, were as follows 38.4° which is 3.2° above normal. By sections; the mean temperatures were as follows: Northern sections 36.7° which is 4.1° above normal; central section 38.3°, which is, 3.3° above normal; southern section 40.3°, which is 2.3° above normal. The highest monthly mean was 42.8° at Red Oak; lowest monthly mean, 35.2° at Sibley. The highest temperature reported was 70° Belle Plaine, Webster City, Burlington and Corning, on the 4, 12, 13, and 17; lowest temperature reported—12° at Estherville on the 30th. The average monthly maximum was 63.2° average monthly minimum, 0.6°. Greatest daily range, 54° at Massena; average of greatest daily ranges 34.3°. The Average precipitation for the state as shown by records of 131 stations, was 2.84 inches, which is 1.53 inches above normal. The averages by sections were as follows: Northern section 3.16 inches, which is 1.91 inches above normal; central section, 2.67 inches, which is 1.26 inches above normal; southern section, 2.58 inches, which is; 1.40 inches above normal. The largest amount reported was 5.30 inches at Plover, least amount reported, .90 at Mt. Vernon. The greatest daily rainfall reported was 2.70 inches at Ft. Madison on the 23d. Average number

of days on which .01 of an inch or more was reported. The prevailing direction of the wind was Northwest; highest velocity reported, 54 miles per hour from the northwest, at Sioux City, on the 24th. Average number of clear days, 16; partly cloudy 7; cloudy 7.

OBSERVERS' NOTES.

ALTA—*David E. Hadden*. The mean temperature of November, 1905 was 4.2 degrees above the normal and the precipitation, 2.12 inches in excess of the average of the preceding 15 years and the amount was larger than that of any November during the same period. The month as a whole was pleasant and ideal for corn picking.

ALTON—*W. S. Stagle*. Snow storm on 28th. Ten per cent of the corn still in the fields; picking was delayed on account of wet weather.

AMANA—*Conrad Schadt*. The month was remarkable for its many fine Indian summer days. There were but four days on which the mean temperature was below the freezing point, and only one—the last—on which the maximum temperature was below that point. Farmers had good and ample time for corn husking and plowing.

BRIT—*Geo. P. Hardwick*. Splendid month for farm work, plowing until 23th. Pastures unusually good until the end.

CLEAR LAKE—*Oscar Stevens*. Clear Lake froze over on the night of the 29th.

CLINTON—*Dr. Luke Roberts*. Maximum temperature, 6 degrees below and minimum and mean 3 degrees above normal; rainfall 0.67 inch in excess of normal. Storm days 7 less, cloudy days less and clear days more than normal.

DECEMBER.

The monthly mean temperature for the state, as shown by records of 117 stations, was 27.0°, which is 4.0° above normal. By sections the mean temperatures were as follows: Northern section 25.2°, which is 5.0° above normal; central section 26.9°, which is 3.8° above normal; southern section 28.9°, which is 3.3° above normal. The highest monthly mean was 32.4°, at Red Oak; lowest monthly mean, 22.8° at Charles City. The highest temperature reported was 62°, at Jefferson on the 8th; lowest temperature reported, -11°, at Monticello on the 23d and 24th. The average monthly maximum was 52.0°; average monthly minimum, -3.1°. Greatest daily range, 53° at De Soto; average of the greatest daily ranges 36.0°. The average precipitation for the state, as shown by records of 125 stations, was 0.52 inch, which is 0.73 of an inch below normal. The averages by sections were as follows: Northern section, .40 inch, which is 0.65 inch below normal; central section, 0.63 inch, which is 0.71 inch below normal; southern section, 0.53 inch, which is 0.84 inch below normal. The largest amount reported was 1.69 inches at Ottumwa, least amount reported, trace, at Estherville, and Rock Rapids. The greatest daily rainfall reported was 1.27 inches at Ottumwa on the 28th. Average number of days on which .01 of an inch or more was reported, 3. The prevailing direction of the wind, Northwest; highest velocity reported, 37 miles per hour, from the Northwest, at Sioux City on the 8th. Average number of clear days 19; partly cloudy, 6; cloudy, 6.

OBSERVER'S NOTES.

ALTON.—*W. S. Stagle*. All corn was picked by December 15; hog cholera abated; bees were out on the 26th.

AMANA.—*Conrad Schadt*. Indian summer extended far into December; weather mild until towards close of month.

ATLANTIC.—*J. W. Love*. Unseasonably warm winter month; pasturage yet for stock; no rain and only 1 inch of snow.

BONAPARTE.—*B. R. Vale*. An open month; good roads; only reached zero once; sub-oil dry.

BRITT.—*Geo. P. Hardwick*. Remarkably fine month; above average of recent years; corn harvest finished earlier than usual.

CHARITON.—*C. C. Burr*. No severe storms and more than usual number of fine days; stock in good condition.

CLINTON.—*Luke Roberts*. December warm, the mean temperature being 4.7° above normal; rainfall 0.43 [of an inch below normal; wind moderate; 4 inches of snow.

IOWA FALLS.—*J. B. Farmalee*. The finest December in ten years.

OLIN.—*N. Potter*. December has been remarkable for evenness: no severe storms, with good roads and healthfulness; one of the best in Iowa's history, or the winter's experience in 60 years.

RIDGEWAY.—*Arthur Betts*. Month was uncommonly fine; 190 hours of sunshine, or 19 hours more than ever before in December. For the year 1905 the mean temperature was 46.8°; precipitation 35.93; hours of sunshine 2,823; snowfall 42.3 inches; clear days 159; cloudy days 56, prevailing wind south.

WAVERLY.—*H. S. Hoover*. Remarkable month for finishing up outdoor work; it was 4.4 degrees warmer than the preceding December.

7th to the 17th, causing delay in planting operations and retarding germination of seed in the ground. The balance of the month was variable, with some more than the average amount of moisture; but fair progress was made in planting, and cultivating the early planted fields. Wheat, oats, barley, rye, meadows and pastures made good growth in May. The average conditions of grain and grasses were nearly normal at the close of the month.

June was about normal in temperature, and the rainfall was 1 inch above the state average. The distribution of rainfall was very unequal, ranging from 1.80 inches at Forest City to 14.89 at Keosauqua. The greatest excess was recorded in the southeast district, and in the northwest counties. The first week was warm and mostly dry, affording ideal conditions for growth of crops and cultivation of corn and potatoes. Some corn planting was done, in localities previously too wet, as late as the 12th to 15th of the month. The rainfall on the 9th and 10th was excessively heavy and destructive in VanBuren and adjoining counties; but the copious showers in others parts of the state were timely and beneficial to all crops. The third week was normal in temperature and amount of sunshine, with conditions favorable for cleaning out the weedy fields, and general farm work. The month closed with a showery period of the three to four days. Haying operations were begun somewhat earlier than usual, and the first cutting of clover suffered damage by the wet weather. The corn crop was doing fairly well in the larger part of the state at the end of the month.

The daily mean temperature of July was 3.8° below normal and the rainfall was 1.44 inches below the average of previous years. The first half of the month brought the bulk of the wet weather and conditions were more favorable during the latter half for harvest of hay and grains. The conditions were not altogether favorable in the early part of the month for finishing the cultivation of corn. The fields were not generally clean as could be desired when laid by. The warmest period was from about the 13th to 20th during which corn made rapid advancement. Spring wheat, rye and barley ripened under favorable conditions, and the work of harvesting was well advanced in the latter half of July. As a whole July was a favorable month. With but little damage from excess or deficiency of moisture. The crops of wheat, oats, barley and rye secured were better in quality and yield than was deemed possible in the early part of the season. At the close of the month corn gave promise of more than an average crop.

August was above normal in temperature and rainfall. The mean temperature, 74.3° was 2.3° above normal, and 3.7° degrees higher than the daily average in July. From the first week to the close of the month the temperature was near or above the normal line. The rainfall was generally timely, and not greatly in excess of local needs in any part of the state, the distribution being more than usually favorable. In the state the average number of clear days was 16, and 9 were partly cloudy, affording ample sunshine to hasten growth of all belated crops. At the close of the month the corn crop was generally in the full roasting ear stage or glazed, giving promise of reaching maturity in advance of the average date of killing frosts. Good progress was made during the month in threshing wheat, oats and barley; but in many localities these grains suffered some damage from exposure to

showers while in the shock. There was a heavy growth of aftermath in meadows, and the pastures were about as green as in springtime. The potato crop suffered materially from blight. The corn crop was seriously damaged by root worms in fields that had been planted two or more seasons in succession.

September was about 2° above normal in temperature, with a small excess of rainfall. The coldest period of the month was the first decade and the warmest and brightest was the third decade. The distribution of rainfall was quite unequal, more than half the state receiving less than 3.00 inches, the heaviest amounts being recorded in portions of the southwest and northwest districts. During the stormy period from the 14th to the 18th severe windstorms swept over considerable areas in all districts, aggregating over one-third of the state. Corn was prostrated to an unusual extent, resulting in material damages in regions that were most severely stormwrept. The extraordinary weather of the last decade was of inestimable value in bringing to maturity the late planted portion of the corn crop affording ideal conditions for cutting fodder, threshing grain, putting up second crop of clover, aftermath and wild hay, fall plowing etc. At the close of the month fully 98 per cent of corn was well matured. And most of the corn planted as late as June 15 was well ripened. An increased acreage of winter wheat was sown in September, and made an excellent stand. About the usual acreage of winter rye was sown.

The first decade of October was warm and generally dry and clear, with conditions favorable for ripening all belated crops, and drying out the corn crop preparatory to husking, which was in progress in the latter part of the month. The last decade was also very dry and clear, altogether the month of October was notable for its large percentage of sunshine and agreeable weather. The first killing frosts were reported about the 11th and 12th in all districts, after all crops were well matured. Pastures were green, affording excellent grazing throughout the month. All minor crops, garden truck and fruit were harvested in due season, under favorable conditions. Except some damage to flattened corn by wet weather from the 15th to 20th, the conditions during October were all that could be desired.

The average temperature in November was 3.2° above normal. There was a large excess of clear or partly cloudy weather, as compared with the average. Conditions were unusually favorable for gathering corn, and all kinds of field work usual to the season. The bulk of the corn crop was husked in good condition for cribbing or shipping. Pasturage was unusually good for grazing stock. Fall wheat and rye were looking well, and much fall plowing was in evidence in all parts of the state.

The closing month of the year was one of the fairest and most agreeable winter months ever known in this section. Altogether the crop season of 1905 will be remembered as one that contributed largely to the prosperity of the state and nation.

CLIMATE AND CROP BULLETINS.

SUMMARIES OF WEEKLY BULLETINS ISSUED DURING THE SEASON 1905.

BULLETIN NO. 1, WEEK ENDING APRIL 10, 1905.

Following a winter of extreme severity, March was phenomenally warm except a few days in the second decade. The soil thawed and the surface dried off rapidly, and conditions were favorable for plowing, seeding and preparatory farm operations a week earlier than usual, and more than two weeks in advance of last year. The bulk of the spring wheat area was seeded prior to the 2d of April, and reports indicate that the acreage of this crop is less than last year. Fall wheat, rye and clover wintered well and are promising.

The week ending April 10th brought cooler weather, but the average was about normal. With some delay on account of wet weather and freezing, very good progress has been made in completing the seeding of oats and barley, and preparing ground for the corn crop. Much more than the usual amount of plowing was done in the late fall and early spring, and with normal conditions in the future a very large acreage will be in readiness for corn planting before May 1.

Good progress has been made in planting early potatoes and garden truck. Grass started unusually early and the pastures are already inviting the grazing herds. The early sown grain fields show promising germination. Fruit buds have thus far escaped injury by freezing, and the condition of the staple varieties of fruit is satisfactory. All kinds of farm stock are reported in good health.

BULLETIN NO. 2, APRIL 17.

The week was unseasonably cold, the daily mean for the state being 6 to 10 degrees below normal, with heavy frosts and ice in all districts. The minimum temperature reported was ten degrees at Sibley, on morning of 14th. Except in southern districts the precipitation was light and mainly in form of snow. Conditions have been generally favorable for farm work, and good progress has been made finishing seeding and plowing for corn, a very large acreage being in readiness for planting. Growth of grass and germination of seed has been retarded by cold weather. Reports do not show material injury to early seeded wheat, oats and barley from effects of freezing. It is probable that the earlier varieties of fruit have been injured to some extent, especially in the southern half of the state. The general situation is favorable and the season is still in advance of the average. The soil is in extra good condition for working, with sufficient moisture to start vegetation with normal temperature. Farm work is well advanced in all sections.

BULLETIN NO. 3, APRIL 24.

The first half of the week was dry, cool and favorable for field work. On Thursday and Friday copious showers visited all parts of the state, except a narrow belt in the northern tier of counties, from Worth to Lyon. The rainfall was timely and very beneficial, being followed by warmer weather. Frost and ice were reported in all districts on several mornings, though generally causing but little damage to crops and fruits. Good progress has been made in preparation of ground for corn, and a large area is now ready for the planters. The ground is still cold, the soil thermometer at the State College farm registering 39 degrees at depth of six inches. The refreshing effects of showers and warmer weather are noted in pastures, meadows and grain fields.

Though growth of vegetation has been retarded by cold nights, the season is still relatively early. The pastures are forward, and foliage is well advanced for the time of the year. The general crop outlook is promising.

BULLETIN NO. 4, MAY 1.

The closing week in April indicated a trend toward normal temperature. In the Mississippi valley the daily mean was about 4 degrees above; in the central district about normal, and in the Mississippi valley about 4 degrees below normal. The rainfall was light in the northern section; about normal in the central, and somewhat in excess of present needs in portions of the southern section. Fair progress has been made in farm work, except in the localities where rainfall was excessive. Plowing for corn is more than usually advanced and if weather is warm and dry, planters will be afield in all districts of the state the first week in May. Reports from the northwest and southwest districts state that some farmers began planting as early as April 27th. Wheat, oats, barley and rye are growing finely. Pastures and meadows show a good stand of grass. Fruit trees give promise of full bloom and show but little damage by freezing. The general crop situation is excellent.

BULLETIN NO. 5, MAY 8.

The temperature of the first week in May was above normal in all parts of the state, the warmest portion being the Mississippi slope. The rainfall was light, except in a few localities in the central and northern sections. There was considerable excess of cloudiness, with high winds that retarded growth to some extent. Reports indicate good progress in farm operations. Plowing is generally well completed, and a good beginning has been made in planting corn in all districts. With favorable weather it is anticipated that the larger part of the corn area will be planted by the 15th, with the soil generally in fine tilth. In a few localities early planted corn is coming up nicely. The growth of grass and small grain has been fairly good, though in considerable portions of the state these crops would be improved by warm rains. The promise of the staple fruits is yet very good in all sections. Garden truck is coming on early, despite occasional light frosts.

BULLETIN No. 6, MAY 15.

The week was cool, cloudy and excessively wet in all districts. General rains or scattered showers were of daily occurrence, the amounts reported ranging from 2.00 to 5.90 inches, and the average for the State was probably above 3.00 inches. A number of reports have been received of local damage to buildings, crops and live stock by severe windsqualls, hail and lightning. Corn planting and other field work have been much delayed by excessive moisture, and in considerable areas several days of drying weather will be required to put the soil in fit condition for resuming planting operations. On naturally dry or well tiled lands planting may be resumed within a day or two, with favorable conditions. Reports indicate that pastures and meadows have received much benefit from the moisture, except on low and flooded lands and all kinds of small grain on well drained soils are doing notably well and stooling out nicely. Early planted corn is sprouting fairly well. There are some reports of injury to fruit by wind, hail and excessive rains during the blooming stage. Generally the crop conditions are fairly good, needing only warm and dry weather to make the outlook bright and satisfactory.

BULLETIN No. 7, MAY 22.

The daily average temperature of the week was from 2 to 4 degrees below normal, with an excess of cloudiness. The rainfall was moderate, except in a few localities; but there was considerable excess of moisture in all districts, caused by heavy rains of the preceding week. Field work was generally resumed on drier lands about the 17th, and considerable progress has been made in planting corn. In the northwest district the bulk of the corn acreage has been planted; in other parts of the state this work is about one-half to three-fourths completed. In all sections the low and undrained fields are quite wet, and more than the usual amount of replanting will be done. On dry and warm lands germination has been fairly good. Pastures and meadows show luxuriant growth, and small grain crops are generally doing well. Warmer weather is needed for rapid growth. Reports are not favorable as to the cherry crop but other fruits are doing fairly well. With normal weather in the future the general crop conditions will be very satisfactory.

BULLETIN No. 8, MAY 29.

The week was slightly cooler than usual, and closed with copious and widely distributed showers. Conditions were favorable for field work most of the week, and good progress has been made in finishing planting corn. This work is practically completed, except where the fields are too wet. More than the usual amount of replanting has been necessitated on account of flooded fields or defective seed. It is probable that the corn acreage will be considerably less than the area prepared or intended for that crop. Cultivation of early planted fields is in progress.

The copious rains will prove beneficial to grass and small grain crops, especially on the drier lands, which had become encrusted and cloddy.

Most of the reports show favorable growth and conditions of meadows, pastures, wheat, oats, barley, potatoes and garden truck. But little damage resulted from frost on the morning of the 26th. There are some reports of apples dropping, but generally that important fruit crop is promising. Strawberries will yield heavily. The cherry crop will be light.

BULLETIN No. 9, JUNE 5.

This has been the best week of the season, the average rainfall being below and the temperature above normal. In scattered localities there were showers heavy enough to cause some delay in farm work, but generally conditions were highly favorable, and good progress has been made in finishing replanting and pushing the cultivation of the cornfields. Most of the reports indicate good progress in cleaning the corn, and the late planted fields show more ready germination and a better stand than the earliest planting. Altogether the condition of the corn crop is better than it was at the corresponding date last year, the fields being dryer and cleaner, and the plants show better color. There has been sufficient moisture and heat to maintain normal growth of grass, wheat, oats, barley, rye, potatoes, and garden truck. A very abundant crop of strawberries is now being harvested. There are some reports from the southern section of apples dropping badly, but the general condition of that important fruit is promising. The cherry crop will be very light. Grapes show a liberal fruiting.

BULLETIN No. 10, JUNE 12.

The week ending the morning of the 11th was warm and generally favorable for cultivation of corn and growth of all crops. The showers that fell on the afternoon and night of the 9th were very beneficial in three-fourths of the state, but considerable damage resulted from extremely heavy downpours in the Mississippi valley from Clinton to Keokuk, in a large part of the southeast district, and in scattered localities in the central and south central counties. The principal damage to crops resulted from flooding the lowlands and washing the cultivated slopes. The general condition of corn outside of the flooded portions of the state is fairly good. Numerous reports indicate that the small grain crops are making rank growth on rich and flat lands. The clover crop is also becoming bulky, and haying operations will begin quite early. Potatoes, garden vegetables and small fruits are doing notably well. The apple crop is still promising a fair yield in the northern half of the state, and more than half a crop in the southern half.

BULLETIN No. 11, JUNE 19.

The week was above normal in temperature, with abundant sunshine for vigorous growth of all crops. Conditions were favorable for the cultivation of corn, except in limited areas saturated by heavy rainfall in preceding week. Very good progress has been made in cleaning out the weedy cornfields, and probably four-fifths of the acreage planted has been fairly well cultivated. The stand is generally below normal, and the stage of growth is very uneven on account of replanting; but, as a whole, the crop is as promising as at the corresponding date last year, with more favorable temperature of soil and air to promote growth. The small grain crops are well

advanced, and generally heading out. There are numerous reports of rank growth of wheat and oats, but as yet damage by rust is not indicated except in oats in some of the southern counties. Clover is heavy, and the early harvest of that crop is in progress. The meadows and pastures are unusually good. Potatoes and garden truck are thriving. The yield of strawberries is much above the average. In the northern districts apples are doing well, but not promising in the south.

BULLETIN No. 12. JUNE 26.

The week was alternately warm and cool, with the average temperature slightly below normal. The rainfall was variable, as usual at this time of the year, but the area in which there is much excess of moisture is relatively small. There was sufficient warmth during the week to promote the healthy growth of corn, and in the larger part of the state good progress has been made in the cultivation of this crop. The early planted fields are being plowed the third time. The stand is generally better than was indicated by previous reports. The crop will be laid by about as early as in the average of recent years.

Spring wheat is heading with generally vigorous growth of straw, and but little evidence of rust. The oats crop is variable, ranging from very light and short on poor soil to excessively heavy on richest lands. The crop is at its most critical stage, needing sunshine and dry weather to make a fair yield. Barley is heading nicely, with fair prospect of a crop. Clover is unusually heavy, except in a few localities, and the harvest of the crop is well begun. Timothy is not promising, though heavy in a few places. Potatoes give promise of an extra yield. Apples are reported fair in the north and very poor at the south.

BULLETIN No. 13. JULY 3.

The week ending on the morning of the 3d brought a large excess of rain in all the districts, the amounts reported ranging from 1.50 to over 5.00 inches. The daily average temperature was 6 degrees below normal in the central district, and relatively low in all parts of the state. The prevalent cool weather was beneficial to spring wheat and oats, checking damage by rust. In nearly all parts of the state the soil was too wet for cultivation of corn, and on an average only about one or two days' work in that line was done. In respect to stage of growth corn is quite uneven, ranging from a few inches to a full normal height. In the southwest district a large per cent of the crop has been laid by in fair condition; and in all sections most of the early planted fields show normal growth. As a whole, the corn crop is better than at corresponding date last year. Spring wheat and oats are generally headed out and filling well, with but little indication of heavy damage by rust and blight. Early hay harvest was begun a week or more ago and considerable clover has been ruined by excessive rain. With fair weather in the future, the hay crop will be very good. Pastures are extra good. Potatoes and all garden truck are doing well. The apple crop shows decline in condition.

BULLETIN No. 14. JULY 10.

The daily average temperature of the past week was 4 to 6 degrees below normal, and the rainfall was somewhat in excess of present needs. Conditions were more favorable for field work the latter half of the week, and some progress has been made in cultivating late planted corn, and in haymaking and cutting winter wheat, rye, barley and early oats. There has been considerable damage to clover that was cut the preceding week; but there is a large acreage yet to be cut, and, with fair weather, a full average hay crop will be harvested. In the southern districts harvesting early oats and fall rye and wheat is in progress. There are but few reports of damage to wheat and oats by rust. Except on low, wet soils the general condition of the corn crop is fairly good. In respect to height, stand and cleanliness, it is better than the condition reported on the corresponding date last year. All the minor field crops are doing very well. In the southern section the apple crop is very poor, especially late keeping varieties.

BULLETIN No. 15, JULY 17.

The week was cool, with excess of cloudiness and scattered showers until the 14th, which brought a period of high temperature, with more favorable conditions for haymaking, finishing cultivation of late corn and harvesting fall wheat, rye and early oats and barley. In the southern half of the state, except in fields too wet for binders, these small grain crops have been cut. In the northern half barley and rye are being harvested, and oats and spring wheat are ripening normally with promise of fair yield. Haymaking is well advanced in all districts where local conditions were fairly good, but there has been considerable loss of clover hay that was cut prior to the 12th. The corn crop is now making excellent progress in all districts, except on very wet lands, which will be eliminated from the acreage in final estimates of yield. In earliest fields tassels are noted, and the color is good. The general outlook for field crops is very good. As yet no material damage by rust or blight is indicated in the grain fields. The hay crop is heavy, and pasturage is above normal. Early potatoes yield abundantly. The apple crop is disappointing.

BULLETIN No. 16, JULY 24.

This has been the most favorable week of the season for rapid growth of corn and harvesting hay and small grain. The period of extreme heat and humidity which began in the latter half of the preceding week culminated in electric storms on the morning of the 19th, with heavy local showers in the eastern half of the central section. At a few localities the rainfall was from two to three inches, but in four-fifths of the state it was much below normal. The corn crop has made most excellent progress, and the larger portion is very nearly up to the normal size for the last decade of July. In a considerable part of the state the surface is becoming quite dry, and rain will soon be needed for corn, potatoes and vegetables. Fine progress has been made in securing the heavy hay crop, and in harvesting oats and barley. In the southern and central districts the oats crop is

nearly all in shock or stack, and the harvest is well under way in the northern section. Spring wheat is ripening well and much of this crop is about ready to be cut. There are but few reports of damage by rust. Pastures are good; potatoes and garden truck are doing well. Apples are about as previously reported. The berry crop has been abundant and grapes are promising.

BULLETIN No. 17, JULY 31.

The average temperature of the week has been 5 to 7 degrees below normal, with some excess of cloudiness. The rainfall was light in the northern section and eastern half of the central section, but copious showers fell in the west central and the southern districts. The rainfall was timely and beneficial to corn, potatoes, pastures and vegetables. In portions of the northern half of the state these crops will soon be in need of additional moisture. Though somewhat delayed by mists and clouds, fair progress has been made in securing the balance of the hay crop, harvesting oats and threshing from the shock. Except in the northern counties, the oats crop is mainly in shock or stack, and early threshing reports indicate good yield and quality. The harvest of spring wheat has been begun, and the reports are generally favorable. Corn is steadily advancing in all districts, with present indications of a good yield of that great staple. The pastures afford ample feed for grazing herds. The hay crop is heavy, though a portion has been damaged by wet weather. The apple crop has continually declined, though in some localities early varieties yield well.

BULLETIN No. 18, AUG. 7.

In the larger part of the state this has been an ideal week for growth of immature crops, with good conditions for harvesting and threshing the ripened cereals. The oats crop is mainly in shock or stack, and threshing returns indicate a yield above the average of recent years. The harvest of spring wheat is nearly finished to the north line of the state, and the general condition of this crop is fairly good in the districts where the acreage is largest. There have been but few reports of damage by rust. Corn has advanced rapidly in response to high temperatures and generally ample moisture. It is earing heavily, and the earliest planted fields make good showing of roasting ears. The crop as a whole is very promising. Pastures are holding out notably well. The apple crop has steadily declined, and expert fruitmen report not more than a third of the normal yield for the state.

BULLETIN No. 18, AUGUST 14.

The past week brought the highest average temperature of the season, the daily excess ranging from 4 to 5 degrees at all stations. There was a very high percentage of sunshine, and conditions were favorable for threshing grain, and stacking except for the oppressive heat during the working days of the week.

Nearly all observers reported a shortage of moisture on the surface, and gave expression to general fear of damage by drought and hot winds; but the copious and well distributed rainfall on Saturday night and Sunday allayed apprehensions of serious injury to immature crops from that cause. Corn has made great advancement toward maturity, and the general condition of the crop is highly satisfactory. Good reports continue to come as to the excellent yield and quality of oats, and the spring wheat crop gives promise of a better output and higher quality of grain than the state has produced in recent years. A considerable amount of wild hay has been secured. The soil is now in good condition for plowing preparatory for fall seeding. The recent showers will help out late potatoes and refresh the pastures. Altogether, it has been thus far a very good crop season, promising more than an average output of staple farm products.

BULLETIN No. 19, AUGUST 21.

The week was about normal in temperature, and the rainfall was copious in the larger part of the state. The beneficial results of ample warmth and moisture are apparent in the improved condition of corn, pastures and potatoes, and all unripened crops. There is now sufficient moisture in the soil for the future needs of the corn crop if the balance of the season should be unusually dry, and the crop is about as well advanced as usual at the close of the second decade in August. The total of damage to the crop by wind and hail is not in excess of the average in previous seasons. The outlook is generally satisfactory as to that great staple. Pastures are much improved. The second crop of clover is unusually heavy in the central and southern sections. Threshing has been somewhat delayed by showers. Reports of yield and quality of wheat and oats are very good. Some progress has been made in harvesting wild hay, and in fall plowing.

BULLETIN No. 20, AUGUST 28.

The past week was above normal in temperature with an excess of rainfall in the larger part of the state. Generally the rainfall was beneficial, but in several of the central counties the corn crop suffered considerable damage by heavy downpours and wind, with hail in a limited area. While the loss is heavy in some localities, the percentage of damage for the state is small. The general weather conditions have been favorable for the rapid advancement of corn toward maturity. In answer to a circular of inquiry as to probable time when the corn crop will be safe from harm by frost, various opinions have been given by crop reporters. The crop is more than usually variable as to stage of growth, ranging from the milk to the denting period. Generally, it may be stated that for a fully matured crop there is need of a frostless September, with normal temperature. Probably 80 per cent will be practically safe by September 20th to 25th, and the balance needs the full month. The crop is more advanced in the northern districts than in the southern. The season has been thus far more favorable than last year. Pastures and vegetables have been kept green and growing. The apple crop has steadily declined. Conditions are favorable for plowing. Late potatoes have had favorable condition of soil. Threshing has been retarded and some wheat and oats in shock injured by wet weather. Wild hay and aftermath heavy.

BULLETIN NO. 21, SEPTEMBER 4.

During the past week there were five days of very warm weather, with light local showers, followed by a cool wave and near approach to the frost line in northern districts. The average for the week was 3 to 5 degrees above normal. Under these favorable conditions the corn crop has made satisfactory advancement. Some early planted corn on well drained land is about ripe enough to be put into shock, and cutting will be commenced within the next week if weather is favorable. As a whole, the crop is doing well. A good beginning has been made in fall plowing and seeding fall grain. Pastures are generally affording good grazing for stock. The second cutting of clover is reported to be unusually good, and the aftermath of the meadows is quite heavy. Threshing from the shock is nearly completed, and the oats crop shows considerable loss in quality because of failure to stack the grain. Reports indicate that the late potato crop is not so good as last year. Grapes are ripening well. The yield of winter apples will be very light.

BULLETIN NO 22. SEPT. 11.

The week ending the morning of the 11th was somewhat cooler than usual, with an excess of cloudiness. The rainfall was generally below normal except in portions of the west central and southwest districts. The week closed with warmer weather and ample sunshine, giving promise of conditions more favorable for ripening corn and other immature crops. The corn crop has made very good advancement and the product will be better because of slower growth, providing normal weather continues through the balance of the month. Reports indicate that fully 80 per cent of the crop will be practically safe by the 25th, though a frostless September is very desirable for the normal ripening of the whole crop. Some progress has been made in cutting in the districts where the valuable corn fodder is utilized. About the usual amount of damage has been suffered from windstorms, hail, poor seed and root worms; but there will be a very handsome amount left at the harvest. Pastures have been kept green and growing by damp weather. Late potato crop is not as good as the early planting. All reports as to apples are quite unsatisfactory. Fall plowing is in progress, and the area of winter wheat will be increased somewhat.

BULLETIN NO. 23. SEPT. 18.

The week was warmer than usual, with more than the normal amount of cloudiness, and very heavy rainfall in the southwestern fourth of the state. The daily mean temperature was 3 to 5 degrees above normal. In the larger part of the state conditions were fairly good for all immature crops, the chief drawback being the lack of sunshine to hasten maturity of belated portion of the corn crop. In considerable portions of the state the bulk of this crop is fairly well matured, and cutting is in progress in all sections where silos are used and corn fodder is utilized. For the state at large more than two-thirds is beyond danger of serious harm by frost. The late planting needs the balance of the month and dry weather to develop sound merchantable corn.

The damage by wind in limited areas will lessen the output somewhat and render harvesting more difficult. Generally, there has been good progress in fall plowing. More than the usual acreage of fall wheat has been sown. Pasturage is at its best for this time of the year. Reports as to late potatoes are not satisfactory, though the output is likely to be near the state average. Late fall and winter apples have suffered from windstorms, but there was not much fruit to lose. A fair grape harvest is being secured. Garden truck is abundant.

BULLETIN No. 24, SEPT. 25.

Following heavy showers on the 18th, which caused some local damage in western districts, the past week brought 6 days of ideal weather for the belated portion of the corn crop. The daily mean temperature has been 3 to 5 degrees above normal in the larger part of the state, and since the 19th the sky has been practically cloudless. Good progress has been made in threshing, fall plowing and cutting corn. Reports indicate that more than the usual acreage of corn will be put into shock in the central and western districts. In all the best corn districts of the state, where the crop received timely cultivation, it is practically safe. For the state at large, 85 to 90 per cent is now well matured. The immature portion needs frostless weather for the balance of the month and probably some of it a little beyond. Conservatively estimated, the amount of corn now mature is fully equal to the state average for the past fifteen years.

BULLETIN No. 25, OCT. 2.

This has been another week of ideal weather, the daily mean temperature ranging from 6 to 9 degrees above normal, with very light rainfall and drying winds. September was frostless, and the latter half was unusually warm. The conditions have been very favorable for ripening the corn crop, which is now practically safe from possibility of harm by frost, except in very small areas, where planting was done after the June floods. Much of the corn planted as late as June 15 has developed beyond expectations, the husks and blades brown and kernels sound. Reports indicate that for the state at large more than 95 per cent of the entire corn acreage is well matured, and from 5 to 2 per cent would suffer some harm from a very heavy frost at this time. The very latest planting promises to be sound and merchantable if present conditions prevail a week longer. The quality of the crop as a whole is extra good. The crop season has been favorable. The daily mean temperature since March 1 has been 1.5 degrees above normal. The output of corn, wheat, oats, barley, rye, hay and forage stuff will be above the state average. The only drawbacks have been the very poor apple crop and partial failure of late potatoes.

IOWA CROP REPORT JUNE 1, 1905.

ACREAGE OF FARM CROPS, AND AVERAGE CONDITION OF CROPS, FRUIT AND LIVE STOCK.

Following is a summary of the June 1st reports, received from county and township correspondents of the Iowa Weather and Crop Service.

CORN.—The reports show an increase in the acreage in more than half the counties, and a slight decrease in some of the others wherein a portion of the acreage prepared for corn was too wet to plant prior to June 1st. The average increase for the state is about three per cent. The number of acres by counties can not be given until after the completion of the state census, now in process of tabulation.

The average condition of the corn crop was estimated about ninety per cent, or about the same as last year on corresponding date. A considerable portion of the crop, however, was scarcely visible above ground on June 1st.

The other staple farm crops are rated as follows, in condition:

Winter wheat, 102 per cent; spring wheat, 99; oats, 95; barley, 96; rye, 98; flax, 94; potatoes, 97; meadows, 100; pastures, 97.

CONDITION OF FRUIT.—Apples, 80 per cent; plums, 70; peaches, 35; cherries, 65; grapes, 90; strawberries, 103; raspberries, 96; blackberries 94.

CONDITION OF LIVE STOCK.—Cattle, 100 per cent; sheep, 99; hogs, 99; spring pigs, 90; horses, 99; foals, 95.

CONDITION OF CROPS JUNE 1, 1904.—Corn, 90 per cent; winter wheat, 85; spring wheat, 94; oats, 92; barley, 93; rye, 91; flax, 85; potatoes, 95; meadows, 96; pastures, 97.

The area of spring wheat sown this year has been reduced probably 10 per cent below the area harvested last year. The oats acreage about the same as last year. Barley acreage has been reduced 7 to 10 per cent.

IOWA CROP REPORT JULY 1, 1905.

Reports of crop correspondents showed the following averages of condition of staple crops, July 1, 1905: Winter wheat, 99; spring wheat, 94; corn, 92; oats, 96; rye, 96; barley, 98; flax, 95; hay crop, 101; pastures, 105; potatoes, 98; apples, 65; grapes, 88; plums, 68 per cent.

On July 1, 1904, spring wheat was rated 91; corn, 90; oats, 91; barley, 93; flax, 89; hay, 90; pastures, 94; potatoes, 101; apples, 85 per cent.

IOWA CROP CONDITIONS AUGUST 1, 1905.

The August 1st report of crop correspondents has been tabulated, showing following estimates of the condition of crops on the percentage basis: Corn, 94 per cent; spring wheat, 93; oats, 97; flax, 78; potatoes, 92; pastures, 103; apples, 40; grapes, 91.

Last year at corresponding date the estimates were: Corn 88; spring wheat, 75; oats, 89; flax, 94; pastures, 96; potatoes, 101; apples, 73; grapes, 86.

IOWA CROPS, FINAL REPORT 1905.

TOTAL YIELD FOR THE STATE—VALUE OF SOIL PRODUCTS AT FARM PRICES, DECEMBER 1, 1905.

The crop season of 1905, as shown by tabulated reports from each county, was the best that has been reported in this state since 1900. Altogether the showing as to aggregate yield and price of staple products is beyond estimates made during the early half of the season.

Corn. Reports indicate unusual variation in the yield of corn, the averages by counties ranging from 25 to 45 bushels per acre, as a result of notable local differences in condition of the soil in the critical stages of the season. The first report of the season showed an average increase in the acreage of corn planted as compared with last year, but adverse local conditions in May and June caused a loss of acreage which has been taken into account in the final estimate of the output. The census returns showed the total area of corn to have been 9,583,815 acres in 1904. The yield of this year is based on a total of 9,285,150 acres, the average yield for the state being 37.2 bushels per acre. The total product appears to be 345,871,840 bushels which is 816,800 bushels in excess of the output of any previous year; but the average per acre was higher in four previous seasons since 1890. The average value of the corn crop on Dec. 1 was about 35 cents per bushel—total for the state, \$121,055,140.

Wheat. The yield and quality of winter wheat has been good this season; but the acreage was small. The total appears to be 1,253,020 bushels, an average of 20.2 bushels per acre, and quality good. The total of spring wheat was 5,155,760 bushels—an average of 14.4 bushels per acre. The total wheat output (6,108,780 bushels) is worth \$4,614,321—an average of 72 cents per bushel.

Oats. The yield of oats, 33.8 bushels per acre, is above the average but the product was somewhat impaired by wet weather while standing in shocks. The total appears to be 146,439,240 bushels, which amount has been exceeded but once in the records of the state, and that was in 1895. The farm value of the crop Dec. 1 was 25 cents per bushel—total \$36,609,810.

Rye. Total yield 1,283,500 bushels—an average of 18 bushels per acre. Value, \$667,420, at 52 cents per bushel.

Counties.	Winter Wheat.		Spring Wheat.		Corn.		Oats.		Rye.		Barley.		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			15	2,760	38	3,299,540	35	2,599,410	18	20,430	30	139,080	10	7,250	65	118,300	2.0	61,820	1.5	7,720
Franklin			15	18,600	38	4,042,820	40	3,009,640	16	1,760	35	39,300	12	1,920	92	97,520	1.5	44,320	1.2	23,170
Freemont	22	88,640	15	18,210	40	4,612,800	32	3,558,170	20	6,730					80	62,720	1.5	27,050	1.5	4,820
Greene			14	8,680	39	4,371,210	34	1,673,140	15	630	27	54,050	10	1,200	90	62,100	1.3	38,330	1.0	20,140
Grundy			14	12,040	43	4,341,710	31	2,059,930	18	24,840	30	225,300			110	145,200	1.8	65,260	1.5	14,640
Guthrie	25	5,250	12	56,040	34	2,983,840	28	1,148,140	12	1,220	25	52,250			88	59,850	1.7	61,650	1.0	6,570
Hamilton	18	570	14	34,580	40	4,288,680	31	1,744,370	20	560	30	22,950	12	1,560	98	119,540	1.8	54,650	1.2	28,980
Hancock	20	600	15	30,450	35	2,875,950	33	2,579,280	21	1,170	29	64,670	10	3,100	110	114,500	2.2	30,060	1.5	29,910
Hardin			12	27,720	38	3,924,640	36	2,234,160	14	1,640	28	30,240	8	160	80	103,280	2.0	55,820	1.5	22,860
Harrison	22	4,620	12	260,040	40	5,362,400	35	658,780	16	3,280	25	35,650			75	95,250	2.0	38,350	1.3	21,290
Henry	16	10,880	14	1,680	34	2,293,160	32	963,360	17	38,420	24	15,360			90	50,850	1.7	52,480	1.0	
Howard			14	11,270	35	1,792,350	33	1,913,140	15	570	32	299,480	11	31,920	65	61,750	1.7	56,390	1.2	12,216
Humboldt			18	58,800	42	2,863,770	36	1,767,520	20	160	30	37,990	10	1,440	115	55,200	1.8	42,240	1.5	26,946
Ida			13	76,960	39	3,814,590	36	1,335,960	20	210	30	225,630			102	96,900	1.8	45,090	1.2	4,970
Iowa	21	8,820	16	13,360	43	3,922,370	33	1,257,960	17	10,130	28	114,840			97	119,310	2.0	87,840	1.5	2,460
Jackson	17	4,930	15	21,360	41	3,958,150	37	1,058,570	18	25,360	30	183,210			70	81,900	1.8	106,060	1.5	60
Jasper	19	18,580	13	42,250	39	5,270,850	33	1,551,160	20	4,220	25	60,250			75	121,600	1.8	96,350	1.5	3,100
Jefferson	18	22,880	12	1,810	30	1,924,980	32	769,530	14	50,820	30	45,600			87	58,290	1.8	59,540	1.0	60
Johnson	24	15,120	16	3,360	42	4,352,460	36	1,452,960	15	24,240	26	185,640			105	132,200	2.0	102,730	1.0	2,540
Jones			15	9,930	43	3,673,060	31	852,280	20	17,440	27	201,420			102	98,940	2.0	102,960	1.0	560
Keokuk	18	14,580	16	6,800	30	2,935,650	32	1,011,520	20	56,800	25	139,500			85	73,100	1.5	68,940	1.0	520
Kossuth			15	63,540	35	4,648,280	34	4,157,520	22	2,200	28	84,750	9	8,190	94	149,460	1.6	60,190	1.2	92,430
Lee	18	240,010	31	1,830,950	28	600,320	18	74,880	30	3,600					60	70,800	1.8	83,080	1.0	100
Linn	20	16,240	16	40,480	44	5,112,360	41	2,055,330	20	18,640	30	27,690			75	135,750	1.6	96,160	1.5	9,010
Louisia	20	14,280	15	9,150	39	3,808,550	35	812,350	18	52,020	28	19,880			70	40,250	1.8	35,140	1.5	2,890
Lucas	18	51,340			29	1,472,040	30	383,800	16	6,410					50	28,750	1.6	107,260	1.5	460
Lyon			15	246,150	38	3,553,320	40	2,826,880	18	2,700	28	1,435,560	10	1,040	85	105,400	2.0	35,700	1.5	17,230
Madison	22	10,220	16	16,320	38	3,194,680	32	899,840	17	3,450	30	81,090			112	76,280	2.0	87,820	1.2	2,010
Mahaska	18	20,160	13	10,530	30	3,031,890	28	853,690	15	15,390	28	138,320			83	75,530	1.8	70,940	1.5	1,960
Marion	21	32,780	15	13,130	31	2,809,560	28	761,660	20	7,080	25	36,750			70	59,640	1.8	66,730	1.2	1,290
Marshall			14	48,870	39	4,469,670	40	2,324,840	20	5,600	31	68,510			80	91,200	2.0	70,360	1.0	2,610
Mills	17	30,770	12	65,280	33	3,246,870	32	456,020	20	840	28	16,890			90	77,400	2.0	44,950	1.5	7,550
Mitchell			12	6,020	35	2,104,200	36	2,554,920	18	3,600	25	243,950	10	4,100	60	97,200	1.8	54,060	1.2	3,680
Monona	25	18,900	14	244,060	30	3,900,510	33	642,840	20	5,140	31	199,020	10	210	93	113,460	2.0	19,850	1.6	33,870
Totals for State	20.2	1,253,020	14.4	5,155,760	37.2	345,871,840	33.8	146,439,240	18	1,283,500	27.5	15,566,770	9.8	173,770	84	9,352,190	1.8	6,477,300	1.2	1,313,310
Av. per acre	20.2		14.4		37.2		33.8		18		27.5		9.8		84		1.8		1.2	

BETTER YIELDING GRASS LANDS.*

(By Prof. Chas. F. Curtiss, Dean of Agriculture, I. S. C.)

We have had and are having a great corn revival throughout Illinois and the entire corn belt and it is an excellent thing. It certainly means that we are going to produce very much better results. We are going to get more from the corn lands of this great West, but we need to have as well as a corn revival, a grass revival. We need to study the grass crop as well as the corn crop.

The two great products of the central west are corn and grass and the greater of these is grass. That is, the grass and the forage crops of our farms and our farming states are of greater value, taken the one year with another, on an average, than any other single crop that we produce.

As a rule, we give less consideration to the hay and grass lands—than to any other part of our farms. I believe they are the lands that are the most susceptible to improvement, and it is the crop in which we can increase the returns with the least expenditure of additional labor, and at the least cost.

We are confronted with new conditions in the agriculture of the central west today. We have seen these lands advance, within a decade or a little more, from \$50 and \$75 to \$100 and \$150 per acre, and it is my prediction that they have not yet reached the limit. At the same time, while these western lands have been advancing in value we have experienced a decline of 25 to 50 per cent in the lands further east, the lands of the Ohio and Miami valleys and eastward from that. There will sometime be a corresponding advance in the lands of some other sections, if we do not give attention to the right methods of maintaining the productive capacity of our farming land.

We all know that as valuable as corn is, it is not a complete ration, and if we expect to produce the best results in growing animals, and in dairy stock, and in developing horses, and in maintaining the breeding qualities of our animals, we must have a variety of feed stuffs. We must have the constituents that go to build up the bone and muscle and properly develop the animal in the highest form and highest state of excellence. These things are absolutely essential; never so much so as today, in view of the high-priced land that we have, in view of the quicker returns we must get from these animals, and the higher excellence that we must produce in the finished product. That point is generally conceded by the most successful

*This article is an extract from a stenographic report of Professor Curtiss' address before the late Illinois Farmers' Institute. It has lately been revised by Professor Curtiss and was published in the *Prairie Farmer* of Chicago, August 10, 1905.

stock men. In the face of the fact that we have higher priced labor, higher priced feed products of all kinds, the problem presented is, how we may cheapen the production of these animals by the rations we use, or the methods we employ in growing and producing them on our farms, and produce the finished product at comparatively a lower cost and without sacrificing any of the excellence.

I believe that the grass crop affords today the surest and most practical means of accomplishing cheaper production. That is, I think if we would give to the improvement of our forage crops and our pasture lands the same attention that we have given to the improvement of our cultivated crops and our grain crops, that we would receive a larger increase, larger returns for less expenditure than any other improvement that we may have.

It is sometimes said that when land becomes worth a hundred dollars an acre or more, that it is worth too much to maintain in grass. I believe that statement and that theory are entirely fallacious.

You will find today in the rich agricultural land of Great Britain a larger area of grass, relatively, than you will find in Illinois or Iowa. You will find lands worth three or four hundred dollars per acre more largely devoted to the growing of grass crops than they are in this country. And I believe, if we are to maintain our farms in the highest state of productive capacity, and conduct them with the highest profits, we shall be obliged to devote a large part of our farming lands to grass production and relatively less to corn production.

I believe that if we were today to reduce the cultivated lands devoted to the grain crops twenty-five per cent and apply better methods, and devote that reduction of grain crops to grass production, that we might maintain our present output of grain, and at the same time have this increased grass land, that could be applied to the production of live stock, with greater profit than any other part of the farm. And I think it goes without saying we all recognize that we could reduce the acreage of our cultivated grain crops one-fourth per cent without decreasing the yield, if, at the same time we could apply the best methods of more thorough cultivation and of rotation, and the improved methods of agriculture which are being introduced today.

Now, in view of the fact that the grain crops have all advanced in value, in view of the fact that everything a farmer buys to balance his corn crop is high priced, and will undoubtedly continue high in price, I believe that we have, right on our farms and in the products of our farms, the means of balancing the ration, with greater economy and with greater profit, and with greater advantage to the maintenance of the fertility of the farm, than through the purchase of any of the by-products from the factories or the mills. These products must continue to be high, and while of course we do not expect to quit producing them, because there is a certain output from our factories and our mills that must always be consumed on the farm, and they ought to be consumed here rather than go abroad, yet there is a limit to the price we can pay for them and utilize them with profit.

Instead of paying out a large amount of money for these products at high prices, we might better produce on the farm the feeding stuffs containing the nutrients and the elements of growth and muscle and bone making

that we need in our animals. The safest, the surest and the best means of producing that will be through the grass crops rather than in the grain crops.

Now I think we could, in the first place, extend the grazing season from two to three months in the year, on nearly every farm throughout this state and other states similarly situated. In fact, we do not get good grazing more than five or six months in the year, seldom more than five months. Wherever we can grow blue grass, we can extend the grazing period to eight or nine months, without serious difficulty. Particularly is that true with regard to the production of horses and of beef cattle. It can not be so readily done with dairy cattle for the reason we can not expose them so much, and have them out so many months in the year.

But by maintaining our lands in good condition, and providing for a good growth of grass throughout the summer months, and carrying a surplus into the autumn and over the winter, we can graze up till the first of January in nearly all parts of Illinois. From this latitude south there will be no difficulty. And then, by maintaining a surplus of grass on the pastures over winter, we can turn stock out by the first of April instead of the first of May. So we can add two months to the grazing period at the end of the season, and one month at the beginning of the season, by holding in reserve on our grass lands a surplus of feed, which can be drawn upon at any time.

In order to do this, however, it will be necessary to give attention to the grass lands, in the way of building them up; in the way of cultivating them. If we expect to grow a crop of grass, we must expect to feed that crop the same as we feed our live stock. And we must give the same attention to cultivating and the maintenance of the grass lands in the best state of fertility that we give to other parts of the farm. Three-fourths of our grass lands are relatively neglected lands. The pasture lands, as a rule, are the poorest and most inferior parts of the farm.

It is not always the case, but as a rule, the pasture receives no consideration, until all other parts of the farm have been brought under improved methods. And if we were to give it the annual attention in the way of top dressing, in the way of harrowing and distributing fertilizer, in the way of renewing the grass seed, and in the way of drains, keeping the soil sweet and light and in the best possible condition, I believe that we could practically double the output from our pasture lands.

One of the first essentials is to see that we have a good stand of grass. So many of our grass lands are simply set aside to grass, and they are grazed closely from the beginning to the end of the season. The soil bakes, and becomes what we call hidebound at times. The grass dies, and then if it is exposed when it is bare during the winter and during the midsummer's severe drouth, it dries out and kills out, and very soon we will have not more than half or three-quarters of a stand of grass on many of our grazing lands. And whenever that condition occurs, nature provides for a covering, and the weeds come in there, and they take possession of the soil just as soon as there is an opportunity. Just as soon as there is a reduced condition or weakened vitality of the grass crop, the weeds will come on and take possession. So that over a large part of our grazing lands, we have not a stand of grass at all, in many cases not to exceed a half a stand.

The first thing should be to secure a stand, after providing drainage. Of course that should be the beginning of all agricultural operations. We should have our grass land drained, as well as our agricultural land, and if we do not we can not expect returns. Of course we may get an inferior, coarse, rough sort of grass, but it will not be the grass and it will not be the production that we must have from our valuable land today. No man can afford to own valuable land today that is not drained.

That should be the beginning. Then we ought to go through our grass land and make sure of getting a stand, the very first thing we do. I do not mean that we ought to put a plow in and plow them up regardless of conditions or what we want to use them for. I want to say emphatically that the best grass land of the world, in all farming countries, is land that has been devoted to grass for centuries. And that will be so in this state. Of course it may be desirable, and will be desirable to rotate a good part of the farm, but if certain portions of the farm can be put into grass and left there permanently, it will be much better than to be continually plowing the pasture land. If our land is lacking a stand in grass, it will not be necessary to put a plow in and plow it up and reseed, to start over again. We can put the disk and harrow in there and give the surface of our pasture land a thorough cutting up; so complete a cutting up that it will look, perhaps, as though but little grass remained. But put on, in connection with that, clover and timothy seed, and alsike and we can at once get a stand of grass without in any way disturbing the sod which has been there so long, and which is of such great value in getting the land up to its highest state of production. It will surprise you to see how much this will improve the grass land.

We have recently made some experiments on the college farm at Ames with blue grass pasture land that was not by any means in a low condition. It had been pastured, but kept up in a good state of fertility, but by going on it in the spring, just as soon as the frost was out of the ground, and putting a disk on and cutting it up, and then sowing the grass seed at the rate of two or three pounds per acre, dependent upon the varieties—sometimes as much as five pounds per acre—and following that with the harrow, and then not pasturing too heavily for a time, we have been able to add as much as one hundred per cent to the productive capacity of the soil in the first season, and that advantage will accrue for several seasons to follow.

It is very easy to add fifty per cent to the grass crop in a single year, by this method. Instead of having grass land growing weeds we can have the entire area growing grass. There is never any trouble about weeds in the pastures, if you first have the soil in good condition, and have grass enough to make a good stand. We see weedy pastures all over this country, on the best farms as well as on the poorest, and in nine cases out of ten the sole trouble is that the methods of managing this grass land have been wrong, and the weeds stand is a protest against that farmer's methods. The weeds would not be there if the methods had been right, and if there had been an opportunity for the grass to take possession of the soil. If you give our grasses possession of the rich farming land of central Illinois or any part of the state, and maintain the soil in the right condition, there will be no trouble in keeping down the weeds.

These are some of the first things that need to be observed in the growing of grass. Then, when we get our lands in that condition, we need to keep them there. It is like what the old English gardener said to an American lady, about making a lawn. In traveling in England she was very much aken with the richness and the velvety, luxuriant growth of the English awns, and she thought she would get a recipe for making that kind of a lawn and have some in her own dooryard, so she asked him if he would kindly tell her how he made a lawn, and got it in such nice condition. He said:

"Madam, it is very simple. I prepares the seed bed perfectly, and I sows the grass seed, and then I waters it and mows it, and waters it and mows it for four hundred years, and then you have a lawn."

Now, that is the way to make a pasture. We must get the soil right, get the grass seed in there, and keep it in there and then feed the grass crop the same as the corn crop. We know we cannot grow corn unless we get the soil up and keep it up in a high state of fertility. And the same is true of the grass crop. If we give the same attention to the improvements of our grass lands, we will get double the returns for the outlay and labor and expense that we would get in improving our tillable lands.