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U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

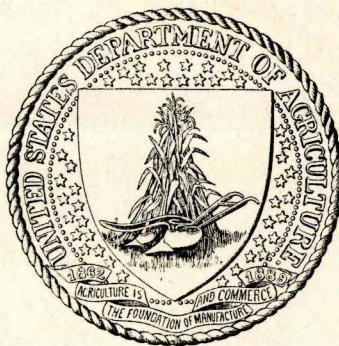
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JANUARY, 1919

BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, JANUARY, 1919 No. 1

GENERAL SUMMARY.

The mean temperature, 25.8°, is next to the highest of the 30 Januarys of state-wide record, the excess in temperature being about 14 degrees in Emmet county in the north and about 4 degrees in Wayne county in the south. The first five days were severely cold with temperatures as much as 30 degrees below normal; the last 16 days were remarkably mild, several days being more than 20 degrees above normal.

This was the driest January of record. Most of the precipitation occurred in the snowstorm that was in progress at the close of the preceding month, though small, scattered amounts occurred, 4th-7th and 20th-23d. The number of clear days, 20, is the greatest record in January. The snow covering disappeared in the Missouri slope counties by about the 8th but persisted till the 21st-24th over a belt extending from Keokuk and Washington counties northeast over Clayton and Dubuque counties. The ground was not deeply frozen at any time, and during the last week very little frost remained in the ground, plowing was done, shrubs were set out and dandelions bloomed and formed their white seed balls. Buds were much swelled and some fear is entertained for their safety. Maple sap ran for a few days. Winter wheat is believed to be in good condition, though there were some adverse reports of heaving due to alternate freezing and thawing. Practically no ice has been harvested. Brisk marketing early in the month was prevented by bad roads after the 15th. Building was unusually active for January.

PRESSURE.

The mean pressure (reduced to sea level) for the state was 30.10 inches. The highest recorded was 30.65 inches, at Omaha, Neb., and Sioux City, on the 3d, and the lowest was 29.68 at Sioux City on the 24th. The monthly range was 0.97 inches.

TEMPERATURE.

The mean temperature for the state, as shown by the records of 102 stations, was 26.8°, or 8.9° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 25.2°, or 10.6° higher than the normal; Central, 27.0°, or 8.8° higher than the normal; Southern, 28.2°, or 7.3° higher than the normal. The highest monthly mean was 31.9°, at Omaha, Neb., and the lowest monthly mean was 22.4°, at Northwood. The highest temperature reported was 64°, at Centerville on the 19th, and the lowest temperature reported was -32° at Maquoketa on the 4th. The temperature range for the state was 96°.

PRECIPITATION.

The average precipitation for the state, as shown by the records of 110 stations, was 0.24 inch, or 0.8 inch less than the normal. By divisions the averages were as follows: Northern, 0.31 inch, or 0.53 inch less than the normal; Central, 0.22 inch or 0.89 inch less than the normal; Southern,

0.19 inch, or 1.00 inch less than the normal. The greatest amount, 0.86 inch occurred at Nora Springs, and the least, a trace at Chariton, Mt. Pleasant., Olin, Tipton, Stockport and Winterset. The greatest amount in any 24 consecutive hours, 0.62 inch, occurred at Nora Springs on the 1st.

SNOW.

The average snowfall for the state was 2.8 inches or 4.1 inches below the normal. The greatest amount, 12.2 inches, occurred at Lansing, and at least, a trace at six stations.

WIND.

The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau Station was at the rate of 42 miles per hour from the northwest at Sioux City, on the 4th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 68, or 18 per cent higher than the normal. The percentage of the possible amount at the several regular Weather Bureau stations was as follows: Charles City, 55; Davenport, 64; Des Moines, 73; Dubuque, 64; Keokuk, 76; Sioux City, 75; Omaha, Neb., 71. Clear days average 20; partly cloudy 5, and cloudy 6.

MISCELLANEOUS PHENOMENA.

- Aurora: 1st, 3d, 4th.
- Fog, dense: 11th, 12th, 15th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 27th.
- Halo, lunar: 6th, 9th, 10th, 11th, 13th, 16th, 18th.
- Halo, solar: 1st, 2d, 8th, 11th, 17th, 18th.
- Parhelia: 1st, 2d, 8th, 13th.

COMPARATIVE DATA FOR THE STATE—JANUARY.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipi- tation .01 in.	Clear	Partly cloudy	Cloudy
1890	19.7	+1.8	61	-27	2.03	+0.98	3.46	0.35					
1891	26.0	+8.1	58	-4	1.75	+0.70	3.99	0.61					
1892	15.3	-2.6	76	-38	1.09	+0.04	3.13	0.10	6.9	5	16	9	6
1893	9.3	-8.6	54	-34	0.74	-0.31	3.20	0.13	6.9	6	11	9	11
1894	19.3	+1.4	69	-37	1.09	+0.04	2.24	0.31	6.0	5	14	9	8
1895	13.6	-4.3	68	-31	0.85	-0.20	2.65	0.09	8.7	4	15	7	9
1896	23.4	+5.5	68	-20	0.48	-0.57	2.10	T.	2.8	3	10	10	11
1897	17.2	-0.7	66	-30	2.01	+0.96	6.16	0.15	3.2	7	12	7	12
1898	23.4	+5.5	52	-11	1.60	+0.55	5.32	T.	12.6	5	15	6	10
1899	19.8	+1.9	68	-34	0.28	-0.77	1.15	T.	1.5	3	15	10	6
1900	25.6	+7.7	66	-20	0.53	-0.52	2.47	T.	2.3	3	16	7	8
1901	23.7	+5.8	60	-21	0.74	-0.31	2.34	0.04	6.2	4	14	9	8
1902	22.4	+4.5	63	-31	0.88	-0.17	2.83	0.19	9.4	4	17	8	6
1903	23.0	+5.1	60	-12	0.28	-0.77	1.46	T.	2.0	4	13	7	11
1904	14.0	-3.9	57	-32	1.18	+0.13	3.68	0.02	6.1	6	12	8	11
1905	11.2	-6.7	56	-30	0.91	-0.14	1.82	0.12	11.1	7	14	7	10
1906	24.6	+6.7	69	-19	1.52	+0.47	4.71	0.28	11.3	5	14	6	11
1907	18.8	+0.9	68	-22	1.52	+0.47	5.30	0.10	6.0	7	8	7	16
1908	24.9	+7.0	60	-18	0.44	-0.61	1.50	0.06	4.6	2	17	8	6
1909	21.2	+3.3	72	-25	1.66	+0.61	3.74	0.41	7.8	6	9	6	16
1910	18.1	+0.2	56	-35	1.57	+0.52	3.15	0.55	12.6	6	13	7	11
1911	20.2	+2.3	66	-35	0.97	-0.08	3.73	0.11	7.3	5	9	8	14
1912	4.2	-13.7	49	-47	0.53	-0.52	1.90	T.	5.5	5	14	7	10
1913	20.9	+3.0	62	-25	0.77	-0.28	2.05	0.04	7.2	5	14	9	8
1914	27.8	+9.9	64	-10	0.88	-0.17	2.34	0.27	5.1	5	11	8	12
1915	17.5	-0.4	59	-32	1.63	+0.58	3.15	0.10	7.3	8	13	8	10
1916	17.8	-0.1	63	-34	2.62	+1.57	6.07	0.85	7.2	10	12	6	13
1917	17.0	-0.9	60	-28	0.83	-0.22	2.07	0.17	7.2	4	17	8	8
1918	8.6	-9.3	53	-35	1.02	-0.03	2.79	0.26	11.2	7	13	8	10
1919	26.8	+8.9	64	-32	0.23	-0.82	0.66	0.00	2.9	2	20	5	6

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

Climatological Data for January, 1919.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit					Precipitation, in Inches				Number of Days			Prevailing direction of wind.	Observers.			
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, (unmelted).	Precipitation .01 in. or more			Clear	Partly cloudy.	Cloudy.
<i>Northern Division</i>																				
Algona.....	Kossuth.....	1,213	46	26.2	+11.9	52	18†	-24	3	40	0.17	-0.63	0.12	3.0	2	23	2	6	nw.	W. E. Laird.
Allison.....	Butler.....	1,045	7	25.1	-----	55	29	-22	3	40	0.55	-----	0.50	5.5	2	23	2	6	nw.	J. A. Bell.
Alta.....	Buena Vista.....	1,513	28	26.8	+12.7	57	29	-23	3	35	0.10	-0.56	0.05	0.8	3	17	9	5	sw.	David F. Hadden.
Alta (near).....	Buena Vista.....	-----	23	-----	-----	-----	-----	-----	-----	-----	0.21	-0.42	0.21	3.0	1	-----	-----	-----	-----	Warren Minard.
Alton.....	Sioux.....	1,305	14	25.4	+10.2	54	29	-24	3	36	0.25	-----	0.20	2.5	2	16	10	5	nw.	W. S. Slagle.
Belmond.....	Wright.....	1,205	9	25.0	-----	53	24†	-23	3	41	0.56	-----	0.40	5.6	6	16	10	5	w.	Geo. P. Hardwick.
Britt.....	Hancock.....	1,236	22	24.6	+10.9	54	29	-24	3	42	0.24	-0.40	0.24	2.4	1	19	7	5	s.	J. A. Bell.
Charles City.....	Floyd.....	1,015	28	24.0	+12.6	51	24	-23	3	38	0.22	-0.75	0.15	5.8	4	10	15	6	nw.	U. S. Weather Bureau.
Decorah.....	Winneshiek.....	875	26	23.8	+ 9.9	47	24†	-31	4	31	0.10	-1.12	0.05	1.0	2	21	1	9	w.	Wm. F. Baker.
Estherville.....	Emmet.....	1,298	24	26.8	+14.1	54	18†	-22	3	32	0.15	-0.46	0.10	3.0	2	25	6	0	s.	A. O. Peterson.
Fayette.....	Fayette.....	1,003	29	23.2	+ 9.7	53	24	-24	3	41	0.60	-0.64	0.60	7.0	1	21	5	5	nw.	R. Z. Latimer.
Forest City.....	Winnebago.....	1,226	25	24.7	+11.9	55	29	-24	3	43	0.55	-0.23	0.50	5.5	2	18	7	6	nw.	Eugene Secor.
Humboldt.....	Humboldt.....	1,095	31	26.6	+10.6	58	29	-22	3	40	0.04	-0.75	0.04	1.0	1	16	10	5	s.	H. C. Snitkey.
Inwood.....	Lyon.....	1,474	15	25.2	+11.4	55	29	-27	3	35	0.35	-0.19	0.20	3.0	4	23	2	6	nw.	F. B. Hanson.
Lansing.....	Allamakee.....	632	13	-----	-----	-----	-----	-----	-----	-----	0.56	-0.77	0.50	12.2	-----	-----	-----	-----	-----	Chas. R. Serene.
LeMars.....	Plymouth.....	1,224	23	27.3	+11.1	59	29	-22	3	38	0.17	-0.38	0.11	1.6	2	19	6	6	nw.	G. A. C. Clarke.
Mason City.....	Cerro Gordo.....	1,148	22	-----	-----	50 ^o	18†	-31	3	42 ^o	0.30	-0.75	0.30	3.0	1	17	7	7	nw.	Northern Sugar Corporat'n.
New Hampton.....	Chickasaw.....	1,169	22	24.0	+10.7	50	29	-25	4	32	0.42	-0.48	0.38	7.5	2	21	4	6	w.	A. F. Kemman.
Nora Springs†.....	Floyd.....	1,064	6	26.6	-----	58	29	-25	4	48	0.86	-----	0.62	4.5	4	19	7	5	s.	Arthur Betts.
Northwood.....	Worth.....	1,222	23	22.4	+ 9.8	49	18†	-25	3	41	0.30	-0.74	0.30	3.0	1	18	5	8	sw.	Chas. Dwelle.
Pocahontas.....	Pocahontas.....	1,248	15	27.2	+11.7	59	18†	-23	3	42	0.15	-0.50	0.14	2.8	2	22	4	5	s.	F. E. Hronek.
Clayton.....	Clayton.....	1,180	20	23.0	+ 8.6	50	27	-28	4	35	0.66	-0.50	0.60	6.5	4	13	11	7	sw.	F. L. Williams.
Rock Rapids.....	Lyon.....	1,358	20	24.8	+12.2	54	29	-24	3	36	0.22	-0.29	0.13	2.8	4	22	4	5	sw.	J. K. Medberry.
Sanborn.....	O'Brien.....	1,553	5	25.0	-----	54	30	-26	3	36	0.17	-----	0.10	1.7	3	21	5	5	nw.	Jas. W. Dow.
Sibley.....	Osceola.....	1,212	26	24.4	+12.7	55	29	-25	3	35	0.61	+0.07	0.24	6.5	3	24	2	5	sw.	H. F. Olds.
Sioux Center.....	Sioux.....	1,426	20	26.2	+11.6	56	29	-26	3	35	0.40	-0.19	0.20	4.0	2	18	4	9	w.	J. de Ruyter.
Storm Lake.....	Buena Vista.....	1,440	30	27.2 ^a	+11.9	58 ^a	29	-23 ^a	3	35 ^a	0.08	-0.60	0.07	1.5	2	19	6	6	nw.	Geo. R. Fracker.
Washta.....	Cherokee.....	1,157	21	26.6	+10.2	57	29	-22	3	40	0.05	-0.47	0.05	0.5	1	22	3	6	s.	H. L. Felter.
Waverly.....	Bremer.....	948	23	25.5	+10.5	54	10†	-28	4	50	0.49	-0.51	0.42	4.8	3	17	8	6	sw.	H. Arnold.
West Bend.....	Palo Alto.....	1,197	26	25.4	+10.7	56	18†	-25	3	43	0.28	-0.65	0.18	3.0	2	21	5	5	nw.	Jos. Dorweiler.
Means and extremes.....	-----	-----	-----	25.2	+10.6	59	18†	-31	3	50	0.31	-0.53	0.62	3.8	2	19	6	6	nw.	-----
<i>Central Division</i>																				
Ames.....	Story.....	926	43	27.2	+ 9.1	58	29	-21	3	41	0.11	-0.82	0.08	2.5	3	19	5	7	-----	Iowa State College
Audubon.....	Audubon.....	1,301	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Baxter.....	Jasper.....	998	19	27.0	+ 9.0	59	29	-19	3	41	0.18	-0.73	0.08	1.2	4	14	10	7	sw.	Rev. Paul Traeger.
Belle Plaine.....	Benton.....	886	29	26.4	+ 8.9	55	24	-21	4	39	0.22	-1.43	0.18	2.5	3	18	6	7	sw.	O. C. Burrows.
Boone.....	Boone.....	1,134	14	-----	-----	-----	-----	-21	3	-----	0.16	-0.63	0.14	3.8	2	24	2	5	w.	Carl F. Henning.
Carroll.....	Carroll.....	1,265	29	28.0	+11.0	59	29	-23	3	38	0.25	-0.56	0.20	2.5	2	24	2	5	sw.	Mrs. Jos. J. Wolfe.
Cedar Rapids.....	Linn.....	733	37	27.4	+10.2	57	24	-17	4	33	0.22	-1.10	0.17	2.2	2	21	3	7	w.	R. S. Toogood.
Clinton.....	Clinton.....	593	46	25.3	+ 4.7	54	24	-26	4	33	0.25	-1.58	0.18	3.5	4	14	5	12	sw.	H. Burde.
Davenport.....	Scott.....	580	48	27.8	+ 7.0	56	24	-16	4	30	0.07	-1.50	0.04	2.0	3	14	10	7	w.	U. S. Weather Bureau.
Delaware.....	Delaware.....	1,083	28	24.6	+ 8.8	52	25	-28	4	35	0.02	-0.88	0.02	0.2	1	21	3	7	nw.	Nettie E. Ball.
Denison.....	Crawford.....	1,180	25	28.8	+11.0	60	29	-23	3	34	0.08	-0.53	0.08	2.0	1	20	3	8	w.	Emma Brogden.
Des Moines.....	Polk.....	861	49	29.8	+ 9.4	62	29	-17	3	37	0.08	-1.13	0.04	2.5	3	15	8	8	nw.	U. S. Weather Bureau.
Dubuque.....	Dubuque.....	639	46	25.9	+ 7.6	51	24	-23	4	33	0.17	-1.32	0.11	2.3	4	9	12	10	nw.	U. S. Weather Bureau.
Fort Dodge.....	Webster.....	1,126	19	36.1	+11.1	57	29	-22	3	33	0.35	-0.40	0.35	3.5	1	21	4	6	sw.	J. F. Monk.
Fornell.....	Poweshiek.....	1,023	25	27.8	+ 8.9	57	24†	-19	3	38	0.30	-0.97	0.25	3.0	2	19	6	6	sw.	D. W. Brainard.
Grundy Center.....	Grundy.....	976	28	27.8	+10.9	55	29	-19	3	38	0.40	-0.52	0.40	4.0	1	21	4	6	sw.	M. G. Heiberger.
Guthrie Center.....	Guthrie.....	1,077	24	27.6	+ 8.0	60	29	-20	3	41	0.02	-0.78	0.02	0.2	1	21	7	3	nw.	C. T. Harney.
Harlan.....	Shelby.....	1,182	20	27.1	+ 8.4	55	29	-21	3	40	0.43	-0.24	0.30	3.0	3	25	0	6	s.	E. L. Tilton.
Independence.....	Buchanan.....	921	55	25.7	+10.1	56	24	-24	4	37	0.45	-0.77	0.45	4.5	1	21	3	7	sw.	Dr. M. A. Fleming.
Iowa City.....	Johnson.....	683	58	25.8	+ 8.2	59	24	-25	4	38	0.08	-1.57	0.04	2.0	2	16	8	7	sw.	Prof. J. F. Reilly.
Iowa Falls.....	Hardin.....	1,107	26	25.4	+11.6	55	29	-22	3	42	0.66	-0.55	0.60	6.6	3	22	3	6	sw.	J. B. Parmelee.
Jefferson.....	Greene.....	1,052	20	27.0	+ 9.1	58	29	-21	3	43	0.23	-0.23	0.23	3.0	1	21	4	6	w.	Will I. Lyon.
LeClaire.....	Scott.....	576	19	-----	-----	-----	-----	-----	-----	-----	0.29	-1.01	0.20	2.7	3	-----	-----	-----	-----	Margaret T. Disney.
Little Sioux.....	Harrison.....	1,040	14	28.6 ^a	+ 9.4	63 ^a	29	-21 ^a	3	40 ^a	0.20	-----	0.20	2.0	1	-----	-----	-----	-----	Geo. H. Gibson.
Logan.....	Harrison.....	928	52	31.2	+11.8	63	30	-20	3	40	0.20	-0.86	0.10	2.0	2	21	7	3	sw.	Mary Jean Stern.
Maquoketa.....	Jackson.....	688	18	25.0	+ 6.8	51	24†	-32	4	35	0.01	-1.31	0.01	0.1	1	15	11	5	nw.	Ira H. Stephens.
Marshalltown.....	Marshall.....	947	27	28.7	+12.5	58	24†	-19	3	42	0.24	-0.90	0.15	3.9	5	24	0	7	nw.	Chas. F. W. Kothenbeutel.
Monroe.....	Jasper.....	922	7	28.0	-----	62	29	-20	3	40	0.14	-----	0.14	1.1	1	20	3	8	sw.	J. E. Dibel.
Muscataine.....	Muscataine.....	554	59	-----	-----	-----	-----	-----	-----	-----	0.34	-1.55	0.32	4.0	2	-----	-----	-----	-----	Wm. P. Molis.
Olin.....	Jones.....	760	21	24.4	+ 5.5	53	24	-27	4	35	T.	-1.38	T.	T.	0	20	8	3	sw.	Dr. F. W. Port.
Onawa.....	Monona.....	1,051	19	28.4	-----	62	29	-21	3	40	0.30	-0.70	0.20	2.5	2	25	0	6	s.	Mrs. H. E. Colby.
Perry.....	Dallas.....	975	18	26.8	+ 8.1	57	29	-21	3	40	0.13	-1.00	0.13	1.3	1	20	6	5	nw.	Mrs. C. E. Anthony.
Rockwell City.....	Calhoun.....	1,134	23	27.2	+ 9															

Climatological Data for January, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit						Precipitation, in Inches				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, (unmelted).	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
<i>Southern Division</i>																				
Afton	Union	1,212	25	28.2	+ 7.2	56	29	-19	3	30	0.20	-0.64	0.20	2.0	1	24	2	5	sw.	J. E. Deitrick.
Albia	Monroe	959	21	28.1	+ 8.7	60	29	-19	3	36	0.05	-1.24	0.05	1.0	1	13	2	5	sw.	F. H. Holmes.
Allerton	Wayne	1,122	17	28.5	+ 3.8	57	24	-21	3	38	0.47	-0.84	0.45	7.0	1	12	2	5	sw.	James C. Huston.
Atlantic	Cass	1,164	28	28.1	+ 8.7	54	29	-20	3	34	0.18	-0.60	0.10	1.6	2	16	2	5	sw.	Thos. H. Whitney.
Bedford	Taylor		19	27.2	+ 6.0	57	24†	-21	3	37	0.15	-0.85	0.10	2.0	2	21	3	5	sw.	E. E. Healy.
Bloomfield	Davis	881	12	28.6	---	59	29	-18	3	38	0.10	-1.88	0.10	1.0	1	16	11	4	sw.	V. G. Warner.
Bonaparte	Van Buren	565	28	27.6	+ 5.6	60	29	-21	4	37	0.50	-1.10	0.50	5.0	1	25	1	5	sw.	Bruce R. Vale.
Burlington	Des Moines	544	23	29.8	+ 7.4	58	24	-16	3†	31	0.40	-1.33	0.40	4.0	1	20	6	5	sw.	Mrs. E. M. Donnelly.
Centerville	Appanoose	1,013	14	29.8	---	64	19	-19	3	35	0.05	---	0.05	0.5	1	21	4	5	sw.	Leo. J. Allen.
Chariton	Lucas	1,042	24	26.4	+ 5.7	61	29	-21	3	40	T.	-1.16	T.	0	18	11	2	nw.	C. C. Burr.	
Clarinda	Page	1,009	29	28.6	+ 8.9	59	24†	-19	3	45	0.51	-0.44	0.43	5.1	2	19	7	5	s.	A. S. Van Sandt.
Columbus Jet	Louisa	595	18	27.6	+ 5.6	56	24†	-18	3	33	0.08	-1.16	0.05	0.7	2	30	1	0	sw.	J. B. Johnston.
Corning	Adams	1,117	27	28.0	+ 8.3	57	29	-19	4	35	0.20	-0.69	0.20	2.0	1	25	0	5	sw.	Jerome Smith.
Corydon	Wayne	1,101	26	28.0	+ 6.2	62	29	-20	3	36	0.09	-1.24	0.09	2.0	1	20	6	5	sw.	May C. Miller.
Creston	Union	1,312	14	27.3	+ 9.3	55	29	-21	3	59	0.42	---	0.27	4.0	3	19	5	7	sw.	Mrs. T. E. McConnell.
Cumberland	Cass		20								0.30	-0.58	0.30	3.0	1	28	1	2	sw.	J. H. Reppert.
Earlham	Madison	1,126	17	27.1	+ 8.0	58	24	-22	3	43	0.57	-0.68	0.51	6.0	1	24	1	6	sw.	Geo. Phillips.
Fairfield	Jefferson	780	35	27.8	+ 6.0	60	24†	-16	3	40	0.01	-1.54	0.01	0.1	1	26	2	3	sw.	Prof. R. M. McKenzie.
Glenwood	Mills	1,100	22	30.8	---	60	29	-17	3	34	0.30	---	0.20	3.0	2	23	3	5	sw.	Dr. Geo. Mogridge.
Greenfield	Adair		27	26.4 ^c	+ 7.2	55 ^c	29	-21 ^c	3	33 ^c	0.40	-0.50	0.40	4.0	1				nw.	Frank A. Ward.
Indianola	Warren	969	27	28.3	+ 7.9	58	29	-19	3	32	0.13	-1.08	0.08	1.3	4	19	2	10	nw.	Prof. J. L. Tilton.
Keokuk	Lee	614	48	30.7	+ 7.0	60	24	-18	3	32	0.01	-1.68	0.01	0.1	1	20	9	2	sw.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	27	27.1	+ 6.2	58	29	-18	4	37	0.02	-1.32	0.02	0.2	1	21	7	3	se.	J. H. Landes.
Knoxville	Marion	920	24	28.2	+ 7.2	62	29	-18	3	40	0.13	-1.07	0.05	1.3	3	21	5	5	sw.	W. J. Casey.
Lacota	Warren		20								0.50	-1.22	0.10	5.0	6	12	11	8	sw.	J. B. Alter.
Lamoni	Decatur	1,100	12	27.6	+ 6.1	60	29	-20	3	37	0.07	---	0.04	0.7	2	25	1	5	w.	Edward D. Moore.
Lenox	Taylor	1,250	24	28.2	+ 7.8	58	29	-19	3	54	0.12	-0.58	0.10	1.2	2	23	1	7	nw.	J. L. Hurley.
Mt. Ayr	Ringgold	1,286	26	28.3	+ 6.5	60	29	-20	3	35	0.25	-0.82	0.20	2.5	2	19	7	5	sw.	Alex Maxwell.
Mt. Pleasant	Henry	729	38	28.6	+ 6.5	59	24	-19	4	36	T.	-1.51	T.	T.	0	20	5	6	sw.	John H. Jericho.
Murray	Clarke	1,216	28	28.2	+ 7.8	60	29	-20	3	34	0.16	-0.72	0.13	2.2	2	18	8	5	sw.	M. T. Ashley.
Northboro	Page	1,120	7																	J. M. Darby.
Oakland	Pottawattamie			28.8		55	29	-20 ^a	3	37	0.56	---	0.41	5.6	3	23	3	5	s.	M. E. Gray.
Oskaloosa	Mahaska	835	43	27.8	+ 7.8	61	29	-19	3	38	0.12	-0.84	0.11	2.3	2	21	6	4	w.	Roy R. Robinson.
Ottumwa	Wapello	849	24			61 ^m	29	-17 ^m	3							22	6	3		Eugene O. Field.
Pella	Marion	877	16	27.8 ^a	+ 7.4	58 ^a	25	-18 ^a	3	42 ^a	0.07	-0.95	0.06	2.0	2				s.	J. H. Ver Steeg.
St. Charles	Madison	1,070	18	29.4	+ 7.9	62	29	-15	3	34	0.12	-1.16	0.12	1.5	1	25	1	5	sw.	R. D. Minard.
Shenandoah††	Page			30.1 ^a		60 ^a	24†	-18 ^a	3	45 ^a	0.10	---	0.10	1.0	1				s.	L. L. Hunter.
Sigourney	Keokuk	877	23	27.2	+ 6.4	59	24	-18	3†	37	0.14	-1.18	0.08	2.1	2	21	4	6	sw.	W. E. Utterback.
Stockport	Van Buren	754	17	26.0	+ 4.0	59	29	-24	4	41	T.	-1.37	T.	T.	0	22	5	4	sw.	C. L. Beswick.
Thurman	Fremont		22	29.0	+ 8.1	58	29	-19	3	46	0.15	-0.47	0.10	2.5	2	17	9	5	nw.	C. R. Paul.
Washington	Washington	769	37	27.4	+ 6.8	60	24	-19	4	36	0.06	-1.44	0.03	1.0	2	18	12	1	sw.	Wm. A. Cook.
Winterset	Madison	1,129	28	28.8	+ 7.9	60	29	-20	3	33	T.	-0.96	T.	T.	0	25	3	3	sw.	H. S. Ely.
Omaha, Nebr.		1,040	48	31.9	+11.4	62	29	-18	3	29	0.10	-0.55	0.10	2.9	2	15	8	8	nw.	U. S. Weather Bureau.
Means and extremes				28.2	+ 7.3	64	19	-24	4	46	0.19	-1.00	0.51	2.2	2	21	5	5	sw.	
State				26.8	+ 8.9	64	19	-32	4	50	0.24	-0.81	0.62	2.8	2	20	5	6	sw.	

The departures from normal temperatures and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining division means. Reference letters ^a, ^b, ^c, appearing in the table indicate the number of days missing, for example, ^b represents two days, etc. †Also other dates. ††Received too late to be included in means and summaries. T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).				Wind.				Sunshine				
	Mean.	Highest.	Date.	Lowest.	Mean.		Date.	Total movement	Average hourly velocity.		Maximum		Per cent of possible.	Departure from normal.			
					7 a. m.	Noon.			7 p. m.	Lowest.	Miles.	From.			Date.		
Charles City	30.07	30.46	3	29.73	17	92	75	81	50	28	4,690	6.3	22	nw.	25	55	+ 3
Davenport	30.10	30.44	9	29.70	1	90	72	77	40	28	5,447	7.3	23	w.	7	64	+19
Des Moines	30.09	30.57	3	29.76	24	85	67	74	33	28	5,192	7.0	24	nw.	7	73	+24
Dubuque	30.09	30.42	9	29.69	1	88	71	76	42	28	4,472	6.0	23	nw.	8	64	+16
Keokuk	30.14	30.52	3	29.87	17	82	65	69	43	28	5,325	7.2	24	s.	8	76	+25
Sioux City	30.08	30.65	3	29.68	24	80	63	68	27	3	8,153	11.0	42	nw.	4	75	+21
Omaha, Neb.	30.10	30.65	3	29.74	24	80	63	68	38	29	5,216	7.0	35	nw.	4	71	+15
Means and extremes	30.10				85	69	73					7.4				68	+18
		30.65	3	29.68	24				27	3			42	nw.	4		
Normals and records	30.14		25 th		3d	85		78		19 th		8.7			16 th	50	
		31.09	1905	28.71	1906				125	1892			172	nw.	1903		

†Sioux City. §Dubuque. †Local mean time. †And other dates.

Daily Precipitation for January, 1919—Continued.

Stations.	Watersheds.	Day of Month.																															Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Southern Division</i>																																			
Afton	Grand	.20						T.																											0.20
Albia	Des Moines	.05				T.	T.	T.																											0.05
Allerton	Chariton	.02			T.				.45																										0.47
Atlantic	Nishnabotna	.10			.05			.01												.01	.01														0.18
Bedford	Missouri	.10			.05																														0.15
Bloomfield	Mississippi	.10																																	0.10
Bonaparte	Des Moines	.50					T.	T.																											0.50
Burlington	Mississippi	.40				T.																													0.40
Centerville	Chariton	.05			T.	T.																													0.05
Chariton	Chariton	T.							T.																										T.
Clarinda	Nodaway	.43			.08																														0.51
Columbus Jct.	Iowa	.03			T.	.05																													0.08
Corning	Nodaway	.20			T.																														0.20
Corydon	Chariton	.09			T.	T.	T.	T.															T.												0.09
Creston	Missouri	.27	T.	.10	.05																														0.42
Cumberland	Nodaway	.30																																	0.30
Earlham	Des Moines	.57	T.		T.	T.		T.																											0.57
Fairfield	Skunk	.01			T.	T.																T.													0.01
Glenwood	Missouri	.10			.20																														0.30
Greenfield	Nodaway	.40			T.																														0.40
Indianola	Des Moines	.08			.01	.02		.02																											0.13
Keokuk***	Mississippi				T.	.01	T.																												0.01
Keosauqua	Des Moines	T.			T.	T.	.02																												0.02
Knoxville	Des Moines				.05		.05	T.																											0.13
Lacona	Des Moines	.05	.10				.10	.10	.05	.10																									0.50
Lamoni	Grand	.03			.04																														0.07
Lenox	Missouri	.10			.02																														0.12
Mt. Ayr	Grand	.20			.05	T.		T.					T.																						0.25
Mt. Pleasant	Skunk				T.			T.																											T.
Murray	Grand	.13			.03			T.					T.																						0.16
Northboro	Tarkio																																		
Oakland	Nishnabotna	.41			.10	.05																													0.56
Oskaloosa	Des Moines	.11			T.	.01	T.	T.																											0.12
Ottumwa	Des Moines																																		
Pella	Skunk	.06			T.	.01		T.																											0.07
St. Charles	Des Moines	.12			T.																														0.12
Shenandoah	Nishnabotna	.10			T.																														0.10
Sigourney	Skunk	.08			T.	.06	T.	T.																											0.14
Stockport	Skunk																																		0.00
Thurman	Missouri	.10			.05			T.																											0.15
Washington	Skunk				.03			.03																											0.06
Winterset	Des Moines					T.																													T.
Omaha, Neb.***	Missouri			.03	.07			T.																											T.

Except as otherwise indicated, observations are generally made late in the afternoon near sunset, and precipitation recorded is for 24 hours ending at time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.

***Regular Weather Bureau Station; precipitation is for 24-hour period, midnight to midnight.

*Precipitation indicated in the next following measurement.

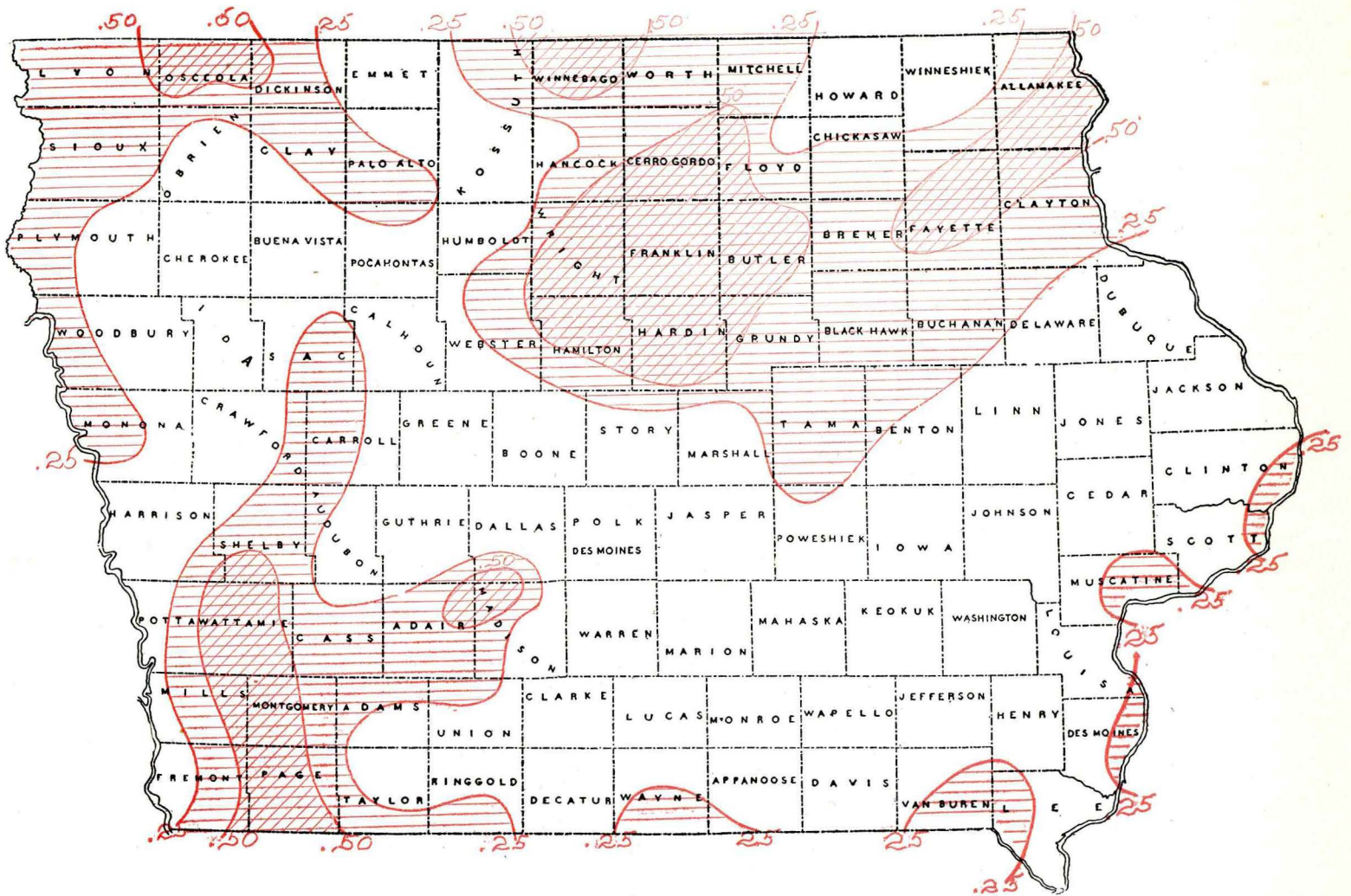
**Incomplete.

Daily Maximum and Minimum Temperatures for the Month of January, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by Northern Division, Central Division, and Southern Division, listing various Iowa cities and their daily temperature ranges.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record. Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

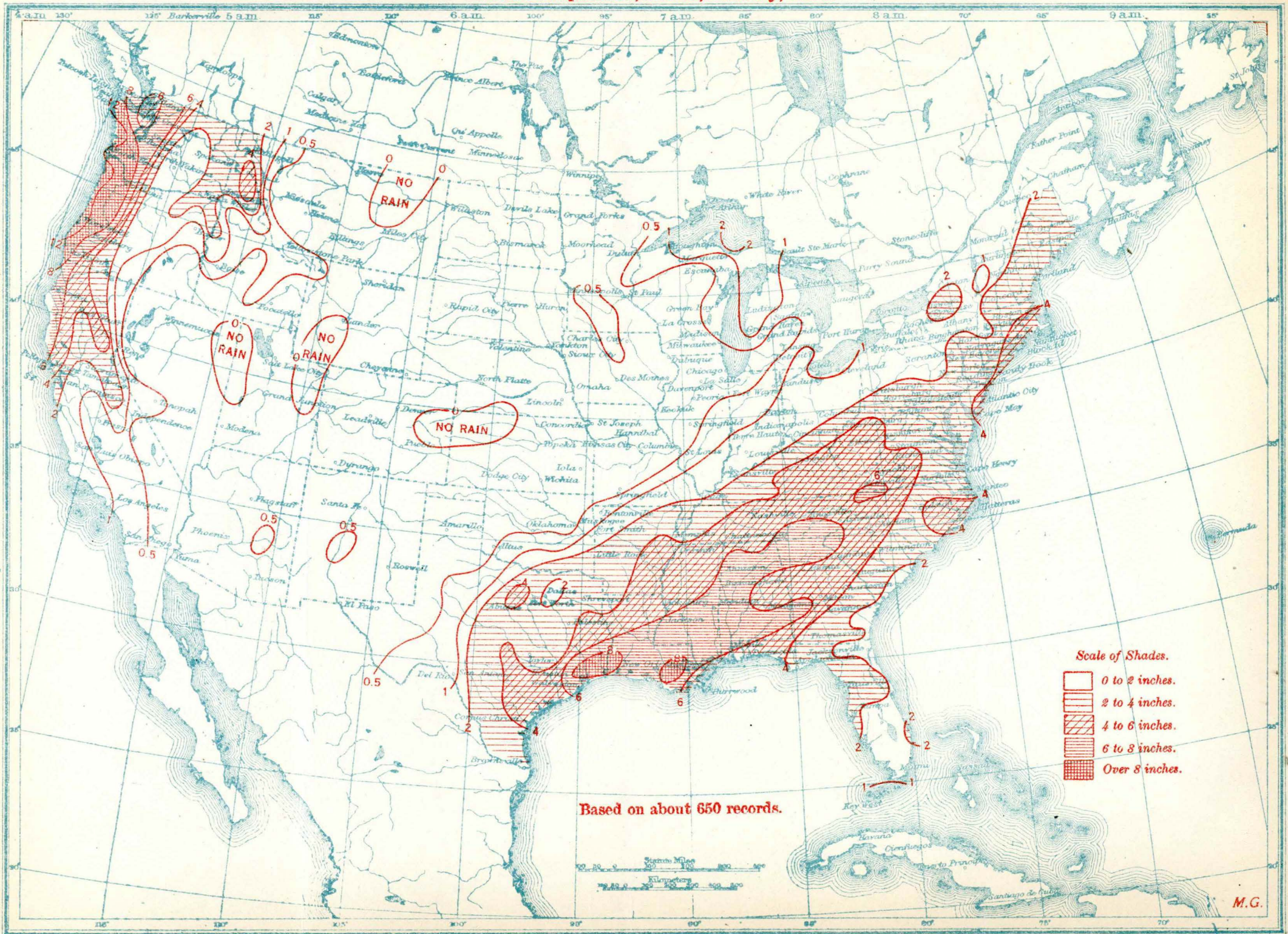
TOTAL PRECIPITATION, JANUARY, 1919



SCALE OF SHADES—IN INCHES



Total Precipitation, Inches, January, 1919.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

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CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

FEBRUARY, 1919

BY
CHARLES D. REED
METEOROLOGIST

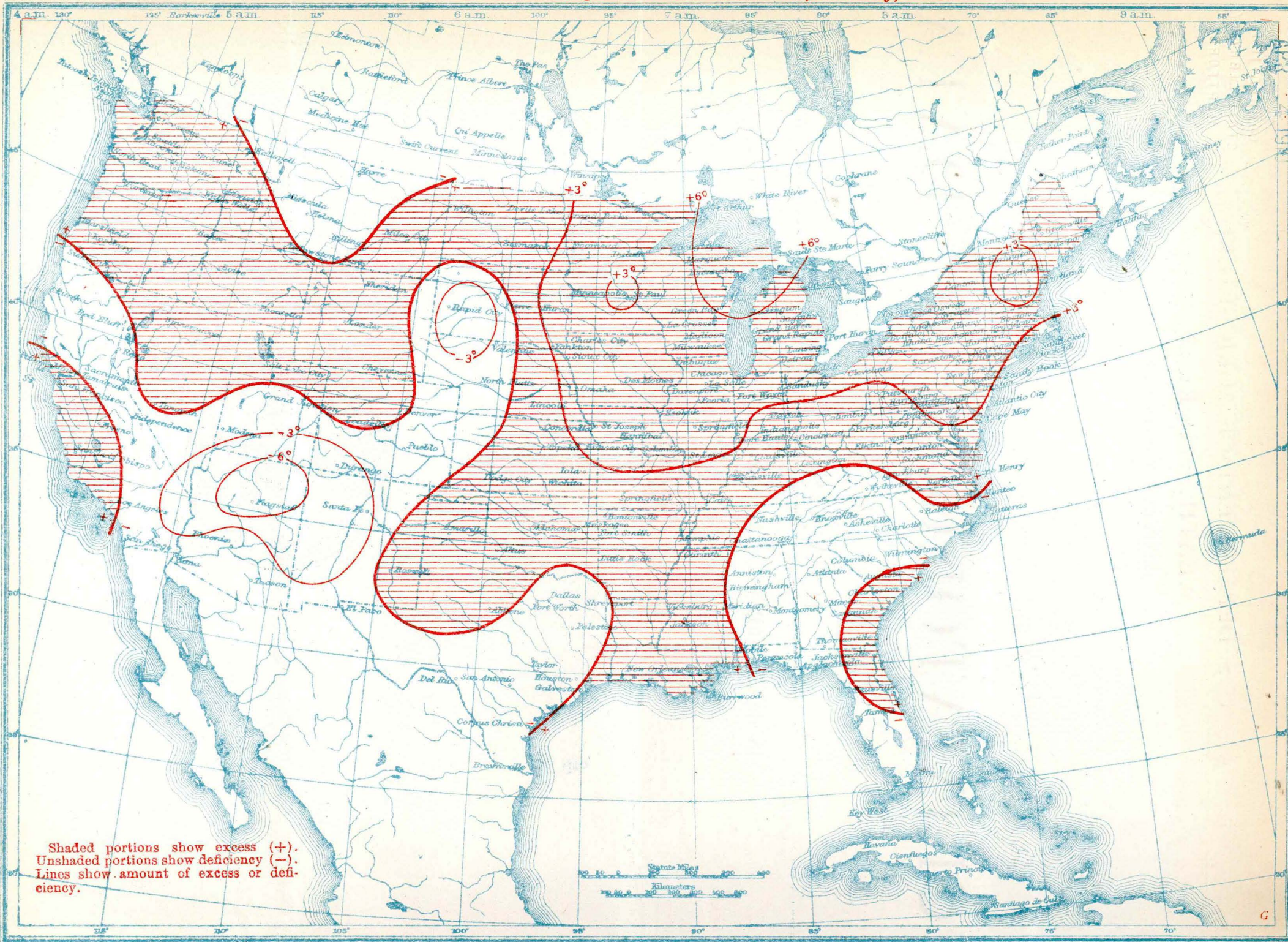


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

L.

Departure of the Mean Temperature from the Normal, February, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, FEBRUARY, 1919 No. 2

GENERAL SUMMARY.

Mild weather prevailed, except cold periods, 4th-9th and 24th-28th. No severely cold weather occurred; below zero temperatures were infrequent and were not reported at all in the southeastern counties. Temperature excesses of 5 to 8 degrees occurred in the southern tiers of counties but in the northern tier the temperature was nearly normal.

Precipitation was in excess of the normal, except the extreme southeast corner of the State, and was generally well distributed as to frequency and area. A heavy rain, generally exceeding one inch, occurred on the 13th-14th, turning to snow. Snowfall ranged from approximately 5 inches in Harrison, Greene, Boone, Clinton and Keokuk counties, to 18 inches in Osceola County. The ground was snow-covered less than five days in some of the extreme southern and eastern counties and about 25 days in Emmet and Dickinson Counties in the northwest. During a general storm that was moving eastward over this part of the country, on the 13th-14th, a copious deposit of dust or sediment occurred, which from its peculiar reddish color and crystalline structure, as revealed by microscopic examination, is believed to have been transported from the far west.

The mild, moist winter is believed to have brought winter wheat, rye and grasses through in good condition. Fruit buds, though abnormally swelled, are believed safe, except possibly peaches in the south. In the southern and eastern counties, the ice harvest was the smallest in years and a large quantity has been shipped in from the north. The roads were generally bad.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.00 inches. The highest recorded was 30.61 inches, at Dubuque, on the 19th, and the lowest was 28.96, at Omaha, Neb., on the 13th. The monthly range was 1.65 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 97 stations, was 24.9°, or 4.4° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 20.7°, or 3.6° higher than the normal; Central, 25.3°, or 4.6° higher than the normal; Southern, 28.8°, or 5.2° higher than the normal. The highest monthly mean was 31.4°, at Keokuk and Burlington, and the lowest monthly mean was 16.2°, at Sibley. The highest temperature reported was 65°, at Fairfield and Ottumwa, on the 11th, and the lowest reported was -16°, at Spencer, on the 9th. The temperature range for the State was 81°.

HUMIDITY.

The average relative humidity for the State at 7:00 a. m. was 86 per cent, and at 7:00 p. m. it was 76 per cent. The mean for the month was 81 per cent, or about 1 per cent higher than the normal. The highest monthly mean was 87 per cent, at Charles City, and the lowest was 77, at Omaha, Neb.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 102 stations, was 2.42 inches, or 1.27 inches more

than the normal. By divisions, the averages were as follows: Northern, 2.37 inches, or 1.46 inches more than the normal; Central, 2.50 inches, or 1.30 inches more than the normal; Southern, 2.40 inches, or 1.05 inches more than the normal. The greatest amount, 4.12 inches, occurred at Nora Springs, and the least, 1.09 inches, at Lansing. The greatest amount in any 24 consecutive hours, 2.10 inches, occurred at Glenwood on the 13th.

SNOW.

The average snowfall for the State was 9.9 inches, or 2.5 inches more than the normal. The greatest amount, 18.0 inches, occurred at Sibley, and the least, 3.8 inches, at Logan.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was 43 miles an hour from the west at Keokuk on the 28th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 51, or about 5 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 46; Davenport, 46; Des Moines, 46; Dubuque, 52; Keokuk, 58; Sioux City, 57; Omaha, Neb., 50.

MISCELLANEOUS PHENOMENA.

Aurora: Observed at Atlantic on the 6th; Nora Springs on the 21st; and Alta, Oskaloosa and Pella on the 28th.

Dust: (red) 13th, 14th.

Fog: 5th, 12th.

Hail: 2d, 3d, 12th, 13th.

Halo: (lunar or solar) 6th, 12th, 16th, 19th, 25th, 27th.

Sleet: 2d, 3d, 12th, 13th, 18th, 20th, 28th.

Thunderstorm: 3d, 13th.

COMPARATIVE DATA FOR THE STATE—FEBRUARY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. of in. or more	Clear	Partly cloudy	Cloudy
1890	26.0	+5.5	67	-24	0.83	-0.32	2.18	0.11					
1891	19.4	-1.1	70	-31	1.16	+0.01	2.41	0.55					
1892	28.1	+7.6	68	-20	1.20	+0.05	2.18	0.12	5.0				
1893	16.4	-4.1	60	-28	1.39	+0.24	2.91	0.06	8.1	6	10	8	10
1894	19.7	-0.8	60	-19	0.89	-0.26	2.41	T.	8.4	3	16	8	4
1895	16.4	-4.1	73	-33	0.49	-0.66	1.34	0.02	3.3	4	12	9	6
1896	27.4	+6.9	78	-13	0.71	-0.44	2.40	0.04	5.4	4	12	9	8
1897	24.7	+4.2	61	-24	0.89	-0.26	1.81	0.22	8.0	5	6	10	12
1898	24.2	+3.7	62	-18	1.20	+0.05	3.65	0.10	7.8	5	10	9	9
1899	12.2	-8.3	75	-40	0.89	-0.26	4.32	0.12	7.1	5	11	10	7
1900	14.8	-5.7	60	-27	1.30	+0.15	4.57	0.18	9.9	6	10	8	10
1901	17.5	-3.0	49	-21	1.01	-0.14	3.00	0.12	9.7	4	15	7	6
1902	17.6	-2.9	62	-21	0.73	-0.42	2.39	0.02	2.6	4	13	8	7
1903	19.8	-0.7	56	-21	1.18	+0.03	3.25	0.30	7.9	4	13	7	8
1904	14.8	-5.7	70	-26	0.41	-0.74	1.99	T.	4.5	4	10	9	10
1905	12.8	-7.7	69	-41	1.57	+0.42	2.97	0.44	15.5	7	14	6	ε
1906	23.6	+3.1	66	-32	1.29	+0.14	2.91	0.20	6.1	5	14	7	7
1907	25.0	+4.5	65	-31	0.71	-0.44	1.95	0.06	4.6	4	14	6	8
1908	24.3	+3.8	59	-16	1.09	+0.54	3.95	0.23	8.9	6	12	6	11
1909	26.2	+5.7	62	-26	1.54	+0.39	4.72	0.30	7.7	5	11	6	11
1910	17.8	-2.7	58	-21	0.46	-0.69	2.09	T.	4.0	3	14	8	6
1911	27.3	+6.8	71	-13	2.76	+1.61	5.46	0.50	7.0	6	12	6	10
1912	18.1	-2.4	57	-30	1.21	+0.06	3.25	0.04	11.2	5	10	9	10
1913	20.2	-0.3	70	-24	0.82	-0.33	2.39	0.07	7.3	4	14	7	7
1914	16.8	-3.7	59	-29	0.87	-0.28	1.99	0.32	9.2	6	10	9	9
1915	29.1	+8.6	62	-8	2.93	+1.78	5.39	0.43	9.4	9	9	5	14
1916	19.0	-1.5	62	-32	0.55	-0.60	1.38	0.05	6.0	4	14	8	7
1917	15.2	-5.3	68	-37	0.36	-0.79	1.19	T.	3.5	3	14	8	6
1918	23.0	+2.5	70	-36	0.95	-0.20	2.10	0.09	6.0	5	14	7	7
1919	24.9	+4.4	65	-16	2.42	+1.27	4.12	1.32	9.9	8	11	5	12

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

Climatological Data for February, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days.			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Northern Division																				
Algona	Kossuth	1,213	46	21.2	+ 3.6	43	2	-10	27	40	2.13	+1.04	0.69	12.2	10	14	3	11	nw.	W. E. Laird.
Allison	Butler	1,045	7	22.3	-----	48	11†	-7	9	30	3.01	-----	1.41	12.0	9	12	2	14	nw.	J. A. Bell.
Alta	Buena Vista	1,513	28	20.9	+ 4.8	48	11	-6	28	30	2.35	+1.43	1.00	9.5	9	10	9	9	nw.	David E. Hadden.
Alta (near)	Buena Vista	-----	23	-----	-----	-----	-----	-----	-----	-----	1.91	+0.96	1.00	6.5	6	-----	-----	-----	nw.	Warren Minard.
Alton	Sioux	1,305	14	20.9	+ 3.2	45	2†	-8	28	32	1.43	-----	0.41	10.2	8	9	8	11	nw.	W. S. Slagle.
Belmond	Wright	1,205	9	19.8	-----	40	1†	-12	7	31	3.03	-----	0.90	14.9	13	5	11	12	nw.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	19.6	+ 2.9	42	11	-12	7	33	1.67	+0.86	0.62	11.2	11	10	8	10	n.	L. B. Goodman.
Charles City	Floyd	1,015	28	20.6	+ 5.5	48	12	-5	25†	32	2.56	+1.59	0.95	15.4	11	9	7	12	nw.	U. S. Weather Bureau.
Decorah	Winneshiek	875	26	18.6	+ 1.0	50	12	-4	25	29	1.47	+0.44	0.48	11.2	9	13	2	13	nw.	Wm. F. Baker.
Estherville	Emmet	1,298	24	-----	-----	42	-----	-----	-----	-----	2.10	+1.42	0.75	12.5	9	16	5	7	ne.	A. O. Peterson.
Fayette††	Fayette	1,003	29	22.8	+ 5.4	50	11	-5	25	33	2.66	+0.90	1.15	10.5	11	15	2	11	nw.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	19.8	+ 4.7	40	1†	-8	14	30	2.80	+1.96	1.00	13.0	8	12	3	13	nw.	Eugene Secor.
Humboldt	Humboldt	1,095	31	21.0 ^a	+ 1.8	45 ^b	11†	-11 ^a	7	34 ^a	2.42	+1.58	0.65	10.0	8	-----	-----	-----	s.	H. C. Snitkey.
Inwood	Lyon	1,474	15	19.7	+ 3.5	44	11	-9	28	32	1.47	+0.72	0.47	8.5	10	13	8	7	nw.	F. B. Hanson.
Lansing††	Allamakee	632	13	-----	-----	-----	-----	-----	-----	-----	1.09	-0.19	0.30	-----	10	-----	-----	-----	nw.	Chas. R. Serene.
LeMars	Plymouth	1,224	23	23.6	+ 5.3	51	3	-5	7†	44	1.95	+1.18	0.84	9.5	8	9	9	10	nw.	G. A. C. Clarke.
Mason City††	Cerro Gordo	1,148	22	19.7	+ 2.4	44	12	-9	7	31	2.17	+1.36	0.40	6.1	9	12	7	9	nw.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	21.9	+ 5.3	49	12	-7	25	29	2.62	+1.70	1.04	13.5	10	13	6	9	nw.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	22.8	-----	47	13	-6	27	30	4.12	-----	1.46	6.2	9	13	4	11	nw.	Arthur Betts.
Northwood	Worth	1,222	23	17.7	+ 1.4	44	12	-10	27	30	2.75	+1.43	1.30	14.0	8	12	6	10	nw.	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	21.0	+ 3.4	47	11	-10	28	31	2.39	+1.54	0.94	9.2	12	7	11	10	nw.	F. E. Hronek.
Postville	Clayton	1,180	20	22.4	+ 4.7	52	11	-6	25	40	2.06	+0.92	0.66	11.1	11	11	6	11	ne.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	19.6	+ 4.0	44	11	-10	9	35	1.81	+1.44	0.64	9.5	10	16	2	10	nw.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	19.4	-----	43	11	-10	28	30	3.15	-----	0.95	12.0	9	11	7	10	nw.	Jas. W. Dow.
Sibley	Osceola	1,212	26	16.2 ^a	+ 1.6	42 ^a	1	-11 ^a	9	35	2.88	+2.33	1.00	18.0	10	-----	-----	-----	nw.	H. S. Olds.
Sioux Center	Sioux	1,426	20	21.4	+ 4.4	50	11	-8	28	30	2.25	+1.55	0.75	11.5	7	11	2	15	ne.	J. de Ruyter.
Spencer	Clay	1,319	5	19.2	-----	44	11	-16	9	41	-----	-----	-----	14.8	-----	-----	-----	nw.	E. W. Little.	
Storm Lake	Buena Vista	1,440	30	23.0 ^b	+ 5.9	47 ^c	11	-6	28	30	2.33	+1.58	1.02	7.0	8	14	4	10	nw.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	22.6	+ 3.9	50	11	-12	7†	40	2.60	+1.78	1.10	9.0	7	7	10	11	s.	H. L. Felter.
Waverly	Bremer	948	23	23.4	+ 4.8	49	11†	-4	25†	31	2.30	+1.18	1.20	9.1	10	13	3	12	nw.	H. Arnold.
West Bend	Palo Alto	1,197	26	19.8	+ 2.3	45	11	-11	9	32	2.31	+1.42	0.88	11.5	6	8	7	13	nw.	Jos. Dorweller.
Means and extremes	-----	-----	-----	20.7	+ 3.6	52	11	-16	9	44	2.37	+1.46	1.46	11.1	9	11	6	11	nw.	-----
Central Division																				
Ames	Story	926	43	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Iowa State College.
Audubon	Audubon	1,301	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	V. M. Jones.
Baxter	Jasper	998	19	25.0	+ 2.9	57	11	-3	7	32	1.86	+0.94	0.80	6.2	9	8	6	14	nw.	Rev. Paul Traeger.
Belle Plaine	Benton	886	29	25.6	+ 4.8	58	11	-1	9	34	2.80	+1.18	1.17	16.6	9	15	3	10	nw.	O. C. Burrows.
Boone	Boone	1,134	14	24.0	+ 5.0	51	11	-2	7†	28	2.53	+1.63	1.17	5.5	10	-----	-----	-----	nw.	Carl Fritz Henning.
Carroll	Carroll	1,265	29	23.4	+ 4.4	50	11	-8	7	32	2.25	+1.18	1.14	7.3	7	11	6	11	nw.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	26.2	+ 6.4	57	11	0	8†	31	2.13	+0.71	0.63	8.9	7	12	0	16	w.	R. S. Toogood.
Clinton	Clinton	593	46	28.2	+ 5.3	60	11	4	5†	32	2.34	+0.27	0.82	6.9	13	11	4	13	nw.	H. Burde.
Davenport	Scott	580	48	28.2	+ 4.4	59	11	4	7	39	2.20	+0.64	0.93	9.7	8	12	3	13	e.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	24.2	+ 5.5	54	11	-3	25	36	2.28	+1.39	0.89	14.5	8	13	4	11	nw.	Nettie E. Ball.
Denison	Crawford	1,180	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Emma Brogden.
Des Moines	Polk	861	40	26.5	+ 2.4	57	11	-1	7	30	3.00	+1.92	1.09	14.4	12	11	2	15	nw.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	25.7	+ 4.1	55	11	2	25	31	2.87	+1.49	1.21	13.5	10	8	7	13	nw.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	26.8	+ 4.2	48	11	-6	9	38	2.58	+1.06	1.25	7.8	12	10	7	11	ne.	J. F. Monk.
Grinnell	Grinnell	1,023	25	26.8	+ 4.7	58	11	0	7†	34	2.46	+1.35	1.00	12.5	8	10	5	13	nw.	D. W. Brainard.
Grundy Center	Grundy	976	28	26.2	+ 6.6	50	11	-4	7	37	2.39	+1.50	1.10	9.0	8	10	5	13	nw.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	25.4	+ 3.8	54	11	-8	7†	37	2.92	+1.90	1.45	10.1	9	12	8	8	nw.	C. T. Harney.
Harlan	Shelby	1,182	20	24.8	+ 4.2	54	12	-8	7	34	2.80	+1.76	1.40	10.0	6	15	3	10	n.	E. L. Tilton.
Independence	Buchanan	921	55	24.6	+ 5.3	51	11†	-4	25	40	1.88	+0.82	0.94	6.5	9	14	1	13	nw.	H. A. Lindsay.
Iowa City	Johnson	683	58	27.2	+ 6.7	62	11	2	7†	36	2.63	+1.10	1.16	10.0	8	13	4	11	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	22.6	+ 5.8	47	12	-7	7	32	2.85	+1.21	1.12	11.5	12	12	1	15	nw.	J. B. Parmelee.
Jefferson	Greene	1,052	20	23.5	+ 2.3	50	11	-8	7	33	2.02	+0.92	0.92	5.5	8	10	8	10	nw.	Will I. Lyon.
LeClaire	Scott	573	19	-----	-----	-----	-----	-----	-----	-----	1.90	+0.32	0.76	5.0	8	-----	-----	-----	nw.	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	26.8	+ 4.7	57	11	-5	28	35	2.62	-----	1.67	4.4	8	13	5	10	se.	Geo. H. Gibson.
Logan††	Harrison	928	52	28.6	+ 6.6	57	11†	-3	28	39	2.11	+0.89	1.30	3.8	5	10	10	8	e.	Mary Jean Stern.
Maquoketa	Jackson	688	18	27.0	+ 5.5	56	11	1	8	33	2.24	+0.84	1.10	-----	10	11	6	11	nw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	25.6	+ 6.5	56	11	-3	7†	38	1.61	+0.47	0.75	7.9	10	15	1	12	nw.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	932	7	27.8	-----	62	11	-4	7	35	2.38	-----	1.11	11.9	8	13	3	12	nw.	J. A. Dibel.
Muscataine	Muscataine	554	59	-----	-----	-----	-----	-----	-----	-----	2.29	+0.35	0.95	7.5	8	-----	-----	-----	nw.	Wm. F. Molis.
Olin††	Jones	760	21	26.2	+ 4.3	52	11	2 ^a	7†	33 ^a	3.20	+1.67	0.89	7.0	6	14	5	9	nw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	25.8	-----	54	11	-5	28	35	2.51	+1.31	1.07	7.5	7	14	4	10	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	24.8	+ 5.5	51	11†	-7	7	30	2.41	+1.03	0.92	6.0	7	12	3			

Climatological Data for February, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days				Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.	Partly cloudy.		Cloudy.	Prevailing direction of wind.
<i>Southern Division</i>																				
Afton	Union	1,212	25	28.6	+ 5.2	60	11	- 1	28	37	2.95	+1.80	1.10	12.5	9	11	7	10	n.	J. E. Deitrick.
Albia	Monroe	959	21	28.2	+ 6.1	55	12	0	7†	40	2.10	-0.54	0.78	8.0	5	5	7	16	nw.	F. H. Holmes.
Allerton	Wayne	1,122	17	29.9	+ 5.2	59	11	1	7†	37	1.78	-0.19	1.06	9.0	6	8	9	11	n.	James C. Huston.
Atlantic	Cass	1,164	28	25.8	+ 4.1	51	11†	- 3	7†	32	2.46	-1.32	1.03	9.3	11	4	10	14	ne.	Thos. H. Whitney.
Bedford	Taylor	19	29.4	+ 5.5	59	11	- 2	28	37	2.72	-1.34	1.13	8.7	8	10	5	13	nw.	E. E. Healy.	
Bloomfield	Davis	881	12	30.2	---	62	11	3	7†	35	3.04	-1.62	0.74	15.0	8	5	13	10	nw.	V. G. Warner.
Bonaparte	Van Buren	565	28	30.3	+ 5.6	64	11	4	7	38	1.32	-0.69	0.55	7.0	6	14	0	14	nw.	Bruce R. Vale.
Burlington	Des Moines	544	23	31.4	+ 6.5	62	11	6	28	38	2.49	+0.51	0.75	10.0	7	13	3	12	se.	Mrs. Edna M. Donnelly.
Centerville	Appanoose	1,013	14	30.2	---	54	13	- 2	7	37	1.65	---	0.74	8.2	6	11	6	11	nw.	Leo J. Allen.
Chariton	Lucas	1,042	24	28.2	+ 4.8	63	11	- 2	7†	41	2.20	-1.60	1.10	8.0	4	11	6	11	nw.	C. C. Burr.
Clarinda	Page	1,069	29	30.7	+ 8.9	62	11	0	28	37	3.06	+1.93	1.62	7.8	7	10	9	9	nw.	A. S. Van Sandt.
Columbus Jct.	Louisa	595	18	29.9	+ 5.1	60	11	4	25	34	2.29	-0.70	1.00	9.0	7	20	3	5	nw.	J. B. Johnston.
Corning	Adams	1,117	27	29.0	+ 7.4	59	2	0	28	31	2.40	-1.24	1.25	6.5	5	11	3	14	sw.	Jerome Smith.
Corydon	Wayne	1,161	26	29.6	+ 5.2	64	11	- 1	7	40	2.27	-0.81	1.16	9.5	7	11	7	10	nw.	May C. Miller.
Creston	Union	1,312	14	26.0	+ 5.2	57	11	- 6	15	40	2.47	---	1.39	10.5	8	7	8	13	nw.	Mrs. T. E. McConnell.
Cumberland	Cass	20	---	---	---	---	---	---	---	---	2.00	+0.89	0.85	10.0	5	18	0	10	sw.	J. H. Reppert.
Earlham	Madison	1,126	17	25.8	+ 4.0	56	12	- 6	7	36	2.82	-1.40	1.60	9.5	8	9	4	15	nw.	Geo. Phillips.
Fairfield	Jefferson	780	35	29.8 ^a	+ 5.0	65 ^a	11	1 ^a	4	45 ^a	2.92	-1.24	1.12	10.0	6	11	4	13	nw.	Prof. R. M. McKenzie.
Glenwood	Mills	1,160	22	28.8	---	60	11	- 3	28	31	3.37	---	2.10	11.7	7	10	2	16	n.	Dr. Geo. Mogridge.
Greenfield	Adair	27	26.2 ^c	+ 4.7	54 ^c	11	- 2 ^c	28	31	1.50	-0.36	0.60	9.0	5	---	---	---	---	nw.	Frank A. Ward.
Indianola	Warren	969	27	26.9	+ 3.8	59	11	- 2	7	29	1.75	+0.56	0.88	6.3	8	7	6	15	nw.	Prof. J. L. Tilton.
Keokuk	Lee	614	48	31.4	+ 4.8	62	11	6	28	36	1.57	-0.65	0.67	4.7	9	14	4	10	w.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	27	30.8	+ 7.5	62	11	4	7	36	1.66	-0.66	0.75	6.8	8	11	5	12	se.	J. H. Landes.
Knoxville	Marion	920	24	28.2	+ 3.8	64	11	- 1	7	38	3.43	-2.23	1.30	8.5	8	13	2	13	nw.	W. J. Casey.
Lacona	Warren	20	---	---	---	---	---	---	---	---	1.73	+0.68	0.62	13.0	6	5	18	5	---	J. B. Alter.
Lamoni	Decatur	1,100	12	31.2	+ 5.2	61	11	3	28	39	2.69	---	1.00	5.0	6	13	5	10	nw.	Ed. D. Moore.
Lenox	Taylor	1,250	24	28.8	+ 6.0	60	11	- 1	28	33	2.33	-1.27	1.20	6.8	7	8	10	10	nw.	J. L. Hurley.
Mount Ayr	Ringgold	1,236	26	29.1	+ 4.5	61	11	0	28	39	2.39	-1.01	0.99	8.5	8	10	6	12	nw.	Alex Maxwell.
Mt. Pleasant	Henry	729	3†	30.4	+ 5.5	63	11	4	7	39	2.00	-0.49	0.62	5.4	8	15	0	13	nw.	John H. Jericho.
Murray	Clarke	1,216	28	28.5	+ 5.2	61	11	0	7†	32	2.34	-1.32	0.93	10.4	8	10	4	14	n.	M. T. Ashley.
Northboro	Page	1,120	7	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	J. M. Darby.
Oakland	Pottawattamie	1,150	---	26.8	---	53	11	- 3	28	31	2.39	---	1.42	6.5	5	13	3	12	nw.	M. E. Gray.
Oskaloosa	Mahaska	835	43	28.6	+ 5.2	64	11	1	7	37	3.09	-1.96	0.79	16.4	9	10	5	13	nw.	Roy R. Robinson.
Ottumwa	Wapello	849	24	28.2	---	65	11	3 ^a	6†	38 ^a	3.31	-1.80	1.60	9.5	7	8	5	15	nw.	Eugene O. Field.
Fella	Marion	877	16	28.2	+ 4.5	64	11	- 3	7	37	1.52	+0.22	0.64	12.0	7	12	0	16	nw.	J. H. Ver Steeg.
St. Charles	Madison	1,070	18	27.9	+ 3.8	60	11	- 2	7	32	3.17	+1.90	1.02	12.5	7	13	1	14	nw.	R. D. Minard.
Shenandoah	Page	---	---	29.8 ^a	---	66 ^a	12	0 ^a	28	33 ^a	2.42	---	1.81	4.5	4	---	---	---	---	J. L. Hunter.
Sigourney	Keokuk	877	23	28.5	+ 4.6	63	11	1	7	37	2.36	-0.85	0.60	13.5	10	13	3	12	nw.	W. E. Utterback.
Stockport	Van Buren	754	17	29.8	+ 4.7	63	11	3	7	37	1.64	-0.61	0.55	7.5	8	11	6	11	nw.	C. L. Beswick.
Thurman	Fremont	---	---	28.6	+ 5.5	57	11	- 4	28	33	3.26	+2.00	1.70	7.0	5	3	13	12	nw.	C. R. Paul.
Washington	Washington	769	37	29.0	+ 5.2	64	11	3	7	39	2.49	+1.18	0.83	12.0	10	8	9	11	nw.	Wm. A. Cook.
Winterset	Madison	1,129	28	27.8	+ 4.7	58	11	- 3	7	32	2.96	-1.93	1.36	7.5	6	11	8	9	nw.	H. S. Ely.
Omaha, Nebr.	---	1,040	48	27.8	+ 4.1	61	11	- 3	28	29	2.07	+1.31	1.09	8.5	11	4	11	13	nw.	U. S. Weather Bureau.
Means and extremes	---	---	---	28.8	+ 5.2	65	11	-11	28	45	2.40	+1.05	2.10	9.2	7	10	6	12	nw.	---
State means and extremes	---	---	---	24.9	+ 4.4	65	11	-16	9	45	2.42	+1.27	2.10	9.9	8	11	5	12	nw.	---

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means. Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc. †Also other dates. ‡Received too late to be included in means and summaries. T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).				Wind.				Sunshine					
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.			Total movement	Average hourly velocity.	Maximum		Per cent of possible.					
						7 a. m.	Noon. †	7 p. m.			Miles.	From.		Date.	Departure from normal.			
Charles City	30.01	30.48	19	29.09	13	90	80	84	59	12.5	694	8.5	26	s.	10	46	-16	
Davenport	29.99	30.55	19	28.97	13	88	70	76	44	11	6,126	9.1	34	w.	28	46	-9	
Des Moines	29.98	30.47	8	28.97	13	86	71	74	52	11.5	897	9.8	35	nw.	28	46	-10	
Dubuque	30.01	30.61	19	29.08	13	87	72	75	44	10.5	623	7.5	24	ne.	13	52	-1	
Keokuk	30.00	30.53	19	28.97	13	82	70	73	50	---	6,130	9.1	43	w.	28	58	+ 8	
Sioux City	30.01	30.52	8	29.18	13	87	79	78	56	---	9,042	13.5	41	nw.	28	57	+ 1	
Omaha, Neb.	29.98	30.50	8	28.96	13	84	72	71	45	11	7,405	11.0	40	nw.	14	50	- 7	
Means and extremes	30.00	---	---	---	---	86	73	76	---	---	---	9.6	---	---	---	51	- 5	
Normals and records	30.10	---	21st 1918	---	28th 1884	---	76	---	22†	---	---	9.3	---	---	4th 1880	---	56	---
	---	331.07	1918	28.69	1902	---	---	---	---	---	---	---	809	nw.	1917	---	---	---

§Sioux City. *Davenport. †Des Moines. ‡Local mean time. †And other dates.

THE WINTER OF 1918-19.

The mean temperature for the three winter months was 28.1°, which is 7.3° above the normal for the State, and 2.1° warmer than the warmest of the 29 winters of record, 1907-8. The highest temperature reported was 68° at Columbus Junction, Louisa County, on December 8. The lowest temperature reported was 32° below zero at Maquoketa, Jackson County, on January 4.

The average monthly precipitation for the State was 1.32 inches, and the average total precipitation was 3.95 inches, or 0.53 inch more than the winter normal. The average total snowfall, unmelted, was 17.9 inches, or 2.6 inches less than the normal and 6.0 inches less than the average fall for the winter of 1917-18.

The total number of days with .01 inch or more of precipitation was 18, or the same as the average for the winter of 1917-18. The average number of clear days was 40, partly cloudy, 18, cloudy, 32, as compared with 37 clear, 24 partly cloudy and 29 cloudy days during the winter of 1917-18.

Daily Precipitation for February, 1919

Stations.	Watersheds.	Day of Month.																												Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
<i>Northern Division</i>																														
Algona	Des Moines	.41	.60	.05	.19								.69	.04							.03			.05		.02	.05	.13		
Allison	Cedar	.05	.05	.30	.20					.10			1.41	.10	T.						.20	T.		.25	.40	T.	.31			
Alta	Raccoon	.05	.65	.25	.15								1.00	.05							.10				.04	.06		.35		
Alta (near)	Raccoon	.57	.22	.03									1.00	.05							T.				.04			.91		
Alton	Floyd	.41	.20	.10								T.	.30	.20							.02					.10	.10	.43		
Belmond	Iowa	.37	.48	.28	.10							.12	.90	.05	.01	T.					.15			.30	.20	.05	.02	.03		
Britt	Iowa	.27	.21	.09	.01							T.	.62	.01	T.						.04			.22	.01	.05	T.	.67		
Charles City	Cedar	.14	.35	.07									.95	.10							.11	.01		.38	.13	.06	.26	.56		
Decorah	Mississippi	.15	T.										.35	.02							.03	.02		.17	.07	.48	.18	.47		
Estherville	Des Moines	.75	.10	.10	.05								.60	.02							.15			.25	.05	.05	.05	.210		
Fayette	Mississippi	T.	.27		.05								1.15	.12							.24	.03	.04	.20	.11	.17	.28	.66		
Forest City	Cedar	.35	.40	T.	.10								1.00	T.	T.						T.	.10		.35	.20	T.	.30	.80		
Humboldt	Des Moines	.27	.50	.10									.65	T.							.60			.15	.10	.05	.22	.42		
Inwood	Big Sioux	.47	.18	.05	.07								.30	.05	.05						T.	.05		.10	.10	.10	.15	.47		
Lansing	Mississippi	.05	.05	.05									.10	.30	.02							.02	.02	.23	.06	.06	.24	.09		
LeMars	Floyd	.38	.28	.02									.84	.15							T.	.06		T.	.02	T.	.20	.95		
Mason City	Cedar	.28	.40	.08	.04								.90								.01			.16	.22	.08	.27			
New Hampton	Wapsipinicon	.05	.20	T.	.05								1.04	.10							.10	.12	.26	.20	T.	.50	.212			
Nora Springs	Cedar	.45	1.08	.05	.05								1.46	.03							.05	T.	.50	.20	.20	.30	.42			
Northwood	Cedar	.25	.30	.10									1.30								T.		.40	.10	.10	.20	.275			
Pocahontas	Des Moines	.55	.45	.08	.02								.94	.21	T.		.04				.02	T.	.03	.02	.01	.02	.39			
Postville	Mississippi	.05	.15	.03									.66	.05	.02						.10	.10	.15	.15	.05	.60	.06			
Rock Rapids	Big Sioux	.07	.64	.13	.25								.32	.10							T.	T.	.05	T.	.07	.03	.18	.84		
Sanborn	Floyd	.95	.35	.20									.95	.40									.10	.05	.10	.05	.15			
Sibley	Big Sioux	1.00	.30	.20	.06							.60	.20	.10										.10	.20	.12	.88			
Sioux Center	Floyd	T.	.75	.20	T.								.65	.30							T.	.05		T.	.20	.10	.25			
Spencer	Little Sioux		.33	.25									1.10												.20	.50				
Storm Lake	Raccoon	.64	.21	.26	.07								1.02	.04							.02			T.	.07	.27	.33			
Washta	Little Sioux	.40	.30	.20	T.								1.10	.25							.25	T.		T.	.10	.20	.60			
Waverly	Cedar	.03	.12	.11									T.	1.20							.11	.05	.07	.19	.22	.20	.30			
West Bend	Des Moines		.58	.52	T.	.21							T.	.88			.04				T.			T.	.08	T.	.21			
<i>Central Division</i>																														
Ames	Skunk																													
Audubon	Nishnabotna																													
Baxter	Skunk	.07	.32		.06								.80	.03	T.						.3	.12	.04	T.		.12	.86			
Belle Plaine	Iowa		.10	.01	.12								1.17	.22							.4	.28	.04	T.		.46	.80			
Boone	Des Moines	.22	.15	T.	.12								1.17	.40	.05	T.					.15	T.	.12	.08	.07	.53				
Carroll	Raccoon	.36	.20		.15								1.14	.15							.2		.05			.25				
Cedar Rapids	Cedar	T.	T.	T.	.10							.38	.63	.27	T.						.25	.15	T.		.35	.13				
Clinton	Mississippi		.01	.02									.82	.36	.01	.01					.36	.66	.10	.04	.01	.0	.34			
Davenport	Mississippi	T.	T.	T.	.03							.09	.93	.28	T.						.51	T.	.04	.03	T.	T.	.20			
Delaware	Mississippi		.11										.89	.21							.05	.12	.29	.05		.58	.28			
Denison	Missouri																													
Des Moines	Des Moines	T.	.55	T.	.25							.05	1.05	.02	.04						.58	.12	.04	.02	.02	.26	.00			
Dubuque	Mississippi	T.	.07	.01	.02							T.	1.21	.23							.38	.12	.16	.09	T.	.53	.87			
Fort Dodge	Des Moines	.55	.10	.10	.10	T.							1.25	.15	T.						.05	T.	.05	.05	.08	.05	.58			
Grinnell	Iowa	T.	.16		.10								1.00	.15							.50	.10	.05	T.		.40	.46			
Grundy Center	Cedar	.14	.25	T.	.30								1.10	.20							.10		T.	.20	.10	T.	.230			
Guthrie Center	Raccoon	.18	.32		.17								1.45	.18							.52		.05	.02		.03	.02			
Harlan	Nishnabotna	.40	.30		.10								1.40	.20							.40					.80				
Independence	Wapsipinicon	T.	.14	T.	.04								.94	.01	T.						.04	T.	.28	.03		.36	.88			
Iowa City	Iowa	T.	.03	T.	.04								1.16	.56	T.						.26	T.	.25	.06	T.	.27	.63			
Iowa Falls	Iowa	.12	.46	.03	.25								1.12	.05	.02						.10	.05	.20	.20	.20	.25	.85			
Jefferson	Raccoon	.12	.08	T.	.10								.92	T.	.10						.24		.36	T.	T.	.10	.02			
LeClaire	Mississippi		T.		.04	T.							.40	.76	.10						.40	.40	.03	.01		.25	.99			
Little Sioux	Little Sioux	.41	.05	.05									1.67	.20							.04		.16			.10	.62			
Logan	Missouri	.38	.08										1.30	.15							.20						.11			
Maquoketa	Maquoketa	T.	T.	T.	.05								1.10	.21	.02	.01					.12	.05	.02	.04		.62	.24			
Marshalltown	Iowa	.04	.20		.08								.75	.07							.16	.08	.03	.02		.18	.61			
Monroe	Skunk	.14	.17		.11								1.11	.04							.41	T.	.02	T.	T.	.38	.28			
Muscataine	Mississippi		T.	.03	.04	T.							.46	.95	.10						.34	.07		T.	T.	.10	.29			
Olin	Wapsipinicon				.20								.55	.60							.80	.30	T.	T.		.75	.30			
Onawa	Missouri	.54	.05		.30								1.07	.30							.05			T.		.20	.51			
Perry	Raccoon	.17	.42		.15								.92	.24	.06						.45	T.	T.	T.		.10	.21			
Rockwell City	Raccoon	.15	.70	T.	.10								.60	.38	T.						.15		.07	.03		.19	.37			
Sac City	Raccoon	.50	.50	.20	.10								1.00	.20							.05		.20	T.	T.	.10	.25			
Sioux City	Missouri	.01	.67	.18	.10	.04			T.	T.			1.38	.12							T.	T.	.01	T.	T.	.20	.61			
Tipton	Cedar	T.	.70										1.25	.62							.40	.03	T.	T.		.10	.10			
Toledo	Iowa	T.	.14	T.	.10								1.00	.15							.35	.12	.06	T.		.10	.10			
Waterloo	Cedar	.02	T.		.25								1.20	.12							.20	.65	.07	.10	.07	.40	.48			
Waukegan	Raccoon	.20	.40		.08								1.21	.31	.01						.68	.08	.08	T.	T.	.06	.31			
Webster City	Des Moines	.45	.32	T.	.20								.82	T.							1.00		1.00	.10		.30				
Whitten	Iowa	T.	.60	T.	.15								1.09	T.							.20	T.	T.	.10		.10	.24			
Williamsburg	Iowa		.07		.05								1.07	.42	.02	T.					.30	.62	.13	.09	.0	.20	.48			

Daily Precipitation for February, 1919—Continued.

Stations.	Watersheds.	Day of Month.																												Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28			
<i>Southern Division</i>																																
Afton	Grand		.10	.50			.10								T.	1.10	.20	.10						.55	.10		T.			.20	2.95	
Albia	Des Moines			.05			T.							.78	.28							.57		T.		T.			.42	2.10		
Allerton	Chariton	T.		.05			.10				T.			1.00	T.							.35		.10					.18	1.78		
Atlantic	Nishnabotna	T.	.27	.52			.03					.03		1.03	.10							.36		.01				.01		.05	2.46	
Bedford	Missouri	T.	.05	.48										1.13	.45							.46		.05		T.			.05	2.72		
Bloomfield	Mississippi			.11			.40							.74	.45							.35		.45		.24			.30	3.04		
Bonaparte	Des Moines		T.	T.			.09						.55	.12	T.							.32		.09		T.			.10	1.32		
Burlington	Mississippi						.10						.44	.35	.03							.75		.60	T.		T.		.22	2.49		
Centerville	Chariton		T.	T.			.04						.74	.20	T.							.33		.09					.25	1.65		
Chariton	Chariton			.10			T.						1.10	T.	T.							.66							.34	2.20		
Clarinda	Nodaway		.09	.39			T.						1.62	.42	.03							.35		T.					.10	3.00		
Columbus Jet	Iowa		T.	T.			.07						1.00	.40	.08							.53		.08		T.	T.	T.	.13	2.29		
Corning	Nodaway		T.	T.	.36								1.25	.44								.30		T.		T.			.05	2.40		
Corydon	Chariton		T.	T.	.05		.05						1.16	.02	T.							.39		.10		T.			.50	2.37		
Creston	Missouri		.02	T.	T.	.30	.15						1.30	.30	T.							.30		.05					.05	2.47		
Cumberland	Nodaway		.15		.10								.85	.50								.40								2.00		
Earlham	Des Moines			.31	.30		.18						1.00	.27	T.							.63		.04		T.		T.	T.	.09	2.82	
Fairfield	Skunk			T.			.20						.70	1.12	T.							.35		.20					.35	2.92		
Glenwood	Missouri		T.	.10	.25								2.10	.02	.08							.80		T.		T.			.02	3.37		
Greenfield	Nodaway			T.	.25		.10						.35	.20								.60								T.	1.50	
Indianola	Des Moines			.01	.20								.88	.03	.05							.40		.08		T.		T.	T.	.10	1.75	
Keokuk	Mississippi		T.	T.			.03						.67	.27	.02							.33		.10			.04	.02		.09	1.57	
Keosauqua	Des Moines		T.	T.			.10	T.					.75	.35	.03							.24		.10			.01			.08	1.66	
Knoxville	Des Moines		.10	.10			.10						.85	.25								.38		1.30		T.				.35	3.43	
Laona	Des Moines		.01	.42			.10							.10								.48								.62	1.73	
Lamoni	Grand		T.	.58			T.						1.00	.40								.11		.04					.56	2.69		
Lenox	Missouri			.25			T.						1.20	.50	.05							.25		.08					.05	2.33		
Mt. Ayr	Grand		T.	.05	.30		T.						.99	.35	.02							.30		.08		T.			.30	2.39		
Mt. Pleasant	Skunk			.06			.07						.55	.62	.05							.45		.08					.12	2.00		
Murray	Grand		.04	.28			.02						.93	.32	T.							.45		.09		T.		T.		.21	3.34	
Northboro	Tarkio																															
Oakland	Nishnabotna		.32	.25			T.						1.42	T.	.10							.30		T.						T.	.39	
Oskaloosa	Des Moines			.12			T.	.04			T.			.79	.72	.12						.55		.30			.06		T.	T.	.39	3.09
Ottumwa	Des Moines		T.				.03						.40	.19	.08	T.						1.60		.12						.94	3.31	
Pella	Skunk		T.	T.			T.	.10			T.			.22	.05	.05						.64		.11		T.	T.	T.		.35	1.52	
St. Charles	Des Moines			.40	T.		.30						1.02	.35	T.							.60		.10						.40	3.17	
Shenandoah	Nishnabotna			.25									1.81	.10	T.							.26								T.	2.42	
Sigourney	Skunk		T.	.03			T.	.05			T.		.60	.36	.05							.46		.20			.03	.01	T.	.57	2.36	
Stockport	Skunk			.03			.10						.55	.18	.13							.40		.20						.05	1.64	
Thurman	Missouri		T.	T.	.60			T.				.04	1.70	.20	T.							.72								T.		
Washington	Skunk		.09				.07						.69	.83								.45		.02	.16		.04		.01	.13	2.49	
Winterset	Des Moines		.15	.27	.05								1.36	.46	T.							.67				T.				T.	2.96	
Omaha, Nebr.	Missouri		.02	.12	.10	T.	T.			T.	T.		.30	.85	.06	.01						.50		.05		T.		T.	.05	.01	2.07	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.
 |||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 *Precipitation included in the next following measurement.
 **Incomplete.

ERRATA.

Report for January, 1919: Page 5; Charles City, low barometer published 29.73 inches on 17th, should be 29.70 inches on 24th; mean humidity 7:00 p. m. published 81 per cent should be 82 per cent. Knoxville, total precipitation published 0.13 inch should be 0.23 inch; precipitation departure published —1.07 inches, should be —0.97 inch; total snowfall published 1.3 inches, should be 2.3 inches. Page 7; Knoxville, precipitation on 1st should be 0.10 inch and the total should be 0.23 inch.

LATE REPORT.

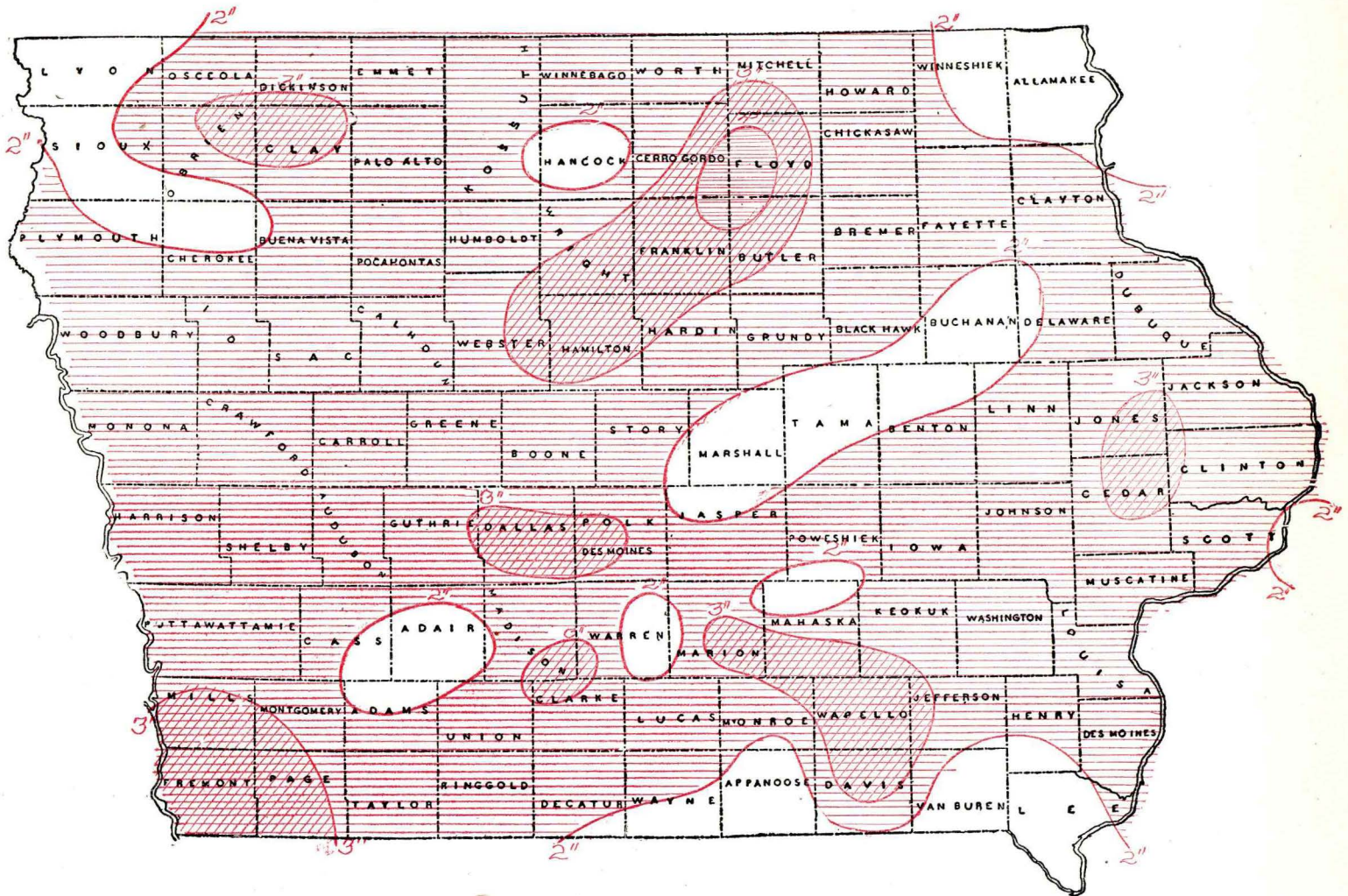
Greenfield: December, 1918; mean temperature, 35.0°; departure of mean from normal, +10.0°; highest temperature, 60° on the 8th; lowest temperature, 1° on the 24th; greatest daily range in temperature, 22°; total precipitation, 1.08 inches; departure from the normal, —0.10 inch; greatest in 24 hours, 0.38 inch; total snowfall, 6.0 inches; number of days with .01 inch or more of precipitation, 4; prevailing wind direction, southwest.

Daily Maximum and Minimum Temperatures for the Month of February, 1919.

Table with columns for Stations, days 1-28, and Mean. Rows are grouped by division: Northern Division (Algona, Alta, Alton, Belmont, Charles City, Decorah, Forest City, Inwood, LeMars, Mason City, New Hampton, Northwood, Pocahontas, Postville, Sibley), Central Division (Belle Plaine, Carroll, Davenport, Des Moines, Dubuque, Fort Dodge, Grinnell, Guthrie Center, Independence, Iowa City, Iowa Falls, Little Sioux, Marshalltown, Sac City, Sioux City), and Southern Division (Albia, Allerton, Atlantic, Bedford, Bloomfield, Burlington, Columbus Jet, Corning, Fairfield, Keokuk, Northboro, Pella, Sigourney, Thurman, Omaha, Nebr.). Each station entry includes maximum and minimum temperatures for each day and a monthly mean.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record. §§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

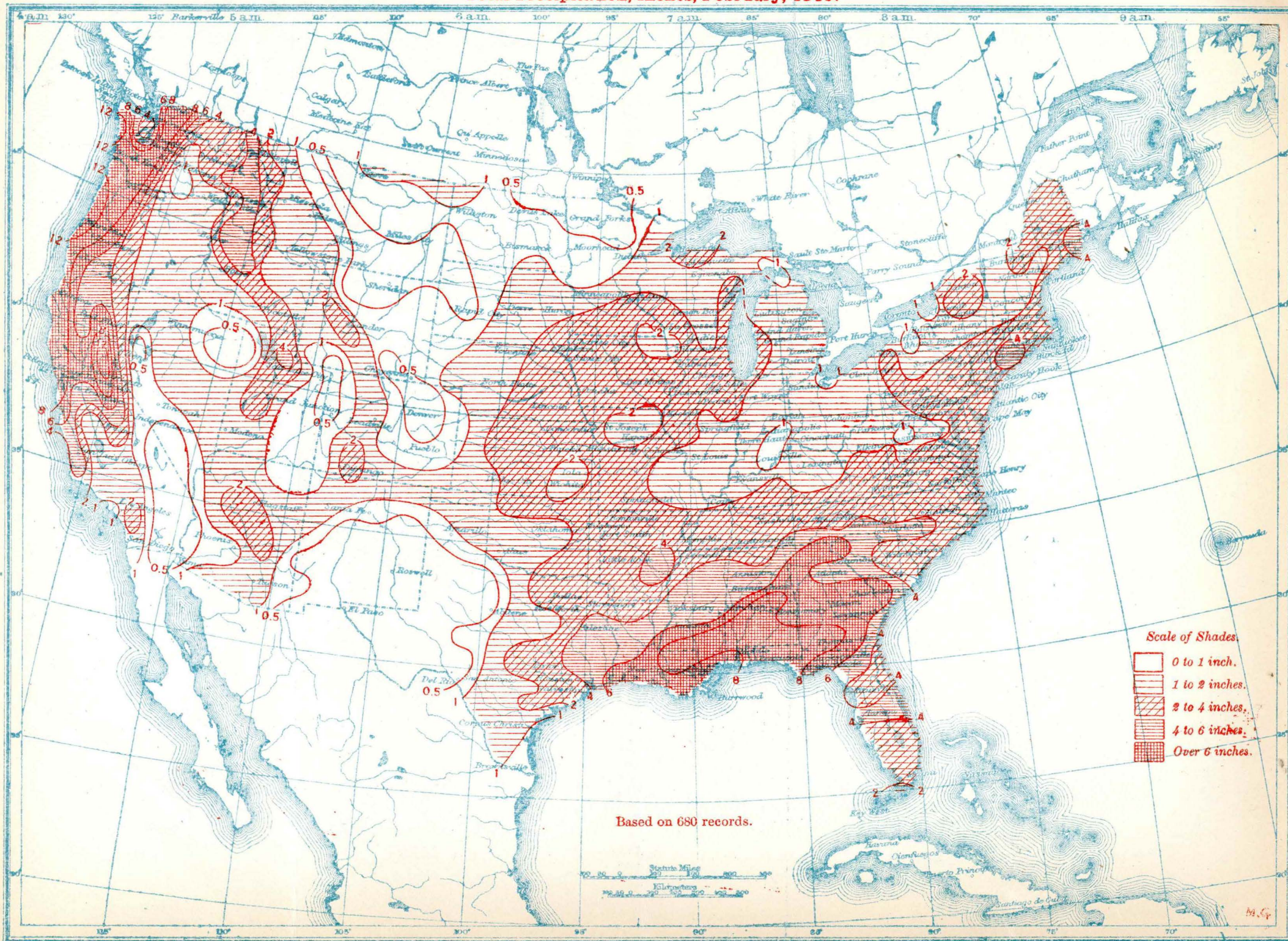
TOTAL PRECIPITATION, FEBRUARY, 1919.



SCALE OF SHADES—IN INCHES



Total Precipitation, Inches, February, 1919.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

MARCH, 1919

BY
CHARLES D. REED
METEOROLOGIST

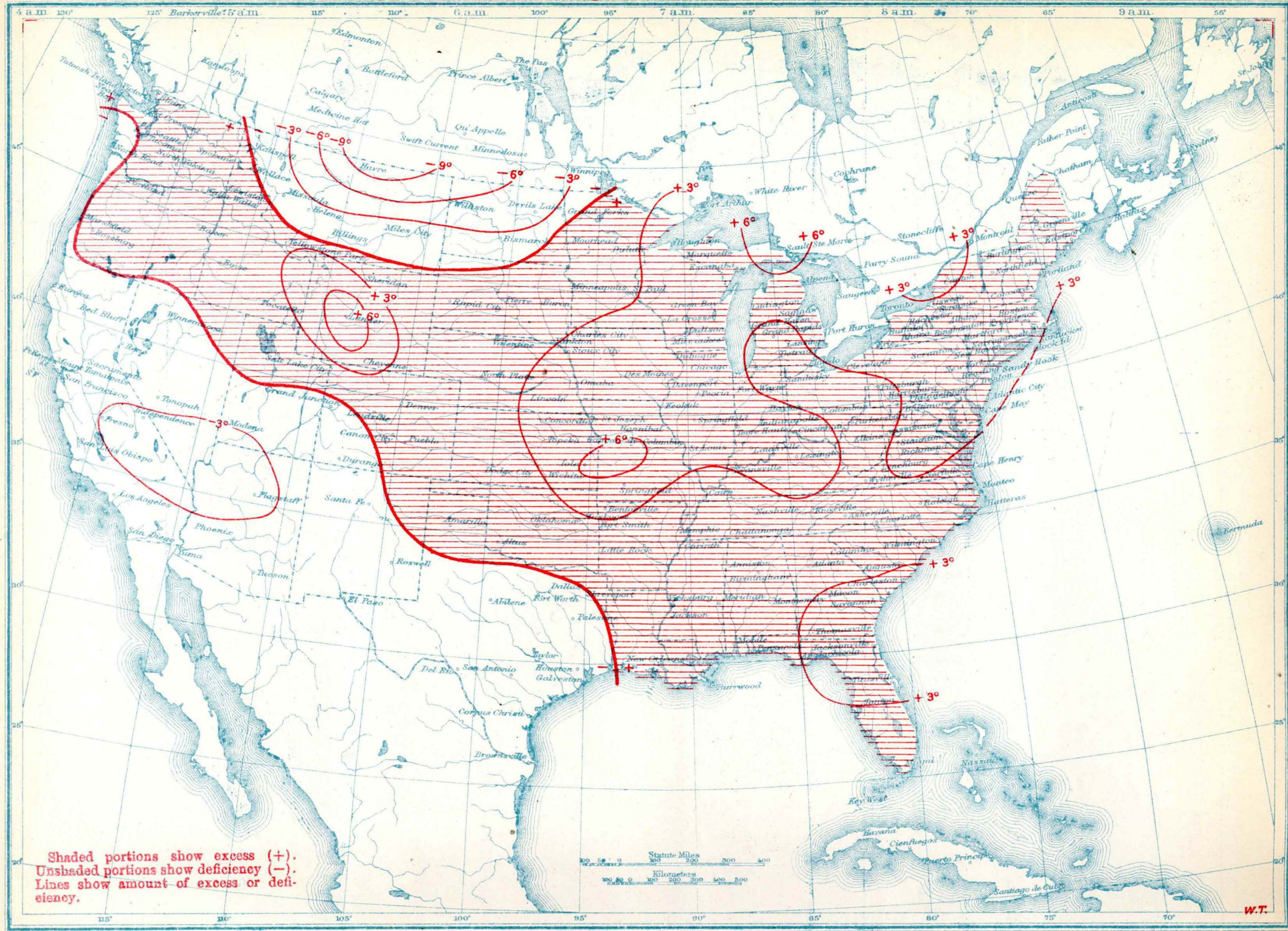


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

6.

Departure of the Mean Temperature from the Normal, March, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, MARCH, 1919 No. 3

GENERAL SUMMARY.

March came in with a cold wave and temperatures of zero or lower at nearly all stations, but temperatures were generally above normal after the 10th, and the mean temperature was above normal at all stations, the greatest excess being about 6° from southern Harrison County southeast to Page County. The mean temperature, December to March, inclusive, was 30.4°, or 6.5° higher than the normal and 1.4° warmer than the warmest similar period heretofore (1907-8) in 29 years. The ground was not frozen deeply at any time and plowing was done at intervals in each of the winter months.

Snow occurred at most stations on the 4th or 6th-7th and heavy rains 14th-16th. The total precipitation was slightly below the normal from the middle-western counties northeast to the north-central counties; also in the extreme northeast and southeast. An excess of over 2 inches occurred in Polk, Warren, and the southern portions of Marion and Mahaska Counties.

The ground was snow-covered in nearly all portions of the State during the prevalence of zero temperatures at the beginning of the month. In the Big Sioux Valley and east through the northern two tiers of counties and from Polk and Warren Counties northeast to the Mississippi River the snow covering continued from 7 to 10 days.

The soil was more than usually moist throughout the winter, but dried rapidly after March 16. Seeding was half finished at the close of the month and beginning in the central counties. Winter wheat never looked better. Rye, grasses, clover, alfalfa and fruits were in very good condition. Very little winter-killing was reported.

About 6 p. m. of the 15th a tornado occurred at Toronto, Iowa, causing damage to buildings estimated at \$2,000. About 3:30 p. m. of that date a small tornado moved from southwest to northeast between Des Moines and Fort Des Moines, damaging residences, barns and out-buildings about \$3,000.

Sleet globules falling at Oskaloosa on the morning of the 4th had a pinkish tint due to dust particles washed from the air by the raindrops before they became frozen. Microscopic examination of the dust indicated that it was of Rocky Mountain origin, having been transported by a large general storm that passed eastward over the State on the 3d-4th.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.17 inches. The highest recorded was 30.80 inches, at Charles City, on the 21st; and the lowest was 29.47 inches, at Sioux City, on the 14th. The monthly range was 1.33 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 103 stations, was 37.5°, or 4.2° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 34.7°, or 4.3° higher than the normal; Central, 37.6°; or 4.0° higher than the normal; Southern, 40.2°, or 4.3° higher than the normal. The highest monthly mean was 43.0°, at Keokuk, and the lowest monthly mean was 30.6°, at Sibley. The highest temperature reported was 78°, at Thurman, on the 19th. The lowest temperature reported was -11°, at Inwood on the 1st.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 83 per cent, and at 7 p. m. it was 68 per cent. The mean for the month was 76 per cent, or about 2 per cent higher than the normal. The highest monthly mean was 80 per cent, at Charles City, and the lowest was 71 at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 109 stations, was 2.33 inches, or 0.56 inch more than the normal. By divisions the averages were as follows: Northern, 1.58 inches, or 0.05 inch more than the normal; Central, 2.44 inches, or 0.57 inch more than the normal; Southern, 2.98 inches, or 1.06 inches more than the normal. The greatest amount, 5.40 inches, occurred at Lacona, and the least, 0.81 inch at Spencer. The greatest amount in any 24 consecutive hours, 3.50 inches, occurred at Muscatine on the 16th.

SNOW.

The average snowfall for the State was 1.1 inches, or 4.2 inches less than the normal. The greatest amount, 5.5 inches occurred at Rock Rapids. Fourteen stations reported no snow, and 20 stations reported only a trace.

WIND.

The prevailing direction of the wind was from the southeast. The highest velocity reported from a regular Weather Bureau station was at the rate of 45 miles an hour from the southeast, this occurring at Sioux City on the 14th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 60, or about 2 per cent higher than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 51; Davenport, 54; Des Moines, 62; Dubuque 63; Keokuk, 67; Sioux City, 60; Omaha, Nebr., 62.

COMPARATIVE DATA FOR THE STATE—MARCH.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre-.01 in. or more	Clear	Partly cloudy	Cloudy
1890.....	28.0	- 5.3	75	-24	1.57	-0.20	3.67	0.32	-----	-----	-----	-----	-----
1891.....	26.8	- 6.5	66	-19	2.60	+0.83	4.58	1.33	-----	10	6	8	17
1892.....	31.9	- 1.4	84	- 6	2.22	+0.45	4.58	0.57	3.9	6	11	8	12
1893.....	31.8	- 1.5	84	- 8	2.14	+0.37	4.40	0.64	4.0	8	9	11	11
1894.....	41.0	+ 7.7	84	- 5	2.03	+0.26	4.52	0.26	2.7	6	13	10	8
1895.....	34.4	+ 1.1	94	-11	0.83	-0.94	2.60	0.22	2.9	4	16	8	7
1896.....	30.9	- 2.4	81	-12	1.10	-0.67	3.99	0.16	5.4	5	12	9	10
1897.....	32.0	- 1.3	72	-22	2.39	+0.62	6.16	0.29	5.5	8	9	8	14
1898.....	37.5	+ 4.2	72	- 2	1.94	+0.17	6.21	0.33	3.7	6	12	9	10
1899.....	33.0	-10.3	75	-16	1.62	-0.15	5.90	0.37	8.0	6	7	12	12
1900.....	30.7	- 2.6	81	-13	2.06	+0.29	5.15	0.45	6.6	5	12	9	10
1901.....	34.2	+ 0.9	76	- 8	2.64	+0.87	5.25	0.70	12.6	7	10	8	13
1902.....	39.1	+ 5.8	79	-12	1.45	-0.32	4.33	0.13	1.3	7	9	11	11
1903.....	38.8	+ 5.5	82	- 6	1.88	-0.39	3.90	0.15	3.9	7	11	7	13
1904.....	34.8	+ 1.5	78	- 3	2.18	+0.41	4.57	0.50	4.4	7	8	8	15
1905.....	41.5	+ 8.2	84	- 1	2.04	+0.27	3.70	0.89	4.1	7	8	8	15
1906.....	27.1	- 6.2	65	-14	2.34	+0.57	4.55	0.58	8.9	10	8	7	16
1907.....	40.6	+ 7.3	92	- 7	1.35	-0.42	5.05	0.23	4.1	6	14	7	10
1908.....	37.9	+ 4.6	85	- 8	1.58	-0.19	3.74	0.45	1.1	6	13	7	11
1909.....	32.5	- 0.8	71	-15	1.53	-0.24	5.00	0.28	9.8	6	12	10	9
1910.....	48.9	+15.6	92	-10	0.17	-1.60	1.32	0.00	T.	1	23	6	2
1911.....	39.4	+ 6.1	83	- 2	0.93	-0.84	4.84	T.	1.9	5	16	9	6
1912.....	24.9	- 8.4	70	-19	2.01	+0.24	5.25	0.60	19.1	7	15	6	10
1913.....	31.9	- 1.4	78	-23	2.48	+0.71	5.88	0.74	5.3	9	11	10	11
1914.....	34.7	+ 1.4	78	- 5	1.69	-0.08	3.84	0.28	1.8	7	12	8	11
1915.....	29.3	- 4.0	61	- 5	0.96	-0.81	2.12	0.17	8.8	5	8	9	14
1916.....	35.2	+ 1.9	80	-18	1.57	-0.20	5.80	0.23	2.9	6	11	9	11
1917.....	34.6	+ 1.3	85	-12	1.84	+0.07	4.35	0.57	6.2	6	14	8	9
1918.....	42.9	+ 9.6	85	- 0	0.63	-1.14	2.12	0.03	2.6	3	19	7	5
1919.....	37.5	+ 4.2	78	-11	2.33	+0.56	5.40	0.81	1.1	6	15	8	8

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

Climatological Data for March, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days.			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
<i>Northern Division</i>																				
Algona	Kossuth	1,213	46	35.4	+ 4.8	71	29	- 4	2	35	0.99	-0.50	0.60	0.5	4	18	5	8	sw.	W. E. Laird.
Allison	Butler	1,045	7	35.4	-----	71	29	- 5	1	37	1.82	-----	1.20	0.0	4	14	12	5	se.	J. A. Bell.
Alta	Buena Vista	1,513	28	35.3	+ 5.2	72	29	- 5	1	36	1.39	-0.13	0.56	1.5	6	13	11	7	se.	David F. Hadden.
Alta (near)	Buena Vista	23	23	-----	-----	-----	-----	-----	-----	-----	1.13	-0.24	0.50	0.5	6	6	-----	-----	Warren Minard.	
Alton	Sioux	1,305	14	35.6	+ 4.3	70	29	- 6	1	35	1.34	-----	0.52	2.5	6	10	15	6	nw.	W. S. Slagle.
Belmond	Wright	1,205	9	35.5	-----	70	29	- 4	1	35	1.26	-----	0.60	1.9	9	8	17	6	s.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	34.0	+ 3.9	72	29	- 6	1	38	1.05	-0.31	0.66	0.6	6	12	11	8	s.	L. M. Goodman.
Charles City	Floyd	1,015	28	34.2	+ 5.8	69	29	- 6	1	32	2.48	+0.56	1.83	0.2	8	8	14	9	n.	U. S. Weather Bureau.
Decorah	Winnebago	875	26	34.2	+ 4.0	67	29	- 5	1	38	2.00	+0.20	1.00	0.0	3	20	5	6	s.	Wm. F. Baker.
Estherville†	Emmet	1,298	24	36.0 ^c	+ 7.4	69	29	- 15 ^f	8	34 ^f	1.10	-0.19	0.40	1.5	5	22	4	5	s.	A. O. Peterson.
Fayette	Fayette	1,063	29	35.2	+ 4.6	70	29	- 4	1	37	2.92	+0.88	1.93	4.0	7	16	8	7	se.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	34.3 ^a	+ 5.4	72 ^a	29	- 7 ^a	1	38 ^b	1.22	-0.22	0.90	T.	4	17	4	10	s.	Eugene Secor.
Humboldt	Humboldt	1,095	31	37.1	+ 4.8	75	29	- 2	1	39	0.97	-0.50	0.63	0.3	5	14	8	9	s.	H. C. Snitkey.
Inwood	Lyon	1,474	15	33.8 ^a	+ 3.2	72 ^a	29	- 11 ^a	1	34 ^a	1.34	+0.33	0.65	3.4	7	21	5	5	s.	F. B. Hanson.
Lansing	Allamakee	632	13	-----	-----	-----	-----	-----	-----	-----	1.72	-0.31	1.34	T.	7	-----	-----	-----	Chas. R. Serene.	
LeMars	Plymouth	1,224	23	35.9	+ 3.8	72	29	- 3	2	35	1.16	-0.05	0.51	0.5	6	13	8	10	se.	G. A. C. Clarke.
Mason City	Cerro Gordo	1,148	22	34.3	+ 4.2	70	29	- 7	1	37	1.32	-0.08	0.84	0.0	6	16	11	4	se.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	34.6	+ 5.0	68	29	- 8	1	33	3.03	+1.10	2.40	.0	3	19	7	5	se.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	36.4	-----	73	29	- 4	1	36	2.12	-----	0.83	0.2	6	13	11	7	se.	Arthur Betts.
Northwood	Worth	1,222	23	31.0 ^a	+ 1.6	66 ^a	29	- 9 ^a	1	50 ^b	2.00	+0.24	0.80	4.0	5	15	9	7	sw.	Chas. Dwell.
Pocahontas	Pocahontas	1,248	15	36.2	+ 5.2	75	29	- 3	1	41	1.31	+0.03	0.62	1.5	5	17	6	8	se.	F. E. Hronek.
Postville	Clayton	1,180	20	33.8	+ 3.2	64	29	- 9	1	36	2.32	+0.41	1.37	T.	4	11	13	7	se.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	33.8	+ 4.0	70	29	- 8	1	39	1.94	+0.88	0.83	5.5	8	22	5	4	nw.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	33.8	-----	70	29	- 7	1†	33	1.59	-----	0.68	3.0	6	21	5	5	se.	Jas. W. Dow.
Sibley	Osceola	1,212	26	30.6 ^f	+ 2.2	69 ^f	29	- 8 ^f	1	37 ^f	1.17	-0.01	0.55	2.5	8	-----	-----	-----	sw.	H. F. Olds.
Sioux Center	Sioux	1,426	20	34.4	+ 3.6	70	29	- 8	1	39	1.16	-0.10	0.66	5.0	4	18	4	9	s.	J. de Ruyter.
Spencer	Clay	1,319	5	34.4	-----	72	29	- 7	1	37	0.81	-----	0.51	-----	2	16	10	5	se.	E. W. Little.
Storm Lake	Buena Vista	1,440	30	36.0	+ 5.2	72	29	- 5	1	35	1.14	-0.18	0.45	T.	5	19	6	6	s.	Geo. H. Fracker.
Washata	Cherokee	1,157	21	36.4	+ 4.7	74	29	- 2	1†	41	0.96	+0.03	0.63	1.0	5	17	7	7	s.	H. L. Felter.
Waverly	Bremer	948	23	36.0	+ 4.5	72	29	- 5	1	37	2.46	+0.64	1.59	.0	3	-----	-----	-----	se.	H. Arnold.
West Bend	Palo Alto	1,197	26	35.6	+ 4.8	72	29	- 5	1†	39	1.23	-0.44	0.89	1.5	4	16	9	6	se.	Jos. Dorweiler.
Means and extremes				34.7	+ 4.3	75	29	- 11	1	50	1.58	+0.05	2.40	1.4	5	16	9	6	s.	
<i>Central Division</i>																				
Ames	Story	926	43	38.1	+ 4.1	71	29	0	1	36	1.95	+0.43	1.04	0.0	5	22	4	5	se.	Iowa State College.
Audubon	Audubon	1,301	25	-----	-----	-----	-----	-----	-----	-----	2.79	+0.83	1.22	0.4	7	9	13	9	se.	V. M. Jones.
Baxter	Jasper	998	19	37.6	+ 3.7	69	29	0	1	34	2.79	+0.83	1.22	0.4	7	9	13	9	se.	Rev. Paul Traeger.
Belle Plaine†	Benton	886	29	37.8	+ 4.5	70	29	- 4	1	33	3.37	+1.04	1.46	2.0	7	13	9	9	se.	O. C. Burrows.
Boone	Boone	1,134	14	37.6	+ 5.2	72	29	- 1	1	35	2.42	+0.89	1.72	0.5	4	18	7	6	sw.	Carl F. Henning.
Carroll	Carroll	1,265	29	37.9	+ 5.9	72	29	- 3	1	37	1.49	-0.37	0.68	0.5	4	20	4	7	se.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	38.6	+ 5.9	70	29	- 2	1	38	1.59	-0.37	1.20	2.1	4	10	8	13	s.	R. S. Toogood.
Clinton	Clinton	593	46	39.2	+ 4.4	71	29	1	1	33	3.70	+0.83	2.36	2.6	11	12	10	9	se.	H. Burde.
Davenport	Scott	530	48	40.0	+ 4.6	69	29	1	1	28	3.98	+1.77	3.01	T.	8	8	13	10	e.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	35.0	+ 3.8	67	29	- 8	1	42	2.35	+0.66	1.24	1.0	5	17	8	6	s.	Nattie E. Ball.
Denison	Crawford	1,180	25	38.4	+ 4.6	70	29	- 2	1	33	1.90	+0.30	1.16	2.4	5	19	5	7	s.	Emma Brogden.
Des Moines	Polk	861	40	33.8	+ 3.1	68	29	- 1	1	29	3.67	+2.02	2.88	3.3	8	9	12	10	e.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	36.6	+ 3.4	66	29	- 4	1	32	2.24	+0.03	1.49	3.0	7	11	9	11	s.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	35.2	+ 4.1	75	29	- 2	1	45	2.46	+0.73	1.33	0.2	4	16	6	9	se.	J. F. Monk.
Grinnell	Poweshiek	1,023	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	se.	D. W. Brainard.
Grundy Center	Grundy	976	28	38.4	+ 5.8	71	29	- 3	1	36	2.97	+1.16	1.80	.0	4	17	6	8	ne.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	38.2	+ 3.8	70	29	0	1	36	2.61	+1.02	1.30	0.6	7	19	7	5	sw.	C. T. Harney.
Harlan	Shelby	1,182	20	38.0	+ 4.2	70	29	0	1	36	1.93	+0.52	0.90	1.0	4	21	3	7	s.	E. L. Tilton.
Independence	Buchanan	921	55	37.0	+ 4.6	70	29	- 5	1	41	2.47	+0.72	1.36	T.	4	20	2	9	se.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	38.6	+ 5.4	70	29	- 2	1	31	2.65	+0.27	1.27	1.0	8	9	9	13	se.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	36.6	+ 6.0	72	29	- 4	1	36	2.27	+0.41	1.37	0.3	6	16	7	8	s.	J. B. Parmelee.
Jefferson	Greene	1,052	20	37.7	+ 3.8	72	29	- 2	1	37	1.81	-----	0.85	0.5	5	16	7	8	se.	Will I. Lyon.
LeClaire	Scott	576	19	-----	-----	-----	-----	-----	-----	-----	4.61	+2.28	2.90	1.1	10	-----	-----	-----	se.	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	38.2	+ 2.6	72	29	- 2	1	38	1.04	-----	0.40	T.	5	15	7	9	se.	Geo. H. Gibson.
Logan	Harrison	928	52	41.3	+ 6.1	72	29	- 3	1	34	1.23	-0.51	0.63	2.0	3	15	7	9	sw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	36.2 ^a	+ 1.5	66 ^a	29	- 4 ^a	1	44 ^a	2.50	+0.15	1.30	T.	6	-----	-----	-----	se.	Ira H. Stephens.
Marshalltown	Marshall	947	27	38.4	+ 6.0	71	29	- 2	1	38	2.00	+0.12	0.98	T.	5	22	0	9	se.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	37.4	-----	66 ^a	15	- 2	1	44 ^a	2.93	-----	1.38	0.0	6	21	3	7	s.	J. A. Dibel.
Muscatine	Muscatine	554	59	-----	-----	-----	-----	-----	-----	-----	4.18	+1.54	3.50	1.0	8	-----	-----	-----	se.	Wm. P. Molis.
Olin	Jones	760	21	38.4	+ 4.1	70	29	- 2	1	35	2.25	-0.08	1.35	2.0	3	16	10	5	e.	Dr. F. W. Port.
Onawa	Monona	1,051	19	38.0	-----	75	29	- 1	1	41	0.91	-0.76	0.27	4.0	5	15	7	9	se.	Mrs. H. E. Colby.
Perry	Dallas	975	18	37.6	+ 3.6	72	29	- 1	1	40	2.44	+0.46	1.30	0.0	5	-----	-----	-----	se.	Mrs. C.

Climatological Data for March, 1919—Continued.

Main climatological data table with columns for Stations, Counties, Elevation, Length of record, Temperature (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation (Total, Departure from normal, Greatest in 24 hours, Total snowfall, unmelting, Precipitation .01 in. or more), Number of Days (Clear, Partly cloudy, Cloudy), Prevailing direction of wind, and Observers.

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means. Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc. †Also other dates. ††Received too late to be included in means and summaries. T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Table with columns for Stations, Barometric Pressure (Mean, Highest, Date, Lowest), Relative Humidity (Mean, Date, Total movement, Average hourly velocity, Maximum), Wind (Miles, From, Date), Sunshine (Per cent of possible, Departure from normal), and records.

§Charles City. *Des Moines. †Sioux City. ‡Local mean time.

RIVERS.

Stages above normal prevailed in most of the interior rivers of the State during the winter, which was so mild that in the central and southern portions the rivers remained open much of the time and there was no well-defined spring breakup. Heavy rains, March 14-16, caused marked rises in all of the rivers. The smaller streams of the eastern part of the State overflowed and caused some damage by washouts and interfering with railway traffic. Three persons were drowned near Waukon, Allamakee County, while crossing what had been a dry run before the storm. The Des Moines River at Des Moines reached a crest stage of 8.4 feet, 8.6 feet below flood stage, on the 19th, but about 50 miles down stream where the drainage area received heavier rains the flood stage was reached. At Ottumwa it rose 8.8 feet to a crest stage of 13.2 feet, 3.2 feet above flood stage, on the 18th. Moderate crests passed down the boundary rivers between the 19th and 24th.

Daily Precipitation for March, 1919—Continued.

Stations.	Watersheds.	Day of Month.																															Totals			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
<i>Southern Division</i>																																				
Afton	Grand									T.																										2.75
Albia	Des Moines				T.					T.																										2.82
Allerton	Chariton																																			3.18
Atlantic	Nishnabotna				.02		.05			.15																										2.43
Bedford	Missouri						T.		.15																								T.		2.94	
Bloomfield	Mississippi				.10																														2.56	
Bonaparte	Des Moines																																			1.58
Burlington	Mississippi	T.																																		2.08
Centerville	Chariton				.21																															4.11
Chariton	Chariton																																	T.		3.28
Clarinda	Nodaway				T.		.03	.09																												3.63
Columbus Jct.	Iowa																																			3.19
Corning	Nodaway				.05		.20																													3.48
Corydon	Chariton				.01																															3.17
Creston	Missouri				.05			.10		.15																										3.44
Cumberland	Nodaway									.10																										1.98
Earlham	Des Moines				.11			.10																												3.10
Fairfield	Skunk																																			2.79
Glenwood	Missouri																																			1.87
Greenfield	Nodaway																																			2.68
Indianola	Des Moines				.05			.06																												3.70
Keokuk**	Mississippi				.08																															1.49
Keosauqua	Des Moines																																			1.89
Knoxville	Des Moines				T.																															3.84
Lacona	Des Moines				.07			.07																												5.40
Lamoni	Grand																																			4.14
Lenox	Missouri																																			3.12
Mt. Ayr	Grand																																			3.63
Mt. Pleasant	Skunk																																			2.29
Murray	Grand				.09			T.	.02																											3.44
Northboro	Tarkio																																			3.72
Oakland	Nishnabotna																																			1.56
Oskaloosa	Des Moines				.54			.04																												4.69
Ottumwa	Des Moines																																			2.53
Pella	Skunk				.15																															2.01
St. Charles	Des Moines																																			2.58
Shenandoah	Nishnabotna																																			3.14
Sigourney	Skunk				.06																															2.20
Stockport	Skunk																																			2.77
Thurman	Missouri																																			3.92
Washington	Skunk				.04																															3.18
Winterset	Des Moines				.01																															3.18
Dmaha, Nebr.**	Missouri																																			1.59

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 **Incomplete.
 *Precipitation included in the next following measurement.

MISCELLANEOUS PHENOMENA.

Aurora: 1st, 5th, 8th, 12th, 19th, 20th, 21st, 27th, 28th, 31st.

Birds: (migration of) Corydon, robins and bluebirds on the 10th; Earlham, bluebirds on the 9th, robins and meadow larks on the 13th, wild geese and ducks on the 13th; Murray, robins and blue birds on the 8th; Boone, robins on the 11th, blue birds on the 12th; Whitten, robins on the 10th; Nora Springs, robins and meadow larks on the 23d; Pocahontas, robins, meadow larks and wild ducks on the 13th and 14th; Postville, bluebirds on the 12th, robins on the 15th, black-birds, on the 16th; Sanborn, robins on the 15th.

Corona: 9th, 12th.

Dust: (red): 4th.

Fog: 8th, 9th, 13th, 14th, 15th, 20th, 25th, 30th.

Hail: 4th, 9th, 14th, 15th.

Halo: (lunar or solar): 6th.

Parhelia: 6th, 17th.

Sleet: 4th, 6th, 7th, 8th, 10th, 15th, 26th.

Thunderstorms: 4th, 14th, 15th, 16th, 25th, 29th, 30th.

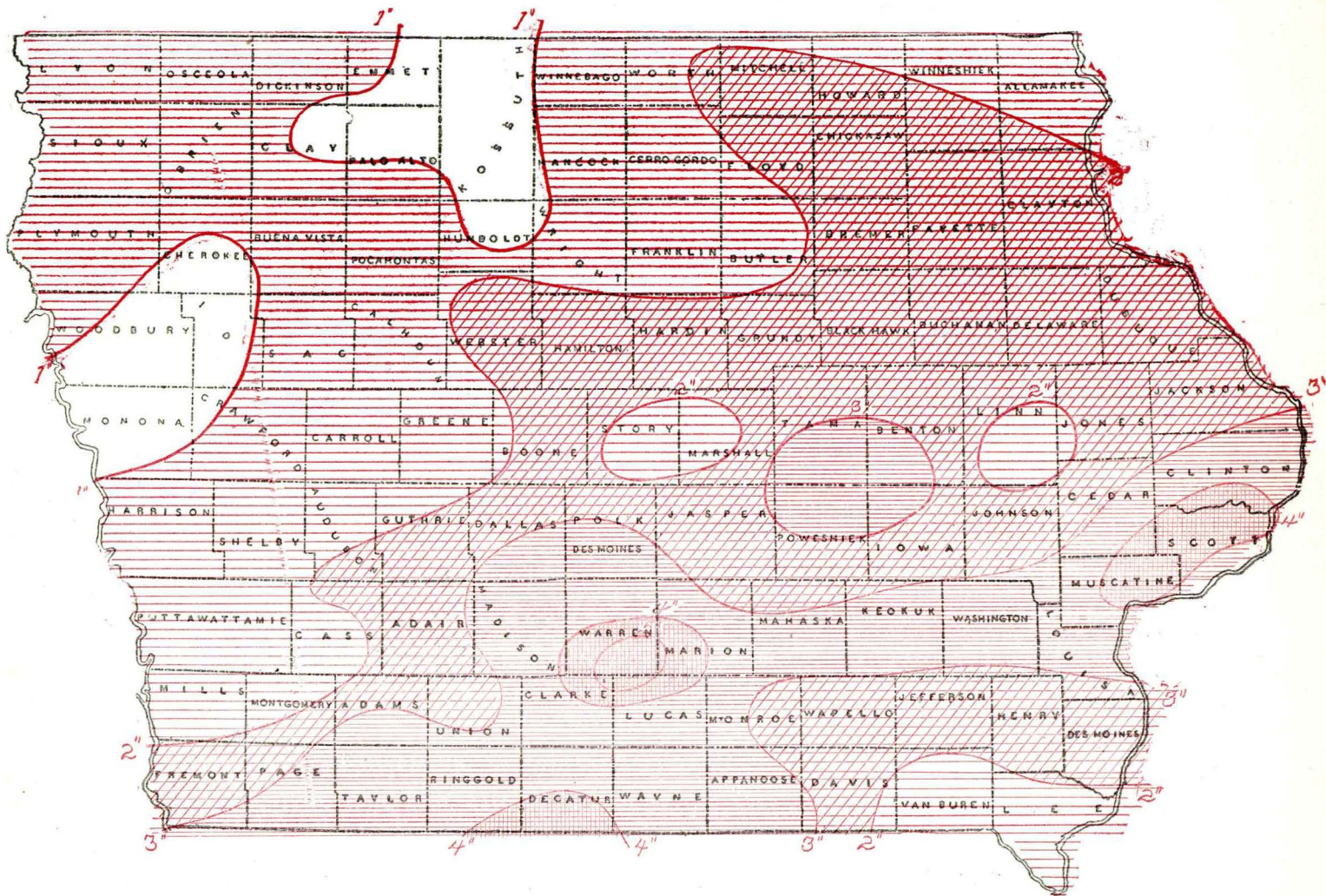
Tornadoes: 15th.

Daily Maximum and Minimum Temperatures for the Month of March, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by Northern Division, Central Division, and Southern Division, listing various Iowa cities and their daily temperature ranges.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record. §§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

TOTAL PRECIPITATION, MARCH, 1919.



SCALE OF SHADES—IN INCHES



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

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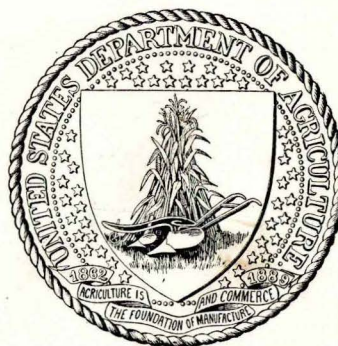
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

APRIL, 1919

BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

B

Departure of the Mean Temperature from the Normal, April, 1919.



Shaded portions show excess (+).
Unshaded portions show deficiency (-).
Lines show amount of excess or deficiency.

A.T.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, APRIL, 1919 No. 4

GENERAL SUMMARY.

For the State as a whole, April temperature was nearly normal, though deficiencies approximating 2° occurred from Union County northeast through Dallas to southern Hardin County and from Webster northeast to Worth, while excesses in the eastern portion were greatest (about 2 degrees) in Linn County. Temperatures, 5th-7th, the warmest period, were 10 to 18 degrees above normal, while during a cold period, 24th-26th, they were about as much below normal with readings low in the twenties and heavy to killing frosts in nearly all sections. Fortunately, nothing was far enough advanced to be seriously damaged except fruit in Scott and possibly some nearby counties.

Showers were frequent and heavy. The average number of rainy days, 14, exceeds the previous April record which was 12 in 1909; while the amount of precipitation has been exceeded only in 1896 and 1897. Rain fell some place in the State every day except the 25th. Downpours on the 23d damaged roads and railways and eroded and flooded fields in portions of Shelby, Audubon, Guthrie, Carroll and Greene Counties. Heavy rains occurred in many sections on the 7th and 9th. Precipitation was above normal in all but Lee and Des Moines Counties, the greatest excesses, 5 to nearly 7 inches, being in Adair and Cass counties.

A small tornado struck about two miles south of Grand-mound, Clinton County, on the afternoon of the 23d, but damage was confined to trees and small buildings. The Omaha tornado of the 6th seems to have done no material damage after crossing the Missouri river.

Field work was greatly delayed by the frequent rains and wet soil, not more than 5 or 6 days being suitable. Not more than 60 per cent of the intended oats acreage had been seeded up to the close of the month and much that was seeded before the heavy rains set in on the 7th lay uncovered on the ground and thus germinated without the possibility of disking or harrowing. Considerable of the pledged and intended spring wheat acreage could not be seeded and will be devoted to other crops, mostly corn. Winter wheat stood freely, made rank growth and was a foot high and beginning to joint in the southern counties. It was feared that the rank growth would cause it to lodge and that the indicated excess of straw would reduce the yield of grain. Pasturing and clipping with mowers was resorted to in some localities. Only about 40 per cent of the spring plowing was done and practically no corn planting. Blooming of fruit trees was beneficially retarded, though in the southern tier of counties the blossoms opened and received the first spray. The wet, cloudy weather was detrimental to the pig crop. Sunshine averaged 44 per cent of the possible amount or 16 per cent below normal.

PRESSURE.

The mean pressure, (reduced to sea level), for the State was 29.97 inches. The highest recorded was 30.66 inches, at Sioux City on the 24th, and the lowest was 29.23 inches at Omaha, Nebr., on the 6th. The monthly range was 1.43 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 103 stations, was 48.4°, or 0.3° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 46.5°, or 0.2° lower than normal; Central, 48.7° or 0.2° lower than the normal; Southern, 50.0°, or 0.6° lower than the normal. The highest monthly mean was 52.9° at Keokuk, and the lowest was 43.8°, at Northwood. The highest temperature reported was 81°, at Fairfield on the 6th, and the lowest was 20° at Fayette, Maquoketa and Earlham, on the 1st. The temperature range for the State was 61°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 81 per cent; and at 7 p. m. it was 66 per cent. The mean for the month was 74 per cent, or about 7 per cent above the normal. The highest monthly mean was 78 per cent at Omaha, Nebr., and the lowest was 68 per cent, at Dubuque.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 109 stations, was 4.78 inches, or 1.92 inches more than the normal. By divisions the averages were as follows: Northern, 4.32 inches, or 1.64 inches more than the normal; Central, 4.81 inches, or 1.95 inches more than the normal; Southern, 5.22 inches, or 2.17 inches more than the normal. The greatest amount, 9.00 inches, occurred at Cumberland, and the least, 1.94 inches, at Keokuk. The greatest amount in any 24 consecutive hours, 3.05 inches, occurred at Greenfield, on the 21st-22d.

SNOW.

The average snowfall for the State was 0.7 inch, or 1.1 inches less than the normal. The averages by divisions were: Northern, 1.6 inches; Central, 0.5 inches; Southern, a trace. The greatest amount, 9.0 inches, occurred at Sioux Center.

COMPARATIVE DATA FOR THE STATE—APRIL.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With prec. .01 in. or more	Clear	Partly cloudy	Cloudy
1890.....	51.8	+3.1	88	2	1.80	-1.06	4.46	0.38	-----	6	14	9	7
1891.....	50.6	+1.9	93	13	2.15	-0.71	5.06	0.59	-----	8	14	7	9
1892.....	45.4	-3.3	88	14	4.75	+1.89	8.38	2.43	5.7	9	8	9	13
1893.....	45.5	-3.2	96	15	4.21	+1.35	8.51	1.24	6.0	10	8	9	13
1894.....	51.7	+3.0	93	12	3.07	+0.21	6.91	0.55	0.2	9	11	11	8
1895.....	54.2	+5.5	98	8	2.62	-0.24	5.88	0.28	2.1	5	14	8	8
1896.....	54.5	+5.8	94	10	5.02	+2.16	9.67	2.35	4.5	11	11	10	9
1897.....	47.9	-0.8	89	19	5.35	+2.49	9.86	2.22	T.	11	9	9	12
1898.....	48.1	-0.6	91	14	2.56	-0.30	4.82	0.27	T.	8	13	9	8
1899.....	48.9	+0.2	89	1	2.40	-0.46	5.76	0.56	2.0	7	12	11	7
1900.....	52.2	+3.5	89	19	2.67	-0.20	6.62	0.43	0.9	6	12	9	9
1901.....	49.9	+1.2	92	15	1.79	-1.07	3.47	0.66	2.0	5	14	8	8
1902.....	48.2	-0.5	96	9	1.71	-1.15	4.15	0.40	T.	5	14	11	5
1903.....	49.8	+1.1	86	17	2.98	+0.12	6.00	0.74	0.8	9	11	9	10
1904.....	44.1	-4.6	86	13	3.63	+0.77	8.97	1.52	1.4	7	15	6	9
1905.....	47.5	-1.2	90	10	3.03	+0.17	5.39	0.63	1.2	8	12	8	10
1906.....	52.5	+3.8	94	22	2.42	-0.44	5.55	0.53	0.6	8	14	9	7
1907.....	41.5	-7.2	80	10	1.32	-1.54	3.22	0.24	2.7	6	12	8	10
1908.....	50.5	+1.8	91	8	2.24	-0.62	4.59	0.67	0.3	8	14	8	8
1909.....	43.8	-4.9	86	14	4.58	+1.72	9.43	0.83	3.1	12	9	9	12
1910.....	52.5	+3.8	99	15	1.48	-1.38	4.86	1.10	3.0	7	14	7	9
1911.....	46.7	-2.0	86	3	3.09	+0.23	6.04	1.33	3.6	9	11	8	11
1912.....	49.9	+1.2	84	20	2.66	-0.20	5.66	0.78	1.1	8	13	8	9
1913.....	50.2	+1.5	88	16	3.28	+0.42	7.43	1.12	2.7	9	15	5	10
1914.....	48.6	-0.1	88	11	2.52	-0.34	5.03	0.37	0.3	8	10	8	12
1915.....	57.2	+8.5	95	18	1.41	-1.45	4.02	0.05	T.	7	15	10	5
1916.....	47.1	-1.6	90	11	2.62	-0.24	5.92	1.13	1.1	10	10	9	11
1917.....	45.5	-3.2	88	17	4.55	+1.69	7.84	2.05	3.8	11	9	7	14
1918.....	44.8	-3.9	79	12	2.32	-0.54	4.20	1.01	3.5	9	12	8	10
1919.....	48.4	-0.3	81	20	4.78	+1.92	9.00	1.94	0.7	14	8	8	14

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

Climatological Data for April, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.							Precipitation, in Inches.				Number of Days			Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.	Partly cloudy.		Cloudy.	Prevailing direction of wind.
Northern Division																				
Algona	Kossuth	1,213	46	47.0	0.0	68	22	27	24	28	6.24	+3.73	2.10	T.	10	15	4	11	se.	W. E. Laird.
Allison	Butler	1,045	7	47.2		74	22	24	1	31	4.36		1.05	2.5	16	7	10	13	ne.	J. A. Bell.
Alta	Buena Vista	1,513	28	46.2	-0.1	74	22	24	24	32	3.90	-0.86	0.66	0.5	15	6	11	13	nw.	David E. Hadden.
Alta (near)	Buena Vista		23								3.78	+0.96	0.73	0.2	14					Warren Minard.
Alton	Sioux	1,305	14	46.5	-0.3	73	22	24	24	32	3.46		0.81	T.	14	4	13	13	ne.	W. S. Slagle.
Belmond	Wright	1,205	9	46.6		70	6†	25	1	30	6.81		1.74	2.3	15	5	12	13	se.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	45.4	-1.2	71	22	25	25	31	5.48	+3.06	2.01	2.8	16	7	9	14	e.	L. M. Goodman.
Charles City	Floyd	1,015	28	46.0	-0.3	73	22	24	1	39	3.29	+0.46	0.92	T.	16	4	12	14	ne.	U. S. Weather Bureau.
Decorah	Winneshiek	875	26	47.3	+0.4	75	22	21	1	36	2.97	+0.53	0.67	2.0	15	11	4	15	nw.	Wm. F. Baker.
Elkader	Clayton	727	40	47.9	-0.1	76	22	22	1†	38	3.95	+1.18	1.08	1.5	12	7	7	16	e.	D. C. Hale.
Estherville	Emmet	1,298	24	44.5	-0.6	71	22	23	25	34	3.73	+0.88	0.60		12	9	17	4	s.	A. O. Peterson.
Fayette	Fayette	1,063	29	46.8	+0.4	75	22	20	1	38	3.27	+0.18	0.76	T.	12	11	4	15	se.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	46.0	+0.1	74	22	24	1	42	5.67	+3.32	2.12	1.0	11	8	7	15	ne.	Eugene Secor.
Humboldt	Humboldt	1,065	31	48.2	0.0	76	23	24	1	35	3.45	+0.78	0.69	T.	10	6	10	14	ne.	H. C. Snitkey.
Inwood	Lyon	1,474	15	46.2	-0.4	75		22	24	36	3.18	+0.59	0.99	7.5	12	10	6	14	ne.	F. B. Hanson.
Lansing	Allamakee	632	13								3.44	+1.06	0.90	T.	16					Chas. R. Serene.
LeMars	Plymouth	1,224	23								5.24	+2.75	1.80	T.	14	7	12	11	nw.	G. A. C. Clarke.
Mason City	Cerro Gordo	1,148	22	46.2	-0.2	71	22	22	1†	34	5.24	+2.75	1.80	T.	14	7	12	11	nw.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	46.7	+0.3	73	22	25	1†	31	3.99	+1.57	1.26		14	11	5	14	w.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	48.3		74	22	25	1	34	5.52		1.48	1.2	16	11	7	12	s.	Arthur Betman.
Northwood	Worth	1,222	23	43.8	-2.3	68	22	21	1	34	5.40	+2.93	1.75	5.0	10	9	6	15	ne.	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	47.0	0.0	72	22	25	1	34	3.55	+1.20	0.63	0.6	14	9	8	13	ne.	F. E. Hronek.
Pocahontas	Clayton	1,180	20	46.2	+0.4	71	22	24	1†	30	4.03	+1.05	1.05	1.2	15	8	7	15	sw.	F. L. Williams.
Rock Rapids†	Lyon	1,358	20	46.0	+0.9	71	22	23	24	35	3.91	+1.26	0.78	7.4	15	12	8	10	ne.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	45.8		70	18†	23	24	34	4.65		0.98	0.5	14	6	11	13	se.	Jas. W. Dow.
Sibley	Osceola	1,212	26	44.0	-0.5	69	22	23	24	34	4.84	+2.71	0.85	5.0	15	8	8	14	sw.	H. F. Olds.
Sioux Center	Sioux	1,426	20	46.2	-0.3	73	20	22	24	34	3.61	+0.99	0.63	9.0	12	6	7	17	e.	J. de Ruyter.
Spencer	Clay	1,319	5	46.4		70	20†	25	24	34	4.61		1.25	T.	13	6	10	14	se.	E. W. Little.
Storm Lake	Buena Vista	1,440	30	46.6	-0.2	73	22	25	24	30	4.05	+1.21	0.90	1.3	13	10	7	13	se.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	47.2	+0.1	72	22	25	1	37	4.08	+1.67	0.80	T.	14	8	9	13	s.	H. L. Felter.
Waverly	Bremer	948	23	47.2	-0.6	73	22	22	1	33	4.13	+1.27	1.00	T.	16	9	9	12	se.	H. Arnold.
West Bend	Palo Alto	1,197	26	48.0	+0.8	73	21	24	1	40	4.93	+2.09	1.06	T.	14	7	8	15	ne.	Jos. Dorweiler.
Means and extremes				46.5	-0.2	76	22†	20	1	42	4.32	+1.64	2.12	1.6	14	8	9	13	ne.	
Central Division																				
Ames	Story	926	43	47.2 ^a	-2.4	71 ^a	19†	22 ^a	1	34 ^a	6.35	+3.49	1.45	0	11	6	5	19	nw.	Iowa State College.
Audubon†	Audubon	1,301	25	46.1	-2.6	72†	6	24†	24	42†	6.99	+3.90	1.95	0	11					V. M. Jones.
Baxter	Jasper	908	19	48.8		76	6	28	1	36	4.49	+3.90	1.95	0	11					Rev. Paul Traeger.
Belle Plaine†	Benton	886	29	50.1	+1.2	76	6†	25	1	37	5.70	+2.43	1.36	0.6	16	6	12	12	se.	O. C. Burrows.
Boone	Boone	1,134	14	48.2	+0.3	74	6	26	1	30	5.89	+3.13	1.59	0.5	17	9	7	14	e.	Carl F. Henning.
Carroll	Carroll	1,265	29	47.8	+0.6	75	6	23	1	36	4.37	+1.48	0.76	0	15	7	9	14	ne.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	51.1	+2.3	77	6†	27	1	33	4.93	+2.03	1.91	T.	11	10	3	17	e.	R. S. Toogood.
Clinton	Clinton	593	46	50.4	+0.7	79	6	22	1	36	2.99	+0.17	0.70	0	13	6	11	13	se.	H. Burde.
Davenport	Scott	530	48	51.0	+0.8	77	6	30	1	28	3.60	+0.72	1.12	0	17	3	12	15	e.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	47.1	+0.4	73	6†	24	1	32	5.07	+2.21	1.19	1.0	12	13	4	13	e.	Nettie E. Ball.
Denison	Crawford	1,180	25	48.6	0.0	72	7†	26	24	30	3.27	+0.32	0.72	T.	13	14	5	11	s.	Emma Brogden.
Des Moines	Polk	801	40	49.3	-1.3	76	6	31	1	29	5.30	+2.32	1.68	0.9	15	5	12	13	e.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	49.0	+0.1	75	6	28	1	29	4.47	+1.55	1.06	0.1	15	7	8	15	s.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	44.4 ^d	-2.6	72 ^d	6	25	1	31 ^d	4.76	+2.13	1.70	1.0	13	7	11	12	ne.	J. P. Monk.
Grinnell	Poweshiek	1,023	25																	D. W. Brainard.
Grundy Center	Grundy	976	28	50.2	+1.4	78	22	24	1	31	5.10	+2.03	1.20	2.0	15	8	10	12	se.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	48.8	-0.8	75	6	22	1	37	6.04	+3.13	1.12	T.	15	10	8	12	nw.	C. T. Harney.
Harlan	Shelby	1,182	20	48.0	-0.9	73	6	24	1	35	5.90	+3.38	1.40	0	14	12	4	14	s.	E. L. Tilton.
Independence	Buchanan	921	55	49.2	+1.4	74	19†	24	1	36	4.94	+2.54	1.00	1.5	13	10	6	14	e.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	50.2	+1.6	78	6	23	1	35	4.28	+1.10	0.63	T.	19	7	9	14	ne.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	48.4	+2.0	74	6	22	1	37	4.20	+1.07	0.70	2.0	15	10	8	12	s.	J. B. Parmelee.
Jefferson	Greene	1,052	20	48.1	-1.0	74	6	23	1	35	5.72		1.71	T.	14	7	7	16	s.	Will I. Lyon.
LeClaire	Scott	576	19								3.39	+0.46	0.72	0	16					Margaret T. Disney.
Little Sioux	Harrison	1,040	14	48.9	-1.7	73	6	26	24	40	4.55		1.36	T.	9	6	6	18	se.	Geo. H. Gibson.
Logan	Harrison	928	52	50.6	+0.2	74	20†	28	24	33	4.62	+1.88	0.93		13	7	8	15	e.	Mary Jean Stern.
Maquoketa	Jackson	688	18	49.6	+0.4	76	6	20	1	36	3.84	+1.05	1.43	0	11	6	9	15	e.	Ira H. Stephens.
Marshalltown	Marshall	947	27	49.4	+1.1	78	22	23	1	42	6.05	+3.35	1.16	0	17	8	1	21	nw.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	49.4		75	6	29	25	35	5.78		1.36	0	16	11	4	15	sw.	J. E. Dibel.
Muscataine	Muscataine	554	59								3.71	+0.38	0.98	0	15					Wm. P. Molis.
Olin	Jones	760	21	50.3	+1.6	80	22	23	1	40	5.25	+2.00	1.70		7	11	9	10	sw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	48.4		75	22	26	24	37	4.83	+2.32	1.71	0	10	6	7	17	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	47.6	-2.0	75	6†	23	1	37	6.87	+4.12	1.53	0	14	8	10	12	ne.	Mrs. C. E. Anthony.
Rockwell City†	Calhoun	1,134	23	47.4	-0.7	73	22	27	24</											

Chmatological Data for April, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in inches.				Number of Days.			Observers.				
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, melted.	Precipitation .01 in. or more.	Clear.		Partly cloudy.	Cloudy.	Prevailing direction of wind.	
Southern Division																					
Afton	Union	1,212	25	48.4	- 2.2	74	22	27	1	31	6.49	+3.14	1.80	0	12	12	7	11	sw.	J. E. Deitrick.	
Albia	Monroe	959	21	49.8	+ 0.2	78	6	24	1	32	5.96	+3.11	1.32	0	15	7	1	22	e.	F. H. Holmes.	
Allerton	Wayne	1,122	17	49.6	- 1.3	72	19†	27	1	32	5.33	+2.39	1.28	T.	14	8	10	12	sw.	James C. Huston.	
Atlantic	Cass	1,164	28	48.4	- 1.2	74	6	26	1	37	5.86	+2.93	1.29	0.1	15	1	9	20	nw.	Thos. H. Whitney.	
Bedford	Taylor	—	19	49.3	- 1.0	75	7†	25	1	36	5.20	+2.71	1.35	T.	11	7	7	16	se.	E. E. Healy.	
Bloomfield	Davis	881	12	51.0	—	76	6	27	1	34	3.49	+0.36	1.35	0	15	7	11	12	se.	V. G. Warner.	
Bonaparte	Van Buren	565	28	51.6	+ 0.3	76	6	25	1	33	3.33	+0.12	1.06	T.	12	16	2	12	nw.	Bruce R. Vale.	
Burlington	Des Moines	544	23	52.8	+ 1.6	79	6	26	1	31	2.55	-0.69	0.88	T.	12	13	5	12	sw.	Mrs. Edna M. Donnelly.	
Centerville	Appanoose	1,013	14	52.0	—	77	6†	27	1	41	5.24	—	1.50	T.	13	6	10	14	se.	Leo J. Allen.	
Chariton	Lucas	1,042	24	49.1	- 0.9	75	6	24	1	34	5.78	+2.66	1.05	T.	13	6	13	11	w.	C. C. Burr.	
Clarinda	Page	1,609	29	49.5	- 0.1	77	7	27	1	43	5.89	+3.06	1.29	0	14	7	5	18	ne.	A. S. Van Sandt.	
Columbus Jet.	Louisa	595	18	52.5	+ 1.8	78	6	26	1	30	3.35	+0.41	1.05	0.3	9	17	5	8	s.	Bruce R. Vale.	
Corning†	Adams	1,117	27	—	—	—	—	—	—	—	6.55	+3.02	1.76	0	—	—	—	—	13	se.	Jerome Smith.
Corydon	Wayne	1,101	26	50.0	- 1.2	76	6	26	1	32	6.07	+2.94	1.20	T.	15	8	8	14	s.	May C. Miller.	
Creston	Union	1,312	14	47.2	- 1.1	71	19†	28	24	30	7.89	—	2.45	0	13	7	5	18	nw.	Mrs. T. E. McConnell.	
Cumberland	Cass	—	20	—	—	—	—	—	—	—	9.00	+6.73	2.18	T.	10	12	7	11	sw.	J. H. Reppert.	
Earlham	Madison	1,126	17	47.6	- 1.6	74	6	20	1	36	5.78	+2.32	2.13	T.	15	11	6	13	nw.	Geo. Phillips.	
Fairfield	Jefferson	780	35	50.6 ^b	- 0.2	81 ^b	6	27 ^b	18	38 ^b	4.40	+0.75	1.05	0	14	—	—	—	—	s.	Prof. R. M. McKenzie.
Glenwood	Mills	1,100	22	50.4	—	74	6	29	24	30	5.91	—	1.75	0	13	7	11	12	ne.	Dr. Geo. Mogridge.	
Greenfield	Adair	—	27	49.2	- 0.6	74	6	27	24	33	8.26	+5.14	3.05	0	13	7	14	9	sw.	Frank A. Ward.	
Indianola	Warren	969	27	50.0	- 0.5	76	6	31 ^a	16	29 ^a	5.32	+2.11	1.49	0.1	17	5	4	21	nw.	Prof. J. L. Tilton.	
Keokuk	Lee	614	48	52.9	+ 0.9	77	6	31	1	31	1.94	-1.40	1.00	T.	15	6	12	12	ne.	U. S. Weather Bureau.	
Keosauqua	Van Buren	644	27	51.8	+ 1.3	78	6	21	1	38	3.12	-0.38	1.12	0	12	11	5	14	sw.	J. H. Landes.	
Knoxville	Marion	920	24	50.6	+ 1.0	79	6	23	1	35	6.27	+3.28	1.05	0	15	6	8	16	nw.	W. J. Casey.	
Lacona	Warren	—	20	—	—	—	—	—	—	—	6.90	+4.20	1.42	0	14	6	15	9	—	J. B. Alter.	
Lamoni	Decatur	1,100	12	49.7	- 1.3	75	6†	26	1	33	4.87	—	1.17	T.	16	11	8	11	sw.	Ed. D. Moore.	
Lenox	Taylor	1,250	24	49.2	- 1.1	74	6	29	1†	31	6.58	+3.64	1.90	T.	12	9	6	15	nw.	J. L. Hurley.	
Mount Ayr	Ringgold	1,236	26	49.4	- 1.8	74	6	28	1	30	5.87	+2.72	1.48	T.	15	9	5	16	nw.	Alex Maxwell.	
Mt. Pleasant	Henry	729	38	51.8	+ 0.6	78	6	24	1	35	3.46	+0.56	1.00	0	16	4	13	13	se.	John H. Jericho.	
Murray	Clarke	1,216	28	49.6	- 0.9	76	6	27	1	34	5.46	+2.26	1.60	T.	16	7	9	14	s.	M. T. Ashley.	
Northboro	Page	1,046	5	50.9	—	78	6†	27	1	36	5.43	—	1.82	0	13	9	2	19	nw.	J. M. Darby.	
Oakland	Pottawattamie	—	—	47.8	—	71	6	23	9	34	5.13	—	1.66	0	8	8	9	13	se.	M. E. Gray.	
Oskaloosa	Mahaska	825	43	50.6	0.0	78	6	25	1	33	6.10	+3.34	1.28	T.	17	5	8	17	w.	Roy R. Robinson.	
Ottumwa	Wapello	849	24	49.3	—	77	6	28	1	39	4.70	+1.95	1.20	T.	15	13	3	14	sw.	Eugene O. Field.	
Pella	Marion	877	26	50.1	- 0.3	78	6	23	1	42	4.88	+2.05	1.15	T.	15	9	3	18	se.	J. H. Ver Steeg.	
Shenandoah	Page	—	—	49.2 ^a	—	75 ^b	6†	29 ^a	1†	44 ^a	3.65	—	1.60	T.	10	—	—	—	nw.	L. L. Hunter.	
Sigourney	Keokuk	877	23	50.5	- 0.5	78	6	25	1	32	4.64	+1.36	0.84	T.	14	9	7	14	ne.	W. E. Utterback.	
Stockport	Van Buren	754	17	50.3	- 0.2	76	6	25	19†	39	3.27	+0.21	1.03	0	15	11	8	11	nw.	C. L. Beswick.	
Thurman	Fremont	—	—	49.2	- 2.0	75	6†	29	1	41	5.01	+1.88	1.32	T.	10	3	15	12	nw.	C. R. Paul.	
Washington	Washington	769	37	51.6	+ 1.0	80	6	23	1	35	4.58	+1.96	1.03	0	15	5	13	12	w.	Wm. A. Cook.	
Winterset	Madison	1,129	28	48.6	- 2.1	75	6	24	1	35	6.54	+2.94	1.5 ^a	T.	15	11	7	12	nw.	H. S. Ely.	
Omaha, Nebr.	—	1,040	48	49.1	- 1.4	73	6	29	24	28	4.66	+1.65	0.98	0.3	17	4	9	17	nw.	U. S. Weather Bureau.	
Means and extremes.	—	—	—	50.0	- 0.6	81	6	20	1	44	5.22	+2.17	3.05	T.	14	8	8	14	nw.	—	
State means and extremes.	—	—	—	48.4	- 0.3	81	6	20	1	44	4.78	+1.92	3.05	0.7	14	8	8	14	se.	—	

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.

Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc.

†Also other dates. ††Received too late to be included in means and summaries.

T. Precipitation is less than 0.01 inch rain or melted snow.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 44, or about 16 per cent below normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 39; Davenport, 44; Des Moines, 48; Dubuque, 46; Keokuk, 52; Sioux City, 35 Omaha, Nebr., 41. Clear days averaged, 8 partly cloudy, 8; cloudy, 14.

MISCELLANEOUS PHENOMENA.

Aurora: 15th, 18th, 22d.

Birds, (Migration of): Earlham, mocking birds, 21st, whippoorwills, 22d, wrens, 28th.

Corona: 5th.

Fog: 2d, 3d, 4th, 5th, 29th, 30th.

Halo, (lunar or solar): 2d, 4th, 5th, 6th, 7th, 9th, 10th, 12th, 16th, 18th, 21st, 22d, 23d.

Hail: 2d, 5th, 6th, 7th, 9th, 10th, 12th, 16th, 21st, 22d, 23d.

Sleet: 8th, 9th, 10th, 15th, 16th.

Thunderstorms: 1st, 2d, 3d, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 13th, 14th, 15th, 16th, 21st, 22d, 23d, 24th, 28th, 29th.

Tornado: 6th, 23d.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).			Wind.			Sunshine						
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.		Total movement.	Average hourly velocity.	Maximum		Per cent of possible.					
						7 a. m.	Noon.			Miles.	From.		Date.	Departure from normal.			
Charles City	29.98	30.56	24	29.33	10	83	63	70	28	20	5,558	7.7	25	n.	23	39—26	
Davenport	29.97	30.49	25	29.47	10	78	60	66	26	26	6,500	9.0	28	e.	14	44—17	
Des Moines	29.97	30.57	24	29.35	10	82	70	68	27	25	6,204	8.6	40	sw.	7	48—12	
Dubuque	29.99	30.53	25	29.41	10	77	60	64	34	25	5,217	7.2	29	sw.	19	46—11	
Keokuk	29.98	30.49	24	29.54	10	77	60	61	32	19	6,578	9.1	36	sw.	10	52—5	
Sioux City	29.97	30.66	24	29.25	7	84	67	63	23	5	10,270	14.3	45	nw.	5	35—23	
Omaha, Nebr.	29.96	30.61	24	29.23	6	84	72	72	34	5	7,230	10.0	42	nw.	22	41—18	
Means and extremes.	29.97	—	—	—	—	81	65	66	—	—	—	9.4	—	—	—	—	44—16
Normals and records.	29.98	—	—	—	—	76	—	57	—	—	—	10.0	—	—	25 th	60	
	—	30.78	1918	28.80	1893	—	—	—	—	—	—	—	—	—	—	—	—

§Dubuque. *Davenport. †Omaha, Nebr. ††Sioux City. ‡Local mean time. †And other dates.

Daily Precipitation for April, 1919.

Stations.	Watersheds.	Day of Month.																														Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
<i>Northern Division</i>																																		
Algona	Des Moines	.40				2.10		.30						.21	1.40	.45															.28	.66	.23	6.24
Allison	Cedar	.05	.06		.04		1.05	T.	.76	.19	.01	T.	T.	.52	.47	.25				T.	.02	T.	.34	.08					.08		.27	.17	3.36	
Alta	Raccoon	.22	.63	.01		.53			.66	.14				.40	.52	.22	.02					.06	.04					.18	.02		.25	3.90		
Alta (near)	Raccoon	.30	.49			.73		.42	.39					.51	.38	.05						.03	.09	.06			T.	.09		.13	.11	3.78		
Alton	Floyd	.05	.29	.81		.74	.03	.16	.26				.07	.42	.46	.02				T.		.04					T.	T.		.06	.05	3.46		
Belmond	Iowa	.08	T.			1.74		1.00	.55	.04			.04	.58	.68	.24	.02			T.		.32	.40					.12	T.	.92	.08	6.81		
Britt	Iowa	.08	.06			2.01		.48	.42	.02			.07	.20	.72	.28				T.		.04	.30	.04				.28		.38	.10	5.48		
Charles City***	Cedar	.01	.09	T.	.02	T.	.92	.57	.12		T.		.26	.42	.24	.16				.01		.11	.01			T.	.11		.17	.07	3.29			
Decorah	Mississippi	.14	.02	.03		.20	.52	T.	.67	.04			.16		.45	.36	.09				.03			.08				.08		.15	.10	2.97		
Elkader	Mississippi	.10	T.		.08		.65		1.08	.13	T.	T.		.48	.58	.15				T.			.25					.18		.02	.25	3.95		
Estherville	Des Moines	.18	.10			.50	.25		.50	.10				.35	.60	.40					.05		.30				T.				.40	T.	.20	5.40
Fayette	Mississippi	.18	T.		.12		.76		.13	T.	T.			.65	.49	.11					.04		.44					.15		.05	.15	3.27		
Forest City	Cedar					2.12		.57	.59			T.		.40	.50	.61					T.	.20	.01					.35		.22	.10	5.67		
Humboldt	Des Moines	.17	T.			.69		.25	.54					.44	.58	.10						.28						.15		.55	T.	3.45		
Inwood	Big Sioux	.10				.99	.06		.32	.10				.32	.76	.13					.03		.28	.03			T.	T.			.06	3.18		
Lansing	Mississippi			.06	.05	T.		.30	.56	.04	.90	.04			.18	.60	.10	.16				.14			.10	T.		.04	.02		.15	3.44		
LeMars	Floyd																																	
Mason City	Cedar	.08	.04			1.80		.54	.60			.17		.40	.55	.12						.11						.28	.01	.46	.08	5.24		
New Hampton	Wapsipinicon	.05	T.		T.	1.26		.61	.15	.04	.07			.51	.51	.15				T.		.12	.07				.13		.18	.14	3.99			
Nora Springs	Cedar	.27	.01			.18	1.30	.80	.39	.02	.07	.14	.62	.56	.44							.18					.22	.28	.04	5.52				
Northwood	Cedar					1.75		.75	.50	T.	T.	T.		.50	.50	.30					T.		.30					.40	T.	.20	5.40			
Pocahontas	Des Moines	.15	.35			.31		.41	.23				.01	.38	.63	.10						.38	.04				.14		.32	.10	3.55			
Postville	Mississippi	.14			.11	1.00		1.05	.16	T.	.05			.33	.26	.16	.03				.12		.28				.12		.04	.18	4.03			
Rock Rapids	Big Sioux	T.	.24			.03	.78	.13	.34	.18	.01			.13	.64	.68	.02				.07		.33	T.				.15		.16	.17	3.91		
Sanborn	Floyd	.25	.98			.80	T.	.23	.39				.09	.18	.90	.20					.01		.45				.01		.07	.09	4.65			
Sibley	Big Sioux	.40	.10	.37		.73	.30	.16	.41	.05			.10	.41	.85	.04				T.		.67				T.		.10	.15	4.84				
Spencer	Floyd	T.	.12	.56		.63		.17	.20	.40				.03	.52	.65				T.		.17	T.			T.		.16	T.	.31	3.61			
Storm Lake	Little Sioux	.20	.22			1.25		.40	.30					.05	.22	.76	.15					.68						.04		.26	.08	4.61		
Waukegan	Raccoon	.12	.38			.90		.46	.62					.63	.75	.21	.13					.06						.12		.21	.06	1.05		
Washta	Little Sioux	.20	.68			.78	.03	.43	.46		T.	.03	.80	.05	.05							.36	.10			.08				.03	4.08			
Waverly	Cedar	.07	T.		.04	1.00		.05	.25	.01	.04	T.	.60	.45	.17				T.		T.		.06	.11			.16	.01	.16	.15	4.13			
West Bend	Des Moines	.12	.38			1.06		.35	.31	T.			.30	.68	.04							.17	.72	.04				.18	.43	.15	4.93			
<i>Central Division</i>																																		
Ames	Skunk	.04	.20			.77		1.45	.50					.75		.07						.57	.80				.40			.80	6.35			
Audubon	Nishnabotna	.04				.43		1.28	.30			.90	T.									1.04	1.95				.75	.02	.25	.03	6.99			
Baxter	Skunk	.07	.23	.01		.43	T.	.97	.10			.01	T.	.54	.19	.04				T.		.45	.67				.43	.17	.06	.12	4.49			
Belle Plaine	Iowa	.15	.14		.04	.43	T.	1.36	.05	T.	T.			.64	.27	.12	.03					.41	1.15			T.	.33	.26	.05	.27	5.70			
Boone	Des Moines	.05	.10	.10		.23	.26	.49	1.59	.15				.60	.20	.14	.16					.32	.23				.45	.05		.77	5.89			
Carroll	Raccoon	.18	.17			.40		.07	.65	.06				.72	.40	.04	.02					.76	.33				.24		.02	.31	4.37			
Cedar Rapids	Cedar		T.		T.	.60		.40	.46	T.				.46	.33	.05	.05					.24	1.91				.08	.15		T.	4.93			
Clinton	Mississippi		T.		T.	.01	.25		.26	.01				.70	.35	.01	.07				T.		.67				.35	.17	.04	.10	2.99			
Davenport***	Mississippi	T.	.05		.05	.29	.04	.16	.03	.01	T.	T.	1.12	.09	.09	.01						.02	.78				.56	.15	.03	.12	3.60			
Delaware	Mississippi		.16		.17	.67		1.19	.07	.02				.80	.80	.14						.56					.26			.23	5.07			
Denison	Missouri	.16	.02			.43		.48	.08					.63	.08	.02						.06	.21	.72			.19		.19	.32	3.27			
Des Moines***	Des Moines	.16	.21			.42	.15	1.54	.06					.48	.13	.13						.73		.37		T.	.56	.01	.28	.07	5.30			
Dubuque***	Mississippi	T.	.11		.18	.63	.04	1.02	.06				.01	.48	.19	.07	T.			.09	.02		.70				.20		T.	.67	4.47			
Fort Dodge	Des Moines	.15				.40	.10		1.70	.08				.55	.30	.15	.13					.30	.10				.10	T.		.70	4.76			
Grinnell	Iowa																																	
Grundy Center	Cedar	.15	.15		.10	.83		1.26	.08		.05			.64	.50	.20						.35	.20				.23		.10	.32	5.10			
Guthrie Center	Raccoon	.18	.30			.57		.40	.45	.03				.95	.12	.03						.10	.75	1.12		T.	.40		.52	.12	6.04			
Harlan	Nishnabotna	.20				.65		.95	.12					.70	.05	.10						.10	.85	1.40			.50	.03	.20	.05	5.90			
Independence	Wapsipinicon	.08	.16		.21	.54		1.00	.14	T.				.87	.48	.11	T.					.45					.41		.05	.44	4.94			
Iowa City	Iowa		.08	.03		.01	.43	.20	.43	.03	.03	.05		.63	.41	.07	.14					.31	.56	.09			.23	.46		.09	4.28			
Iowa Falls	Iowa	.10	.09			.30	.57	.16	.70	.13				.52	.40	.18	.07				T.		.35	.13			.24	T.		.26	4.20			
Jefferson	Raccoon	.17	.03			.17		1.71	.27	T.			T.	.77	.37	.05						.40	.72				.38	.03	.61	.04	5.72			
Le Claire	Mississippi		.02			.07	.22	.07	.13	.02	T.			.62	.44	.11	.10					T.	.65	.12			.03	.72		.06	3.39			
Little Sioux	Little Sioux	.14				.34		.60						.80	.07							.96	1.36				.08		.20	.45	5.55			
Logan	Missouri	.69				.46		.71	.18					.77	.08							.10	.12	.93			.44	.02	.11	.01	4.62			
Maquoketa	Maquoketa		T.		T.	.53		.35	.10	T.				.65	.18	.06	.02						1.43				.31	.05	T.	.16	3.84			
Marshalltown	Iowa	T.	.40	.05		.01	.65	.84	.43	.07				.62	.38	.09						.33	1.16				.44	.14		.40	6.05			
Monroe	Skunk	.34	.22			.51	T.	1.36	.13	.02	T.			.71	.21	.18	.02					.11	.57	.69			.39		.09	.23	5.78			
Muscataine	Mississippi		.05	.06		.30	T.	.20	.02	.02	.04	.96		.26	.03	.04							.11	.98			.62	T.	.31	.37	3.71			
Olin	Wapsipinicon		T.			.50		.70	T.					.90	.20	T.							1.70		</									

Daily Precipitation for April, 1919—Continued.

Stations.	Watersheds.	Day of Month.																														Totals	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
<i>Southern Division</i>																																	
Afton.....	Grand.....	.44	.02				.24	T.	1.80	T.	T.				.98		.04						.93	.90	.17			.60	.12	.25		6.49	
Albia|||	Des Moines.....	.41					.43	.81	.56	.05			.86	.21	.10							1.32	.09			.26	.32	.12	.36		.06	5.96	
Allerton.....	Chariton.....	.27	.16				.70		1.28	.04				.65	.03	.10						T.	1.20	.08				.32	.01	.47		.02	5.33
Atlantiel|||	Nishnabotna.....	.15	.64				.47		1.29	T.	.03			.58	.03	.01	.03						1.16	.47				.48	.03	.21		.28	5.86
Bedford.....	Missouri.....	.40					.68	T.	1.35	.11				.45		.06						T.	.47	.32			T.	.79		.55		.02	5.20
Bloomfield.....	Mississippi.....	.17	.12				.30		.53	.08	.01			.45	.01	.03	.02						1.35				.10	.05	.20		.07	3.49	
Bonaparte.....	Des Moines.....	.10	.12			.03	.41		.65	.15				.42	.05	T.							1.06				.20	.05	.09			3.33	
Burlington|||	Mississippi.....		.09				.03		.23		.35	T.		.43	.05	T.	.06						.68	.09			T.	.38	.02	.14		.25	5.53
Centerville.....	Chariton.....	.30					.70		.80	.08				.65	.03	.05	.25						1.50	T.			.15	.08	.55		.10	5.24	
Chariton.....	Chariton.....	.42	.14				.33	T.	1.05					.48	.12	.10							.44	.80	.22			.75	.65	.28		.25	7.78
Clarinda|||	Nodaway.....	.40	.05				.88		1.29	.55	.07	T.		.32	.02								.34	.25			.49	.23	.47		.53	5.89	
Columbus Jct.....	Iowa.....	.10					.47		.42	T.	T.			T.	1.05	.12	.11						.40				.43	.25	T.			3.35	
Corning.....	Nodaway.....	.38				.70		T.	1.76	.10				.64	T.	*							.29	.73	.32			.84	.03	.49		.27	5.55
Corydon.....	Chariton.....	.26	.12				.85	T.	1.20	.05	.01			.89	T.	.18	T.						.64	.89	.16		T.	.33	.02	.43		.04	6.77
Creston|||	Missouri.....	.10	.23				.37		1.30	1.00				.80	.10	T.							2.45	.25			.38	.38	.28		.25	7.89	
Cumberland.....	Nodaway.....	.15					1.67		2.18	T.				1.62		.32							.81		.86		.32	.15	.92			9.00	
Earlham.....	Des Moines.....	.16	.16				.09	T.	2.13	.20	T.			.43	.06	.06							.48	.63	.39		.65	.09	.21		.04	5.78	
Fairfield.....	Skunk.....	.20	.05				.25		.66	.04	T.			1.02	.10	.14	T.						1.05	.04			.53	.05	.10		.17	4.40	
Glenwood.....	Missouri.....	.25	.38				.68		1.75	.05				.48	T.								.30	.25	.35		.37	.10	.57		.38	5.91	
Greenfield.....	Nodaway.....		.40				.70	T.	1.50	.35				.55	.05								1.85	1.20	.33		.70	.10	.26		.25	7.26	
Indianola.....	Des Moines.....	.28	.08	T.			.28	T.	1.49	.21	.02		T.	.48	.08	.11	.01						.35	.69	.39		.45	.15	.20		.05	5.32	
Keokuk***	Mississippi.....	.02	.03		.02		.12	.02	.12	T.				.01	.17		.01	.01					.50	.50			.37	T.	.02	.02	1.94		
Keosauqua.....	Des Moines.....	.12	.12				.40	T.	1.50	.03	T.			T.	.36	T.	.07						1.12	T.			.18	.03	.10		.09	3.12	
Knoxville.....	Des Moines.....	.38	.20				.87		1.05	.04				.95	.13	.12							.08	1.00	.40		.58	.20	.20		.07	6.27	
Lacona.....	Des Moines.....	.64	.36				.42		1.40	1.00				1.42	.08	.10							.52	1.02	.22		.38	.16	.20		.20	6.90	
Lamon|||	Grand.....	.02	.50				.10	.37	.75	.43	.02			.44	.03	T.						.02		1.17	.16		.18	.19	.45		.04	4.87	
Lenox.....	Missouri.....	.41					.86	T.	1.90	.09				.60	T.	.03							.39	.62	.25		.63		.65		.15	6.58	
Mt. Ayr.....	Grand.....	.35	.02				.51	T.	1.48	.03				.64	.03	.03							.24	.76	.22		T.	.85	.05	.63		.03	5.87
Mt. Pleasant.....	Skunk.....	.07	.22			.25	.13		.34	.05	.01			.64	.12	.04							1.00	.03			.25	.16	.09		.06	3.46	
Murray.....	Grand.....	.31	.05				.20	.01	1.60	.07				.57	.04	.03							.65	.84	.16		.49	.15	.21		.11	5.49	
Northboro.....	Tarkio.....	.50	.07				.70		1.82	.08				.37	.01								T.	.15	.40		T.	.65	.05	.29		.34	5.43
Oakland.....	Nishnabotna.....						.35		1.66	.06				.83									.86		.37		T.	.41		.59			5.13
Oskaloosa.....	Des Moines.....	.12	.14				.45	T.	1.28	.48	.04			1.18	.23	.12	.08						T.	.06	.79	.17		.67	.11	.09		.09	6.10
Ottumwa|||	Des Moines.....	.37				T.	.40	.31	.50	T.				.75	.10	.05	.65						1.20		.05		.16	.41	.05	.20		.10	4.70
Pella.....	Skunk.....	.25	.25				.35	T.	1.15	.03	T.			T.	.63	.25	.65	T.					.10	.85	.45		.25	.15	.10		.02	4.88	
Shenandoah.....	Nishnabotna.....	.25	T.				.35		1.60	.05				.12		T.							T.	.40			.68	.03	.15		.02	3.65	
Stigourney.....	Skunk.....	.06	.25				.37	T.	.63	.02	T.			.84	.20	.07							T.	.80	.19		.58	.16	.06		.41	4.64	
Stockport.....	Skunk.....	.14	.17				.28		.53	.16	T.			.42	.04	.02	.02						1.03	.02			.18	.10	.12		.04	3.27	
Thurman.....	Missouri.....	.06	T.				.71		1.32	T.				.83		T.							.06	.27	.52		T.	.86	.06	.32		.50	5.01
Washington.....	Skunk.....		.39				.42		.65	.04	.05			1.03	.04	.08	.06						.59	.15			.17	.69	.05		.07	4.58	
Winterset.....	Des Moines.....	.20	.15				.17		1.58	.18				.54	.08	.10							.58	1.00	.45			.70	.18	.36		.27	6.54
Omaha, Neb.***	Missouri.....	.63	.40				.51	.12	T.	.98	.05			.14	.73	.01	T.						.58	.42	.04		.29	.14	.05	.16		.01	4.06

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 **Incomplete.
 *Precipitation included in the next following measurement.

WIND.

The prevailing direction of the wind was from the south-east. The highest velocity reported from a regular Weather Bureau station was at the rate of 45 miles an hour from the northwest at Sioux City on the 5th.

CONDITION OF CROPS MAY 1st.

Reports to the Iowa Weather and Crop Service from township correspondents shows the condition of winter wheat to be 109 per cent, and less than 1 per cent of the acreage seeded last fall will be plowed up or abandoned for any cause; spring wheat, 98; tame hay, 101. Practically no corn planting and only about 40 per cent of the spring plowing had been done. Farm work was about 2 weeks later than normal.

RIVERS.

River stages were generally above normal throughout the month. The Missouri touching Iowa did not closely approach flood stage. The Mississippi did not reach flood stage above Le Claire, though in Dubuque cellars of some wholesale houses were flooded when a stage of 16.6 feet was reached on the 22d--23d. Damage was averted by preventive measures taken on warnings given 10 days in advance by the Dubuque Weather Bureau Office. The highest stage at Clinton, 15.4 feet on the 24th was 0.6 foot below flood stage. At Muscatine the highest stage, 15.8 feet on the 26th, was 0.2 foot below flood stage. At Le Claire the highest stage, 10.7 feet, 0.7 foot above flood stage, was reached on the 29th, and a dam

that is being constructed to improve navigation was damaged. Keokuk passed the flood stage, 14 feet, on the 21st and reached a stage of 16.2 on the 27th-28th. There was considerable overflow of both the Des Moines and Mississippi rivers in that vicinity.

Interior rivers, though high, were generally below flood stage except the Des Moines River from Ottumwa to the mouth. Flood stages (10 feet or higher) prevailed at Ottumwa, 24th-27th, with a crest stage of 12.0 feet on the 26th.

WETTEST PERIOD.

More precipitation fell and more days were rainy in the period February 1-April 30 in Iowa than in any other similar period in the 30 years since state-wide records have been compiled; 9.53 inches falling on 28 days, or 3.75 inches and 9 days above the respective normals. The precipitation is 165 per cent of the normal. The year 1897 has held the record heretofore with 8.63 inches and 24 rainy days.

ERRATA.

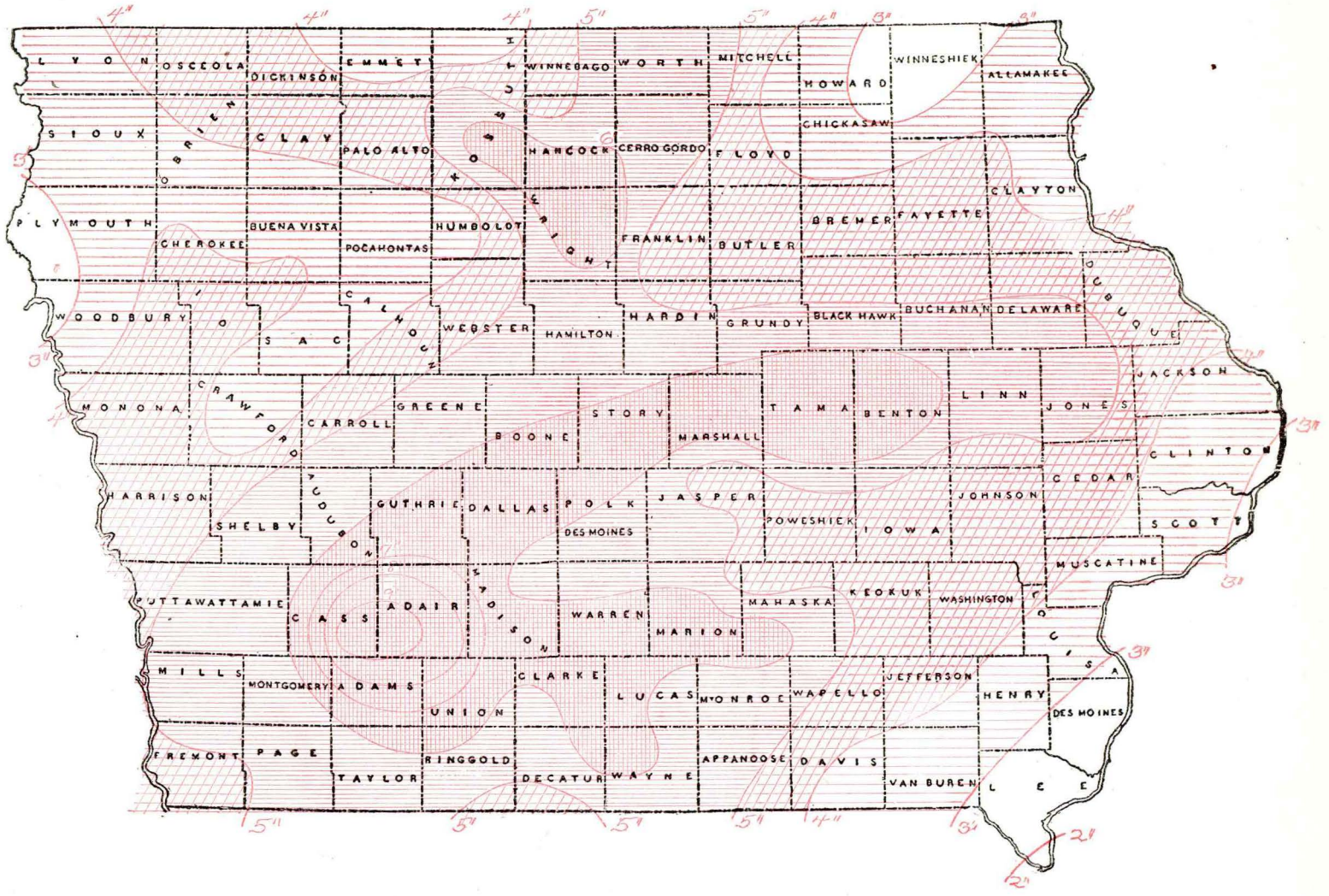
Report for March, 1919; Page 28; Pocahontas, mean temperature published 36.2, should be 36.0; departure published +5.2, should be +5.0. Page 32; mean maximum temperature published 46.9, should be 46.5. Page 28; Des Moines; mean temperature published 38.8, should be 39.0; departure published +3.1, should be +3.3. Page 32; Des Moines; maximum temperature on the 30th published 49, should be 55; mean of the maximum published 48.4, should be 48.6.

Daily Maximum and Minimum Temperatures for the Month of April, 1919.

Table with columns for Stations, days 1-30, and Mean. Rows are grouped by division: Northern Division (Algona, Alta, Alton, Belmont, Charles City, Decorah, Forest City, Inwood, LeMars, Mason City, New Hampton, Northwood, Pocahontas, Postville, Sibley), Central Division (Belle Plaine, Carroll, Davenport, Des Moines, Dubuque, Fort Dodge, Grinnell, Guthrie Center, Independence, Iowa City, Iowa Falls, Little Sioux, Marshalltown, Sac City, Sioux City), and Southern Division (Albia, Allerton, Atlantic, Bedford, Bloomfield, Burlington, Columbus Jet, Corning, Fairfield, Keokuk, Northboro, Pella, Sigourney, Thurman, Omaha, Nebr.). Each station entry includes maximum and minimum temperature values for each day and a monthly mean.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record
§§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

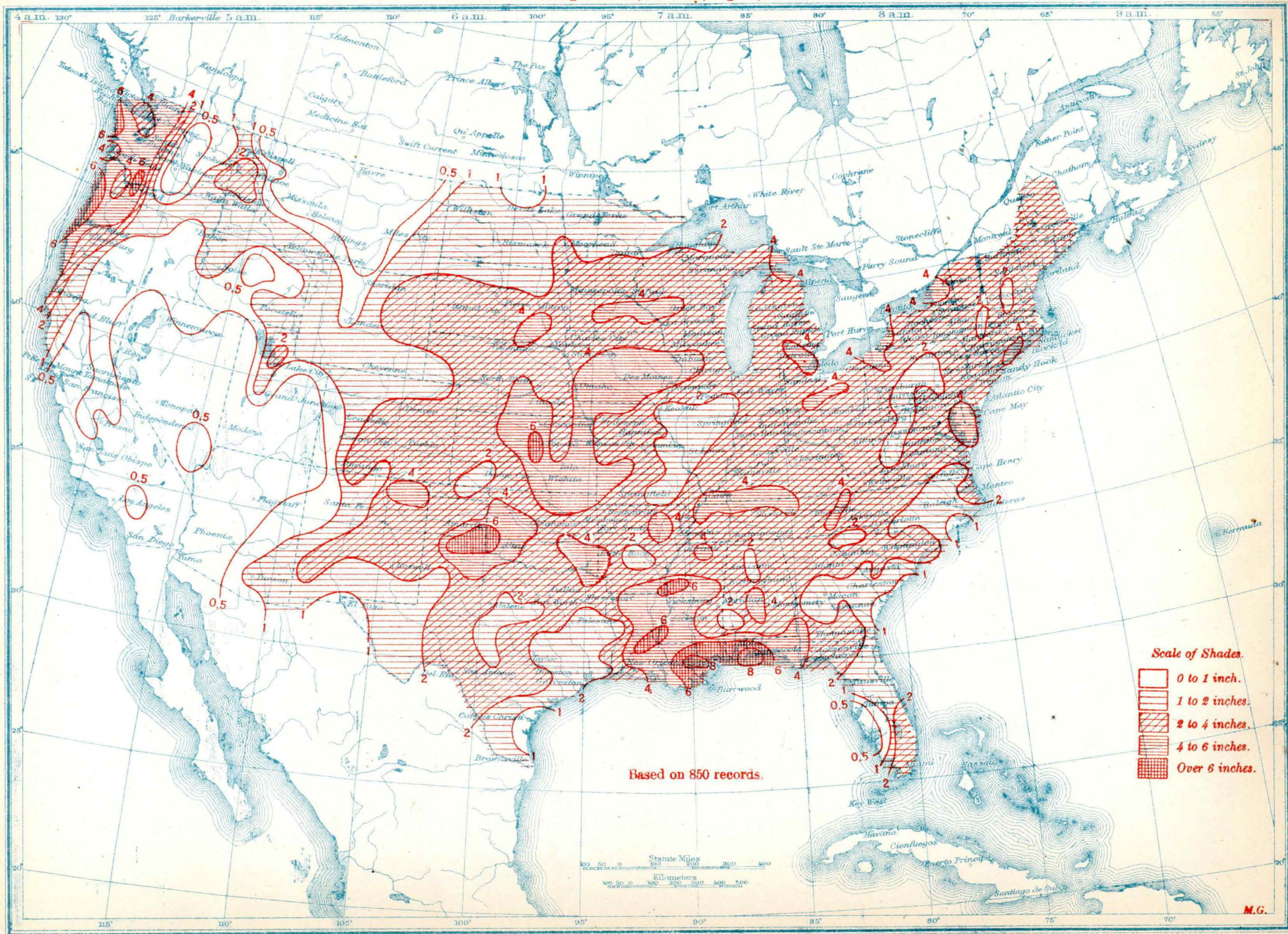
TOTAL PRECIPITATION, APRIL, 1919.



SCALE OF SHADES—IN INCHES



Total Precipitation, Inches, April, 1919.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

MAY, 1919

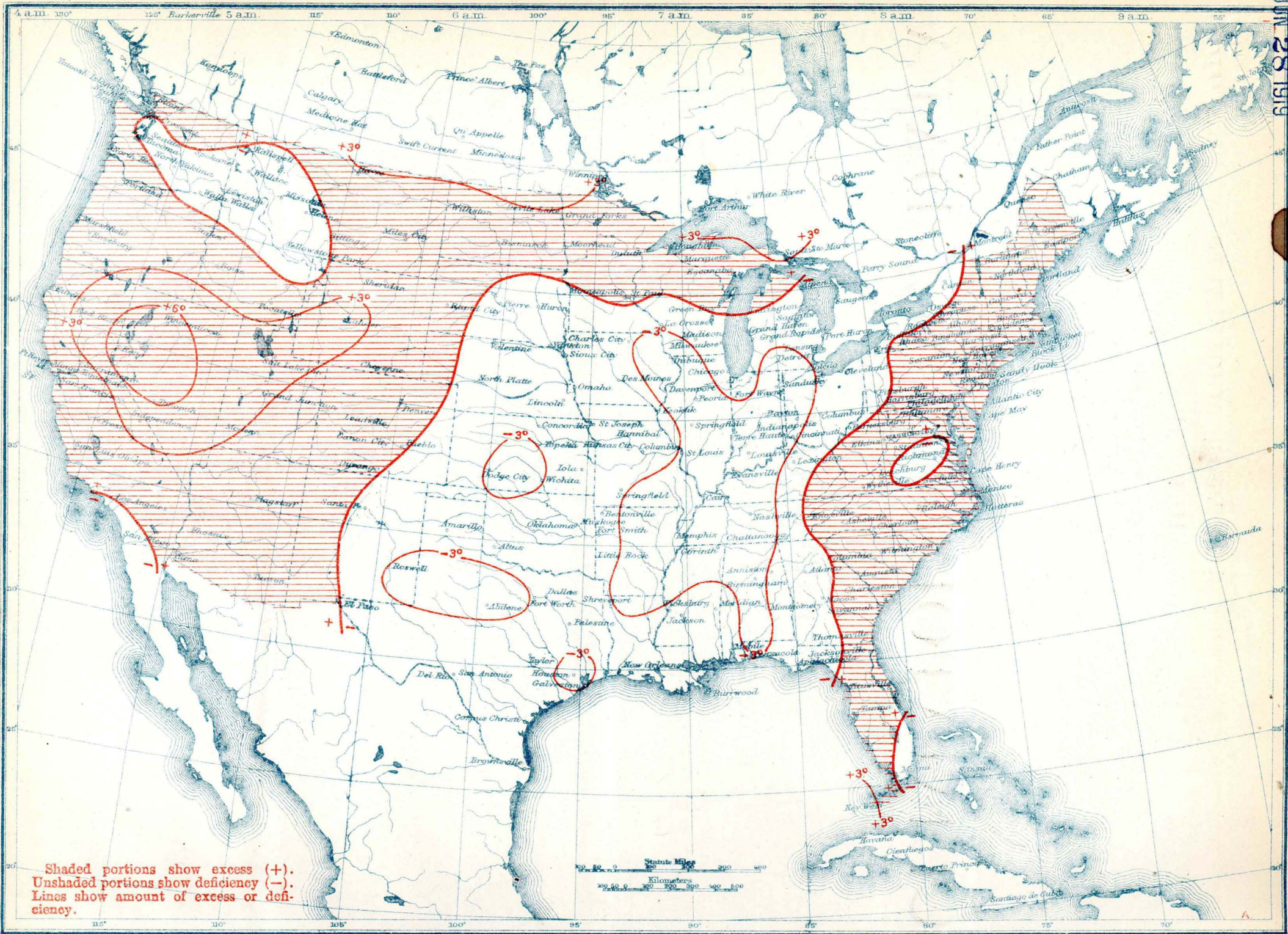
BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

Departure of the Mean Temperature from the Normal, May, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, MAY, 1919 No. 5

GENERAL SUMMARY.

Cool weather prevailed till the 26th when it turned warm. Temperatures in the 90's occurred at many stations on the 30th. Mean temperatures were below the normal at all stations but Clarinda which had a slight excess. Frosts or freezes were general on the 2d and occasional light frosts were reported up to the 18th.

The precipitation was below normal, except from Appanoose east to Lee and northeast to Jones and Jackson counties. The rainy period that prevailed through April continued till May 6 when it culminated in a general downpour. The saturated condition of the soil prevented, or greatly retarded, spring plowing and corn planting during the comparatively rainless week that followed, so that by the 15th only 40 per cent of the corn had been planted. Heavy rains on the 19th in the southern division caused further delay. By the close of the month, 95 per cent of the corn planting had been completed—about the same as last year—the stand was good, about 80 per cent of the crop showed the rows across the field, and cultivation was making good progress in the drier counties. The cold, cloudy, rainy weather of the first week prevented proper pollination of cherries and plums thereby greatly reducing the crop. Pastures, clover, timothy and alfalfa are in the best condition for several years, except where injured beyond recovery by drouth and grasshoppers in the southwest portion last season. Winter wheat made rapid growth and became so rank generally as to be subject to damage by lodging.

Tornadoes occurred on the 3d, 6th and 31st (See page 53.)

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.95 inches. The highest recorded was 30.35 inches, at Dubuque, on the 5th, and the lowest was 29.53, at Sioux City, on the 31st. The monthly range was 0.82 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 104 stations, was 58.2°, or 2.3° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 57.2°, or 1.8° lower than the normal; Central, 58.2°, or 2.5° lower than the normal; Southern, 59.1°, or 2.6° lower than the normal. The highest monthly mean was 61.6°, at Omaha, Nebr., and the lowest was 55.1°, at Postville. The highest temperature recorded was 93° at Cedar Rapids, on the 30th, and the lowest was 30°, at Decorah, Elkader, Fayette and Mason City, on the 2d. The temperature range for the state was 63°.

HUMIDITY.

The average relative humidity for the State at 7 a. m., was 79 per cent, and at 7 p. m. it was 58 per cent. The mean for the month, 68 per cent, is about normal. The highest monthly mean was 72 per cent, at Keokuk, and the lowest was 62 per cent, at Des Moines.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 110 stations, was 3.11 inches, or 1.46 inches less

than the normal. By divisions the averages were as follows: Northern, 2.49 inches, or 1.99 inches less than the normal; Central, 2.97 inches, or 1.62 inches less than the normal; Southern, 3.87 inches, or 0.77 inches less than the normal. The greatest amount, 7.14 inches, occurred at Maquoketa, and the least, 0.73 inch, at Fort Dodge. The greatest amount in 24 consecutive hours, 3.00 inches, occurred at Olin on the 3d.

SNOWFALL.

The only snow reported was traces, at Dubuque and Perry.

WIND.

The prevailing direction of the wind was from the southeast. The average velocity was 7.5 miles per hour, or 1.2 miles less than the normal. The highest velocity reported from a regular Weather Bureau station was at the rate of 40 miles an hour from the northwest, at Sioux City, on the 6th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 59 or about 3 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 59; Davenport, 51; Des Moines, 61; Dubuque, 62; Keokuk, 64; Sioux City, 52; Omaha, Nebr., 65.

MISCELLANEOUS PHENOMENA.

- Aurora: 1st, 2d, 3d, 4th, 5th, 12th, 16th, 24th.
- Fog: 3d, 14th, 15th, 24th, 25th.
- Frost: 1st, 2d, 5th, 6th, 9th, 10th, 11th, 16th, 17th, 18th.
- Hail: 3d, 4th, 5th, 15th, 19th.
- Halo, (lunar or solar): 1st, 2d, 4th, 7th, 10th, 11th, 12th, 13th, 17th, 18th, 23d, 25th, 27th.
- Thunderstorm: 2d, 3d, 4th, 5th, 6th, 7th, 14th, 15th, 18th, 19th, 26th, 30th, 31st.
- Rainbow: 17th, 19th.

COMPARATIVE DATA FOR THE STATE—MAY.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	57.7	-2.8	90	26	3.56	-1.01	6.44	1.61	-----	9	10	13	8
1891	58.3	-2.2	94	21	3.18	-1.39	7.10	1.46	-----	8	14	9	8
1892	54.0	-6.5	88	29	8.77	+4.20	12.64	4.87	T.	16	5	9	17
1893	56.6	-3.9	96	26	3.45	-1.12	5.82	1.65	0	9	13	9	9
1894	61.1	+0.6	96	22	1.87	-2.70	4.77	0.33	0	6	17	10	4
1895	61.7	+1.2	104	24	3.19	-1.38	5.79	0.84	0	9	11	12	8
1896	65.5	+5.0	100	34	6.69	+2.12	11.79	3.40	0	12	11	12	8
1897	58.5	-2.0	96	20	1.92	-2.65	3.59	0.21	0	5	16	10	5
1898	59.6	-0.9	92	26	4.67	+0.10	7.82	2.22	0	12	9	10	12
1899	60.2	-0.3	90	27	6.23	+1.66	11.47	3.09	0	13	9	12	10
1900	63.2	+2.7	98	22	3.31	-1.26	6.98	0.96	0	8	14	10	7
1901	60.7	+0.2	95	28	2.35	-2.22	4.57	0.72	0	7	16	9	6
1902	63.8	+3.3	97	25	5.39	+0.82	18.04	0.87	0	13	10	12	9
1903	61.6	+1.1	91	24	8.55	+3.98	15.45	2.88	0	16	9	12	10
1904	59.6	-0.9	93	27	3.78	-0.79	8.15	1.50	0	8	13	10	8
1905	58.3	-2.2	88	28	5.95	+1.38	10.83	2.57	0	14	12	11	8
1906	60.8	+0.3	95	24	3.54	-1.03	10.72	0.89	0	11	13	10	8
1907	53.5	-7.0	96	14	3.48	-1.09	7.68	0.71	1.0	10	11	10	10
1908	59.4	-1.1	93	13	8.34	+3.77	14.33	1.33	0	15	9	11	11
1909	57.9	-2.6	97	18	4.34	-0.23	7.85	1.86	0.1	9	12	12	7
1910	55.4	-5.1	89	18	3.41	-1.16	6.91	1.29	T.	10	15	7	9
1911	64.9	+4.4	98	23	3.76	-0.81	8.73	0.42	0.7	9	16	9	6
1912	62.7	+2.2	97	29	3.33	-1.24	6.41	0.72	0	10	14	11	6
1913	59.4	-1.1	102	30	6.24	+1.67	10.25	3.14	0	13	11	8	12
1914	62.2	+1.7	98	25	3.31	-1.26	6.90	0.30	T.	10	14	11	6
1915	56.1	-4.4	99	25	7.34	+2.77	13.21	3.82	T.	14	9	9	13
1916	59.9	-0.6	94	27	4.93	+0.36	10.44	2.14	T.	12	13	10	8
1917	55.1	-5.4	95	18	3.87	-0.70	7.33	1.69	0.6	10	15	8	8
1918	64.9	+4.4	98	9	6.87	+2.30	11.98	2.72	T.	13	13	11	7
1919	58.2	-2.3	93	30	3.11	-1.46	7.14	0.73	0	9	13	11	7

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

Climatological Data for May, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Northern Division																				
Algona	Kossuth	1,213	46	57.8	-1.5	87	30	35	2	31	2.97	-1.16	0.95	0	7	22	6	3	se.	W. E. Laird.
Allison	Butler	1,045	7	57.3	—	89	30	33	17	33	2.16	—	0.50	0	11	10	12	9	se.	J. A. Bell.
Alta	Buena Vista	1,513	28	57.7	-1.3	85	28	36	7	30	1.51	-3.51	0.50	0	8	12	13	6	se.	David E. Hadden.
Alta (near)	Buena Vista	23	—	—	—	—	—	—	—	—	1.99	-3.09	0.60	0	7	—	—	—	—	Warren Minard.
Alton	Sioux	1,305	14	57.6	-1.9	86	28†	32	2	36	2.31	—	0.94	0	7	11	14	6	se.	W. S. Slagle.
Belmond	Wright	1,205	9	57.2	—	89	30	33	2	33	3.17	—	1.02	0	10	4	22	5	se.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	56.4 ^a	-2.0	81 ^a	27†	32	2	33 ^a	2.80	-1.92	1.13	0	9	—	—	—	—	L. M. Goodman.
Charles City	Floyd	1,015	28	56.8	-2.7	89	30	32	2	32	2.72	-2.22	1.02	0	10	9	15	7	se.	U. S. Weather Bureau.
Decorah	Winneshiek	875	26	57.4	-2.6	91	30	30	2	40	2.60	-2.01	1.32	0	11	17	6	8	se.	Wm. F. Baker.
Elkader	Clayton	727	40	57.1	-3.0	91	30	30	2	39	2.54	-1.61	1.02	0	7	18	9	4	e.	D. C. Hale.
Estherville	Emmet	1,298	24	56.2	-1.4	89	28	31	2	39	1.90	-3.17	0.90	0	6	17	11	3	s.	A. O. Peterson.
Fayette	Fayette	1,003	29	56.4	-1.6	90	30	30	2	40	1.90	-3.10	0.95	0	7	15	10	6	se.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	56.6	-1.9	90	30	32 ^a	2	34 ^a	1.73	-2.76	0.80	0	7	12	10	9	se.	Nina Secor.
Humboldt	Humboldt	1,095	31	58.0	-1.4	91	30	32	2	36	1.74	-2.66	0.58	0	5	10	13	8	n.	H. C. Snitkey.
Inwood	Lyon	1,474	15	56.6	-2.5	85	28†	33	7	35	1.81	-2.09	0.81	0	8	17	7	7	se.	F. B. Hanson.
Lansing	Allamakee	692	13	—	—	—	—	—	—	—	4.27	-0.73	2.20	0	9	—	—	—	—	Chas. R. Serene.
LeMars	Plymouth	1,224	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	G. A. C. Clarke.
Mason City	Cerro Gordo	1,148	22	56.0	-2.8	87	30	30	2	34	2.47	-2.19	1.13	0	9	8	17	6	se.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	57.1	-1.4	90	30	32	2	31	2.16	-2.51	0.65	0	8	15	8	8	e.	A. F. Kenman.
Nora Springs	Floyd	1,064	6	57.9	—	89	30	40	2†	36	3.16	-2.51	1.54	0	10	15	7	9	s.	Arthur Betts.
Northwood	Worth	1,222	23	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	57.4	-1.9	89	30	32	2	36	1.95	-2.34	0.55	0	7	13	13	5	se.	F. E. Hronek.
Postville	Clayton	1,180	20	55.1	-3.6	85	30	32	2	32	2.58	-2.72	1.42	0	11	12	9	10	se.	E. W. Little.
Rock Rapids	Lyon	1,358	20	57.6	-0.9	88	28	31	1	40	2.95	-0.49	1.08	0	8	22	7	2	sw.	J. K. Medberry.
Sanborn	O'Brien	1,533	5	57.6	—	86	28†	33	7	33	2.64	-0.49	1.02	0	9	15	10	6	se.	Carl F. Henning.
Sibley†	Osceola	1,212	26	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	H. F. Olds.
Sioux Center	Sioux	1,426	20	57.6	-1.2	85	28	35	7†	31	3.12	-1.37	1.23	0	6	19	5	7	se.	J. de Ruyter.
Spencer	Clay	1,319	5	57.5 ^m	—	87 ^m	28	31 ^m	2	40 ^m	3.47	—	1.50	0	9	—	—	—	—	E. W. Little.
Storm Lake	Buena Vista	1,440	30	57.6	-1.7	85	30	37	2†	32	2.10	-1.94	0.75	0	8	16	11	4	e.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	57.4	-1.6	85	28†	31	2	38	2.79	-2.36	0.86	0	6	14	13	4	s.	H. L. Felter.
Waverly	Bremer	948	23	57.0	-2.9	89	30	38	9	34	2.01	-2.51	0.63	0	10	17	7	7	se.	H. Arnold.
West Bend	Palo Alto	1,197	26	58.4	-0.8	89	30	34	7	35	2.79	-1.21	0.77	0	9	6	18	7	se.	Jos. Dorweiler.
Means and extremes				57.2	-1.8	91	30	30	2	40	2.49	-1.99	2.20	0	8	14	11	6	se.	
Central Division																				
Ames	Story	926	43	57.4	-3.8	85	30	34	2	34	2.34	-2.43	0.80	0	9	24	4	3	—	Iowa State College.
Audubon	Audubon	1,301	25	57.0 ^a	-3.2	85 ^a	30	34 ^a	2	34 ^a	2.54	-1.87	0.65	0	7	—	—	—	s.	V. M. Jones.
Baxter	Jasper	998	19	57.6	-3.0	86	30	35	2	32	2.29	-3.01	0.86	0	9	5	11	15	se.	Rev. Paul Traeger.
Belle Plaine	Benton	886	29	58.5	-1.9	88	30	34	2	33	3.97	-0.66	1.27	0	13	11	18	2	se.	O. C. Burrows.
Boone	Boone	1,134	14	58.0	-1.7	88	30	36	2	29	1.57	-3.55	0.80	0	9	12	17	2	se.	Carl F. Henning.
Carroll	Carroll	1,265	29	58.4	-0.8	87	28	36	7†	33	0.96	-3.71	0.36	0	7	18	7	6	se.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	59.2	-2.1	93	30	39	2†	34	3.90	-0.59	1.50	0	7	16	9	6	e.	R. S. Toogood.
Clinton	Clinton	593	46	58.0	-3.5	91	30	34	2	38	5.72	+1.10	2.88	0	11	11	10	10	ne.	H. Burde.
Davenport	Scott	580	48	58.2	-3.3	90	30	39	9	31	4.85	+0.66	2.35	0	11	6	12	13	e.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	56.0	-2.9	83	30	33	2†	30	2.02	-2.48	0.72	0	6	15	13	3	e.	Nettie E. Ball.
Denison	Crawford	1,180	25	58.9	-1.0	87	30	37	2†	32	2.28	-1.92	0.80	0	7	22	7	2	n.	Emma Brogden.
Des Moines	Polk	861	40	59.8	-1.8	86	30	40	2	27	2.96	-1.60	1.61	0	9	5	13	13	se.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	57.8	-3.0	90	30	37	2	30	2.79	-1.53	0.75	0	12	7	14	10	n.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	56.3 ^b	-3.4	85 ^b	28	35 ^b	2	30 ^b	0.73	-4.60	0.20	0	7	—	—	—	—	J. F. Monk.
Grinnell	Poweshiek	1,023	25	59.0	-2.4	90	30	36	2	30	2.81	-1.84	0.71	0	11	—	—	—	—	J. P. Stocks.
Grundy Center	Grundy	976	28	59.2 ^a	-1.3	89 ^a	30	40 ^a	2†	30 ^a	1.76	-3.15	0.62	0	7	—	—	—	—	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	59.0	-2.4	87	30	33	2	38	2.69	-2.06	0.65	0	9	20	9	2	sw.	O. T. Harney.
Harlan	Shelby	1,182	20	58.1	-2.1	86	30	34	2	35	1.93	-2.59	0.60	0	6	24	3	4	s.	E. L. Tilton.
Independence	Buchanan	921	55	57.3	-2.3	87	30†	34	1	32	1.89	-2.35	0.56	0	6	16	6	9	e.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	57.8	-3.1	80	30	31	2	36	4.49	+0.04	1.61	0	12	9	11	11	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	57.0	-1.5	87	30	32	2	31	1.76	-2.84	0.53	0	10	17	6	8	e.	J. B. Parmelee.
Jefferson	Greene	1,052	20	57.6	-3.4	86	28†	32	2	35	1.13	—	0.38	0	5	8	14	9	se.	Will I. Lyon.
LeClaire	Scott	576	19	—	—	—	—	—	—	—	4.70	+0.64	1.56	0	10	—	—	—	—	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	59.5	-2.5	87	28†	33	7	37	2.08	—	0.47	0	10	10	12	9	se.	Geo. H. Gibson.
Logan	Harrison	928	52	60.8	-0.8	91	30	35	19	39	2.87	-1.33	1.11	0	8	8	18	5	nw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	56.7 ^a	-3.6	88 ^a	30	34 ^a	2	38 ^a	7.14	+2.53	2.89	0	8	—	—	—	—	Ira H. Stephens.
Marshalltown	Marshall	947	27	58.8	-1.7	91	30	35	2	41	2.33	-2.18	0.85	0	10	10	8	13	se.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	58.3	—	88	30	38	2	28	3.03	—	0.98	0	6	13	7	11	n.	J. E. Dibel.
Muscatine	Muscatine	554	59	—	—	—	—	—	—	—	5.26	+0.86	1.50	0	13	—	—	—	—	Wm. P. Mohs.
Olin	Jones	760	21	58.8	-1.7	91	30	34	2	40	6.95	+2.25	3.00	0	6	15	11	5	ne.	Dr. F. W. Port.
Onawa	Monona	1,051	19	59.6	—	88	29†	36	2	38	2.66	-2.30	1.15	0	8	18	5	8	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	57.9	-3.5	88	30	33	2	33	1									

Climatological Data for May, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
<i>Southern Division</i>																				
Afton	Union	1,212	25	59.0	- 2.8	84	30	34	5	34	4.02	-0.72	1.40	0	7	13	18	0	se.	J. E. Deitrick.
Albia	Monroe	959	21	53.2	- 3.0	87	30	36	9	36	4.48	-0.49	1.38	0	12	5	3	23	e.	F. H. Holmes.
Allerton	Wayne	1,122	17	57.8	- 3.7	82	28	37	1	26	3.18	-1.53	0.93	0	8	8	11	12	e.	James C. Huston.
Atlantic	Cass	1,164	28	60.0	- 1.1	89	29	36	2	34	1.73	-2.70	0.69	0	10	5	8	18	se.	Thos. H. Whitney.
Bedford	Taylor		19	59.0	- 1.7	84	30	32	2	32	4.61	-0.15	1.37	0	8	13	8	10	se.	E. E. Healy.
Bloomfield	Davis	881	12	53.5		85	30	39	2†	35	6.67	+1.82	1.85	0	12	7	19	5	e.	V. G. Warner.
Bonaparte	Van Buren	565	28	57.9	- 4.1	85	30	38	9	37	5.73	+1.39	2.04	0	10	18	7	6	e.	Bruce R. Vale.
Burlington	Des Moines	544	23	59.4	- 3.4	90	30	40	9	34	4.01	-0.09	1.22	0	13	13	8	10	se.	Mrs. Edna M. Donnelly.
Cerrville	Appanoose	1,013	14	59.6		87	30	39	2†	34	7.02		2.19	0	10	9	12	10	se.	Leo J. Allen.
Chariton	Lucas	1,042	24	56.8	- 3.8	84	30	35	2	34	4.02	-0.69	1.40	0	6	9	13	9	se.	C. C. Burr.
Clarinda	Page	1,009	29	61.2	+ 0.4	88	29	35	2	33	2.67	-2.46	1.05	0	7	12	10	9	ne.	A. S. Van Sandt.
Columbus Jct.	Louisa	595	18	59.0	- 3.4	85	30	38	10	32	5.32	+1.23	1.83	0	10	19	10	2	ne.	J. O. Phillips.
Corning	Adams	1,117	27	59.3	- 1.3	85	30	34	2	28	4.10	-1.12	1.38	0	7	17	4	10	se.	Jerome Smith.
Coryton	Wayne	1,101	26	58.4	- 3.5	86	30	36	2	33	4.89	+0.38	1.52	0	10	11	14	6	ne.	May C. Miller.
Creston	Union	1,312	14	57.8	- 1.7	83	30	38	2†	31	3.33		1.42	0	7				se.	Mrs. P. E. McConnell.
Cumberland	Cass		20								3.50	-0.72	1.30	0	7	20	9	2	sw.	J. H. Reppert.
Earlham	Madison	1,126	17	57.8	- 2.1	84	30	31	2	40	2.15	-2.53	0.65	0	6	13	14	4	se.	W. O. Phillips.
Fairfield	Jefferson	780	35	58.0 ^a	- 3.7	88 ^a	30	37 ^a	9	37 ^a	4.15	-1.12	1.55	0	11	11	12	8	e.	Prof. R. M. McKenzie.
Glenwood	Mills	1,100	22	60.5		85	30	37	2	32	2.55		0.88	0	10	15	8	8	ne.	Dr. Geo. Mogridge.
Greenfield	Adair		27	59.3 ^b	- 2.0	86 ^b	28†	36 ^b	1	34 ^b	3.86	-1.04	1.33	0	7				ne.	Frank A. Ward.
Indianola	Warren	969	27	58.9	- 2.7	85	30	40	2†	26	4.07	-0.42	1.95	0	9	8	9	14	se.	Prof. J. L. Tilton.
Keokuk	Lee	614	48	60.0	- 3.2	88	30	42	9	33	4.24	-0.11	1.35	0	14	6	17	8	ne.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	27	58.6	- 3.6	88	30	36	2	36	5.38	+0.76	2.07	0	13	8	13	10	e.	J. H. Landes.
Knoxville	Marion	920	24	58.8	- 3.9	90	30	35	2	33	3.12	-1.00	1.53	0	8	12	10	9	se.	W. J. Casey.
Lacona	Warren		20								3.75	-1.42	1.24	0	11	9	15	7		J. B. Alter.
Lamoni	Decatur	1,100	12	53.8	- 3.2	85	30	34	2	31	4.68		1.50	0	11	11	12	8	e.	Ed. D. Moore.
Lenox	Taylor	1,250	24	60.1	- 1.2	87	28	38	2†	34	3.99	-0.96	1.30	0	9	19	9	3	nw.	J. L. Hurley.
Mount Ayr	Ringgold	1,236	26	59.0	- 3.2	83	29†	37	2	27	4.28	-1.42	1.22	0	10	10	14	7	ne.	Alex Maxwell.
Mt. Pleasant	Henry	729	38	58.8	- 3.8	90	30	38	2†	38	5.43	+0.96	2.14	0	12	5	16	10	ne.	John H. Jericho.
Murray	Clarke	1,216	28	60.0	- 1.3	89	30	39	2†	31	3.71	-1.19	1.10	0	8	6	13	12	se.	M. T. Ashley.
Northboro	Page	1,046	5	61.4		87	29†	36	2	33	1.61		0.62	0	9	15	4	12	ne.	J. M. Darby.
Oakland	Pottawattamie			60.6		86	29†	38	7	32	1.48		0.61	0	7	20	8	3	se.	M. E. Gray.
Oskaloosa	Mahaska	825	43	59.4	- 2.2	89	30	37	2	34	3.69	-0.13	1.27	0	11	6	9	16	ne.	Roy R. Robinson.
Ottumwa	Wapello	849	24	58.6		86	30	39	1	33	3.96	-0.68	1.75	0	12	17	3	11	ne.	Eugene O. Field.
Pella	Marion	877	26	57.5	- 4.7	86	30	34	2	42	3.13	-1.65	1.60	T.	7	15	2	14	e.	J. H. Ver Steeg.
Shenandoah††	Page																			L. L. Hunter.
Sigourney	Keokuk	877	23	58.2	- 4.0	88	30	38	2†	32	2.97	-1.31	1.22	0	11	13	4	14	e.	W. E. Utterback.
Stockport	Van Buren	754	17	57.4	- 4.4	84	30	35	2	35	5.70	+1.29	2.08	0	13	10	11	10	ne.	C. L. Beswick.
Thurman	Fremont		22	60.8	- 1.9	88	29	35	2	35	2.66	-2.25	0.86	0	8	0	27	4	nw.	C. R. Paul.
Washington	Washington	769	37	58.6	- 3.1	89	30	38	2†	30	4.04	+0.01	1.69	0	11	8	14	9	se.	Wm. A. Cook.
Winterset	Madison	1,129	28	59.0	- 3.3	86	30	38	5	30	3.30	-1.34	0.92	0	9	14	14	3	se.	H. S. Ely.
Omaha, Nebr.		1,040	48	61.6	- 0.9	86	29	43	5	25	1.70	-2.80	1.31	0	14	8	17	6	e.	U. S. Weather Bureau.
Means and extremes				59.1	- 2.6	90	30	31	2	42	3.87	-0.77	2.19	0	10	11	11	9	se.	
State means and extremes				58.2	- 2.3	93	30	30	2	44	3.11	-1.46	3.00	0	9	13	11	7	se.	

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.

Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc.

†Also other dates. ††Received too late to be included in means and summaries.

T. Precipitation is less than 0.01 inch rain or melted snow.

ERRATA.

Report for April, 1919: Page 41; Keokuk: number of cloudy days published 12, should be 11; number of partly cloudy days published 12, should be 13.

RIVERS.

Flood stages prevailed on the Mississippi River below Le Claire during the first part of the month with a crest stage of 17.4 feet at Keokuk on the 8th; then falling to below the flood stage after the 12th. On the Missouri, moderate stages prevailed with but slight fluctuations. Moderately high stages prevailed on the interior rivers during the first part of the month due to heavy rains, but the flood stage was not reached except on the Des Moines River below Ottumwa.

TORNADOES.

On May 3, between 4:30 p. m. and 5:20 p. m., a well defined tornado formed about 5 miles southwest of Linn Grove, Buena Vista county, moved northeastward, passing a short distance northeast of Sioux Rapids and turned slightly to-

ward the north into Clay county where it dissipated. Numerous sets of farm buildings in its course were demolished and the steel rails and wooden cross ties of the recently constructed bridge of the Minneapolis and St. Louis Railroad across the Little Sioux River near Sioux Rapids, were torn from the 90-foot wooden trestle, leaving it otherwise almost undamaged. The path of the storm at the widest was 400 feet and its total length about 12 miles. The total damage is about \$25,000. Between 6:00 p. m. and 6:30 p. m. of the same day, about 20 miles to the east in Pocahontas county, another tornado moved across the northwest corner of Marshall township into the south-central portion of Swan Lake township south of the town of Laurens. The path was 75 to 200 feet wide and 4½ miles long. Practically nothing was left standing in its path; total damage, \$15,000. On the same day between 6:45 p. m. and 7 p. m., another tornado moved east-northeast from just south of Ulmer, Sac county, through the village of Grant City, where it destroyed six houses, a church and a school house, damaged four other houses, and

Daily Precipitation for May, 1919—Continued.

Stations.	Watersheds.	Day of Month.																															Totals				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
Southern Division																																					
Afton	Grand		.07	.90	1.02		.08													1.40			T.	T.			.05							.50	4.02		
Albia	Des Moines	.10	1.38	.60			.51							.19					.71	.33	T.	.05	.10	T.			.10	T.				.25	.16	4.48			
Allerton	Chariton	.08	.09	.53			.85								.18					.93								.28						.24	3.18		
Atlantic	Nishnabotna			.12	.33	.04		.07					.02	.02	T.	.40				.69				T.				.01						.03	1.73		
Bedford	Missouri		.20	1.06	.96		.06						T.			.23				.70			T.	T.	T.									1.37	4.61		
Bloomfield	Mississippi	.07	.11	1.85	1.25		1.80													1.12	.01	.01	.68	.01	T.			.01						.35	6.67		
Bonaparte	Des Moines		.06	2.04	.89		.54							T.	.15				1.19	T.	.03		.35				.20	T.						.48	5.73		
Burlington	Mississippi	.06	.09	.88	1.22	.03		.56	.01						.12				.16	.40		.24	.01	.23										T.	4.01		
Centerville	Chariton	.06	.27	1.77	2.19		1.06	T.							.27				.87	T.		T.	.02					.33						.24	7.02		
Chariton	Chariton		.10	1.40	1.25	T.									.33				.82	T.	T.	T.					.12							T.	4.02		
Clarinda	Nodaway			1.05	.39							T.	.07			.26				.81	.08					.01									2.67		
Columbus Jct.	Iowa		.21	1.83	.55		.85							.02	T.				.52			.12	.27	.47										.48	5.32		
Corning	Nodaway		.14	.89	.38		T.								.53				1.38									.45						.33	4.10		
Corydon	Chariton	.04	.08	1.52	.73		.73								.22				1.06	T.	T.	.65	T.	T.			T.	.22						.24	4.89		
Creston	Missouri			1.12			.05								.32				1.42	.28	T.		T.											.07	3.33		
Cumberland	Nodaway		.02		.53	.18									.27				1.10									.10						1.30	3.50		
Earlham	Des Moines	T.	.03	.54	.44		.02												.65																.47	2.15	
Fairfield	Skunk	.03	.12	1.55	.63		.31							.12	T.				.78			.05					.07	.01							.48	4.15	
Glenwood	Missouri		.18	.38	.15	.05	.02					.30			.33				.88								.04								.22	2.55	
Greenfield	Nodaway			.80	1.33		.05								.36				.83									.06							.43	3.86	
Indianola	Des Moines	.02	.03	1.95	.85		.43								.12				.56				T.												.07	4.47	
Keokuk	Mississippi	T.	.27	.67	1.30		.78	.16							.03				.54			.12	.11	.03				.02	.09					.04	4.24		
Keosauqua	Des Moines	.05	.04	2.03	1.05		.50	.02						.08	.12				1.04	T.	.02	.11	T.				.05							.27	5.38		
Knoxville	Des Moines	.17	.04	1.53	.50		.25	.25							.44	T.			.44	T.	.07	T.					T.	T.							1.2	3.12	
Lacona	Des Moines	.04	.09	1.24	.33		.28	.30							.09				1.08	.01	T.		.07					.15							.14	3.75	
Lamoni	Grand	.04		1.17	.91		.11	.31											1.50	.21			T.	T.	.06			.23							.01	4.68	
Lenox	Missouri		.10	1.16	.21		.09						.02		.47				1.30			T.					T.	.05							.50	2.90	
Mt. Ayr	Grand		.07	1.16	.60		.24								.47				1.22	T.			T.	.04			.06	.04							.38	4.28	
Mt. Pleasant	Skunk	.16	.06	2.14	.52		.75	.01							.10				1.10		.05	.16	.21				T.	T.							.17	5.43	
Murray	Grand	T.	.09	1.05	1.10		.07								.36				.86			T.	T.				T.	.04							.14	3.71	
Northboro	Tarkio		.18	.62	.25		.05					.14			.03				.30																.02	1.61	
Oakland	Nishnabotna		.07		.01	T.	.05							.10	.43				.61									.02	T.						.21	1.48	
Oskaloosa	Des Moines	.07	.06	1.27	.49		.84								.06				.52		.08	.02	.02	T.			T.								.26	3.69	
Ottumwa	Des Moines	.04	1.75	.62	T.		.33							.10					.10		.08	.07	.01	T.			.02						.16	.68	3.96		
Pella	Skunk		.10	1.60	.65		.23												.35	T.	T.		.10				T.								.10	3.13	
Shenandoah	Nishnabotna																																				
Sigourney	Skunk	.10	.10	1.22	.45		.49								.02				T.	.34	T.	.03	.04	.06											.12	2.97	
Stockport	Skunk	.08	.07	2.08	.53	.10	.12								.20				1.03	T.	.04	.12	.08				.07	T.							1.18	5.70	
Thurman	Missouri		.12	.81	.26	T.	T.					.23			.08				T.	.86																.15	2.66
Washington	Skunk	.10		1.69	.52		.42								.01	.04			.60			.06	.18	.20											.22	4.04	
Winterset	Des Moines	.02	.03	.76	.92		.28								.23				.51																	.51	3.30
Omaha, Neb.***	Missouri		.08	.07	.03	.01	.02				.04	.24			.20	.04			.55	.04								T.	.04						.34	1.70	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.

***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.

**Incomplete.

*Precipitation included in the next following measurement.

uprooted large trees. It disappeared about three miles north-east of Grant City. The width of the path was about 200 feet and the length about six miles; total damage about \$10,000. On May 6 a slight tornado occurred south of Harvey, Marion county, and another near Langworthy, Jones county, but the damage was immaterial. On the 31st there was slight evidence of a tornado at Walcott, Scott county.

IOWA CROP REPORT, JUNE 1, 1919.

Following is a summary showing the percentage condition of crops on June 1:

Corn, 95 per cent; oats, 98; spring wheat, 99; winter wheat, 107; barley, 98; rye, 101; flax, 98; potatoes, 97; tame hay, 102; wild hay, 100; pastures, 105; alfalfa, 102; sweet corn, 97; pop corn, 96 percent.

On May 15 only 40 per cent of the corn planting was done for the State as a whole. In the drier counties, Shleby, Calhoun and Pocahontas, 70 per cent, or more had been completed, while from Jackson southwest to Washington, thence westward to Union Counties only 5 to 20 per cent was planted. Heavy rains on the 19th further retarded field work in the southern division so that only 80 per cent of the corn planting had been done up to the close of the month in Lucas county, but in Black Hawk, Calhoun, Humboldt, Fremont and Page counties planting was finished, and for the State as a whole 95 per cent was done on June 1.

The secretary of the State Horticultural Society reports

the condition of fruit on June 1 as follows: "Apples, 66 per cent; pears, 45; Americana plums, 49; Domestica plums, 44; Japanese plums, 34; cherries, 54; peaches, 3; grapes, 82; red raspberries, 84; black raspberries, 85; blackberries, 82; currants, 72; gooseberries, 78; strawberries, 90 per cent of a full crop. The average for all fruits is 62, a decline of 10 points since May 1."

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).					Relative Humidity (%).			Wind.				Sunshine					
	Mean.	Highest.	Date.	Lowest.	Date.	7 a. m.	Noon.	7 p. m.	Lowest.	Date.	Total movement.	Average hourly velocity.		Per cent of possible.	Departure from normal.			
												Miles.	From.					
Charles City	29.96	30.29	5	29.65	23	78	53	57	32	17	4,215	5.7	23	s.	31	59	-9	
Davenport	29.94	30.20	5	29.62	22	79	58	63	35	14	5,438	7.3	34	nw	6	51	-14	
Des Moines	29.95	30.25	5	29.60	23	76	54	49	31	14	5,306	7.1	27	se.	3	61	0	
Dubuque	29.97	30.35	5	29.62	23	79	55	59	31	18	4,353	5.9	39	se.	3	62	+4	
Keokuk	29.94	30.23	5	29.64	22	79	70	66	31	18	4,903	6.6	25	w.	6	64	0	
Sioux City	29.94	30.27	5	29.53	31	84	62	56	36	15	8,530	11.5	40	nw.	6	52	-6	
Omaha, Neb.	29.93	30.25	5	29.59	3	77	56	59	36	28	6,085	8.2	31	n.	14	65	+5	
Means and extremes	29.95																	
		30.35	5	29.53	31	79	58	58	31	14		7.5						
Normals and records	29.95		4th		7th	77		59		3d		8.7			21st	62		
		*30.58	1910	\$29.02	1875					\$10	1889			184	nw.	1893		

*Dubuque. \$Omaha. †Sioux City. ‡Local mean time. †And other dates.

Daily Maximum and Minimum Temperatures for the Month of May, 1919.

Stations.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Mean		
Northern Division																																		
	Albion	55	55	63	57	52	55	52	64	67	68	67	66	70	69	67	60	70	70	66	65	67	67	62	68	74	80	78	85	83	87	83	67.5	
Alta	Maximum	45	35	45	47	45	40	39	42	56	47	50	50	44	45	50	40	49	46	44	44	50	53	50	49	50	54	54	55	60	60	48.0		
	Minimum	59	49	69	55	55	55	57	69	70	72	70	65	70	72	65	64	72	65	60	68	71	68	73	77	75	81	85	83	83	74	68.3		
Alton	Maximum	41	38	45	45	39	39	36	40	46	45	49	49	45	42	46	37	45	48	45	45	43	51	50	55	49	53	56	57	63	60	47.1		
	Minimum	61	50	72	60	49	55	58	57	74	73	68	68	68	73	68	68	74	68	66	65	70	74	72	74	76	80	80	86	86	85	82	69.7	
Belmond	Maximum	38	32	44	43	39	43	36	35	38	45	51	50	45	39	44	38	38	44	45	44	40	47	47	55	54	54	50	55	65	60	45.6		
	Minimum	57	53	61	60	52	58	53	61	63	69	68	67	72	73	67	62	74	71	68	61	64	64	62	73	74	80	81	87	82	89	79	67.9	
Charles City	Maximum	43	33	46	46	40	41	40	40	46	44	45	46	41	43	49	37	41	48	47	40	40	46	55	55	45	51	56	55	65	63	46.5		
	Minimum	58	58	59	62	54	57	55	62	64	68	66	67	68	69	68	62	70	70	68	59	61	60	64	72	76	80	80	87	84	89	79	67.6	
Decorah	Maximum	40	32	44	42	42	41	41	40	41	46	44	42	45	49	48	42	41	45	49	42	41	52	50	46	47	49	56	55	53	57	63	46.0	
	Minimum	59	62	60	65	59	54	58	65	68	70	69	72	72	70	67	64	74	70	72	63	62	61	69	77	82	84	81	90	91	85	70.5		
Forest City	Maximum	44	30	46	42	43	42	42	38	37	39	37	38	39	39	49	50	42	36	48	46	44	50	51	41	43	46	52	50	53	63	44.4		
	Minimum	58	56	60	60	54	54	53	66	66	69	68	68	72	70	70	64	71	70	68	59	65	61	61	73	79	83	80	86	86	90	81	63.4	
Inwood	Maximum	43	32	40	45	39	40	39	40	43	47	43	42	38	41	46	36	46	51	46	41	41	50	50	45	45	49	54	54	55	61	44.7		
	Minimum	47	51	54	54	48	54	60	66	75	72	65	65	67	72	62	71	75	58	70	64	73	76	75	70	72	79	82	85	85	85	74	67.9	
Mason City	Maximum	41	34	42	39	37	42	33	38	42	44	52	50	47	40	38	36	41	48	41	48	41	38	39	42	48	52	58	54	51	58	63	60	45.2
	Minimum	58	60	59	61	52	56	54	60	62	66	66	68	71	70	66	62	70	70	68	65	62	64	61	72	74	79	80	86	84	87	85	67.7	
New Hampton	Maximum	42	30	41	43	39	40	39	39	42	46	41	40	37	45	49	37	40	45	47	40	39	50	51	45	43	49	52	54	50	56	62	44.2	
	Minimum	57	58	56	64	54	57	55	61	65	68	69	69	70	70	68	63	71	69	68	61	62	58	65	74	77	82	82	87	86	91	85	68.4	
Northwood	Maximum	43	32	47	42	41	40	37	41	37	40	42	43	42	47	50	42	42	45	48	42	42	42	50	45	49	52	58	59	55	59	65	45.8	
	Minimum	59	62	60	65	59	54	58	65	68	70	69	72	72	70	67	64	74	70	72	63	62	61	69	77	82	84	81	90	91	85	70.5		
Pocahontas	Maximum	44	30	46	42	43	42	42	38	37	39	37	38	39	39	49	50	42	36	48	46	44	50	51	41	43	46	52	50	53	63	44.4		
	Minimum	58	56	60	60	54	54	53	66	66	69	68	68	72	70	70	64	71	70	68	59	65	61	61	73	79	83	80	86	86	90	81	63.4	
Postville	Maximum	43	32	40	45	39	40	39	40	43	47	43	42	38	41	46	36	46	51	46	41	41	50	50	45	45	49	54	54	55	61	44.7		
	Minimum	47	51	54	54	48	54	60	66	75	72	65	65	67	72	62	71	75	58	70	64	73	76	75	70	72	79	82	85	85	85	74	67.9	
Sibley	Maximum	41	34	42	39	37	42	33	38	42	44	52	50	47	40	38	36	41	48	41	48	41	38	39	42	48	52	58	54	51	58	63	60	45.2
	Minimum	58	60	59	61	52	56	54	60	62	66	66	68	71	70	66	62	70	70	68	65	62	64	61	72	74	79	80	86	84	87	85	67.7	
Central Division	Maximum	42	30	41	43	39	40	39	40	43	46	41	40	37	45	49	37	40	45	47	40	39	50	51	45	43	49	52	54	50	56	62	44.2	
	Minimum	57	58	56	64	54	57	55	61	65	68	69	69	70	70	68	63	71	69	68	61	62	58	65	74	77	82	82	87	86	91	85	68.4	
Belle Plaine	Maximum	43	32	45	40	39	40	39	40	35	38	38	38	40	48	46	41	40	38	50	43	42	48	49	41	44	49	54	57	51	55	65	44.1	
	Minimum	58	55	65	63	55	57	55	66	71	71	71	68	72	73	67	64	74	71	67	62	68	68	65	74	76	79	81	85	85	89	82	69.6	
Carroll	Maximum	45	32	45	45	39	43	35	40	46	43	49	48	39	40	45	38	38	43	40	42	42	48	49	51	45	49	54	52	51	60	62	45.5	
	Minimum	54	57	55	65	53	54	58	63	65	65	65	68	68	70	68	62	68	71	65	61	55	60	61	70	74	78	78	82	81	85	81	66.1	
Davenport	Maximum	40	32	45	40	39	40	39	40	35	38	38	38	40	48	46	41	40	38	50	43	42	48	49	41	44	49	54	57	51	55	65	44.1	
	Minimum	58	55	65	63	55	57	55	66	71	71	71	68	72	73	67	64	74	71	67	62	68	68	65	74	76	79	81	85	85	89	82	69.6	
Des Moines	Maximum	45	32	45	45	39	43	35	40	46	43	49	48	39	40	45	38	38	43	40	42	42	48	49	51	45	49	54	52	51	60	62	45.5	
	Minimum	54	57	55	65	53	54	58	63	65	65	65	68	68	70	68	62	68	71	65	61	55	60	61	70	74	78	78	82	81	85	81	66.1	
Dubuque	Maximum	40	32	45	40	39	40	39	40	35	38	38	38	40	48	46	41	40	38	50	43	42	48	49	41	44	49	54	57	51	55	65	44.1	
	Minimum	58	55	65	63	55	57	55	66	71	71	71	68	72	73	67	64	74	71	67	62	68	68	65	74	76	79	81	85	85	89	82	69.6	
Fort Dodge	Maximum	45	32	45	45	39	43	35	40	46	43	49	48	39	40	45	38	38	43	40	42	42	48	49	51	45	49	54	52	51	60	62	45.5	
	Minimum	54	57	55	65	53	54	58	63	65	65	65	68	68	70	68	62	68	71	65	61	55	60	61	70	74	78	78	82	81	85	81	66.1	
Grinnell	Maximum	40	32	45	40	39	40	39	40	35	38	38	38	40	48	46	41	40	38	50	43	42	48	49	41	44	49	54	57	51	55	65	44.1	
	Minimum	58	55	65	63	55	57	55	66	71	71	71	68	72	73	67																		

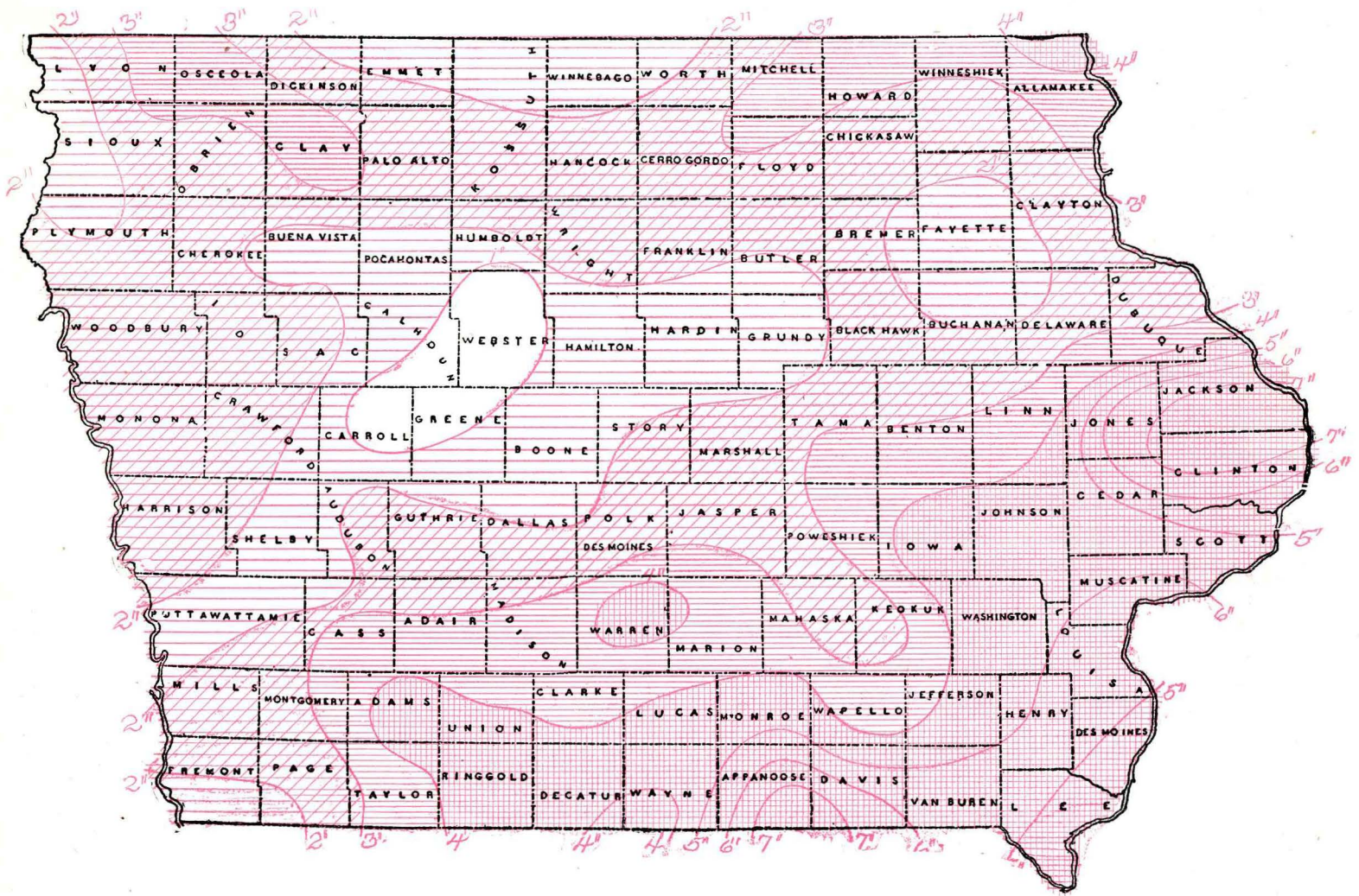
HAIL STORMS DURING APRIL, 1919

Date	County	Township	Direction From	Area Covered	Character	Size of Stones	Damage	Width of Path
21	Clark	Doyle	N. W.	Small	Light	¼ inch	Slight	Narrow
21	Henry	Jackson	N. E.	Small	Light	Small	None	Narrow
29	Clark	Doyle	S. W.	Small	Light	¼ inch	Slight	Narrow
30	Dickinson	Westport				1-16 to ¼ inch	Slight	2 miles

HAIL STORMS DURING MAY, 1919

3	Palo Alto	Fern Valley	N.	16 sq. mi.	Heavy	Large	Slight	3 to 4 miles
3	Pocahontas	Lake	S. E.	8 sq. mi.	Heavy	½ inch	Slight	1½ miles
3	Taylor	Clayton	N.	18 sq. mi.	Moderate	¼ to 1 inch	Slight	3 miles
3	Guthrie	Beaver	N. W.	Small	Light	Small	Slight	Narrow
3	Kossuth	Portland	W.	10 sq. mi.	Moderate	½ inch	Slight	1 to 2 miles
3	Kossuth	Plum Creek	W.	9 sq. mi.	Moderate	½ inch	Slight	1 to 1½ miles
3	Ringgold	Liberty	S.	36 sq. mi.	Light	⅝ inch	Slight	6 miles
3	Madison	Webster	S. W.	16 sq. mi.	Heavy	½ to 1½ inch	Considerable	Up to 1½ miles
3	Madison	Lincoln	W.	12 sq. mi.	Heavy	Up to 1 inch	Considerable	3 miles
3	Winnebago	Forest	S. E.	15 sq. mi.	Light	¼ inch	Slight	2½ miles
3	Wright	Norway	N. E.	24 sq. mi.	Light	¼ inch	Slight	2 to 3 miles
3	Polk	Allen	N. E.	Small	Light	⅜ inch	Slight	Narrow
3	Warren	Jefferson	S. E.	12 sq. mi.	Light	Small	Slight	2 miles
3	Wayne	Warren	S.	Small	Light	Small	Slight	Narrow
3	Hardin	Union	S. E.	Small	Light	¼ inch	Slight	Narrow
3	Marshall	Linn	S.	Small	Light	½ inch	Slight	Narrow
3	Marion	Lake Prairie	S. W.	6 sq. mi.	Light	½ inch	Slight	1½ miles
3	Winneshiek	Decorah	E.		Light	¼ inch	None	Narrow
3	Winneshiek	Glenwood	S. E.		Moderate	¼ inch	Slight	Narrow
3	Linn	Grant	E.	15 sq. mi.	Moderate	½ inch	Considerable	1 to 3 miles
3	Linn	Spring Grove	E.	20 sq. mi.	Moderate	½ inch	Considerable	3 to 4½ miles
5	Polk	Four Mile	S.	5 sq. mi.	Heavy	¾ inch	Considerable	1 mile
5	Warren	Allen	S. E.	2 miles	Light	Small	Slight	Narrow
5	Warren	Lincoln		Narrow	Light	Large	Slight	Narrow
5	Wayne	Richman	S. E.	8 sq. mi.	Heavy	Large	Considerable	1 to 2 miles
5	Jackson	Maquoketa	W.	Large	Moderate	¼ inch	Slight	Wide
6	Decatur	Bloomington	S. W.	Large	Moderate	¼ to ½ inch	Slight	Wide
6	Decatur	Fayette	S. W.	Large	Light	Up to ¾ inch	Slight	4 miles
6	Polk	Allen	W.	Small	Light	½ to ½ inch	Slight	Narrow
6	Warren	Union	S. W.	Small	Light	¼ inch	Slight	Narrow
6	Warren	Washington	W.	Small	Light	½ inch	Slight	Narrow
6	Wayne	Walnut	N. W.	20 sq. mi.	Moderate	¾ inch	\$1,000	4 miles
6	Wayne	Warren	S. W.	5 sq. mi.	Moderate	½ inch	Slight	¾ mile
6	Wayne	Richman	S.	3 sq. mi.	Moderate	½ inch	Slight	½ mile
6	Wayne	Clay	W.	3 sq. mi.	Light	½ inch	Slight	½ mile
6	Marion	Clay	S.	2½ sq. mi.	Light	½ to 1 inch	Slight	1 mile
6	Monroe	Monroe	S. W.	20 sq. mi.	Light	Up to ½ inch	Slight	Wide
6	Monroe	Union	W.	Small	Light	¼ inch	Slight	Narrow
6	Appanoose	Walnut	W.	Small	Heavy	½ inch	Considerable	Narrow
6	Appanoose	Bellair	W.	20 sq. mi.	Moderate	¼ to ½ inch	Considerable	Wide
6	Appanoose	Vermillion	S. W.	Small	Moderate	½ inch	Considerable	Narrow
6	Appanoose	Douglas	S. W.	Large	Light	Small	Slight	Wide
6	Iowa	Pilot	N. W.	1 sq. mi.	Light	½ inch	Slight	Narrow
6	Johnson	Union	S. E.	5 sq. mi.	Moderate	Up to ½ inch	Slight	1 mile
6	Winneshiek	Bloomfield	S. E.	Small	Light	¼ inch	Slight	Narrow
6	Henry	Baltimore	N. W.	5 sq. mi.	Moderate	½ inch	Slight	1 mile
6	Henry	Center	W.	6 sq. mi.	Moderate	Up to ½ inch	Slight	1½ miles
12	Madison	Webster	S.	6 sq. mi.	Light	Small	None	1½ miles
19	Adams	Jasper	N. E.	Small	Light	¼ inch	None	Narrow
19	Clarke	Madison	N. E.	¾ sq. mi.	Light	¼ inch	None	Narrow
19	Mahaska	Harrison	E.	Large	Light	½ inch	Slight	Wide
19	Mahaska	Lincoln	E.	12 sq. mi.	Light	½ inch	Considerable	2 miles
31	Iowa	Troy		Small	Light	¼ inch	Slight	

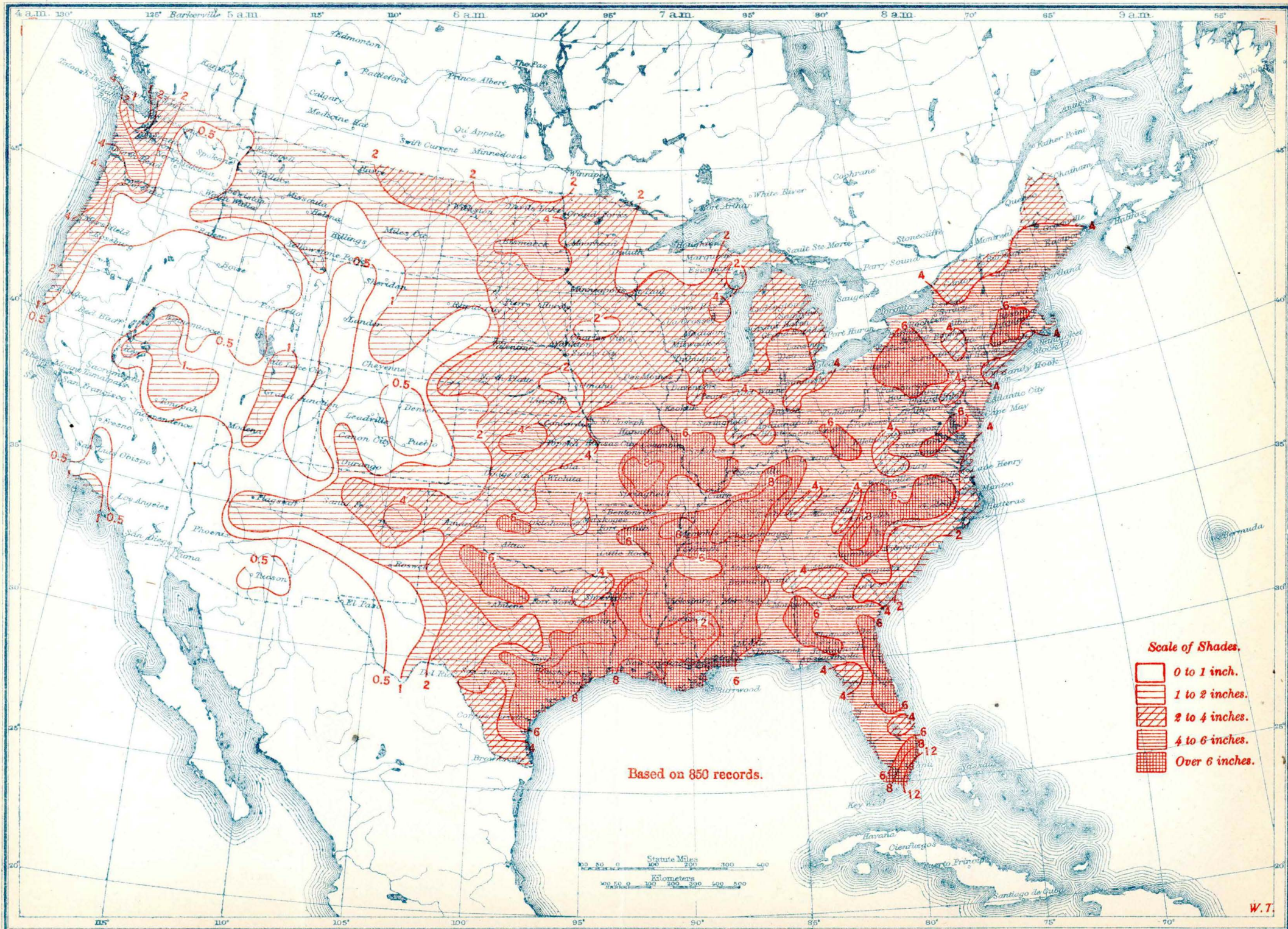
TOTAL PRECIPITATION, MAY, 1919.



SCALE OF SHADES—IN INCHES



Total Precipitation, Inches, May, 1919.



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U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JUNE, 1919

BY
CHARLES D. REED
METEOROLOGIST

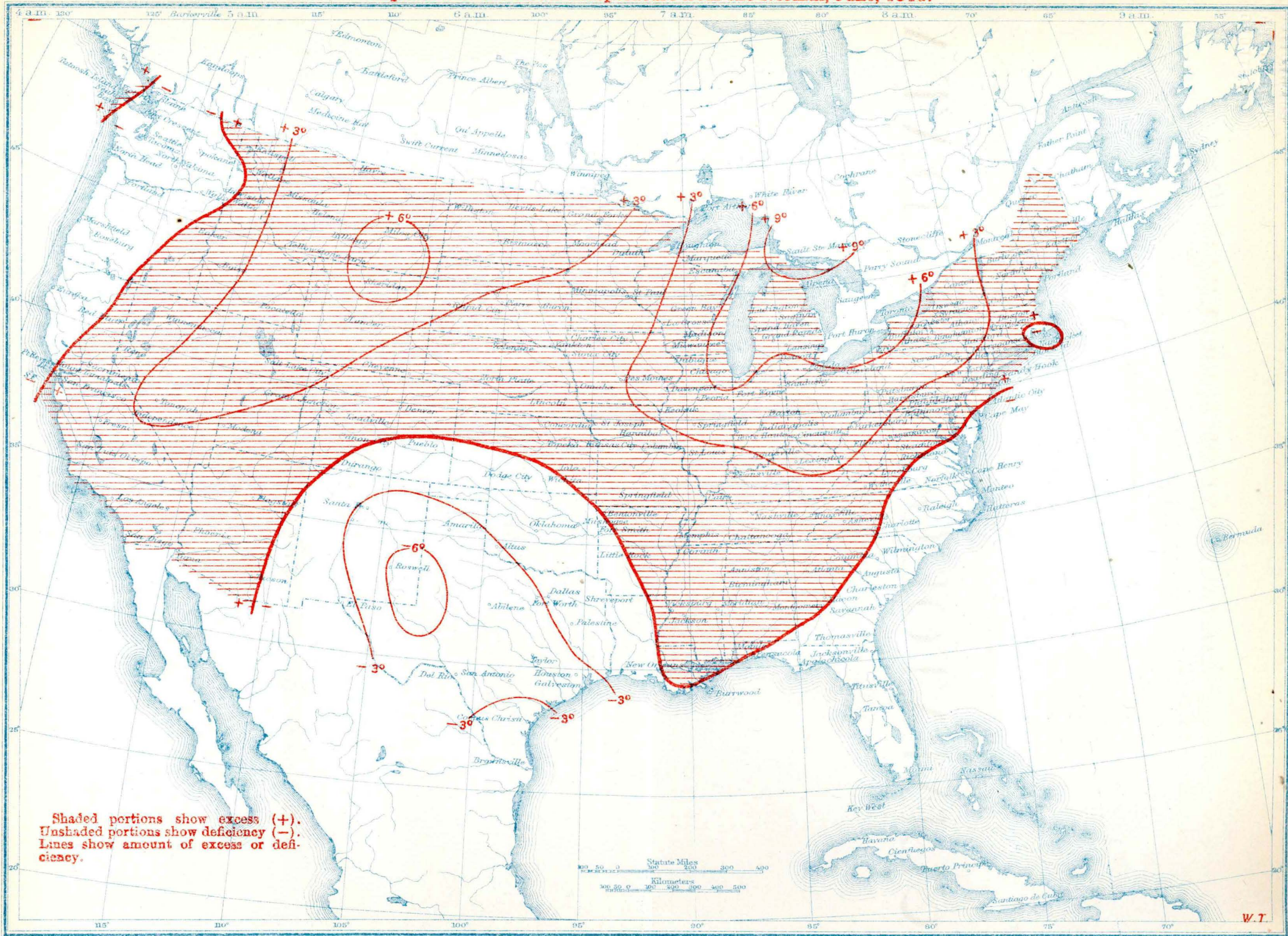


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

6

Departure of the Mean Temperature from the Normal, June, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, JUNE, 1919 No. 6

GENERAL SUMMARY.

The first eight days of June were cool followed by an 18-day period of unusually warm weather with cooler toward the close. All stations had an excess of temperature, the greatest being about 4 degrees in the eastern counties.

Heavy general rains, 1st-8th, were followed by more intermittent local rains which nearly ceased after the 24th. Many heavy local rains occurred in the central and north portions on the 10th and 20th. Nearly all stations reported precipitation above normal for the month, though there were some deficiencies reported in the extreme southwest and southeast counties. In portions of Buena Vista and Tama counties the precipitation was between 7 and 8 inches above the normal. A tornado in Chickasaw county, 7:30 to 8 p. m. of the 23d, caused damage totaling about \$60,000. About 6:25 p. m. on the same date near Riceville, Marshall county, a tornado caused about \$5,000 damage. This storm was remarkable in that it made a complete loop and crossed its own path nearly all within sections 1, 2 and 12 of Douglas Township, as vouched for by many eye witnesses.

During a severe thunderstorm in and north of Dubuque, 8:40 to 10:30 p. m., June 23d, roads and bridges were destroyed, basements flooded and street railway traffic stopped. The damage in Dubuque county amounted to about \$25,000.

Hail was less prevalent than usual in June. The most important was about 3 p. m. of the 27th, in Prussia and Summer-set Townships in Adair County where \$100,000 damage was reported. The June hail table will appear in a later issue.

The unusually prolonged hot spell, and the high humidity of the first part of the warm period were exceptionally favorable for diseases of small grains such as scab, red rust, smut and blight. Not much black stem rust was reported. Winter wheat which had been very promising since December deteriorated greatly and was prematurely ripened. Half or more of the kernels in the heads became shrunken or diseased. This was somewhat offset by the unusually good stand. Harvest was well advanced in the south and beginning in the central counties at the close of the month. Spring wheat was similarly affected and oats did not fill well. Corn made unusual progress and the dry weather toward the close permitted cultivation so that the fields became fairly clean.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.01 inches. The highest recorded was 30.30 inches at Davenport, on the 13th, and the lowest was 29.66 inches, at Charles City, on the 23d. The monthly range was 0.64 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 99 stations, was 71.9°, or 2.8° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 70.3°, or 2.7° higher than the normal; Central, 72.1°, or 2.8° higher than the normal; Southern, 73.2°, or 2.9° higher than the normal. The highest monthly mean was 75.8°, at Burlington and Keokuk, and the lowest was 68.4° at Britt. The highest temperature reported was 98° at Omaha, Nebraska, on the 23d, and the lowest was 41°, at Chariton, on the 4th. The temperature range for the State was 57°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 85 per cent, and at 7 p. m. it was 68 per cent. The mean for the month was 76 per cent, or 6 per cent above the normal. The highest monthly mean was 82 per cent at Charles City, and the lowest was 72 per cent, at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 105 stations, was 6.13 inches, or 1.75 inches more than the normal. By divisions the averages were as follows: Northern, 7.18 inches, or 2.75 inches more than the normal; Central, 5.92 inches, or 1.60 inches more than the normal; Southern, 5.29 inches, or 0.90 of an inch more than the normal. The greatest amount, 12.25 inches, occurred at Alta, and the least, 1.82 inches, at Keosauqua. The greatest amount in 24 consecutive hours, 5.10 inches, occurred at Sac City, on the 10th.

WIND.

The prevailing direction of the wind was from the south-east. The highest velocity reported from a regular Weather Bureau station was 42 miles an hour, from the northwest, at Omaha, Nebraska, on the 25th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 60, or about 9 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 53; Davenport, 64; Des Moines, 54; Dubuque, 65; Keokuk, 79; Sioux City, 38; Omaha, Nebr., 65.

MISCELLANEOUS PHENOMENA.

- Aurora: 1st, 4th, 25th.
- Fog: 7th, 8th, 10th, 16th, 18th, 22d, 23d, 30th.
- Hail: 3d, 6th, 9th, 10th, 13th, 19th, 21st, 23d, 26th.
- Halos (lunar or solar): 8th.
- Rainbows: 1st, 5th, 6th, 9th, 10th, 11th, 12th, 13th, 16th.
- Thunderstorms: All days during the month except on the 25th, 26th, 28th, 29th.
- Tornadoes: 23d, at 8:00 p. m., New Hampton; and at 6:25 p. m., Riceville.

COMPARATIVE DATA FOR THE STATE—JUNE.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation, of in.	Clear	Partly cloudy	Cloudy
1890	72.7	+ 3.6	106	44	7.76	+3.38	16.53	1.57	-----	11	12	10	8
1891	69.1	0.0	99	37	5.39	+1.01	19.88	1.68	-----	11	8	10	12
1892	69.2	+ 0.1	102	42	5.19	+0.81	14.16	0.67	-----	10	12	11	7
1893	71.2	+ 2.1	100	40	3.91	-0.47	7.56	1.36	-----	8	15	11	4
1894	73.2	+ 4.1	104	34	2.67	-1.71	6.20	0.57	-----	7	16	10	4
1895	69.7	+ 0.6	102	34	4.32	-0.06	9.26	0.98	-----	10	11	11	8
1896	69.1	0.0	100	40	3.11	-1.27	7.89	0.81	-----	9	12	13	5
1897	69.1	0.0	103	29	3.81	-0.57	9.38	1.03	-----	10	10	12	8
1898	71.4	+ 2.3	99	42	4.72	+0.34	12.48	1.90	-----	9	13	10	7
1899	70.7	+ 1.6	100	42	5.04	+0.66	11.99	1.10	-----	10	12	13	5
1900	69.7	+ 0.6	102	38	3.98	-0.40	12.35	0.67	-----	5	17	10	3
1901	72.3	+ 3.2	106	30	3.71	-0.67	7.84	1.05	-----	9	15	11	4
1902	65.2	- 3.9	97	32	7.16	+2.78	16.04	1.46	-----	14	8	11	11
1903	64.6	- 4.5	96	30	2.86	-1.52	6.04	0.75	-----	10	13	10	7
1904	67.1	- 2.0	94	35	3.45	-0.93	8.35	0.44	-----	7	13	10	7
1905	69.9	+ 0.8	100	36	5.53	+1.15	14.89	1.80	-----	10	12	11	7
1906	67.9	- 1.2	99	37	3.92	-0.46	8.27	1.48	-----	8	15	10	5
1907	66.5	- 2.6	98	36	5.35	+0.97	9.33	2.07	-----	11	14	9	7
1908	67.1	- 2.0	94	35	5.06	+1.28	11.88	1.77	-----	13	12	10	8
1909	69.1	0.0	96	40	6.41	+2.03	13.30	2.80	-----	13	12	10	8
1910	69.5	+ 0.4	105	33	1.99	-2.39	5.51	0.05	-----	7	18	7	5
1911	75.7	+ 6.6	108	36	1.82	-2.56	6.28	0.06	-----	5	20	8	2
1912	66.2	- 2.9	101	34	2.74	-1.64	5.71	0.78	-----	7	15	9	6
1913	71.5	+ 2.4	102	33	3.31	-1.07	8.95	0.74	-----	7	19	8	3
1914	72.2	+ 3.1	101	40	5.57	+1.19	13.24	1.17	-----	13	12	14	4
1915	65.1	- 4.0	91	31	4.16	-0.22	9.99	1.72	-----	11	12	12	6
1916	64.5	- 4.6	96	38	3.71	-0.67	7.96	1.41	-----	10	13	11	6
1917	66.0	- 3.1	100	32	6.65	+2.27	13.82	3.04	-----	12	13	10	7
1918	70.8	+ 1.7	104	38	5.29	+0.91	10.19	1.55	-----	11	16	10	4
1919	71.9	+ 2.8	98	41	6.13	+1.75	12.25	1.82	-----	13	12	12	4

Climatological Data for June, 1919.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.							Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.	Partly cloudy.			Cloudy.	
Northern Division																					
Algona	Kossuth	1,213	46	70.4	+ 2.3	90	19†	48	2	22	5.00	+0.56	0.82	0	15	15	6	9	sw.	W. E. Laird.	
Allison	Butler	1,045	7	70.4	-----	91	18†	49	6	29	4.50	-----	0.93	0	14	5	12	13	se.	J. A. Bell.	
Alta	Buena Vista	1,513	28	69.4	+ 1.8	92	23	46	2	24	12.25	+7.34	3.10	0	13	9	13	8	s.	David E. Hadden.	
Alta (near)	Buena Vista	23	-----	-----	-----	-----	-----	-----	-----	-----	11.63	+6.90	2.00	0	12	-----	-----	-----	-----	Warren Minard.	
Alton	Sioux	1,305	14	70.1	+ 2.4	95	23	46	2†	29	4.89	-----	1.38	0	13	10	12	8	se.	W. S. Slagle.	
Belmond	Wright	1,205	9	71.2	-----	94	19	46	6	28	6.80	-----	2.23	0	21	2	19	9	se.	Geo. P. Hardwick.	
Britt	Hancock	1,236	22	68.4 ^b	+ 1.0	91 ^b	18†	46 ^b	6	25 ^b	5.15	+1.16	0.98	0	16	-----	-----	-----	-----	L. M. Goodman.	
Charles City	Floyd	1,015	28	70.6	+ 1.8	90	19	51	6	28	6.05	+0.95	1.57	0	14	5	18	7	se.	U. S. Weather Bureau.	
Decorah	Winnebago	875	26	72.2	+ 3.7	93	19	50	28	33	7.24	+3.00	2.18	0	13	10	13	7	se.	Wm. F. Baker.	
Elkader	Clayton	751	40	72.8	+ 4.1	94	19†	48	28	39	6.33	+2.38	1.30	0	12	14	10	6	s.	D. C. Hale.	
Estherville	Emmet	1,298	24	69.4	+ 3.1	95	23	45	2	31	9.07	+4.36	1.60	0	15	17	10	3	s.	A. O. Peterson.	
Fayette	Fayette	1,003	29	70.8	+ 4.0	88	18†	50	7†	35	6.21	+1.50	0.75	0	16	14	9	7	se.	R. Z. Latimer.	
Forest City†	Winnebago	1,226	25	69.4 ^a	+ 1.9	91 ^a	18†	47 ^a	6	29 ^a	5.74	+1.53	0.96	0	15	8	9	13	se.	-----	
Humboldt	Humboldt	1,095	31	71.4	+ 3.3	94	18	49	2†	29	6.65	+2.25	1.54	0	13	12	11	7	se.	H. C. Snitkey.	
Inwood	Lyon	1,474	15	69.4	+ 1.8	91	25	45	6†	30	8.48	+3.33	1.62	0	11	16	6	8	s.	F. B. Hanson.	
Lansing	Allamakee	632	13	-----	-----	-----	-----	-----	-----	-----	6.35	+2.04	1.94	0	15	-----	-----	-----	-----	Chas. R. Serene.	
LeMars	Plymouth	1,224	23	-----	-----	96 ^b	23	50 ^b	28	28 ^b	-----	-----	-----	0	-----	-----	-----	-----	-----	C. L. Treney.	
Mason City	Carro Gordo	1,148	22	70.0	+ 2.6	96	20	48	6†	29	8.07	+2.99	3.07	0	14	6	17	7	se.	North'n Sugar Corporation.	
New Hampton	Chickasaw	1,169	22	70.7	+ 3.5	91	19	50	6†	29	7.91	+3.97	2.01	0	11	9	13	8	s.	A. F. Kemman.	
Nora Springs	Floyd	1,064	6	71.6	-----	94	18	50	6†	27	8.75	-----	1.55	0	19	10	10	10	s.	Arthur Betts.	
Northwood	Worth	1,222	23	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Chas. Dwell.	
Pocahontas	Pocahontas	1,248	15	70.6	+ 3.5	93	18	47	2†	27	5.72	+1.41	1.88	0	15	10	11	9	se.	F. E. Hronek.	
Rockville	Clayton	1,180	20	68.8	+ 2.2	87	19	48	28	27	6.40	+1.99	1.64	0	12	7	16	7	se.	F. L. Williams.	
Rock Rapids	Lyon	1,358	20	70.6	+ 2.6	93	18†	47	3†	29	7.12	+2.81	1.35	0	15	20	6	4	sw.	J. K. Medberry.	
Sanborn	O'Brien	1,553	5	69.6	-----	95	25	45	2†	30	6.83	-----	1.60	0	16	13	10	7	se.	Jas. W. Dow.	
Sibley	Osceola	1,212	26	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	H. F. Olds.	
Sioux Center	Sioux	1,426	20	69.3	+ 2.1	94	23	47	2†	27	4.59	+0.63	1.28	0	12	19	5	6	s.	J. de Ruyter.	
Spencer	Clay	1,319	5	70.2	-----	94	23	46	2†	30	6.36	-----	1.40	0	14	3	20	7	ne.	E. W. Little.	
Storm Lake	Buena Vista	1,440	30	69.9	+ 2.3	92	23†	47	2	25	11.97	+7.59	2.60	0	13	15	11	4	s.	Geo. H. Fracker.	
Washita	Cherokee	1,157	21	70.0	+ 2.6	94	23	46	2	33	9.30	+5.22	1.75	0	14	12	7	11	s.	H. L. Felter.	
Waverly	Bremer	948	23	69.0	+ 1.3	92	18†	46	30	38	5.59	+1.57	1.27	0	13	10	16	4	se.	H. Arnold.	
West Bend	Palo Alto	1,197	26	70.6	+ 2.4	94	25	46	6	31	5.80	+1.63	1.03	0	17	4	21	5	s.	Jos. Dorweiler.	
Means and extremes				70.3	+ 2.7	96	20†	45	2†	39	7.18	+2.75	3.10	0	14	11	12	7	se.		
Central Division																					
Ames	Story	926	43	72.0 ^b	+ 2.5	92 ^b	18†	48 ^b	8	28 ^b	2.88	-1.66	1.71	0	9	-----	-----	-----	-----	-----	Iowa State College.
Audubon†	Audubon	1,301	25	70.5	+ 2.3	94	18	45	2†	26	6.40	+2.57	1.48	0	12	13	11	6	se.	V. M. Jones.	
Baxter	Jasper	998	19	71.2	+ 2.2	94	18	45	2†	26	4.93	+0.76	3.01	0	12	3	14	13	se.	Rev. Paul Traeger.	
Belle Plaine†	Benton	886	29	72.2	+ 3.2	89	13†	50	8	25	5.50	+1.45	1.19	0	16	7	17	6	se.	C. C. Burrows.	
Boone	Boone	1,134	14	71.6	+ 2.6	93	18†	49	7	27	4.48	-0.20	1.74	0	10	-----	-----	-----	-----	Carl F. Henning.	
Carroll	Carroll	1,265	29	70.5	+ 2.7	93	23	46	2†	30	5.54	+0.76	1.88	0	15	14	6	10	se.	Mrs. J. J. Wolfe.	
Cedar Rapids	Linn	733	37	74.6	+ 4.0	95	13	52	28	32	3.47	-0.26	1.09	0	11	17	7	6	s.	R. S. Toogood.	
Clinton	Clinton	593	46	74.4	+ 4.0	93	30	51	8	35	2.84	-1.46	1.04	0	10	11	13	6	se.	H. Burde.	
Davenport	Scott	580	48	74.6	+ 3.7	92	16	52	28	28	3.90	-0.21	1.49	0	11	8	15	7	e.	U. S. Weather Bureau.	
Delaware	Delaware	1,083	28	70.8	+ 3.0	88	18†	49	28	29	6.79	+2.84	1.32	0	13	8	17	5	s.	Nettie E. Ball.	
Denison	Crawford	1,180	25	71.2	+ 3.1	93	24	46	2	25	6.14	+2.15	1.20	0	14	15	6	9	sw.	Emma Brogden.	
Des Moines	Polk	861	40	73.4	+ 3.0	92	25	52	2	24	7.36	+2.40	2.46	0	13	5	12	13	sw.	U. S. Weather Bureau.	
Dubuque	Dubuque	639	46	72.8	+ 3.2	92	19	52	28	26	6.24	+1.69	1.88	0	15	7	16	7	se.	U. S. Weather Bureau.	
Fort Dodge†	Webster	1,126	19	72.0	+ 3.4	96	24	49	6†	32	6.73	+2.55	2.22	0	10	8	13	9	se.	Isadore Haugh.	
Grinnell	Poweshiek	1,031	25	73.1	+ 3.1	93	26	50	5	31	4.52	+0.20	1.34	0	9	-----	-----	-----	-----	J. P. Stocks.	
Grundy Center	Grundy	976	28	73.4	+ 4.6	94	19	51	28	31	5.56	+0.54	1.75	0	14	12	14	4	se.	M. G. Heiberger.	
Guthrie Center	Guthrie	1,077	24	71.9	+ 2.1	91	18†	49	2	28	8.55	+4.34	2.22	0	12	18	7	5	sw.	C. T. Harney.	
Harlan	Shelby	1,182	20	72.2	+ 3.9	97	19	47	2	29	6.12	+1.83	1.70	0	14	19	5	6	s.	E. L. Tilton.	
Independence	Buchanan	921	55	71.1	+ 3.4	89	18	49	27	30	4.83	+0.34	1.04	0	15	15	8	7	e.	Dr. H. A. Lindsay.	
Iowa City	Johnson	683	58	73.2	+ 3.4	94	16	50	8	33	7.07	+2.62	2.50	0	13	13	13	4	se.	Prof. J. F. Reilly.	
Iowa Falls	Hardin	1,107	26	70.3	+ 3.0	90	19	47	6	25	9.09	+3.69	3.27	0	16	14	7	9	e.	J. B. Parmelee.	
Jefferson	Greene	1,052	20	71.3	+ 2.3	93	18†	48	8	31	4.89	-----	1.27	0	13	12	6	12	s.	Will I. Lyon.	
LeClaire	Scott	576	19	-----	-----	-----	-----	-----	-----	-----	6.55	+2.87	1.75	0	10	-----	-----	-----	-----	Margaret T. Disney.	
Little Sioux	Harrison	1,040	14	71.8	+ 1.5	95	23	44	6	31	5.61	-----	1.56	0	16	13	5	12	se.	Geo. H. Gibson.	
Logan	Harrison	928	52	71.6	+ 1.6	96	19	48	2	28	7.34	+2.10	1.58	0	14	11	15	4	sw.	Mary Jean Stern.	
Maquoketa	Jackson	688	18	72.2	+ 3.8	90	15†	50	7†	29	4.16	-0.65	1.35	0	8	11	13	6	e.	Ira H. Stephens.	
Marshalltown	Marshall	947	27	72.8	+ 3.6	92	20†	48	8	33	5.35	+1.09	2.18	0	16	10	8	12	se.	Chas. F. W. Kothenbeutel.	
Monroe	Jasper	922	7	72.1	-----	90	18	51	5	26	5.52	-----	1.23	0	13	10	9	11	sw.	I. F. Dibel.	
Muscataine	Muscataine	554	59	-----	-----	-----	-----	-----	-----	-----	2.86	-1.61	1.80	0	10	-----	-----	-----	-----	Wm. P. Molls.	
Olin	Jones	760	21	72.4 ^a	+ 3.2	91	19	50 ^a	21	36 ^a	6.70	+3.38	1.40	0	10	9	19	2	sw.	Dr. F. W. Port.	
Onawa	Monona	1,051	19	71.8	-----	98	23	46	5	28	6.52	+1.94	1.55	0	12	11	8	11	se.	Mrs. H. E. Colby.	

Climatological Data for June, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Southern Division																				
Afton	Union	1,212	25	71.7	+ 0.9	91	18†	49	9	29	9.47	+4.53	3.00	0	13	14	13	3	sw.	J. E. Deitrick.
Albia	Monroe	959	21	73.0	+ 3.5	93	18	50	5	30	4.31	+0.19	1.81	0	8	12	0	18	e.	F. H. Holmes.
Allerton	Wayne	1,122	17																	James C. Huston.
Atlantic	Cass	1,164	28	73.0	+ 3.4	97	25	48	2	32	6.34	+1.22	1.40	0	16	5	10	15	se.	Thos. H. Whitney.
Bedford	Taylor	19	19	72.0	+ 2.4	92	23†	48	2	29	6.14	+2.20	1.27	0	16	8	17	5	s.	E. E. Healy.
Bloomfield	Davis	881	12	73.6		92	16	52	5	31	3.45	-0.46	0.85	0	13	7	20	3	e.	V. G. Warner.
Bonaparte	Van Buren	565	28	73.2	+ 2.8	91	16†	52	28	28	2.72	-1.52	1.00	0	11	21	6	3	e.	Bruce R. Vale.
Burlington	Des Moines	544	23	75.8	+ 3.9	93	16†	54	7†	27	4.34	-0.04	1.35	0	9	19	7	4	s.	Mrs. Edna M. Donnelly.
Centerville	Appanoose	7,013	14	74.6		93	18†	52	5	28	3.31		0.70	0	14	13	11	6	se.	Leo J. Allen.
Chariton	Lucas	1,042	24	71.0	+ 2.3	90	18†	41	4	29	5.41	+1.13	1.75	0	6	9	14	7	se.	C. C. Burr.
Clarinda	Page	1,009	29	74.0	+ 4.0	97	25	49	2	31	6.55	+1.73	1.57	0	18	11	14	5	s.	A. S. Van Sandt.
Columbus Jct.	Louisa	595	18	74.1	+ 3.1	91	17†	52	28	29	3.73	-0.43	1.27	0	9	23	5	2	se.	J. B. Johnston.
Corning	Adams	1,117	27	72.4	+ 3.0	94	25	50	6	32	5.62	+1.52	1.98	0	9	10	14	6	se.	Jerome Smith.
Corydon	Wayne	1,101	26	72.8	+ 2.5	92	17†	49	5	30	8.98	+4.69	4.96	0	12	11	16	3	s.	May C. Miller.
Creston	Union	1,312	14	70.8	+ 2.3	91	25	49	2†	28	9.45		2.10	0	14	7	14	9	s.	Mrs. T. E. McConnell.
Cumberland	Cass		20								4.37	-0.07	1.37	0	11	19	9	2	sw.	J. H. Reppert.
Earlham	Madison	1,126	17	71.0	+ 3.3	91	23	48	8	35	5.24	+1.00	1.48	0	13	14	9	7	se.	Geo. Phillips.
Fairfield	Jefferson	780	35	73.6 ^c	+ 2.9	92 ^c	17	52 ^c	7	32 ^c	3.26	-1.51	0.97	0	8				w.	Prof. R. M. McKenzie.
Glenwood	Mills	1,100	22	72.3		94	23	47	2	27	6.13		1.70	0	14	13	11	6	se.	Dr. Geo. Mogridge.
Greenfield	Adair		27																	Frank A. Ward.
Indianola	Warren	969	27	73.0	+ 2.7	94	15	51	5	30	8.88	+4.42	2.36	0	13	9	5	16	se.	Prof. J. L. Tilton.
Keokuk	Lee	614	48	75.8	+ 3.3	93	19	56	28	26	2.38	-1.97	0.84	0	7	10	17	3	se.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	27	74.2	+ 2.9	94	17	53	8	34	1.82	-2.21	0.74	0	10	8	14	8	se.	J. H. Landes.
Knoxville	Marion	920	24	73.8	+ 2.7	95	18	49	5	33	3.64	-0.31	1.65	0	7	10	12	8	se.	W. J. Casey.
Lacona	Warren		20								6.35	+1.88	1.65	0	16	6	16	8		J. B. Alter.
Lamoni	Decatur	1,100	12	73.0	+ 2.1	94	25	50	5†	30	9.11		2.69	0	12	15	11	4	s.	Ed. D. Moore.
Lenox	Taylor	1,250	24	73.4	+ 3.8	94	25†	49	2	28	4.96	+0.90	1.83	0	13	18	9	3	s.	J. L. Hurley.
Mount Ayr	Ringgold	1,236	26	72.6	+ 2.0	91	25†	50	2†	26	6.65	+1.81	2.08	0	14	13	13	4	se.	Alex. Maxwell.
Mt. Pleasant	Henry	729	38	74.5	+ 3.1	92	16†	51	28	33	2.81	-2.30	0.77	0	7	15	12	3	se.	John H. Jericho.
Murray	Clarke	1,216	28	73.4	+ 3.4	94	18†	50	2	31	7.20	+3.26	1.76	0	15	8	13	9	s.	M. T. Ashley.
Northboro	Page	1,046	5	73.5		93	18†	49	2	28	4.88		0.82	0	12	10	9	11	se.	J. M. Darby.
Oakland	Pottawattamie			72.6 ^b		93 ^b	25	47 ^b	4†	28 ^b	7.63		1.90	0	14	17	5	8	s.	M. E. Gray.
Oskajosa	Mahaska	825	43	73.3	+ 3.1	93	18	47	2	27	4.95	+1.08	1.42	0	10	5	19	6	se.	Roy R. Robinson.
Ottumwa	Wapello	849	24	75.0 ^d		92 ^d	16†	53 ^d	4	27 ^d	4.27	+0.44	1.05	0	10				se.	Engene O. Field.
Pella	Marion	877	26	72.1	+ 1.7	90	18†	48	2	28	4.10	+0.61	1.35	0	8	12	3	15	e.	J. H. Ver Steeg.
Shenandodah	Page																			L. L. Hunter.
Sigourney	Keokuk	877	23	72.8	+ 2.0	91	19	51	5	30	3.46	-0.43	1.32	0	9	13	8	9	ne.	W. E. Utterback.
Stockport	Van Buren	754	17	72.8	+ 2.2	93	17	52	28	33	2.60	-1.95	0.68	0	11	13	13	4	s.	C. L. Beswick.
Thurman	Fremont		22	73.1	+ 1.8	97	23†	47	2	32	3.72	-1.89	1.22	0	11	5	22	3	se.	C. R. Paul.
Washington	Washington	769	37	74.0	+ 3.0	91	18	53	8†	29	4.97	+1.09	1.25	0	9	9	15	6	sw.	Wm. A. Cook.
Winterset	Madison	1,129	28	72.7	+ 2.5	92	25†	50	5†	28	8.49	+3.46	1.89	0	13	21	6	3	sw.	H. S. Ely.
Omaha, Nebr.		1,040	48	73.4	+ 1.8	98	23	48	2	32	4.44	-0.61	0.79	0	14	8	16	6	s.	U. S. Weather Bureau.
Means and extremes				73.2	+ 2.9	98	23	41	4	35	5.29	+0.90	4.96	0	12	12	12	6	se.	
State means and extremes				71.9	+ 2.8	98	23	41	4	39	6.13	+1.75	5.10	0	13	12	12	6	se.	

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.
 Reference letters ^a, ^b, ^c, appearing in the table indicate the number of days missing; for example, ^b represents two days, etc.
 †Also other dates. ††Received too late to be included in means and summaries.
 T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).			Wind.				Sunshine					
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.		Total movement.	Average hourly velocity.	Maximum		Per cent of possible.	Departure from normal.				
						7 a. m.	Noon †			Miles.	From.						
Charles City	30.02	30.24	14	29.66	23	88	69	75	47	28	3,954	5.5	20	ne.	18	53	-21
Davenport	30.02	30.30	13	29.67	24	82	58	64	39	30	4,664	6.5	30	s.	3	64	-6
Des Moines	30.00	30.24	14	29.68	23	86	65	70	50	28	4,536	6.3	26	s.	13	54	-13
Dubuque	30.04	30.29	13	29.68	24	86	64	69	35	29	3,985	5.5	24	se.	1	65	+1
Keokuk	30.02	30.29	14	29.70	24	81	64	64	43	29	4,239	5.9	25	se.	11	79	+6
Sioux City	29.98	30.19	14	29.67	23	90	68	68	35	18	7,770	10.8	39	n.	19	38	-27
Omaha, Neb.	29.97	30.19	14	29.68	23	84	66	69	44	17	5,030	7.0	42	nw.	25	65	-12
Means and extremes	30.01					85	65	68				6.8				60	-9
		30.30	13	29.66	23				35	†18			42	nw.	25		
Normals and records	29.93		10 th		5 th	79		60		30 th		7.7		22 ^d	69		
		30.61	1913	\$29.04	1880				†14	1894		8.5		1917			

*Dubuque. §Omaha. †Sioux City. ‡Local mean time. †And other dates.

ERRATA.

Report for April, 1919: Page 40; Charles City, mean temperature published 46.0, should be 66.1; departure published -0.3, should be, -0.2. Page 44; maximum temperature on the 8th published 45, should be 47; maximum temperature on the 15th published 36, should be, 41; mean of the maximum temperature published 54.5, should be, 54.8; minimum temperature on the 14th published 45, should be, 41; mean of the minimum temperature published 37.5, should be, 37.4. Page 41; Corning, cloudy days published 13, should be, blank. Page 44; Corning, minimum temperature on 1st omitted, should be, 19^b; mean temperature published 39.6^a, should be, 38.9^b.
 Report for May, 1919: Page 53; Keokuk; greatest precipitation in 24 hours published 1.35 inches, should be, 1.36 inches.

MISSING DATA.

Report for April, 1919: Page 41; Corning, mean temperature 48.4^b; departure -1.2; highest temperature 74^b, on the 6th; lowest temperature 19^b, on the 1st; greatest daily range 35^b; days with 0.01 or more precipitation 13.

Daily Precipitation for June, 1919.

Stations.	Watersheds.	Day of Month.																														Totals				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30					
<i>Northern Division</i>																																				
Algona	Des Moines	.04	.55	.24		.29	.32			.31	.82	.02				.13	.69		.21	.20	.62		.48					.08						5.00		
Allison	Cedar	.06	.45	.34	.27	.49	.17			.06	.93	.01		.14	T.	T.	.77		.02	.39		T.	.40										4.50			
Alta	Raccoon	1.05	.10		1.35	.20	.05	.20		.03	1.70	3.10	1.15									1.25	.50	1.57									12.25			
Aita (near)	Raccoon	.68	.12	1.80	.10	.18	.10			.50	1.50	1.93	1.17							T.			1.75	2.00									11.63			
Alton	Floyd	.69	.06	1.38	.11	.04	.58			.56	.44	.55	.24		T.							.12	.08	.04									4.89			
Belmond	Iowa	.08	.62	.44	.35	.72	.38	.04		.21	.18	.08	.02	.05	.02	.04	2.23		.08	.02	.05	1.15	.02	.02	T.								6.80			
Britt	Iowa	.05	.54	.29	.28		.89	.01		.98	.13	.01	T.		T.	.83	1.09			.05		.82	.03	.12				.03	T.				5.15			
Charles City***	Cedar	.57	.17	.52	.64	.08	.06			1.14	1.41	.02		.01		.57	.13			.71													6.05			
Decorah	Mississippi	.11	.77		1.20	.06	.85				.54	.77	.39			.13																	7.24			
Elkader	Mississippi	1.09	.88	1.30	.41	.40	.09	.07			.45	.80	.08	T.		T.	.58			T.													6.33			
Estherville	Des Moines	.50	.10		1.60		.13	.35		.11	1.40	.70	1.20				.85		.05		.10	.18	1.05	.75									9.07			
Payette	Mississippi	.63	.57	.66	.21	.71	.42			.18	.05	.18	.11				.02	.62		.08		.75	.75	T.									6.21			
Forest City	Cedar																																			
Humboldt	Des Moines	.20	.93	.58	1.34	.68	.18			.46	.38	.09					.07					1.54		.12				.08						6.65		
Inwood	Big Sioux	.80	.14		1.07	.22		.18			1.62	.02	1.59		.74							1.38	T.											8.48		
Lansing	Mississippi	.03	.76	.04	1.94	.20	.75	.05			.26	1.08	.06			T.	.80			.19	.20	.05												6.35		
LeMars	Floyd																																			
Mason City	Cedar	.28	.89	.21	.62	.32	.39			.71	.38	.06				.69	3.07					.05												8.07		
New Hampton	Wapsipicon	.72	.47	.20	.66	.37	.02				1.53	.77			T.	T.	.88							.28	T.									7.91		
Nora Springs	Cedar	.29	.04	.58	.64	.24	.39	.05	.06	1.55	.91	.14			.55	.03	.72	1.38		.76	.05	.01												8.75		
<i>Northwood</i>																																				
Pocahontas	Cedar																																			
Postville	Des Moines	.35	.24	1.88	.20	.10	.15			.47	.21	.48				.01					.23	.06	.30	.34	.65									5.72		
Rock Rapids	Mississippi	.76	.58	.20	1.64	.60	.09				.40	.57			T.		1.14	1.06			.22	.14												6.40		
Santborn	Big Sioux	.65		1.35	.23	.22	.43	.11		1.07	.04	.28	.35	.07	.15							1.15	.38	.64										7.12		
	Floyd	.69	.10	1.60	.19	.10	.37			1.08	1.07	.31	.59		.02							.32	.19	.25	.02									6.83		
Sibley	Big Sioux																																			
Sioux Center	Floyd	1.28		1.05	.12	.05	.36			.62	.12	.53	.34	.03	.04							T.	.05												4.59	
Spencer	Little Sioux	.35	.10	1.40	.10	.20	.24			1.15	.17	.75	1.00									.29	.09	.46											6.36	
Storm Lake	Raccoon	.72	.10	2.15	.21	.15	.03			1.43	2.60	1.37	.35									.33	.16	2.37											11.97	
Washta	Little Sioux	.77		1.68	.20	.48	.28		.05	.70	1.37	1.05	1.75	T.	T.							.10	.18	.58	.11									9.30		
Waverly	Cedar	1.27		.63	.35	.53	.04	T.	T.	T.	.27	.38			.32	.01	T.	.76	T.	T.		T.	.94	.02										5.59		
West Bend	Des Moines	.15	.38	.98	.52	.18	.20			.46	.10	T.			.01	.17	.47		.41	.13		.45	.01	1.03	T.			.15						5.86		
<i>Central Division</i>																																				
Ames	Skunk	1.71	.79			.05									.02	.02	.03						.14	.11	.01										2.88	
Audubon	Nishnabotna	.09	.22	1.48	.04	.06	.04			.15	.05	.31										.03	.25												6.40	
Baxter	Skunk	3.01	.55	.08	.18	.15	.37	.02		T.	.13	.19	T.			.12	T.				.08	T.	.02	T.											4.93	
Belle Plaine	Iowa	.20	1.00	.26	.26	.68	.71	.01		.37	.28	.05	.01			.01	.43				.01	T.	.03			1.19									5.50	
Boone	Des Moines	1.14	1.18	.14	1.74	.08	.02	.07			T.		.05			.04			T.				.02												4.48	
Carroll	Raccoon	1.22	.33	.10	1.88	.47	.22	.26		.12	.05	.10	.12				.20					.12		.19	.16										5.54	
Cedar Rapids	Cedar	.18	1.09	.19	.38	.34	.15	.17			.60				.15								.16												3.47	
Clinton	Mississippi	.02	1.04	.21	.55	.15	.17	T.			T.	.02			T.							.06			.59										2.84	
Davenport***	Mississippi	T.	.53	1.49	.41	.16	.19			.40			T.	T.	T.								.12	.02	.15	.22									3.90	
Delaware	Mississippi	.78	1.32	.82	.12	1.00	.20				.18	.10	.13			.08					.13							.68							6.79	
Denison	Missouri	1.00	.25	1.20	.15	.20	.20	.35		.18	.22	.82			.14								.80	.55	.08										6.14	
Des Moines***	Des Moines	2.40	.34	1.71	.19	.21	.19			T.	.82	.07			T.	.08				.63	.62		.68	T.	.02										7.36	
Dubuque***	Mississippi	1.72	.16	1.03	.50	.16	.17			.40		.08	.01	.0		.12	.38				.01	.04	T.												6.24	
Fort Dodge	Des Moines	.25	1.75	.08	1.55	.33	.08	.19			T.	.10	.22										2.22													6.73
Grinnell	Iowa	1.34	.73	.50	.65	.34	.60								.25						.10		.01												4.52	
Grundy Center	Cedar	1.75	.10	.85	.56	.36	.28			.12	.25			.11			.12				.10		.50		.12		.30								5.56	
Guthrie Center	Raccoon	.68	1.05	2.22	.32	.40	.57	.02			1.59	.28			.29								.99												8.55	
Harlan	Nishnabotna	1.10	.45	1.70	.14	.60	.10		.51	.07	.40	.65	.04		.12								.10	.14											6.12	
Independence	Wapsipicon	.51	1.04	.17	.34	.51	.11				.25	T.	.25		T.	.15				.68	.05	.34	.15	.04		.24								4.83		
Iowa City	Iowa	.15	2.50	.45	.93	.62	.64	.36			.40				.04	.07						.01	.32	T.	T.	.58									7.07	
Iowa Falls	Iowa	1.15	.57	.12	.63	.25	.06	.11			.42	.57	.32	T.	.01	T.	.32	3.27				.64		.46	T.		.19							9.09		
Jefferson	Raccoon	.48	1.12	1.27	.15	.36	.07	.05	T.	T.	.39	.02			.03	T.	T.						.34	.13	T.										4.89	
Le Claire	Mississippi	.03	1.10	1.75	1.12	.14	.15	.21			T.				T.								.10		1.23		.72	T.							6.55	
Little Sioux	Little Sioux	1.56	.06	.76	.16	.03	.07		.24	.15	.32	1.05	.32	T.								.04	.20	.04											5.61	
Logan	Missouri	1.58		1.02	.18	.12			1.19	.02	.42	.74	.16									.09	.87	.82	.40										7.34	
Maquoketa	Maquoketa	.12	1.35	.48	1.21	.17	.56								T.		.04									.23									4.16	
Marshalltown	Iowa	.30	2.18	.10	.68	.34	.07	.17			T.	.20	.14		.05	.21				.04		.15	.58	.11		.03										

Daily Precipitation for June, 1919—Continued.

Stations.	Watersheds.	Day of Month.																														Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
<i>Southern Division</i>																																		
Afton.....	Grand.....	2.50	3.00		.15	.35	.10	T.		.31	.12		.30	.44				.30			.10	.60						1.20					9.47	
Albia|||	Des Moines.....	1.81	.15	.60	.86	.18	.30		T.	T.	.07	T.		T.				.34			T.		T.										4.31	
Allerton.....	Chariton.....																																	
Atlantic|||	Nishnabotna.....	1.40	.52	.22	1.38	.56	.18	.01			.80	.43	.26			.32	.08			.01	.02		.11						.04			6.34		
Bedford.....	Missouri.....	.50	.87	1.27	.25				.35	.02		.48		.46	.42	.28				.06	.01	.91	T.				.05	.01		.20		6.14		
Bloomfield.....	Mississippi.....		.75	.71	.85	.05	.05	.12	.50	.09		T.	.09	.03				.05	.10			.06										3.45		
Bonaparte.....	Des Moines.....		1.00	.10	.27	.45	.15			.02		T.	.10	.02				T.	T.		.16	.08		.37								2.72		
Burlington|||	Mississippi.....		.39	.80	1.35	.13	.06	.19							.90							.32		.20								4.34		
Centerville.....	Chariton.....	.62	.70	.54	.25	.20	.15	.05		.04		.11	.22					.24	.17			.01	.01	T.								3.31		
Chariton.....	Chariton.....	1.75	.99	.68	1.55	T.	.25			T.	T.	T.	T.		.28					T.	T.	T.	T.									5.41		
Clarinda|||	Nodaway.....	1.57	.60	.72	.72	.21	.15			.15	.13	.22	.35		.10	.44	.01				.08	.27		.02			.76		.05			6.55		
Columbus Jet.....	Iowa.....		.54	1.27	.55	.27	.31	T.				T.	T.						.05	.09		.10		.55			T.	.09				3.73		
Corning.....	Nodaway.....	1.04	1.35	1.98	.41	.09			T.	T.	T.	T.			.15	.06				T.	T.	T.	T.									5.62		
Corydon.....	Chariton.....	4.78	1.71	.65	.85	.05	.16	.09			T.	.02			.05	T.						.44	.02										8.98	
Creston|||	Missouri.....	1.22	2.10	1.05	1.75	.12	.25	T.			.07	.15			.05	1.05					.16		.55	.07				T.	.95				9.45	
Cumberland.....	Nodaway.....	.57	.82	1.37	.42	.18	.12		.13				.28		.32	.10						.06											4.37	
Earlham.....	Des Moines.....	.98	1.45	1.48	.16	.07	.33				.19	.12			.15	.03				.17		.03							.10				5.24	
Fairfield.....	Skunk.....		.61		.64	.01		.26				.03		T.	.14							.97		.60									3.26	
Glenwood.....	Missouri.....	1.28	.30	1.30	.08	.08	.04		.07	.20	.19	.30									.25		.25				1.70		.18				6.13	
Greenfield.....	Nodaway.....																																	
Indianola.....	Des Moines.....	2.01	1.44	.89	.81	.09	.48			T.	2.36	.07	.01	T.	.53	T.				T.		.01	.05	.13	T.							8.88		
Keokuk***	Mississippi.....		.74	.44	.79	T.	.04					T.									.17	.03	T.	.17									2.38	
Keosauqua.....	Des Moines.....		.65	.09	.22	.20	.24	.17				.06	T.		.02					T.	T.		.09										1.82	
Knoxville.....	Des Moines.....	.65	1.65	.25	.43	T.	.28				T.	T.			.24						.14		.08		T.								3.64	
Lacena.....	Des Moines.....	1.65	.66	.24	1.33	.31	.39			.01	.02	.60	.08		.27					.08	.10		.18	.03	.40								6.35	
Lamoni|||	Grand.....	2.69	2.48	1.13	1.20							.20	.01			.03				.02	.49		.02	.03									9.11	
Lenox.....	Missouri.....	.63	1.09	1.83	.27		.10	.12		.02		.18		.26	.17	T.						.24		.10					.04				4.96	
Mt. Ayr.....	Grand.....	1.09	2.09	1.43	.29	.38	.07	T.		.02	.11	.25		.12	.36	T.						T.	.18	.02					T.	.25			6.65	
Mt. Pleasant.....	Skunk.....		.77	.75	.30	.53	.12	.21																	.13								2.81	
Murray.....	Grand.....	1.28	1.76	1.10	.25	.07	.22	.01		T.	.06	T.		.04	.60	.06						1.02	.04	.17				.52					7.20	
Northboro.....	Tarkio.....	.82	.73	.63	.27	.29			T.	.24		.75		T.	.06						.35	T.		.14				.58		.02			4.88	
Oakland.....	Nishnabotna.....	1.03	.33	1.13	.23	.15	.01		.20	.12	.52	1.36										1.90	.41	.15				.09					7.63	
Oskaloosa.....	Des Moines.....	.78	1.42	.19	.72	.20	.56						T.		.04					T.	T.	.37	.61	T.	.06								4.95	
Ottumwa|||	Des Moines.....	1.05	.15	.90	.37							.50	.09							.28		.26	.30	.37									4.27	
Pella.....	Skunk.....	1.35	1.06	.15	.60	.20	.17			T.	T.	T.		T.	.39					T.		.24	T.										4.10	
Shenandoah.....	Nishnabotna.....																																	
Sigourney.....	Skunk.....	.31	1.32	.23	.40	.49	.47				T.	.14	.01	T.	T.					T.	T.		T.		.09								3.46	
Stockport.....	Skunk.....		.68	.09	.24	.37	.24			.02		.06	.02									.01		.34									2.60	
Thurman.....	Missouri.....	1.22	.32	.53	.18	.12	T.		T.	.21	.18	.22										.34	T.	T.				.26		.14			3.72	
Washington.....	Skunk.....		.25	.87	.34	.45	.47				.15										.14		.50		.80								4.97	
Winterset.....	Des Moines.....	1.84	1.89	1.45	.27	.07	.80	.02			.42	.06		T.	.21						.44		.95										8.49	
Omaha, Neb.***	Missouri.....	1.19	.09	.29	.06	.09	.01		.69	.14	.66	.30	T.		T.	T.						.07	T.	T.			.56	.02	.24				4.44	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 **Incomplete.
 *Precipitation included in the next following measurement.

RIVERS.

Flood stages were not reached on any of the boundary rivers during the month and the stages were generally below normal. On the interior rivers high stages prevailed during the greater portion of the first half of the month due to general excessive rains; the Des Moines River was above flood stage at Ottumwa from the 4th to the 8th, inclusive, and was within 2.1 feet of the flood stage at Boone.

IOWA CROP REPORT, JULY 1, 1919.

Reports from township correspondents showed the following average condition of crops on July 1: Corn, 94 per cent; oats, 92; spring wheat, 90; winter wheat, 91; barley, 93; rye, 95; flax, 90; potatoes, 94; tame hay, 103; wild hay, 100; pastures, 106; alfalfa, 101; sweet corn, 96; pop corn, 96 per cent. The decline in winter wheat since June 1 is 16 per cent, yet it is about the 10-year average. Spring wheat is 4 per cent below the 10-year average. Corn is 2 per cent above the 10-year average. The condition of tame hay is 3 per cent higher than before reported in the last 10 years.

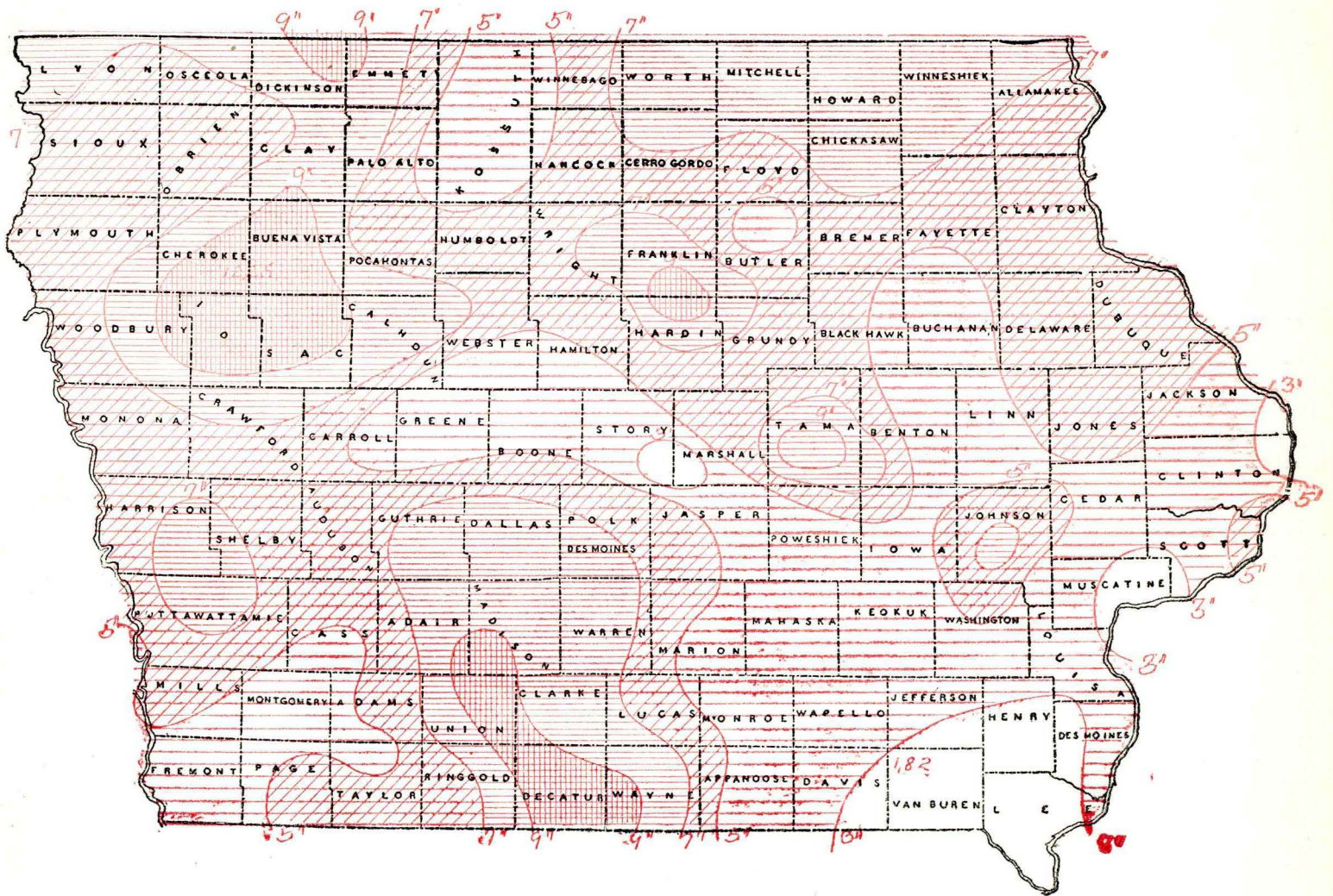
Delay on the part of the township assessors in making their returns of the acreage of the various crops in 1918, makes it impossible to complete the acreage estimates of the Iowa Weather and Crop Service for the crops of 1919, in time for publication in this issue, but they will appear in the July report.

The secretary of the state horticultural society reports the condition of fruit on July 1 as follows: "Summer apples, 54 per cent; fall apples, 50; winter apples, 40; pears, 16; Americana plums, 24; Domestica plums, 18; Japanese plums, 17; cherries, 58; grapes, 85; red raspberries, 90; black raspberries, 91; blackberries, 83; currants, 73; gooseberries, 80 per cent of a full crop. The average for all fruit is 47 per cent or one point below the ten-year average for July, but is 15 points below that of last month, the decline being caused by the heavy drop of apples, pears and plums. The condition of the berry crop has improved slightly during the month and the percentage on red and black raspberries is the highest reported for July 1 in the last 20 years."

Daily Maximum and Minimum Temperatures for the Month of June, 1919.

Stations.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Mean		
<i>Northern Division</i>																																	
Algona	Maximum	71	62	64	67	64	65	72	75	75	79	83	85	84	83	84	85	88	90	82	80	83	90	85	87	86	76	75	80	86	78.3		
	Minimum	57	48	52	60	53	50	53	54	58	63	65	67	66	66	65	65	65	70	68	67	69	69	70	68	67	68	63	60	62	64	62.4	
Alta	Maximum	60	64	64	66	62	64	69	73	75	77	76	81	82	81	83	85	88	89	79	81	88	92	84	89	84	79	77	81	85	78.1		
	Minimum	52	46	50	53	49	47	50	51	60	61	63	65	69	63	65	65	67	67	68	65	65	65	69	65	67	69	67	57	57	60.7		
Alton	Maximum	64	62	60	68	63	68	72	72	74	73	73	79	86	83	86	88	90	93	89	80	85	91	95	87	94	89	83	80	83	80	80.4	
	Minimum	50	46	48	55	48	48	46	50	48	48	64	64	69	64	65	66	66	65	67	66	67	67	70	65	65	69	67	58	61	66.0		
Belmond	Maximum	76	71	68	74	63	67	65	75	75	80	80	83	88	80	85	87	85	93	94	82	82	84	91	85	91	92	80	78	81	88	80.8	
	Minimum	59	50	53	56	50	46	52	53	58	63	65	68	67	66	64	64	65	68	66	68	69	70	69	66	64	66	65	53	64	62	61.6	
Charles City	Maximum	79	61	70	70	65	65	74	78	80	83	84	88	83	85	86	88	88	90	90	83	82	81	87	81	85	89	76	75	81	87	79.6	
	Minimum	61	55	55	55	54	51	53	51	55	63	65	68	67	65	67	66	68	68	66	68	68	70	69	66	64	66	56	52	54	59	61.5	
Decorah	Maximum	85	67	73	72	72	67	67	79	81	79	84	86	90	85	88	87	86	92	93	87	85	84	87	86	87	88	81	81	85	91	82.5	
	Minimum	64	59	56	64	54	51	53	53	53	63	64	67	67	65	67	68	67	67	66	66	67	68	68	69	64	65	63	60	62	60	62.0	
Forest City	Maximum	77	60	63	70	65	62	61	75	75	80	82	87	82	83	86	87	91	90	78	80	82	90	80	87	88	77	74	81	85	78.5		
	Minimum	57	49	52	59	49	47	52	54	54	60	64	65	66	66	64	63	64	67	66	65	67	67	68	65	64	64	60	52	60	60.3		
Inwood	Maximum	60	65	55	67	65	75	73	76	67	73	73	80	86	82	85	87	87	90	87	78	84	89	90	87	91	83	83	79	83	78.9		
	Minimum	55	48	47	52	48	45	45	50	60	60	64	65	63	64	65	65	65	65	65	66	65	66	66	62	65	69	65	59	60	62.5		
Mason City	Maximum	78	63	64	70	69	65	62	73	75	78	80	85	86	83	85	84	87	91	81	96	87	84	75	91	81	87	90	80	79	79.6		
	Minimum	60	51	53	60	50	48	49	52	63	64	67	63	64	64	65	64	67	64	67	68	70	69	67	61	64	65	62	52	52	58.0		
New Hampton	Maximum	82	63	70	70	67	65	64	76	79	78	83	84	88	84	86	85	89	90	91	86	83	82	86	81	84	89	77	81	78	87	80.3	
	Minimum	61	57	55	62	51	50	52	50	56	60	63	66	65	65	66	66	67	67	66	66	65	65	68	68	65	63	66	62	58	50	61.1	
<i>Central Division</i>																																	
Belle Plaine	Maximum	84	67	75	71	68	70	69	75	81	84	83	82	89	85	87	87	86	88	89	87	85	83	86	85	83	88	83	75	80	86	81.4	
	Minimum	64	60	57	59	60	56	51	50	57	65	68	62	65	65	67	69	67	69	65	69	70	71	68	65	63	66	68	53	56	67	63.1	
Carroll	Maximum	66	65	66	70	64	66	73	76	79	82	77	82	87	80	84	87	90	92	92	86	87	88	93	87	92	91	81	79	83	87	81.1	
	Minimum	55	46	50	57	48	46	49	46	59	61	61	61	66	64	65	66	66	66	65	66	67	65	67	65	69	68	66	57	54	62	59.9	
Davenport	Maximum	85	72	82	73	71	72	71	78	85	87	86	89	91	88	89	92	92	91	92	88	84	81	88	86	95	92	77	76	84	90	83.9	
	Minimum	69	66	61	60	58	57	55	55	60	68	69	70	73	72	70	72	71	71	70	71	69	71	69	68	68	70	57	52	56	62	65.3	
Des Moines	Maximum	83	62	73	69	66	69	74	77	84	81	79	84	88	78	85	89	90	92	92	88	86	88	91	88	92	81	82	76	83	89	82.2	
	Minimum	61	52	55	54	52	53	53	55	63	65	67	69	69	70	68	70	71	70	70	71	72	71	74	68	74	67	56	59	66	64.5		
Dubuque	Maximum	85	71	81	72	67	69	77	80	86	85	87	89	86	88	85	88	88	89	92	88	84	81	86	84	84	89	76	75	80	87	82.0	
	Minimum	63	65	63	57	57	56	54	54	58	66	67	69	70	69	71	70	68	68	66	71	68	69	62	66	67	68	59	52	56	61	63.7	
Fort Dodge	Maximum	78	62	70	70	66	68	69	76	80	81	80	85	89	82	87	87	90	95	95	87	83	88	94	96	91	92	84	77	85	91	82.6	
	Minimum	60	52	53	58	51	49	49	49	59	62	65	70	67	68	67	67	67	65	66	66	66	67	67	67	67	65	67	53	53	63	61.5	
Grinnell	Maximum	83	64	74	70	67	70	71	76	83	85	84	86	90	83	89	91	91	92	92	91	85	86	90	89	92	93	80	77	85	90	83.3	
	Minimum	61	57	56	56	50	54	51	62	60	65	67	67	66	67	66	70	68	68	66	69	70	70	68	69	64	67	68	51	55	59	62.9	
Guthrie Center	Maximum	79	66	71	70	67	69	75	75	83	82	76	84	88	79	84	89	90	91	91	89	90	88	87	88	88	88	90	86	79	83	87	82.1
	Minimum	60	49	52	56	50	49	49	49	61	67	65	67	68	68	65	67	68	63	67	65	66	67	68	70	63	70	55	58	55	63	61.7	
Independence	Maximum	84	67	78	78	70	68	65	74	80	83	84	85	87	87	87	88	87	89	88	83	82	86	87	82	88	87	74	74	78	85	81.2	
	Minimum	63	60	56	60	52	53	50	53	55	62	65	69	65	64	67	67	68	64	67	67	69	68	65	64	66	63	49	52	53	55	61.0	
Iowa City	Maximum	87	70	78	73	70	72	71	77	84	86	84	86	90	88	90	94	92	91	91	90	85	83	88	87	84	89	76	75	80	88	83.8	
	Minimum	65	63	61	60	55	55	52	50	56	56	69	67	67	66	64	66	67	69	63	69	70	70	70	70	64	66	65	62	56	55	62.5	
Iowa Falls	Maximum	75	75	75	71	71	65	65	71	78	81	80	82	85	79	83	83	84	89	90	84	83	81	87	85	86	89	77	73	78	85	79.7	
	Minimum	61	53	56	58	50	47	49	52	56	61	66	67	66	66	66	65	63	67	65	67	68	70	68	61	64	69	66	53	53	60	60.9	
Little Sioux	Maximum	68	63	60	64	66	69	78	76	79	82	79	83	88	84	85	88	90	91	91	85	87	90	95	92	93	90	89	82	85	88	82.0	
	Minimum	54	46	48	54	46	44	47	55	59	60	65	65	68	64	67	68	68	68	68	67	67	68	70	69	66	70	67	60	63	68	61.6	
Marshalltown	Maximum	83	65	74	73	70	69																										

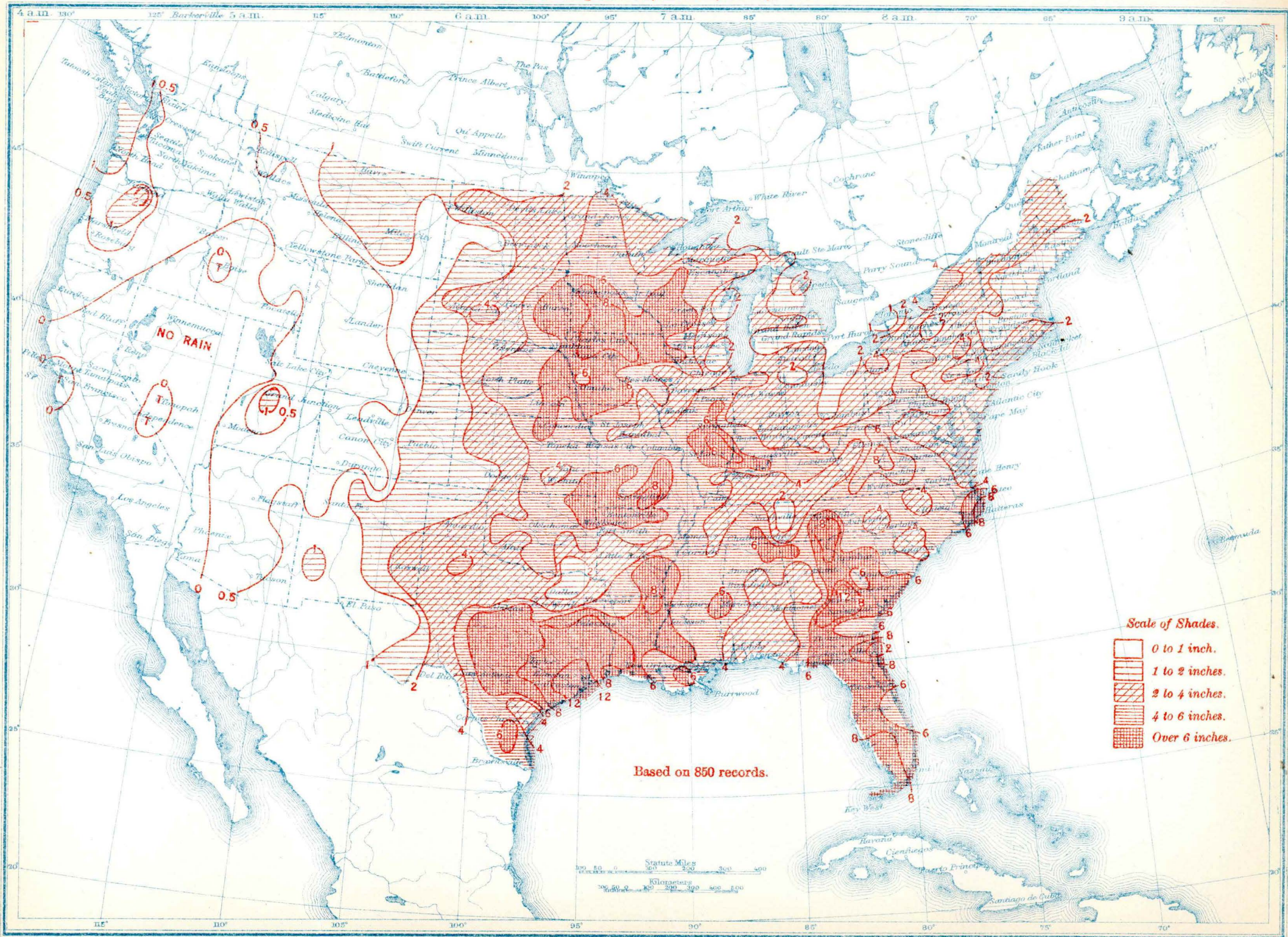
TOTAL PRECIPITATION FOR JUNE, 1919



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, June, 1919.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

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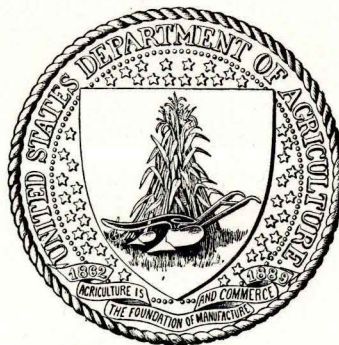
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JULY, 1919

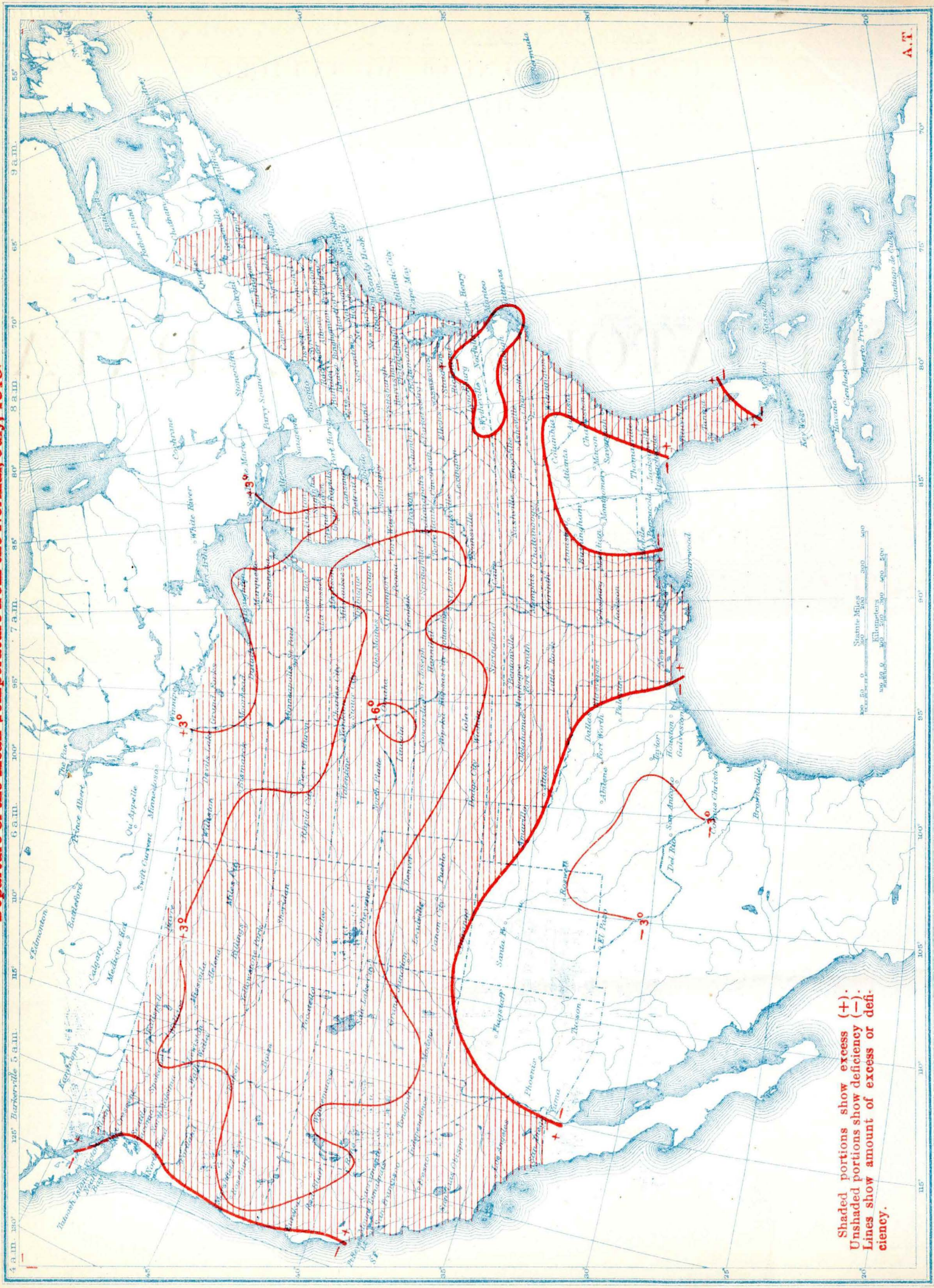
BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

Departure of the Mean Temperature from the Normal, July, 1919.



Shaded portions show excess (+).
 Unshaded portions show deficiency (-).
 Lines show amount of excess or deficiency.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, JULY, 1919, No. 7

GENERAL SUMMARY.

July was warmer than the normal and the excess was uniform throughout the State, ranging from 3.5° in the southern division to 3.1° in the northern division. There were no cool periods and the temperature was normal, or below, on very few days. The hottest part of the month occurred during the last week and values of 100°, or slightly above, were recorded at places in all divisions.

The precipitation was deficient and unevenly distributed, ranging from less than half an inch in Butler County to nearly 8.00 inches at Dubuque. Most of the precipitation occurred during the first half of the month and was generally ample for all needs; after the 15th of the month a dry period set in that prevailed till the 31st. The dry weather in connection with the high temperature and strong winds that prevailed during the last week of the month had a very injurious effect on all vegetation and when relieved by showers on the 31st corn was beginning to fire over much of the State, particularly in the central and some southwest counties. There were no severe wind storms during the month but one of the most severe rainstorms of record occurred at Dubuque, on the 9th, 1.20 inches falling in 10 minutes and 2.70 inches fell in one hour. Seven persons lost their lives by being drowned and a number severely injured. The property loss was approximated at \$125,000.00. F.L.D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.98 inches. The highest pressure recorded was 30.24 inches at Dubuque on the 8th, and the lowest was 29.61 at Sioux City on the 26th. The monthly range was 0.62 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 99 stations, was 77.4°, or 3.3° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 75.8°, or 3.1° higher than the normal, Central, 77.6°, or 3.3° higher than the normal; Southern 78.7°, or 3.5° higher than the normal. The highest monthly mean was 81.8° at Omaha, Nebraska, and the lowest was 72.4° at Postville. The highest temperature reported was 104° at Webster City on the 30th and Keosauqua on the 31st; the lowest was 41 at Waverly on the 16th. The temperature range for the State was 63°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 75 per cent, and at 7 p. m. it was 52 per cent. The mean for the State was 64 per cent, or 4 per cent lower than the normal. The highest monthly mean was 66 per cent at Dubuque and Sioux City, and the lowest was 61 per cent at Omaha, Nebr.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 105 stations, was 2.86 inches, or 1.10 inches less than the normal. By divisions the averages were as follows: Northern, 3.36 inches, or 0.52 inch less than the normal; Central, 2.42 inches, or 1.56 inches less than the normal; Southern

2.79, or 1.23 inches less than the normal. The greatest amount, 7.82 inches, occurred at Dubuque, and the least, 0.39 of an inch at Allison. The greatest amount in 24 consecutive hours, 4.12 inches, occurred at Le Mars on the 13th.

WIND.

The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau Station was 38 miles an hour, from the west, at Sioux City on the 13th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 82, or 8 per cent more than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City 85; Davenport 85; Des Moines 79; Dubuque 83; Keokuk 90; Sioux City 70; Omaha, Neb. 84.

MISCELLANEOUS PHENOMENA.

Aurora: 19th.

Fog: 11th, 14th, 20th, 24th.

Hail: Northern Division 9th, 11th; Central Division 8th, 9th, 12th; Southern Division, 7th, 9th, 10th, 31st.

Halo: (Lunar or Solar): 8th.

Rainbow: 31st.

Thunderstorms: 2nd, 3rd, 4th, 5th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 20th, 21st, 24th, 27th, 28th, 29th, 30th, 31st.

RIVERS.

Moderate stages prevailed on the Missouri River and after the first there was a gradual tendency to lower stages; on the Mississippi River good boating stages prevailed throughout the month, and except a slight freshet that occurred after the 4th at Dubuque and later at points farther down the river, the tendency was to lower stages and the lowest stages occurred generally on the last day of the month. On the interior rivers low stages prevailed.

COMPARATIVE DATA FOR THE STATE—JULY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation, 0.1 in.	Clear	Partly cloudy	Cloudy
1890	75.6	+1.5	110	45	1.98	-1.98	5.00	0.37	-----	3	18	8	5
1891	68.5	-5.6	99	41	4.22	+0.26	8.20	1.67	-----	8	13	13	5
1892	73.0	-1.1	104	38	5.29	+1.33	12.86	1.71	-----	9	16	10	5
1893	75.0	+0.9	102	47	3.33	-0.63	8.84	1.49	-----	7	19	10	2
1894	76.4	+2.3	109	39	0.63	-3.33	3.50	T.	-----	3	22	8	1
1895	72.1	-2.0	104	35	3.40	-0.56	10.10	0.45	-----	7	15	12	4
1896	73.6	-0.5	104	42	6.90	+2.94	12.67	1.61	-----	9	14	11	6
1897	75.6	+1.5	106	42	3.26	-0.70	7.60	1.01	-----	6	18	10	3
1898	73.4	-0.7	102	42	2.98	-0.98	12.88	0.55	-----	7	19	9	3
1899	73.1	-1.0	101	38	3.07	-0.89	8.66	0.42	-----	7	16	10	5
1900	73.4	-0.7	102	37	6.15	+2.19	18.45	1.80	-----	9	16	10	5
1901	82.4	+8.3	113	46	2.34	-1.62	5.97	0.27	-----	5	21	9	1
1902	73.1	-1.0	99	41	8.67	+4.71	13.57	4.82	-----	13	14	10	7
1903	72.9	-1.2	100	40	4.83	+0.87	12.72	0.94	-----	9	17	9	5
1904	70.6	-3.5	100	38	4.41	+0.45	11.97	1.28	-----	10	16	9	6
1905	70.6	-3.5	102	40	2.91	-1.05	7.08	0.69	-----	9	14	10	7
1906	70.9	-3.2	102	42	3.04	-0.92	7.05	0.26	-----	8	18	10	3
1907	73.7	-0.4	102	41	7.27	+3.31	13.66	3.97	-----	13	16	11	4
1908	73.0	-1.1	100	42	3.66	-0.30	9.21	0.70	-----	8	16	10	5
1909	72.3	-1.8	102	46	4.77	+0.81	12.20	1.20	-----	10	15	8	8
1910	74.5	+0.4	108	43	1.86	-2.10	5.69	0.12	-----	7	19	8	4
1911	75.5	+1.4	111	38	2.27	-1.69	6.62	0.68	-----	7	18	10	3
1912	74.6	+0.5	103	38	3.71	-0.25	7.56	1.17	-----	10	17	10	4
1913	76.1	+2.0	108	45	1.82	-2.14	6.23	T.	-----	5	21	8	2
1914	76.6	+2.5	109	43	2.27	-1.69	6.50	0.44	-----	5	20	8	3
1915	69.5	-4.6	92	40	8.32	+4.36	15.83	3.68	-----	14	10	12	9
1916	79.7	+5.6	105	48	1.78	-2.18	6.87	0.10	-----	5	23	7	1
1917	74.3	+0.2	106	38	2.27	-1.69	6.06	0.23	-----	7	21	8	2
1918	73.1	-1.9	105	40	3.17	-0.79	8.05	0.26	-----	8	19	8	4
1919	77.4	+3.3	104	41	2.86	-1.10	7.82	0.39	-----	6	22	8	1

Climatological Data for July, 1919.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Observers.			
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.		Partly cloudy.	Cloudy.	Prevailing direction of wind.
Northern Division																				
Algona	Kossuth	1,213	46	76.1	+ 2.8	97	29†	58	16	32	0.81	-2.21	0.65	0	2	29	1	sw.	W. E. Laird.	
Allison	Butler	1,045	7	76.6	-----	100	29†	51	11	38	0.39	0.16	0	5	15	16	0	sw.	J. A. Bell.	
Alta	Buena Vista	1,513	28	75.6	+ 2.8	95	26	57	21	28	2.17	-2.38	1.20	0	5	21	9	1	s.	David E. Hadden.
Alta (near)	Buena Vista	23	23	-----	-----	-----	-----	-----	-----	-----	3.58	-1.17	1.15	0	7	-----	-----	-----	sw.	Warren Minard.
Alton	Sioux	1,305	14	76.5	+ 3.5	99	26	52	20	32	4.45	-----	1.15	0	9	18	12	1	e.	W. S. Slagle.
Belmond	Wright	1,205	9	76.8	-----	100	9†	54	16†	35	1.81	-----	0.70	0	6	18	13	0	se.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	73.9	+ 1.2	99	30	52	22	33	1.42	-2.57	0.67	0	7	24	6	1	s.	L. M. Goodman.
Charles City	Floyd	1,015	28	75.4	+ 1.9	98	30	54	11	33	4.47	+0.89	3.00	0	8	19	12	0	se.	U. S. Weather Bureau.
Decorah	Winnebago	875	26	76.0	+ 2.6	98	26	48	11	38	3.53	-0.42	2.86	0	6	20	8	3	sw.	Wm. F. Baker.
Elkader	Clayton	751	40	75.9	+ 1.5	100	27†	51	7†	45	4.10	-0.08	1.30	0	7	26	4	1	s.	D. C. Hale.
Estherville	Emmet	1,298	24	73.6	+ 2.9	95	30	54†	5	34	-----	-----	-----	0	-----	22	9	0	sw.	A. O. Peterson.
Fayette	Fayette	1,003	29	74.9	+ 2.9	99	26†	50	11	37	2.22	-1.74	1.01	0	7	25	6	0	sw.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	74.4	+ 1.8	100	30	51	18†	35	2.24	-1.40	0.91	0	6	18	9	4	s.	Nina Secor.
Humboldt	Humboldt	1,095	31	78.1	+ 4.9	101	26†	53	22	37	1.32	-2.34	0.60	0	4	18	12	1	s.	H. C. Smitkey.
Inwood	Lyon	1,474	15	75.2	+ 2.3	96	9†	54	21	33	4.83	+1.68	2.33	0	11	23	7	1	s.	F. B. Hanson.
Lansing	Allamakee	632	13	-----	-----	-----	-----	-----	-----	-----	2.37	-2.02	1.54	0	8	-----	-----	-----	sw.	Chas. R. Serene.
LeMars	Plymouth	1,224	23	77.6	+ 4.9	99	26	55	6	32	7.38	+3.37	4.12	0	9	23	7	1	s.	C. L. Trenery.
Mason City	Cerro Gordo	1,148	22	76.0	+ 3.1	100	30	49	11	39	3.36	-0.26	2.13	0	6	3	28	0	se.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	75.6	+ 3.4	99	30	52	11	35	1.99	-1.76	1.04	0	4	22	7	2	s.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	76.1	-----	101	26	50	11	39	3.31	-----	1.60	0	10	22	8	1	s.	Arthur Betts.
Northwood	Worth	1,222	23	-----	-----	93 ^c	30	48 ^c	11	36 ^c	4.40	+0.41	1.35	0	7	15	12	4	sw.	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	76.6	+ 4.1	98	9†	52	22	35	2.07	-2.03	0.51	0	6	23	7	1	s.	F. E. Hronek.
Postville	Clayton	1,180	20	72.4	+ 0.7	92	26†	51	11	28	3.17	-1.35	0.95	0	7	17	13	1	sw.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	75.8	+ 2.0	97	9	54	6	33	4.32	+1.24	1.70	0	9	27	3	1	s.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	76.3	-----	97	26	54	6	37	4.13	-----	2.08	0	9	25	5	1	sw.	Jas. W. Dow.
Sibley	Oseola	1,212	26	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0	-----	-----	-----	-----	sw.	H. F. Olds.
Sioux Center	Sioux	1,426	20	75.8	+ 3.5	98	9	55	6†	33	5.43	+1.04	2.03	0	9	30	0	1	s.	J. de Ruyter.
Spencer	Clay	1,319	5	76.5	-----	98	9†	50	17	42	4.17	-----	2.85	0	7	14	16	1	sw.	E. W. Little.
Storm Lake	Buena Vista	1,440	30	76.6	+ 3.7	96	9†	57	21	27	2.40	-1.49	0.76	0	10	28	2	1	s.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	76.0	+ 3.3	96	9	50	22	35	6.84	+2.64	3.40	0	8	24	6	1	s.	H. L. Felter.
Waverly	Bremer	948	23	73.6	+ 0.6	100	30	41	16	47	1.20	-2.74	1.17	0	2	15	15	1	se.	H. Arnold.
West Bend	Palo Alto	1,197	26	76.5	+ 3.5	99	30	53	22	35	1.69	-1.87	0.73	0	7	20	10	1	s.	Jos. Dorweiler.
Means and extremes				75.8	+ 3.1	101	26†	41	16	47	3.36	-0.52	4.12	0	7	21	9	1	s.	
Central Division																				
Ames	Story	926	43	78.2	+ 4.2	99	26†	52	16	35	1.01	-3.33	0.56	0	5	23	7	1	sw.	Iowa State College.
Audubon	Audubon	1,301	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0	-----	-----	-----	-----	sw.	V. M. Jones.
Baxter	Jasper	998	19	77.8	+ 4.2	99	27	58	16†	31	1.81	-2.25	0.63	0	10	15	14	2	sw.	Rev. Paul Traeger.
Belle Plaine	Benton	886	29	76.4	+ 3.0	97	27	53	22	34	2.82	-1.16	1.59	0	6	24	6	1	sw.	C. C. Burrows.
Boone	Boone	1,134	14	78.0	+ 3.7	99	27	54	22	33	2.25	-1.69	1.00	0	7	27	4	0	s.	Carl F. Henning.
Carroll	Carroll	1,265	29	77.1	+ 4.3	98	9	52	22	33	2.72	-0.89	0.95	0	7	27	4	0	sw.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	79.8	+ 4.2	102	30	57	11	33	1.55	-2.14	0.93	0	6	21	4	6	s.	R. S. Toogood.
Clinton	Clinton	593	46	78.3	+ 3.2	99	30	57	11	32	2.12	-1.94	1.04	0	8	21	9	1	sw.	H. Burde.
Davenport	Scott	580	48	79.2	+ 3.8	96	27	61	7	26	2.56	-0.99	1.88	0	7	22	7	2	sw.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	74.8	+ 1.8	96	27	54	16	31	2.98	-0.71	0.87	0	5	23	8	0	s.	Nettie E. Ball.
Denison	Crawford	1,180	25	77.6	+ 4.1	96	9†	52	22	35	4.36	+0.70	2.80	0	5	25	6	0	sw.	Emma Brogden.
Des Moines	Polk	861	40	79.8	+ 4.3	98	27	59	22	29	2.68	-1.18	1.22	0	9	19	11	1	sw.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	76.6	+ 1.9	95	27	56	11	27	7.82	+3.52	3.87	0	7	17	11	3	s.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	78.7	+ 5.1	102	9	54	22	35	3.38	-0.30	2.07	0	9	18	10	3	sw.	Isadore Haugh.
Grinnell	Poweshiek	1,031	25	78.5	+ 4.0	101	27	56	16†	35	1.56	-2.55	0.62	0	7	26	5	0	se.	J. P. Stocks.
Grundy Center	Grundy	976	28	77.8	+ 3.5	99	27	54	17	36	0.64	-3.30	0.26	0	5	22	8	1	sw.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	77.6	+ 2.8	99	27	49	22	40	3.42	-0.86	1.98	0	7	25	6	0	sw.	C. T. Harney.
Harlan	Shelby	1,182	20	77.2	+ 3.7	97	30	48	22	37	4.25	+0.14	1.63	0	6	28	2	1	s.	E. L. Tilton.
Independence	Buchanan	921	55	76.8	+ 4.1	101	27	52	11	39	0.46	-3.96	0.25	0	3	26	4	1	s.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	77.2	+ 2.5	100	27	54	17	37	1.03	-3.25	0.34	0	5	23	8	0	se.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	75.4	+ 3.5	99	30	50	16†	37	0.56	-3.63	0.21	0	8	24	6	1	sw.	J. B. Parmelee.
Jefferson	Greene	1,052	20	76.8 ^c	+ 2.0	97 ^c	30	55 ^c	16	34 ^c	2.64	-----	0.92	0	7	-----	-----	-----	sw.	Will I. Lyon.
LeClaire	Scott	576	19	-----	-----	-----	-----	-----	-----	-----	1.39	+2.40	0.80	0	3	-----	-----	-----	sw.	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	78.6	+ 3.4	100	26	50	22	38	1.92	-----	0.91	0	6	22	5	4	se.	Geo. H. Gibson.
Logan	Harrison	928	52	78.8	+ 4.1	98	26	52	22	34	1.57	-3.07	0.70	0	5	22	8	1	sw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	75.0 ^a	+ 1.8	96 ^a	4	50 ^a	23	38 ^a	1.96	-2.31	0.96	0	4	23	7	1	sw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	78.4	+ 4.4	100	27†	51	23	42	2.58	-1.59	1.55	0	6	22	5	4	sw.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	78.6	-----	100	30	58	22	30	3.77	-----	2.16	0	7	30	1	0	s.	J. A. Dibel.
Muscatine	Muscatine	554	59	-----	-----	-----	-----	-----	-----	-----	1.05	-2.78	0.47	0	3	-----	-----	-----	sw.	Wm. P. Mohs.
Olin	Jones	760	21	-----	-----	99	30	-----	-----	-----	2.40	-1.12	1.70	0	3	22	9	0	sw.	Dr. F. W. Fort.
Onawa	Monona	1,051	19	78.0	-----	100	9†	52	22	35	2.71	-1.57	1.52	0	6	26	4	1	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	77.3	+ 2.3	100	27	52	22	35	2.17	-1.88								

Climatological Data for July, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
<i>Southern Division</i>																				
Afton.....	Union.....	1,212	25	78.0	+ 2.5	98	27	56	22	28	0.65	-3.40	0.57	0	2	23	8	0	sw.	J. E. Deitrick.
Albia.....	Monroe.....	959	21	77.8	+ 3.1	99	28†	54	16	36	4.69	+0.63	3.51	0	5	24	0	7	sw.	F. H. Holmes.
Allerton.....	Wayne.....	1,122	17	78.1 ^c	+ 2.9	99 ^c	30	60 ^c	16†	32 ^c	3.60	-0.76	2.40	0	3	—	—	—	sw.	James C. Huston.
Atlantic.....	Cass.....	1,164	28	79.8	+ 5.1	100	26†	52	22	33	1.92	-1.81	0.85	0	11	19	8	4	sw.	Thos. H. Whitney.
Bedford.....	Taylor.....	19	77.2	+ 2.5	98	31	51	22	38	2.60	-1.80	1.15	0	6	24	6	1	s.	E. E. Healy.	
Bloomfield.....	Davis.....	881	12	79.1	—	102	31	57	7	37	2.52	-2.04	1.10	0	8	19	12	0	s.	V. G. Warner.
Bonaparte.....	Van Buren.....	565	28	78.0	+ 2.9	99	28	55	10	39	3.04	-0.60	2.70	0	4	27	4	0	w.	Bruce R. Vale.
Burlington.....	Des Moines.....	544	23	80.2	+ 4.2	102	28	60	7	30	1.01	-2.53	0.54	0	3	28	3	0	nc.	Mrs. Edna M. Donnelly.
Centerville.....	Appanoose.....	1,013	14	79.8	—	101	28	58	16†	37	4.00	—	2.40	0	5	21	5	5	sw.	Leo J. Allen.
Chariton.....	Lucas.....	1,042	24	76.8	+ 3.0	98	30	55	16	32	4.98	+0.52	3.30	0	4	23	8	0	sw.	C. C. Burr.
Clarinda.....	Page.....	1,009	29	79.8	+ 4.6	101	13†	52	22	40	2.27	-2.21	1.10	0	7	26	3	2	s.	A. S. Van Sandt.
Columbus Jct.....	Louisa.....	595	18	78.6	+ 3.6	96	26†	60	7†	28	1.82	-2.09	0.65	0	6	27	4	0	sw.	J. B. Johnston.
Corydon.....	Adams.....	1,117	27	78.0	+ 3.6	97	31	49	22	38	2.77	-1.24	1.85	0	4	26	2	3	sw.	Jerome Smith.
Creston.....	Wayne.....	1,101	26	77.6	+ 2.1	100	31	55	16†	35	6.08	+2.31	3.72	0	4	24	7	0	s.	May C. Miller.
	Union.....	1,312	14	77.0	+ 3.2	98	31	54	22	32	2.67	—	1.00	0	5	20	9	2	s.	Mrs. T. E. McConnell.
Cumberland.....	Cass.....	20	—	—	—	—	—	—	—	—	1.99	-2.20	1.38	0	4	30	0	1	sw.	J. H. Reppert.
Earlham.....	Madison.....	1,126	17	77.2 ^a	+ 3.9	99 ^a	27†	48 ^a	22	30 ^a	1.68	-2.35	0.64	0	5	—	—	—	sw.	Geo. Phillips.
Fairfield.....	Jefferson.....	780	35	78.4 ^b	+ 2.4	102 ^b	26	55 ^b	17	39 ^b	0.94	-2.92	0.56	0	4	—	—	—	w.	Prof. R. M. McKenzie.
Glenwood.....	Mills.....	1,100	22	80.3	—	100	26†	58	20	35	1.53	—	0.70	0	5	20	11	0	s.	Dr. Geo. Mogridge.
Greenfield.....	Adair.....	27	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	s.	Frank A. Ward.
Indianola.....	Warren.....	969	27	79.0	+ 3.9	99	30	58	22	36	4.85	+1.11	1.90	0	7	19	10	2	s.	Prof. J. L. Tilton.
Keokuk.....	Lee.....	614	48	81.0	+ 4.0	100	31	62	7	30	2.47	-1.56	1.06	0	7	21	10	0	s.	U. S. Weather Bureau.
Keosauqua.....	Van Buren.....	644	27	79.6	+ 3.9	104	31	53	17	41	0.84	-3.16	0.59	0	4	26	5	0	se.	J. H. Landes.
Knoxville.....	Marion.....	920	24	79.3	+ 3.6	102	29†	53	22	38	2.76	-1.25	1.53	0	7	23	8	0	se.	W. J. Casey.
Lacona.....	Warren.....	20	—	—	—	—	—	—	—	—	2.80	-0.80	1.76	0	10	13	14	4	s.	J. B. Alter.
Lamoni.....	Decatur.....	1,100	12	77.6	+ 1.5	99	30†	56	16	34	4.98	—	1.93	0	4	28	2	1	s.	Ed. D. Moore.
Lenox.....	Taylor.....	1,250	24	79.0	+ 4.1	99	31	57	22	32	2.76	-1.60	1.20	0	6	27	4	0	s.	J. L. Hurley.
Mount Ayr.....	Ringgold.....	1,236	26	78.0	+ 2.0	98	31	57	22	32	2.52	-2.15	1.78	0	5	26	4	1	sw.	Alex Maxwell.
Mt. Pleasant.....	Henry.....	729	38	79.2	+ 3.4	100	27†	57	7	34	4.91	+1.49	3.30	0	3	16	15	0	sw.	John H. Jericho.
Murray.....	Clarke.....	1,216	28	79.1	+ 4.1	102	29	57	16	34	1.53	-2.63	0.49	0	7	20	9	2	s.	M. T. Ashley.
Northboro.....	Page.....	1,046	5	79.6	—	100	31	54	22	38	2.81	—	1.55	0	6	25	5	1	sw.	J. M. Darby.
Oakland††	Pottawattamie.....	—	—	78.8	—	98	27	55	23	35	0.87	—	0.29	0	5	26	3	2	s.	M. E. Gray.
Oskaloosa.....	Mahaska.....	825	43	78.3	+ 3.7	99	28	57	16†	34	5.22	+1.61	2.05	0	8	19	10	2	sw.	Roy R. Robinson.
Ottumwa.....	Wapello.....	849	24	79.1	—	99	28†	59	15	32	3.58	+0.15	1.21	0	5	19	6	6	se.	Eugene O. Field.
Pella.....	Marion.....	877	26	77.2	+ 2.0	98	31	44	16	42	2.20	+0.3	1.13	0	6	29	0	2	s.	J. H. Ver Steeg.
Shenandoah.....	Page.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	sw.	L. L. Hunter.
Sigourney.....	Keokuk.....	877	23	78.0	+ 2.4	101	28	56	7†	35	3.36	-0.57	1.19	0	7	24	5	2	sw.	W. E. Utterback.
Stockport.....	Van Buren.....	754	17	77.7	+ 2.7	102	28	53	18	43	3.16	-1.24	1.35	0	9	25	6	0	sw.	C. L. Beswick.
Thurman.....	Fremon't.....	—	—	80.6	+ 4.2	102	27	42	22	42	0.62	-4.42	0.62	0	1	6	25	0	sw.	C. R. Paul.
Washington.....	Washington.....	769	37	78.6	+ 3.9	99	29†	58	16	30	4.23	+0.84	2.95	0	4	—	—	—	sw.	Wm. A. Cook.
Winterset.....	Madison.....	1,129	28	78.8	+ 3.0	99	27†	54	22	36	1.85	-2.82	1.11	0	6	31	0	0	sw.	H. S. Ely.
Omaha, Neb.	—	1,040	48	81.8	+ 5.3	101	26	63	22	27	0.63	-3.70	0.25	0	4	22	7	2	s.	U. S. Weather Bureau.
Means and extremes.....	—	—	—	78.7	+ 3.5	104	31	44	16	43	2.79	-1.23	3.72	0	5	23	7	1	sw.	—
State means and extremes.....	—	—	—	77.4	+ 3.3	104	30†	41	16	47	2.86	-1.10	4.12	0	6	22	8	1	sw.	—

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.
 Reference letters ^a, ^b, ^c, appearing in the table indicate the number of days missing; for example, ^b represents two days, etc.
 †Also other dates. ††Received too late to be included in means and summaries.
 †. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).			Wind.				Sunshine.						
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.		Total movement.	Average hourly velocity.		Miles.	From.	Date.	Per cent of possible.	Departure from normal.			
						Noon. †	7 P. M.		Miles.	From.								
Charles City	29.98	30.19	16	29.70	11	78	48	54	27	23	4,277	5.7	23	sw.	13	85	+ 4	
Davenport	29.99	30.22	1	29.68	12	72	46	52	30	12.5	4,602	6.2	35	ne.	9	85	+12	
Des Moines	29.97	30.19	16	29.70	11	74	46	49	26	22.5	5,132	6.9	32	sw.	26	79	+ 5	
Dubuque	30.00	30.24	8	29.72	12	77	54	56	33	22.5	3,848	5.3	24	n.	27	83	+13	
Keokuk	30.00	30.22	1	29.77	11	72	50	49	29	20	4,632	6.2	34	nw.	9	90	+15	
Sioux City	29.98	30.21	15	29.61	26	81	52	52	31	22	5,076	10.9	38	w.	13	70	- 3	
Omaha, Neb.	29.94	30.18	16	29.65	11	72	51	50	30	33.8	5,259	7.1	30	ne.	11	84	+11	
Means and extremes.....	29.98	—	—	—	—	75	50	52	—	—	—	6.9	—	—	—	82	—	+ 8
Normals and records	29.95	—	7th	—	4th	79	—	—	—	—	—	6.8	—	—	13th	74	—	—
	—	*30.47	1892	29.37	1905	—	—	—	—	—	—	—	—	—	—	—	—	—

*Davenport. †Charles City. ‡Des Moines. †Local mean time. ††Omaha.

Daily Precipitation for July, 1919—Continued.

Stations.	Watersheds.	Day of Month.																															Totals				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
<i>Southern Division</i>																																					
Afton	Grand				T.	.08										.57																			0.65		
Albia	Des Moines				.35					3.51					.15																				.27	4.69	
Allerton	Chariton				2.60										.40																				.60	3.60	
Atlantic	Nishnabotna		.25	.32	.10	.01				.01			.22	.85	.06	.04																	.05		1.92		
Bedford	Missouri				.20	.38					.26	.60			.01																			1.15	2.60		
Bloomfield	Mississippi				.45	.05					1.10	.15			.01	.01																	.50	.25	2.52		
Bonaparte	Des Moines				2.70	.06				.15																						.13		T.	3.04		
Burlington	Mississippi						T.				.54					.15																	T.		.32	1.01	
Centerville	Chariton				.90	.32	.03				2.40	.35																								4.00	
Chariton	Chariton				.44	.80					3.30	.44																							T.	4.98	
Clarinda	Nodaway				.20	1.10	.35				.37	.10	.13																				.02		2.27		
Columbus Jct.	Iowa				.45	.24				.65							.14	.20														.14			1.82		
Corning	Nodaway				.53	.25						1.85		T.																				.14	2.77		
Corydon	Chariton				1.06	.95					3.72	.35				T.																			6.08		
Creston	Missouri				.10	.57	1.00				.05	.95																							2.67		
Cumberland	Nodaway				.28						.08	1.38																						T.	.25	1.99	
Earlham	Des Moines				.64						.38	T.	.43																				.07		1.68		
Fairfield	Skunk				T.	.56	.02	T.			.33	.03																							0.94		
Glenwood	Missouri				.10	.70					.09																								.60	1.53	
Greenfield	Nodaway																																				
Indianola	Des Moines				.75	.60					.60	.20	.20	.60																					1.90	4.85	
Keokuk	Mississippi				1.04					.20		.01	.01		T.																	.03	.16	1.02	2.47		
Keosauqua	Des Moines				.44	.15					.21	.04			T.																				0.84		
Knoxville	Des Moines				T.	.05					.78	.14	.16	.07	T.																	.03		1.53	2.76		
Lacona	Des Moines				.60	.02				.01	1.76	.33	.01	.01	.02																		.02		.02	2.80	
Lamoni	Grand					1.73	1.20				.12		1.93																							4.98	
Lenox	Missouri				.38	.36					.10	1.20				.05																			.67	2.76	
Mt. Ayr	Grand				.36	T.				.02	.32	1.78			T.																				.04	2.52	
Mt. Pleasant	Skunk				3.30						.24																							1.37		4.91	
Murray	Grand				.14	.49		T.			.39	.44				.02																	.02		.03	1.53	
Northboro	Tarkio		.14		.80	1.55					.03																								.26	2.81	
Oakland	Nishnabotna				.21	.14					.07	.29																						T.		.16	0.87
Oskaloosa	Des Moines				1.33					2.05		.12	.06	T.	.05																		.03	.05	1.53	5.22	
Ottumwa	Des Moines				.90					1.21		.07			.60																					.80	3.58
Pella	Skunk				.15	T.					.48	.65		.15	.13	T.																		T.	.64	2.20	
Shenandoah	Nishnabotna																																				
Sigourney	Skunk				.34	.07				.76	.31	T.	T.																					.57	.12	1.19	3.36
Stockport	Skunk				1.35	.09			T.		.15	.19	.04			.10																		.05	.16	1.03	3.16
Thurman	Missouri				T.	.62																														T.	0.62
Washington	Skunk				2.95						.62	.04																								.62	4.23
Winterset	Des Moines				.04				.01		.07	.40																							T.	1.11	1.85
Omaha, Neb.	Missouri				.14	T.			.25		.09					T.																				.15	0.63

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

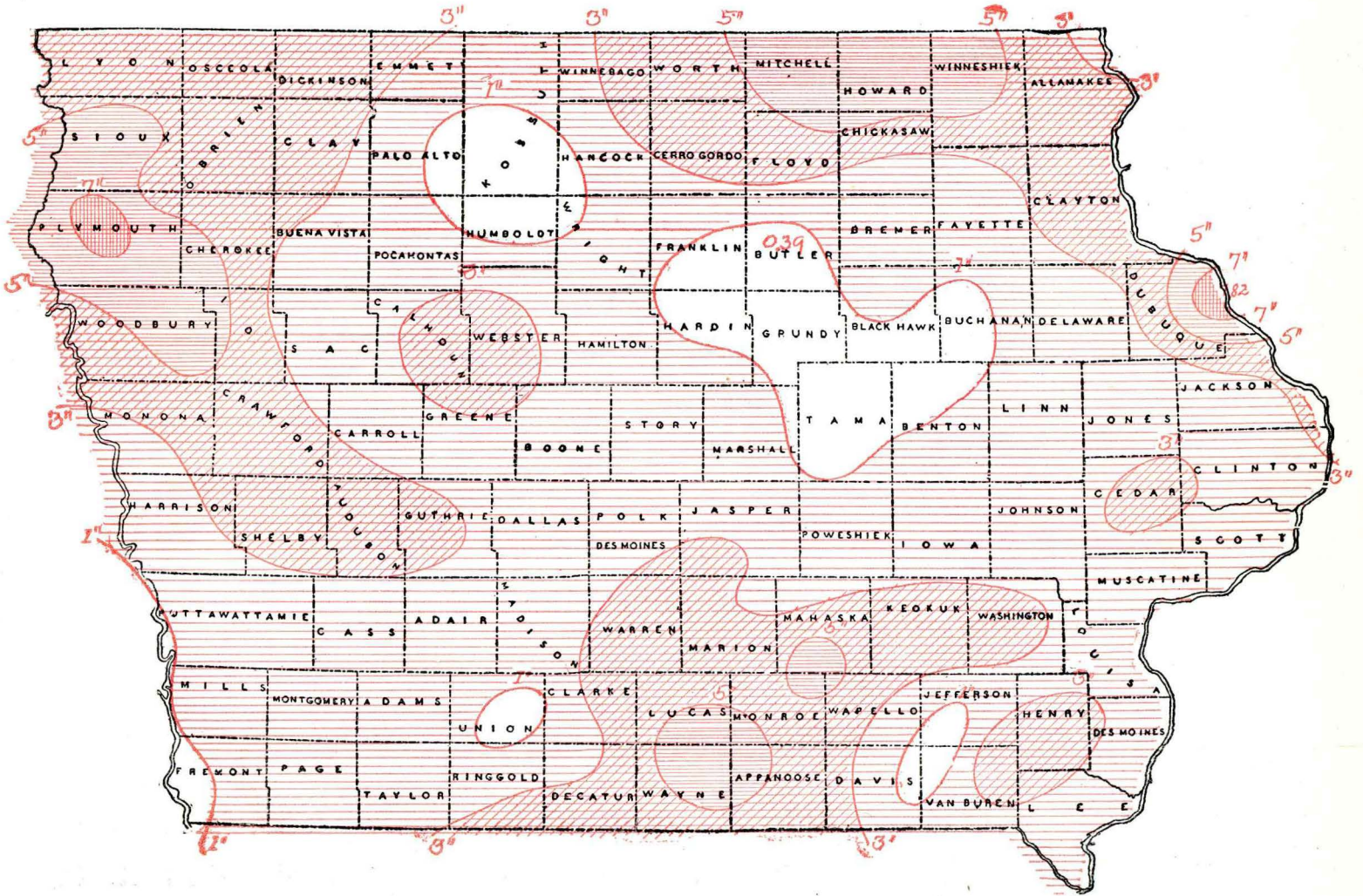
- |||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
- ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
- **Incomplete.
- *Precipitation included in the next following measurement.

Daily Maximum and Minimum Temperatures for the Month of July, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by division: Northern Division, Central Division, and Southern Division. Each station entry includes maximum and minimum temperature values for each day.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record. Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

TOTAL PRECIPITATION, JULY, 1919.



SCALE OF SHADES—IN INCHES



INTENSE RAIN STORM AND FRESHET, DUBUQUE, IOWA,
JULY 9, 1919.

J. H. Spencer.

(75th Meridian Mean Time Used Herein.)

The rain storm of July 9, 1919, was the worst at this station since July 4, 1876, when 40 persons were drowned at Rockdale, on the outskirts of Dubuque. In the storm of July 9 seven persons were drowned in freshets caused by the torrential rains and great damage resulted to streets in all portions of the city lying below the bluffs. Although three houses were struck by lightning, thunder and lightning were rather less severe than in some of the storms of the past eight years; damage from lightning was slight, probably due to the heavy rainfall, which prevented serious fires. Wind velocity was light, and therefore the crop damage was comparatively small, except on flooded lowland, where they were ruined.

At no time during the hours that preceded the period of heaviest rainfall was there much indication of a severe storm, although the weather in the morning quickly changed to warm and sultry. Rain began as a light thundershower from 11:25 a. m. to 11:55 a. m. Rain began again at 12:15 p. m. and was moderately heavy until 2:50 p. m. Then followed the great downpour of 2.64 inches from 2:51 p. m. to 3:36 p. m. Hourly amounts for the entire storm were as follows:

11 a. m. to noon	.05
Noon to 1 p. m.	.44
1 p. m. to 2 p. m.	.34
2 p. m. to 3 p. m.	.80
3 p. m. to 4 p. m.	2.23
After 4 p. m.	.01
Total	3.87 inches

Rainfall was excessive from 2.51 p. m. until 3:36 p. m., and accumulated amounts were as follows for this period:

5 minutes	.17	30 minutes	2.16
10 "	.51	35 "	2.40
15 "	1.17	40 "	2.51
20 "	1.71	45 "	2.64
25 "	1.91		

The following are the greatest amounts during the entire storm in—

5 minutes	.80	30 minutes	2.23
12 "	1.20	One hour	2.70
15 "	1.52	Two hours	3.03

Union Park, a pleasure resort on the outskirts of the city to the northwest, is a narrow valley only a few hundred feet wide in places, with steep hills on either side. Running through the valley is a creek, which is practically dry except during wet periods. During the period of excessive rainfall on July 9th this creek became a raging torrent many feet deep, overflowing its banks, and destroying park property of all kinds. A number of picnickers took shelter from the rain in a pavilion near the creek. The rising waters quickly flooded the building and finally swept it away, precipitating its occupants into the freshet. In spite of heroic deeds upon the part of the park employees and others, five persons were drowned here or elsewhere in the park. They were: Mrs. Chris Wagner, age 38; Blanche Wagner, age 10; Edmund Wagner, age 3; Sarah Sezer, age 6; Herbert Ricke, age 4. Property loss at Union Park is estimated at from \$10,000 to \$15,000.

Another tragedy occurred on 32d street, near Heim's brick yard. Mrs. George Kennicker and two small children attempted to cross the street and the woman and one child were swept by the torrent of water into the Bee Branch sewer and drowned. The dead child is Ruth Brose, age 3. The other child was carried over the mouth of the sewer and escaped, but with serious injuries.

The damage to waterway streets and to many streets on the level below the bluffs was surprisingly great. Kaufmann Avenue was completely ruined and also West Locust Street between Jackson School and Mt. St. Joseph College. Julian Avenue and Dodge Street were badly damaged. Much of the brick paving on 8th street for several blocks above Bluff was stripped off and thousands of brick carried down by the water to the business section of the city. The wood block paving for several blocks on Couler Avenue

above 18th Street was carried away and the avenue over this area was a wreck after the storm. Some of the streets below Main, particularly from the Carr, Ryder & Adams Co. factory northward to the Brunswick-Balke-Collender Co. factory, were covered with water during the height of the storm; water in large areas was 2 to 3 feet deep. Hundreds of cellars were flooded and some were completely filled with water and mud, the water reaching to the first floor in many instances. These are only typical instances of the damage by the storm. Few sections of the city from Eagle Point and the Brunswick-Balke-Collender Co. factory on the north to Dodge Street and the lumber yards on the south—a distance of about four miles—escaped damage.

City officials estimate that the streets of the city were probably damaged to the extent of \$75,000 to \$100,000. This may be correct, because many thousands of dollars will be required to clean and repair the streets, while some are beyond repair and will have to be replaced. There are hundreds of individual losses, relatively small.

About 20 small bridges in Dubuque County were damaged or destroyed, causing a loss of nearly \$25,000. Total damage from the storm was approximately \$125,000. This includes damage to city streets, county roads and bridges, at Union Park, and to homes and factories.

Incidental to the storm of July 9, 1919, it is worthy of note that during the past nine years (1911 to 1919, inclusive) there have been seven storms in which more than 3.00 inches of rain within 24 consecutive hours fell, or more storms of similar intensity than occurred during the 29-year period from 1882 to 1910, inclusive, which gave only six. On the other hand, during the eight-year period from 1874 to 1881, there were nine storms that gave more than 3.00 inches of rain within 24 consecutive hours.

The following table gives the dates of all storms at Dubuque from 1874 to 1919, inclusive, in which 3.00 inches or more of rain fell within 24 consecutive hours:

September 18-19, 1874	3.70 inches
September 8-9, 1875	5.40 "
July 4-5, 1876	4.55 "
September 5, 1876	3.40 "
July 6-7, 1879	3.39 "
June 3-4, 1880	3.03 "
September 25, 1880	3.38 "
July 10, 1881	3.42 "
September 26, 1881	4.01 "
August 23-24, 1885	3.38 "
May 9-10, 1890	3.18 "
June 2-3, 1890	3.04 "
June 16, 1892	3.48 "
July 26, 1899	4.82 "
September 13-14, 1909	3.25 "
August 10-11, 1911	3.75 "
August 18-19, 1912	5.23 "
August 31-September 1, 1914	3.18 "
September 14-15, 1914	3.38 "
September 25-26, 1915	4.79 "
August 16-17, 1918	5.22 "
July 9, 1919	3.87 "

The following table gives the heaviest rainfall in periods of 5 minutes, 10 minutes, 15 minutes, 30 minutes, one hour, and two hours for a number of storms. It shows how much heavier was the rainfall on July 9, 1919, within a one hour period, than during any storm at Dubuque in recent years:

Storm of—	In 5 Min.	In 10 Min.	In 15 Min.	In 30 Min.	In 1 Hr.	In 2 Hrs.	In 24 Hrs.
August 10-11, 1911	.32	.52	.62	.81	1.12	1.97	3.75
August 18-19, 1912	.50	.71	.94	1.46	1.95	2.62	5.23
August 31-September 1, 1914	.41	.72	1.03	1.30	1.68	1.96	3.18
September 14-15, 1914	.34	.51	.58	.73	.85	1.26	3.38
September 25-26, 1915	.34	.46	.53	.68	1.27	2.23	4.79
August 16-17, 1918	.35	.62	.79	1.37	2.10	2.96	5.22
July 9, 1919	.80	1.20	1.52	2.23	2.70	3.03	3.87

From the record of "Excessive" precipitation at Dubuque the following data are taken: On July 4, 1876, 4.55 inches fell in two hours, five minutes. On July 7, 1891, 1.87 inches fell in 27 minutes. On August 18, 1912, 1.81 inches fell in 43 minutes. On August 31, 1914, 1.23 inches fell in 20 minutes. On September 26, 1915, 2.57 inches fell in two hours, 27 minutes. On August 16-17, 1918, 2.48 inches fell in one hour, 18 minutes. On July 9, 1919, 2.65 inches fell in 45 minutes.

ACREAGE OF CROPS IN IOWA, 1919.

During the last two years acreages have made unusually rapid shifts from one crop to another, and in such cases, it seems that township correspondents have a tendency to lag behind the changes. For that reason, last year's estimates differed greatly from the assessors' reports. Much time and care have been devoted to checking the assessors' reports from every possible angle, and while some errors in these that can not be remedied, are known to exist, in their general aspects they are believed to be nearly correct.

Corn. The largest surprise is in the corn acreage of 1918 which assessors' reports place at 9,303,514, or more than 1,000,000 acres less than estimated by any government, state or private agency. This tremendous decrease is all accounted for in the increases shown in small grains, spring wheat leading, though not much ahead of oats. Based on assessors' reports and the percentage estimates of the township reporters of the Iowa Weather and Crop Service, the 1919 corn acreage is 9,499,700, or 196,200 acres more than in 1918. This allows for 193,900 acres planted in the spring that were drowned out later in the season.

Oats. Area seeded, 5,670,500 acres, or 152,400 less than last year; practically all harvested.

Spring Wheat. Area harvested, 555,400 acres, or 54,600 less than last year. The acreage seeded was 637,700, but hot, humid weather, favorable for "scab," blight and other plant diseases, caused the abandonment of 82,300 acres and greatly reduced the yield and quality on the harvested acreage.

Winter Wheat. Acreage harvested, 785,000, or 476,000 more than in 1918. The acreage seeded in the fall of 1918 was 805,100. There was practically no winter killing, and up to June 10 an unusually large yield per acre was indicated, but the same adverse conditions affected winter wheat that affected spring wheat, only the former was farther advanced when the unfavorable weather set in. The yield was greatly reduced below that expected, though not much below the normal; and 20,100 acres were abandoned as not worth harvesting.

Barley. Acreage seeded, 509,140, or 28,800 less than last year.

Rye. Acreage seeded, 70,630, or 1,200 more than last year.

Flax. Acreage seeded, 16,410, or 1,440 more than last year.

Potatoes. Acreage, 97,520, or 860 more than last year.

Hay. Acreage of tame and wild hay, 3,160,640, or 21,500 more than last year.

Alfalfa. Acreage, 121,930; increase, 1,830 acres.

Pastures. Acreage, 9,677,700, or 84,000 less than last year. Pastures last year were underestimated, 681,700 acres.

IOWA CROP REPORT, AUGUST 1, 1919.

The condition of crops on August 1 was as follows: Corn, 93 per cent, or 5 per cent better than the average of the last 10 years; pastures, 95 per cent, or 11 per cent better than the 10-year average; potatoes, 72, or 8 per cent poorer than the 10-year average.

Early thrashing reports, mainly from the central and southern parts of the State, show the average yield of winter wheat to be 18.5 bushels per acre, or 2.4 bushels below the 10-year average and considerably under standard weight; spring wheat, 10.2 bushels, or 5.7 bushels below the 10-year average and of such poor quality that much can not be milled; early oats, 33.3 bushels, or 3.3 bushels below normal; late oats, 33.0 bushels; barley, 24.9 bushels; rye, 16.0 bushels.

The yield of tame hay is reported as 1.8 tons per acre; wild hay, 1.4 tons.

If final returns maintain these averages, the State will produce about 188,261,000 bushels of oats; spring wheat, 5,665,000 bushels; winter wheat, 14,522,500; barley, 12,678,000; rye, 1,130,000 bushels; and 6,106,000 tons of hay, including alfalfa.

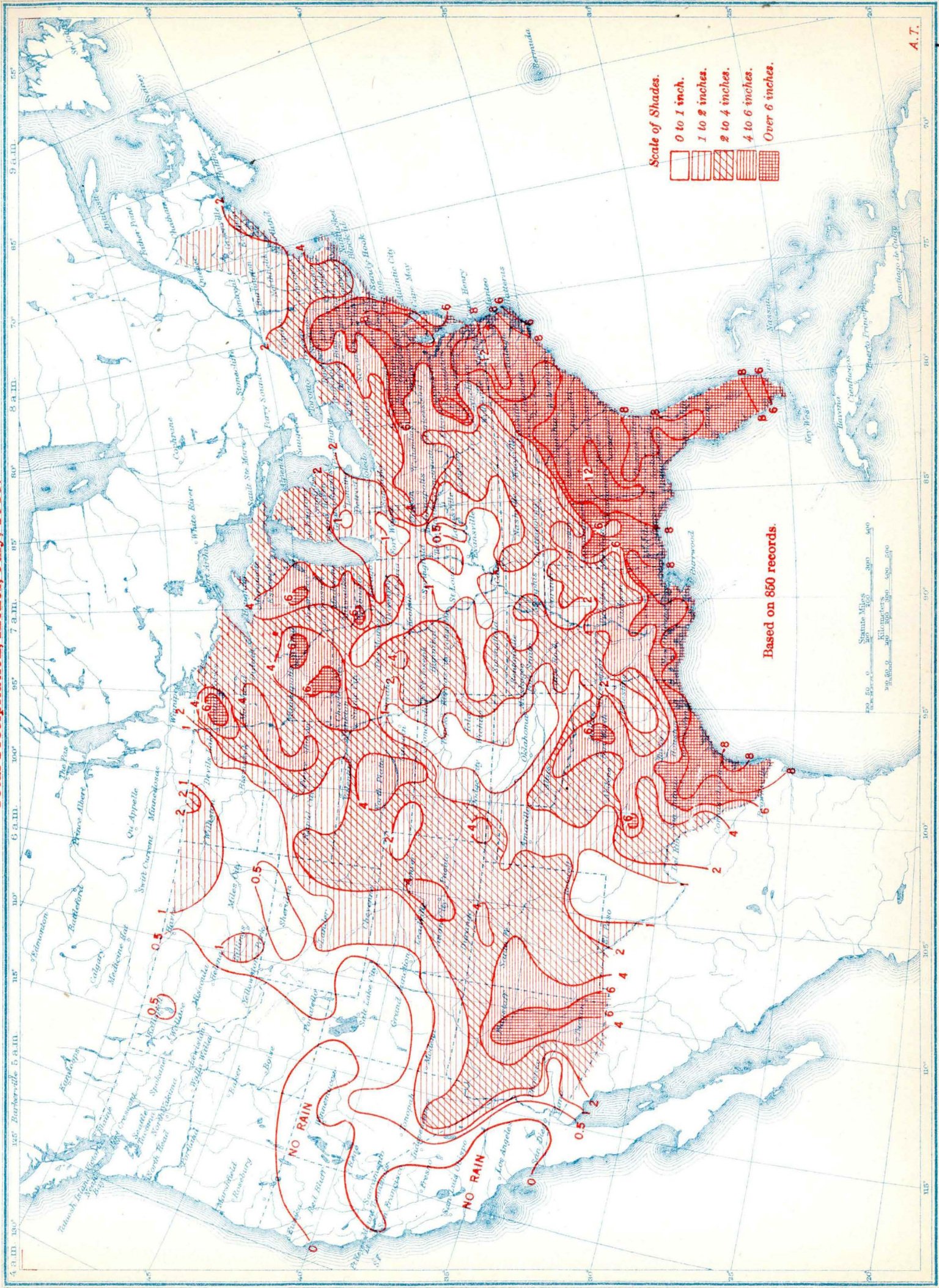
The secretary of the State Horticultural Society reports the condition of fruit on August 1 as follows:

Summer apples, 55 per cent; fall apples, 44; winter apples, 27; pears, 17; Americana plums, 15; Domestica plums, 13; Japanese plums, 9; grapes, 80 per cent of a full crop. The average of all fruits is 32.5 per cent. The average of apples for the last 10 years is 46 per cent which is 4 per cent higher than the crop of this year. The failure of the Americana plums has reduced the general average of fruits this year 25 per cent below the average of the last 10 years on this crop. Grapes are more promising, being 13 per cent above the 10-year average of this crop. Apples in commercial orchards that have been sprayed, will be a fair crop of good quality, while those from farm orchards that have not been cared for will be poor and scarcely marketable on account of scab and worm injury.

Iowa Crops 1919 Estimated Number of Acres by Counties.

	Corn	Oats	Spring Wheat	Winter Wheat	Barley	Rye	Flax	Potatoes	Tame Hay	Wild Hay	Alfalfa	Pastures
Adair	111,500	42,600	7,400	11,742	8,100	140		690	17,100	1,670	90	115,000
Adams	73,600	26,900	3,500	18,159	2,130	150		420	15,500	1,770	350	95,800
Allamakee	39,000	40,000	5,400	973	10,000	500	50	1,070	49,500	1,230	10	170,500
Appanoose	46,700	25,500	2,100	14,543	50	800		300	35,700	840	40	124,600
Audubon	106,600	38,800	6,500	3,510	12,900	20		700	21,200	1,490	990	80,200
Benton	136,300	94,100	4,600	1,525	12,030	1,110		880	36,600	2,030	90	112,800
Black Hawk	100,500	70,500	2,700	825	8,870	3,300	20	1,370	19,800	8,620	50	89,800
Boone	124,800	78,400	3,700	1,844	1,890	80	100	380	20,700	7,270	250	81,000
Bremer	62,500	53,400	2,800	152	3,200	1,100	20	1,250	18,700	21,360	60	74,800
Buchanan	95,500	70,600	3,300	141	7,700	1,540	10	910	26,300	12,000	30	109,400
Buena Vista	119,400	95,100	2,100	247	1,700	410	60	960	18,000	7,160	580	73,900
Butler	98,400	81,800	2,800	27	2,800	1,230	10	1,290	24,900	10,600	10	87,100
Calhoun	139,200	101,200	1,500	500	1,300	70	20	460	18,400	3,090	210	53,600
Carroll	111,500	66,400	8,000	2,222	3,500	30		1,560	27,200	6,480	300	78,600
Cass	120,700	43,700	10,000	22,798	15,370	670		820	22,200	890	500	98,900
Cedar	103,700	40,500	3,400	6,742	16,630	360		730	22,600	130	90	102,000
Cerro Gordo	84,600	76,800	4,500	45	5,710	100	200	1,210	28,500	8,300	120	79,700
Cherokee	122,500	83,800	1,000	271	3,880	50	10	1,010	25,500	7,900	2,250	80,200
Chickasaw	60,000	61,000	4,900	14	4,550	170	350	1,150	30,400	13,400		85,600
Clarke	57,500	23,200	1,300	16,332	260	510		190	22,000	80	100	107,000
Clay	106,000	83,400	1,000	149	2,820	150	380	770	21,000	11,400	430	73,600
Clayton	70,900	62,400	6,200	1,691	15,820	680		1,730	62,000	1,150	50	175,700
Clinton	103,000	48,300	6,300	4,397	16,640	2,090		790	50,800	1,450	100	151,800
Crawford	133,700	64,500	22,400	1,387	5,070	220		1,300	43,300	4,940	4,200	115,700
Dallas	120,700	60,200	4,100	23,617	1,330	200		310	17,000	1,900	490	86,400
Davis	57,000	39,400	1,700	200	1,340	200		450	46,100	30	40	148,300
Decatur	68,800	34,000	1,200	23,297	60	1,330		710	29,100	220	140	125,700
Delaware	82,400	58,000	3,800	411	14,530	2,210		950	37,700	5,800	30	111,000
Des Moines	63,700	28,300	1,100	16,146	620	3,730		850	23,300	30	260	79,300
Dickinson	61,800	50,700	3,000		2,990	100	750	520	12,900	11,630	180	49,400
Dubuque	64,300	49,800	5,400	500	8,300	280		2,690	55,800	600	60	145,000
Emmet	56,700	58,000	1,100		3,300	400	730	490	15,200	5,200	110	52,400
Fayette	87,700	76,100	4,100	428	12,540	480	80	1,380	58,200	11,000	10	148,400
Floyd	75,900	74,300	5,200	33	4,700	910	430	1,460	30,800	4,260	50	71,200
Franklin	108,800	84,800	1,800	102	5,400	250	70	1,420	30,300	7,680	20	81,300
Fremont	117,300	14,700	2,900	35,626	520	580		300	8,200	2,550	7,950	65,400
Greene	137,100	74,500	4,000	2,287	1,380	50	20	420	22,300	4,240	60	78,400
Grundy	100,600	78,000	2,500	966	5,250	40	20	1,750	21,500	7,230	10	61,800
Guthrie	169,100	48,800	6,800	5,883	2,420	130		380	23,800	3,320	250	108,400
Hamilton	128,600	88,500	3,100	508	2,430	50	30	990	19,500	4,890	130	71,100
Hancock	93,200	89,300	3,900	80	5,490	200	400	1,270	23,200	22,500	90	75,100
Hardin	104,500	75,600	2,100	214	5,460	90	30	820	26,600	4,800	100	73,900
Harrison	135,700	49,000	27,900	12,004	3,250	340		890	8,400	6,480	13,560	88,900
Henry	66,100	32,800	1,200	9,223	340	1,330		320	28,000		60	96,800
Howard	45,000	60,500	4,100	119	7,910	480	1,500	920	29,800	11,780	10	75,400
Humboldt	86,800	68,200	3,000	344	4,390	100	40	460	18,400	5,560	180	43,300
Ida	80,100	54,800	4,000	88	4,710	50	30	1,160	22,300	1,740	1,550	56,200
Iowa	93,200	45,300	4,700	4,131	4,610	540		1,160	34,300	430	20	113,100
Jackson	62,700	34,000	5,800	1,322	5,480	920		1,220	56,500	1,480	70	184,600
Jasper	139,600	65,900	13,500	8,878	1,650	320		610	34,100	640	90	136,800
Jefferson	63,400	30,600	1,100	8,651	180	960		510	35,900		40	95,800
Johnson	99,000	46,200	3,100	5,287	2,660	1,700		1,220	40,400	560	80	124,600
Jones	72,900	42,400	2,300	496	10,930	390		920	47,300	180	50	134,100
Keokuk	106,300	39,800	8,100	7,060	430	490	3,000	690	36,400	10	30	120,300
Kossuth	166,100	153,300	5,500	180	7,620	290		1,840	32,000	28,480	220	113,700
Lee	55,500	24,000	1,400	14,914	690	10,300		1,130	31,400	30	210	128,000
Linn	116,600	66,500	5,600	1,272	5,300	1,140		1,670	45,100	2,800	130	119,400
Louisa	61,200	26,600	600	18,048	530	2,540		730	18,500	180	90	73,800
Lucas	53,000	27,700	2,000	17,298	150	230		170	23,300	70	60	114,800
Lyon	126,400	100,000	4,400	92	9,660	60	40	1,740	12,700	8,730	2,480	60,000
Madison	83,500	28,400	3,100	31,578	4,940	330		450	19,000	1,230	180	134,700
Mahaska	108,500	44,100	6,700	12,063	840	350		500	32,600	220	100	115,300
Marion	86,100	34,400	7,200	24,412	1,060	340		320	23,700	290	100	127,900
Marshall	111,500	69,800	6,600	3,854	1,250	170		750	35,000	300	20	88,500
Mills	102,200	19,300	7,100	21,955	1,700	320		990	8,700	3,720	8,530	69,000
Mitchell	54,100	86,200	5,300	65	4,280	90	1,200	4,370	27,700	3,520		70,300
Monona	116,700	27,900	32,400	17,328	2,040	200	30	2,790	7,600	9,860	11,960	88,900
Monroe	37,300	16,100	3,100	15,919	180	690		250	24,500	40	30	123,500
Montgomery	88,700	24,100	8,500	27,264	1,560	670		550	15,600	560	3,140	76,600
Muscatine	77,700	23,900	2,900	10,580	7,650	3,640		1,170	22,200	530	330	80,900
O'Brien	106,000	86,600	2,100	178	9,520	40	150	1,160	20,300	6,890	940	72,900
Osceola	78,200	72,300	2,300	62	5,500	30	400	1,000	14,500	6,030	180	41,800
Page	98,700	27,000	5,400	46,758	620	860		550	21,600	770	3,380	123,100
Palo Alto	107,200	80,700	2,200	54	2,040	390	1,250	820	15,700	18,800	100	56,300
Plymouth	183,100	91,300	42,300	935	7,380	120	20	1,760	21,800	18,600	10,150	109,900
Pocahontas	125,900	104,600	2,100	119	1,980	830	30	850	19,400	8,090	220	70,600
Polk	97,400	45,900	10,000	19,985	190	430	10	2,370	17,500	3,050	400	91,800
Pottawattamie	192,700	50,800	15,300	28,150	18,390	590		2,050	29,200	6,530	14,760	127,400
Poweshiek	112,700	54,800	5,000	1,507	4,670	160		710	28,200	80	80	112,400
Ringgold	77,100	30,500	1,000	18,463	4,320	540		230	27,100	80	20	129,100
Sac	113,700	84,900	1,100	549	5,070	60	20	810	23,100	4,570	330	71,400
Scott	73,800	24,600	5,400	15,693	24,120	2,500		3,280	30,800	1,670	820	79,100
Shelby	115,700	51,000	9,400	1,236	12,420	40		900	25,500	3,510	2,340	101,400
Sioux	165,400	90,600	12,900	532	24,670	150		1,770	19,600	13,980	4,970	75,200
Story	134,300	78,300	2,800	3,307	1,500	300	60	1,740	23,000	2,740	180	66,400
Tama	120,200	78,100	6,500	1,069	13,680	390		1,330	38,700	1,280	50	128,800
Taylor	89,600	31,600	1,200	27,333	550	720		470	21,500	770	540	119,100
Union	65,600	29,900	1,100	14,692	1,940	250		600	15,600	690	30	104,700
Van Buren	53,600	26,700	900	10,426	130	2,180	10	190	35,500	10	210	125,700
Wapello	52,500	22,300	2,400	17,384	480	920		550	26,300		120	92,400
Warren	78,600	56,500	5,300	47,399	1,600	550		350	24,000	640	190	131,600
Washington	101,500	47,700	2,500	5,174	580	280		530	34,000	20	70	112,600
Wayne	68,500	35,700	1,500	14,655	110	460		120	37,300	60	50	121,300
Webster	144,100	116,400	5,200	428	1,350	30	20	1,390	22,300	10,510	560	82,600
Winnebago	62,700	53,700	9,300	119	7,820	40	1,500	1,290	18,500	18,700	40	53,700
Winneschick	83,000	68,000	9,700	183	15,660	430	800	1,290	50,600	4,620	10	145,500

Total Precipitation, Inches, July, 1919.



Scale of Shades.
0 to 1 inch.
1 to 2 inches.
2 to 4 inches.
4 to 6 inches.
Over 6 inches.

Based on 850 records.

Statute Miles 0 100 200 300 400 500
Kilometers 0 100 200 300 400 500

A.T.

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

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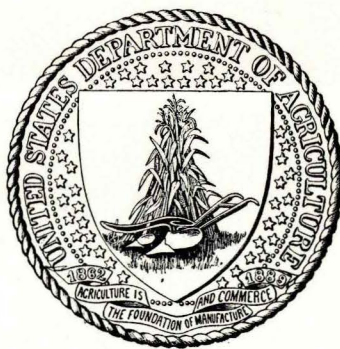
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

AUGUST, 1919

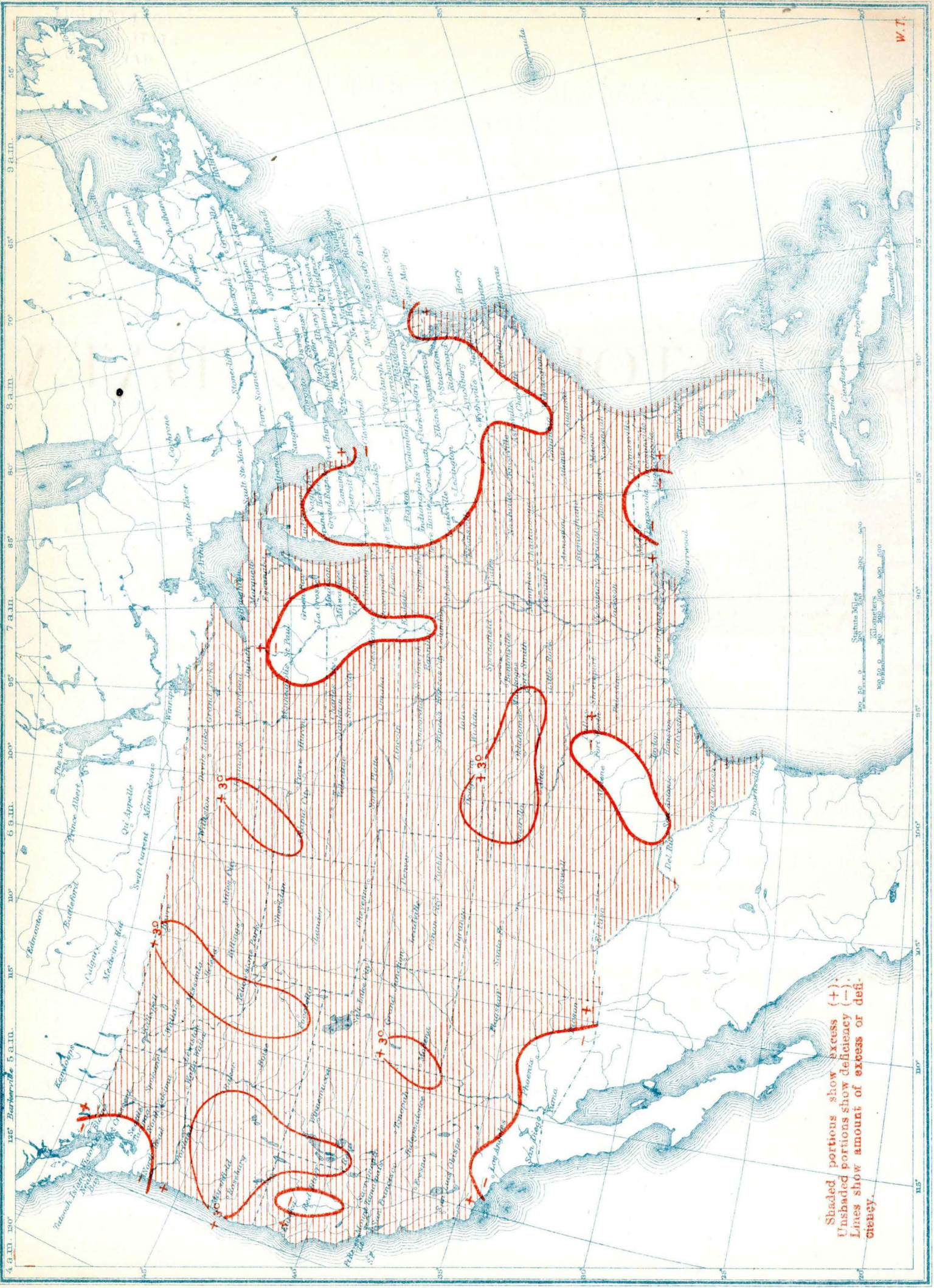
BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

Departure of the Mean Temperature from the Normal, August, 1919.



Shaded portions show excess (+).
 Unshaded portions show deficiency (-).
 Lines show amount of excess or deficiency.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, AUGUST, 1919. No. 8

GENERAL SUMMARY.

August was a pleasant month with the temperature near the normal. There were no protracted hot spells and after a short period of hot weather during the first week, the rest of the month was generally below the normal. Temperatures exceeding 100° occurred at only a few stations and after the first week the maxima were below 90° over most of the State. The lowest temperature of the month occurred on the last day over practically the entire State and three stations reported light frost. The weather was favorable for the maturing of crops, harvesting and threshing but too dry for plowing and seeding and meadows and pastures were suffering for rain and turning brown at the close of the month, except in a few small areas.

Like July, the precipitation was deficient, except a few small areas, the principal one being a narrow strip in the east-central district, and the distribution uneven. Most of the precipitation occurred during the first half of the month and was sufficient to assure a good corn crop, there being no heavy downpours and all was taken up by the soil.

A small tornado occurred in Butler County on the afternoon of the 4th. It originated several miles north of Dumont and moved southeast striking the edge of Bristow, the length of the path being less than ten miles and the width varying from about 20 feet to more than 1,000 feet. No lives were lost but there was considerable property damage, the buildings and live stock damage being about 12,000 and the loss to crops about \$25,000. A severe wind and hail storm occurred on the morning of the 6th in Blackhawk County, in the extreme eastern portion. A number of barns were blown down and in one 17 head of stock were killed by the hay loft falling in; wind towers were bent to the ground, trees uprooted and broken off by the wind and considerable corn was stripped by the hail.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.98 inches. The highest recorded was 30.31 inches, at Dubuque, on the 10th, and the lowest was 29.59 inches, at Sioux City, on the 3d. The monthly range was 0.72 of an inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 104 stations, was 71.5°, or 0.3° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 70.3°, or 0.1° lower than the normal; Central, 71.5°, or 0.2° lower than the normal; Southern, 72.8°, or 0.4° lower than the normal. The highest monthly mean was 75.0°, at Omaha, Nebr., and the lowest was 67.8°, at Postville. The highest temperature recorded was 103° at Clarinda on the 6th, and the lowest was 38°, at Inwood, Rock Rapids and Washta, on the 31st. The temperature range for the State was 65°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 111 stations, was 2.59 inches, or 1.09 inches less than the normal. By divisions the averages were as follows: Northern, 2.30 inches, or 1.18 inches less than the normal; Central, 2.98 inches, or 0.79 of an inch less than the normal; Southern,

2.50 inches, or 1.28 inches less than the normal. The greatest amount, 5.72 inches, occurred at Maquoketa, and the 0.97 of an inch, at Sioux Center. The greatest amount in 24 hours, 2.98 inches, occurred at Cedar Rapids, on the 5th.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 80 per cent, and at 7 p. m. it was 56 per cent. The mean for the month was 68 per cent, or 4 per cent lower than the normal. The highest monthly mean was 71 per cent, at Charles City, and the lowest was 64 per cent, at Keokuk.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was at the rate of 38 miles an hour, from the west, at Sioux City, on the 3d.

SUNSHINE.

The average per cent of the possible amount of sunshine was 77, or 6 per cent more than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 85; Davenport, 70; Des Moines, 72; Dubuque, 83; Keokuk, 84; Sioux City, 71; Omaha, Neb., 73.

MISCELLANEOUS PHENOMENA.

- Aurora: 18th.
- Fog: 5th, 6th.
- Frost (light): 31st, at Alton, Fayette and Rock Rapids.
- Hail: 4th, 5th, 6th, 12th, 24th.
- Halo (solar): 13th.
- Haze: 11th, 19th, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th.
- Thunderstorms: All days except 8th, 10th, 11th, 18th, 22d, 27th, 28th, 29th, 31st.
- Tornado: 4th.

RIVERS.

Moderate stages prevailed on the Mississippi and Missouri Rivers, and except a few slight rises, fell steadily throughout the month; on the interior rivers low stages, with a general falling tendency, prevailed.

COMPARATIVE DATA FOR THE STATE—AUGUST.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	68.4	- 3.4	102	36	3.41	-0.27	6.44	1.02	-----	8	15	10	6
1891	69.1	- 2.7	106	34	4.24	+0.56	13.02	1.23	-----	8	13	12	6
1892	71.4	- 0.4	102	40	2.24	-1.44	4.69	0.65	-----	5	18	9	4
1893	69.4	- 2.4	101	30	2.32	-1.36	6.22	0.40	-----	5	19	9	3
1894	74.6	+ 2.8	108	38	1.58	-2.10	4.53	T	-----	4	21	8	2
1895	71.9	+ 0.1	103	37	4.43	+0.75	10.63	0.67	-----	7	17	9	5
1896	71.7	+ 0.1	104	34	3.52	-0.16	12.25	0.86	-----	8	15	11	5
1897	68.9	- 2.9	104	35	1.86	-1.82	4.98	0.47	-----	6	15	11	5
1898	71.2	- 0.6	103	40	3.44	-0.24	10.55	0.58	-----	6	17	9	5
1899	74.4	+ 2.6	100	41	3.68	0.00	10.45	1.12	-----	7	17	10	4
1900	77.4	+ 5.6	103	44	4.65	+0.97	10.43	1.26	-----	6	18	10	3
1901	73.8	+ 2.0	105	40	1.29	-2.39	4.46	T	-----	5	20	9	2
1902	69.1	- 2.7	98	37	6.58	+2.90	15.47	1.57	-----	11	11	11	9
1903	69.1	- 2.7	101	41	6.64	+2.96	17.74	2.55	-----	11	12	10	9
1904	69.1	- 2.7	97	35	3.43	-0.25	6.75	0.66	-----	7	17	8	6
1905	74.3	+ 2.5	104	44	4.05	+0.37	8.47	1.04	-----	9	16	9	5
1906	74.1	+ 2.3	101	33	3.95	+0.27	10.51	0.92	-----	9	17	9	5
1907	71.1	- 0.7	99	37	4.33	+0.65	9.67	1.05	-----	9	17	9	5
1908	70.0	- 1.8	101	38	4.77	+1.09	10.55	1.35	-----	8	17	8	2
1909	76.1	+ 4.3	103	33	1.81	-1.87	8.21	T	-----	5	21	10	6
1910	71.9	+ 0.1	104	36	3.88	+0.20	11.22	0.37	-----	8	15	10	5
1911	71.7	+ 0.1	107	34	3.32	-0.36	9.47	0.44	-----	9	16	10	5
1912	71.0	- 0.8	101	40	3.78	+0.10	7.90	0.89	-----	10	15	10	4
1913	76.6	+ 4.8	108	40	2.68	-1.00	7.13	0.68	-----	6	17	10	4
1914	73.7	+ 1.9	103	40	2.19	-1.49	4.90	0.42	-----	7	17	10	4
1915	65.9	- 5.9	91	30	2.81	-0.87	9.14	0.27	-----	8	16	8	7
1916	74.0	+ 2.2	106	35	2.58	-1.10	6.23	0.49	-----	7	18	9	4
1917	69.4	- 2.4	102	31	2.29	-1.39	6.31	0.70	-----	7	19	8	4
1918	76.0	+ 4.2	113	38	3.61	-0.07	8.38	0.54	-----	8	16	10	5
1919	71.5	- 0.3	103	38	2.59	-1.09	5.72	0.97	-----	7	19	9	3

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

Climatological Data for August, 1919.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Northern Division																				
Algona	Kossuth	1,213	46	71.2	+ 0.4	93	3	45	31	29	1.88	-1.79	0.90	0	4	30	1	0	sw.	W. E. Laird.
Allison	Butler	1,045	7	71.5	-----	98	4	44	31	38	1.80	-----	0.80	0	7	17	14	0	nw.	J. A. Bell.
Altamont	Buena Vista	1,513	28	70.5	- 0.1	95	3	49	31	32	2.12	-1.77	1.40	0	8	18	12	1	nw.	David E. Hadden.
Alta (near)	Buena Vista	-----	23	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.97	0	6	-----	-----	-----	-----	Warren Minard.
Alton	Sioux	1,305	14	71.0	- 0.4	93	5†	39	31	39	2.40	-----	0.88	0	5	16	13	2	se.	W. S. Slagle.
Belmond	Wright	1,205	9	71.6	-----	96	3†	43	31	36	1.70	-----	0.53	0	8	19	12	0	nw.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	68.8	- 1.4	94	3	46	26†	41	2.04	-1.76	0.80	0	7	17	13	1	n.	L. M. Goodman.
Charles City	Floyd	1,015	28	69.6	- 1.1	91	3	45	31	35	1.90	-1.52	1.03	0	9	15	16	0	nw.	U. S. Weather Bureau.
Decorah	Winneshek	875	26	70.3	- 0.9	91	4	46	27†	35	2.29	-1.07	0.86	0	7	23	6	2	nw.	Wm. F. Baker.
Elkader	Clayton	751	40	70.1	- 1.3	95	4	43	31	36	2.74	-0.71	1.17	0	6	21	9	1	s.	D. C. Hale.
Estherville	Emmet	1,298	24	68.8	- 0.3	89	3†	43	31	36	3.30	-0.80	1.20	0	4	20	11	0	s.	A. O. Peterson.
Fayette	Fayette	1,003	29	69.1	- 0.5	93	4	42	31	38	3.04	-0.38	1.66	0	8	23	8	0	nw.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	69.2	- 0.9	93	3	45	31	35	2.06	-1.38	0.78	0	7	23	6	2	n.	Nina Secor.
Humboldt	Humboldt	1,095	31	71.5	+ 0.7	98	3	40	25†	42	2.56	-0.80	0.79	0	8	15	14	2	sw.	H. C. Smitkey.
Inwood	Lyon	1,474	15	71.4	+ 0.4	96	3	38	31	40	0.99	-1.89	0.36	0	8	28	2	1	nw.	F. B. Hanson.
Lansing	Allamakee	632	13	-----	-----	-----	-----	-----	-----	-----	2.32	-0.51	1.39	0	7	-----	-----	-----	-----	Chas. R. Serene.
LeMars	Plymouth	1,224	23	71.4	+ 0.6	100	3	39	31	40	1.75	-1.04	0.67	0	6	26	5	0	s.	C. L. Trenery.
Mason City	Cerro Gordo	1,148	22	68.6	- 1.4	99	5	42	31	38	1.95	-1.99	0.85	0	7	9	21	1	nw.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	70.6	+ 0.9	93	4	45	31	33	1.78	-1.89	1.17	0	7	18	13	0	nw.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	70.6	-----	93	3†	44	31	40	2.43	-----	1.09	0	8	23	8	0	s.	Arthur Betts.
Northwood	Worth	1,222	23	-----	-----	86 ¹	3	41 ¹	31	36 ¹	2.74	-1.30	1.95	0	5	-----	-----	-----	-----	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	70.4	- 0.4	95	3	42	31	37	4.76	+0.85	1.73	0	8	21	7	3	n.	F. E. Hronek.
Postville	Clayton	1,180	20	67.8	- 1.4	88	4	46	31	28	2.59	-0.97	1.20	0	9	18	12	1	ne.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	69.6	- 1.8	94	3	38	31	39	1.44	-0.83	0.84	0	4	25	5	1	nw.	J. C. Medberry.
Sanborn	O'Brien	1,553	5	70.4	-----	95	3	43	31	36	3.05	-----	1.50	0	5	26	4	1	nw.	Jas. W. Dow.
Sibley	Osceola	1,212	26	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	H. F. Olds.
Sioux Center	Sioux	1,426	20	71.4 ^d	+ 1.0	97 ^d	3	52 ^d	25	37 ^d	0.97	-2.21	0.54	0	4	-----	-----	-----	-----	J. de Ruyter.
Spencer	Clay	1,319	5	71.0	-----	97	3	40	31	40	2.06	-----	0.97	0	4	19	9	3	sw.	E. W. Little.
Storm Lake	Buena Vista	1,440	30	71.0	- 0.1	95	3	46	31	31	1.74	-1.59	0.90	0	5	23	7	1	w.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	69.4	- 1.8	96	3	38	31	39	3.39	+0.26	1.52	0	7	22	6	3	n.	H. L. Felter.
Waverly	Bremer	948	23	70.4	- 0.2	95	4	43	31	35	3.69	+0.31	1.80	0	7	11	16	4	nw.	H. Arnold.
West Bend	Palo Alto	1,197	26	70.4	+ 0.2	97	3	41	31	42	1.85	-2.04	0.76	0	6	24	7	0	sw.	Jos. Dorweiler.
Means and extremes				70.3	- 0.1	100	3	38	31	42	2.30	-1.18	1.95	0	6	20	10	1	nw.	
Central Division																				
Ames	Story	926	43	73.1	+ 0.8	95	4	50	26	31	3.65	-0.16	1.70	0	7	23	6	2	sw.	Iowa State College.
Audubon	Audubon	1,301	25	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	V. M. Jones.
Baxter	Jasper	998	19	71.0	- 0.8	92	4†	46	31	33	2.73	-0.89	1.10	0	9	8	17	6	se.	Rev. Paul Traeger.
Belle Plaine	Benton	886	29	70.6	- 0.7	96	4	48	26†	32	3.23	-0.27	1.25	0	7	18	9	4	se.	O. C. Burrows.
Boone	Boone	1,134	14	70.8	- 1.0	94	3	47	31	30	3.77	-0.01	1.39	0	5	24	5	2	s.	Carl F. Henning.
Carroll	Carroll	1,265	29	71.2	+ 0.6	96	3	44	31	35	2.77	-1.14	1.16	0	5	28	1	2	nw.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	73.6	+ 0.8	98	4	50	31	32	5.38	+1.87	2.98	0	6	17	4	10	w.	R. S. Toogood.
Clinton	Clinton	593	46	73.0	+ 1.1	98	4	51	31	32	2.18	-1.53	1.12	0	6	15	13	3	nw.	H. Burde.
Davenport	Scott	580	48	73.0	0.0	96	4	50	31	26	3.58	-0.06	1.32	0	7	19	7	5	sw.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	70.2	+ 0.2	94	4	45	31	31	2.89	-0.87	0.85	0	8	17	14	0	s.	Nettie E. Ball.
Denison	Crawford	1,180	25	71.6 ^a	- 0.1	97 ^a	3	43 ^a	30	35 ^a	1.15	-2.96	0.25	0	8	-----	-----	-----	-----	Emma Brogden.
Des Moines	Polk	861	40	73.4	+ 0.4	94	4	49	31	30	2.19	-1.42	0.70	0	7	15	12	4	nw.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	70.8	- 1.2	95	4	50	31	28	1.58	-1.46	0.84	0	7	14	13	4	nw.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	71.6	0.0	97	3	46	31	42	4.38	+0.03	1.45	0	7	15	13	3	sw.	Isadore Haugh.
Grinnell	Poweshiek	1,031	25	71.8	- 0.9	96	4	47	31	35	4.33	+0.27	1.39	0	10	23	6	2	sw.	J. C. Stocks.
Grundy Center	Grundy	976	28	72.3	+ 0.5	94	5†	47	31	33	1.82	-1.81	0.52	0	6	16	14	1	nw.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	71.2	- 1.3	95	3	40	31	37	1.42	-2.79	0.50	0	7	24	6	1	sw.	C. T. Harney.
Harlan	Shelby	1,182	20	71.0	- 0.5	97	3	39	31	39	1.38	-2.60	0.55	0	9	23	3	5	s.	E. L. Tilton.
Independence	Buchanan	921	55	71.1	+ 0.3	94	4†	46	31	35	2.68	-0.63	1.00	0	8	27	3	1	ne.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	71.4	- 0.8	96	4	46	31	34	2.67	-1.57	0.88	0	9	22	8	1	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	70.0	+ 0.5	93	4	42	31	36	1.61	-2.10	0.50	0	8	23	8	0	nw.	J. B. Parmelee.
Jefferson	Greene	1,052	20	69.7 ^b	- 2.3	95 ^b	5	42 ^b	31	35 ^b	2.72	-----	-----	-----	6	-----	-----	-----	-----	Will I. Lyon.
LeClaire	Scott	576	19	-----	-----	-----	-----	-----	-----	-----	4.06	+0.32	1.70	0	8	-----	-----	-----	-----	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	72.6	- 1.0	99	3	41	31	38	2.56	-0.22	1.55	0	7	18	8	5	ne.	Geo. H. Gibson.
Logan	Harrison	928	52	72.8	- 0.4	99	3	44	31	33	1.09	-2.68	0.30	0	6	18	11	2	sw.	Mary Jean Stern.
Maquoketa	Jackon	688	18	69.4	- 1.1	95	4	46	26†	31	5.72	+2.54	1.78	0	8	18	8	5	sw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	72.4	+ 0.6	94	3†	47	31	37	3.93	+0.76	1.13	0	8	17	10	4	w.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	72.6	-----	92	4	48	31	30	3.45	-----	1.46	0	7	25	4	2	s.	J. A. Dibel.
Muscataine	Muscataine	554	59	-----	-----	-----	-----	-----	-----	-----	3.87	-0.32	1.16	0	8	-----	-----	-----	-----	Wm. P. Molis.
Olin	Jones	760	21	71.2	- 0.3	97	4†	47	31	37	5.17	+0.47	1.80	0	6	17	14	0	sw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	72.1	-----	101	3	43	31	39	1.81	-2.55	0.62	0	6	18	11	2	n.	Mrs. H. E. Colby.
Perry	Dallas	975	18	71.0 ^a	- 1.4	95 ^a	4	43 ^a	31	37 ^a </										

Climatological Data for August, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Southern Division																				
Afton.....	Union.....	1,212	25	74.2	+ 1.2	98	3	48	31	33	1.80	-1.72	1.15	0	5	18	13	0	sw.	J. E. Deitrick.
Albia.....	Monroe.....	959	21	71.4	- 1.7	96	5	43	31	35	3.33	+0.11	1.08	0	7	17	0	14	sw.	F. H. Holmes.
Allerton.....	Wayne.....	1,122	17	73.0	- 0.9	96	5†	46	31	34	1.62	-2.61	0.70	0	5	11	8	12	sw.	Keith Burns.
Atlantic.....	Cass.....	1,164	28	73.4	+ 0.8	100	5	45	31	37	2.18	-1.41	0.96	0	3	11	9	11	sw.	Thos. H. Whitney.
Bedford.....	Taylor.....	19	19	72.3	- 1.1	100	6	42	31	39	2.59	-1.26	1.15	0	7	20	6	5	s.	E. E. Healy.
Bloomfield.....	Davis.....	881	12	73.4 ^e	-----	97 ^e	5†	50 ^e	31	38 ^e	4.31	+0.73	1.25	0	9	-----	-----	-----	nw.	V. G. Warner.
Bonaparte.....	Van Buren.....	565	28	72.5	- 0.6	94	4	46	31	32	1.92	-2.03	0.45	0	3	21	9	1	nw.	Bruce R. Vale.
Burlington.....	Des Moines.....	544	23	74.1	+ 0.1	98	4	49	31	29	3.05	-1.28	1.48	0	8	21	7	3	sw.	Mrs. Edna M. Donnelly.
Centerville.....	Appanoose.....	1,013	14	73.3	-----	95	4†	46	31	33	3.15	-----	1.80	0	9	13	5	13	nw.	Leo C. Allen.
Chariton.....	Lucas.....	1,042	24	70.0	- 2.6	95	5	42	31	35	2.53	-1.39	0.90	0	7	15	14	2	sw.	C. C. Burr.
Clarinda.....	Page.....	1,009	29	74.4	+ 0.9	103	6	46	31	39	1.57	-2.05	0.47	0	8	18	6	7	s.	A. S. Van Sandt.
Columbus Jet.....	Louisa.....	595	18	72.2	- 0.5	95	4	50	31	27	2.56	-2.67	0.80	0	8	20	2	0	w.	F. H. Johnston.
Corning.....	Adams.....	1,117	27	71.9	- 0.3	99	6	40	31	39	2.14	-1.80	1.22	0	5	18	8	5	sw.	Jerome Smith.
Corydon.....	Wayne.....	1,101	26	72.2	- 1.7	97	4	45	31	38	2.60	-0.96	1.21	0	11	12	16	3	nw.	May C. Miller.
Creston.....	Union.....	1,312	14	72.4 ^d	+ 0.6	98 ^d	5	51 ^d	26	35 ^d	2.30	-----	1.05	0	9	-----	-----	-----	nw.	Mrs. T. E. McConnell.
Cumberland.....	Cass.....	20	20	-----	-----	-----	-----	-----	-----	-----	1.42	-2.55	0.90	0	4	27	3	1	sw.	J. H. Reppert.
Earlham.....	Madison.....	1,126	17	71.4	+ 0.2	95	3†	41	31	46	1.88	-2.52	0.82	0	4	20	6	5	sw.	Geo. Phillips.
Fairfield.....	Jefferson.....	780	35	72.8 ^b	- 0.3	98 ^b	4	47 ^b	31	33 ^b	2.72	-0.92	1.29	0	7	-----	-----	-----	nw.	Prof. R. M. McKenzie.
Glenwood.....	Mills.....	1,100	22	74.4	-----	100	3†	45	31	33	3.67	-----	1.09	0	7	15	10	6	ne.	Dr. Geo. Mogridge.
Greenfield.....	Adair.....	27	27	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	Frank A. Ward.
Indianola.....	Warren.....	969	27	73.0	+ 0.1	98	4	54	29†	38	-----	-----	0	-----	17	8	6	sw.	Earle H. Briggs.	
Keokuk.....	Lee.....	614	48	74.4	+ 0.2	97	4	53	31	28	3.85	+0.61	1.63	0	10	15	15	1	s.	U. S. Weather Bureau.
Keosauqua.....	Van Buren.....	644	27	73.4	+ 0.1	100	4	48	31	34	3.41	-0.13	0.96	0	8	18	8	5	s.	J. H. Landes.
Knoxville.....	Marion.....	920	24	72.7	- 0.9	96	4	46	31	34	4.03	-0.04	1.53	0	9	16	8	7	nw.	W. J. Casey.
Lacona.....	Warren.....	20	20	-----	-----	-----	-----	-----	-----	-----	1.77	-2.15	0.82	0	11	11	15	5	s.	J. B. Alter.
Lamoni.....	Decatur.....	1,100	12	73.0	- 0.7	100	6	48	31	34	1.93	-----	0.97	0	6	-----	-----	-----	-----	Ed. D. Moore.
Lenox.....	Taylor.....	1,250	24	72.9	+ 0.1	98	6	46	31	35	2.07	-1.65	1.33	0	7	21	6	4	s.	J. L. Hurley.
Mount Ayr.....	Ringgold.....	1,236	26	72.8	- 1.3	96	6	47	31	35	1.68	-1.82	0.61	0	7	20	4	7	s.	Alex Maxwell.
Mt. Pleasant.....	Henry.....	729	38	73.7	- 0.7	97	4	47	31	31	3.40	-0.03	2.07	0	8	7	23	1	nw.	John H. Jericho.
Murray.....	Clarke.....	1,216	28	73.4	- 0.2	99	5	50	31	33	2.10	-1.43	0.92	0	9	11	16	4	s.	M. T. Ashley.
Northboro.....	Page.....	1,046	5	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.61	0	7	26	2	3	s.	J. M. Darby.
Oakland.....	Pottawattamie.....	-----	-----	73.5 ^e	-----	98 ^e	3	47 ^e	31	42 ^e	2.07	-----	0.61	0	7	26	2	3	s.	M. E. Gray.
Oskaloosa.....	Mahaska.....	825	43	71.8	- 1.0	95	4	49	31	33	2.69	-0.50	1.18	0	8	13	12	6	sw.	Roy R. Robinson.
Ottumwa.....	Wapello.....	849	24	72.0	-----	96	5	47	31	31	3.23	-0.37	1.18	0	7	17	7	7	sw.	Eugene O. Field.
Pella.....	Marion.....	877	26	71.2	- 1.9	94	4	43	31	36	2.47	-0.98	0.74	0	7	24	2	5	nw.	J. H. Ver Steeg.
Shenandoah.....	Page.....	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	0.46	0	8	12	17	2	nw.	L. L. Hunter.
Sigourney.....	Keokuk.....	877	23	71.9	- 1.3	96	4	45	31	34	1.48	-1.99	0.46	0	8	12	17	2	nw.	W. E. Utterback.
Stockport.....	Van Buren.....	754	17	72.5	- 0.7	97	4	46	31	34	2.76	-1.03	0.67	0	11	18	9	4	s.	C. L. Beswick.
Thurman.....	Fremont.....	-----	29	73.8	+ 0.4	102	3	44	31	41	2.13	-2.32	0.75	0	6	6	22	3	se.	O. R. Paul.
Washington.....	Washington.....	769	37	72.1	- 0.4	96	4	48	31	29	1.92	-1.86	0.72	0	7	-----	-----	-----	nw.	Wm. A. Cook.
Winterset.....	Madison.....	1,129	28	72.8	- 0.7	95	4†	45	31	35	2.61	-1.21	0.65	0	7	28	2	1	sw.	H. S. Ely.
Omaha, Nebr.....	-----	1,040	48	75.0	+ 0.6	101	3	53	31	30	2.91	-0.71	0.85	0	10	12	14	5	s.	U. S. Weather Bureau.
Means and extremes.....	-----	-----	-----	72.8	- 0.4	103	6	40	31	46	2.50	-1.28	2.07	0	7	17	9	5	sw.	-----
State means and extremes.....	-----	-----	-----	71.5	- 0.3	103	6	38	31	46	2.50	-1.09	2.98	0	7	19	9	3	nw.	-----

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.
 Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc.
 †Also other dates. ††Received too late to be included in means and summaries.
 T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).				Wind.				Sunshine				
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.		Lowest.	Date.	Total movement.	Average hourly velocity.	Maximum		Per cent of possible.	Departure from normal.		
						7 a. m.	7 p. m.					Miles.	From.				
Charles City	29.96	30.30	10	29.66	3	83	57	59	42	25	3,922	5.3	24	sw.	20	85	+10
Davenport	29.98	30.28	10	29.71	4	78	52	57	34	42	4,650	6.2	26	w.	6	70	0
Des Moines	29.98	30.27	31	29.69	4	81	54	56	27	21	4,554	6.1	35	sw.	20	72	0
Dubuque	29.98	30.31	10	29.70	20	80	52	61	31	31	3,877	5.2	24	n.	16	83	+18
Keokuk	29.99	30.26	10	29.76	4	76	60	53	39	31	4,659	6.3	22	nw.	30	84	+11
Sioux City	29.96	30.30	31	29.59	3	83	52	51	29	18	6,313	6.5	38	w.	3	71	+5
Omaha, Neb.	29.97	30.26	31	29.63	3	76	49	53	27	3	4,905	6.6	35	s.	12	73	+5
Means and extremes	29.98	-----	-----	29.59	3	80	54	56	-----	-----	-----	6.3	-----	-----	-----	77	+6
Normals and records	29.97	-----	29th	-----	10th	82	-----	61	-----	-----	-----	6.7	-----	6th	71	-----	-----
	-----	30.43	1909	29.40	1874	-----	-----	-----	-----	-----	-----	-----	70	sw.	1916	-----	-----

*Sioux City. §Omaha. †Des Moines and Omaha. ‡Local mean time. †And other dates. ††Sioux City.

Daily Precipitation for August, 1919—Continued.

Stations.	Watersheds.	Day of Month.																															Totals	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
<i>Southern Division</i>																																		
Afton	Grand			.20							1.15	.25																						1.80
Albia	Des Moines	.27	.56				1.08				.28	.15		.51	T.					T.	T.				.48		.10		.10				3.33	
Allerton	Chariton				.62						.70			.10	.10										.10								1.62	
Atlantic	Nishnabotna	.09						.01			.96			.88			.01				.01				.02			.25					2.18	
Bedford	Missouri	1.15					T.				.48	.25								.06					.21	.39		.05	T.				2.59	
Bloomfield	Mississippi	1.00		.75		.01		1.25			.30	.01	.24		.35									.40									4.31	
Bonaparte	Des Moines	T.		.35			T.	.45			.09	.21	.12		.36	.03								.31									1.92	
Burlington	Mississippi	1.48			.17	.14		.89			.02	.02	.26		.07										.02								3.05	
Centerville	Chariton	.50		.02			1.80				.50	.01	.01		.10	.09					T.			.12									3.15	
Chariton	Chariton	.35		.20		.18		.50			.90		.16		T.						T.			.24			T.		T.				2.53	
Clarinda	Nodaway	.15				T.		T.			.08			.27								.13				.09	.33	.47	.05	T.			1.57	
Columbus Jct.	Iowa	.80		.25			.23	.30			.02	T.		.80										.14									2.56	
Corning	Nodaway										1.22	.32			T.						.12			T.		.27		.21					2.14	
Corydon	Chariton	1.21					.04	.08			.94	.07	.04		T.		.04						.12			.01		.04					2.60	
Creston	Missouri	.10		.05							1.05	.15	.30									.05			.15	.01	.25	.20					2.30	
Cumberland	Nodaway										.90	.37														.07			.08				1.42	
Earlham	Des Moines			.31		T.					.82	.30			T.									.45		T.		T.					1.88	
Fairfield	Skunk	1.29		.42		T.	T.	.36			.06	T.	.34		.18						T.			.07									2.72	
Glenwood	Missouri					.30					.20	.36										.36			.61	.75		1.09					3.67	
Greenfield	Nodaway																																	
Indianola	Des Moines			.10			.10				.50																							**
Keokuk	Des Moines	.04		.14		.08	1.52				.03	1.45	.18		.22						.05			.14					T.				3.85	
Keosauqua	Des Moines	.96		.19			.90				.13	.03			.75	.05								.40									3.41	
Knoxville	Des Moines	1.53		.60		T.	.07	.40			.48	.38	.07		T.								.42										4.03	
Lacona	Des Moines	.01		.82		.01	.01	.01			.52	.12	.23		.02								.01										1.77	
Lamon	Grand	.48									.97						.06						.13					.17	.12				1.93	
Lexon	Missouri	.07									1.33	.27									.05	.05				.15		.15					2.07	
Mt. Ayr	Grand	.61					T.				.46	.14			T.						.05	.05		.07	T.	.25		.10				1.68		
Mt. Pleasant	Skunk	2.07		.37			.27	.26			.03		.24		.04									.18										3.40
Murray	Grand	.07		.13		.08	T.				.92	.35			T.									.30		.05		.14					2.10	
Northboro	Tarkio																																	
Oakland	Nishnabotna						.02				.61	.18	.51									.30				.05	.40							2.07
Oskaloosa	Des Moines	.12		.56		T.	1.18				.12	.09	.26	.08	T.									.28	T.								2.69	
Ottumwa	Des Moines		.30	.16			1.18				.17	.62		.40										.40										3.23
Pella	Skunk	.08		.74		.22	.53					.02	.23	T.										.65									2.47	
Shenandoah	Nishnabotna																																	
Sigourney	Skunk	.22		.46		.03	.10				.04	T.	.36		.19									.08										1.48
Stockport	Skunk	.67		.32			.11	.27			.12	.23	.12		.56	.02					.10			.24										2.76
Thurman	Missouri					.12						.56			.02						.18				.75	.50		T.	T.	T.				2.13
Washington	Skunk			.32		.34	.19	.20			.04		.72											.11										1.92
Winterset	Des Moines			.65		.36	.03				.65	.22	.37												.33									2.61
Omaha, Neb.	Missouri	.08			.03						.19	.66	.38		T.										.16	.65	.27	.19					2.91	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.
 ||| Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 **Incomplete.
 *Precipitation included in the next following measurement.

ERRATA.

Report for July, 1919: page 76; Estherville; total precipitation and departure published blank, should be, 6.81 inches and +2.28 inches. Page 78; precipitation on 14th published blank, should be, 2.39 inches; the total should be 6.81 inches. Page 77; Albia; total precipitation and departure published 4.69 inches and +0.63 inches, should be, 4.42 inches and +0.36 inches. Page 79; precipitation published 0.27 inch on the 31st, should be 0.00 and the total 4.42 inches.

IOWA CROP REPORT, SEPTEMBER 1, 1919.

Reports from township correspondents, September 1, show the average condition of corn to be 96 per cent, which is 12 per cent above the 10-year average. It is believed that the yield will be about 42 bushels per acre, which would mean a crop of

398,987,000 bushels, an unusually large percentage of which will be sound and marketable, with normal weather. Iowa will easily head the list of corn-producing states this year.

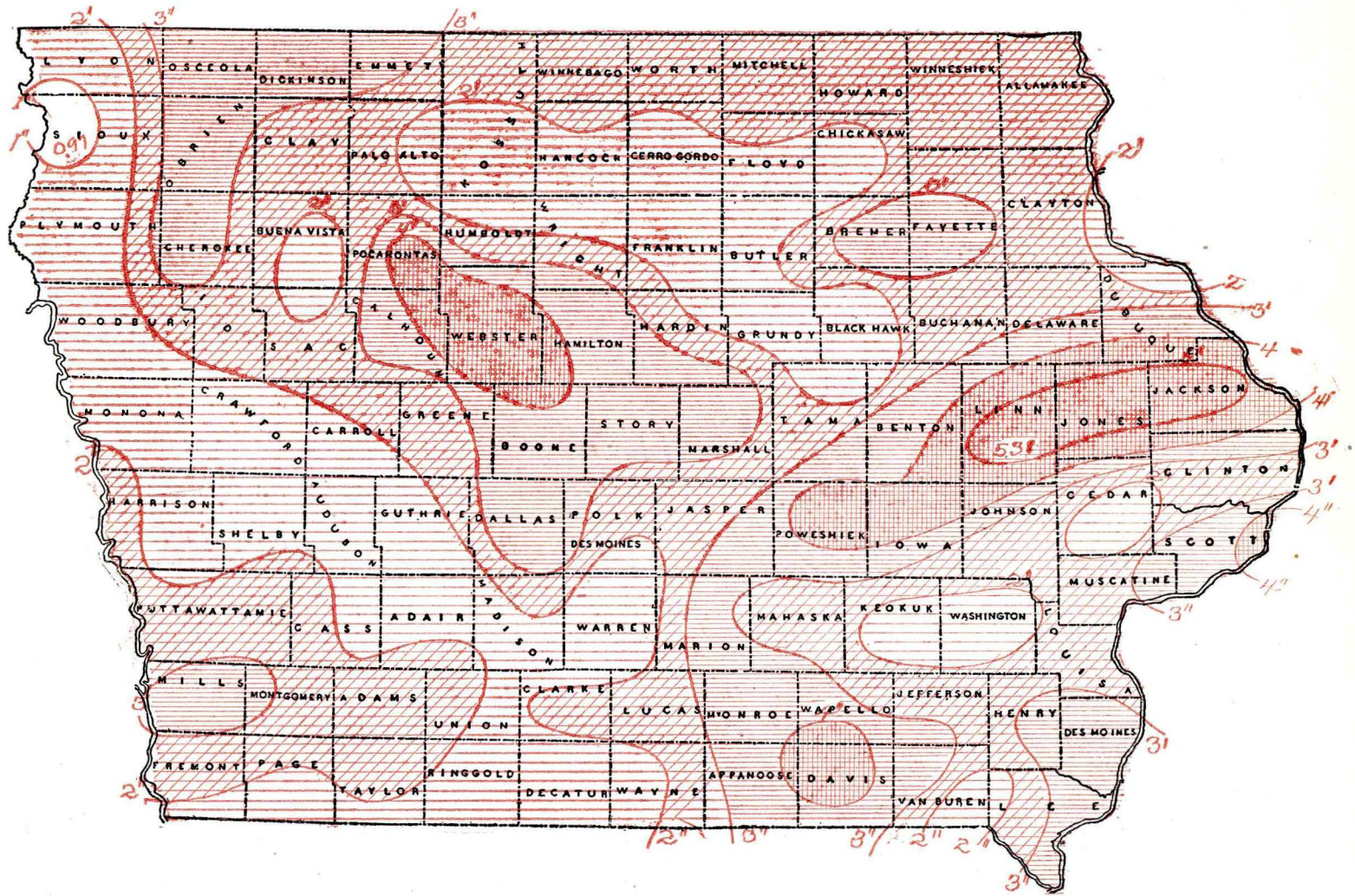
Up to September 1 the average of all reported yields of winter wheat was 18 bushels; spring wheat, 10; oats, 34; barley, 25; rye, 15; timothy seed, 4.6. If the final figures are similar, Iowa will produce this year, of winter wheat, 14,130,000 bushels; spring wheat, 5,544,000 bushels, much of which is not fit for milling; oats, 192,797,000 bushels; barley, 12,728,000; rye, 1,059,000; timothy seed, 920,000. Eighty-nine per cent of the threshing had been done up to September 1 which is 17 per cent more than normal. Much of the grain is being stored on the farm, as cars are not available in which to ship it. The condition of pastures is 90 per cent, or about 5 per cent above normal; potatoes, 60 per cent or 10 per cent below normal.

Daily Maximum and Minimum Temperatures for the Month of August, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by division: Northern Division (Albion to Sibley), Central Division (Belle Plaine to Sioux City), and Southern Division (Albia to Omaha, Nebr.). Each station entry includes Maximum and Minimum temperature values for each day.

* b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record
§§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

TOTAL PRECIPITATION, AUGUST, 1919



SCALE OF SHADES—IN INCHES.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

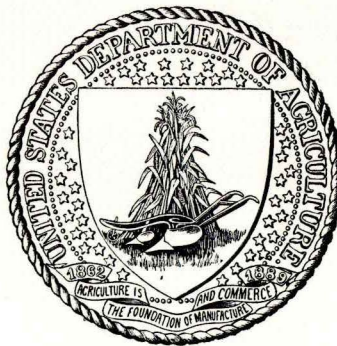
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

SEPTEMBER, 1919

BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, SEPTEMBER, 1919. No. 9

GENERAL SUMMARY.

Warm, dry, sunshiny weather prevailed till the 17th when heavy to excessive rains set in, followed by a clear, cool period, 22d-27th, and then by heavy, general rains, 28th-30th. Temperatures in the 90's occurred at most stations between the 6th and 10th. Light to heavy frosts with temperatures near freezing occurred in the northwest counties, 23d-25th.

Drouth prevailed in the south and central divisions from about August 14 to September 17, while in the north division rains were generally about normal in amount and frequency after September 2d. Excessive rains occurred at a number of stations on the 18th-19th and 30th. In the west part of Davenport on the 30th, storm drains were not large enough to carry off the water. Basements over a large tract were flooded, street car traffic was seriously impeded, numerous washouts occurred along the line of the Clinton, Davenport & Muscatine Railway, and interurban communication with Muscatine was suspended during the entire day. At Muscatine the damage to bridges, roadways, basements, stocks of goods, houses and household goods is placed at \$200,000.

Corn matured and dried rapidly till the rains set in, and about 85 per cent was safe from frost at the close of the month. Silo filling and fodder cutting progressed rapidly. The hard, dry condition of the soil made plowing almost impossible till the 17th. Then the rains came gently, steadily and copiously for the next three or four days, saturating the soil to a great depth. Plowing and winter wheat seeding were pushed rapidly 22d-27th. It is probable that the winter wheat acreage will be reduced to a pre-war basis or about one-third that seeded in the fall of 1918. Pastures recovered from the drouth rapidly. Live stock, which has been fed, began to subsist on pastures toward the end of the month. Stock water and wells which had failed in many places in the south part of the State were replenished. The rains came too late for potatoes which are a poor crop, generally. Many farms have not raised enough for their own use.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.00 inches. The highest recorded was 30.33 inches at Dubuque, on the 4th, and the lowest was 29.33 at Davenport, on the 19th. The monthly range was 1.00 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 100 stations was 67.5°, or 4.1° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 65.4°, or 3.6° higher than the normal; Central, 67.6°, or 4.1° higher than the normal; Southern, 69.4°, or 4.4° higher than the normal. The highest monthly mean was 71.3°, at Northboro, and the lowest, 60.4°, at Northwood. The highest temperature reported was 99° at Maquoketa, on the 7th, Knoxville, on the 9th, and Clarinda on the 10th; and the lowest was 33° at Inwood on the 25th. The temperature range for the State was 66°.

HUMIDITY.

The average relative humidity for the State at 7:00 a. m. was 82 per cent and at 7:00 p. m. was 61 per cent. The mean for

the month was 72 per cent, which is 2 per cent below normal. The highest monthly mean was 76 per cent at Charles City, and the lowest was 66 per cent at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 108 stations, was 5.34 inches, or 1.98 inches above the normal. By divisions, the averages were as follows: Northern, 3.58 inches, or .53 inches more than the normal; Central, 6.01 inches, or 2.55 inches more than the normal; Southern, 6.43 inches, or 2.87 inches more than the normal. The greatest amount, 11.82 inches, occurred at Grinnell and Corning, and the least, 1.49 inch, at Forest City. The greatest amount in 24 consecutive hours, 5.52 inches, occurred at Grinnell, on the 30th.

WIND.

The prevailing direction of the wind was from the south. The highest velocity reported from a regular Weather Bureau Station was at the rate of 45 miles an hour from the south at Sioux City, on the 26th.

SUNSHINE.

The average per cent of the possible amount of sunshine was 65, which is 2 per cent above normal. The per cent of the possible amount at regular Weather Bureau Stations was as follows: Charles City, 60; Davenport, 67; Des Moines, 62; Dubuque, 64; Keokuk, 80; Sioux City, 59; Omaha, Neb., 60.

RIVERS.

Though many heavy rains occurred, beginning the 17th, the rate at which they fell was generally slow, and as the ground was very dry from more than a month of drouth, little of the rain reached the streams as a rule till the 30th, and no large rises in the streams had occurred up to the close of the month. The largest rise was 3.9 feet at Van Meter on the Raccoon in the five-day period ending the 22d. This rise was quite noticeable at Ottumwa on the Des Moines, where it amounted to 3.3 feet in the four-day period ending on the 22d. On the Mississippi and Missouri Rivers rather low stages prevailed.

COMPARATIVE DATA FOR THE STATE—SEPTEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation .01 in.	Clear	Partly cloudy	Cloudy
1890	59.3	-4.1	96	23	2.97	-0.39	4.85	1.36	-----	7	13	10	7
1891	67.3	+3.9	104	28	1.33	-2.03	3.60	0.13	-----	4	20	7	3
1892	64.7	+1.3	99	29	1.53	-1.83	4.15	0.16	-----	4	16	6	6
1893	64.7	+1.3	102	18	2.34	-1.02	5.49	0.74	-----	4	20	6	4
1894	65.1	+1.7	100	26	3.57	+0.21	7.43	0.67	-----	8	15	10	5
1895	66.8	+3.4	103	22	3.03	-0.33	7.43	0.85	-----	5	18	8	4
1896	58.5	-4.9	95	22	4.09	+0.73	9.96	1.82	-----	10	11	8	10
1897	70.9	+7.5	106	26	2.04	-1.32	5.88	0.00	-----	4	23	8	2
1898	65.3	+1.9	99	29	2.69	-0.67	8.45	0.41	-----	7	16	9	5
1899	62.5	-0.9	104	15	0.93	-2.43	4.32	T.	-----	4	16	8	5
1900	64.4	+1.0	99	26	4.98	+1.62	8.82	2.48	-----	9	15	8	7
1901	63.3	-0.1	102	26	4.77	+1.41	13.62	1.71	-----	9	13	8	9
1902	59.1	-4.3	88	23	4.35	+0.99	10.41	1.65	-----	9	15	6	9
1903	60.8	-2.6	94	28	3.81	+0.45	8.79	1.42	-----	10	14	6	10
1904	64.0	+0.6	94	30	2.78	-0.58	8.33	0.09	-----	7	13	8	9
1905	65.8	+2.4	96	36	3.81	+0.45	13.18	0.50	-----	8	14	8	8
1906	67.2	+3.8	100	27	4.16	+0.80	11.10	0.64	-----	8	16	8	6
1907	62.8	-0.6	98	25	2.75	-1.61	6.06	1.38	-----	8	15	9	6
1908	67.9	+4.5	98	20	1.20	-2.16	3.46	0.25	-----	3	21	6	3
1909	62.4	-1.0	94	30	3.58	+0.22	7.34	1.39	-----	9	14	8	8
1910	63.2	-0.2	99	30	3.59	+0.23	7.43	1.18	-----	9	14	7	9
1911	65.8	+2.4	103	32	5.12	+1.76	13.73	1.19	-----	10	11	7	10
1912	62.1	-1.3	104	24	3.98	+0.62	10.12	0.28	-----	11	12	8	10
1913	64.5	+1.1	107	19	3.31	-0.05	7.44	0.45	-----	9	15	8	7
1914	64.5	+1.1	99	30	7.88	+4.52	16.24	2.48	-----	10	16	7	7
1915	63.7	+0.3	91	30	6.03	+2.67	12.45	2.88	-----	11	11	8	11
1916	62.5	-0.9	98	21	3.89	+0.53	9.71	1.45	-----	7	17	6	5
1917	62.6	-0.8	97	28	2.90	-0.46	8.68	0.39	-----	7	15	7	8
1918	58.6	-4.8	93	20	1.87	-1.49	4.62	0.48	-----	6	16	8	6
1919	67.5	+4.1	99	33	5.34	+1.98	11.82	1.49	-----	8	16	6	8

Climatological Data for September, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days				Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.	Partly cloudy.		Cloudy.	Prevailing direction of wind.
Northern Division																				
Algona	Kossuth	1,213	46	65.7	+ 3.5	90	6†	39	25	33	3.19	-0.05	1.15	0	8	17	2	11	se.	W. E. Laird.
Allison	Butler	1,045	7	66.6	---	95	8	39	25	36	2.94	---	0.79	0	9	15	3	12	sw.	J. A. Bell.
Alta	Buena Vista	1,513	28	65.6	+ 3.7	90	8	41	25	35	2.28	-0.80	0.72	0	12	11	9	10	s.	David E. Hadden.
Alta (near)	Buena Vista	23	---	---	---	---	---	---	---	---	2.39	-1.25	0.83	0	7	---	---	---	---	Warren Minard.
Alton	Sioux	1,305	14	65.6	+ 3.2	90	6†	35	25	41	2.81	---	0.58	0	10	11	9	10	ne.	W. S. Slagle.
Belmond	Wright	1,205	9	67.2	---	94	8	36	25	41	5.51	---	1.45	0	13	14	7	9	sw.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	64.6 ^a	+ 3.1	90 ^a	7	37 ^a	23	40 ^a	2.06	-1.43	0.58	0	10	13	2	15	s.	L. M. Goodman.
Charles City	Floyd	1,015	28	65.0	+ 3.3	91	8	42	25	35	3.94	+1.14	1.55	0	12	14	7	9	s.	U. S. Weather Bureau.
Decorah	Winneshek	875	26	65.3	+ 3.1	91	7	40	23	36	6.75	+2.81	3.71	0	10	19	3	8	nw.	Wm. F. Baker.
Elkader	Clayton	751	40	65.2	+ 2.5	96	8	38	26	39	4.42	+0.59	1.70	0	11	17	4	9	s.	D. C. Hale.
Estherville	Emmet	1,298	24	64.4	+ 4.3	93	20	37	25	40	4.64	+0.95	2.05	0	9	13	11	6	s.	A. O. Peterson.
Fayette	Fayette	1,003	29	64.5	+ 3.2	95	8	38	23	41	4.21	+0.82	1.10	0	9	17	3	10	se.	R. Z. Latimer.
Forest City	Winneshiek	1,226	25	65.0	+ 3.7	92	7	37	26	41	1.49	-1.96	1.03	0	8	17	2	11	s.	W. R. Prewitt.
Humboldt	Humboldt	1,095	31	67.0	+ 4.7	96	8	39	23†	39	3.26	+0.22	1.80	0	10	12	9	9	s.	H. C. Snitkey.
Inwood	Lyon	1,474	15	65.1	+ 2.6	91	7	33	25	46	2.76	-0.05	0.68	0	10	15	6	9	s.	F. B. Hanson.
Lansing	Allamakee	632	13	---	---	---	---	---	---	---	5.55	+1.77	2.30	0	9	---	---	---	---	Chas. R. Serene.
LeMars	Plymouth	1,224	23	66.4	+ 4.0	92	7†	35	25	46	2.30	-0.95	0.68	0	7	16	7	7	s.	C. L. Trenery.
Mason City	Cerro Gordo	1,148	22	63.4	+ 2.0	91	7†	37	26	38	1.85	-0.60	0.44	0	9	11	11	8	se.	North'n Sugar Corporation.
New Hampton	Chickasaw	1,169	22	65.7	+ 4.8	94	8	41	22	37	4.40	+1.28	2.00	0	9	12	7	11	s.	A. F. Kemman.
Nora Springs	Floyd	1,664	6	67.1	---	96	7	40	12†	42	3.68	---	1.41	0	11	13	8	9	s.	Arthur Betts.
Northwood	Worth	1,222	23	---	---	---	---	---	---	---	4.40	+1.14	1.22	0	11	15	4	11	sw.	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	66.6	+ 4.2	95	8	36	25	39	3.51	-0.28	0.99	0	10	14	9	7	s.	F. E. Hronek.
Postville	Clayton	1,180	20	63.8	+ 2.7	87	8	40	23	30	3.43	-0.26	0.72	0	10	12	9	9	sw.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	63.2	+ 1.2	88	7	34	25†	47	3.83	+1.41	1.10	0	11	19	4	7	ne.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	64.8	---	94	6†	35	25	37	4.38	---	1.20	0	10	15	5	10	ne.	Jos. W. Dow.
Sioux Center	Sioux	1,426	20	65.7	+ 3.9	90	7	37	25	40	2.94	-0.12	0.87	0	9	17	2	11	s.	J. de Ruyter.
Spencer	Clay	1,319	5	---	---	---	---	---	---	---	4.69	---	---	0	---	---	---	---	---	E. W. Little.
Storm Lake	Buena Vista	1,440	30	67.0	+ 4.8	91	8	40	25	35	2.31	-0.75	0.93	0	10	16	6	8	nw.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	65.7	+ 2.4	92	7	34	25	44	2.83	-0.69	0.90	0	8	16	4	10	s.	H. J. Felter.
Waverly	Bremer	948	23	65.6	+ 3.4	95	8	39	12	41	3.92	+0.93	1.60	0	8	13	6	11	sw.	H. Arnold.
West Bend	Palo Alto	1,197	26	66.2	+ 4.6	93	8	35	25	39	3.15	+0.08	1.50	0	9	13	8	9	s.	Jos. Dorweiler.
Means and extremes	---	---	---	65.4	+ 3.6	96	7†	33	25	47	3.58	+0.53	3.71	0	10	15	6	9	s.	---
Central Division																				
Ames	Story	926	43	69.1	+ 5.7	93	8†	42	1†	40	7.70	+4.03	3.40	0	9	17	2	11	w.	Iowa State College.
Audubon	Audubon	1,301	25	---	---	---	---	---	---	---	---	---	---	0	---	---	---	---	---	V. M. Jones.
Baxter	Jasper	973	19	67.1	+ 3.6	93	9†	39	22	41	6.79	+3.17	1.74	0	9	10	9	11	sw.	Rev. Paul Fraeger.
Belle Plaine†	Benton	886	29	67.0	+ 3.8	96	7	40	23	35	6.16	+3.02	1.72	0	6	15	7	8	sw.	O. C. Burrows.
Boone	Boone	1,134	14	67.4	+ 4.9	91	8†	42	25	31	8.64	+5.08	3.89	0	8	15	5	10	s.	Carl F. Henning.
Carroll	Carroll	1,265	29	68.6	+ 6.6	94	8	41	23	36	5.45	+2.37	2.48	0	8	19	0	11	sw.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	69.6	+ 5.6	96	9	46	26	35	3.35	+0.32	1.41	0	7	19	4	7	s.	R. S. Toogood.
Clinton	Clinton	593	46	68.2	+ 4.7	94	9	42	26	37	6.71	+3.38	2.20	0	8	16	6	8	nw.	H. Burde.
Davenport	Scott	559	48	68.8	+ 4.1	92	9	48	23	30	7.23	+3.14	3.48	0	9	15	9	6	sw.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	64.8	+ 2.9	89	7†	38	25	37	5.15	+1.77	1.86	0	8	15	8	7	s.	Nettie E. Ball.
Denison	Crawford	1,180	25	68.4 ^a	+ 4.9	94 ^a	9	43 ^a	22†	35 ^a	4.46	+1.53	2.05	0	6	---	---	---	---	Emma Brogden.
Des Moines	Polk	861	40	68.9	+ 3.9	94	9	45	23	32	7.47	+4.40	2.31	0	7	12	8	10	sw.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	66.1	+ 2.5	91	8	43	26	29	5.35	+1.76	1.94	0	10	12	7	11	s.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	67.6	+ 5.0	95	8†	40	23†	36	3.15	-1.16	1.05	0	8	12	7	11	w.	Isadore Haugh.
Grinnell	Poweshiek	1,031	25	67.2	+ 2.6	96	9	37	23	44	11.82	+8.23	5.52	0	8	18	4	8	nw.	J. C. Stocks.
Grundy Center	Grundy	976	28	67.2	+ 3.6	93	8	41	12†	38	6.52	+3.09	3.05	0	8	13	8	9	nw.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	68.0	+ 4.3	94	9	41	12†	38	9.44	+5.91	2.85	0	6	17	6	7	sw.	O. T. Harney.
Harlan	Shelby	1,182	20	66.6	+ 3.4	96	9	36	23	41	5.12	+0.94	2.52	0	5	20	4	6	s.	E. L. Titton.
Independence	Buchanan	921	55	67.0	+ 4.4	93	8	42	23†	38	5.09	+1.23	2.00	0	6	20	3	7	sw.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	68.2	+ 4.6	98	9	41	13†	41	5.10	+1.42	2.30	0	8	20	4	6	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	66.3	+ 5.4	94	8	39	25	40	4.35	+0.81	1.65	0	11	16	3	11	s.	J. B. Parmelee.
Jefferson	Greene	1,052	20	67.0	+ 3.8	93	9	39	25	37	7.51	---	3.15	0	8	16	4	10	sw.	Will I. Lyon.
LeClaire	Scott	576	19	---	---	---	---	---	---	---	7.07	+3.67	2.60	0	9	---	---	---	---	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	68.2	+ 2.6	97	9	37	22	47	3.40	---	1.35	0	8	13	8	9	se.	Geo. H. Gibson.
Logan	Harrison	928	52	69.2	+ 4.7	94	9	40	23†	42	2.91	-0.43	1.45	0	5	14	8	8	sw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	65.3	+ 2.7	99	7	39	26	33	6.29	+3.03	1.87	0	9	13	8	9	sw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	68.8	+ 5.4	96	9	39	12	42	5.98	+2.24	2.05	0	8	17	1	12	sw.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	68.9	---	96	9	43	23	33	7.20	---	1.66	0	7	20	2	8	s.	J. A. Dibel.
Muscatine	Muscatine	554	59	---	---	---	---	---	---	---	7.39	+3.88	3.85	0	8	---	---	---	---	Wm. P. Molis.
Olin	Jones	760	21	67.4	+ 4.4	96	8	43	19	36	4.80	+1.60	1.65	0	6	16	9	5	sw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	67.8	---	96	9	38	22†	44	3.92	+0.46	1.94	0	6	14	9	7	e.	Mrs. H. E. Colby.
Perry	Dallas	975	18	67.7	+ 3.9	95	9	41	23	38	8.16	+5.02	2.86	0	7	18	6	6	sw.	Mrs. C. E. Anthony.
Rockwell City†	Calhoun	1,134	23	66.7 ^b	+ 3.9	94 ^a	8	38 ^b	25	39 ^b	3.49	-0.47	1.48	0	8	---	---	---	---	A. W. Melsaac.
Sac																				

Climatological Data for September, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Observers.				
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.		Partly cloudy.	Cloudy.	Prevailing direction of wind.	
Southern Division																					
Afton	Union	1,212	25									8.55	+4.58	1.90	0	7	17	6	7	sw.	J. E. Deitrick.
Albia	Monroe	959	21	68.9	+ 4.3	95	9	42	12†	36	5.89	+2.24	2.23	0	6	19	0	11	sw.	F. H. Holmes.	
Allerton	Wayne	1,122	17	69.9 ^b	+ 4.2	95 ^a	10	44 ^b	23	37 ^b				0		16	7	7	w.	Keith Burns	
Atlantic	Cass	1,164	28	69.1	+ 5.0	96	9	41	23	36	4.85	+1.33	2.97	0	0	12	7	11	sw.	Thos. H. Whitney.	
Bedford	Taylor		19	68.6	+ 3.2	95	9	37	23	40	7.15	+3.57	4.35	0	6	17	8	5	s.	E. E. Healy.	
Bloomfield	Davis	881	12	69.8		96	9	43	23†	39	5.21	+1.23	1.63	0	7	16	10	4	s.	V. G. Warner.	
Bonaparte	Van Buren	565	28	69.4	+ 3.9	94	9	43	1†	39	4.45	+0.25	1.95	0	7	23	3	4	sw.	Bruce R. Vale.	
Burlington	Des Moines	544	23	70.4	+ 4.3	98	9	46	23	35	4.52	+0.87	1.15	0	9	22	3	5	sw.	Mrs. Edna M. Donnelly.	
Centerville	Appanoose	1,013	14	69.9		93	9	44	12†	38	5.50		2.00	0	7	16	7	7	sw.	Leo J. Allen.	
Chariton	Lucas	1,042	24	67.8	+ 3.1	94	8†	40	23	38	6.92	+3.60	1.85	0	6	15	9	6	sw.	C. C. Burr.	
Clarinda	Page	1,069	29	70.2	+ 5.6	99	10	40	23	41	7.87	+4.88	3.02	0	7	18	3	9	s.	A. S. Van Sandt.	
Columbus Jct.	Louisa	595	18	69.4	+ 4.1	94	9	46	23	30	5.69	+2.53	1.95	0	7	26	2	2	sw.	U. S. Weather Bureau.	
Corning	Adams	1,117	27	68.2 ^b	+ 4.3	95 ^a	9	39 ^b	22†	37 ^b	11.82	+8.54	3.23	0	6				s.	Jerome Smith.	
Corydon	Wayne	1,101	26	68.8	+ 2.8	96	9	41	23	41	6.44	+2.96	2.21	0	7	17	4	9	s.	May C. Miller.	
Creston	Union	1,312	14	68.9	+ 5.3	94	9	42 ^a	22†	36 ^a	8.87		2.29	0	8	11	10	9	sw.	Mrs. T. E. McConnell.	
Cumberland	Cass		20								4.29	+0.51	1.75	0	5	25	5	0	sw.	J. H. Reppert.	
Earlham	Madison	1,125	17	67.8	+ 4.5	95	9	38	12†	40	4.74	+1.14	1.39	0	7	19	3	8	sw.	Geo. Phillips.	
Fairfield	Jefferson	780	35	69.4 ^b	+ 4.2	96 ^b	8†	41 ^b	1	42 ^b	6.11	+2.84	2.06	0	6	20	4	6	w.	Prof. R. M. McKenzie.	
Glenwood	Mills	1,100	22	70.8		98	9	43	25	34	7.89		3.15	0	5	17	4	9	se.	Dr. Geo. Mogridge.	
Greenfield	Adair		27																	Frank A. Ward.	
Indianola	Warren	969	27	69.2	+ 4.2	94	9	44	23	35	7.55	+4.13	2.55	0	8	16	4	10	sw.	Prof. J. L. Tilton.	
Keokuk	Lee	614	48	70.8	+ 4.4	94	9	47	26	32	4.69	+0.72	1.44	0	5	18	7	5	s.	U. S. Weather Bureau.	
Keosauqua	Van Buren	644	27	69.4	+ 4.9	97	9	41	12†	43	3.98	-0.28	1.48	0	7	18	6	6	sw.	J. H. Landes.	
Knoxville	Marion	920	24	69.8	+ 4.5	99	9	42	12	41	8.74	+5.16	2.50	0	7	17	5	8	sw.	W. J. Casey.	
Lacona	Warren		29								6.45	+2.71	1.50	0	7	11	14	5		J. B. Alter.	
Lamoni	Deatur	1,160	12	69.1	+ 3.8	95	9	42	23	43	5.21		1.76	0	8	18	5	7	s.	Ed. D. Moore.	
Lenox	Taylor	1,250	24	69.3	+ 4.6	95	9	42	23	39	10.87	+7.47	3.80	0	7	21	3	6	s.	J. L. Hurley.	
Mount Ayr	Ringgold	1,236	26	69.4	+ 3.5	94	9	40	23	35	5.56	+1.98	2.10	0	7	20	3	7	s.	Alex Maxwell.	
Mt. Pleasant	Henry	729	38	69.8	+ 4.4	97	9	44	23	35	4.47	+1.24	1.32	0	6	16	9	5	sw.	John H. Jericho.	
Murray	Clarke	1,216	28	69.8	+ 4.5	96	9	44	23†	39	6.00	+2.53	1.49	0	7	15	8	7	s.	M. T. Ashley.	
Northboro	Page	1,046	5	71.3		95	9	43	23	34	7.45		4.10	0	8	18	3	9	s.	J. M. Darby.	
Oakland	Pottawattamie			68.6		94	9	42	23	34	5.70		3.25	0	5	20	3	7	s.	M. E. Gray.	
Oskaloosa	Mahaska	825	43	69.0	+ 4.3	96	9	43	23†	34	6.76	+3.71	1.84	0	7	15	8	7	sw.	Roy R. Robinson.	
Ottumwa	Wapello	849	24	67.8		93	9	44	22†	33	7.70	+4.01	2.40	0	6	13	9	8	se.	Eugene O. Field.	
Pella	Marion	877	26	69.0	+ 3.8	96	8	42	1†	41	7.07	+3.84	1.60	0	7	22	0	8	s.	J. H. Ver Steeg.	
Shenandoah	Page																			L. L. Hunter.	
Sigourney	Keokuk	877	23	69.4	+ 4.4	96	9	42	1†	41	6.33	+3.16	2.28	0	6	21	3	6	nw.	W. E. Utterback.	
Stockport	Van Buren	754	17	68.8	+ 3.9	96	9	40	1	44	4.27	+3.05	1.06	0	7	20	6	4	s.	C. L. Beswick.	
Thurman	Premont		22	70.4	+ 5.2	97	9	39	23	37	8.04	+3.54	3.08	0	6	10	14	6	sw.	C. R. Paul.	
Washington	Washington	769	37	68.8	+ 4.1	95	9	43	23	33	6.01	+3.00	1.85	0	8	15	10	5	sw.	Wm. A. Cook.	
Winterset	Madison	1,129	28	69.4	+ 4.6	95	9	42	23†	35	5.76	+2.42	1.30	0	7	21	4	5	sw.	H. S. Ely.	
Omaha, Nebr.		1,040	48	70.8	+ 5.0	98	9	48	22	30	5.28	+2.25	3.49	0	9	16	3	11	s.	U. S. Weather Bureau.	
Means and extremes				69.4	+ 4.4	99	9†	37	23	44	6.43	+2.87	4.35	0	7	17	6	7	sw.		
State means and extremes				67.5	+ 4.1	99	7†	33	25	47	5.34	+1.98	5.52	0	8	16	6	8	s.		

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.

Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc.

†Also other dates. ††Received too late to be included in means and summaries.

T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).				Wind.				Sunshine				
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.			Total movement.	Average hourly velocity.	Maximum		Per cent of possible.	Departure from normal.			
						7 a. m.	Noon. †	7 p. m.			Miles.	From.			Date.		
Charles City	29.99	30.31	4	29.46	20	84	58	69	29	24	4,316	5.6	26	s.	26	60	- 9
Davenport	30.01	30.29	1	29.33	19	82	51	60	33	13	4,564	6.3	25	s.	20	67	+ 4
Des Moines	30.00	30.25	4	29.48	18	83	54	59	32	12	5,075	7.0	32	sw.	5	62	+ 0
Dubuque	30.02	30.33	4	29.46	19	82	57	66	33	24	3,917	5.4	22	s.	26	64	+ 5
Keokuk	30.03	30.29	1	29.39	19	78	52	54	29	19	4,766	6.6	29	se.	18	80	+19
Sioux City	29.96	30.27	4	29.40	20	86	63	58	30	†23	8,093	11.2	45	s.	26	59	- 4
Omaha, Neb.	29.97	30.27	22	29.50	18	76	54	59	37	†12	5,101	7.1	27	n.	24	61	- 3
Means and extremes	30.00				82	56	61					7.0				65	+ 2
		30.33	4	29.33	19				†19			45	s.		26		
Normals and records	30.02		26 th		30 th	83		64		25 th		7.4			7 th	63	
		*30.65	1909	‡29.27	1878				†20	1893			‡72	sw.	1872		

*Dubuque. †Omaha. ‡Des Moines. †Local mean time. †And other dates. ††Davenport.

MISCELLANEOUS PHENOMENA.

Aurora: 1st, 2d, 15th, 19th, 20th, 23d, 24th, 25th, 26th, 30th.
Fog, dense: 10th, 15th, 16th, 18th, 19th, 23d, 24th, 28th, 30th.
Frost, heavy: Northern Division, 25th. **Light:** Northern Division, 12th, 20th, 22d, 23d, 24th, 25th, 26th. Central Division, 12th.
Hail: 20th.
Halo (Lunar or solar): 1st, 12th, 16th.
Rainbow: 20th, 21st.
Thunderstorms: 2d, 3d, 9th, 10th, 13th, 16th, 17th, 18th, 19th, 20th, 21st, 25th, 27th, 28th, 29th, 30th.

Daily Precipitation for September, 1919

Stations.	Watersheds.	Day of Month.																														Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Northern Division																																
Algona.....	Des Moines.....		.26	.11					.54				.06					1.15				.13							.28		.66	3.19
Allison.....	Cedar.....		.02						T. .16				T. .03					.66	.11	.78								T. .03	.36	.79	2.94	
Alta|||.....	Raccoon.....			.32	.02				T. .03						.16	.03		.65	.08			.05	.12						.06	.04	.72	2.28
Alta (near).....	Raccoon.....		.42	T.					.05					T. .19				.55				.15	.20								.83	2.39
Alton.....	Floyd.....		T. .58	.10					.54					.10	.12			.28					.08						.37	.22	.42	2.81
Belmond.....	Iowa.....		.14	.03					.04	1.00				.06	.04			1.23	.30	.24		.21						T. 1.45	.02	.75	5.51	
Britt.....	Iowa.....			.04					.52	T. .12					.12	.01		.51	T. .01			.17							.08	.02	.58	2.06
Charles City***.....	Cedar.....		.10						1.00	.55				.03	.04			.25	.62			.11	.05						.79	.07	.33	3.94
Decorah|||.....	Mississippi.....		T. .17						3.71						.04			.23	.06	.54		.72	.05						1.10	.10	6.75	
Elkader.....	Mississippi.....		T. .06	.03					.04	.77					T. .04			.30	.11	1.70		.37							.08	.32	.64	4.42
Estherville|||.....	Des Moines.....		.05	.30					2.05	.45					.09			.25	.50										T. .65	.30	4.64	
Fayette.....	Mississippi.....								.05	1.10					T. .08			.65	.05	.95		.38							.14	.02	.87	4.21
Forest City|||.....	Cedar.....		T. .25						.02	1.03					.01			.03					.10						.02		.03	1.49
Humboldt.....	Des Moines.....		.41	T.					.88					.11	.07			1.80	.09	.08	.04	.08						.20	T. .03	T. .32	3.26	
Inwood|||.....	Big Sioux.....		.68	.31					.47	.03				.19	.04			.19				.04								.39	.42	2.76
Lansing|||.....	Mississippi.....			.08					2.30									.05	.03	.45		.67	.08						1.70	.19	5.55	
LeMars.....	Floyd.....		.27	T.					.49					T. .13				.37				.15						T. .21	.68	2.30		
Mason City|||.....	Cedar.....		.01	.11					.36						.07			.32	.29			.13	.16						.44	.28	1.85	
New Hampton.....	Wapsipinicon.....		.09						.33	.60				T. .07	T. .04			.33	.24			.28						T. .08	2.00	.45	4.40	
Nora Springs.....	Cedar.....		.07	.17					.58						.16	.03		.29	.13			.09	.21					1.41	.54	3.68		
Northwood.....	Cedar.....		.13	.20					1.20	.12					.02	T. .08		.20	.01		1.22	.15						.90		.25	4.40	
Pocahontas.....	Des Moines.....		.43	.11					T. .43						.12			.97	.24			T. .08						.06		.99	3.51	
Postville.....	Mississippi.....		T. .04						.18	.65				T. .07	T. .04			.17	.06	.72		.51						.20	.40	.50	3.43	
Rock Rapids.....	Big Sioux.....		.35	.60					1.10						.15			.71		.10		.05						.04	.25	.35	3.83	
Sanborn.....	Floyd.....		.06	.83	.05				.84					.11				1.20				.05						.50	.20	.54	4.38	
Sioux Center.....	Floyd.....		.02	.87	.17				.46					.02	T. .07			.48				.03						T. .37		.52	2.94	
Spencer.....	Little Sioux.....			.80					1.00						*			*				* 1.30						.80		4.06		
Storm Lake.....	Raccoon.....		.32	.01					.05						.05	.16		.50				.07	.12					.10		.93	2.31	
Washta.....	Little Sioux.....			.50					.06						T. .33			.38				.41	.04					.21		.90	2.83	
Waverly.....	Cedar.....		T. .01						T. .05						T. .07			.49	1.60			.28	.09					.11	.55	.75	3.92	
West Bend.....	Des Moines.....		.24	.09					.33						.04	.03		1.50	T. .03		T. .12							T. .06	.74	3.15		
Central Division																																
Ames.....	Skunk.....		.30	.20														.99	2.05	.18		.50						.03	3.40	.05	7.70	
Audubon.....	Nishnabotna.....																		1.50	.50	1.72		.86					.17	.12	1.74	6.79	
Baxter.....	Skunk.....		T. .08															1.14	.81	1.30		.96						.23		1.72	6.16	
Belle Plaine.....	Iowa.....		T. .08															T. .98	3.18			.30	.04					.12	.05	3.89	8.64	
Boone|||.....	Des Moines.....																															
Carroll|||.....	Raccoon.....																	.85	.34	1.02		.45	.12					.10	.09	2.48	5.45	
Cedar Rapids|||.....	Cedar.....								.30									.04	.52	1.41		.50	T. .08					.08	.50	3.35		
Clinton.....	Mississippi.....		T. .01						2.20									.21	.64	.32	.50	1.15						.45		1.18	6.71	
Davenport***.....	Mississippi.....								.01									.96	.84	.15	1.51	.08						.20	.04	3.44	7.23	
Delaware.....	Mississippi.....			.07				1.23										.27	.37	.74		.50						.11		1.86	5.15	
Denison.....	Missouri.....																	.08	.97	.68		.51	.17							2.05	4.46	
Des Moines***.....	Des Moines.....																	1.52	2.31		1.68	.23						.55	.24	.94	7.47	
Dubuque***.....	Mississippi.....		T. .03						T. .97									.18	.48	1.47	.27	.17						.46	.04	1.28	5.35	
Fort Dodge|||.....	Des Moines.....			.33														.40	.33	.63		T. .16							.15	1.05	3.15	
Grinnell.....	Iowa.....			.05														1.28	1.19	2.20		1.15						.33	10	5.52	11.82	
Grundy Center.....	Cedar.....		T. .05						.05									.90	.55	3.05		.26						.44		1.52	6.52	
Guthrie Center.....	Raccoon.....																	.86	2.85	.70		2.40						.26		2.37	9.44	
Harlan.....	Nishnabotna.....																	.35	2.52			1.15						.30		.80	5.12	
Independence.....	Wapsipinicon.....		T. .04						.54									.23		1.74		.54						.04		2.00	5.09	
Iowa City|||.....	Iowa.....								T. .01									.02	.75	2.30		.47	.06					.11	.24	1.15	5.10	
Iowa Falls|||.....	Iowa.....			.17					.01									.08	1.65	.88		.21	.08					.01	.28	.93	4.35	
Jefferson.....	Raccoon.....			.02	.07				T. .37									1.09	3.15	1.09		.49						.16		1.53	7.51	
Le Claire|||.....	Mississippi.....			.08														.10	1.30	.73		.35	1.32	.07				.25	2.60	7.07		
Little Sioux.....	Little Sioux.....																	.35	1.35			.10	.20					.02		1.16	3.40	
Logan.....	Missouri.....																	.40	1.45			.18						.18		.70	2.91	
Maquoketa.....	Maquoketa.....		T. .03						1.84									.22	.36	1.87	.41	.20						.45	.91		6.29	
Marshalltown|||.....	Iowa.....			.03														.07	1.32	2.05		.64						.35	.04	1.48	5.98	
Monroe.....	Skunk.....																	1.06	1.65	.83	T. .135							.61	.04	1.66	7.20	
Muscatine|||.....	Mississippi.....								T. .60									.45	1.13	1.18		.06	.40	.05				T. .27	3.85	7.39		
Olin.....	Wapsipinicon.....																	.35	.90			.85						.45	T. .165	4.80		
Onawa.....	Missouri.....		T. .05															.40	.75			.24	.09					T. .24		1.94	3.92	
Perry.....	Raccoon.....			.05														1.53	1.73	.25		1.50						.24		2.86	8.16	
Rockwell City.....	Raccoon.....								T. .06									.65	.61	.05		.40	.15							1.48	3.49	
Sac City.....	Raccoon.....		.35	T.					.06									.52	.59			.85	.15					.10		1.48	4.1	

Daily Precipitation for September, 1919—Continued.

Stations.	Watersheds.	Day of Month.																														To-tals	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
<i>Southern Division</i>																																	
Afton-----	Grand-----																	1.15	1.90	.40		1.20								1.85	.50	1.55	8.55
Albia|||-----	Des Moines-----																	T.	.63	1.12		2.23	.15						1.03	T.	.73	5.89	
Allerton-----	Chariton-----																																
Atlantic|||-----	Nishnabotna-----				.01										.01			.15	.50	2.97		.51	.09							.37		.24	4.85
Bedford-----	Missouri-----									T.							.73	4.35			1.33								.56	.11	.07	7.15	
Bloomfield-----	Mississippi-----									.11							.50	.45	.80		1.63								1.22		.50	5.21	
Bonaparte-----	Des Moines-----									T.							.31	.73	.44		.55								1.95	.02	.45	4.45	
Burlington|||-----	Mississippi-----										.03						.08	1.15	1.10		.78	.12							.56	.11	.59	4.52	
Centerville-----	Chariton-----				T.					.05							.36	.65	2.00		.91	T.							.92	T.	.61	5.50	
Chariton-----	Chariton-----									T.							.63	.78	.92		1.64								1.10		1.85	6.92	
Clarinda|||-----	Nodaway-----																.20	1.37	3.02		1.94	.04							.89		.41	7.87	
Columbus Jct.-----	Iowa-----																1.27	.65	.85		.10	.60							.27		1.95	5.69	
Corning-----	Nodaway-----																1.54	3.23			1.99								2.20	.23	2.63	11.82	
Corydon-----	Chariton-----										.11						.44	1.23	.55		1.28							T.	.62		2.21	6.44	
Creston|||-----	Missouri-----																.10	1.05	2.00		1.08	.10						2.29	1.30	.95	8.87		
Cumberland-----	Nodaway-----																.87	1.23	.22									1.75		.22		4.29	
Earlham-----	Des Moines-----				T.												.69	1.39	.29		.55								1.26	.03	.53	4.74	
Fairfield-----	Skunk-----				T.						T.						.48	.58			1.18								2.06	.04	1.77	6.11	
Glenwood-----	Missouri-----																.62	3.15				.25							2.22		1.65	7.89	
Greenfield-----	Nodaway-----																																
Indianola-----	Des Moines-----																																
Keokuk***-----	Mississippi-----										.15						.50	1.37			T.	1.23							1.44	T.		4.69	
Keosauqua-----	Des Moines-----				T.						T.						.30	.93	.30		.67								1.48	.02	.28	3.98	
Knoxville-----	Des Moines-----																.76	1.15	1.60		2.50								.90	.08	1.75	8.74	
Lacona-----	Des Moines-----																.60	1.10	1.33		1.50								1.02	.25	.65	6.45	
Lamoni|||-----	Grand-----																.06	.75	1.76		1.46	.19							.63	.06	.30	5.21	
Lenox-----	Missouri-----																1.00	2.47	.13		1.45								1.62	.40	3.80	10.87	
Mt. Ayr-----	Grand-----				T.						.03						.56	2.10	.63		.85								.75	T.	1.24	5.56	
Mt. Pleasant-----	Skunk-----										T.						.64	.59	.71		.77								.44		1.32	4.47	
Murray-----	Grand-----																.70	.86	.47		.75								1.10	.63	1.49	6.00	
Northboro-----	Tarkio-----										T.																			.15	.02	.14	7.45
Oakland-----	Nishnabotna-----																.52	3.25			.36							T.	1.05		.52	5.70	
Oskaloosa-----	Des Moines-----				.01												.67	.71	1.32		1.58								.63		1.84	6.76	
Ottumwa|||-----	Des Moines-----				T.						T.						T.	.65	1.55		1.66	.09							1.35	T.	2.40	7.70	
Pella-----	Skunk-----																.90	1.05	1.43		1.60								.55	.21	1.33	7.07	
Shenandoah-----	Nishnabotna-----																																
Sigourney-----	Skunk-----																.92	.48	1.00		1.28									.42		2.28	6.38
Stockport-----	Skunk-----										T.						.38	.65	.31		1.04								.76	.07	1.06	4.27	
Thurman-----	Missouri-----																.88	3.08			1.62								1.72	T.	.27	8.04	
Washington-----	Skunk-----										.04						.12	2.10	.69		.80	.05							.36		1.85	6.01	
Winterset-----	Des Moines-----				T.												.63	1.30	.55		.70							T.	.63	1.05	.90	5.76	
Omaha, Neb.***-----	Missouri-----																.38	3.49			.02	.12							.38	.02	.83	.01	5.28

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.

|||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 ***Regular Weather Bureau Station; precipitation is for 24 hour period, midnight to midnight.
 **Incomplete.
 *Precipitation included in the next following measurement.

Daily Maximum and Minimum Temperatures for Month of September, 1919.

Table with columns for Stations, 1-30, and Mean. Rows are grouped by division: Northern Division (Algonia, Alta, Alton, Belmont, Charles City, Decorah, Forest City, Inwood, Mason City, New Hampton, Northwood, Pocahontas, Postville), Central Division (Belle Plaine, Carroll, Davenport, Des Moines, Dubuque, Fort Dodge, Grinnell, Guthrie Center, Independence, Iowa City, Iowa Falls, Little Sioux, Marshalltown, Sac City, Sioux City), and Southern Division (Albia, Allerton, Atlantic, Bedford, Bloomfield, Burlington, Columbus Jct., Corning, Fairfield, Keokuk, Northboro, Pella, Sigourney, Thurman, Omaha, Nebr.). Each station entry includes Maximum and Minimum temperature values for each day.

*, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record
§§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

HAIL STORMS DURING JUNE, 1919.

Date	County	Township	Direction From	Area Covered	Character	Size of Stones	Damage	Width of Path
1	Bremer	Jefferson	S. W.	1 sq. mi.	Moderate	1/2 inch	Slight	1/2 mile
1	Bremer	Dayton	S. W.	Large	Light	1/4 to 3/8 inch	Slight	Wide
1	Adair	Orient	N. W.	Large	Light	3/8 inch	Slight	Wide
1	Monroe	Bluff Creek	N. W.	Small	Light	1/4 inch	Slight	Narrow
2	Jones	Wayne	S. E.	Small	Moderate	1/4 inch	Considerable	Narrow
5	Winneshiek	Decorah	W.	Small	Light	Small	Slight	Narrow
6	Clayton	Highland	N.	Large	Moderate	1/8 to 1/4 inch	Slight	1 1/2 miles
9	Humboldt	Spring Vale	N. E.	Small	Light	1/2 inch	Slight	Narrow
9	Franklin	Mott	S. W.	Small	Light	1/2 inch	Considerable	Narrow
9	Marion	Lake Prairie	S.	Small	Light	1/4 inch	None	Narrow
9	Linn	Putnam	S.	Small	Light	1/2 inch	None	Narrow
9	Johnson	E. and W. Lucas	S.	Small	Light	1/4 inch	Considerable	Narrow
10	Dallas	Lynn	S. E.	Small	Light	1/2 inch	None	Narrow
10	Polk	Webster	N. W.	Small	Light	3/8 inch	None	Narrow
10	Polk	Des Moines	W.	Small	Light	Small	None	Narrow
13	Franklin	Reeve	S. E.	4 sq. mi.	Light	Small	Slight	1 mile
13	Taylor	Clayton	S. E.	Large	Light	1/4 inch	Slight	Wide
13	Madison	Jasper	S. E.	6 sq. mi.	Moderate	Large	Considerable	2 miles
14	Lyon	Allison	S. W.	Large	Light	Small	Slight	Wide
14	Lyon	Cleveland	S. W.	Large	Light	Small	Slight	2 miles
17	Polk	Madison	W.	1 1/2 miles	Moderate	1/4 to 1/2 inch	Considerable	1 mile
17	Polk	Crocker	W.	2 1/2 miles	Heavy	3/8 to 1 inch	Severe	1 mile
17	Linn	Fairfax	N. W.	5 sq. mi.	Light	3/8 inch	Slight	1 1/2 miles
18	Winneshiek	Canoe	N. W.	3 sq. mi.	Moderate	1/2 inch	Considerable	1 mile
18	Winneshiek	Decorah	N. W.	Small	Light	Small	None	Narrow
18	Winneshiek	Frankville	N. W.	Small	Light	1/8 inch	None	Narrow
18	Clayton	Highland	N. E.	Large	Light	1/4 inch	None	Wide
18	Marshall	Taylor	S. E.	Small	Light	Small	None	Narrow
18	Linn	Linn	E.	Large	Moderate	1/8 to 1/2 inch	Considerable	Wide
18	Mahaska	White Oak	W.	4 sq. mi.	Moderate	1/2 inch	Slight	1 1/2 mile
18	Marion	Lake Prairie	E.	Small	Light	Small	None	Narrow
18	Washington	Marion	N. W.	Large	Light	Up to 2 inches	Considerable	Wide
19	Harrison	Calhoun	N. W.	Small	Light	1/4 inch	Slight	Narrow
21	Osceola	Ocheyedan	S.	Small	Heavy	-----	Considerable	Narrow
23	Mitchell	Douglas	W.	Small	Heavy	-----	Considerable	Narrow
23	Floyd	Rock Grove	S. W.	Small	Light	1/4 to 1/2 inch	None	Narrow
23	Marshall	Taylor	E.	Small	Light	Small	Considerable	Narrow
23	Linn	Fairfax	N. W.	Small	Light	Small	Slight	Narrow
25	Mills	Glenwood	N.	Large	Light	Small	Considerable	Wide
27	Crawford	Washington	N. E.	Large	Light	3/4 inch	Slight	2 miles
27	Adair	Summerset	N. W.	8 sq. mi.	Heavy	Up to 1 inch	\$100,000	1 1/2 miles
27	Adair	Prussia	N. W.	3 sq. mi.	Heavy	Up to 1 inch	Considerable	1 mile
27	Adair	Grand River	N. E.	Large	Light	1/4 inch	Slight	Wide

HAIL STORMS DURING JULY, 1919.

4	Cedar	Center	N. W.	Large	Heavy	Up to 1 inch	Considerable	Wide
5	Appanoose	Walnut	N. W.	Small	Light	Small	None	Narrow
9	Sac	Cook	S.	4 sq. mi.	Heavy	Large	Considerable	1 mile
9	Boone	Amaqua	E.	Large	Light	Large	Considerable	Wide
9	Winneshiek	Canoe	N. W.	Small	Light	Small	None	Narrow
9	Winneshiek	Glenwood	N. W.	Small	Moderate	Small	None	Narrow
9	Winneshiek	Bloomfield	S.	8 sq. mi.	Moderate	1 inch	Slight	2 miles
9	Fayette	Union	W.	2 sq. mi.	Light	1/4 inch	None	1 mile
9	Allamakee	Taylor	W.	Small	Moderate	1/4 to 1/2 inch	Slight	Narrow
9	Clayton	Highland	N. W.	9 sq. mi.	Light	1/4 inch	None	1 1/2 miles
9	Hardin	Ellis	W.	Large	Moderate	1/2 to 3/4 inch	Considerable	Wide
9	Marshall	Lynn	N. W.	-----	Heavy	1/2 inch	Severe	-----
9	Jones	Rome	N. W.	Large	Moderate	1/2 inch	Considerable	Wide
9	Iowa	Lincoln	N. W.	Small	Light	3/8 inch	Slight	Narrow
9	Iowa	Pilot	N. W.	Small	Light	1/4 inch	Slight	Narrow
9	Iowa	Troy	N. W.	Small	Light	3/4 inch	Slight	Narrow
9	Wayne	Corydon	-----	Large	Heavy	Up to 2 inches	Severe	Wide
9	Decatur	Morgan	N. E.	Large	Light	1/4 inch	Slight	Wide
9	Wayne	Benton	N. E.	Large	Heavy	Large	Severe	3 miles
9	Monroe	Union	N. E.	Small	Light	1/2 inch	Slight	Narrow
9	Scott	Rockingham	N. E.	Large	Moderate	1 inch	Considerable	Wide
9	Scott	Allen's Grove	N.	Large	Moderate	3/8 inch	Considerable	Wide
11	Lyon	Lyon	-----	2 sq. mi.	Light	1/2 inch	\$500	1 mile
11	Woodbury	Arlington	N.	Large	Heavy	1/4 to 1/4 inch	Considerable	Wide
11	Harrison	Calhoun	N. W.	Small	Light	1/4 inch	Slight	Narrow
11	Ringgold	Lincoln	W.	Small	Light	-----	Slight	Narrow
29	Muscatine	Goshen	N. E.	-----	Heavy	3/4 inch	Severe	Narrow

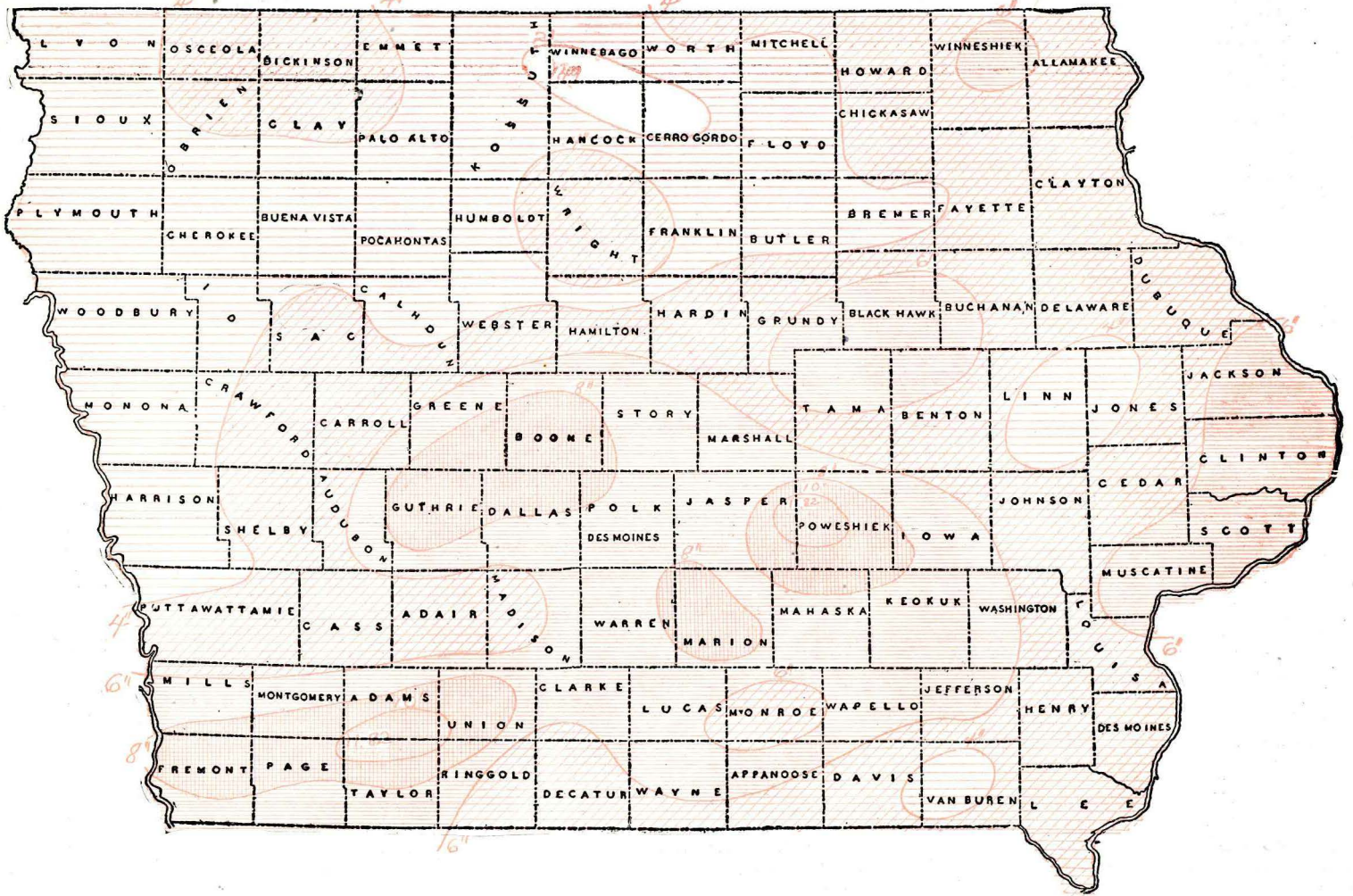
HAIL STORMS DURING AUGUST, 1919.

6	Crawford	Stockholm	N. W.	Large	Light	Up to 3/4 inch	Slight	Wide
6	Appanoose	Vermillion	N. W.	Small	Heavy	1/2 inch	Slight	Narrow
12	Plymouth	Henry	S. W.	5 sq. mi.	Heavy	1/4 to 1/2 inch	Considerable	1 1/4 miles
12	Polk	Lee	S. W.	Small	Light	Small	None	Narrow
15	Iowa	Troy	S. W.	Small	Light	Small	None	Narrow
20	Winneshiek	Glenwood	N. W.	Small	Light	Small	None	Narrow
24	Cherokee	Liberty	S. W.	3 sq. mi.	Heavy	3/4 inch	Considerable	1 mile

HAIL STORMS DURING SEPTEMBER, 1919.

20	Clinton	Lincoln	S. W.	Small	Heavy	-----	Considerable	-----
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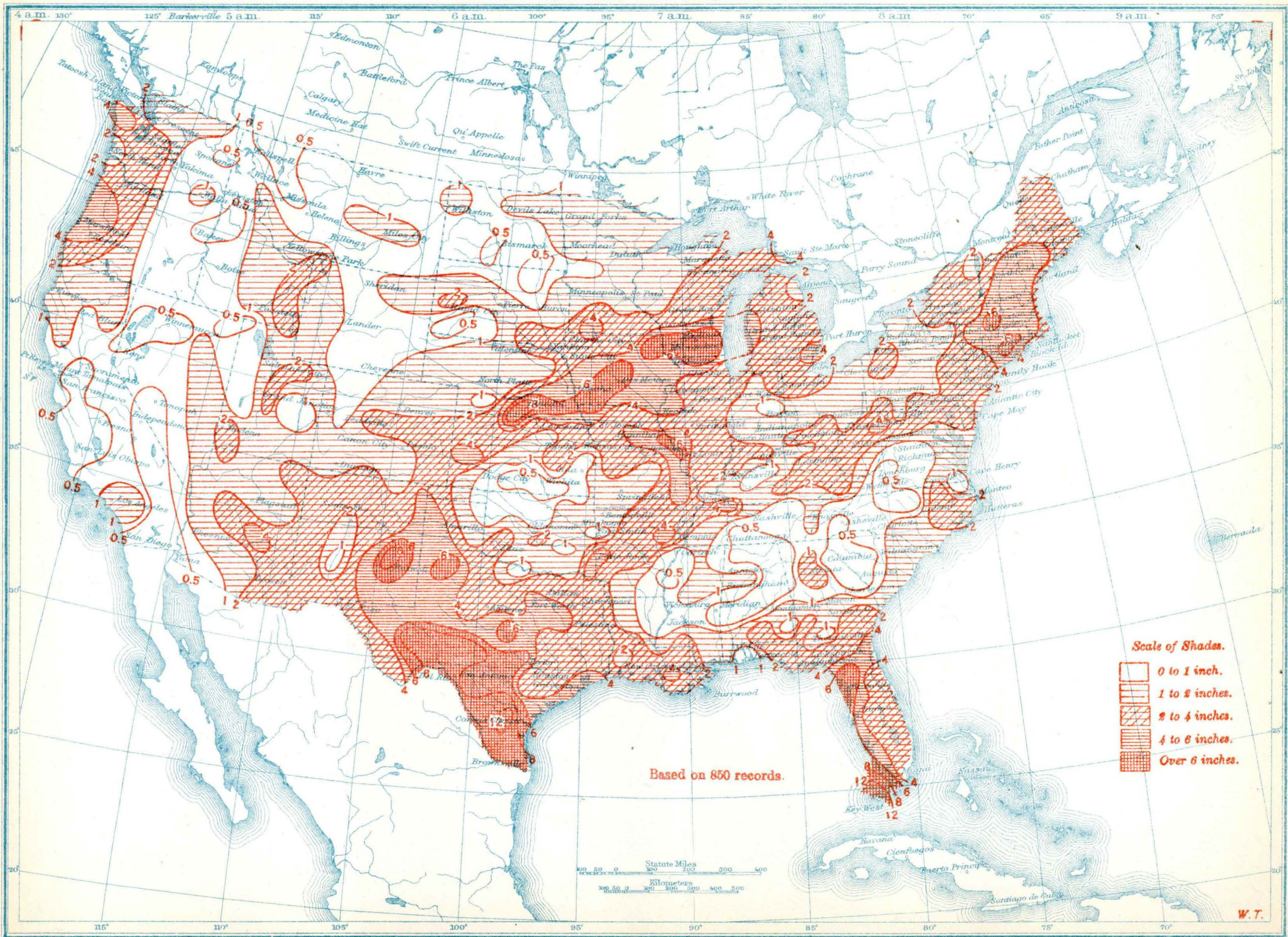
TOTAL PRECIPITATION, SEPTEMBER, 1919.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, September, 1919.



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WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

OCTOBER, 1919

BY
CHARLES D. REED
METEOROLOGIST

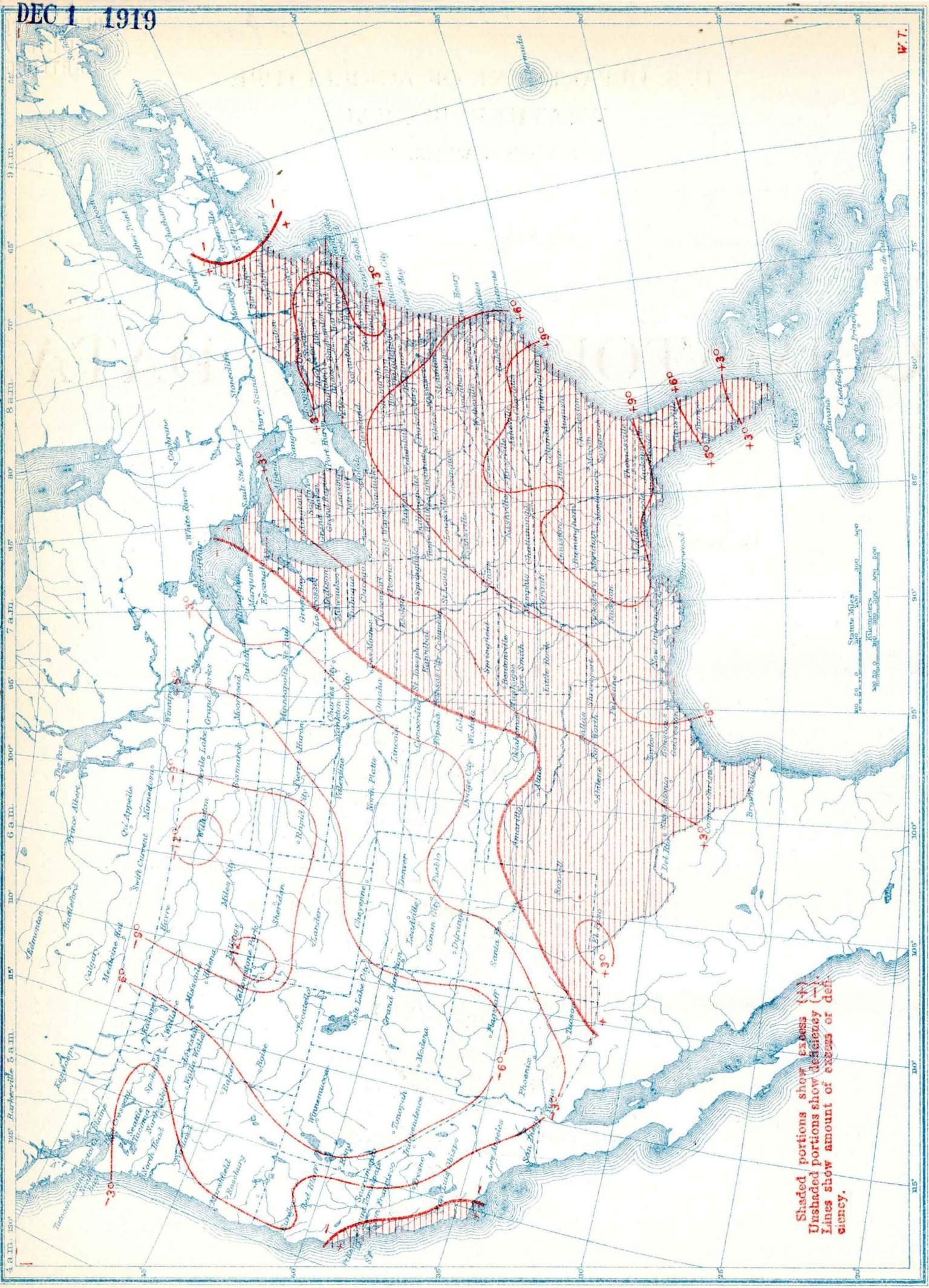


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

DEC 1 1919

Departure of the Mean Temperature from the Normal, October, 1919.



Shaded portions show excess (+)
 Unshaded portions show deficiency (-)
 Lines show amount of excess or deficiency.

W. T.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, OCTOBER, 1919. No. 10

GENERAL SUMMARY.

The mean temperature for October averaged slightly below the normal for the State, but the departures varied greatly with a deficiency of nearly four degrees along the extreme western counties and an excess of nearly three degrees over a large portion of the southeastern and east-central sections. Killing frosts occurred during the month over the entire State, the date varying from the 10th and 11th over most of the western and central portions until as late as the 31st at points along the Mississippi River.

The precipitation was above the normal, though very unevenly distributed, varying from less than half an inch in Sioux County to nearly nine inches in Delaware County, but the time of occurrence was nearly uniform throughout the month over the entire State. Rainy days averaged 10 and equaled the frequency of October, 1911, which has held the record since the State-wide records have been kept; and the largest monthly total, 8.65 inches, has been exceeded only in October, 1908, when a fall of 8.83 inches was recorded. Another unusual downpour occurred at Dubuque on the 4th. See special article, page 119.

The month was generally favorable for pastures and the seeding and germination of winter wheat but too wet for corn husking, and this condition in connection with the large number of cloudy days and deficient sunshine delayed the drying of corn so that at the end of the month very little had been cribbed. Winter wheat in the early sown fields is up to a good stand but the acreage has been greatly reduced. Notwithstanding the frequent rains, the roads were in bad condition for but short periods, but over a large portion of the eastern half of the State it was impossible to haul full loads of corn from the fields the greater part of the month.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.03 inches. The highest recorded was 30.45 inches, at Sioux City, on the 10th, and the lowest was 29.39 inches at Omaha, Nebr., on the 8th. The monthly range was 1.06 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 101 stations, was 50.7°, or 0.1° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 47.6°, or 1.4° lower than the normal; Central, 51.3°, or 0.4° higher than the normal; Southern, 53.2°, or 0.6° higher than the normal. The highest monthly mean was 56.5°, at Keokuk, and the lowest was 43.8°, at Rock Rapids. The highest temperature reported was 89°, at Nora Springs, Carroll and Clarinda, on the 2d; the lowest was 8°, at Inwood, on the 28th. The temperature range for the State was 81°.

HUMIDITY.

The average relative humidity for the State at 7 A. M. was 85 per cent, and at 7 P. M. it was 70 per cent. The mean for the month was 78 per cent, or 6 per cent greater than the normal. The highest monthly mean was 81 per cent at Davenport, and the lowest was 74 per cent at Omaha, Nebr. The lowest observed was 30 per cent at Sioux City on the 7th.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 110 stations, was 3.02 inches, or 0.56 inch greater than the normal. By divisions the averages were as follows: Northern, 2.30 inches, or 0.04 inch less than the normal; Central, 3.99 inches, or 1.50 inches greater than the normal; Southern, 2.77 inches, or 0.23 inch greater than the normal. The greatest amount, 8.65 inches, occurred at Delaware, and the least, 0.45 inch, occurred at Sioux Center. The greatest amount in 24 consecutive hours, 3.85 inches, occurred at Grundy Center, on the 4th.

SNOW.

Light snow occurred in the northwest portion of the State on the 16th, 24th, 25th, 26th, and 27th, and at its maximum totaled 1.9, at Storm Lake. The snow was soon melted.

WIND.

The prevailing direction of the wind was south. The highest velocity reported from a regular Weather Bureau station was 40 miles per hour, from the northwest, at Sioux City on the 9th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 49, or 13 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 42; Davenport, 51; Des Moines, 51; Dubuque, 51; Keokuk, 60; Sioux City, 42; Omaha, Nebr., 49.

RIVERS.

A moderate rise occurred on the Missouri River on the 2d and after the passing of the crest the stage remained nearly stationary the rest of the month. On the Mississippi and interior rivers a sharp rise occurred during the first week, due to heavy rains over most eastern and north-central sections, after which falling stages were the rule.

COMPARATIVE DATA FOR THE STATE—OCTOBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipit- tation .01 in.	Clear	Partly cloudy	Cloudy
1890.....	49.2	-1.6	86	16	3.48	+1.02	6.82	1.59	-----	7	11	11	9
1891.....	50.0	-0.8	92	19	2.77	+0.31	6.53	0.85	-----	6	18	7	6
1892.....	54.5	+3.7	96	14	1.55	-0.91	2.58	0.00	0.0	4	21	6	4
1893.....	52.4	+1.6	94	10	1.28	-1.18	4.56	0.02	0.0	4	16	9	6
1894.....	51.7	+0.9	90	20	2.67	+0.21	5.25	0.03	0.2	8	14	8	9
1895.....	46.0	-4.8	88	4	0.47	-1.99	1.38	0.00	T.	2	19	8	4
1896.....	47.9	-2.9	88	12	3.13	+0.67	5.05	1.51	T.	5	18	6	7
1897.....	56.8	+6.0	97	12	1.14	-1.32	3.30	0.03	0.0	4	17	8	6
1898.....	47.5	-3.3	88	17	3.56	+1.10	5.75	1.27	3.6	8	7	9	15
1899.....	56.7	+5.9	95	17	1.73	-0.73	4.64	0.15	0.0	5	17	8	6
1900.....	59.3	+8.5	90	21	3.91	+1.45	8.00	1.20	0.0	7	16	7	8
1901.....	54.2	+3.4	88	20	1.98	-0.48	4.23	0.45	T.	6	17	7	7
1902.....	53.5	+2.7	83	20	2.54	+0.08	6.66	0.28	T.	5	16	8	7
1903.....	52.2	+1.4	90	16	1.95	-0.51	4.50	0.32	0.0	5	19	6	6
1904.....	53.1	+2.3	96	16	1.67	-0.79	4.43	0.14	T.	6	15	8	8
1905.....	49.2	-1.6	95	16	3.40	+0.94	5.36	1.20	1.6	8	16	6	9
1906.....	50.5	-0.3	87	7	1.96	-0.50	4.25	0.50	0.1	6	14	7	10
1907.....	50.4	-0.4	85	10	1.50	-0.96	3.71	0.30	0.0	5	20	5	6
1908.....	51.1	+0.3	89	17	3.38	+0.92	8.83	0.58	2.6	8	16	6	9
1909.....	49.7	-1.1	97	10	2.22	-0.24	4.70	0.48	T.	6	16	6	9
1910.....	55.2	+4.4	93	10	0.77	-1.69	1.73	T.	0.1	4	21	4	6
1911.....	48.7	-2.1	87	14	3.34	+0.88	7.03	0.73	0.6	10	12	8	11
1912.....	52.2	+1.4	92	16	2.98	+0.52	5.77	1.03	T.	6	21	3	7
1913.....	49.2	-1.6	89	-2	3.03	+0.57	7.29	3.05	1.2	9	15	8	8
1914.....	55.9	+5.1	88	14	3.23	+0.77	6.64	0.74	T.	9	16	6	9
1915.....	54.4	+3.6	86	19	1.31	-1.15	3.25	T.	T.	5	19	6	6
1916.....	50.9	+0.1	92	6	2.00	-0.46	4.33	0.20	2.0	8	16	7	8
1917.....	42.9	-7.9	85	0	1.41	-1.05	4.00	0.15	2.2	6	10	11	10
1918.....	55.1	+4.3	93	21	3.64	+1.18	7.56	1.36	0.8	7	13	7	11
1919.....	50.7	-0.1	89	8	3.02	+0.56	8.65	0.45	T.	10	11	8	12

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

Climatological Data for October, 1919.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days				Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelled.	Precipitation .01 in. or more.	Clear.	Partly cloudy.		Cloudy.	Prevailing direction of wind.
Northern Division																				
Algona	Kossuth	1,213	46	46.8	-2.0	81	2	16	28	32	1.73	-0.51	0.56	0	9	10	7	14	se.	W. E. Laird.
Allison	Butler	1,045	7	49.6	---	86	2	19	28	34	3.56	---	1.69	0	10	6	14	11	nw.	J. A. Bell.
Alta	Buena Vista	1,513	28	46.2	-2.6	83	2	18	28	32	1.14	-1.81	0.26	T.	9	12	8	11	nw.	David E. Hadden.
Alta (near)	Buena Vista	---	23	---	---	---	---	---	---	---	---	---	---	T.	9	12	8	11	nw.	Warren Minard.
Alton	Sioux	1,305	14	46.4	-2.6	80	1	14	28	35	1.27	---	0.54	T.	12	6	9	16	ne.	W. S. Slagle.
Belmond	Wright	1,205	9	48.8	---	88	2	19	28	32	2.50	---	0.85	0.3	12	7	11	13	s.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	47.4	-1.2	86 ^a	2	16 ^a	27	38 ^a	2.12	-0.21	0.78	T.	11	10	5	16	n.	L. M. Goodman.
Charles City	Floyd	1,015	28	47.8	-0.4	84	2	19	28	30	3.56	+1.53	1.40	T.	13	7	13	11	s.	U. S. Weather Bureau.
Decorah	Winneshie	875	26	50.0	+0.9	80	2	22	28	33	3.96	+1.19	1.73	0	12	10	7	14	s.	Wm. F. Baker.
Elkader	Clayton	751	40	50.8	+0.6	84	2	19	29	35	3.48	+1.00	1.14	0	14	11	8	12	s.	D. C. Hale.
Estherville	Emmet	1,298	24	45.9	-1.4	79	1	21	26	33	0.85	-1.57	0.20	0	6	9	11	11	nw.	A. O. Peterson.
Fayette	Fayette	1,003	29	50.0	+1.3	82	1	22	28 [†]	34	4.37	+1.91	1.46	0	9	10	9	12	nw.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	47.2	-1.1	83	1 [†]	15	28	32	2.30	-0.11	1.10	T.	6	9	10	12	nw.	W. R. Prewitt.
Humboldt	Humboldt	1,095	31	48.9	-1.9	88	2	20	28	34	2.35	+0.23	1.06	T.	5	9	8	14	s.	H. C. Snitkey.
Inwood	Lyon	1,474	15	45.0	-3.9	81	1	8	28	37	1.59	-0.63	0.43	0.4	13	13	3	15	s.	F. B. Hanson.
Lansing	Allamakee	632	13	---	---	---	---	---	---	---	4.13	+1.33	1.14	0	13	---	---	---	---	Chas. R. Serene.
LeMars	Plymouth	1,224	23	47.3	-2.0	83	2	13	28	39	2.81	+0.59	1.37	T.	7	9	12	10	n.	C. L. Trenery.
Mason City	Cerro Gordo	1,148	22	47.4	-1.4	87	3	16	28	32	2.63	+0.49	1.41	0	12	4	9	18	nw.	North'n Sugar Corporation.
Milford (near)	Dickinson	---	22	45.6	---	79	1	26	25 [†]	32	0.83	---	0.27	T.	10	8	7	16	nw.	Dr. F. J. Smith.
New Hampton	Chickasaw	1,169	22	49.0	+0.9	83	2	20	28	34	3.89	+1.62	1.80	0	10	6	15	10	nw.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	50.5	---	89	2	20	28	35	3.16	---	1.31	0	14	9	11	11	s.	Arthur Betts.
Northwood	Worth	1,222	23	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Chas. Dwell.
Pocahontas	Pocahontas	1,248	15	48.2	-1.2	85	2	19	28	34	1.53	-0.94	0.44	0.6	10	7	8	16	ne.	F. E. Hronek.
Postville	Clayton	1,180	20	49.0	-0.1	79	1 [†]	22	28	34	4.07	+1.49	1.65	0	14	6	15	10	nw.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	43.8	-3.1	78	1	12	28	35	1.81	-0.51	0.54	0.5	11	13	5	13	sw.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	45.6	---	81	2	15	28	34	1.31	---	0.40	0.5	10	8	10	13	ne.	Jas. W. Dow.
Sioux Center	Sioux	1,426	20	45.8	-2.9	83	2	11	28	35	0.45	-1.61	0.22	T.	5	11	3	17	s.	J. de Ruyter.
Spencer	Clay	1,319	5	---	---	68 ^b	22	14 ^b	28	38 ^b	1.28	---	---	---	---	---	---	---	---	E. W. Little.
Storm Lake	Buena Vista	1,440	30	47.9	-2.3	85	2	18	28	30	1.22	-0.66	0.29	1.9	10	13	3	15	nw.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	47.2	-2.4	83	1	16	28	42	1.37	-0.67	0.40	T.	8	12	6	13	s.	H. L. Felter.
Waverly	Bremer	948	23	50.6	+0.5	83	1 [†]	19	28	34	5.31	+2.95	1.23	0	16	7	8	16	nw.	H. Arnold.
West Bend	Palo Alto	1,197	26	47.8	-0.3	88	2	15	28	36	1.52	-0.41	0.39	0	11	8	11	12	s.	Jos. Dorweiler.
Means and extremes				47.6	-1.4	89	2	8	28	42	2.30	-0.04	1.73	0.1	10	9	9	13	nw.	
Central Division																				
Ames	Story	926	43	51.0	-0.3	85	1	22	28 [†]	39	3.84	+1.10	1.21	0	10	7	14	10	s.	Iowa State College.
Audubon	Audubon	1,301	25	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	V. M. Jones.
Baxter	Jasper	998	19	51.8	+0.3	86	1	23	28 [†]	34	1.97	-0.82	0.80	0	14	6	13	12	se.	Rev. Paul Traeger.
Belle Plaine	Ben ton	886	29	52.1	+0.6	84	1 [†]	22	29	33	3.35	+0.79	0.81	0	13	10	10	11	s.	O. C. Burrows.
Boone	Boone	1,134	14	50.4	-0.6	83	1	22	28	30	3.74	+1.03	1.65	0	9	---	---	---	---	Carl F. Henning.
Carroll	Carroll	1,265	29	50.4	+1.1	89	2	19	28	38	3.56	+1.00	1.10	0	8	15	2	14	sw.	Mrs. J. J. Wolfe.
Cedar Rapids	Linn	733	37	54.0	+3.1	87	1	23	29	37	3.20	+0.77	1.31	0	7	6	4	21	s.	R. S. Toogood.
Clinton	Clinton	593	46	53.8	+2.8	86	1	23	29	30	7.74	+5.35	2.38	0	14	12	7	12	se.	H. Burde.
Davenport	Scott	580	48	54.6	+2.0	86	1	28	29	31	5.32	+2.93	2.09	0	13	12	7	12	e.	U. S. Weather Bureau.
Delaware	Delaware	1,083	28	50.8	+1.7	83	1	20	29	34	8.65	+6.35	3.24	0	10	11	14	6	se.	Nettie E. Ball.
Denison	Crawford	1,180	25	49.2	-1.6	85	1	17	28	32	4.34	+2.22	1.35	T.	7	13	10	8	s.	Emma Brogden.
Des Moines	Polk	861	40	52.1	-0.4	86	1	22	29	30	2.20	-0.48	0.78	0	11	7	12	12	s.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	52.0	0.0	82	1	25	29	30	6.22	+3.54	3.38	0	14	6	13	12	s.	U. S. Weather Bureau.
Fort Dodge	Webster	1,126	19	---	---	---	---	---	---	---	3.20	+0.21	0.95	T.	8	16	2	13	s.	Isadore Haugh.
Grinnell	Poweshiek	1,031	25	52.2	-0.2	85	1	22	28	38	2.88	+0.20	1.13	0	12	14	8	9	sw.	J. C. Stocks.
Grundy Center	Grundy	976	28	51.7	+0.9	85	1	20	28	35	6.84	+4.24	3.85	0	13	5	11	15	nw.	M. G. Heiberger.
Guthrie Center	Guthrie	1,077	24	50.8	-0.5	85	1	20	28	35	4.53	+2.00	2.98	0	12	16	4	11	nw.	C. T. Harney.
Harlan	Shelby	1,182	20	48.2	-2.2	86	1	15	28	36	3.19	+0.65	1.00	0	8	16	2	13	s.	E. L. Tilton.
Independence	Buchanan	921	55	52.2	+2.3	84	1	21	28 [†]	39	7.27	+4.81	3.17	0	9	14	6	11	s.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	53.8	+2.8	86	1	20	29	36	4.01	+1.29	1.00	0	13	10	8	13	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	50.0	+1.6	84	2	20	28	33	2.86	+0.50	1.37	0	10	10	8	13	s.	J. B. Parmelee.
Jefferson	Greene	1,052	20	49.2	-1.8	84	1 [†]	20	28	33	2.28	---	0.65	0	12	11	8	12	se.	Will I. Lyon.
LeClaire	Scott	576	19	---	---	---	---	---	---	---	6.89	+4.82	2.40	0	13	---	---	---	---	Margaret T. Dinsney.
Little Sioux	Harrison	1,040	14	48.9	-3.9	87	1	12	28	40	1.91	---	0.48	T.	11	9	10	12	se.	Geo. H. Gibson.
Logan	Harrison	928	52	49.8	-2.0	86	1	16	28	34	2.00	-0.35	0.79	0	7	11	6	14	sw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	52.6	+1.5	82	1 [†]	19	29	36	4.91	+2.13	1.04	0	12	7	13	11	nw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	52.4	+1.8	87	1	21	29 [†]	36	5.43	+2.71	1.91	0	12	17	0	14	sw.	Chas. F. W. Kothenbeuter.
Monroe	Jasper	922	7	54.0	---	86	1	22	29	33	2.20	---	0.93	0	7	13	5	13	nw.	J. A. Dibel.
Muscatine	Muscatine	554	59	---	---	---	---	---	---	---	3.89	+1.19	1.38	0	11	---	---	---	---	Wm P. Molis.
Olin	Jones	760	21	52.2	+1.4	82	1 [†]	19	29	31	6.00	+3.62	1.70	0	9	12	12	7	sw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	48.6	---	86	1	14	28	39	2.50	+0.30	0.65	T.	10	15	3	13	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	50.2	-1.1	86	1	20	28	37										

Climatological Data for October, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days				Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.	Partly cloudy.		Cloudy.	Prevailing direction of wind.
Southern Division																				
Afton	Union	1,212	25							1.93	-0.74	0.80	0	8	9	11	11	sw.	J. E. Deitrick.	
Albia	Monroe	959	21	53.0	+ 1.1	86	2	22	29	2.64	+0.10	1.04	0	6	13	2	16	nw.	F. H. Holmes.	
Allerton	Wayne	1,122	17	55.5	+ 2.1	86	1†	21	28	4.2			0	6	9	9	14	n.	Keith Burns.	
Atlantic	Cass	1,164	28	50.3	- 0.7	86	1	16	28	2.41	-0.12	0.84	T.	15	9	9	13	nw.	Thos. H. Whitney.	
Bedford	Taylor		19	52.0	- 0.4	86	1	18	28	4.1	0.0	1.28	0	10	13	6	12	s.	E. E. Healy.	
Bloomfield	Davis	881	12	54.8		87	2	22	29	3.3	-0.32	0.65	0	11	7	15	9	se.	V. G. Warner.	
Bonaparte	Van Buren	565	28	54.6	+ 1.2	86	1†	24	29	2.40	+0.49	0.55	0	10	15	5	11	e.	Bruce R. Vale.	
Burlington	Des Moines	544	23	56.0	+ 2.3	88	1†	25	29	2.35	+0.09	0.93	0	12	17	4	10	sw.	Mrs. Edna M. Donnelly.	
Centerville	Appanoose	1,013	14	54.3		86	1†	23	28	4.9	2.07	0.83	0	11	11	6	14	se.	Leo J. Allen.	
Chariton	Lucas	1,042	24	51.6	- 1.2	85	1	14	28	4.0	-0.53	0.72	0	5	13	12	6	sw.	C. C. Burr.	
Clarinda	Page	1,009	29	52.7	+ 0.8	89	2	19	28	3.8	0.0	1.24	0	10	13	6	12	s.	A. S. Van Sandt.	
Columbus Jct.	Louisa	595	18	55.6	+ 2.7	84	1†	25	29	4.88	+2.37	1.56	0	10	21	5	5	s.	J. B. Johnston.	
Corning	Adams	1,117	27	50.9	- 0.5	86	1	17	28	3.6	-0.25	1.09	0	7	15	2	14	nw.	Jerome Smith.	
Corydon	Wayne	1,101	26	53.8	- 0.1	86	1†	19	28	3.09	+0.27	0.94	0	11	12	11	8	s.	May C. Miller.	
Creston	Union	1,312	14	52.6 ^a	+ 1.3	85	1	18 ^b	28	34 ^b	1.75		0.45	0	7	6	9	16	nw.	Mrs. T. E. McConnell.
Cumberland	Cass		20							2.30	-0.62	0.80	0	4	18	1	12	s.	J. H. Reppert.	
Earlham	Madison	1,126	17	51.2	- 0.6	85	1†	17	28	1.48	-1.17	0.55	0	6	15	4	12	sw.	Geo. Phillips.	
Fairfield	Jefferson	780	35	53.7 ^a	+ 1.0	86 ^a	1	20 ^a	29	35 ^a	4.46	+1.63	1.03	0	10			s.	Prof. R. M. McKenzie.	
Glenwood	Mills	1,100	22	51.1		87	1	19	28	3.4	3.91	1.50	0	8	14	1	16	nw.	Dr. Geo. Mogridge.	
Greenfield	Adair		27																Frank A. Ward.	
Indianola	Warren	969	27	52.6	- 0.3	85	1	24	28†	3.5	-1.28	0.40	0	10	10	5	16	se.	Prof. J. L. Tilton.	
Keokuk	Lee	614	48	56.5	+ 2.0	87	1	29	29	1.68	-0.81	0.38	0	12	11	8	12	s.	U. S. Weather Bureau.	
Keosauqua	Van Buren	644	27	55.6	+ 3.4	87	1†	20	29	2.93	+0.94	0.60	0	11	12	5	14	se.	J. H. Landes.	
Knoxville	Marion	920	24	53.7	+ 0.2	88	1	20	29	3.7	-0.53	0.79	0	8	12	5	14	nw.	W. J. Casey.	
Lacona	Warren		20							3.31	+0.37	0.74	0	12	6	18	7		J. B. Alter.	
Lamoni	Decatur	1,100	12	53.0	+ 0.1	86	1	18	28	3.4	3.07	1.18	0	8	12	8	11	s.	Ed. D. Moore.	
Lenox	Taylor	1,250	24	52.2	- 1.0	86	2	18	28	3.4	-0.40	0.66	0	10	13	9	9	s.	J. L. Hurley.	
Mount Ayr	Ringgold	1,236	26	53.0	+ 0.6	85	1	17	28	3.5	-1.32	0.43	0	7	11	9	11	s.	Alex Maxwell.	
Mt. Pleasant	Mt. Henry	729	38	55.6	+ 2.9	88	1	24	29	3.7	-0.14	0.68	0	11	9	8	14	se.	John H. Jericho.	
Murray	Clarke	1,216	28	53.0	+ 0.2	85	1	20	28	3.6	-1.05	0.43	0	11	8	13	10	s.	M. T. Ashley.	
Northboro	Page	1,046	5																J. M. Darby.	
Oakland	Pottawattamie			50.3		87	2	15	28	3.79		1.25	0	7	15	1	15	s.	M. E. Gray.	
Oskaloosa	Mahaska	825	43	53.5	+ 1.0	85	1	22	29	3.3	+2.64	0.94	0	11	12	7	12	nw.	Roy R. Robinson.	
Ottumwa	Wapello	849	24	51.5 ^b		85 ^b	2	26 ^b	28†	50 ^b	2.52	+0.01	1.02	0	3			nw.	Eugene O. Field.	
Pella	Marion	877	26	53.4	+ 0.3	86	1†	23	29	3.6	-0.17	0.66	T.	9	17	1	13	se.	J. H. Ver Steeg.	
Sigourney	Keokuk	877	23	53.8	+ 1.2	86	2	21	29	3.4	+0.85	0.94	0	11	13	7	11	nw.	W. E. Utterback.	
Stockport	Van Buren	754	17	53.6	+ 0.8	86	1†	19	29	3.7	+1.40	1.08	0	12	10	9	12	s.	C. L. Beswick.	
Thurman	Fremont		22	51.2	- 1.4	88	1	18	28	3.7	+0.24	1.76	0	5	11	10	10	nw.	C. R. Paul.	
Washington	Washington	769	37	54.2	+ 1.7	86	1	24	29	3.1	+2.13	1.78	0	11	6	15	10	sw.	Wm. A. Cook.	
Winterset	Madison	1,129	28	52.4	+ 0.1	85	1†	20	28	3.5	-0.86	0.60	0	11	15	9	7	nw.	H. S. Ely.	
Omaha, Nebr.		1,040	48	50.6	- 3.6	87	1	19	28	3.6	+0.44	0.98	T.	14	10	8	13	s.	U. S. Weather Bureau.	
Means and extremes				53.2	+ 0.6	89	2	19	28	3.6	+0.23	1.78	0	9	12	7	12	s.		
State means and extremes				50.7	- 0.1	89	2	8	28	50	3.02	+0.56	3.85	T.	10	11	8	12	s.	

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means. Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc. †Also other dates. ††Received too late to be included in means and summaries. T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).				Wind.				Sunshine.				
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.			Total movement.	Average hourly velocity.	Maximum			Per cent of possible.			
						7 a. m.	Noon.†	7 p. m.			Miles.	From.			Departure from normal.		
Charles City	30.03	30.39	10	29.43		9.85	66	74	41	†6	1,761	6.4	23	nw.	28	42	-23
Davenport	30.04	30.35	11	29.54		9.88	64	74	43	8.5	1,266	6.9	25	nw.	28	51	-17
Des Moines	30.01	30.37	10	29.48		9.86	60	69	34	22	5,085	6.8	37	sw.	1	51	-12
Dubuque	30.06	30.40	11	29.53		9.86	63	73	34	16	4,269	5.7	26	ne.	4	51	-4
Keokuk	30.05	30.35	10	29.59		9.83	62	68	35	8.5	658	6.8	27	se.	21	60	-1
Sioux City	30.03	30.45	10	29.40		9.87	74	67	30	7.8	353	11.2	40	nw.	9	42	-18
Omaha, Neb.	30.02	30.41	10	29.39		8.81	61	68	41	7.5	669	7.6	34	nw.	24	49	-13
Means and extremes	30.03					8.54	64	70				7.3				49	-13
		30.45	10	29.39		8			30	7			40	nw.	9		
Normals and records	30.03		31 st		20 th	81			62		25 th	8.1			16 th	62	
		*30.69	1913	‡28.96	1876				†17	1895		*60	sw.	1880			

*Davenport. †Omaha. ‡Sioux City. †Local mean time. †And other dates.

MISCELLANEOUS PHENOMENA.

Aurora: 1st, 2d, 3d, 15th, 22d, 23d, 26th, 29th, 31st.
Fog: 1st, 4th, 9th, 12th, 13th, 14th, 17th, 20th, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

Frost, killing: Northern Division—10th, 11th, 12th, 16th, 17th, 19th, 21st, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 31st; Central Division—10th, 11th, 12th, 16th, 17th, 18th, 20th, 21st, 22d, 25th, 26th, 28th, 29th, 31st; Southern Division—11th, 12th, 16th, 17th, 21st, 26th, 28th, 29th.

Hail: 3d, 24th.

Halos (Lunar or Solar): 4th, 11th.

Rainbow: 4th, 18th, 19th.

Sleet: 26th.

Thunderstorms: 1st, 2d, 3d, 4th, 5th, 8th, 9th, 10th, 15th, 16th, 18th, 19th, 20th, 21st, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.

ERRATA.

Report for September, 1919: Page 105; mean temperature at Creston published 68.9 and the departure +5.3, should be 68.8 and +5.2. Charles City; total wind movement published 4,316 miles, should be 4,336; average velocity published 5.6 miles, should be, 6.0 miles. Page 104; Forest City; total precipitation published 1.49 inches and the departure -1.96 inches, should be 2.75 inches and the departure -0.70 inch. Page 106: Forest City; the daily amounts of precipitation should be as follows: 2d, T; 3d, 0.25; 9th, 0.20; 10th, 1.30; 14th, 0.10; 18th, 0.30; 22d, 0.10; 28th, 0.20; 31st, 0.30.

Daily Precipitation for October, 1919.

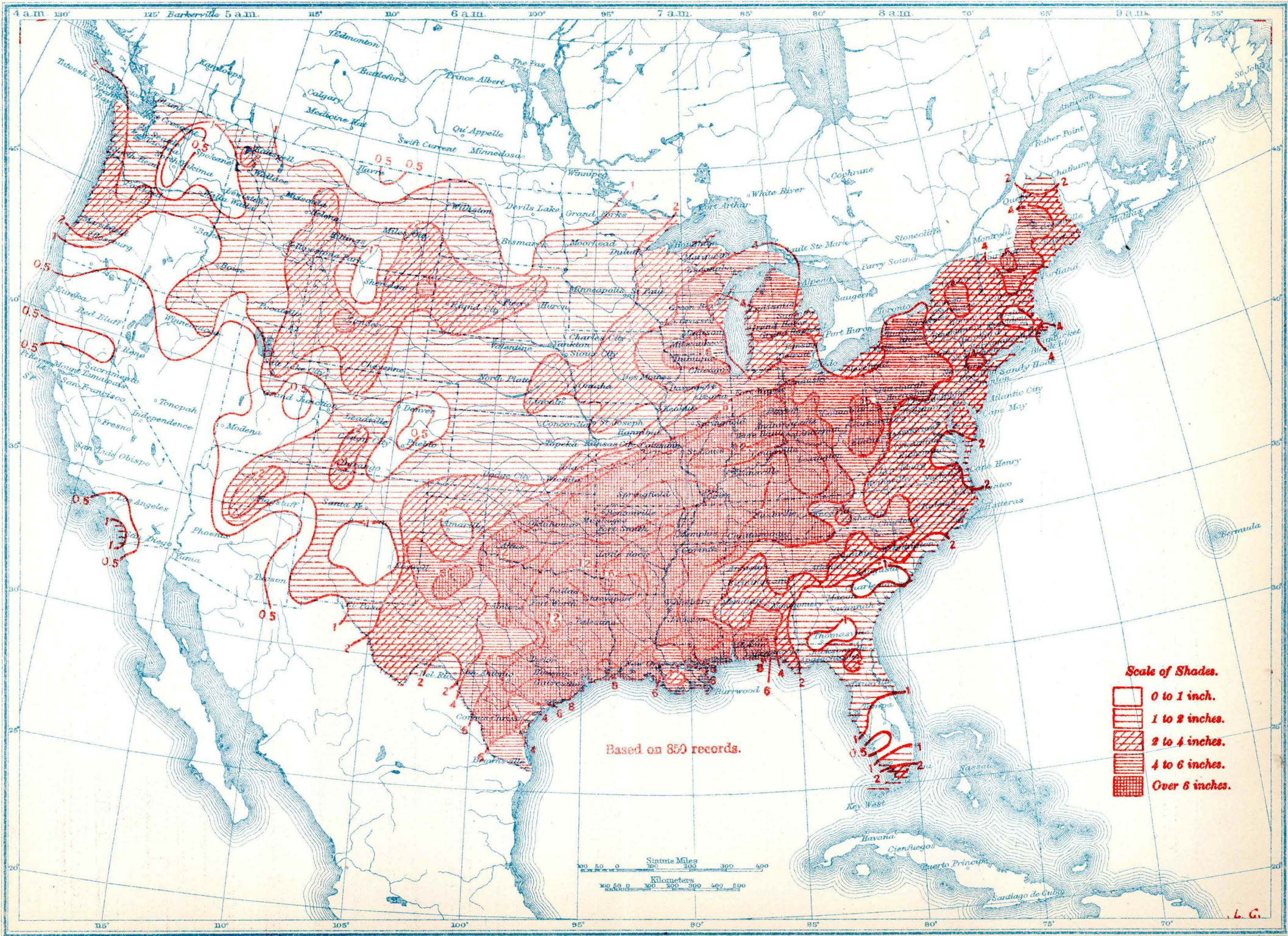
Stations.	Watersheds.	Day of Month.																															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Northern Division</i>																																	
Algona	Des Moines		.03	.11	.13				.56				.10		.14	.14										.17					.35		1.73
Allison	Cedar	.02		.43	.50	.01			.35				T.		.24			.04		.08					T.	.20		T.			1.69		3.56
Alta	Raccoon				.04			.20	.05				.21		.16	.02				.17					T.			.03			.26		1.14
Alta (near)	Raccoon	.05	.04					.26	.06				.13	.04	.18	T.				.05	.10							T.			.23		1.08
Alton	Floyd	.03		T.	.12				.18				.54	.03	.01	.05	T.			.05	.09					.03		T.			.08		1.27
Belmond	Iowa	.04		.18	.11	.04			T.	.55			.02	.03	.27	T.	T.	.20	T.	T.					T.	T.		.18		.85	.03	2.50	
Britt	Iowa	.07		.07	.38	.05			T.	.50			.05	.05	.10		T.	T.			.05				.02		.05				.78		4.37
Charles City***	Cedar	.06		.32	.94	.01		.20	.04				.02	.16				.03		.07				.20	T.	T.	.11		T.	1.40		3.56	
Decorah	Mississippi	.16	.01		.67	.15			.31	.06			T.		.06					.05					.60		.15	.01		T.	1.73		3.96
Elkader	Mississippi	.03	.05	.33	1.14	.05			.14	.04			T.		.15	.09		T.		.04					T.	.21	T.	.19		T.	.98	.04	3.48
Estherville	Des Moines	.15							.20				.16					T.	T.	.12					.05					.17		.85	
Fayette	Mississippi		.28	.40	.78				.68				T.		.25										T.	.28		.20		*	1.50	T.	4.37
Forest City	Cedar				.20				.60				T.					T.							.10		.20				1.10		2.39
Humboldt	Des Moines				.30	T.			.51				T.		.28						.20				T.	T.				1.06		2.35	
Inwood	Big Sioux	.03			.43	.07			.14	.14			.41	.04		.07				.04	.11				.07	T.		.01		.03		1.59	
Lansing|||	Mississippi	.10	.16	.01	.87	.03			.22	.43				.62	.06					.10					.15		.08	.05		.80	1.14	4.13	
LeMars	Floyd	.09		T.	.39				T.	1.37				.05	.05	.10				T.	.16				T.	T.				.12		2.81	
Mason City	Cedar	.10		.10	.52	.09			.34					.08					.01		.06				.18		.12			1.01	.02	2.63	
Milford (near)	Little Sioux	.05		T.	.01				.27				.27	.02	.02				T.	T.	.01				.06		.02			.10		0.83	
New Hampton	Wapsipicon	.03		T.	.52	.56			.42				T.	.08	.11			T.	.06						.21	T.	.10			1.80	T.	3.89	
Nora Springs	Cedar	.01		.05	.38	.05		.10	.44				.08		.16				.10	.06					.18	.03		.21			1.31		3.16
Northwood	Cedar				.01	.22			.04	.44				.07	.18	T.				.17					T.	.02	.07			.31		1.53	
Pocahontas	Des Moines				.01	.22			.44					.07	.18	T.				.17					T.	.02	.07			.31		1.53	
Postville	Mississippi	.08	T.	.21	.88	.03			.40	.27			T.		.14	.01			.03		.02				.17		.08			1.65	.10	4.07	
Rock Rapids	Big Sioux				.28				.14	.16			.54	.05	.03	.10				.03	T.				.31		.07			.10		1.81	
Sanborn	Floyd			.01	.15	.01			.06				.40	.25	.03	.06						.23								.11		1.31	
Sioux Center	Floyd					T.			.02					.22						.05					.02		T.			.14		.45	
Spencer	Little Sioux								.32				.25	.05		T.			.05		.15				.11		.10			.25		1.28	
Storm Lake	Raccoon	.02			.02				.29				.06	.04	.16	.17					.27				T.		.02			.17		1.22	
Washta	Little Sioux			T.	.40				.17				.30	.02		.03				.20			T.		.05		T.		T.	.20		1.37	
Waverly	Cedar	.50	.60	.30	.58	1.23			.30	.16			T.		.18				.03		.09				.07	.21	.03	.05		.94	.04	5.31	
West Bend	Des Moines	.02	.01	.22	.22	.03			T.	.25			.04	.04	.15						.15				T.		T.			.39		1.52	
<i>Central Division</i>																																	
Ames	Skunk			1.17	1.21				.08	.31			.01		.09										.40			.05		.02	.50		3.84
Audubon	Nishnabotna														.18	.12					.03				.09	.07		.04		.07	.80	.04	1.97
Baxter	Skunk	.02		.03	.17	.03			T.	.28			T.		.64	.22					.05				T.	.44	.08	T.	.03	.81	.11	3.35	
Belle Plaine	Iowa	.05	.08		.19	.24	.41						T.		.15						.43					.06				T.	.60	.05	3.74
Boone	Des Moines	.12		.62	1.65				T.					.15								.43								T.	.60	.05	3.74
Carroll	Raccoon				.75	.45				1.10			T.		.18											.04		.08			.61		3.56
Cedar Rapids	Cedar	.35			.75	.45				T.				T.	.28					.04					.14					.42	T.	3.20	
Clinton	Mississippi	1.31		T.	.92	.09			T.		.08				.04	.32					.15				.21	.02	.30		.15	1.01	1.30	7.74	
Davenport***	Mississippi	2.38			.17	.70	.91		T.						.55	.01					.11				.22	.02	.00		.68	1.11	.01	5.32	
Delaware	Mississippi	.04	.64	1.62	3.24	.07			.42				T.		.29	.15									1.16	.10				1.15	.26	8.65	
Denison	Missouri				1.35	.60			.48				T.	.10	T.					T.	.60				.57			T.		.64		4.34	
Des Moines***	Des Moines		.02	.04	.53			.47	.01				T.	.23						T.	.60				.01	.01	T.	.02	.46	.40	2.20		
Dubuque***	Mississippi	.05	.21	.14	3.37	.03			.19	T.			T.	.39						T.	.03				.26	.32	.06	.14	.29	.68	T.	3.20	
Fort Dodge	Des Moines	.20			.95	.27			.85					.20							.05				.03					.65		3.20	
Grinnell	Iowa	.06	.06	.08	.34				.42					.27	.13						.03					.26		.01		1.13	.09	2.88	
Grundy Center	Cedar	.04	.05	.52	3.85	.22			.22					.22	.08					.05					.05	.72	T.	.07			6.84		
Guthrie Center	Raccoon			.15	2.98			.25	.43				.03	.10						.06					T.	.02	T.	.08		.30	.05	4.52	
Harlan	Nishnabotna			.40	.70				1.00				.02	.11	.08						.35									.58		3.19	
Independence	Wapsipicon	.11	.04	1.70	3.17	.11			.26					T.											T.	.34	.14			1.40		7.27	
Iowa City	Iowa	.49		.06	.28	.39			.03					T.	.23	.57									.04		.36	T.	.10	.20	1.00	26.40	
Iowa Falls	Iowa	.13			.53				.37				T.	.15	T.						.10					.01		.08			1.37	.02	2.86
Jefferson	Raccoon	.02		.08	.44	.02	.43	.05	.48				.01	T.	.12	T.					.22				.13	T.	.06		T.	.65	T.	2.28	
Le Claire|||	Mississippi	.42				2.40	.43		.02	.30				T.	.10	.49										.07	T.	.11	.06		1.05	1.20	6.80
Little Sioux	Little Sioux		.12	.03	.46				.48				.09	.22							.14	.20				.05		.01		.11		1.91	
Logan	Missouri				.28				.79				.10		.13												.04			.44		2.06	
Maquoketa	Maquoketa	.45		.60	.60	.06			.10					.05	.58						.20				T.	.23		.15		.85	1.04	4.91	
Marshalltown	Iowa	.59	.15	.47	1.91	.01			.31				T.	.04	.15						.09				T.	.63	T.			.70	.38	5.43	
Monroe	Skunk		.02		.07				.72					.19	.23									T.	T.	T.	T.	T.		.93	.04	2.20	
Muscataine|||	Mississippi	.24				.24	.02		.06	T.				.19	.65										.15				.05	.05	.95	1.38	3.89
Olin	Wapsipicon	.65		.40	1.70	.20			T.					T.	.60											.20		.25		1.40	.60	6.00	
Onawa	Missouri		.05	.65	.40				T.	.38				.04	.21					.20	.03									.40		2.50	
Perry	Raccoon			.02	2.39				.45				T.	.05	.15		</																

Daily Maximum and Minimum Temperatures for Month of October, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped into Northern Division, Central Division, and Southern Division, listing various Iowa cities and their daily temperature ranges.

* , b , c , etc. . . indicate respectively 1 , 2 , 3 , etc. . . days missing from record
§§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

Total Precipitation, Inches, October, 1919.



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U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

NOVEMBER, 1919

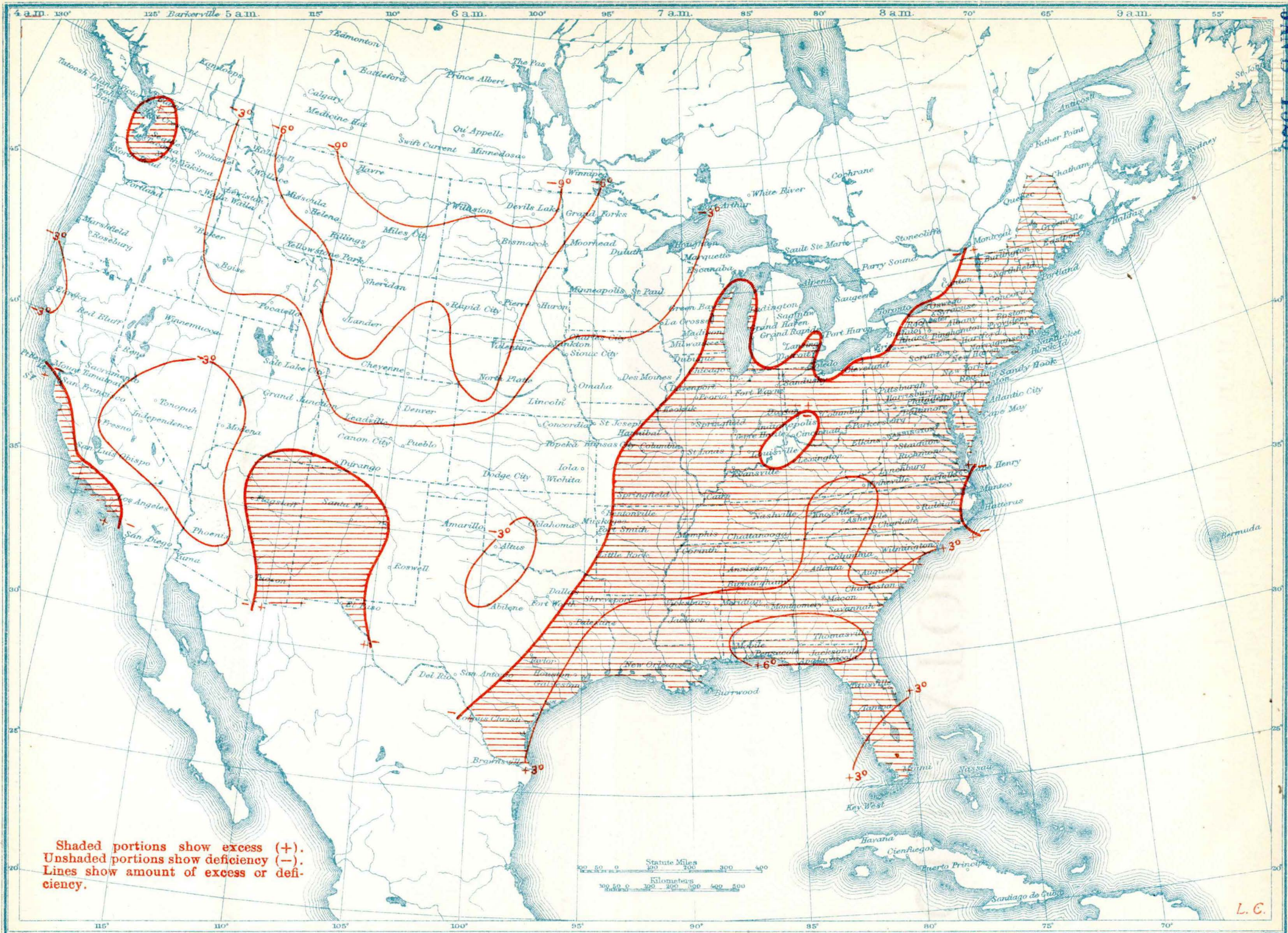
BY
CHARLES D. REED
METEOROLOGIST



PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

Departure of the Mean Temperature from the Normal, November, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

CHARLES D. REED, METEOROLOGIST

VOL. XXX DES MOINES, IOWA, NOVEMBER, 1919. No. 11

GENERAL SUMMARY.

Excepting a small area extending from Page northeast to Madison counties, temperatures averaged below normal, the average daily deficiency being 1.4 degrees. Cold waves occurred on the 11th-12th and 25th-26th, and a warm period from about the 15th to the 24th. On the 13th a temperature of -12 observed at Alton is the lowest November temperature in Iowa since 1905.

Precipitation was evenly distributed and considerably above normal in all sections, resulting mostly from two storm periods, 9th-10th and 27th-29th. In the first period appreciable snow covered the northwest half of the State and in the second all portions were covered heavily, except the Mississippi River counties where it was light.

Wet fields and rainy days continued to delay corn husking till after the 10th when cold, drying weather permitted rapid progress and improved the roads so that much corn was marketed. Southwest gales on the 10th blew down much corn in the eastern half of the State. Considerable of this in the south-central and southeast counties was covered by snow toward the close of the month. Due to the high cost of husking, which averaged 8 cents per bushel, nearly 8 per cent of the corn was "hogged down" this year. At the close of November, 11 per cent of the corn remained unhusked as compared with 9 per cent in 1918.

Winter wheat entered the winter in good condition, 92 per cent of the acreage seeded having become well established. The severe temperatures of the month and the glaze storm of the 28th-29th were preceded by ample snow covering. Wires were damaged by the glaze in the Mississippi River counties.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.11 inches. The highest recorded was 30.74 inches, at Sioux City, on the 27th, and the lowest was 29.09 inches, at Dubuque, on the 29th. The monthly range was 1.65 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 98 stations was 33.6°, or 1.4° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 30.5°, or 2.3° lower than the normal; Central, 33.9°, or 1.2° lower than the normal; Southern, 36.5°, or 0.6° lower than the normal. The highest monthly mean was 39.3°, at Keokuk, and the lowest was 28.1°, at Rock Rapids. The highest temperature recorded was 68° at Creston on the 1st, Lamoni on the 3d, and Harlan on the 16th, and the lowest, -12° at Alton, on the 13th. The temperature range for the State was 80°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 82 per cent and at 7 p. m., 69 per cent. The mean for the month was 76 per cent, which is about normal. The highest mean was 82 per cent at Charles City, and the lowest, 72 per cent, at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 104 stations, was 3.40 inches, or 1.89 inches above the normal. By divisions the averages were as follows: North-

ern, 3.15 inches, or 1.74 inches greater than the normal; Central, 3.39 inches, or 1.86 inches greater than the normal; Southern, 3.66 inches, or 2.08 inches greater than the normal. The greatest amount, 6.22 inches, occurred at Indianola, and the least, 1.97 inches, at Storm Lake. The greatest amount in 24 consecutive hours, 3.85 inches, occurred at Thurman, on the 9th.

SNOWFALL.

The average fall for the State was 6.3 inches, which is 3.8 inches more than the normal. The heaviest fall was 17.0 inches at Harlan. Practically the entire fall of snow occurred on the 27th, 28th and 29th, when one of the largest November snows on record occurred over a large portion of the State. The snowfall was light over the extreme east-central and south-east portions, a few stations reporting less than 1.0 inch.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was at the rate of 63 miles an hour, from the southwest, at Keokuk on the 10th. This is the highest of record in this State in November.

SUNSHINE.

The average per cent of the possible amount of sunshine was 47, or 7 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 36; Davenport, 52; Des Moines, 50; Dubuque, 49; Keokuk, 56; Sioux City, 41; Omaha, Nebr., 48.

MISCELLANEOUS PHENOMENA.

- Aurora: 11th, 29th.
- Fog, dense: 2d, 7th, 8th, 9th, 21st, 29th.
- Halo, lunar: 4th, 18th, 29th.
- Halo, solar: 2d, 12th, 16th, 17th, 18th, 24th.
- Meteor: 2d.
- Sleet: 10th, 27th, 28th, 29th.
- Thunderstorms: 6th, 8th, 9th, 10th, 18th, 24th, 25th.

COMPARATIVE DATA FOR THE STATE—NOVEMBER.

YEAR	Temperature				Precipitation				Number of Day				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precip-itation .01 in.	Clear	Partly cloudy	Cloudy
1890	38.6	+3.6	78	-2	1.46	-0.05	3.55	0.71	-----	8	15	8	7
1891	30.5	-4.5	84	-24	1.70	+0.19	3.64	0.06	-----	7	10	8	12
1892	33.3	-1.7	70	-3	1.10	-0.41	3.16	0.05	1.8	4	11	11	11
1893	34.0	-1.0	86	-13	1.17	-0.34	2.56	0.05	4.6	4	16	8	6
1894	32.7	-2.3	72	-5	0.92	-0.59	2.42	T.	0.4	4	9	11	10
1895	34.3	-0.7	86	-12	1.51	0.00	3.01	0.45	4.9	5	9	8	13
1896	29.6	-5.4	82	-15	1.83	+0.32	4.51	0.16	2.9	5	9	8	13
1897	34.3	-0.7	81	-19	0.66	-0.85	2.24	T.	1.2	5	9	8	10
1898	32.2	-2.8	78	-17	1.50	-0.01	3.61	0.33	8.7	5	12	7	11
1899	43.9	+8.9	86	8	1.20	-0.31	2.97	0.13	0.5	5	12	8	8
1900	33.5	-1.5	79	-6	1.06	-0.45	3.35	T.	3.7	6	12	7	11
1901	35.8	+0.8	77	2	0.86	-0.65	2.30	0.20	2.6	3	18	6	6
1902	41.2	+6.2	79	4	2.13	+0.62	4.19	1.16	1.8	7	9	7	14
1903	34.2	-0.8	76	-5	0.52	-0.99	1.74	T.	1.1	3	13	8	9
1904	41.0	+6.0	80	4	0.15	-1.36	0.50	0.00	0.5	1	20	6	4
1905	38.4	+3.4	70	-12	2.84	+1.33	5.30	0.90	0.6	5	16	7	7
1906	35.4	+0.4	76	-5	2.03	+0.52	3.86	0.35	4.4	8	9	7	14
1907	36.7	+1.7	68	-4	1.03	-0.48	2.27	0.05	0.9	4	17	6	7
1908	39.3	+4.3	80	5	1.56	+0.05	3.31	0.21	1.4	5	14	7	9
1909	42.4	+7.4	84	3	5.39	+3.88	11.48	2.07	6.8	10	10	7	13
1910	33.4	-1.6	76	-5	0.34	-1.17	1.03	T.	0.7	3	13	9	8
1911	29.9	-5.1	77	-8	1.42	-0.09	4.99	0.11	1.6	6	11	8	11
1912	40.1	+5.1	79	6	0.98	-0.53	2.38	0.00	T.	2	18	8	4
1913	44.1	+9.1	78	10	1.18	-0.33	3.49	0.20	0.4	6	11	7	12
1914	41.0	+6.0	80	4	0.22	-1.29	0.95	0.00	T.	2	19	6	5
1915	40.2	+5.2	83	-5	1.94	+0.43	4.86	0.30	1.2	6	11	10	9
1916	37.3	+3.3	80	-8	1.61	+0.10	3.65	0.05	3.6	5	16	6	8
1917	40.7	+5.7	77	3	0.28	-1.23	1.02	T.	1.4	3	14	6	10
1918	39.9	+4.9	76	0	2.11	+0.60	5.10	1.70	4.4	7	13	5	12
1919	33.6	-1.4	68	-12	3.40	+1.89	6.22	1.97	6.3	8	11	7	12

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

Climatological Data for November, 1919

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Prevailing direction of wind.	Observers.		
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelting.	Precipitation .01 in. or more.	Clear.			Partly cloudy.	Cloudy.
Northern Division																				
Algona	Kossuth	1,213	46	30.0	-2.7	56	10	-3	13	37	2.69	+1.39	0.86	11.0	6	11	9	10	nw.	W. E. Laird.
Allison	Butler	1,045	7	31.1		53	3	0	30	30	3.49		1.50	8	11	7	12	nw.	David E. Hadden.	
Alta	Buena Vista	1,513	28	29.8	-2.6	54	2†	-3	30	35	2.79	+1.41	1.42	9.5	12	11	9	10	nw.	Warren Minard.
Alta (near)	Buena Vista		23								2.66	+1.09	1.45	9					nw.	W. S. Stagle.
Alton	Sioux	1,305	14	29.2	-3.4	57	2	-12	13	44	3.39		1.36	12.0	12	8	9	13	nw.	
Belmond	Wright	1,205	9	30.9		57	10	-1	13	32	3.44		1.55	9.2	8	9	10	11	nw.	Geo. P. Hardwick.
Britt	Hancock	1,236	22	30.0	-1.9	57	2	-4	12	32	2.56	+1.17	1.32	7.4	8	10	9	11	nw.	L. M. Goodman.
Charles City	Floyd	1,015	28	30.4	-2.6	58	10	2	30	34	3.78	+2.39	2.47	8.9	10	5	12	13	nw.	U. S. Weather Bureau.
Decorah	Winneshiek	875	26	31.4	-2.3	58	10	3	30	30	3.11	+1.28	2.23	8.7	9	16	3	11	nw.	Wm. F. Baker.
Elkader	Clayton	751	40	33.1	-0.5	58	10	4	30	32	3.91	+2.24	2.34	8.0	6	9	7	14	n.	D. C. Hale.
Estherville	Emmet	1,298	24	28.8	-2.7	54	9	-5	13	35	2.23	+0.84	1.60	7.0	6	15	10	5	nw.	A. O. Peterson.
Fayette	Fayette	1,003	29																nw.	R. Z. Latimer.
Forest City	Winnebago	1,226	25	30.5	-1.2	52	3†	-3	13	35	3.15	+1.72	1.25	8.0	7	12	9	9	s.	W. R. Prewitt.
Humboldt	Humboldt	1,095	31	31.8	-2.5	57	10	-2	30	35	3.29	+1.70	1.44	7.5	7	4	9	17	s.	H. C. Smitkey.
Inwood	Lyon	1,474	15	28.8	-3.0	57	2†	-8	13	40	2.54	+1.70	0.95	9.8	11	13	6	11	nw.	F. B. Hanson.
Lansing	Allamakee	632	13								3.57	+1.99	2.56	6.0	9				n.	Chas. R. Serene.
LeMars	Plymouth	1,224	23	30.7	-2.4	59	2	-8	13	42	3.64	+2.57	1.75	11.0	9	8	12	10	n.	C. L. Treney.
Mason City	Cerro Gordo	1,148	22	30.1	-2.8	56	10	-1	13	32	3.50	+1.82	1.28	10.6	7	5	11	14	nw.	North Sugar Corporation.
Milford (near)	Dickinson		29			54	2	-6	13†	34	2.89		1.35	11.1	11	10	10	10	nw.	Dr. F. J. Smith.
New Hampton	Chickasaw	1,169	22	30.8	-2.2	56*	10	2	13†	30	3.13	+1.50	1.84	8.3	9	9	13	8	nw.	A. F. Kemman.
Nora Springs	Floyd	1,064	6	32.2		58	10	1	13†	34	3.86		2.56	6.9	10	9	7	14	s.	Arthur Betts.
Northwood	Worth	1,222	23																n.	Chas. Dwelle.
Pocahontas	Pocahontas	1,248	15	31.0	-1.8	55	17†	-3	13†	37	2.31	+0.65	1.24	9.3	11	10	9	11	n.	F. E. Ironek.
Postville	Clayton	1,180	20	31.2	-2.1	57	10	2	30	28	3.05	+1.40	1.55	5.0	8	7	11	12	nw.	F. L. Williams.
Rock Rapids	Lyon	1,358	20	28.1	-3.4	54	2	-7	13	36	2.49	+1.43	0.70	11.0	10	17	6	7	se.	J. K. Medberry.
Sanborn	O'Brien	1,553	5	30.2		56	20	-6	30	33	2.94		1.50	8.5	9	10	11	9	nw.	Jas. W. Dow.
Sioux Center	Sioux	1,426	20	29.3	-2.6	58	2†	-5	13	37	5.08	+4.28	2.01	11.5	8	15	1	14	nw.	J. de Ruyter.
Spencer	Clay	1,319	5	29.8		56	17	-6	13	39	2.90		1.00	11.5	7	7	14	9	sw.	E. W. Little.
Storm Lake	Buena Vista	1,440	30	31.4*	-2.2	54*	2†	-2*	30	34*	1.97	+0.84	1.43	6.0	6				nw.	Geo. H. Fracker.
Washta	Cherokee	1,157	21	30.5	-2.9	58	20	-9	13	44	5.10	+3.97	2.20	11.0	6	14	4	12	n.	H. L. Felter.
Waverly	Bremer	948	23	32.5	-1.6	57	9	2	30	32	3.10	+1.51	1.75	5.5	7	14	4	12	nw.	H. Arnold.
West Bend	Palo Alto	1,197	26	29.9*	-2.6	57*	10	-5*	13	37*	2.06	+0.62	1.01	7.0	8	11	9	10	nw.	Jos. Dorweiler.
Means and extremes				30.5	-2.3	59	2	-12	13	44	3.15	+1.74	2.56	8.8	8	10	9	11	nw.	
Central Division																				
Ames	Story	926	43	34.3	-1.1	58	10	2	30	34	3.46	+2.13	1.62	8.0	8	16	3	11	n.	Iowa State College.
Audubon	Audubon	1,301	25																se.	V. M. Jones.
Baxter	Baxter	998	19	34.0	-1.8	58	10	3	30	31	3.46	+2.06	1.74	4.2	9	7	11	12	se.	Rev. Paul Traeger.
Belle Plaine	Benton	886	29	34.1	-1.3	58	10	4	30	31	4.19	+2.46	2.03	6.7	7	11	8	11	nw.	O. C. Burrows.
Boone	Boone	1,134	14	33.5	-1.1	57	10	0	30	35	3.32	+1.95	1.34	6.0	5	12	6	12	nw.	Carl F. Henning.
Carroll	Carroll	1,265	29	33.2	-0.2	58	18	-1	30	35	2.77	+1.52	1.65	6.5	6	14	6	10	nw.	Mrs. J. J. Wolfe.
Cedar Rapids††	Linn	733	46	35.4	+0.4	60	10	7	30	26	2.89	+1.48	1.35	2.0	5	16	2	12	w.	R. S. Toogood.
Clinton	Clinton	593	46	35.8	-0.2	58	10	10	30	29	2.42	+0.48	0.81	1.2	7	11	8	11	nw.	H. Burde.
Davenport	Scott	580	48	36.6	-0.9	59	9	12	30	25	2.70	+0.94	1.14	0.5	8	10	7	13	w.	U. S. Weather Bureau.
Delaware††	Delaware	1,083	28								4.13	+2.49	2.00	7.0	5	13	9	8	nw.	Nettie E. Ball.
Denison	Crawford	1,180	25	34.0	-0.7	57	3†	0	30	34	2.69	+1.51	1.34	8.0	4	12	6	12	n.	Emma Brogden.
Des Moines	Polk	861	40	35.7	-1.1	59	10	5	30	31	3.84	+2.36	2.61	6.7	8	6	10	14	nw.	U. S. Weather Bureau.
Dubuque	Dubuque	639	46	34.6	-1.4	58	10	8	30	26	3.59	+1.78	2.02	1.4	7	7	11	12	nw.	U. S. Weather Bureau.
Fort Dodge††	Webster	1,123	19								2.80	+1.32	1.75	7.0	7	17	8	5	n.	Isadore Haugh.
Ginnell	Poweshiek	1,031	25																n.	J. C. Stocks.
Grundy Center	Grundy	976	28	33.3	-2.1	57	10	2	30	33	2.40	+1.00	1.10	5.0	6	9	10	11	nw.	M. G. Heiberger.
Guthrie	Guthrie	1,077	24	34.2	-1.5	60	17	0	30	34	3.26	+1.83	2.05	7.2	8	11	9	10	nw.	C. T. Harney.
Harlan	Shelby	1,182	20	32.8	-1.6	68	16	-4	30	41	3.70	+2.51	1.90	17.0	8	20	9	10	n.	E. L. Tilton.
Independence	Buchanan	921	55	33.5	-1.0	58	10	4	30	31	3.93	+2.55	1.87	7.0	5	16	3	11	n.	Dr. H. A. Lindsay.
Iowa City	Johnson	683	58	35.3	+0.4	58	10	7	30	31	3.84	+1.58	1.49	1.5	7	13	6	11	nw.	Prof. J. F. Reilly.
Iowa Falls	Hardin	1,107	26	32.2	-0.4	58	10	2	30	33	3.72	+2.18	1.52	10.2	7	12	3	15	nw.	J. B. Parmelee.
Jefferson	Greene	1,052	20	32.2	-1.8	57	10†	0	30	35	3.52		2.07	6.7	7	11	8	11	sw.	Will I. Lyon.
LeClaire	Scott	576	19								3.06	+1.11	1.27	0.8	8				nw.	Margaret T. Disney.
Little Sioux	Harrison	1,040	14	33.7	-2.1	60	17	-4	30	43	2.72		1.25	8.5	8	10	9	11	se.	Geo. H. Gibson.
Logan	Harrison	928	52	34.2	-1.5	58	16†	-2	30	40	2.72	+1.45	1.25	9.0	7	12	8	10	nw.	Mary Jean Stern.
Maquoketa	Jackson	688	18	35.0	-1.3	58	10	9	13	29	3.64	+2.19	1.25	2.2	7	11	7	12	nw.	Ira H. Stephens.
Marshalltown	Marshall	947	27	34.6	0.0	58	10	2	30	35	3.42	+1.95	1.93	6.2	6	15	1	14	nw.	Chas. F. W. Kothenbeutel.
Monroe	Jasper	922	7	36.2		58	3†	4	30	33	4.73		2.15	5.9	7	13	3	14	sw.	J. A. Dibel.
Muscatine	Muscatine	554	59								3.43	+1.07	1.51	0.3	7				nw.	Wm. P. Molis.
Olin	Jones	760	21	33.8	-1.3	54	3	8	30	29	4.18	+2.72	1.40	1.0	5	11	9	10	nw.	Dr. F. W. Port.
Onawa	Monona	1,051	19	32.8		59	2	-2	30	35	3.25	+2.02	2.10	10.0	8	15	4	11	s.	Mrs. H. E. Colby.
Perry	Dallas	975	18	33.5	-2.0	57	17†	-2	30	40	3.67	+2.05	1.62	6.0	7	15	4	11	w.	Mrs. C. E. Anthony.
Rockwell City	Calhoun	1,134	23	32.0	-2.4	56	2	-2	30	32	2.77	+1.19	1.60	5.0	9	7	8	15	nw.	A. W. McIsaac.
Sac City	Sac	1,344	43	31.0	-2.9	57														

Climatological Data for November, 1919—Continued.

Stations.	Counties.	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inches.				Number of Days			Observers.			
				Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation .01 in. or more.	Clear.		Partly cloudy.	Cloudy.	Prevailing direction of wind.
Southern Division																				
Afton	Union	1,212	25														J. E. Deltrick.			
Albia	Monroe	959	21	35.9	-0.9	59	10†	5	30	32	4.02	+2.32	1.66	2.0	6	6	2	22	nw.	F. H. Holmes.
Allerton	Wayne	1,122	17																	Keith Burns.
Atlantic	Cass	1,164	28	34.2	-1.4	59	2	1	30	32	3.36	+2.14	2.10	8.5	8	4	10	16	nw.	Thos. H. Whitney.
Bedford	Taylor	19	36.2	-0.4	62	15	1	30	42	4.35	+2.93	1.67		4.5	7	12	8	10	nw.	E. E. Healy.
Bloomfield	Davis	881	12	37.4		59	10†	7	30	35	3.56	+1.70	1.16	3.0	6	7	12	11	se.	V. G. Warner.
Bonaparte	Van Buren	565	28	37.4	-0.8	60	17	10	30	30	3.45	+1.62	1.15	0.6	9	17	3	10	e.	Bruce R. Vale.
Burlington	Des Moines	544	23	38.8	+0.6	60	17	12	13†	27	3.42	+1.53	1.30	2.0	9	19	1	10	sw.	Mrs. Edna M. Donnelly.
Centerville	Appanoose	1,013	14	37.1		60	10	6	29†	33	2.84		1.15	1.3	7	15	3	12	se.	Leo J. Allen.
Chariton	Lucas	1,042	24	37.5	+0.4	58	1†	5	30	42	3.26	+1.79	1.30	3.0	5	10	10	10	se.	C. C. Burr.
Clarinda	Page	1,009	29	37.2	+1.2	60	24	3	30	35	3.98	+2.54	1.61	7.0	6	12	8	10	nw.	A. S. Van Sandt.
Columbus Jet.	Louisa	535	18	37.2	-0.3	58	10	19	30	27	2.57	+0.71	1.10	0.7	6	18	3	9	nw.	J. B. Johnston.
Corning	Adams	1,117	27	36.3	+0.6	60	17†	2	30	36	3.93	+2.56	2.25	6.0	5	14	1	15	sw.	Jerome Smith.
Corydon	Wayne	1,101	26	36.6	-1.6	60	24	3	30	33	3.39	+1.95	1.11	2.0	8	9	11	10	nw.	May C. Miller.
Creston	Union	1,312	14	37.2	+2.0	68	1	1	30	46	4.47		1.65	8.0	6	3	11	16	nw.	Mrs. T. E. McConnell.
Cumberland	Cass		20								2.54	+1.49	1.42	6.0	5	16	4	10	sw.	J. H. Reppert.
Earlham	Madison	1,126	17	35.2	-0.4	60	17	0	30	40	4.39	+2.73	1.65	6.0	7	14	4	12	nw.	Geo. Phillips.
Fairfield	Jefferson	780	35	37.1 ^d	-0.8	61 ^c	5	9 ^d	30	38 ^d	4.55	+1.29	1.17	2.1	8	16	3	11	w.	Prof. R. M. McKenzie.
Glenwood	Mills	1,100	22	36.4		62	24	2	30	32	3.75		2.35	11.0	6	11	8	11	nw.	Dr. Geo. Mogridge.
Greenfield	Adair		27																	Frank A. Ward.
Indianola	Warren	969	27	35.8 ^a	-1.3	58 ^a	10	2 ^a	30	32 ^a	6.22	+4.74	2.50	3.5	7	13	2	15	se.	Prof. J. L. Tilton.
Keokuk	Lee	614	18	39.3	-0.1	60	10	13	30	30	2.53	+0.68	1.25	1.6	9	12	7	11	nw.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	27	37.2	0.0	59	10†	30	30	32	3.80	+2.23	1.64	1.5	10	7	8	15	se.	J. H. Landes.
Knoxville	Marion	920	24	36.0	-1.9	60	17	4	30	35	4.36	+2.84	1.40		7	10	5	15	nw.	W. J. Casey.
Lacona	Warren		20								2.75	+1.06	1.98	4.5	6	7	13	10	nw.	J. B. Alter.
Lamoni	Decatur	1,100	12	37.2	-0.7	68	3	4	30	40	3.56		1.44	1.0	8	13	8	9	s.	Ed. D. Moore.
Lenox	Taylor	1,250	26	36.2	-0.3	59	2†	0	30	37	3.81	+2.41	1.73	5.0	6	14	8	8	s.	J. L. Hurley.
Mount Ayr	Ringgold	1,236	26	36.8	-1.1	60	17†	3	30	35	3.51	+1.99	1.83	4.5	7	15	4	11	nw.	Alex. Maxwell.
Mt. Pleasant	Henry	729	38	37.4	-0.4	66	1	10	13†	39	4.08	+2.29	1.32	3.6	9	12	6	12	nw.	John H. Jericho.
Murray	Clarke	1,215	28	36.2	-0.7	60	2†	3	30	34	3.73	+2.42	1.79	4.0	6	9	10	11	sw.	M. T. Ashley.
Northboro	Page	1,046	5																	J. M. Darby.
Oakland	Pottawattamie		43	36.6		59	24	-1	30	33	3.29		2.10	9.4	5	13	6	11	n.	M. E. Gray.
Oskaloosa	Mahaska	825	43	36.1	-0.7	58	10	6	30	31	5.27	+3.72	1.87	4.3	8	13	6	11	nw.	Roy R. Robinson.
Ottumwa	Wapello	849	24	35.4		59	10	9	13†	39	3.95	+2.62	2.20		6	13	2	15	se.	Eugene O. Field.
Pella	Marion	877	26	36.4	-1.0	59	3†	4	14	34	2.87	+1.19	1.12	3.7	7	14	2	14	s.	J. H. Ver Steeg.
Sigourney	Keokuk	877	23	35.8	-1.1	58	10	7	30	32	3.63	+1.96	1.33	1.8	7	16	3	11	nw.	W. E. Utterback.
Stockport	Van Buren	754	17	36.2	-1.3	60	17	9	30	32	3.60	+1.93	1.06	1.3	9	15	5	10	s.	C. L. Beswick.
Thurman	Fremont		22	34.7	-2.1	61	17†	2	30	36	4.94	+3.33	3.85	5.5	7	8	12	10	nw.	C. R. Paul.
Washington	Washington	769	37	35.8	-1.4	57	3	8	30	28	3.64	+1.97	1.31	2.0	8	12	9	9	sw.	Wm. A. Cook.
Winterset	Madison	1,129	28	35.6	-1.0	61	17	1	30	34	2.34	+0.85	1.02	7.0	5	21	2	7	w.	H. S. Ely.
Omaha, Nebr.		1,040	48	36.0	-1.7	62	24	4	30	40	2.84	+1.78	1.42	11.8	9	8	10	12	nw.	U. S. Weather Bureau.
Means and extremes				36.5	-0.6	68	1†	-2	30	46	3.66	+2.08	3.85	4.3	7	12	7	11	nw.	
State means and extremes				33.6	-1.4	68	1†	-12	13	46	3.40	+1.89	3.85	6.3	8	11	7	12	nw.	

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means.
 Reference letters ^a, ^b, ^c, appearing in the table indicate the number of days missing; for example, ^b represents two days, etc.
 †Also other dates. ††Received too late to be included in means and summaries.
 T. Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations.	Barometric Pressure Inches (Sea Level).				Relative Humidity (%).			Wind.				Sunshine					
	Mean.	Highest.	Date.	Lowest.	Date.	Mean.		Total movement.	Average hourly velocity.		Miles.	From.	Date.	Per cent of possible.	Departure from normal.		
						7 a. m.	Noon.		7 p. m.	Lowest.							
Charles City	30.10	30.65	27	29.25	29	89	68	76	54	5	5,899	8.2	36	sw.	10	36	-18
Davenport	30.11	30.57	27	29.14	29	85	63	68	36	15	6,497	9.0	40	sw.	10	52	0
Des Moines	30.09	30.61	27	29.32	29	80	65	64	40	14	5,652	7.8	48	sw.	10	50	-6
Dubuque	30.12	30.62	27	29.09	29	81	64	68	36	18	5,554	7.7	33	sw.	10	49	+1
Keokuk	30.13	30.58	27	29.25	29	79	58	64	38	20	6,460	9.0	63	sw.	10	56	+5
Sioux City	30.13	30.74	27	29.19	10	83	72	76	36	1	8,066	11.1	52	w.	10	41	-21
Omaha, Neb.	30.12	30.67	27	29.33	10	77	60	66	41	3	6,748	9.4	32	nw.	11	48	-8
Means and extremes	30.11					82	64	69				8.9				47	-7
		30.74	27	29.09	29				36	†			63	sw.	10		
Normals and records	30.07		2 ^d		28 th	81		70		6 th		8.2			10 th	54	
		*30.96	1896	‡29.03	1918				†16	1916		†63	sw.	1919			

*Sioux City. †Davenport. ‡Omaha. †Local mean time. †Keokuk. †And other dates.

RIVERS.

Heavy rains, 9th-10th, caused sharp rises in the Mississippi and the interior rivers of the State, amounting to 5 to 7 feet in the latter. At Ottumwa, on the Des Moines river, the crest stage, 8.8 feet, is within 1.2 feet of the flood stage.

ERRATA.

Report for October, 1919: Page 120; Charles City; minimum temperature on the 22d published 39, should be 35; mean minimum published 39.1, should be 39.0.

Daily Maximum and Minimum Temperatures for Month of November, 1919.

Table with columns for Stations, days 1-30, and Mean. Rows are categorized into Northern Division (e.g., Algona, Alta, Alton) and Southern Division (e.g., Albia, Allerton, Atlantic). Each station entry includes maximum and minimum temperature values for each day.

a, b, c, etc., indicates respectively 1, 2, 3, etc., days missing from record. §§Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

Revised Acreage of Iowa Crops, 1919, by Counties.

	Corn	Oats	Spring Wheat	Winter Wheat	Barley	Rye	Flax	Potatoes	Tame Hay	Wild Hay	Alfalfa	Pastures
Adair.....	117,100	42,600	10,000	14,200	5,020	140		810	20,800	1,670	110	121,300
Adams.....	77,300	26,900	4,700	21,900	1,320	150		500	20,100	1,770	420	101,100
Allamakee.....	43,000	40,000	7,300	1,200	6,200	500	50	1,270	52,700	1,230	20	179,100
Appanoose.....	50,000	25,500	2,800	17,600	30	800		350	41,300	840	50	131,700
Audubon.....	119,000	85,800	8,800	4,200	8,000	20		820	22,200	1,490	1,200	84,800
Benton.....	143,100	66,400	6,200	1,800	7,440	1,110		1,030	39,400	2,030	110	119,100
Black Hawk.....	105,500	70,500	3,600	1,000	5,490	3,300	20	1,620	22,600	8,020	60	95,000
Boone.....	131,100	78,400	5,000	2,100	1,170	80	100	450	26,800	7,270	300	85,600
Bremer.....	65,700	53,400	3,800	200	1,980	1,100	20	1,470	20,200	20,360	70	79,000
Buchanan.....	100,300	70,600	4,500	200	4,760	1,540	10	1,070	28,800	12,000	40	115,700
Buena Vista.....	125,400	95,100	2,800	300	1,050	410	60	1,130	22,900	7,160	700	78,100
Butler.....	103,300	81,800	3,800	50	1,730	1,230	10	1,520	27,400	10,600	20	92,000
Calhoun.....	146,200	101,200	2,100	600	810	70	20	540	20,900	3,090	260	56,600
Carroll.....	117,100	66,400	10,800	2,700	2,160	30		1,840	30,500	6,480	360	83,100
Cass.....	126,700	43,700	13,500	27,200	9,520	360		970	24,800	890	600	104,300
Cedar.....	108,900	40,500	4,600	8,100	10,300	670		860	45,700	130	110	107,800
Cerro Gordo.....	88,800	76,800	6,100	50	3,540	100	200	1,420	30,500	8,300	140	84,200
Cherokee.....	128,600	83,800	1,400	300	2,400	50	10	1,190	27,000	7,900	2,730	84,700
Chickasaw.....	63,000	61,000	6,600	50	2,820	510	350	1,350	33,000	13,400		90,500
Clarke.....	60,400	23,200	1,800	19,800	160	170		220	28,700	80	120	113,100
Clay.....	111,300	83,400	1,400	200	1,750	150		910	23,500	11,400	520	77,800
Clayton.....	74,400	62,400	8,400	2,000	9,800	680		2,040	66,700	1,150	60	184,700
Clinton.....	110,200	48,300	8,500	5,300	10,280	2,090		960	55,800	1,450	120	160,400
Crawford.....	140,400	64,500	31,300	1,600	3,140	2,200		1,530	46,100	4,940	5,100	122,200
Dallas.....	126,000	60,200	5,500	28,600	820	200		370	20,800	1,900	600	91,300
Davis.....	59,800	39,400	2,300	10,200	120	1,340		530	51,100	30	50	156,900
Decatur.....	72,200	34,000	1,600	28,200	40	1,330		840	33,600	220	170	132,800
Delaware.....	86,500	58,000	5,100	500	9,000	2,210		1,120	40,000	5,800	40	117,300
Des Moines.....	66,900	28,300	1,500	19,500	380	3,730		1,000	25,400	30	320	83,800
Dickinson.....	64,900	50,700	4,000		1,850	1,100	750	610	13,700	11,630	220	52,200
Dubuque.....	67,500	49,800	7,300	600	5,140	280		2,370	59,400	600	70	152,200
Emmet.....	59,500	58,000	1,500		2,040	400	730	580	16,400	5,200	130	55,700
Fayette.....	92,100	76,100	5,500	500	7,770	480	80	1,630	59,800	11,000	20	155,900
Floyd.....	79,700	74,300	7,000	50	2,950	910	430	1,720	34,100	4,260	60	75,200
Franklin.....	114,200	84,800	2,400	100	3,340	250	70	1,680	32,900	7,680	20	85,900
Fremont.....	123,100	14,700	3,900	43,200	320	580		460	9,600	2,550	9,650	69,200
Greene.....	144,000	74,500	5,300	2,800	850	50	20	500	23,900	4,240	70	82,800
Grundy.....	105,600	78,000	3,400	1,200	3,250	40	20	2,060	23,200	7,230	20	65,300
Guthrie.....	114,600	48,800	9,200	7,100	1,490	130		450	28,400	3,320	300	114,400
Hamilton.....	135,000	88,500	4,200	600	1,550	50	30	1,160	22,700	4,890	160	75,200
Hancock.....	98,900	89,300	5,300	100	3,400	200	400	1,500	26,600	21,260	110	79,400
Hardin.....	109,700	75,600	2,800	300	3,380	90	30	970	28,600	4,800	120	78,200
Harrison.....	142,500	49,000	37,400	14,500	1,990	1,340		1,040	9,000	6,480	16,450	93,900
Henry.....	69,400	32,800	1,600	11,100	210	330		380	29,600		70	102,100
Howard.....	47,200	60,500	5,500	150	4,900	480	1,500	1,080	35,200	11,780	10	79,700
Humboldt.....	91,100	68,200	4,000	400	2,720	1,400	40	540	19,400	5,560	210	45,800
Ida.....	86,100	54,800	5,400	100	2,920	50	30	1,370	24,500	1,740	1,880	59,400
Iowa.....	97,900	45,300	6,300	5,000	2,860	540		1,370	38,000	430	20	119,600
Jackson.....	65,800	34,000	7,800	1,600	3,390	320		1,440	60,200	1,480	80	193,000
Jasper.....	146,600	65,900	18,200	10,800	1,020	920		720	37,000	640	110	143,600
Jefferson.....	66,600	30,600	1,500	10,500	110	960		600	38,200		50	101,200
Johnson.....	104,000	46,200	4,200	6,400	1,640	1,790		1,440	43,800	560	100	131,500
Jones.....	76,500	42,400	3,100	600	6,770	890		1,080	48,500	180	60	141,700
Keokuk.....	111,600	39,800	10,900	8,500	270	400		820	41,100	10	40	127,000
Kossuth.....	174,400	153,300	7,400	200	4,720	290	2,790	2,830	36,200	27,480	270	120,100
Lee.....	58,200	24,000	1,900	18,100	430	10,000		1,330	34,800	30	250	135,100
Linn.....	122,300	66,500	7,600	1,500	3,280	1,140		1,970	47,600	2,800	160	126,000
Louisia.....	64,400	26,600	7,800	22,000	330	2,540		860	19,500	180	110	78,000
Lucas.....	56,700	27,700	2,700	24,250	90	230		200	27,200	70	70	121,200
Lyon.....	132,800	100,000	5,900	200	5,980	60	40	2,330	18,800	8,730	3,000	63,400
Madison.....	87,700	28,400	4,200	38,100	3,060	330		530	21,900	1,230	220	142,200
Mahaska.....	113,900	44,100	9,000	14,600	520	850		590	34,100	220	120	122,000
Marion.....	90,400	34,400	9,700	29,500	660	340		380	27,900	290	120	135,100
Marshall.....	111,700	69,800	8,900	4,700	780	170		830	32,400	300	20	88,600
Mills.....	107,300	19,300	8,900	26,600	1,050	320		1,160	9,500	3,720	10,400	79,000
Mitchell.....	60,700	86,200	7,100	100	2,650	90	1,200	5,150	31,300	3,520		74,200
Monona.....	130,500	27,900	43,700	21,000	1,260	200	30	3,000	9,600	9,860	14,520	94,000
Montroe.....	41,000	16,100	4,200	19,300	110	690		290	28,600	40	40	130,500
Montgomery.....	93,100	24,100	11,500	33,000	970	670		650	18,200	560	3,810	81,000
Muscatine.....	81,600	23,900	3,900	12,600	4,730	3,870		1,380	25,100	530	400	84,600
O'Brien.....	114,300	86,600	2,800	200	5,890	40	150	1,370	23,700	6,890	1,140	77,000
Osceola.....	82,100	72,300	3,100	100	3,400	30	400	1,180	17,100	6,030	220	44,200
Page.....	103,600	27,000	7,300	56,000	380	860		1,180	24,300	770	4,100	130,500
Palo Alto.....	112,400	80,700	3,300	100	1,260	330	1,250	970	17,100	18,800	120	69,500
Plymouth.....	191,300	91,300	57,000	1,100	4,560	120	20	2,060	24,700	18,600	12,320	116,100
Pocahontas.....	132,100	104,100	2,500	200	1,230	130	30	1,000	21,500	8,090	270	74,600
Polk.....	102,300	45,900	13,500	24,200	120	430		2,700	20,700	3,050	480	97,000
Pottawattamie.....	203,100	50,800	20,700	34,100	11,380	590		2,460	27,400	6,530	17,900	134,700
Poweshiek.....	118,200	54,800	6,700	1,690	2,990	160		840	30,200	80	20	118,800
Ringgold.....	81,000	30,500	1,400	22,200	200	540		270	31,200	30	20	136,400
Sac.....	119,200	84,900	1,500	700	3,140	60	20	960	27,600	4,570	400	75,400
Scott.....	77,500	24,600	7,300	19,000	14,500	2,500		3,470	32,600	1,670	1,000	83,600
Shelby.....	121,400	51,000	12,700	1,500	7,700	40		1,060	30,400	3,510	2,340	107,200
Sioux.....	173,700	90,600	17,500	600	15,300	60	40	2,090	30,300	13,980	6,040	79,400
Story.....	141,000	78,300	3,800	4,000	80	130	60	1,150	24,600	2,740	60	70,200
Tama.....	126,200	78,100	8,800	1,300	8,480	300		2,050	38,600	1,280	60	136,000
Taylor.....	93,300	31,600	1,600	33,090	340	720		550	31,600	770	600	126,000
Union.....	68,900	29,900	1,500	17,800	1,200	2,250		710	18,800	690	40	116,500
Van Buren.....	56,700	26,700	1,200	12,600	80	2,180	10	220	39,300	10	200	132,800
Wapello.....	55,200	22,300	3,200	21,300	300	920		650	29,400		150	97,600
Warren.....	82,600	56,500	7,200	54,400	990	500		430	28,600	640	230	138,400
Washington.....	106,600	47,700	3,400	6,300	390	260		620	39,700	20	60	119,000
Wayne.....	71,900	55,700	2,000	17,700	70	480		140	45,200		80	128,200
Webster.....	151,300	116,400	7,000	500	840	30	20	840	26,500		680	87,200
Winnebago.....	65,800	53,700	12,600	200	4,840	40	1,500	1,640	20,100	18,700	50	60

AVERAGE AND TOTAL YIELDS OF IOWA CROPS, 1919, BY COUNTIES.

Counties	Corn		Oats		Spring Wheat		Winter Wheat		Barley		Rye		Flax Seed		Potatoes		Hay, Tame		Hay, Wild		Alfalfa	
	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Bushels per acre	Total Bushels	Tons per acre	Total Tons	Tons per acre	Total Tons	Tons per acre	Total Tons
Adair	40	4,684,000	33	1,405,800	10	100,000	17	241,400	21	105,420	17	2,380			38	30,780	1.7	35,360	1.2	2,004	2.0	220
Adams	34	2,628,000	37	995,300	9	42,300	16	350,400	31	40,920	16	2,400			36	18,000	1.5	30,150	1.4	2,478	2.5	1,060
Allamakee	50	2,150,000	39	1,560,000	10	73,000	18	21,600	29	179,800	17	8,500	9.5	475	50	63,500	1.7	89,590	1.6	1,968	3.1	62
Appanoose	37	1,850,000	30	765,000	8	22,400	15	264,000	22	660	14	11,200			32	11,200	1.4	57,820	1.6	1,844	3.1	155
Audubon	46	5,474,000	32	1,241,600	11	96,800	16	67,200	30	240,000	17	340			25	20,500	1.6	35,520	1.2	1,788	3.1	3,720
Benton	43	6,153,000	32	3,011,200	15	93,000	23	41,400	24	178,560	17	18,870			30	30,900	1.6	63,040	1.0	2,030	3.1	341
Black Hawk	32	3,376,000	37	2,608,500	15	54,000	17	17,000	29	159,210	19	62,700	9.5	190	40	64,800	2.0	45,200	1.2	9,624	3.1	186
Boone	44	5,768,000	40	3,136,000	12	60,000	15	31,500	30	35,100	19	1,520	9.5	950	36	16,200	1.7	45,560	1.1	7,997	2.0	600
Bremer	36	2,365,000	33	1,762,200	13	49,400	20	4,000	25	49,500	16	17,600	9.5	190	26	38,220	1.8	36,360	1.4	28,504	3.1	217
Buchanan	36	3,611,000	37	2,612,200	16	72,000	18	3,600	30	142,800	19	29,260	9.5	95	36	38,520	1.9	54,720	1.6	19,200	3.1	124
Buena Vista	42	5,267,000	37	3,518,700	9	25,200	16	4,800	27	28,350	17	6,970	9.5	570	40	45,200	1.7	38,980	1.4	10,024	3.0	2,100
Butler	30	3,099,000	29	2,372,200	12	45,600	19	950	25	43,250	15	18,450	9.5	95	30	45,600	1.7	46,580	1.1	11,660	2.5	50
Calhoun	48	7,018,000	42	4,250,400	7	14,700	15	9,000	28	22,680	18	1,260	9.5	190	35	18,900	1.6	33,440	1.1	3,979	3.5	910
Carroll	44	5,152,000	39	2,589,600	8	86,400	16	43,200	30	64,800	15	450			53	97,520	1.7	51,850	1.4	9,392	2.8	1,008
Cass	43	5,448,000	35	1,529,500	9	121,500	17	462,400	27	257,040	17	6,120			30	29,100	1.6	39,680	1.2	1,668	2.3	1,380
Cedar	47	5,118,000	38	1,539,000	13	59,800	22	178,200	23	236,900	19	12,730			32	27,520	2.0	91,400	1.5	1,985	4.0	440
Cerro Gordo	38	3,374,000	30	2,304,000	10	61,000	15	750	21	74,340	17	1,700	10.0	2,000	53	75,260	1.6	48,800	1.2	9,960	3.1	434
Cherokee	50	6,430,000	38	3,184,400	8	11,200	10	3,000	29	69,600	17	850	9.5	95	52	61,880	2.1	56,700	1.5	11,550	2.5	6,825
Chickasaw	35	2,205,000	26	1,586,000	9	59,400	14	700	19	53,580	16	8,160	9.5	3,325	20	27,000	1.5	49,500	1.4	18,760	3.0	---
Clarke	33	1,993,000	28	649,600	8	14,400	16	816,800	20	3,200	18	3,060			30	6,600	1.3	37,310	1.5	120	3.0	360
Clay	42	4,675,000	37	3,085,800	7	9,800	13	2,600	26	45,500	17	2,550	9.5	3,610	38	34,580	1.5	35,250	1.2	13,680	3.1	1,612
Clayton	48	3,571,000	35	2,184,000	16	134,400	22	44,000	26	254,800	18	12,240			38	77,520	2.0	133,400	1.5	1,725	3.1	186
Clinton	47	5,179,000	35	1,690,500	12	102,000	23	121,900	25	257,000	19	39,710			34	31,620	1.5	83,700	1.2	1,740	3.0	360
Crawford	42	5,897,000	34	2,193,000	8	250,400	16	25,600	27	84,780	18	3,960			56	85,680	1.8	82,980	1.5	7,410	2.9	14,790
Dallas	48	6,048,000	37	2,227,400	10	55,000	19	543,400	20	16,400	18	3,600			36	13,320	1.8	37,440	1.2	2,280	3.3	1,980
Davis	37	2,213,000	33	1,300,200	6	13,800	16	163,200	18	2,160	14	18,760			44	23,320	1.6	81,760	1.6	48	1.8	90
Decatur	33	2,883,000	26	884,000	5	8,000	16	451,200	18	720	12	15,960			44	36,960	1.2	40,320	1.0	220	3.5	595
Delaware	44	3,806,000	31	1,798,000	14	71,400	19	9,500	23	207,000	15	33,150			27	30,240	1.7	68,000	1.2	6,960	3.1	124
Des Moines	46	3,077,000	28	792,400	11	16,500	19	370,500	19	7,220	16	59,680			52	52,000	1.4	35,560	2.0	60	4.0	1,280
Dickinson	40	2,596,000	33	1,673,100	8	32,000	16	46,250	16	46,250	16	1,600	10.0	7,500	50	30,500	1.6	21,920	1.1	12,793	3.5	770
Dubuque	48	3,240,000	29	1,444,200	14	102,200	18	10,800	20	102,800	19	5,320			40	94,800	1.6	95,040	0.8	480	3.0	210
Emmet	32	1,904,000	35	2,030,000	8	12,000	16	44,880	15	6,000	10.0	7,300	34	7,300	34	19,720	1.4	22,960	1.0	5,200	3.0	390
Fayette	41	4,052,000	35	2,663,500	9	49,500	20	10,000	27	209,790	18	8,640	9.5	760	42	68,460	2.0	119,600	1.1	12,100	3.1	62
Floyd	38	3,029,000	29	2,154,700	11	77,000	15	750	23	67,850	15	13,650	9.5	4,085	40	68,800	1.5	51,150	1.5	6,390	3.1	186
Franklin	33	3,769,000	33	2,798,400	12	28,800	15	1,500	24	80,160	15	3,750	9.5	665	30	50,400	1.6	52,640	1.1	8,448	3.1	62
Fremont	42	5,170,000	34	499,800	9	35,100	17	734,400	29	9,280	19	11,020			47	21,620	1.7	16,320	2.0	5,100	3.2	30,880
Greene	43	6,192,000	38	2,831,000	8	42,400	14	39,200	30	25,500	18	900	9.5	190	28	14,000	1.4	33,460	1.2	5,688	2.0	140
Grundy	38	4,013,000	34	2,652,000	12	40,800	20	24,000	28	91,000	21	840			42	86,520	1.5	34,800	1.0	7,230	3.1	62
Guthrie	39	4,469,000	34	1,659,200	11	101,200	19	134,900	29	43,200	20	2,600			32	14,400	1.7	48,280	1.5	4,980	2.5	750
Hamilton	45	6,045,000	41	3,628,500	12	50,400	13	7,800	24	37,200	18	900	9.5	285	55	63,800	2.1	47,670	1.2	5,868	3.1	496
Hancock	37	3,659,000	35	3,125,500	9	47,700	12	1,200	25	85,000	14	2,800	8.0	3,200	53	79,500	1.5	39,900	1.0	21,260	3.5	385
Hardin	41	4,498,000	35	2,646,000	10	28,000	17	5,100	27	91,260	15	1,350	9.5	285	35	33,950	1.5	42,900	1.0	4,800	3.1	372
Harrison	39	5,557,000	34	1,666,000	9	336,600	16	232,000	27	53,730	19	6,460			50	52,000	1.8	16,200	1.3	8,424	2.8	46,060
Henry	42	2,915,000	33	1,082,400	10	16,000	18	199,800	25	5,250	12	15,960			52	19,760	1.7	50,320	1.0	11,780	3.1	31
Howard	39	1,841,000	25	1,512,500	10	55,000	20	3,000	26	127,400	19	9,120	10.0	15,000	40	43,200	1.5	52,800	1.0	5,004	3.3	692
Howard	40	3,644,000	38	2,591,600	9	36,000	15	6,000	28	76,160	20	2,900	9.5	380	51	27,540	1.7	32,980	0.9	5,004	3.3	692
Humboldt	46	3,961,000	40	2,192,000	6	32,400	14	1,400	26	75,920	18	900	9.5	285	50	68,500	1.8	44,100	1.3	2,262	2.8	5,264
Iowa	46	4,503,000	35	1,585,500	12	75,600	21	105,000	27	77,220	15	8,100			39	53,430	2.0	76,000	1.6	688	3.1	62
Jackson	42	2,895,000	36	1,224,000	12	93,600	18	28,800	26	88,140	16	14,720			45	64,800	2.0	120,400	1.6	2,368	4.0	320
Jasper	42	6,157,000	32	2,108,800	9	163,800	18	194,400	26	26,520	16	5,120			27	19,440	1.7	62,900	1.3	832	2.8	308
Jefferson	35	2,331,000	27	826,200	6	9,000	16	168,000	18	1,980	11	10,560			50	30,000	1.5	57,300	1.6	---	3.1	155
Johnson	45	4,680,000	37	1,709,400	15	63,000	21	134,400	26	42,640	14	25,060			40	57,600	1.7	74,460	1.6	896	3.0	300
Jones	43	3,442,000	32	1,356,800	16	49,600	22	13,200	25	169,250	13	5,070			40	43,200	2.0	97,000	1.0	180	4.0	240
Keokuk	43	4,799,000	34	1,353,200	9	98,100	17	144,500	25	6,750	15	7,350			50	41,000	1.9	78,090	1.6	16	4.8	192
Kossuth	39	6,802,000	34	5,212,200	9	66,600	10	2,000	25	118,000	16	4,640	10.0	27,900	50	141,500	1.3	47,060	1.0	27,480	2.0	540
Lee	36	2,095,000	32	2,095,000	10	19,000	19	343,900	22	9,460	15	150,000			60	79,800	1.7	59,160	1.6	48	3.8	950
Lee	46	5,626,000	36	2,394,000	15	114,000	20	30,000	25	82,000	19	21,660			45	88,650	1.6	76,160	1.2	3,360	3.5	

FINAL CROP REPORT OF THE STATE, 1919.

Beginning with this, the final crop report for 1919, the Iowa Weather and Crop Service as a State organization and the U. S. Bureau of Crop Estimates as a Federal organization working in Iowa have combined all data to make one harmonized report of acreage and yield. This has necessitated a revision of the county and total acreages of some of the crops published by the Iowa Weather and Crop Service earlier in the season. The revised acreage table appears on page 133. The prices here quoted were compiled by the Iowa Weather and Crop Service independently. This report does not include or take into consideration live stock, poultry or dairy products.

Corn—The estimated acreage was 10,000,000; average yield, 41.6 bushels per acre; total yield, 416,622,000 bushels; average price, \$1.17 per bushel; total value, \$487,447,000. Only 2 per cent of the crop was reported to be soft or immature and 89 per cent had been husked on December 1. The total bushels of sound corn in Iowa this year are the greatest of record. The quality is generally excellent. Slightly less than 8 per cent of the crop was "hogged down."

Oats—The estimated area harvested was 5,670,000 acres. Average yield, 34.6 bushels; total yield, 196,391,500 bushels; average price, 64 cents; total value \$125,690,560.

Spring Wheat—Area harvested, 750,000 acres; average yield, 9.5 bushels per acre; total yield, 7,145,300 bushels; price per bushel, \$1.89; total value, \$13,504,617.

Winter Wheat—Area harvested, 950,000 acres; average yield per acre, 17.4 bushels; total yield, 16,508,000; average price, \$1.98 per bushel; total value, \$32,687,028.

Barley—Area harvested, 315,000 acres; average yield per acre, 25.5 bushels; total yield, 8,022,800 bushels; average price, \$1.11 per bushel; total value, \$8,905,308.

Rye—Area harvested, 70,000 acres; average yield, 15.9 bushels; total yield, 1,110,050; price per bushel, \$1.33; total value, \$1,476,366.

Flax Seed—Average yield, 9.5 bushels; total yield, 152,275 bushels; total value, at \$3.90 per bushel, \$593,872.

Timothy Seed—Area harvested, 200,000 acres; average yield, 4.5 bushels; total yield, 900,000 bushels; total value, at \$4.91 per bushel, \$4,419,000.

Clover Seed—Area harvested, 60,000 acres; average yield, 1.4 bushels; total value at \$24.92 per bushel, \$2,093,280.

Potatoes—Area harvested, 115,000 acres; average yield, 43 bushels; total yield, 4,942,110 bushels; average price, \$1.94; total value, \$9,587,693.

Hay (Tame)—Average yield, 1.6 tons per acre; total yield, 4,957,370 tons; average price, \$18.37 per ton; total value, \$91,066,887.

Hay (Wild)—Average yield, 1.3 tons; total yield, 631,693 tons; average price, \$16.48; total value, \$10,410,301.

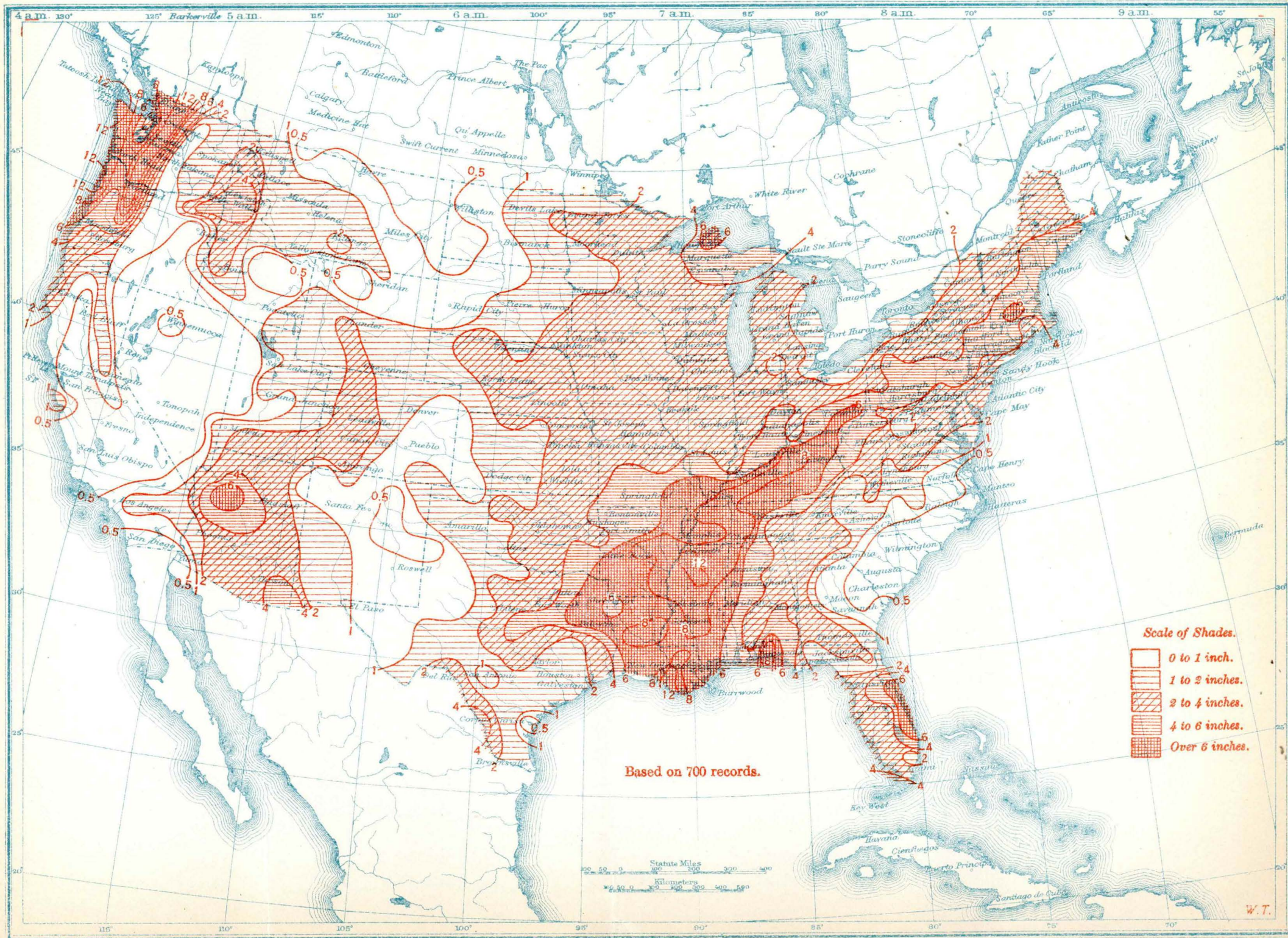
Alfalfa—Area harvested, 148,000 acres; average yield, 3.2 tons; total yield, 477,314 tons; average price, \$23.09 per ton; total value, \$11,021,180.

TABULATED CROP SUMMARY, 1919.

Crop	Acres	Average Yield	Average Price	Total Yield	Total Value
Corn	10,000,000	41.6 Bu.	\$ 1.17	416,622,000	\$ 487,447,740
Oats	5,670,000	34.6 "	.64	196,391,500	125,690,560
Spring wheat	750,000	9.5 "	1.89	7,145,300	13,504,617
Winter wheat	950,000	17.4 "	1.98	16,508,000	32,687,028
Barley	315,000	25.5 "	1.11	8,022,800	8,905,308
Rye	70,000*	15.9 "	1.33	1,110,050	1,476,366
Flax seed	16,000	9.5 "	3.90	152,275	593,872
Timothy seed	200,000	4.5 "	4.91	900,000	4,419,000
Clover seed	60,000	1.4 "	24.92	84,000	2,093,280
Potatoes	115,000	43.0 "	1.94	4,942,110	9,587,693
Hay (tame)	2,992,000	1.6 tons	18.37	4,957,370	91,066,887
Hay (wild)	478,000	1.3 "	16.48	631,693	10,410,301
Alfalfa	148,000	3.2 "	23.09	477,314	11,021,180
Pasture and grazing (estimated)					100,000,000
Ensilage (estimated)					20,000,000
Sweet corn (commercial crop)	40,000	3.0 "	13.50	120,000	1,620,000
Pop corn (estimated)	29,300	24.9 Bu.	3.79	729,570	2,765,070
Buckwheat (estimated)	7,000	14.0 "	1.95	98,000	191,100
Fruit crop (estimated)					7,000,000
Garden truck (estim'd)					8,000,000
Sugar beets for manufacture (estimated)	8,000	8.0 tons	9.00	64,000	576,000
Miscellaneous (estim'd)					11,000,000
Total					\$ 960,056,002

*For grain only; does not include approximately 40,000 acres used for pasture.

Total Precipitation, Inches, November, 1919.



U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

DECEMBER, 1919
AND
Annual Summary for 1919

BY
CHARLES D. REED
METEOROLOGIST



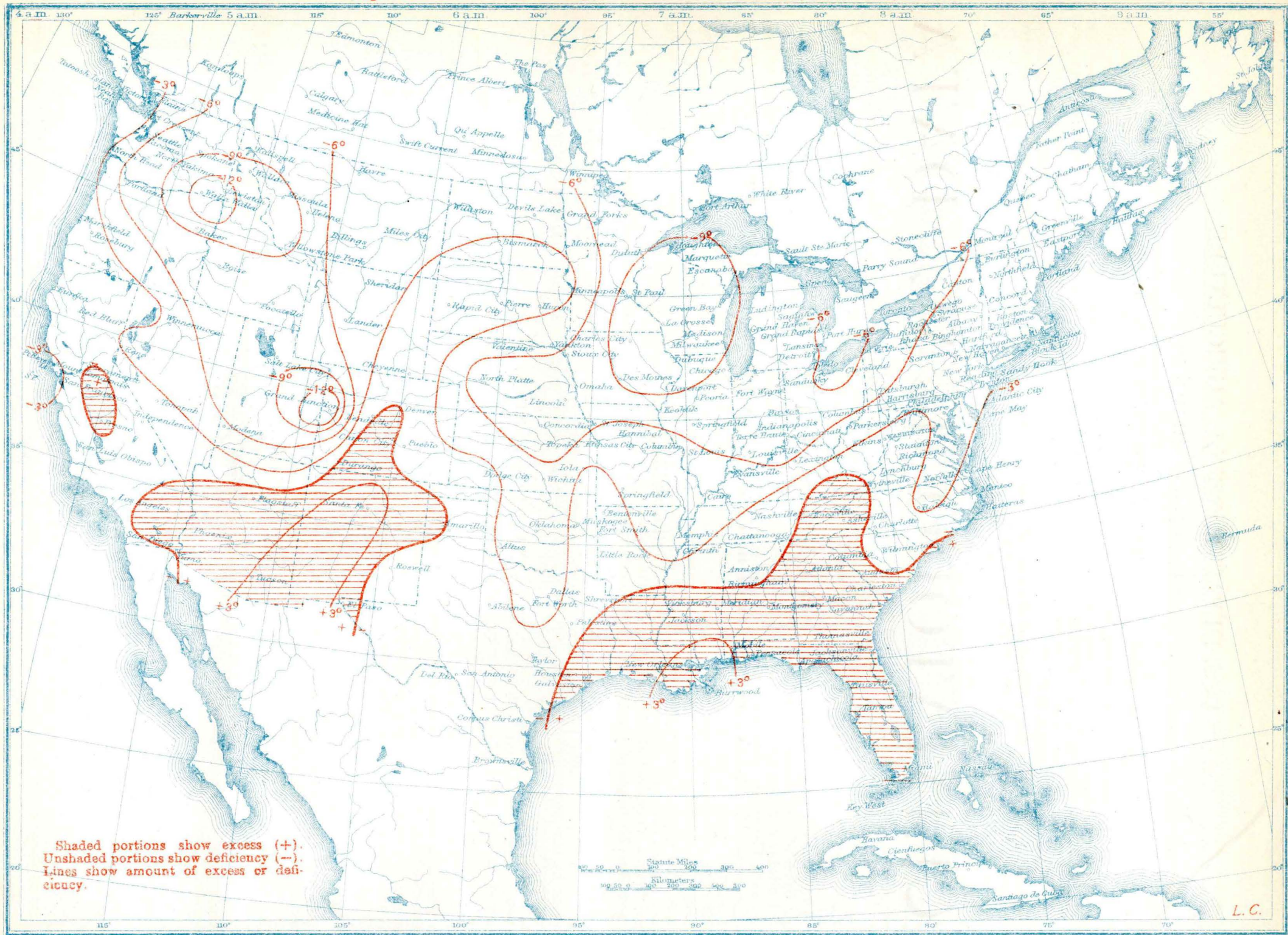
PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE



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Departure of the Mean Temperature from the Normal, December, 1919.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXX Des Moines, Iowa, December, 1919. No. 12

GENERAL SUMMARY

Wintry weather was the outstanding feature. Though not the coldest December for the State as a whole, stations in the eastern half, having records that began since 1876, established new records for low mean temperature. The first three weeks of the month were colder than any other similar period of record. A well-defined cold wave occurred on the 12th-13th and another was sweeping southward across the State on the 31st. December 10th was severely cold. In the morning of that date local areas in Hardin, Grundy, Poweshiek, Dallas, Fremont and Taylor counties experienced temperatures of 30° below zero or lower, which have never before been recorded so early in the winter.

Precipitation, mainly snow, was general on the 1st, and 6th-9th, and scattered on a few other dates. It was well distributed, but below normal, at all stations except Earlham. Under the snow covering, the ground froze but a few inches and where the snow was a foot or more deep it scarcely froze at all, in spite of the low temperature. The snow covering was continuous throughout the State, except the southern tier of counties and along the Mississippi river south of Davenport, where the ground became bare toward the close of the month. From Pottawattamie and Shelby counties east-northeast over Polk county, from 12 to 20 inches of snow lay on the ground from the 9th to the 20th.

Grasses and winter grains were well protected during the severe temperatures. Drifting snow delayed transportation by rail and automobile during the first half of the month. During the last week the snow melted rapidly. Live stock were permitted to graze in the cornfields. Corn husking and shelling and fodder shredding were resumed, though shelling and marketing were limited by car shortage, the elevators being filled to capacity.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.22 inches. The highest recorded was 30.98 inches, at Keokuk, on the 10th, and the lowest was 29.56 inches at Davenport on the 12th. The monthly range was 142 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 100 stations, was 15.0°, or 8.9° lower than the normal. By divisions, three tiers of counties to the division, the mean temperatures were as follows: Northern, 12.4° or 8.8° lower than the normal; Central 14.8° or 9.3° lower than the normal; Southern, 17.9°, or 8.5° lower than the normal. The highest monthly mean was 22.3°, at Keokuk, and the lowest monthly mean was 10.1°, at New Hampton. The highest temperature reported was 52° at Lamoni, on the 30th, and the lowest temperature reported was -36°, at Thurman, on the 10th, the range for the State being 88°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 86 per cent, and at 7 p. m. it was 81 per cent. The mean for the month was 84 per cent, or about 3 per cent above normal. The highest monthly mean was 90 per cent, at Charles City, and the lowest mean was 74 per cent, at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 109 stations, was 0.54 inch, or 0.68 inch less than the normal. By divisions, the averages were as follows: Northern, 0.46 inch, or 0.61 inch less than the normal; Central, 0.58 inch, or 0.67 inch less than the normal; Southern, 0.58 inch, or 0.77 inch less than normal. The greatest amount, 1.55 inches, occurred at Earlham, and the least, 0.08 inch, at Albia. The greatest amount in any 24 consecutive hours, 0.70 inch, occurred at Waverly, on the 9th.

SNOW

The average snowfall for the State was 5.8 inches, or 0.4 inch below normal. The greatest amount, 18.0 inches, occurred at Earlham, and the least, 0.5 inch, at Keokuk.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity was at the rate of 36 miles an hour from the northwest, at Sioux City, on the 12th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 40 per cent, or about 8 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 33; Davenport, 38; Des Moines, 37; Dubuque, 38; Keokuk, 38; Sioux City, 47; and Omaha, Neb., 47 per cent. The average number of clear days was 11; partly cloudy, 7; cloudy, 13.

MISCELLANEOUS PHENOMENA

Aurora: 29th.

Fog; dense: 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 28th.

Halos, lunar and solar: 1st, 5th, 7th, 9th, 10th, 11th, 12th, 16th, 29th, 30th.

Sleet: 5th, 6th, 9th, 19th, 28th.

COMPARATIVE DATA FOR THE STATE—DECEMBER

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more.	Clear	Partly cloudy	Cloudy
1890.....	29.1	+5.2	72	-18	0.45	-0.77	1.40	0.00	.....	3	17	7	7
1891.....	32.3	+8.4	72	-14	2.41	+1.19	4.50	1.21	.....	8	14	9	8
1892.....	18.9	-5.0	68	-29	1.65	+0.43	3.04	0.20	10.9	6	9	8	14
1893.....	22.0	-1.9	70	-21	1.31	+0.09	2.80	0.46	7.6	7	10	9	12
1894.....	30.1	+6.2	73	-17	0.95	-0.27	1.75	0.25	1.3	3	15	6	10
1895.....	25.4	+1.5	63	-16	1.63	+0.41	5.74	0.00	4.1	5	11	9	11
1896.....	30.8	+6.9	70	-10	0.65	-0.57	1.79	T.	1.6	4	10	8	13
1897.....	18.0	-5.9	60	-25	1.65	+0.43	3.22	0.61	15.9	6	11	7	13
1898.....	18.1	-5.8	60	-25	0.48	-0.74	1.70	T.	3.9	3	15	8	13
1899.....	22.6	-1.3	75	-19	1.61	+0.39	4.28	0.10	4.3	5	12	9	10
1900.....	26.9	+3.0	63	-10	0.45	-0.77	2.70	T.	2.4	4	13	6	12
1901.....	20.5	-3.4	64	-31	0.93	-0.29	2.75	0.05	5.4	6	10	9	12
1902.....	20.1	-3.8	59	-20	2.23	+1.01	5.51	0.67	12.9	8	9	6	16
1903.....	19.6	-4.3	58	-27	0.41	-0.81	1.96	T.	3.7	4	11	9	11
1904.....	23.4	-0.5	67	-19	1.44	+0.22	3.68	0.06	12.3	5	12	7	12
1905.....	27.0	+3.1	62	-11	0.52	-0.70	1.69	T.	4.2	3	19	6	6
1906.....	25.7	+1.8	65	-9	1.43	+0.21	2.81	0.37	1.4	6	11	7	13
1907.....	28.8	+4.9	62	-9	1.00	-0.22	2.28	0.05	4.7	5	10	7	14
1908.....	27.2	+3.3	67	-17	0.67	-0.65	2.07	0.05	3.8	3	15	8	8
1909.....	15.1	-8.8	60	-26	2.18	+0.96	6.10	0.89	13.7	11	10	5	16
1910.....	23.4	-0.5	57	-14	0.37	-0.85	1.39	0.01	3.0	3	15	7	9
1911.....	27.9	+4.0	60	-24	2.57	+1.35	4.43	0.62	12.6	7	13	6	12
1912.....	29.2	+5.3	64	-13	0.74	-0.48	1.75	0.10	1.1	3	18	7	6
1913.....	32.0	+8.1	65	-13	1.02	-0.20	4.73	0.00	1.3	4	15	5	11
1914.....	15.7	-8.2	63	-31	1.30	+0.80	2.24	0.57	11.1	9	10	6	15
1915.....	25.0	+1.1	56	-10	0.69	-0.53	1.70	T.	4.6	5	11	8	12
1916.....	18.7	-5.2	67	-25	1.04	-0.18	2.00	0.35	6.7	6	15	8	8
1917.....	14.5	-9.4	62	-40	0.56	-0.66	1.70	0.14	6.7	6	10	9	12
1918.....	32.7	+8.8	68	-7	1.30	+0.08	3.30	0.37	5.1	8	9	8	14
1919.....	15.0	-8.9	52	-36	0.54	-0.68	1.55	0.08	5.8	4	11	7	13

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

CLIMATOLOGICAL DATA FOR DECEMBER, 1919.

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation in in.				No. of Days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from Normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from Normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation .01 inch or more	Clear			Partly cloudy	Cloudy
<i>Northern Division</i>																				
Algona	Kossuth	1213	46	12.0	-9.3	40	29	-22	10	28	0.28	-0.69	0.16	3.5	4	15	5	11	nw.	W. E. Laird
Allison	Butler	1045	7	11.2	.....	40	29	-27	10	32	0.55	.....	0.20	5.5	5	10	6	15	sw.	J. A. Bell
Alta	Buena Vista	1513	28	13.3	-7.7	42	30	-22	10	29	0.44	-0.51	0.20	4.3	6	13	5	13	nw.	David E. Hadden
Alta (near)	Buena Vista	.....	23	.....	.....	.....	.....	.....	.....	.....	0.28	-0.61	0.18	3.0	2	.....	.....	.....	.....	Warren Minard
Alton	Sioux	1305	14	13.3	-8.0	43	29	-26	10	28	0.40	.....	0.20	4.0	4	13	7	11	s.	W. S. Stagle
Belmond	Wright	1205	9	11.1	.....	40	29	-25	10	28	0.81	.....	0.20	8.2	16	7	10	14	w.	Geo. P. Hardwick
Britt	Hancock	1236	22	10.7	-10.0	39	29	-25	10	29	0.29	-0.54	0.08	2.9	8	9	14	8	n.	L. M. Goodman
Charles City	Floyd	1015	28	10.2	-8.8	40	29	-22	10	31	0.47	-0.81	0.26	4.8	7	6	8	17	nw.	U. S. Weather Bureau
Decorah	Winneschiek	875	26	12.2	-10.0	40	29	-23	10	31	0.85	-0.49	0.36	13.3	6	14	2	15	w.	Wm. F. Baker
Elkader	Clayton	751	40	11.8	-10.0	43	29	-25	3	41	0.83	-0.92	0.30	8.3	4	8	4	19	n.	D. C. Hale
Estherville	Emmet	1298	24	11.8	-8.1	40	29	-17	10	31	0.23	-0.58	0.08	3.0	3	13	15	3	nw.	A. O. Peterson
Fayette	Fayette	1003	29	11.4	-9.5	39	29	-23	3	33	0.85	-0.68	0.38	7.7	6	9	6	16	nw.	R. Z. Latimer
Forest City	Winnebago	1226	25	12.0	-7.6	41	29	-24	10	29	0.36	-0.61	0.07	3.6	11	12	6	13	s.	W. R. Prewitt
Humboldt	Humboldt	1095	31	12.8	-10.4	42	29	-22	10	29	0.28	-0.58	0.17	3.5	3	7	9	15	w.	H. C. Snitkey
Inwood	Lyon	1474	15	13.8	-6.2	43	29	-22	10	30	0.27	-0.41	0.08	2.7	8	17	5	9	nw.	F. B. Hanson
Lansing	Allamakee	632	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Chas R. Serene
Le Mars	Plymouth	1224	23	16.1	-6.4	45	29	-18	10	34	0.92	-0.01	0.24	11.5	5	16	3	12	nw.	C. L. Treney
Mason City	Cerro Gordo	1148	22	.....	.....	.....	.....	.....	.....	.....	0.28	-1.12	0.15	2.8	3	15	7	9	nw.	North. Sugar Corp.
Milford (near)	Dickinson	1430	.....	12.4	.....	42	29	-21	10	28	0.35	.....	0.12	3.5	7	8	14	9	nw.	Dr. F. J. Smith
New Hampton	Chickasaw	1169	22	10.1a	-10.8	40a	29	-25a	10	30a	0.45	-0.68	0.24	5.5	3	.....	.....	.....	nw.	A. F. Kenman
Nora Springs	Floyd	1064	6	12.8	.....	43	29	-24	3	36	0.31	.....	0.14	2.0	6	10	7	11	s.	Arthur Betts
Northwood	Worth	1222	23	10.4b	-9.6	40b	29	-19b	10	26b	0.35	-0.89	0.10	3.5	6	8	8	15	nw.	Chas. Dwelle
Pocahontas	Pocahontas	1248	15	13.2	-8.7	42	29	-23	10	29	0.35	-0.51	0.20	4.1	4	12	5	14	sw.	F. E. Hronek
Postville	Clayton	1180	20	10.5	-10.9	40	29	-23	10	27	0.67	-0.79	0.20	6.6	8	6	8	17	w.	F. L. Williams
Rock Rapids	Lyon	1558	20	13.4	-6.2	43	29	-21	10	28	0.31	-0.27	0.08	3.2	6	16	6	9	s.	J. K. Medberry
Sanborn	O'Brien	1553	5	12.8a	.....	42a	29	-21a	10	28a	0.15	.....	0.05	1.0	3	.....	.....	.....	nw.	Jas. W. Dow
Sioux Center	Sioux	1426	20	14.2	-6.9	45	29	-21	10	33	0.35	-0.54	0.10	3.5	5	14	4	13	s.	J. de Ruyter
Spencer	Clay	1319	5	13.0	.....	42	29	-22	10	28	0.40	.....	0.20	4.0	2	13	9	9	nw.	E. W. Little
Storm Lake	Buena Vista	1440	30	14.6	-7.8	41	29	-20	10	29	0.41	-0.41	0.18	4.2	5	16	4	11	sw.	Geo. H. Fracker
Washita	Cherokee	1157	21	14.4	-8.1	45	30	-27	10	36	0.45	-0.35	0.25	5.0	2	16	3	12	s.	H. L. Feiter
Waverly	Bremer	948	23	11.2	-11.6	40	29	-27	10	35	1.00	-0.26	0.70	10.0	6	8	8	20	nw.	H. Arnold
West Bend	Palo Alto	1197	26	11.8	-10.0	41	29	-25	10	31	0.37	-0.86	0.18	3.0	4	12	8	11	s.	Jos. Dorweiler
Means and Extremes	.....	.....	.....	12.4	-8.8	45	29	-27	10	41	0.46	-0.61	0.70	4.8	5	12	7	12	nw.	.....
<i>Central Division</i>																				
Ames	Story	926	43	14.2	-10.2	43	29	-23	10	30	0.48	-0.74	0.24	6.0	2	13	6	12	n.	Iowa State College
Audubon	Audubon	1301	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	V. M. Jones
Baxter	Jasper	998	19	13.9	-10.4	40	29	-26	10	28	0.53	-0.47	0.31	5.3	3	7	8	16	sw.	Rev. Paul Traeger
Belle Plaine	Benton	886	29	13.8	-10.1	43	29	-25	10	31	0.57	-0.86	0.28	7.2	5	8	10	13	nw.	O. C. Burrows
Boone	Boone	1134	14	14.4	-8.7	41	29	-21	10	27	0.31	-0.66	0.15	4.0	3	14	7	10	nw.	Carl F. Henning
Carroll	Carroll	1265	29	14.8	-8.4	44	29	-23	10	42	0.35	-0.67	0.20	3.0	2	16	4	11	nw.	Mrs. J. J. Wolfe
Cedar Rapids	Linn	733	46	16.0	-8.0	40	29	-23	10	35	0.80	-0.60	0.40	8.0	3	13	4	14	w.	R. S. Toogood
Clinton	Clinton	593	46	16.0	-9.7	40	12	-23	10	30	0.61	-1.24	0.27	5.3	8	8	7	16	nw.	H. Burde
Davenport	Scott	580	48	17.5	-9.7	42	30	-14	10	37	0.58	-1.11	0.21	7.0	8	5	8	18	sw.	U. S. Weather Bureau
Delaware	Delaware	1083	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Nettie E. Ball
Denison	Crawford	1180	25	16.0	-8.5	45	30	-22	10	33	0.14	-0.79	0.14	1.5	1	3	5	23	n.	Emma Brogden
Des Moines	Polk	861	40	16.6	-9.1	46	30	-19	10	27	0.93	-0.38	0.50	12.6	6	10	5	16	sw.	U. S. Weather Bureau
Dubuque	Dubuque	639	46	14.4	-10.1	41	29	-18	10	30	0.63	-0.09	0.16	12.6	7	5	9	17	nw.	U. S. Weather Bureau
Fort Dodge	Webster	1126	19	.....	.....	.....	.....	.....	.....	.....	0.39	-0.23	0.10	3.9	8	12	17	2	w.	Isadore Haugh
Grinnell	Poweshiek	1031	25	15.0	-10.5	41	29	-31	10	32	0.68	-0.45	0.36	5.8	3	14	2	15	nw.	J. C. Stocks
Grundy Center	Grundy	976	28	.....	.....	.....	.....	.....	.....	.....	0.35	-0.83	0.15	3.5	3	6	10	15	nw.	M. G. Heiberger
Guthrie Center	Guthrie	1077	24	14.9	-10.5	48	30	-29	10	46	0.63	-0.55	0.24	7.0	6	14	5	12	nw.	C. T. Harney
Harlan	Shelby	1182	20	14.2	-9.6	44	29	-27	10	37	0.50	-0.56	0.30	5.0	2	26	1	4	s.	E. L. Tilton
Independence	Buchanan	921	55	12.3	-10.5	40	29	-25	10	34	0.59	-0.79	0.32	6.5	3	10	5	16	nw.	Dr. H. A. Lindsay
Iowa City	Johnson	733	58	15.8	-8.3	41	29	-25	10	33	0.61	-1.00	0.35	7.5	4	7	7	17	nw.	Prof. J. F. Reilly
Iowa Falls	Hardin	1107	26	11.6	-9.7	39	29	-31	10	30	0.68	-0.69	0.30	6.8	4	11	4	16	sw.	J. B. Parmelee
Jefferson	Greene	1052	20	13.8	-10.4	43	29	-25	10	31	0.80	.....	0.35	8.0	4	13	6	12	sw.	Will I. Lyon
LeClaire	Scott	876	19	.....	.....	.....	.....	.....	.....	.....	0.63	-0.70	0.40	6.3	6	.....	.....	.....	.....	Margaret T. Disney
Little Sioux	Harrison	1040	14	17.3	-8.1	50	30	-26	10	36	0.54	.....	0.35	5.0	4	12	8	11	nw.	Geo. H. Gibson
Logan	Harrison	928	52	17.4a	-7.8	49a	29	-27a	10	34a	0.53	-0.65	0.25	6.0	3	.....	.....	.....	.....	Mary Jean Stern
Maquoketa	Jackson	688	18	15.2	-9.6	43	29	-25	10	30	0.78	-0.76	0.58	8.2	3	7	7	17	nw.	Ira H. Stephens
Marshalltown	Marshall	947	27	14.5	-8.6	42	29	-26	10	29	0.46	-0.89	0.27	4.0	4	12	0	19	sw.	Chas. F. Kothenbeutel
Monroe	Jasper	922	7	16.2	.....	42	29	-23	10	29	0.94	.....	0.46	11.8	3	10	6	15	w.	J. A. Dibel
Muscatine	Muscatine	554	59	.....	.....	.....	.....	.....	.....	.....	0.53	-1.51	0.15	6.6	6	.....	.....	.....	.....	Wm. P. Molis
Olin	Jones	760	21	14.4	-10.6	38	29	-28	10	34	0.40	-1.09	0.40	4.0	1	10	11	10	sw.	Dr. F. W. Port
Onawa	Monona	1051	19	17.0	.....	48	30	-26	10	38	0.39	-0.76	0.32	3.9	3	14	3	14	s.	Mrs. H. E. Colby
Perry	Dallas	975	18	13.8	-11.0	42	30	-34	10	36</										

CLIMATOLOGICAL DATA FOR DECEMBER 1919.

STATIONS	COUNTIES	Elevation—feet	Length of record—years	Temperature, in Degrees Fahrenheit.							Precipitation, in Inches.				Number of Days			Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall, (unmelted)	Precipitation 01 in. or more	Clear	Partly Cloudy			Cloudy
<i>Southern Division</i>																				
Afton	Union	1212	25	19.2	-7.0	44a	30	-20	10	32a	0.36	-0.98	0.24	5.5	2	12	3	16	nw.	J. E. Dietrick
Albia	Monroe	959	21	16.6	-8.7	49	30	-19	10	35	0.08	-1.07	0.08	1.0	1	10	1	20	ne.	F. H. Holmes
Atlantic	Cass	1164	28	15.6	-9.2	43	30	-29	10	33	1.13	-0.07	0.35	11.3	8	8	7	16	sw.	Thos. H. Whitney
Bedford	Taylor		19	17.4	-7.6	49	30	-30	10	37	0.86	-0.26	0.30	7.1	7	14	1	16	nw.	E. E. Healy
Bloomfield	Davis	881	12	19.1		50	30	-17	10	39	0.74	-1.03	0.50	3.4	5	5	14	12	ne.	V. G. Warner
Bonaparte	Van Buren	565	28	19.0	-8.9	48	31	-16	10	34	0.16	-1.19	0.06	1.4	3	13	4	14	s.	Bruce R. Vale
Burlington	Des Moines	544	23	21.4	-6.5	46	30	-12	10	29	0.20	-1.58	0.10	2.0	3	10	6	15	nw.	Mrs. Edna M. Donnelly
Centerville	Appanoose	1013	14	18.9		48	30	-18	10	34	0.60		0.30	6.0	2	12	4	15	se.	Leo. J. Allen
Chariton	Lucas	1042	24	18.3	-8.1	49	30	-20	10	37	0.28	-1.04	0.18	3.0	2	9	7	15	nw.	C. C. Burr
Clarinda	Page	1009	29	19.0	-5.7	51	30	-24	10	35	0.58	-0.59	0.20	4.7	5	14	2	15	nw.	A. S. Van Sandt
Columbus Jct.	Louisa	595	18	19.0	-8.7	41	29†	-16	10	34	0.58	-0.73	0.21	6.6	6	11	8	12	nw.	J. B. Johnston
Corning	Adams	1117	27	16.8	-7.9	44	29	-26	10	34	0.50	-0.84	0.30	5.0	2	16	1	14	nw.	Jerome Smith
Corydon	Wayne	1101	26	18.0	-9.4	51	30	-18	10	38	0.22	-1.20	0.10	2.7	5	12	4	15	sw.	May C. Miller
Creston	Union	1312	14	15.3	-9.4	47	30	-24	10	30	1.10		0.40	10.5	5	8	9	14	nw.	Mrs. T. E. McConnell
Cumberland	Cass		20								0.70	-0.40	0.30	7.0	3	15	3	13	sw.	J. H. Reppert
Earlham	Madison	1126	17	15.0	-10.4	47	30	-29	10	47	1.55	+0.14	0.40	18.0	6	13	3	15	sw.	Geo. Phillips
Fairfield	Jefferson	780	35	17.1a	-10.1	45a	30	-17a	10	33a	0.32	-1.37	0.15	4.3	3				sw.	Prof. R. M. McKenzie
Glenwood	Mills	1100	22	18.8		50	30	-27	10	35	1.10		0.40	11.0	4	12	1	18	nw.	Dr. Geo. Mogridge
Greenfield	Adair		27																	
Indianola	Warren	969	27	16.6	-9.7	45	30	-19	10	28	0.85	-0.60	0.27	8.5	5	9	11	11	sw.	Frank A. Ward
Keokuk	Lee	614	18	22.3	-7.1	50	30	-8	20	40	0.18	-1.69	0.14	0.5	6	7	18	sw.	Prof. J. L. Tilton	
Keosauqua	Van Buren	644	27	19.4	-7.3	48	26†	-17	10	35	0.30	-1.13	0.15	3.5	4	10	9	12	n.	U. S. Weather Bureau
Knoxville	Marion	920	24	16.2	-10.3	48	30	-24	10	31	0.68	-0.69	0.30	6.8	5	12	1	18	sw.	J. H. Landes
Lacona	Warren		20								0.85	-0.85	0.20	8.6	8	6	17	8	nw.	W. J. Casey
Lamoni	Decatur	1100	12	19.0	-7.7	52	30	-21	10	37	0.28	-0.94	0.11	2.7	6	15	0	16	nw.	J. B. Alter
Lenox	Taylor	1250	26	17.9	-7.8	49	30	-21	10	30	0.64	-0.49	0.30	6.4	6	11	6	14	s.	Ed. D. Moore
Mt. Ayr	Ringgold	1236	26	18.3	-8.7	51	30	-22	10	35	0.30	-1.09	0.14	2.9	5	12	3	16	nw.	J. L. Hurlay
Mt. Pleasant	Henry	729	38	19.0	-8.8	46	30	-16	10	34	0.25	-1.11	0.07	2.0	4	9	9	13	sw.	Alex Maxwell
Murray	Clarke	1216	28	17.0	-9.2	48	30	-23	10	35	0.51	-0.61	0.18	5.1	6	6	11	14	sw.	John H. Jericho
Oakland	Pottawattamie										1.05		0.39	10.5	4				n.	M. T. Ashley
Oskaloosa	Mahaska	825	43	16.6	-9.5	44	30	-29	10	30	0.73	-0.42	0.36	7.9	6	10	5	16	sw.	M. E. Gray
Ottumwa	Wapello	849	24	16.6		48	29	-17	11	35	0.62	-0.68	0.28		3	3	10	18	n.	Roy R. Robinson
Pella	Marion	877	26	16.4	-10.2	43	29	-28	10	34	0.55	-0.53	0.33	7.5	3	11	3	17	nw.	Eugene O. Field
Sigourney	Keokuk	877	23	17.2	-9.5	42	30	-24	10	32	0.75	-0.48	0.37	8.6	4	8	7	16	nw.	J. H. Ver Steeg
Stockport	Van Buren	754	17	18.0	-9.6	46	30	-20	10	35	0.25	-1.03	0.10	2.5	3	8	8	15	nw.	W. E. Utterback
Thurman	Fremont		22	17.6	-8.1	48	30	-36	10	46	0.70	-0.65	0.40	7.5	5	10	14	7	nw.	C. L. Beswick
Washington	Washington	769	37	17.4	-9.7	42	29†	-20	10	29	0.42	-0.94	0.15	4.2	4	8	13	10	nw.	C. R. Paul
Winterset	Madison	1129	28	17.0	-9.1	48	30	-21	10	38	0.47	-0.83	0.47	5.0	2	16	6	9	sw.	Wm. A. Cook
Omaha, Nebr.		1040	48	19.4	-7.7	50	30	-16	10	28	0.69	-0.22	0.33	8.1	5	11	7	13	nw.	H. S. Ely
Means and extremes				17.9	-8.5	52	30	-36	10	47	0.58	-0.77	0.50	6.2	4	11	6	14	nw.	U. S. Weather Bureau
State Means and Extremes				15.0	-8.9	52	30	-36	10	47	0.54	-0.68	0.70	5.8	4	11	7	13	nw.	

The departure from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining means. Reference letters a, b, c, etc., appearing in the table indicate the number of days missing; for example, b represent two days, etc. † Also other dates. †† Received too late to be included in means and summaries. †† Precipitation is less than 0.01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Stations	Barometric Pressure Inches (Sea level)					Relative Humidity (Per cent)					WIND					Sun-shine.	
	Mean	Highest	Date	Lowest	Date	Mean					Total movement	Average h rly velocity.	Maximum				
						7 A. M.	Noon †	7 P. M.	Lowest	Date			Miles	From	Date		
Charles City	30.21	30.86	2	29.64	7	92	81	89	70	15	4,849	6.5	23	n	31	33	13
Davenport	30.21	30.93	10	29.56	12	92	80	83	52	13	5,567	7.5	23	nw	12	33	6
Des Moines	30.21	30.88	10	29.67	12	85	77	78	50	2	5,346	7.2	25	sw	28	41	-11
Dubuque	30.23	30.95	10	29.60		87	63	71	60	10	5,353	7.9	28	w	12	33	3
Keokuk	30.22	30.98	10	29.63	12	79	77	81	53	2	4,705	6.3	23	nw	29	38	3
Sioux City	30.22	30.88	2	29.65	7	85	79	82	38	16	7,590	10.2	36	nw	12	47	3
Omaha, Neb.	30.22	30.87	2	29.70	7	86	73	80	61	16	6,364	8.6	28	w	10	47	3
Means and extremes	30.22					86	76	81				7.7				40	3
	30.98	10	29.56	12	84				33	16			36	nw	12		
Normals and records	30.12		29th		27th	84		77		9th		8.1			24th	48	
	*31.09	1917	29.09	1904						20	1889				58	nw	1907

*Sioux City. †Davenport. ‡Sioux City. ††Local mean time.

Daily Maximum and Minimum Temperatures for the Month of December, 1919.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized into Northern Division (Albion to Postville) and Southern Division (Aurea to Omaha, Nebr.). Each station entry includes Maximum and Minimum temperature values for each day.

a, b, c, etc. indicate respectively 1, 2, 3, etc., days missing from record. §§Instruments are read in the morning; the maximum temperature then is charged to the preceding day, on which it almost always occurs.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist.

VOL. XXX

DES MOINES, ANNUAL, 1919

No. 13

GENERAL SUMMARY.

The mean temperature, 48.6° , is 1.2° above normal. January, February, March, June, July, and September were above normal; the other months below. The highest temperature recorded was 104° at Webster City on July 30, and Keosauqua on July 31. The lowest was -36° at Thurman, on December 10. The period December 1, 1918 to March 31, 1919 was milder than any other similar period of record; and the period, February 1 to April 30 was wetter. The total precipitation averaged 36.76 inches, or 4.79 inches above normal.

Spring work was backward, grasses and winter grains made luxuriant growth. Wheat was seriously damaged by high temperatures and high humidities in June. Harvest and thrashing were early. Potatoes were practically a failure, due to hot, dry weather August 14 to September 17. Corn husking was delayed by wet weather in the latter part of September and October.

SYNOPSIS BY MONTHS

January was next to the warmest in 30 years, the northern part of the State being relatively the warmest. However, the first 5 days were cold. For the State as a whole it was the driest January of record. Clear days, averaging 20, is a new record. The ground was bare much of the month except in some eastern counties, but was not deeply frozen. During the last week plowing was done, shrubs were set out and dandelions bloomed. Buds were swelled to the danger point, but no serious damage resulted except to peaches which were destroyed. Building was unusually brisk. Roads became soft after the 15th.

February was generally mild, particularly in the southern counties. Precipitation was generally above normal and well distributed as to frequency and area. Most of it occurred as a heavy rain on the 13th-14th, generally exceeding one inch and turning to snow. Snow covered the ground from less than 5 days in some southern and eastern counties to about 25 days in the extreme northwest. A copious deposit of sediment occurred in the storm of the 13th-14th. It is believed to have been transported from the far west.

The mildest winter in 29 years preceded the 1919 crop season. The mean temperature of December to March inclusive was 30.4° , or 6.5° higher than the normal and 1.4° warmer than the warmest similar period of record. Wheat, rye, grasses, alfalfa, and small fruits all came through the winter in good condition.

Small tornadoes occurred between Des Moines and Fort Des Moines, and at Toronto on March 15. Heavy rains on that date caused marked rises in the streams. In the eastern part of the State rail traffic was delayed by washouts, some damage resulted from overflow, and at Waukon three persons were drowned.

April was cloudy and rainy with about normal temperature, though there was a warm period 5th-7th and a cold period with heavy to killing frosts 24th-26th. Blooming of fruit trees was beneficially retarded so no injury resulted from frost, except in Scott County. Heavy rains occurred in many sections on the 7th and 8th, and downpours on the 23rd damaged roads and railways and eroded and flooded fields in some west central counties. Not

more than 5 or 6 days were suitable for field work in April. More precipitation fell and more days were rainy in the period, February 1-April 30 than in any other similar period in 30 years, the closest approach being in 1897. Seeding was greatly delayed and poorly done. Winter wheat stooled freely and made rank growth. A small tornado occurred near Grandmound, Clinton County on April 23.

During May, cool weather prevailed till the 26th when it turned warm with temperatures in the 90's on the 30th. Frosts or freezes were general on the 2nd and occasional light frosts were reported up to the 18th. Rainy weather and saturated soil delayed plowing and corn planting particularly in the south central counties. Winter wheat made rank growth and was threatened with lodging. Tornadoes occurred on May 3 at Linn Grove in Buena Vista county and in Marshall and Swan Lake townships in Pocahontas county and from south of Ulmer to Grant City, Sac county. On May 6 slight tornadoes occurred near Harvey and near Langworthy.

June opened wet and cool and closed dry and cool, but from the 9th to 26th was unusually warm. High humidities during the first part of the warm period were unusually favorable for diseases of small grains such as scab, red rust, smut and blight. Winter wheat which had been very promising, deteriorated greatly and was prematurely ripened. Spring wheat was most seriously affected, particularly in the northwest portion where little of the crop proved to be fit for milling and a large acreage was abandoned. Corn made unusually good progress after June 8 and the dry weather toward the close of the month permitted cultivation so the fields became fairly clean. Tornadoes occurred in Chickasaw and Marshall counties on June 23.

July was quite continuously warm though the heat was not unusually great till the last week when temperatures of 100 degrees or higher occurred. Precipitation generally was deficient and unevenly distributed. However, rain fell at a record breaking rate at Dubuque on July 9, drowning 7 persons, injuring a number of others and damaging property to the amount of \$125,000. Conditions were favorable for harvesting the small grains and for cultivation of corn, all of which, except the late planted was laid by early in July. Corn seems to have drawn upon a supply of moisture stored in the subsoil. Haying might have been far advanced in June but was generally neglected for corn cultivation. The relatively late cutting followed by dry, hot weather toward the close of July injured the second crop of clover and greatly reduced the crop of seed.

Aside from a few hot days the first week, August was generally pleasant. It was too dry for plowing, seeding, meadows, pastures and truck crops, but excellent for thrashing which was 89 per cent completed by the close of the month. This is 17 per cent greater than normal. Corn made excellent progress and seems to have depended more upon subsoil moisture than upon current rainfall which was scant and scattered. On August 4 a tornado moved from north of Dumont to Bristow, causing about \$37,000 damage.

In September, warm, dry, sunshiny weather prevailed till the 17th when heavy to excessive rains set in, followed by a clear, cool period 22d-27th and then by heavy, general rains, 28th-30th. Light to heavy frosts with temperatures near freezing occurred in the northwest coun-

ties 23d-25th. Drouth prevailed in the south and central divisions from about August 14 to September 17 while in the north division rains were about normal in amount and frequency after September 2. Excessive rains occurred at a number of stations on the 18th-19th and 30th. In the west part of Davenport and at Muscatine on the 30th much damage from local floods occurred. Corn matured and dried rapidly till the rains set in. About 85 per cent of the crop was safe from frost by the close of the month. Preparation for winter wheat seeding was almost impossible till the rains came, gently, steadily and copiously for three or four days beginning the 17th and saturating the soil to a great depth. The work was pushed rapidly 22d-27th. The rains came too late for potatoes which were nearly a failure.

Cloudy, rainy weather in October, cold in the west and warm in the east portions of the State, was favorable for pastures, and the seeding and germination of winter wheat and grasses, but very unfavorable for drying out the corn crop, so that up to the end of the month very little corn had been cribbed. Full loads could not be hauled from the corn fields in the eastern part of the State on account of the wet soil. The cloudy, wet weather was unfavorable for maturing sugar beets. On October 4, at Dubuque, the second excessive and damaging downpour of rain this year occurred. The damage amounted to about \$60,000. Killing frosts occurred during the month over the entire State, the date varying from the 10th and 11th over most of the west and central portions until as late as the 31st at points along the Mississippi River.

November was colder than normal with cold waves on the 11th-12th and 25th-26th and a warm period from about the 15th to the 24th. Precipitation was evenly distributed and considerably above normal. A rather heavy snowstorm for November occurred on the 27th-29th. Wet fields and rainy days continued to delay corn husking till after November 10. Southwest gales on the 10th blew down considerable corn in the eastern half of the State and much of this was covered by later snows in the southeast counties. Winter wheat and grasses entered the winter in good condition. Wires were damaged by a glaze storm in the Mississippi River counties on the 28th-29th.

Wintry weather prevailed in December with cold waves on the 12th-13th and 31st. The severest cold of record so early in the winter occurred on December 10. At Thurman in Fremont, the extreme southwest county of the State, the minimum temperature was -36°. Heavy snow covering during most of the month protected winter grains and grasses. The ground froze but little. Not much out door work was possible and livestock could not graze in corn fields till toward the close of the month.

SUPPLEMENTAL PRECIPITATION TABLE

Stations.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
<i>Northern Division</i>													
Allison.....	0.55	3.01	1.82	4.36	2.16	4.50	0.39	1.80	2.94	3.56	3.49	0.55	29.13
Alta (near).....	0.21	1.91	1.13	3.78	1.99	11.63	3.58	2.10	2.39	1.08	2.66	0.28	32.74
Alton.....	0.25	1.43	1.34	3.46	2.31	4.89	4.45	2.40	2.81	1.27	3.39	0.40	28.40
Elkader.....	.....	.....	.....	3.95	2.54	6.33	4.10	2.74	4.42	3.48	3.91	0.83	.....
Lansing.....	0.56	1.09	1.72	3.44	4.27	6.35	2.37	2.32	5.55	4.13	3.57	.....	.....
LeMars.....	0.17	1.95	1.16	.....	.....	.....	7.38	1.75	2.30	2.81	3.64	0.92	.....
Nora Surings.....	0.86	4.12	2.12	5.52	3.16	8.75	3.31	2.43	3.68	3.16	3.86	0.31	41.28
Northwood.....	0.30	2.75	2.00	5.40	.....	.....	4.40	2.74	4.40	.....	.....	.....	.....
Sibley.....	0.61	2.88	1.17	4.84	.....	.....	.....	.....	.....	.....	.....	.....	.....
Spencer.....	.....	.....	0.81	4.61	3.47	6.36	4.17	2.06	4.09	1.28	2.90	0.40	.....
<i>Central Division</i>													
Ames.....	0.11	.....	1.95	6.35	2.34	2.88	1.01	3.65	7.70	3.84	3.46	0.48	.....
Audubon.....	.....	.....	.....	6.99	2.51	6.40	.....	.....	.....	.....	.....	.....	.....
Delaware.....	0.02	2.28	2.35	5.07	2.02	6.79	2.98	2.89	5.15	8.65	4.13	.....	.....
Dennison.....	0.08	.....	1.90	3.27	2.28	6.14	4.36	1.15	4.46	4.34	2.69	0.14	.....
Grinnell.....	0.30	2.46	.....	.....	2.81	4.52	1.56	4.33	11.82	2.88	3.71	0.68	.....
Jefferson.....	0.23	2.02	1.81	5.72	1.13	4.89	2.64	2.72	7.51	2.28	3.52	0.89	35.27
Rockwell City.....	0.19	2.37	.....	3.80	1.62	7.08	.....	3.78	3.49	2.35	2.77	0.60	.....
Whitten.....	0.60	2.24	2.90	4.04	1.48	.....	2.35	2.94	.....	5.96	2.80	0.72	.....
Van Meter.....	.....	.....	.....	.....	.....	.....	.....	3.44	6.84	2.09	3.75	.....	.....
<i>Southern Division</i>													
Afton.....	0.20	2.95	2.75	6.49	4.02	9.47	0.65	1.80	8.55	1.93	.....	0.36	.....
Allerton.....	0.47	1.78	3.18	5.33	3.18	.....	3.60	1.62	.....	.....	.....	.....	.....
Creston.....	3.42	2.47	3.44	7.89	3.33	9.45	2.67	2.30	8.87	1.75	4.47	1.10	48.16
Greenfield.....	0.40	1.50	2.68	8.26	3.86	.....	.....	.....	.....	.....	.....	.....	.....
Northboro.....	.....	.....	3.72	5.43	1.61	4.88	2.81	.....	7.45	.....	.....	.....	.....
Ottumwa.....	.....	3.31	2.53	4.70	3.96	4.27	3.58	3.23	7.70	2.52	3.95	0.62	.....
Shenandoah.....	3.10	2.42	2.58	3.65	.....	.....	.....	.....	.....	.....	.....	.....	.....

COMPARATIVE DATA FOR THE STATE—Annual.

Year	Temperature				Precipitation in inches				
	Mean annual	Highest	Date	Lowest	Date	Annual	Greatest annual	Least annual	Av. snowfall
1890..	48.0	110	July 13	-27	January 22	31.30	45.74	16.00	.....
1891..	47.3	106	August 9	-31	February 4	32.90	49.05	23.48	.....
1892..	46.6	104	July 11	-38	January 19	36.58	48.77	24.78	34.2
1893..	45.7	102	July* 13	-36	January 14	27.59	33.27	19.19	37.2
1894..	49.7	109	July 26	-37	January 25	21.94	29.81	15.65	19.2
1895..	47.2	104	May 28	-33	February 1	26.77	35.25	18.57	26.0
1896..	48.6	104	July 3	-20	January 4	37.23	51.60	23.68	22.6
1897..	47.8	106	July* 23	-30	January 25	26.98	36.18	20.21	38.8
1898..	47.7	103	August 20	-25	December 31	31.34	55.47	19.51	40.3
1899..	47.3	104	September 6	-40	February 11	28.68	42.06	21.79	23.4
1900..	49.3	103	August 3	-27	February 15	35.05	47.33	25.05	25.8
1901..	49.0	113	July 22	-31	December 15	24.41	37.69	16.35	38.5
1902..	47.7	98	July 30	-31	January 27	43.82	58.80	20.14	28.0
1903..	47.2	101	August 24	-27	December 13	35.39	50.53	26.41	19.4
1904..	46.3	100	July 17	-32	January 27	28.51	38.93	19.34	29.2
1905..	47.2	104	August 11	-41	February* 2	36.56	52.26	24.66	38.3
1906..	48.4	102	July 21	-32	February 10	31.60	44.34	20.63	32.8
1907..	47.4	102	July 5	-31	February 5	31.61	43.90	19.93	24.0
1908..	49.5	101	August 3	-18	January 29	35.26	49.98	24.11	22.7
1909..	47.4	108	August* 15	-26	February* 15	40.01	53.48	27.20	49.0
1910..	48.6	108	July 16	-35	January 7	19.87	27.99	12.11	23.4
1911..	49.5	111	July* 3	-35	January 3	31.37	46.77	19.74	35.3
1912..	46.4	104	September 8	-47	January 12	28.89	33.13	15.25	39.5
1913..	49.7	108	July* 16	-25	January 8	29.95	45.18	20.31	25.4
1914..	49.1	109	July 12	-31	December 26	31.93	44.11	23.30	27.5
1915..	47.8	99	May 14	-32	January 28	39.53	51.15	27.29	31.3
1916..	47.2	106	August 4	-34	January 13	28.90	46.34	22.48	29.5
1917..	44.8	106	July 30	-40	December 29	27.81	36.00	20.78	32.4
1918..	49.2	113	August 4	-36	February 4	32.78	47.53	25.03	33.4
1919..	48.6	104	July 30, 31	-36	December 10	36.76	48.16	26.88	26.6

* And other dates

CLIMATOLOGICAL DATA FOR THE YEAR 1919.

STATIONS	COUNTIES	Elevation, feet.	Length of record, years	Temperature in degrees Fahrenheit					Precipitation in Inches					Number of Days				Prevailing direction of wind		
				Mean	Highest	Date	Lowest	Date	Length of record, years	Total	Greatest monthly	Month	Least Monthly	Month	Total snowfall (unmelted)	Precipitation, 0.01 in. or more.	Clear		Partly Cloudy	Cloudy
Northern Division																				
Algona	Kossuth	1213	46	46.6	97	July 29	-24	Jan. 3	46	28.08	6.24	April	0.17	Jan.	30.2	81	279	51	95	sw.
Allison	Butler	1045	6	47.0	100	July 29	-27	Dec. 10	6	29.15	4.50	June	0.39	July	34.0	100	145	110	110	nw.
Alta	Buena Vista	1513	28	46.4	95	July 26	-23	Jan. 3	28	32.44	12.25	June	0.10	Jan.	26.1	106	153	118	94	nw.
Alta (near)	Buena Vista	23	23	.....	.....	.....	.....	.....	23	32.74	11.63	June	0.21	Jan.	22.5	86	.....	.....	.....	.....
Alton	Sioux	1305	14	46.5	99	July 26	-26	Dec. 10	14	28.40	4.89	June	0.25	Jan.	31.2	102	132	131	102	nw.
Belmond	Wright	1205	8	46.8	100	July 9	-25	Dec. 10	8	37.40	6.81	April	0.56	Jan.	42.4	137	114	154	97	nw.
Britt	Hancock	1236	22	45.3	99	July 30	-25	Dec. 10	22	26.88	5.48	April	0.24	Jan.	27.3	110	.....	.....	.....	s.
Charles City	Floyd	1015	23	45.9	98	July 30	-23	Jan. 3	28	35.44	6.05	June	0.22	Jan.	34.9	120	119	143	103	nw.
Decorah	Winneshiek	875	26	46.5	98	July 26	-31	Jan. 4	26	36.87	7.24	June	0.10	Jan.	36.2	103	194	60	111	nw.
Elkader	Clayton	751	28	.....	100	July 27	.....	.....	40	.....	6.33	June	.....	.....	.....	.....	.....	.....	.....	.....
Estherville	Emmet	1298	24	.....	95	July 30	-22	Jan. 3	24	36.11	9.07	June	0.15	Jan.	27.0	83	198	120	47	s.
Fayette	Fayette	1003	29	46.4	99	July 26	-24	Jan. 3	29	37.20	6.21	June	0.60	Jan.	33.2	100	189	75	101	nw.
Forest City	Winnebago	1226	25	45.8	100	July 30	-24	Jan. 3	25	29.31	5.74	June	0.36	Dec.	31.1	92	166	82	117	s.
Humboldt	Humboldt	1095	25	47.7	101	July 26	-22	Jan. 3	32	28.33	6.65	June	0.04	Jan.	22.3	74	.....	.....	.....	s.
Inwood	Lyon	1474	15	45.8	96	July 9	-27	Jan. 3	15	29.61	8.48	June	0.27	Dec.	35.3	113	210	63	92	s.
LeMars	Plymouth	1224	23	.....	100	Aug. 3	-22	Jan. 3	23	.....	.....	.....	0.17	Jan.	.....	.....	.....	.....	.....	.....
Mason City	Cerro Gordo	1148	22	.....	100	July 30	-31	Jan. 3	22	33.14	8.07	June	0.28	Dec.	22.5	97	113	158	94	nw.
New Hampton	Chickasaw	1169	22	46.4	99	July 30	-24	Jan. 4	22	35.77	7.91	June	0.42	Jan.	34.8	87	.....	.....	.....	.....
Nora Springs	Floyd	1064	6	47.7	101	July 26	-25	Jan. 4	6	41.28	8.75	June	0.31	Dec.	21.0	123	167	95	103	s.
Northwood	Worth	1222	23	.....	93c	July 30	-25	Jan. 3	23	.....	5.68	June	0.30	Jan.	.....	.....	.....	.....	.....	sw.
Pocahontas	Pocahontas	1248	15	47.1	98	July 9	-23	Jan. 3	15	29.60	5.72	June	0.15	Jan.	28.1	104	165	98	102	se.
Postville	Clayton	1180	28	45.3	92	July 26	-28	Jan. 4	28	35.03	6.40	June	0.66	Jan.	30.4	113	128	130	107	sw.
Rock Rapids	Lyon	1358	20	45.5	97	July 9	-24	Jan. 3	20	32.18	7.12	June	0.22	Jan.	39.9	111	231	61	73	sw.
Sanborn	O'Brien	1553	5	45.9	97	July 26	-26	Jan. 3	5	34.99	6.83	June	0.15	Dec.	27.2	93	.....	.....	.....	sw.
Sioux Center	Sioux	1426	20	46.4	98	July 9	-26	Jan. 3	20	30.35	5.43	July	0.35	Dec.	44.5	83	.....	.....	.....	s.
Spencer	Clay	1319	5	.....	98	July 9	.....	.....	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stoim Lake	Buena Vista	1440	23	47.4	96	July 9	-23a	Jan. 3	30	31.72	11.97	June	0.08	Jan.	21.9	95	.....	.....	.....	nw.
Washita	Cherokee	1157	14	47.0	96	July 9	-27	Dec. 10	21	39.76	9.30	June	0.05	Jan.	26.5	86	184	78	103	s.
Waverly	Bremer	948	23	46.8	100	July 30	-28	Jan. 4	23	35.20	5.59	June	0.49	Jan.	29.4	101	.....	.....	.....	s.
West Bend	Palo Alto	1197	26	46.7	99	July 30	-25	Jan. 3	26	27.98	5.80	June	0.28	Jan.	26.0	97	150	121	94	s.
Central Division																				
Ames	Story	926	42	.....	99	July 26	-23	Dec. 10	43	.....	7.70	Sept.	0.11	Jan.	.....	.....	.....	.....	.....	.....
Audubon	Audubon	1301	25	.....	.....	.....	.....	.....	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Baxter	Jasper	998	19	48.6	99	July 27	-26	Dec. 10	19	33.83	6.79	Sept.	0.18	Jan.	17.3	111	97	136	132	se.
Belle Plaine	Benton	886	29	48.7	97	July 27	-25	Dec. 10	29	41.88	6.16	Sept.	0.22	Jan.	36.5	108	156	115	94	se.
Boone	Boone	1134	14	.....	99	July 27	-21	Jan. 3	14	39.08	8.64	Sept.	0.16	Jan.	20.3	89	.....	.....	.....	s.
Carroll	Carroll	1265	29	48.4	98	July 9	-23	Jan. 3	29	32.48	5.54	June	0.25	Jan.	19.8	86	213	51	101	sw.
Cedar Rapids	Linn	733	37	50.5	102	July 30	-23	Dec. 10	37	33.41	5.38	Aug.	0.22	Jan.	23.2	76	178	52	135	s.
Clinton	Clinton	593	45	50.0	99	July 30	-26	Jan. 4	52	39.62	7.74	Oct.	0.25	Jan.	19.5	113	148	103	114	nw.
Davenport	Scott	580	47	50.8	96	July 27	-16	Jan. 4	48	40.57	7.23	Sept.	0.07	Jan.	19.2	110	134	110	121	e.
Delaware	Delaware	1083	28	.....	96	July 27	.....	.....	28	.....	8.65	Oct.	.....	Jan.	.....	.....	.....	.....	.....	s.
Denison	Crawford	1180	25	.....	97a	Aug. 3	-23	Jan. 3	25	.....	6.14	June	0.08	Jan.	.....	.....	.....	.....	.....	s.
Des Moines	Polk	861	40	50.4	98	July 27	-19	Dec. 10	40	41.68	7.47	Sept.	0.08	Jan.	40.4	108	119	117	129	sw.
Dubuque	Dubuque	639	46	48.5	95	July 27	-23	Jan. 4	46	43.97	7.82	July	0.17	Jan.	32.9	115	110	130	125	nw.
Fort Dodge	Webster	1126	19	.....	102	July 9	.....	.....	19	34.91	6.73	June	0.35	Jan.	23.4	94	.....	.....	.....	sw.
Grinnell	Poweshiek	1031	25	.....	101	July 27	-31	Dec. 10	27	.....	11.82	Sept.	0.30	Jan.	.....	.....	.....	.....	.....	.....
Grundy Center	Grundy	976	28	.....	99	July 27	-22	Dec. 10	28	36.75	6.84	Oct.	0.35	Dec.	23.5	90	.....	.....	.....	nw.
Guthrie Center	Guthrie	1077	24	49.0	99	July 27	-29	Dec. 10	24	45.53	9.44	Sept.	0.02	Jan.	25.1	99	207	82	76	sw.
Harlan	Shelby	1182	20	48.2	97	June 19	-27	Dec. 10	20	37.25	6.12	June	0.43	Jan.	36.0	85	249	30	86	e.
Independence	Buchanan	921	55	48.2	101	July 27	-25	Dec. 10	52	36.48	7.27	Oct.	0.45	Jan.	26.0	82	209	50	106	s.
Iowa City	Johnson	683	59	49.5	100	July 27	-25	Jan. 4	56	38.46	7.07	June	0.08	Jan.	22.0	108	162	95	103	nw.
Iowa Falls	Hardin	1107	26	47.1	99	July 30	-31	Dec. 10	26	34.61	9.09	June	0.56	July	37.4	110	187	64	114	s.
Jefferson	Greene	1052	16	47.9	97c	July 30	-25	Dec. 10	20	35.27	7.51	Sept.	0.23	Jan.	23.7	90	.....	.....	.....	.....
Le Claire	Scott	576	19	.....	.....	.....	.....	.....	19	44.63	7.07	Sept.	0.29	Jan.	12.9	104	.....	.....	.....	.....
Little Sioux	Harrison	1040	14	49.4	100	July 26	-26	Dec. 10	14	29.15	5.61	June	0.20	Jan.	19.9	93	.....	.....	.....	se.
Logan	Harrison	928	52	50.5	99	Aug. 3	-27	Dec. 10	52	29.19	7.34	June	0.20	Jan.	22.8	78	.....	.....	.....	sw.
Maquoketa	Jackson	688	18	48.3	96	July 6	-32	Jan. 4	19	43.19	7.14	May	0.01	Jan.	.....	.....	.....	.....	.....	nw.
Marshalltown	Marshall	947	27	49.6	100	July 29	-26	Dec. 10	27	39.38	6.05	April	0.24	Jan.	22.0	107	189	35	141	sw.
Monroe	Jasper	922	7	50.0	100	July 30	-23	Dec. 10	7	42.07	7.20	Sept.	0.14	Jan.	30.7	88	199	50	116	sw.
Muscataine	Muscataine	554	59	.....	.....	.....	.....	.....	60	38.80	7.39	Sept.	0.34	Jan.	19.4	99	.....	.....	.....	.....
Olin	Jones	761	20	.....	99	July 30	-28	Dec. 10	20	47.30	6.95	May	T	Jan.	.....	61	173	126	66	sw.
Onawa	Monona	1051	19	49.0	101	Aug. 3	-26	Dec. 10	19	32.31	6.52	June	0.30	Jan.	27.9	83	191	65	109	s.
Perry	Dallas	975	18	48.8	100	July 27	-34	Dec. 10	18	43.21	8.16	Sept.	0.13	Jan.	23.8	94	.....	.....	.....	s.
Rockwell City	Calhoun	1134	22	.....	.....	.....	.....	.....	23	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sac City	Sac	1344	37	47.0																

MONTHLY AND ANNUAL PRECIPITATION, WITH DEPARTURES FROM THE NORMAL, FOR 1919.

Table with columns for months (Jan-Dec) and Annual, and rows for various stations (Northern, Central, Southern Divisions). Each cell contains precipitation values and departures from normal.

MEAN MONTHLY AND ANNUAL TEMPERATURES, WITH DEPARTURES FROM THE NORMAL, FOR 1919.

STATIONS	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Annual			
	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.	Tem.	Dep.		
Northern Division																												
Algona.....	26.2	+11.9	21.2	+3.6	35.4	+4.8	47.0	0.0	57.8	-1.5	70.4	+2.3	76.1	+2.8	71.2	+0.4	65.7	+3.5	46.8	-2.0	30.0	-2.7	12.0	-9.3	46.6	+1.1		
Allison.....	25.1	.....	22.3	.....	35.4	.....	47.2	.....	57.3	.....	70.4	.....	76.6	.....	71.5	.....	66.6	.....	49.6	.....	31.1	.....	11.2	.....	47.0	.....	
Alta.....	26.8	+12.7	20.9	-4.8	35.3	-5.2	46.2	-0.1	57.7	-1.3	69.4	+1.8	75.6	+2.8	70.5	-0.1	65.6	+3.7	46.2	-2.6	29.8	-2.6	13.3	-7.7	46.4	+1.3		
Alton.....	25.4	+10.2	20.9	-3.2	35.6	+4.3	46.5	-0.3	57.6	-1.9	70.1	+2.4	76.5	+3.5	71.0	-0.4	65.6	+3.2	46.4	-2.6	29.2	-3.4	13.3	-8.0	46.5	+0.8		
Belmond.....	25.0	.....	19.8	.....	35.5	.....	46.6	.....	57.2	.....	71.2	.....	76.8	.....	71.6	.....	67.2	.....	48.8	.....	30.9	.....	11.1	.....	46.8	.....	
Britt.....	24.6	+10.9	19.6	-2.9	34.0	-3.9	45.4	-1.2	56.4a	-2.0	68.4b	+1.0	73.9	+1.2	68.8	-1.4	64.6	+3.1	47.4	-1.2	30.0	-1.9	10.7	-10.0	45.3	+0.4		
Charles City.....	24.0	+12.6	20.6	-5.5	34.2	-5.8	46.0	-0.3	56.8	-2.7	70.6	+1.8	75.4	+1.9	69.6	-1.1	65.0	+3.3	47.8	-0.4	30.4	-2.6	10.2	-8.8	45.9	+1.3		
Decorah.....	23.8	+9.9	18.6	-1.0	34.2	-4.0	47.3	+0.4	57.4	-2.6	72.2	-3.7	76.0	+2.6	70.3	-0.9	65.3	+3.1	50.0	+0.9	31.4	-2.3	12.2	-10.0	46.5	+0.8		
Estherville.....	26.8	+14.1	.....	.....	36.0c	-7.4	44.5	-0.6	56.2	-1.4	69.4	+3.1	73.6	+2.9	68.8	-0.3	64.4	+4.3	45.9	-1.4	28.8	-2.7	11.8	-8.1	.....	.....
Fayette.....	23.2	+9.7	22.8	-5.4	35.2	-4.6	46.8	+0.4	56.4	-1.6	70.8	+4.0	74.9	+1.8	69.1	-0.5	64.5	+3.2	50.0	+1.3	31.9	-0.8	11.4	-9.5	46.4	+1.6		
Forest City.....	24.7	+11.9	19.8	-4.7	34.3a	-5.4	46.0	+0.1	56.6	-1.9	69.4a	+1.9	74.4	+1.8	69.2	-0.9	65.0	+3.7	47.2	-1.1	30.5	-1.2	12.0	-7.6	45.8	+1.4		
Humboldt.....	26.6	+10.6	21.0a	-1.8	37.1	-4.8	48.2	0.0	58.0	-1.4	71.4	+3.3	78.1	+4.9	71.5	+0.7	67.0	+4.7	48.9	-1.9	31.8	-2.5	12.8	-10.4	47.7	-1.2		
Inwood.....	25.2	+11.4	19.7	-3.5	33.8a	-3.2	46.2	-0.4	56.6	-2.5	69.4	+1.8	75.2	+2.3	71.4	-0.4	65.1	+2.6	45.0	-3.9	28.8	-3.0	13.8	-6.2	45.8	+0.7		
New Hampton.....	24.0	+10.7	21.9	+5.3	34.6	+5.0	46.7	+0.3	57.1	-1.4	70.7	+3.5	75.6	+3.4	70.6	+1.3	65.7	+4.8	49.0	+0.9	30.8	-2.2	10.1a	-10.8	46.4	+1.7		
Nora Springs.....	26.6	.....	22.8	.....	36.4	.....	48.3	.....	57.9	.....	71.6	.....	76.1	.....	70.6	.....	67.1	.....	50.5	.....	32.2	.....	12.8	.....	47.7	.....	
Pocahontas.....	27.2	+11.7	21.0	-3.4	36.0	-5.0	47.0	0.0	57.4	-1.9	70.7	+3.6	76.6	+4.1	70.4	-0.4	66.6	+4.2	48.2	-1.2	31.0	-1.8	13.2	-8.7	47.1	+1.5		
Postville.....	23.0	+8.6	22.4	-4.7	33.8	-3.2	46.2	-0.4	55.1	-3.6	68.3	+2.2	72.4	+0.7	67.8	-1.4	63.8	+2.7	49.0	-0.1	31.2	-2.1	10.5	-10.9	45.3	+0.3		
Rock Rapids.....	24.8	+12.2	19.6	-4.0	33.8	+4.0	46.0	+0.9	57.6	-0.9	70.6	+2.6	75.8	+2.0	69.6	-1.8	63.2	-1.2	43.8	-3.1	28.1	-3.4	13.4	-6.2	45.5	+0.9		
Sanborn.....	25.0	.....	19.4	.....	33.8	.....	45.8	.....	57.6	.....	69.6	.....	76.3	.....	70.4	.....	64.8	.....	45.6	.....	30.2	.....	12.8a	.....	45.9	.....	
Sioux Center.....	26.2	+11.6	21.4	-4.4	34.4	-3.6	46.2	-0.3	57.6	-1.2	69.3	+2.1	75.8	+3.5	71.4d	+1.0	65.7	+3.9	45.8	-2.9	29.3	-2.6	14.2	-6.9	46.4	+1.3		
Storm Lake.....	27.2a	+11.9	23.0b	-5.9	36.0	-5.2	46.6	-0.2	57.6	-1.7	69.9	+2.3	76.6	+3.7	71.0	-0.1	67.0	+4.8	47.9	-2.3	31.4a	-2.2	14.6	-7.8	47.4	+1.6		
Washta.....	26.6	+10.2	22.6	-3.9	36.4	-4.7	47.2	+0.1	57.4	-1.6	70.0	+2.6	76.0	+3.3	69.4	-1.8	65.7	+2.4	47.2	-2.4	30.5	-2.9	14.4	-8.1	47.0	+0.9		
Waverly.....	25.5	+10.5	23.4	-4.8	36.4	-4.5	47.2	-0.6	57.0	-2.9	69.0	+1.3	73.6	+0.6	70.4	-0.2	65.6	+3.4	50.6	+0.5	32.5	-1.6	11.2	-11.6	46.8	+0.7		
West Bend.....	25.4	+10.7	19.8	-2.3	35.6	-4.8	48.0	+0.8	58.4	-0.8	70.6	+2.4	76.5	+3.5	70.4	+0.2	66.2	+4.6	47.8	-0.3	29.9a	-2.6	11.8	-10.0	46.7	+1.3		
Central Division																												
Ames.....	27.2	+9.1	.....	.....	38.1	-4.1	47.2a	-2.4	57.4	-3.8	72.0b	+2.5	78.2	+4.2	73.1	+0.8	69.1	+5.7	51.0	0.0	34.3	-1.1	14.2	-10.2	.....	.....
Baxter.....	27.0	+9.0	25.0	-3.9	37.6	-3.7	48.8	-0.5	57.6	-3.0	71.2	+2.2	77.8	+4.2	71.0	-0.8	67.1	+3.6	51.8	+0.3	34.0	-1.8	13.9	-10.4	48.6	+0.9		
Belle Plaine.....	26.4	+8.9	25.6	-4.8	37.8	-4.5	50.1	+1.2	58.5	-1.9	72.2	+3.2	76.4	+3.0	70.6	-0.7	67.0	+3.8	52.1	+1.1	34.1	-1.3	13.8	-10.1	48.7	+1.4		
Boone.....	24.0	.....	24.0	.....	37.6	.....	48.2	-0.3	58.0	-1.7	71.6	+2.6	78.0	+3.7	70.8	-1.0	67.4	+4.9	50.4	-0.2	33.5	-1.1	14.4	-8.7	.....	.....
Carrol.....	28.0	+11.0	23.4	-4.4	37.9	-5.9	47.8	-0.6	58.4	-0.8	70.5	+2.7	77.1	+4.3	71.2	+0.6	68.6	+6.6	50.4	+1.1	33.2	-0.2	14.8	-8.4	48.4	+2.8		
Cedar Rapids.....	27.0	+10.2	26.2	-6.4	38.6	-6.9	51.1	-2.3	59.2	-2.1	74.6	+4.0	79.8	+4.2	73.6	-0.8	69.6	+5.6	54.0	+3.1	35.4	+0.4	16.0	-8.0	50.5	+2.8		
Clinton.....	25.3	-4.7	28.2	-5.3	39.2	-4.4	50.4	-0.7	58.0	-3.5	74.4	+4.0	78.3	+3.2	73.0	+1.1	68.2	+4.7	53.8	+2.3	35.8	-0.2	16.0	-9.7	50.0	+1.4		
Davenport.....	27.8	-7.0	28.2	-4.4	40.0	-4.6	51.0	-0.8	58.2	-3.3	74.6	+3.7	79.2	+3.8	73.0	0.0	68.8	+4.1	54.6	+2.0	36.6	-0.9	17.5	-9.7	50.8	+1.4		
Des Moines.....	29.8	-9.4	26.5	-2.4	38.8	-3.1	49.3	-1.3	59.8	-1.8	73.4	+3.0	79.8	+4.3	73.4	+0.4	68.9	+3.9	52.1	-0.4	35.7	-1.1	16.6	-9.1	50.8	+1.0		
Dubuque.....	25.9	-7.6	25.7	-4.1	36.6	-3.4	49.0	+0.1	57.8	-3.0	72.8	+3.2	76.6	+1.9	70.8	-1.2	66.1	+2.5	52.0	0.0	34.6	-1.4	14.4	-10.1	48.5	+0.6		
Guthrie Center.....	27.6	-8.0	25.4	-3.8	38.2	-3.8	48.8	-0.8	59.0	-2.4	71.9	+2.1	77.6	+2.8	71.2	-1.3	68.0	+4.3	50.8	-0.5	34.2	-1.5	14.9	-10.3	49.0	+0.7		
Harlan.....	27.1	-8.4	24.8	-4.2	38.0	-4.2	48.0	-0.9	58.1	-2.1	72.2	+3.9	77.2	+3.7	71.0	-0.5	66.6	+3.4	48.2	-2.2	32.8	-1.6	14.2	-9.6	48.2	+0.9		
Independence.....	25.7	+10.1	24.6	-5.3	37.0	-4.6	49.2	+1.4	57.3	-2.3	71.1	+3.4	76.8	+4.1	71.1	+0.3	67.0	+4.4	52.2	+2.3	33.5	-1.0	12.3	-10.5	48.2	+1.9		
Iowa City.....	25.8	+8.2	27.2	-6.7	38.6	-5.4	50.2	-1.6	57.8	-3.1	73.2	+3.4	77.2	+2.5	71.4	-0.8	68.2	+4.6	53.8	+2.8	35.3	+0.4	15.8	-8.3	49.5	+1.9		
Iowa Falls.....	25.4	+11.6	22.6	-5.8	36.6	-6.0	48.4	-2.0	57.0	-1.5	70.3	+3.0	75.4	+3.5	70.0	+0.5	66.3	+5.4	50.0	+1.6	32.2	-0.4	11.6	-9.7	47.1	-2.3		
Jefferson.....	27.0	+9.1	23.5	-2.3	37.7	-3.8	48.1	-1.0	57.6	-3.4	71.3	+3.3	76.8c	+2.8	69.7b	+2.3	67.0	+3.8	49.2	-1.8	33.2	-1.8	13.8	-10.4	47.9	+0.3		
Little Sioux.....	28.6a	+9.4	26.8	-4.7	38.2	-2.6	48.9	-1.7	59.5	-2.5	71.8	+1.5	78.6	+3.4	72.6	-1.0	68.2	+2.6	48.9	-3.9	33.7	-2.1	17.3	-8.1	49.4	+0.4		
Logan.....	31.2	+11.8	28.6	-6.6	41.3	-6.1	50.6	+0.2	60.3	-0.7	71.6	+1.6	78.8	+4.1	72.8	-0.4	69.2	+4.7	49.8	-2.0	34.2	-1.5	17.4a	-7.8	50.5	+1.9		
Maquoketa.....	25.0	+6.8	27.0	-5.5	36.2a	-1.5	49.6	+0.4	56.7a	-3.6	72.2	+3.8	75.0a	+1.8	69.4	-1.1	65.3	+2.7	52.6	+1.5	35.0	-1.3	15.2	-9.6	48.3	+0.7		
Marshalltown.....	28.7	+12.5	25.6	-6.5	38.4	-6.0	49.4	+1.1	58.8	-1.7</																		

MONTHLY MAXIMUM TEMPERATURE FOR 1919 WITH DATES.

STATIONS	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date	Max.	Date
<i>Northern Division</i>																								
Algona	52	18†	43	2	71	29	68	22	87	30	90	19†	97	29†	93	3	90	6†	81	2	56	10	40	29
Allison	55	29	48	11†	71	29	74	22	89	30	91	18†	100	29†	98	4	95	8	86	2	53	3	40	29
Alta	57	29	48	11	72	29	74	22	85	28	92	23	95	26	95	3	90	8	83	2	54	2†	42	30
Alton	54	29	45	2†	70	29	73	22	86	28	95	23	99	26	93	5†	90	6†	80	1	57	2	43	29
Belmond	53	24†	40	1†	70	29	70	6†	89	30	94	19	100	9†	96	3†	94	8	88	2	57	10	40	29
Britt	54	29	42	11	72	29	71	22	81a	27†	91b	18†	99	30	94	3	90a	7	86a	2	57	2	39	29
Charles City	51	24	48	12	69	29	73	22	89	30	90	19	98	30	91	3	91	8	84	2	48	10	40	29
Decorah	47	24†	50	12	67	29	75	22	91	30	93	19	98	26	91	4	91	7	80	2	58	10	40	29
Estherville	54	18†	42	12	69	29	71	22	89	28	95	23	95	30	89	3†	93	20	79	1	54	9	40	29†
Fayette	53	24	50	11	70	29	75	22	90	30	88	18†	99	26†	93	4	95	8	83	1	58	10	39	29
Forest City	55	29	40	1†	72a	29	74	22	90	30	91a	18	100	30	93	3	92	7	83	1†	52	3†	41	29
Humbolt	58	29	45a	11†	75	29	76	23	91	30	94	18	101	26†	98	3	96	8	88	2	57	10	42	29
Inwood	55	29	44	11	72a	29	75	4	85	28†	91	25	96	9†	96	3	91	7	81	1	57	2†	43	29
Mason City	50e	18†	44	12	70	29	71	22	87	30	96	20	100	30	99	5	91	7†	87	3	56	10	.....	.....
New Hampton	50	29	49	12	68	29	73	22	90	30	91	19	99	30	93	4	94	8	83	2	56	10	40a	29
Nora Springs	58	29	47	13	73	29	74	22	89	30	94	18	101	26	93	3†	96	7	89	2	58	10	43	29
Pocahontas	59	18†	47	11	75	29	72	22	89	30	93	18	98	9†	95	3	95	8	85	2	55	17†	42	29
Postville	50	27	52	11	64	29	71	22	85	30	87	19	92	26†	88	4	87	8	79	1†	57	10	40	29
Rock Rapids	54	29	44	11	70	29	71	22	88	28	93	18†	97	9	94	3	88	7	78	1	54	2	43	29
Sanborn	56	30	43	11	70	29	70	18†	86	28†	95	25	97	26	95	3	94	6†	81	2	56	20	42a	29
Storm Center	56	29	50	11	70	29	73	20	85	28	94	23	98	9	97d	3	90	7	83	2	58	2†	45	29
Storm Lake	58a	29	47c	11	72	29	73	22	85	30	92	23†	96	9†	95	3	91	8	85	2	54a	2†	41	29†
Washa	57	29	50	11	74	29	72	22	85	28†	94	23	96	9	96	3	92	7	83	1	58	20	45	30
Waverly	54	10†	49	11†	72	29	73	22	89	30	92	18†	100	30	95	4	95	8	83	1†	57	9	40	29
West Bend	56	18†	45	11	72	29	73	21	89	30	94	25	99	30	97	3	93	8	88	2	57a	10	41	29
<i>Central Division</i>																								
Ames	58	29	.....	.....	71	29	71a	19†	85	30	92b	18†	99	26†	95	4	93	8†	85	1	58	10	43	29
Baxter	59	29	57	11	69	29	76	6	88	30	94	18	99	27	92	4†	93	9†	86	1	58	10	40	29
Belle Plaire	55	24	58	11	70	29	76	6†	88	30	89	13†	97	27	96	4	96	7	84	1†	58	10	43	29
Boone	59	29	51	11	72	29	74	6	88	30	93	18†	99	27†	94	3	91	8†	83	1	57	10	41	29
Carrol	59	29	50	11	72	29	75	6	87	28	93	23	98	9	96	3	94	8	89	2	58	18	44	29†
Cedar Rapids	57	24	57	11	70	29	77	6†	93	30	95	13	102	30	98	4	96	9	87	1	60	10	40	29
Clinton	54	24	60	11	71	29	79	6	91	30	93	30	99	30	98	4	94	9	86	1	58	10	40	12
Davenport	56	24	59	11	69	29	77	6	90	30	92	16	96	27	96	4	92	9	86	1	59	9	42	30
Delaware	52	25	54	11	67	29	73	6†	88	30	88	18†	96	27	94	4	89	7†	83	1	57c	9	.....	.....
Denison	60	29	.....	.....	70	29	72	7†	87	30	93	24	96	9†	97a	3	94a	9	85	1	57	3†	45	30
Des Moines	62	29	57	11	68	29	76	6†	86	30	92	25	98	27	94	4	94	9	86	1	59	10	46	30
Dubuque	51	24	55	11	66	29	75	6	90	30	92	19	95	27	95	4	91	8	82	1	58	10	41	29
Grundy Center	55	29	50	11	71	29	78	22	89a	30	94	19	99	27	94	5†	93	8	85	1	57	10	40	29
Guthrie Center	60	29	54	11	70	29	75	6	87	30	91	18†	99	27	95	3	94	9	85	1	60	17	48	30
Harlan	55	29	54	12	70	29	73	6	86	30	97	19	97	30	97	3	96	9	86	1	68	16	44	29†
Independence	56	24	51	11†	70	29	74	19†	87	30†	89	18	101	27	94	4†	93	8	84	1	58	10	40	29†
Iowa City	59	24	62	11	70	29	78	6	89	30	94	16	100	27	96	4	98	9	86	1	58	10	41	29
Iowa Falls	55	29	47	12	72	29	74	6	87	30	90	19	99	30	93	4	94	8	84	2	58	10	39	29
Jefferson	58	29	50	11	72	29	74	6	86	28†	93	18†	97c	30	95b	5	93	9	84	1†	57	10†	43	29
Little Sioux	63a	29	57	11	72	29	73	6	87	28†	95	23	100	26	99	3	97	9	87	1	60	17	50	30
Logan	63	30	57	11†	72	29	74	20†	91	30	96	19	98	26	99	3	94	9	86	1	58	16†	49a	29
Maquoketa	51	24†	56	11	66a	29	76	6	88a	30	90	15†	96a	4	95	4	99	7	82	1†	58	10	43	29
Marshalltown	58	24	56	11	71	29	78	22	91	30	92	20†	100	27†	94	3†	96	9	87	1	58	10	42	29
Monroe	62	29	62	11	66a	29	75	6	88	30	90	18	100	30	92	4	96	9	86	1	58	3†	42	29
Olin	53	24	52	11	70	29	80	22	91	30	91	19	99	30	97	4†	96	8	82	1†	54	3	38	29
Onawa	62	29	54	11	75	29	75	22	88	29†	98	23	100	9†	101	3	96	9	86	1	59	2	48	30
Perry	57	29	51	11†	72	29	75	6†	83	30	92	18	100	27	95a	4	95	9	86	1	57	17†	42	30
Rockwell City	57	29	46	11	73	29	78	22	86	30	92	18	.....	.....	95a	3	94a	8	88	2	56	2	41	30
Sac City	58	29	44	2†	73a	29	72	22	85a	30	90	18†	97	30	95	3	92	8	84a	2	57	2	41	29†
Sioux City	58	29	50	11	73	29	73	22	85	28	96	23	101	26	99	3	92	7	84	1	58	2	46	29
Tipton	56	24	60	11	72	29	78	6†	92	30	94	19†	99	30	96	4	95	8†	85	2	58	3†	40	26†
Toledo	57	23†	57	11	73	29	79	6	92	30	92	13†	101	30	98	4	96	8†	85	1	58	3†	42	29
Waterloo	55	24	51	11	71	29	75	2																

MONTHLY MINIMUM TEMPERATURES FOR 1919, WITH DATES

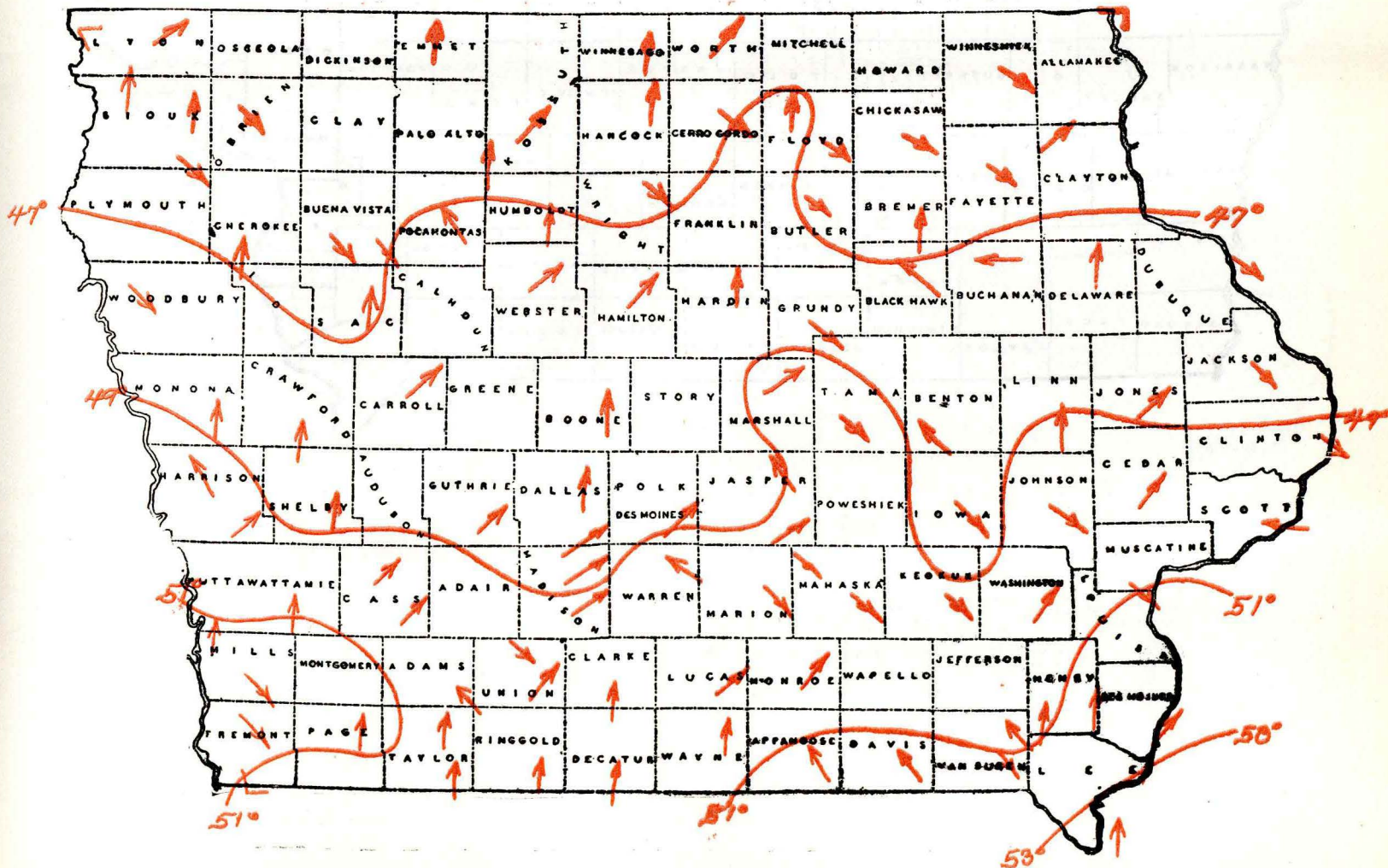
STATIONS	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date	Min.	Date
<i>Northern Division</i>																								
Algona.....	-24	3	-10	9	-4	2	27	24	35	2	48	2	58	16	45	31	39	25	16	28	-3	13	-22	10
Allison.....	-22	3	-7	27	-5	1	24	1	33	17	49	6	51	11	44	31	39	25	19	28	0	30	-27	10
Alta.....	-23	3	-6	28	-5	1	24	24	36	7	46	2	57	21	49	31	41	25	18	28	-3	30	-22	10
Alton.....	-24	3	-8	28	-6	1	24	24	32	2	46	2†	52	20	39	31	35	25	14	28	-12	13	-26	10
Belmond.....	-23	3	-12	7	-4	1	25	1	33	2	46	6	54	16†	43	31	36	25	19	28	-1	13	-25	10
Britt.....	-24	3	-12	7	-6	1	25	25	32	2	46b	6	52	22	46	26†	37a	23	16a	28	-4	12	-25	10
Charles City.....	-23	3	-5	25†	-6	1	24	1	32	2	51	6	54	11	45	31	42	25	19	28	2	30	-22	10
Decorah.....	-31	4	-4	25	-5	1	21	1	30	2	50	28	48	11	46	27†	40	23	22	28	3	30	-23	10
Estherville.....	-22	3	.....	.....	15f	8	23	25	31	2	45	2	54	5	43	31	37	25	21	26	-5	13	-17	10
Fayette.....	-24	3	-5	25	-4	1	20	1	30	2	50	7†	50	11	42	31	38	23	22	28†	3	30	-23	3
Forest City.....	-24	3	-8	14	-7a	1	24	1	32a	2	47a	6	51	18†	45	31	37	26	15	28	-3	13	-24	10
Humboldt.....	-22	3	-11a	7†	-2	1	24	1	32	2	49	2†	53	22	40	25†	39	23†	20	28	-2	30	-22	10
Inwood.....	-27	3	-9	28	-11a	1	22	24	33	7	45	6†	54	21	38	31	33	25	8	28	-8	13	-22	10
Mason City.....	-31	3	-9	7	-7	1	22	1†	30	2	48	6†	49	11	42	31	37	26	16	28	-1	13	.....	.....
New Hampton.....	-25	4	-7	25	-8	1	25	1†	32	2	50	6†	52	11	45	31	41	22	20	28	2	13†	-25a	10
Nora Springs.....	-25	4	-6	27	-4	1	25	1	40	2†	50	6†	50	11	44	31	40	12†	20	28	1	13†	-24	3
Pocahontas.....	-23	3	-10	28	-3	1	25	1	32	2	47	2†	52	22	42	31	36	25	19	28	-3	13†	-23	10
Postville.....	-28	4	-6	25	-9	1	24	1†	32	2	48	28	51	11	46	31	40	23	22	28	2	30	-23	10
Rock Rapids.....	-24	3	-10	9	-8	1	23	24	31	1	47	3†	54	6	38	31	34	25†	12	28	-7	13	-21	10
Sanborn.....	-26	3	-10	28	-7	1†	23	24	33	7	45	2†	54	6	43	31	35	25	15	28	-6	30	-21a	10
Sioux Center.....	-26	3	-8	28	-8	1	22	24	35	7	47	2†	55	6†	52d	25	37	25	11	28	-5	13	-21	10
Storm Lake.....	-23a	3	-6	28	-5	1	25	24	37	2†	47	2	57	21	46	31	40	25	18	28	-2a	30	-20	10
Washta.....	-22	3	-12	7†	-2	1†	25	1	31	2	46	2	50	22	38	31	34	25	16	28	-9	13	-27	10
Waverly.....	-28	4	-4	25†	-5	1	22	1	38	9	46	30	41	16	43	51	39	12	19	28	2	30	-27	10
West Bend.....	-25	3	-11	9	-5	1†	24	1	34	7	46	6	53	22	41	31	35	25	15	28	-5a	13	-25	10
<i>Central Division</i>																								
Ames.....	-21	3	.....	.....	0	1	22a	1	34	2	48b	8	52	16	50	26	42	1†	22	28†	2	30	-23	10
Baxter.....	-19	3	-3	7	0	1	28	1	35	2	45	2†	58	16†	46	31	36	22	23	28†	3	30	-26	10
Belle Plaine.....	-21	4	-1	9	-4	1	25	1	34	2	50	8	53	22	48	26†	40	23	22	29	4	30	-25	10
Boone.....	-21	3	-2	7†	-1	1	26	1	36	2	49	7	54	22	47	31	42	25	22	28	0	30	-21	10
Carroll.....	-23	3	-8	7	-3	1	23	1	36	7†	46	2†	52	22	44	31	41	23	19	28	-1	30	-23	10
Cedar Rapids.....	-17	4	0	8†	-2	1	27	1	39	2†	52	28	57	11	50	31	46	26	23	29	7	30	-23	10
Clinton.....	-26	4	4	5†	1	1	22	1	34	2	51	8	57	11	51	31	42	26	23	29	10	30	-23	10
Davenport.....	-16	4	4	7	1	1	30	1	39	9	52	28	61	7	50	31	48	23	28	29	12	30	-14	10
Delaware.....	-28	4	-3	25	-8	1	24	1	33	2†	49	28	54	16	45	31	38	25	20	29	7a	13	.....	.....
Denison.....	-23	3	.....	.....	-2	1	26	24	37	2†	46	2	52	22	43a	30	43a	22†	17	28	0	30	-22	10
Des Moines.....	-17	3	-1	7	1	1	31	1	40	2	52	2	59	22	49	31	45	23	22	29	5	30	-19	10
Dubuque.....	-23	4	2	25	-4	1	28	1	37	2	52	28	56	11	50	31	43	26	25	29	8	30	-18	10
Grundy Center.....	-19	3	-4	7	-3	1	24	1	40a	2†	51	28	54	17	47	31	41	12†	20	28	2	30	-22	10
Guthrie Center.....	-20	3	-8	7†	0	1	22	1	33	2	49	2	49	22	40	31	41	12†	20	28	0	30	-29	10
Harlan.....	-21	3	-8	7	0	1	24	1	34	2	47	2	48	22	39	31	36	23	15	28	-4	30	-27	10
Independence.....	-24	4	-4	25	-5	1	24	1	34	1	49	27	52	11	46	31	42	23†	21	28†	4	30	-25	10
Iowa City.....	-25	4	2	7†	-2	1	23	1	34	2	50	8	54	17	46	31	41	13†	20	29	7	30	-25	10
Iowa Falls.....	-22	3	-7	7	-4	1	22	1	32	2	47	6	50	16†	42	31	39	25	20	28	2	30	-31	10
Jefferson.....	-21	3	-8	7	-2	1	23	1	32	2	48	8	55c	16	42b	31	39	25	20	28	0	30	-25	10
Little Sioux.....	-21a	3	-5	28	-2	1	26	24	33	7	44	6	50	22	41	31	37	22	12	28	-4	30	-26	10
Logan.....	-20	3	-3	28	-3	1	28	24	35	19	48	2	52	22	44	31	40	23†	16	28	-2	30	-27a	10
Maquoketa.....	-32	4	1	8	-4a	1	20	1	34a	2	50	7†	50a	23	46	26†	39	26	19	29	9	13	-25	10
Marshalltown.....	-19	3	-3	7†	-2	1	23	1	35	2	48	8	51	23	47	31	39	12	21	29†	2	30	-26	10
Monroe.....	-20	3	-4	7	-2	1	29	25	38	2	51	5	58	22	48	31	43	23	22	29	4	30	-23	10
Olin.....	-27	4	2a	7†	-2	1	23	1	34	2	50a	21	.....	.....	.....	47	31	43	19	19	8	30	-28	10
Onawa.....	-21	3	-5	28	-1	1	26	24	36	2	46	5	52	22	43	31	38	22	14	28	-2	30	-26	10
Perry.....	-22	3	-7	7	-1	1	23	1	33	2	49	2†	52	22	43a	31	41	23	20	28	-2	30	-34	10
Rockwell City.....	-22	3	-7	7	-3	1	27	2†	36	2	42	2†	.....	.....	48a	27	38b	25	20	28	-2	30	-22	10
Sac City.....	-23	3	-8	9	-4a	1	25	1†	34a	2	46	2	54	22	47	31	40	25	18a	28	-2	30	-22	10
Sioux City.....	-22	3	-5	28	-2	1	26	24	39	7	48	3	59	6	45	31	42	25	15	28	1	13	-16	10
Tipton.....	-22	4	3	25	-1	1	24	1	44	18	50	28	55	11	47	31	42	26	21	29	9	30	-22	10
Toledo.....	-19	3†	-5	7	-4	1	21	1	34	2	47	8	52	22	44	31	40	12	22	29	4	30	-23	10
Waterloo.....	-28	4	-3	7†	-4	1	22	1	32	2	52	5†	50	11	45	26†	40	23	21	28	4	30	-29	10
Waukegan.....	-21	3	-6	7†	-1	1	27	1	37	2†	50	2†	52											

DATES OF KILLING FROSTS, 1919.

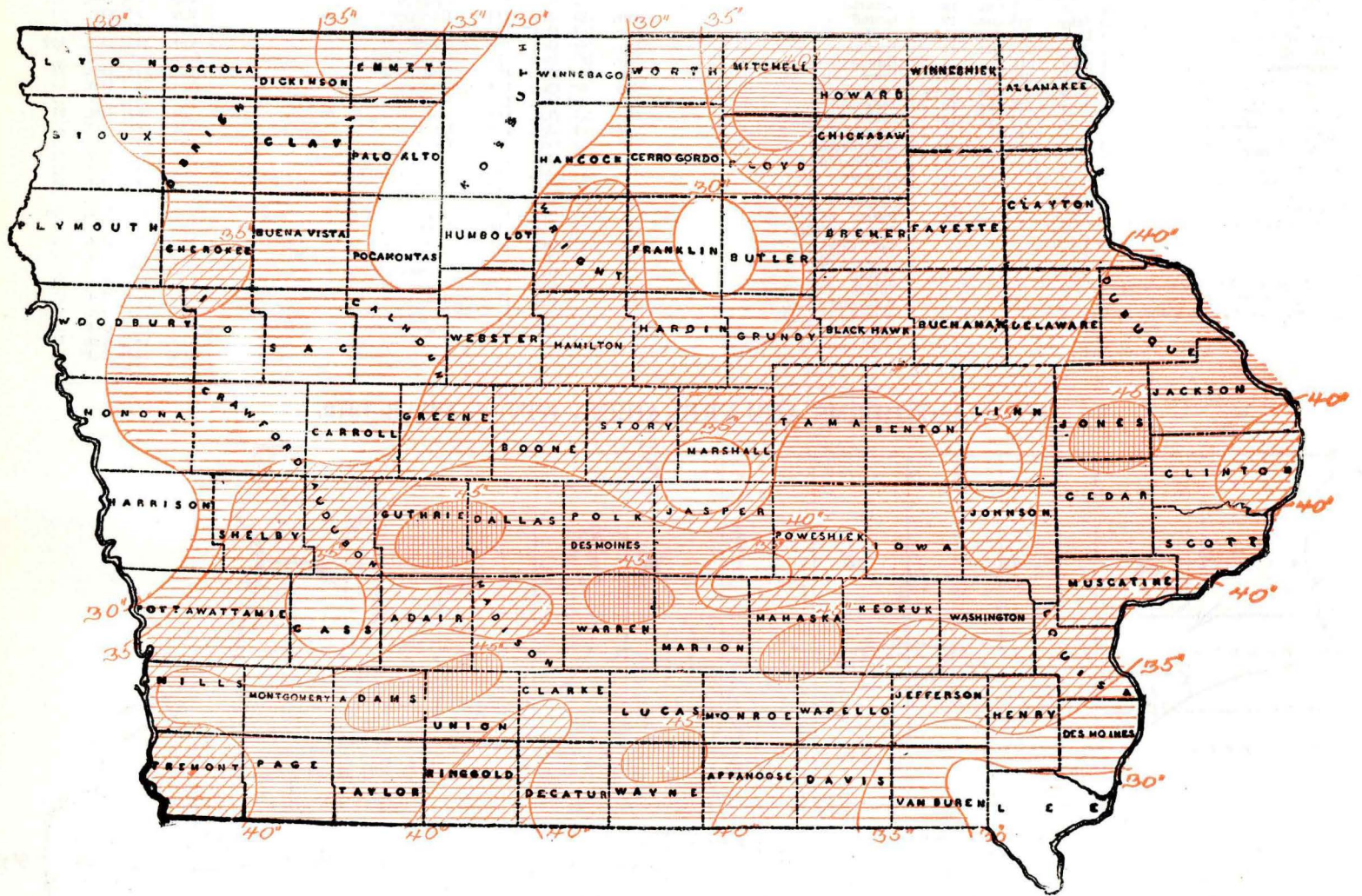
STATIONS	Killing Frosts		STATIONS	Killing Frosts		STATIONS	Killing Frosts	
	Last in Spring	First in Autumn		Last in Spring	First in Autumn		Last in Spring	First in Autumn
<i>Northern Division</i>			<i>Central Division</i>			<i>Southern Division</i>		
Algona	Apr. 26†	Oct. 10	Ames	Apr. 27†	Oct. 11	Afton	Apr. 26†	Oct. 11†
Allison	Apr. 26†	Oct. 11	Audubon	Apr. 26†	Oct. 11	Albia	Apr. 26†	Oct. 12
Alta	Apr. 25†	Oct. 10	Baxter	Apr. 25†	Oct. 11	Allerton	Apr. 26	Oct. 11
Alton	May 2†	Oct. 10	Belle Plaine	Apr. 26	Oct. 11	Atlantic	Apr. 26†	Oct. 10†
Belmond	Apr. 26†	Oct. 11	Boone	Apr. 26	Oct. 10	Bedford	May 2†	Oct. 11†
Britt	May 2†	Oct. 11	Carroll	Apr. 26†	Oct. 10†	Bloomfield	Apr. 26†	Oct. 11
Charles City	Apr. 28	Oct. 11	Cedar Rapids	Apr. 26	Oct. 11†	Bonaparte	Apr. 26†	Oct. 11†
Decorah	May 2†	Oct. 11	Clinton	Apr. 25†	Oct. 17	Burlington	Apr. 25†	Oct. 17
Elkader	May 2†	Oct. 11	Davenport	Apr. 25	Oct. 17	Centerville	Apr. 26†	Oct. 10†
Estherville	May 2†	Oct. 10	Delaware	Apr. 26†	Oct. 11†	Chariton	Apr. 26†	Oct. 11†
Fayette	May 2†	Oct. 11	Denison	Apr. 26†	Oct. 10†	Clarinda	Apr. 25†	Oct. 11
Forest City	May 2†	Oct. 11	Des Moines	Apr. 26	Oct. 17	Columbus Jct.	Apr. 25	Oct. 11
Humboldt	May 2†	Oct. 11	Dubuque	Apr. 25†	Oct. 28	Corning	Apr. 26†	Oct. 11†
Inwood	Apr. 26†	Oct. 10†	Fort Dodge	Apr. 26†	Oct. 11†	Corydon	Apr. 26	Oct. 11†
Le Mars		Oct. 10	Grinnell		Oct. 11	Creston	Apr. 26†	Oct. 11†
Mason City	May 2†	Oct. 10	Grundy Center	Apr. 18†	Oct. 11†	Earlham	May 2†	Oct. 11
New Hampton	May 2†	Oct. 11	Guthrie Center	Apr. 26†	Oct. 11†	Fairfield	Apr. 26†	Oct. 11
Nora Springs	Apr. 26	Oct. 11	Harlan	Apr. 26†	Oct. 10†	Glenwood	Apr. 24†	Oct. 10†
Northwood	May 2†		Independence	Apr. 26†	Oct. 11†	Greenfield	Apr. 25†	
Pocahontas	May 2†	Oct. 11†	Iowa City	Apr. 26	Oct. 11	Indianola	Apr. 26†	Oct. 11
Postville	May 2	Oct. 11†	Iowa Falls	May 2†	Oct. 11†	Keokuk	Apr. 26	Oct. 28
Rock Rapids	May 6†	Oct. 10	Jefferson	May 2†	Oct. 11	Keosauqua	Apr. 26†	Oct. 11†
Sanborn	Apr. 26†	Oct. 10†	Little Sioux	Apr. 24†	Oct. 10†	Knoxville	Apr. 26†	Oct. 11†
Sibley	Apr. 26†	Oct. 10†	Logan	Apr. 24†	Oct. 10†	Lamoni	Apr. 26†	Oct. 11†
Sioux Center	Apr. 26†	Oct. 10†	Maquoketa	Apr. 26†	Oct. 11	Lenox	Apr. 26†	Oct. 11†
Spencer	May 2†	Oct. 10†	Marshalltown	Apr. 26†	Oct. 11	Mt. Air	Apr. 26†	Oct. 11
Storm Lake	Apr. 25†	Oct. 10†	Monroe	Apr. 26†	Oct. 11	Mt. Pleasant	Apr. 26	Oct. 11
Washta	May 2†	Oct. 10†	Olin	Apr. 26†	Oct. 11†	Murray	Apr. 26†	Oct. 11
Waverly	Apr. 26†	Oct. 11	Onawa	Apr. 24†	Oct. 10†	Northboro	Apr. 24†	
West Bend	Apr. 26†	Oct. 10†	Perry	Apr. 26†	Oct. 11	Oakland	Apr. 25†	Oct. 10†
			Rockwell City	Apr. 26†	Oct. 11†	Oskaloosa	Apr. 26	Oct. 11
			Sac City	Apr. 26†	Oct. 10†	Ottumwa	Apr. 25†	Oct. 9†
			Sioux City	Apr. 24†	Oct. 11	Pella	Apr. 26†	Oct. 11
			Tipton	May 18†	Oct. 11†	Shenandoah	Apr. 26†	
			Toledo	Apr. 26†	Oct. 11†	Sigourney	Apr. 26	Oct. 11
			Waterloo	May 2†	Oct. 11†	Stockport	Apr. 26†	Oct. 11†
			Waukee	Apr. 26	Oct. 11	Thurman	Apr. 24†	Oct. 11
			Webster City	May 2†	Oct. 11†	Washington	Apr. 26	Oct. 11
			Williamsburg	Apr. 26†	Oct. 11†	Winterset	Apr. 26	Oct. 11
						Omaha, Nebr.	Apr. 24†	Oct. 14

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

MEAN ISOTHERMS AND PREVAILING WINDS, YEAR 1919.



TOTAL PRECIPITATION, YEAR 1919.

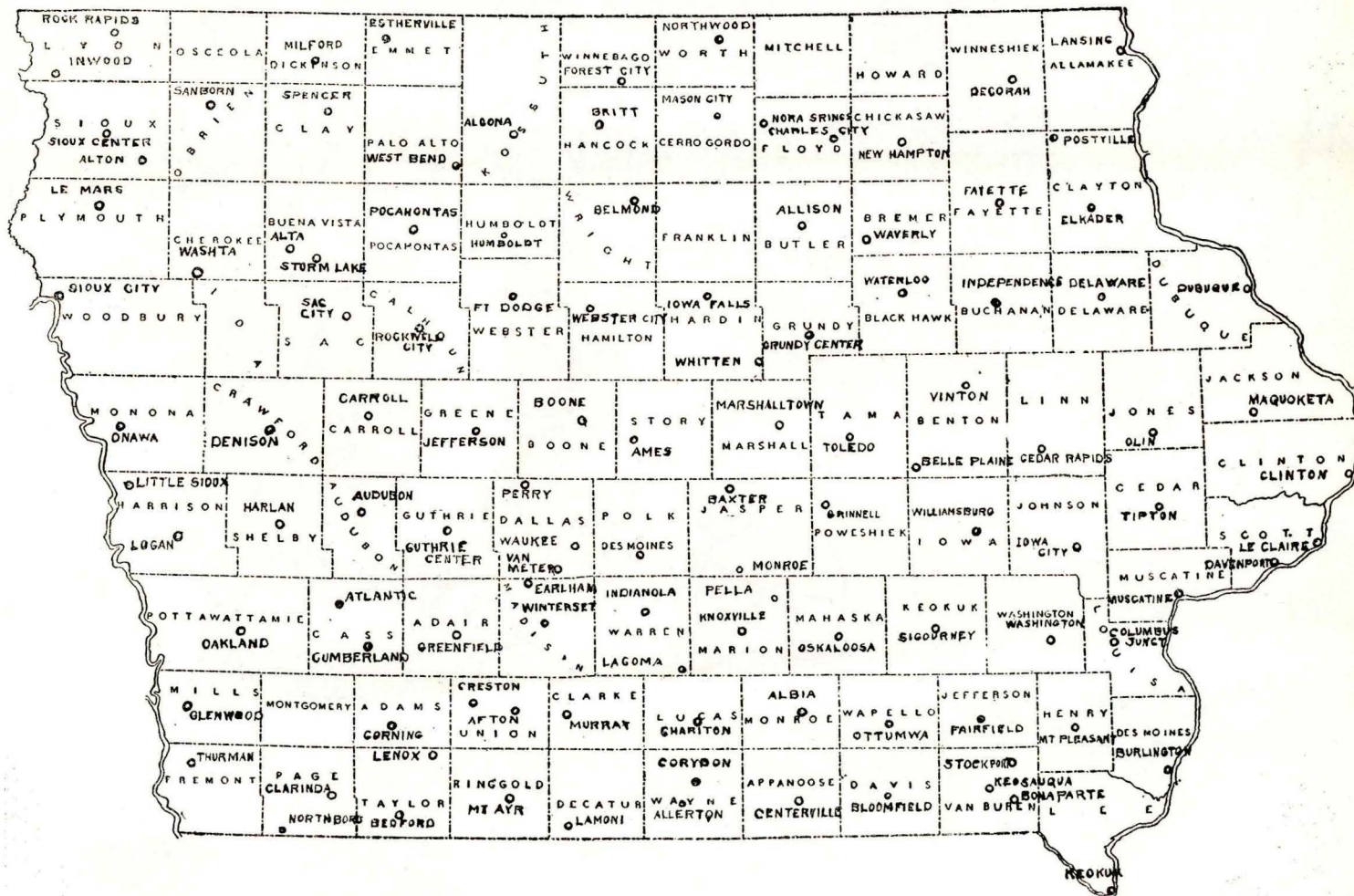


SCALE OF SHADES—IN INCHES.

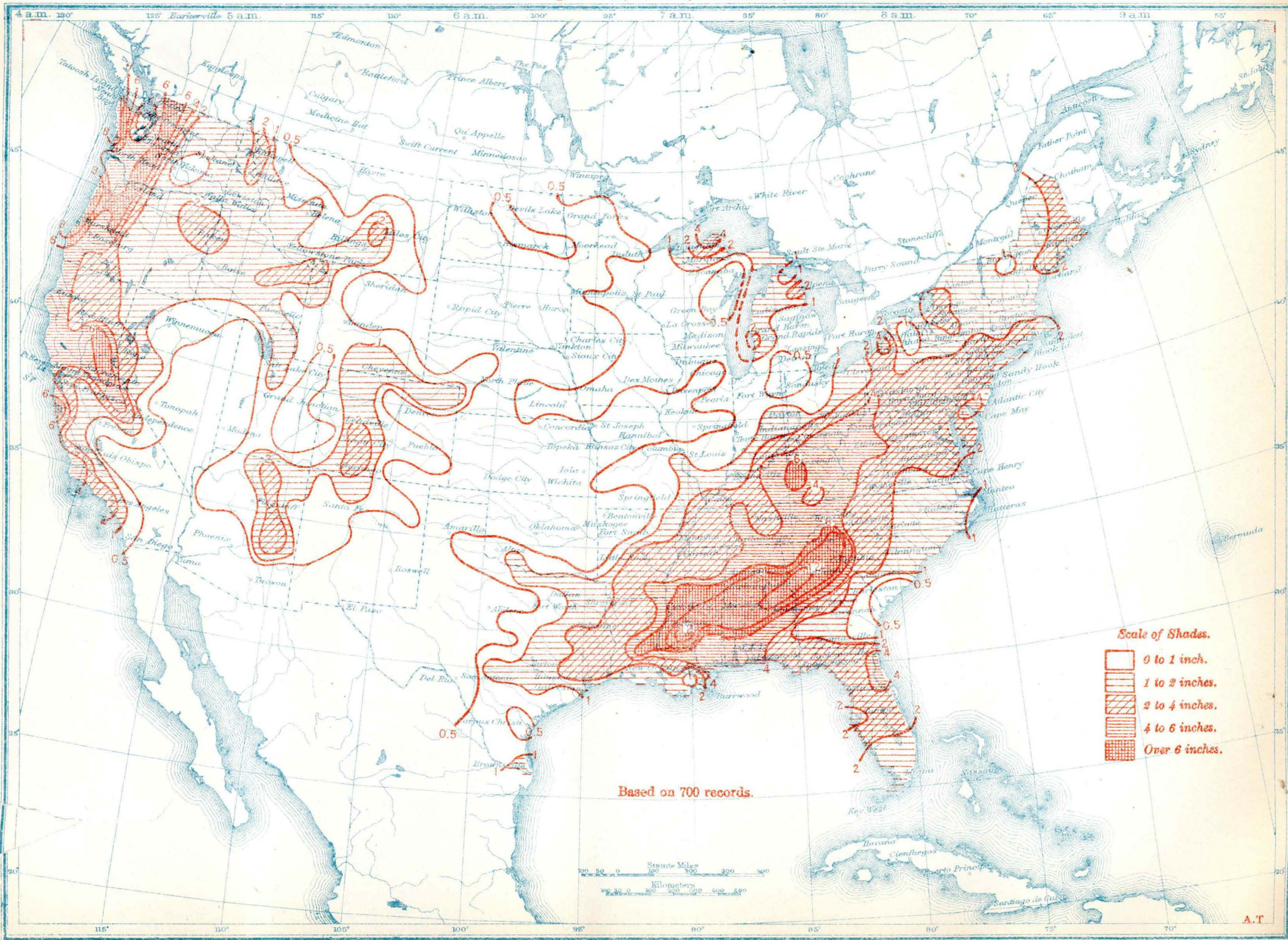


LIST OF CO-OPERATIVE STATIONS AND OBSERVERS

Stations	Observers	Stations	Observers	Stations	Observers
Afton.....	S. R. Brown	Earlham.....	Geo. Phillips	Muscatine.....	Wm. P. Molis
Albia.....	F. H. Holmes	Estherville.....	A. O. Peterson	New Hampton.....	A. F. Kenman
Algona.....	W. E. Laird	Fairfield.....	R. Monroe McKenzie	Nora Springs.....	Arthur Betts
Allison.....	J. A. Bell	Fayette.....	R. Z. Latimer	Northwood.....	Chas. Dwelle
Alta.....	David E. Hadden	Forest City.....	W. R. Prewitt	Oakland.....	M. E. Gray
Alta (near).....	Warren Minard	Fort Dodge.....	Isadore Haugh	Olin.....	Dr. F. W. Port
Alton.....	W. S. Slagle	Glenwood.....	Dr. George Mogridge	Omaha.....	U. S. Weather Bureau
Ames.....	Iowa State College	Greenfield.....	J. C. Patterson	Onawa.....	Mrs. H. E. Colby
Atlantic.....	Thos. H. Whitney	Grinnell.....	J. C. Stocks	Oskaloosa.....	R. R. Robinson
Audubon.....		Grundy Center.....	M. G. Heiberger	Ottumwa.....	Eugene O. Field
Baxter.....	Rev. Paul Traeger	Guthrie Center.....	C. T. Harney	Pella.....	J. H. Ver Steeg
Bedford.....	E. E. Healey	Harlan.....	E. L. Tilton	Perry.....	Mrs. C. E. Anthony
Belle Plaine.....	O. C. Burrows	Humboldt.....	H. C. Snitkey	Pocahontas.....	F. E. Hronek
Belmond.....	Geo. P. Hardwick	Independence.....	Dr. H. A. Lindsay	Postville.....	F. L. Williams
Bloomfield.....	Y. G. Warner	Indianola.....	Prof. L. J. Tilton	Rock Rapids.....	J. K. Medberry
Bonaparte.....	Bruce R. Vale	Inwood.....	F. B. Hanson	Rockwell City.....	A. W. McIsaac
Boone.....	Carl F. Henning	Iowa City.....	Prof. J. F. Reilly	Sac City.....	F. P. Kessler
Britt.....	L. M. Goodman	Iowa Falls.....	J. B. Parmelee	Sanborn.....	J. W. Dow
Burlington.....	Edna M. Donnelly	Jefferson.....	W. I. Lyon	Sigourney.....	W. E. Utterback
Carroll.....	Mrs. Jos. J. Wolfe	Keokuk.....	U. S. Weather Bureau	Sioux Center.....	J. De Ruyter
Cedar Rapids.....	R. S. Toogood	Keosauqua.....	J. H. Landes	Sioux City.....	U. S. Weather Bureau
Centerville.....	Leo. J. Allen	Knoxville.....	W. J. Casey	Stockport.....	C. L. Beswick
Chariton.....	C. C. Burr	Lacona.....	Ed. D. Moore	Storm Lake.....	Geo. H. Fracker
Charles City.....	U. S. Weather Bureau	Lamoni.....	Margaret T. Disney	Thurman.....	C. R. Paul
Clarinda.....	A. S. VanSandt	Le Claire.....	J. L. Hurley	Tipton.....	C. N. Wallick
Clinton.....	H. Burde	Lenox.....	C. L. Trenery	Toledo.....	I. F. Giger
Columbus Jct.....	J. B. Johnston	Le Mars.....	Geo. H. Gibson	Washington.....	W. A. Cook
Corning.....	Jerome Smith	Little Sioux.....	Mary Jean Stern	Washta.....	H. L. Felter
Corydon.....	Mrs. T. E. Hubbard	Logan.....	Ira H. Stephens	Waterloo.....	R. B. Slippy
Creston.....	U. S. Weather Bureau	Maquoketa.....	Chas F. W. Kothenbeutel	Waukee.....	Samuel F. Foft
Cumberland.....	J. H. Reppert	Marshalltown.....	W. E. Groom	Waverly.....	H. Arnold
Davenport.....	U. S. Weather Bureau	Mason City.....	Dr. F. J. Smith	Webster City.....	C. D. Carpenter
Decorah.....	W. F. Baker	Milford (near).....	J. A. Dibel	West Bend.....	Jos. Dorweiler
Delaware.....	Nettie E. Ball	Monroe.....	Alex Maxwell	Whitten.....	B. B. Butler
Denison.....	Emma Brogden	Mount Ayr.....	John H. Jericho	Williamsburg.....	Dr. F. C. Schadt
Des Moines.....	U. S. Weather Bureau	Mount Pleasant.....	M. T. Ashley	Winterset.....	H. S. Ely
Dubuque.....	U. S. Weather Bureau	Murray.....			



Total Precipitation, Inches, December, 1919.



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