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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

JANUARY, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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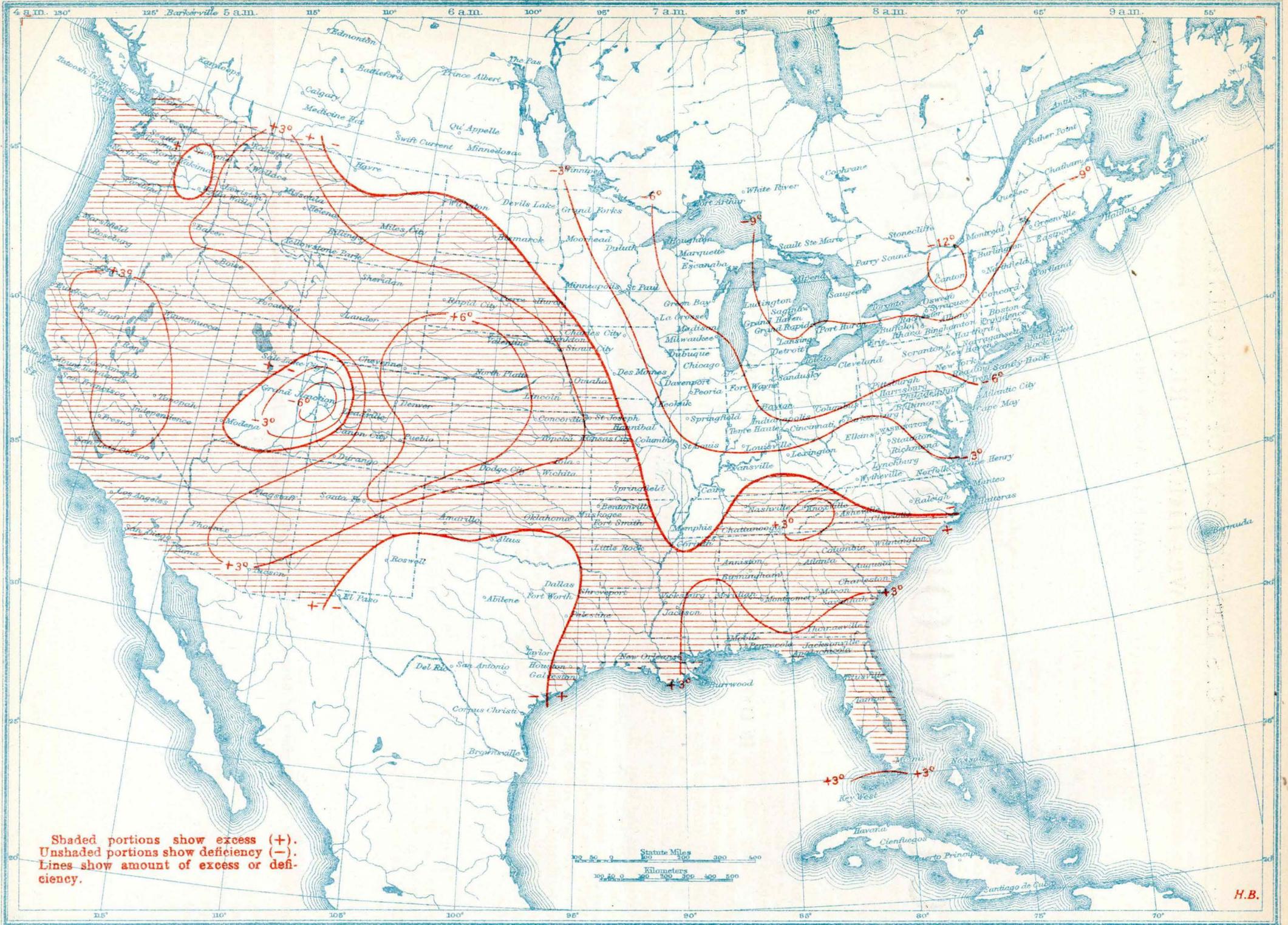


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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



# Departure of the Mean Temperature from the Normal, January, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, January, 1920. No. 1

GENERAL SUMMARY

For the State as a whole, the January temperature was below normal, though the deficiency was neither uniform nor general. Over a considerable area adjoining the Missouri River the temperature was above normal, and in the extreme southwest and extreme west-central portions the excess amounted to nearly 4 degrees. Eastward from this area the temperature gradually became colder and over the northeastern portion, along the Mississippi River, there was a deficiency of nearly 5 degrees. There were no protracted cold periods or very severe weather, neither was there any mild weather, except for short intervals. The usual January thaw was absent and as a result the snow cover remained during the entire month over about 75 per cent of the State, but at the close of the month bare ground was general over the southern tier of counties and along the Missouri River.

Stock were able to graze in corn fields during the greater portion of the month and favorable weather conditions permitted the usual farm work, but marketing of grain was hindered by a shortage of railroad cars.

Precipitation was deficient over the entire State, except a small area over the extreme north-central portion, and the average for the State, 0.42 inch, was with three exceptions the least for January in the past 31 years. Practically the entire amount fell in the form of snow or sleet but there was less drifting than usual and railroad traffic was hindered but little.

The snow cover was favorable for winter grain and it is thought that wheat and rye were uninjured at the end of the month except over a small area in the extreme southeastern portion. An unusually large crop of ice of fine quality was harvested.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.29 inches. The highest recorded was 30.87 inches, at Sioux City on the 24th, and the lowest was 29.61 inches at Des Moines on the 16th. The monthly range was 1.26 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 99 stations, was 16.7°, or 1.2° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 13.1°, or 1.5° lower than the normal; Central, 16.2°, or 2.0° lower than the normal; Southern, 20.8°, or 0.1° lower than the normal. The highest monthly mean was 23.9°, at Glenwood and Thurman, and the lowest monthly mean was 10.0°, at Charles City. The highest temperature reported was 58° at Thurman on the 29th, and the lowest was -26° at Elkader on the 4th. The temperature range for the State 84°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 86 per cent and at 7 p. m., 77 per cent. The mean for the month was 82 per cent, which is just normal. The highest mean was 88 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 106 stations, was 0.42 inch, or 0.63 inch less than the normal. By divisions the averages were as follows: Northern, 0.46 inch, or 0.38 inch less than the normal; Central, 0.41 inch, or 0.70 inch less than the normal; Southern, 0.40 inch, or 0.79 inch less than the normal. The greatest amount, 1.05 inches, occurred at Northwood, and the least, a trace at Denison. The greatest amount in any 24 consecutive hours, 0.64 inch, occurred at Oskaloosa on the 24th.

SNOW

The average snowfall for the State was 4.6 inches, or 2.3 inches below the normal. The greatest amount, 12.7 inches occurred at Forest City, and the least, a trace at Denison.

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 56 miles per hour from the northwest, at Sioux City, on the 20th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 47, or 3 per cent lower than the normal. The percentage of the possible amount at the several regular Weather Bureau stations was as follows: Charles City, 40; Davenport, 54; Des Moines, 46; Dubuque, 55; Keokuk, 51; Sioux City, 35; Omaha, Neb., 49. Clear days average 12, partly cloudy 8, and cloudy 11.

MISCELLANEOUS PHENOMENA

Fog, dense: 6th, 9th, 15th, 16th, 20th, 22d, 25th, and 31st.

Glaze: 15th.

Halos, lunar; 1st, 2nd, 7th, 11th, 22d, 26th, 28th.

Halos, solar: 8th, 22d, 26th, 28th.

Sleet: 6th, 15th, 16th, 22d, 23d.

COMPARATIVE DATA FOR THE STATE—JANUARY

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation .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	.....	4	13	7	11
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	8.2	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	6
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	0.24	-0.81	0.86	T.	2.8	2	20	5	6
1920.....	16.7	-1.2	58	-26	0.42	-0.63	1.05	T.	4.6	4	12	8	11

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

CLIMATOLOGICAL DATA FOR JANUARY, 1920

Table with columns: 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), No. of Days (Precipitation .01 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

CLIMATOLOGICAL DATA FOR JANUARY 1920.

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 0.1 in. or more	Clear			Partly Cloudy	Cloudy
<i>Southern Division</i>																				
Afton.....	Union.....	1212	26	21.6	+0.6	27	29	-4	25	29	0.20	-0.64	0.20	2.5	1	13	10	8	nw.	S. R. Brown
Albia.....	Monroe.....	959	22	19.4	0.0	49	29	-9	25	32	0.37	-0.92	0.37	5.0	1	14	4	13	sw.	F. H. Holmes
Atlantic.....	Cass.....	1164	29	18.8	-0.6	43	29	-7	9†	31	0.52	-0.26	0.20	5.1	9	8	5	18	ne.	Thos. H. Whitney
Bedford.....	Taylor.....	20	20	22.2	+1.0	51	29	-5	9†	31	0.55	-0.45	0.30	5.3	4	15	7	9	nw.	E. E. Healy
Bloomfield.....	Davis.....	881	13	22.0	.....	52	29	-6	25†	34	0.30	-1.63	0.30	4.0	1	6	18	7	nw.	V. G. Warner
Bonaparte.....	Van Buren.....	565	29	21.0	-1.0	47	29	-6	25	30	0.24	-1.36	0.22	2.2	2	16	4	11	nw.	Bruce R. Vale
Burlington.....	Des Moines.....	544	24	21.8	-0.6	44	29	-2	4†	30	0.38	-1.35	0.30	4.0	3	18	4	9	ne.	Mrs. Edna M. Donnelly
Centerville.....	Appanoose.....	1013	15	22.5	.....	49	29†	-10	25	35	0.31	.....	0.29	3.3	2	14	6	11	nw.	Leo. J. Allen
Chariton.....	Lucas.....	1042	25	20.6	-0.1	48	14†	-4	25	32	0.49	-0.67	0.38	6.0	2	9	13	9	ew.	C. C. Burr
Clarinda.....	Page.....	1009	30	23.4	+3.7	51	29	-1	9	30	0.24	-0.71	0.10	2.5	3	13	8	10	nw.	A. S. Van Sandt
Columbus Jct.....	Louisa.....	595	19	19.7	-2.3	42	12†	-6	25	30	0.44	-0.80	0.32	4.8	5	16	5	10	nw.	J. B. Johnston
Corning.....	Adams.....	1117	28	21.6	+1.9	50	29	-6	9	42	0.30	-0.59	0.20	3.0	2	16	2	13	nw.	Jerome Smith
Corydon.....	Wayne.....	1101	27	21.1	-0.7	44	12†	-7	25	32	0.37	-0.96	0.36	4.1	2	13	9	9	nw.	May C. Miller
Creston.....	Union.....	1312	15	19.6	+1.6	50	29	-4	25	34	0.45	.....	0.25	4.5	2	9	16	6	nw.	Mrs. T. E. Hubbard
Cumberland.....	Cass.....	21	.....	.....	.....	.....	.....	.....	.....	.....	0.20	-0.68	0.20	2.0	1	12	9	10	nw.	J. H. Reppert
Earlham.....	Madison.....	1126	18	18.1	-1.0	43	26†	-16	25	38	0.32	-0.93	0.18	3.5	4	12	9	10	nw.	Geo. Phillips
Fairfield.....	Jefferson.....	780	36	20.7c	-1.1	48c	29	-11c	25	37c	0.47	-1.08	0.40	4.9	3	.....	.....	.....	nw.	Prof. R. M. McKenzie
Glenwood.....	Mills.....	1100	23	23.9	.....	52	29	-8	9	38	0.40	.....	0.30	4.0	2	10	1	20	ne.	Dr. Geo. Mogridge
Greenfield.....	Adair.....	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Indianola.....	Warren.....	969	28	19.2	-1.2	45	29	-6	25	29	0.42	-0.79	0.30	4.2	4	13	5	13	nw.	Prof. J. L. Tilton
Keokuk.....	Lee.....	614	49	22.5	-1.2	49	29	0	25	31	0.38	-1.31	0.28	3.8	3	11	8	12	n.	U. S. Weather Bureau
Keosauqua.....	Van Buren.....	644	28	21.1	+0.2	48	29	-9	25	33	0.20	-1.14	0.15	2.0	2	13	6	12	se.	J. H. Landes
Knoxville.....	Marion.....	920	25	18.9	-2.1	47	29	-15	25	39	0.45	-0.75	0.30	4.5	3	14	3	14	nw.	W. J. Casey
Lacona.....	Warren.....	21	.....	.....	.....	.....	.....	.....	.....	.....	0.70	-1.02	0.40	7.0	3	6	16	9	.....	J. B. Alter
Lamoni.....	Decatur.....	1100	13	22.2	+0.7	51	29	-6	25	32	0.21	.....	0.17	3.5	2	17	4	10	nw.	Ed. D. Moore
Lenox.....	Taylor.....	1250	25	22.0	+1.6	51	29	-3	25	31	0.31	-0.39	0.20	3.1	4	16	7	8	nw.	J. L. Hurley
Mt. Ayr.....	Ringgold.....	1236	27	22.1	+0.3	50	29	-6	25	31	0.36	-0.71	0.30	4.6	3	12	9	10	s.	Alex Maxwell
Mt. Pleasant.....	Henry.....	729	39	20.8	-1.3	47	29	-6	25	33	0.49	-1.02	0.25	5.0	5	14	4	13	nw.	John H. Jericho
Murray.....	Clarke.....	1216	29	20.4	0.0	48	29	-6	25	31	0.20	-0.68	0.17	1.8	2	10	10	11	nw.	M. T. Ashley
Oakland.....	Pottawattamie.....	.....	.....	19.9	.....	40	12†	-10	9	35	0.30	.....	0.20	3.0	2	17	3	11	s.	M. E. Gray
Oskaloosa.....	Mahaska.....	825	44	18.8	-1.2	46	29	-11	25	39	0.84	-0.12	0.64	9.1	6	10	8	13	nw.	Roy R. Robinson
Ottumwa.....	Wapello.....	849	25	18.8c	.....	50c	30	-12c	25	36c	0.60	-0.99	0.60	2.0	1	.....	.....	.....	n.	Eugene O. Field
Pella.....	Marion.....	877	27	18.4	-2.0	44	29	-19	25	40	0.44	-0.58	0.33	5.0	2	16	2	13	nw.	J. H. Ver Steeg
Sigourney.....	Keokuk.....	877	24	18.4	-2.4	44	29	-15	25	36	0.44	-0.88	0.35	4.2	3	14	5	12	nw.	W. E. Utterback
Stockport.....	Van Buren.....	754	18	20.0	-2.0	48	29	-12	25	35	0.30	-1.07	0.25	2.5	2	13	8	10	nw.	C. L. Beswick
Thurman.....	Fremont.....	23	.....	24.0	+3.1	58	29	-4	2†	36	0.75	+0.13	0.30	8.0	5	3	21	7	nw.	C. R. Paul
Washington.....	Washington.....	769	38	19.0	-1.6	47	29	-7	25	32	0.52	-0.98	0.38	5.5	4	14	7	10	nw.	Wm. A. Cook
Winterset.....	Madison.....	1129	29	19.8	-1.1	47	29	-6	25	30	0.48	-0.48	0.30	5.0	2	23	5	3	nw.	H. S. Ely
Omaha, Nebr.....	.....	1040	49	23.2	+2.7	53	29	-4	21	28	0.28	-0.37	0.21	2.9	4	10	9	12	nw.	U. S. Weather Bureau
Means and extremes.....	.....	.....	.....	20.8	-0.1	58	29	-19	25	42	0.40	-0.79	0.64	4.1	3	13	8	10	nw.	.....
State Means and Extremes.....	.....	.....	.....	16.7	-1.2	58	29	-26	4	45	0.42	-0.63	0.64	4.6	4	12	8	11	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.  
 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 (Per cent)				WIND				Sun-shine.					
	Mean	Highest	Date	Lowest	Mean		Lowest	Date	Total movement	Average h'ly velocity.	Maximum		Per cent of possible.	Departure from normal.				
					7 A. M.	Noon †					Miles	From			Date			
Charles City	30.30	30.83	24	29.63	16	90	78	85	58	29	5,144	6.9	25	sw	12	40	-12	
Davenport	30.30	30.79	25	29.62	16	92	75	79	48	5	6,318	8.5	27	sw	12	54	+3	
Des Moines	30.27	30.83	24	29.61	16	82	74	78	55	14	5,739	7.7	29	sw	12	46	+3	
Dubuque	30.32	30.82	25	29.66	16	86	76	80	56	1	5,264	7.1	25	nw	20	55	+6	
Keokuk	30.31	30.80	28	29.62	16	76	62	67	29	16	6,012	8.1	32	s	12	51	+2	
Sioux City	30.28	30.87	24	29.63	15	84	77	78	47	12	8,825	11.9	56	nw	20	35	-20	
Omaha, Neb.	30.28	30.83	24	29.64	15	81	66	73	43	22	6,687	9.0	39	ne	19	49	-6	
Means and extremes	30.29	30.87	24	29.61	16	86	73	77	.....	.....	8.5	.....	.....	.....	.....	.....	47	-3
Normals and records	30.14	.....	25th	.....	3d	85	.....	78	.....	19th	.....	8.7	.....	.....	.....	.....	6th	50
records	.....	31.09	1905	28.71	1906	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1903

†Sioux City, §Dubuque, ‡Local mean time, †and other dates





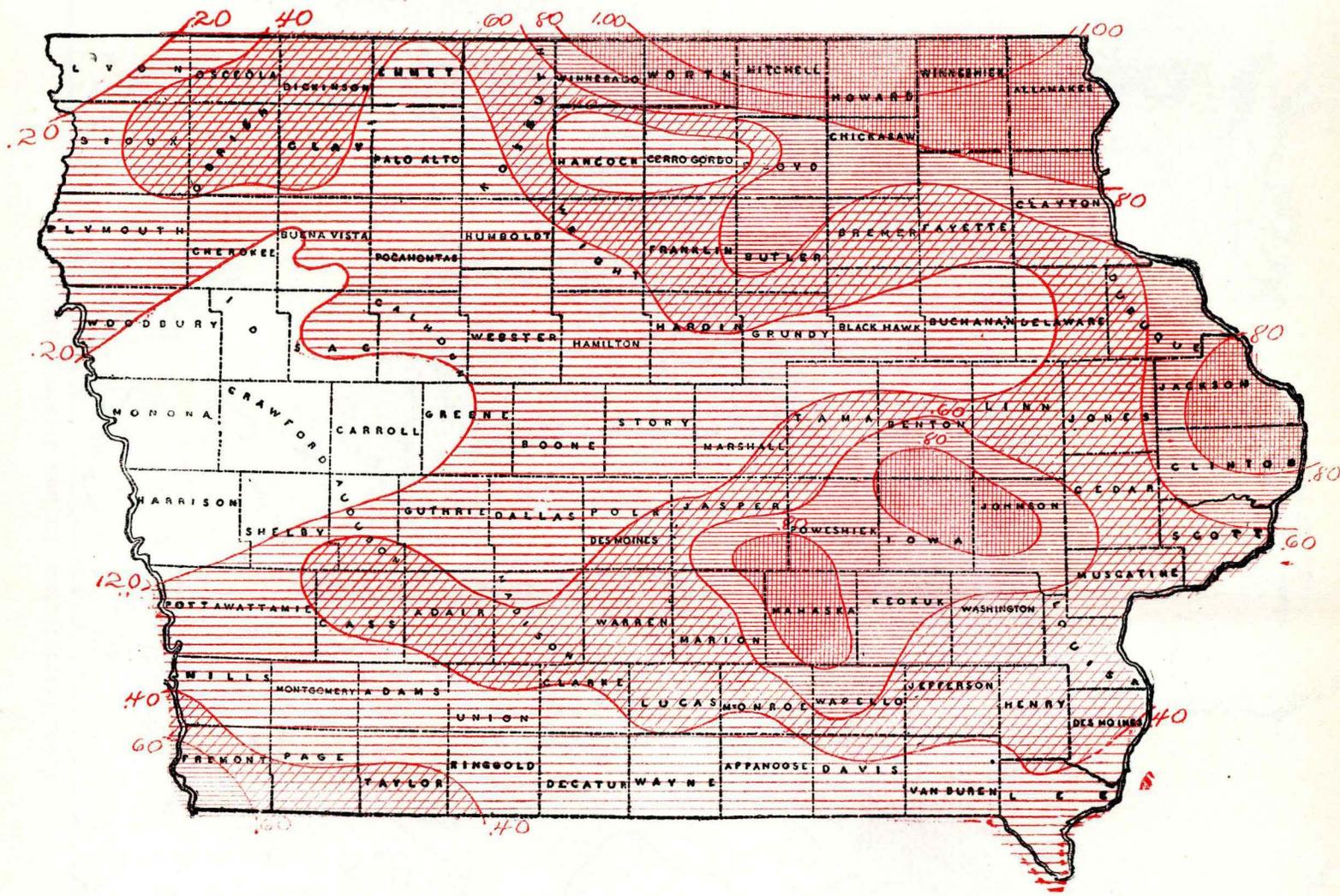
Daily Maximum and Minimum Temperatures for the Month of January, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized into Northern Division, Central Division, and Southern Division, listing various Iowa locations 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 is charged to the preceding day, on which it almost always occurs.

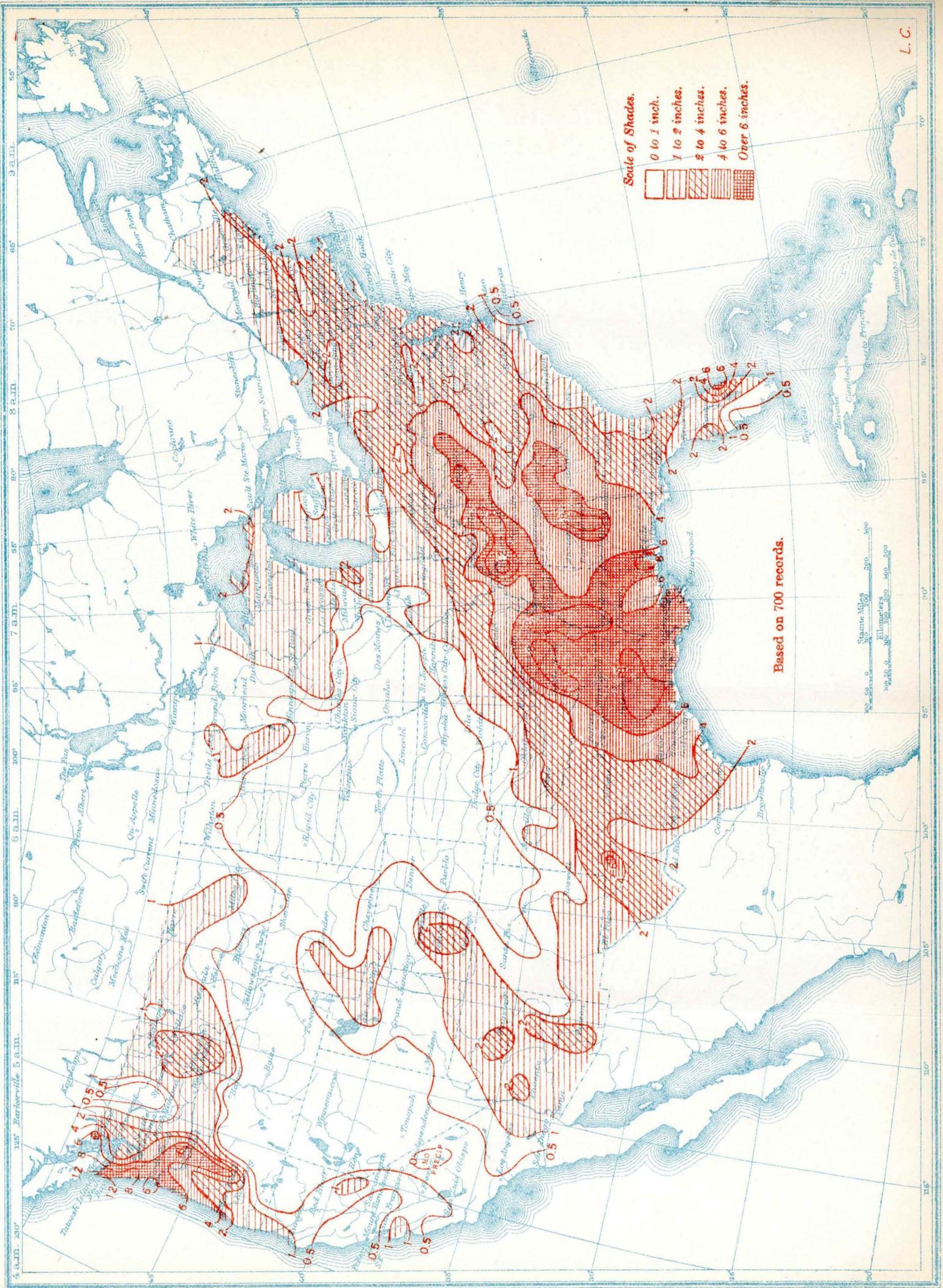
### TOTAL PRECIPITATION, JANUARY 1920.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, January, 1920.



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

Based on 700 records.

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

L.C.

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, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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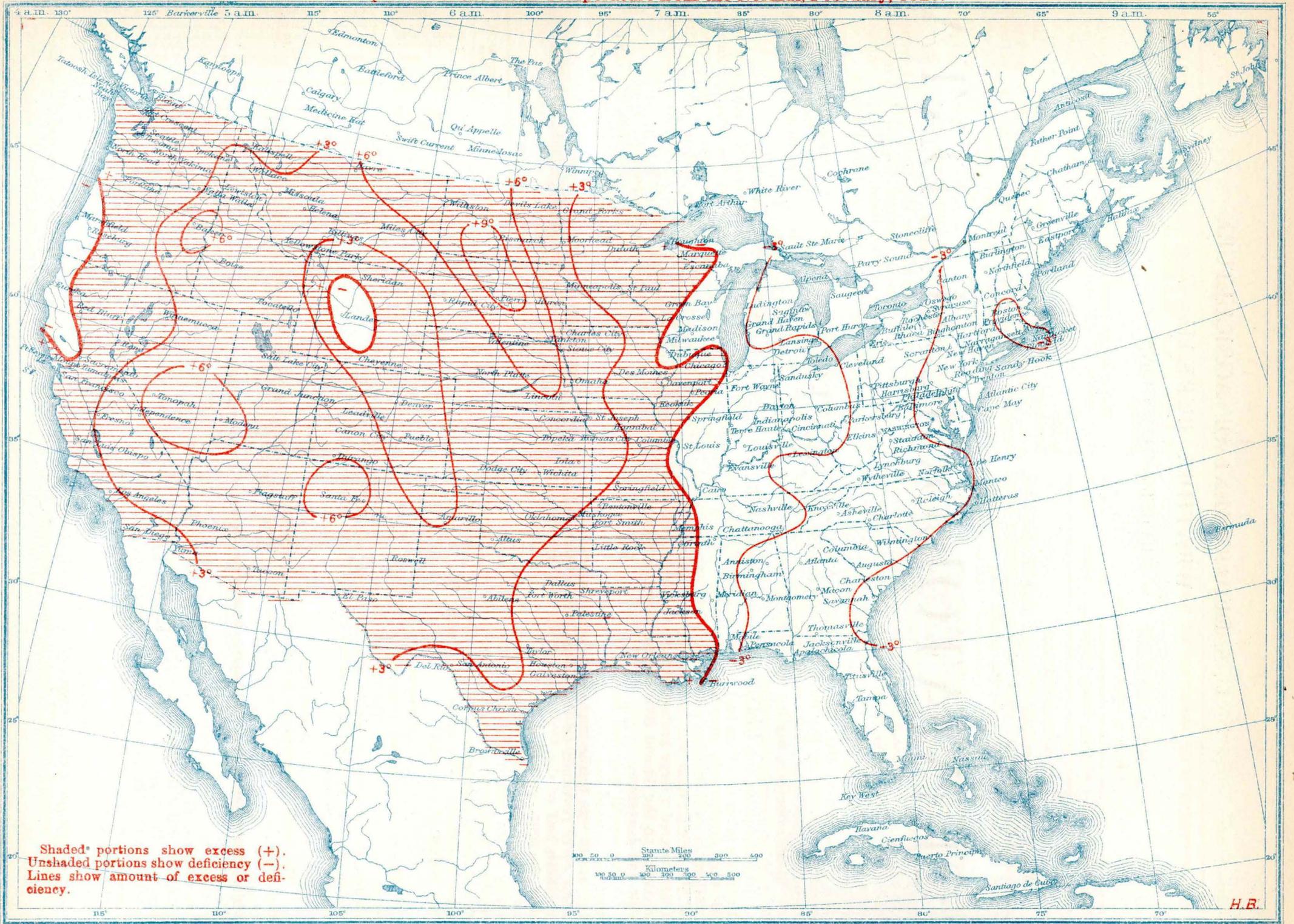
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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



E. C.

Departure of the Mean Temperature from the Normal, February, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, February 1920. No. 2

GENERAL SUMMARY

While the temperature averaged slightly above the normal during February there were no protracted warm spells and for the most part the month was uniformly cold. Zero weather was experienced throughout the State but over the southeastern portion zero, or below, was reached on but a single day. Another feature was the low maxima over the State. While the maximum for the State was 59° in the extreme southeastern portion, outside of a few southern counties, the maxima were well under 50°. The excess in temperature was pronounced in some of the southwestern counties and it gradually became less to the northeast until a deficiency was shown at a single station, Dubuque. An abnormal rise in temperature occurred on the 16th, from considerably below zero over most of the State in the morning, to well above 40° in the afternoon, making the range for the day more than 50° at a number of stations.

Precipitation was deficient, the average amount for the State being less than half the normal and the average for each division was practically the same. Only a few stations in each division reported a slight excess. Most of the precipitation was in the form of snow or sleet. Glaze covered a large portion of the southern and central divisions on the 3d and 20th making travel on foot difficult and dangerous.

The month was free from severe storms, the snow that fell drifted less than usual, and at no time during the month was traffic impeded by snow blockades. The snow cover remained on the ground over most of the northern half of the State throughout the month, but over the southern half it began to disappear early in the month and corn husking and grazing were possible generally as the month advanced. During the most severe weather considerable areas were without snow cover in the southern division and wheat is thought to have suffered materially. The roads were better than usual for this season of the year.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.15 inches. The highest recorded was 30.74 inches, at Dubuque, on the 3d, and the lowest was 29.48, at Charles City and Dubuque, on the 17th. The monthly range was 1.26 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 103 stations, was 24.0°, or 3.5° higher than the normal. By divisions, these tiers of counties to the division, the means were as follows: Northern, 20.8°, or 3.7° higher than the normal; Central, 23.7°, or 3.0° higher than the normal; Southern, 27.4°, or 3.8° higher than the normal. The highest monthly mean was 30.2°, at Clarinda, and the lowest monthly mean was 18.2°, at Postville. The highest temperature reported was 59°, at Keokuk on the 22d, and the lowest reported was -22°, at Elkader, on the 16th. 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 76 per cent. The

mean for the month was 81 per cent, or 1 per cent higher than the normal. The highest monthly mean was 88 per cent, at Charles City, and the least was 72 per cent, at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 108 stations, was 0.56 inch, or 0.59 inch less than the normal. By divisions, the averages were as follows:

Northern, 0.52 inch, or 0.39 inch less than the normal; Central, 0.57 inch, or 0.63 inch less than the normal; Southern, 0.58 inch, or 0.77 inch less than the normal. The greatest amount, 1.75 inches, occurred at Lacona, and the least, 0.04 inch, at Mason City. The greatest amount in any 24 consecutive hours, 0.75 inch, occurred at Earlham, on the 4th, and Little Sioux, on the 5th.

SNOW

The average snowfall for the State was 4.1 inches, or 3.3 inches less than the normal. The greatest amount, 12.5 inches, occurred at West Bend, and the least, a trace, at Burlington, Corning, Lamoni and Mt. Pleasant.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau Station was 42 miles an hour from the northwest at Sioux City on the 13th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 39, or about 17 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 28; Davenport, 45; Des Moines, 43; Dubuque, 43; Keokuk, 48; Sioux City, 29; Omaha, Neb., 34.

MISCELLANEOUS PHENOMENA

Fog: 1st, 2d, 3d, 6th, 7th, 8th, 13th, 20th, 21st, 22d.  
Halos: (lunar) 11th, 12th, 27th.  
Halos: (solar) 12th, 20th.  
Parhelia: 14th.  
Sleet: 3d, 4th, 5th, 8th, 9th, 17th, 20th, 21st, 22d.  
Zodiacal Light: 16th, 18th.

COMPARATIVE DATA FOR THE STATE—FEBRUARY.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation .01 in.	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	.....	3	13	7	8
1892.....	28.1	+7.6	68	-20	1.20	+0.05	2.18	0.12	5.0	6	6	7	16
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	13	9	8
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	8	6
1902.....	17.6	-2.9	62	-21	0.73	-0.42	2.39	0.02	2.6	4	13	7	8
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	8	8
1906.....	23.6	+3.1	66	-32	1.29	-0.14	2.91	0.20	6.1	5	14	7	8
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	1.69	+0.54	3.95	0.23	8.9	6	12	6	11
1909.....	26.2	+5.7	62	-26	1.54	+0.39	4.72	0.30	7.7	5	11	6	11
1910.....	17.8	-2.7	58	-21	0.46	-0.69	2.09	T.	4.0	3	14	8	6
1911.....	27.3	+6.8	71	-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
1920.....	24.0	+3.5	59	-22	0.56	-0.59	1.75	0.04	4.1	5	9	6	14

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



CLIMATOLOGICAL DATA FOR FEBRUARY, 1920.

Table with columns: STATIONS, COUNTIES, Elevation—feet, Length of record—years, Temperature, in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation, in Inches (Total, Departure from normal, Greatest in 24 hours, Total snowfall, unmelting), Number of Days (Precipitation 0.1 in. or more, Clear, Partly Cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. Includes stations like Afton, Albia, Atlantic, Bedford, Bloomfield, Bonaparte, Burlington, Centerville, Chariton, Clarinda, Columbus Jct., Corning, Corydon, Creston, Cumberland, Earlham, Fairfield, Glenwood, Greenwood, Indianola, Keokuk, Keosauqua, Knoxville, Lacona, Lamoni, Lenox, Mt. Ayr, Mt. Pleasant, Murray, Oakland, Oskaloosa, Ottumwa, Pella, Sigourney, Stockport, Thurman, Washington, Winterset, Omaha, Nebr., and State Means and Extremes.

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

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

THE WINTER OF 1919-20.

Table with columns: Stations, Barometric Pressure Inches (Sea level) (Mean, Highest, Date, Lowest, Date), Relative Humidity (Per cent) (Mean, 7 A. M., Noon, 7 P. M., Lowest, Date), WIND (Total movement, Average hourly velocity, Maximum Miles, From, Date), Sunshine (Per cent of possible, Departure from normal).

§Sioux City, \*Davenport, †Des Moines, ‡Local mean time.

The mean temperature for the three winter months was 18.6°, which is 2.2° below the normal for the State, and 9.5° lower than the mean for 1918-1919, which is the warmest of the 30 winters of record. The highest temperature reported was 59° at Keokuk, Lee County, on February 22d. The lowest temperature reported was 38° below zero at Thurman, Fremont County, on December 10th.

The average monthly precipitation for the State was 0.51 inch, and the average total precipitation was 1.52 inches, or 1.90 inches less than the winter normal, and the least amount recorded since State-wide records have been kept. The least amount recorded in any previous winter was 1.65 inches in the winter of 1898-1899. The precipitation was almost entirely in the form of snow and the greater portion of the State was continuously snow covered throughout the winter. The average total snowfall, unmelted, was 14.5 inches, or 6.0 inches less than the normal and 3.4 inches less than the average for the winter of 1918-1919.

The total number of days with .01 inch or more of precipitation was 13, or 5 less than the average for the winter of 1918-1919. The average number of clear days was 32, partly cloudy 21, cloudy 38, as compared 40 clear, 18 partly cloudy, 32 cloudy days during the winter of 1918-1919.



DAILY PRECIPITATION FOR FEBRUARY, 1920.—Continued

Stations	Watersheds	DAY OF MONTH																															Total			
		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.....				.30	.36															.03															0.69
Albia.....	Des Moines.....		.15		.26																						.24									0.65
Allerton.....	Chariton.....																																			0.90
Atlantic.....	Nishnabotna.....		.20	.08	.57																	.03														0.94
Bedford.....	Missouri.....		.25		.64																															0.98
Bloomfield.....	Mississippi.....		T	.01		.51	.01																													0.12
Bonaparte.....	Des Moines.....		T			.07																														0.29
Burlington.....	Mississippi.....					.10	T																													0.33
Centerville.....	Chariton.....			.12		.17																														0.29
Chariton.....	Chariton.....					.16																														0.26
Clarinda.....	Nodaway.....			.40		.48																														0.90
Columbus Jct.....	Iowa.....		T			.14	T																												0.18	
Corning.....	Nodaway.....			.25	.66																															0.91
Corydon.....	Chariton.....		T	.11	T	.20																														0.87
Creston.....	Missouri.....			.40	.50	T		.01																												0.94
Cumberland.....	Nodaway.....			.25																																0.25
Earlham.....	Des Moines.....			.10	.75	.38	T																													1.41
Fairfield.....	Skunk.....					.05	T																													0.22
Glenwood.....	Missouri.....			.30	.10	.20	T																													0.60
Greenfield.....	Nodaway.....				.12																															**
Indianola.....	Des Moines.....		T	.06		.29																														0.53
Keokuk***.....	Mississippi.....			.02		.11	T																												0.19	
Keosauqua.....	Des Moines.....			.02		.11	.01																													0.24
Knoxville.....	Des Moines.....			.12		.30																														1.12
Lacona.....	Des Moines.....			.25	.45	.20																														1.75
Lamoni.....	Grand.....			.16																																0.16
Lenox.....	Missouri.....			.20		.10																														0.40
Mt. Ayr.....	Grand.....			.04	T	.55																														0.60
Mt. Pleasant.....	Skunk.....					.09																														0.21
Murray.....	Grand.....			.08	.14	.37																														0.69
Oakland.....	Nishnabotna.....					.30																														0.30
Oskaloosa.....	Des Moines.....		T	T	.08	.26	T	T																												0.94
Ottumwa   .....	Des Moines.....					.08																														0.38
Pella.....	Skunk.....					.13	T																													0.22
Sigourney.....	Skunk.....		T	T		.14	T																													0.29
Stockport.....	Skunk.....					.07																														0.20
Thurman.....	Missouri.....		T	.27		.68																														0.95
Washington.....	Skunk.....					.14																														0.25
Winterset.....	Des Moines.....			.20	T	.49																														1.02
Omaha, Nebr.***.....	Missouri.....		T	.06	.12	.30	.32																													0.83

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 the 24-hour period, midnight to midnight.  
 \*\* Incomplete.  
 \* Precipitation included in the next following measurement.

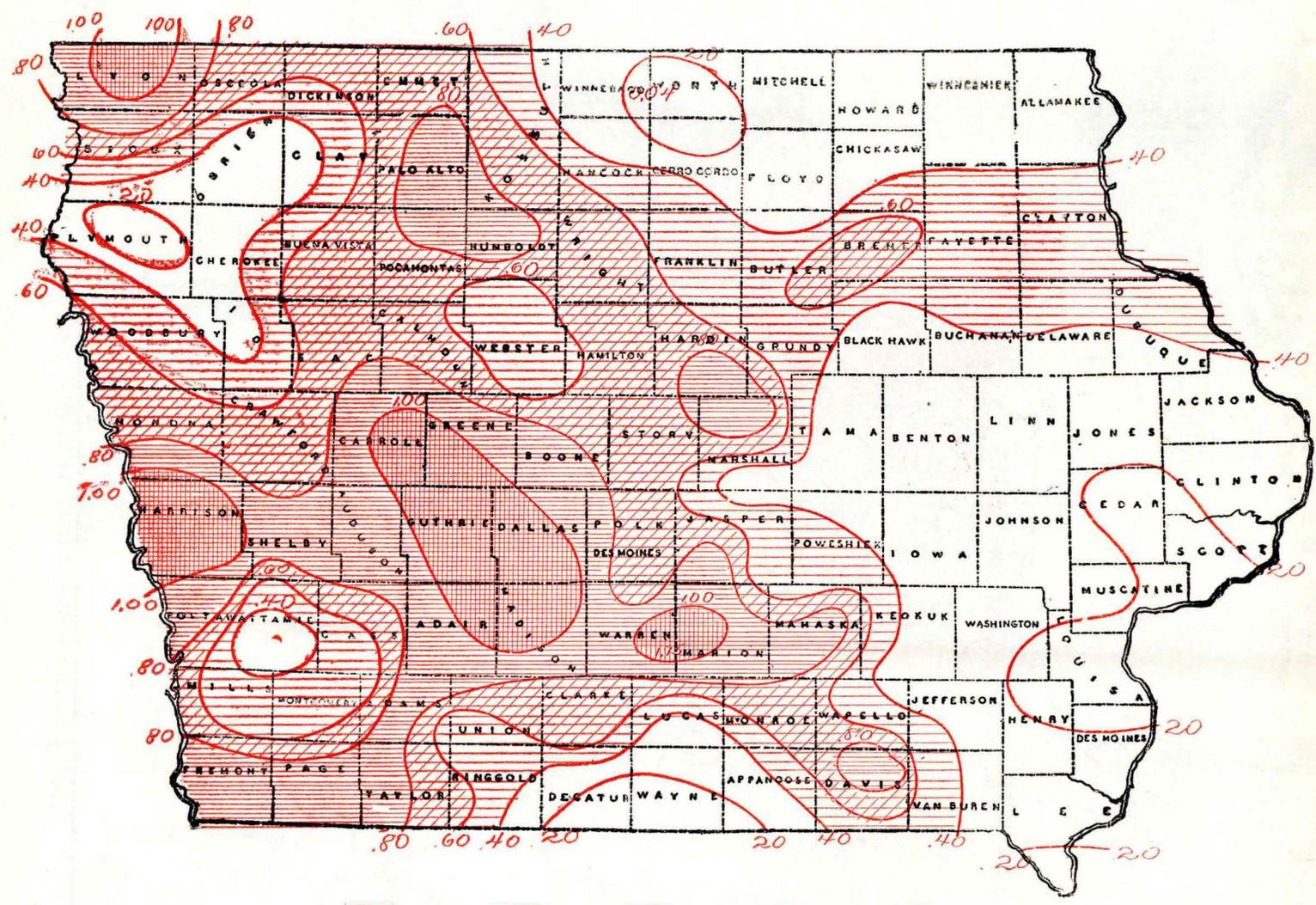
Daily Maximum and Minimum Temperature for the Month of February, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized 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.

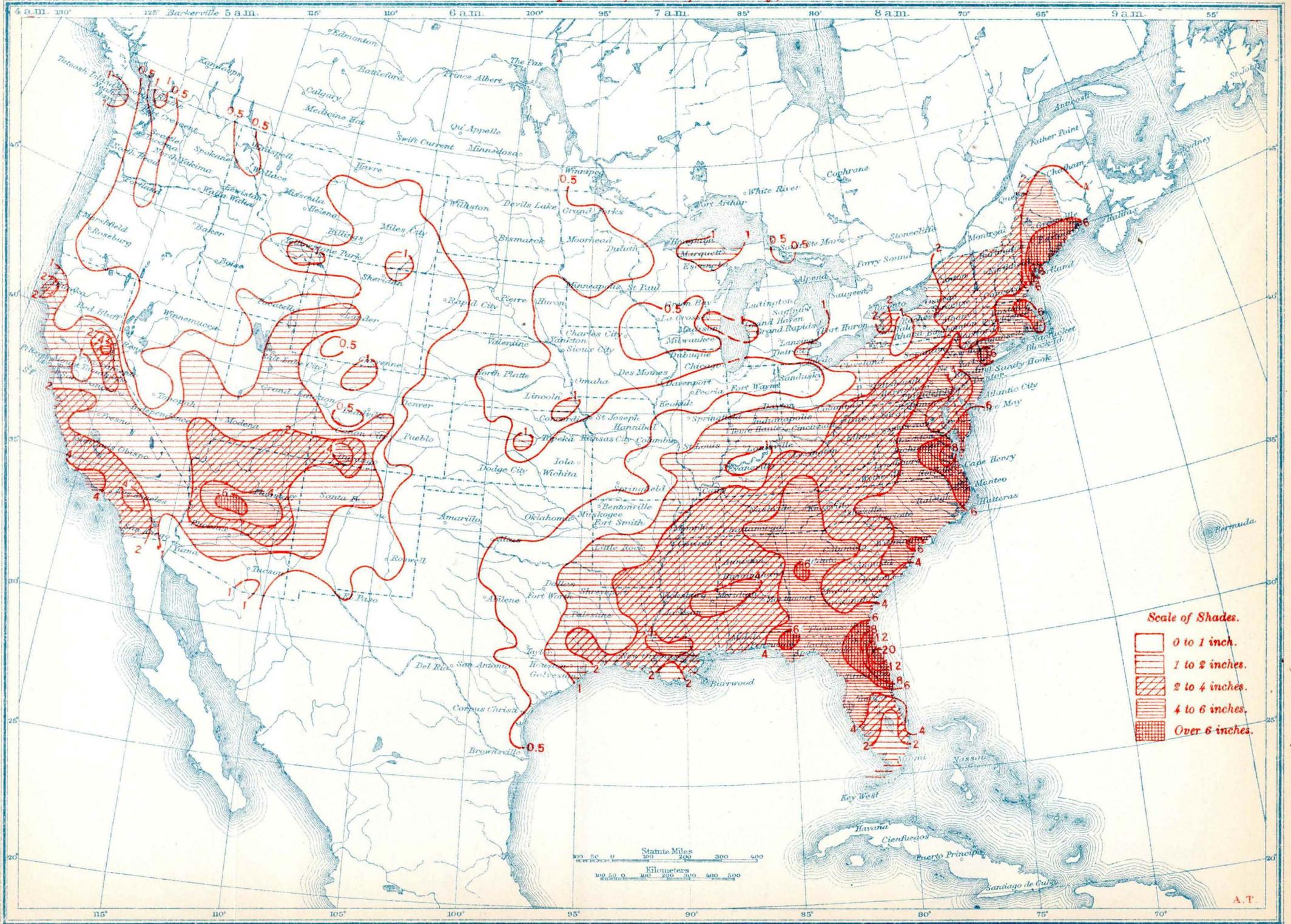
§§Instruments are read in the morning; the maximum temperature then is changed to the preceding day, on which it almost always occurs.

TOTAL PRECIPITATION, — FEBRUARY, 1920.



Less than 0.40    
  0.40 to 0.60    
  0.60 to 0.80    
  0.80 to 1.00    
  More than 1.00

# Total Precipitation, Inches, February, 1920.



### Scale of Shades.

-  0 to 1 inch.
-  1 to 2 inches.
-  2 to 4 inches.
-  4 to 6 inches.
-  Over 6 inches.

100 50 0 100 200 300 400  
 Statute Miles  
 100 50 0 100 200 300 400 500  
 Kilometers

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

MARCH, 1920

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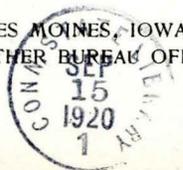
BY  
CHARLES D. REED  
METEOROLOGIST

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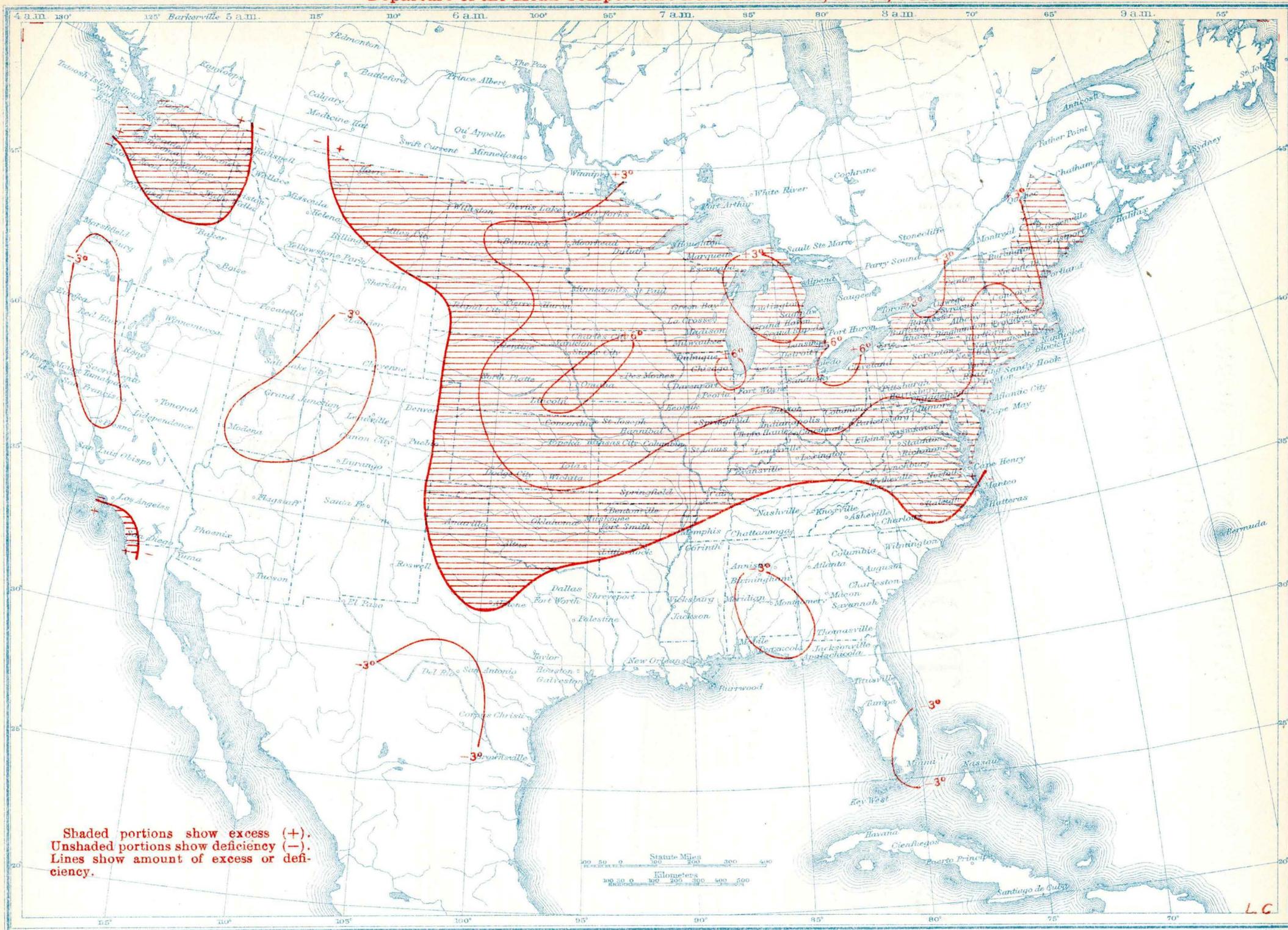
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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



80

Departure of the Mean Temperature from the Normal, March, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, March, 1920 No.3

GENERAL SUMMARY.

March was warm, wet and windy. The month opened with the temperature above normal but this was followed by a cold spell that continued from the 4th to the 7th, inclusive, and during this period temperatures of zero, or lower, were recorded throughout the State. The rest of the month was warm with but an occasional day with the temperature below normal. The ground thawed rapidly after the first week and by the end of the third week the frost was generally out of the ground.

For the state as a whole, this was the wettest March of record. Only a small area in the southwestern portion had a deficiency. The distribution both as to time and amount was uniform, and except a few points in the northwestern portion, the precipitation was mostly rain. The heaviest amounts were recorded in the south-central portion.

The snow cover remained on the ground over the northern portion until about the middle of the second week and over a large portion of the northern section the ground was continuously snow covered since the last week in November. As a result of this heavy snow blanket some stations reported that there was no frost in the ground during the entire winter. The snow that occurred later in the month remained on the ground for only short periods.

Stormy weather was the outstanding feature, due to the passage of an unusual number of energetic general storm centers through, or near the boundaries of the State. The highest wind velocity and lowest barometer reading ever recorded in the State in March occurred at Sioux City, and the total wind movement was high for the entire State. Much damage resulted from the wind which in many cases blew in violent gusts. Many barns, wind mills, silos and telephone poles were blown down and in the cities many plate glass windows were broken. The greatest damage from the wind occurred in the northeast portion where the property loss was between \$75,000 and \$100,000. (See page 33).

Conditions were not favorable for farm work over most of the State, being too wet, but at the close of the month some progress had been made and considerable seeding of small grain had been accomplished. Roads were muddy and in poor condition the greater portion of the month.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.87 inches. The highest recorded was 30.60 inches, at Sioux City and Omaha, Neb. on the 6th; and the lowest was 28.85 inches, the lowest of record for the State for March, at Sioux City, on the 15th. The monthly range was 1.75 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 100 stations, was 38.0°, 4.7° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 34.5°, or 4.0° higher than the normal; Central, 38.6°, or 5.0° higher than the normal; Southern; 41.0°, or 5.1° higher than the normal. The highest monthly mean was 42.8°, at Cla-

rinda, and the lowest monthly mean was 32.0°, at Northwood and Rock Rapids. The highest temperature reported was 80°, at Little Sioux and Onawa, on the 31st. The lowest temperature reported was -21°, at Inwood on the 5th. The temperature range for the State was 101°.

HUMIDITY

The average relative humidity for the State at 7 a. m. was 79 per cent, and at 7 p. m. it was 65 per cent. The mean for the month was 72 per cent, or about 2 per cent lower than the normal. The highest monthly mean was 80 per cent, at Charles City, and the lowest was 64 per cent, at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 104 stations, was 3.02 inches, or 1.25 inches more than the normal. By divisions the averages were as follows: Northern, 2.81 inches, or 1.28 inches more than the normal; Central, 2.79 inches, or 0.92 inch more than the normal; Southern, 3.46 inches, or 1.54 inches more than the normal. The greatest amount, 5.70 inches, occurred at Albia, and the least, 0.47 inch, at Omaha, Neb. The greatest amount in any 24 consecutive hours, 2.50 inches, occurred at Keosauqua, on the 24th - 25th and at Lamoni on the 25th.

SNOW.

The average snow fall for the State was 2.4 inches, or 2.9 inches less than the normal. The greatest amount, 16.2 inches, occurred at Rock Rapids. Four stations reported no snow, and 24 stations reported only a trace.

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 65 miles per hour from the west, the highest of record for the month of March, at Sioux City, on the 16th.

COMPARATIVE DATA FOR THE STATE—MARCH.

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.....	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	2.9	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
1895.....	30.9	-2.4	81	-12	1.10	-0.67	3.99	0.16	5.4	5	12	9	10
1896.....	32.0	-1.3	72	-22	2.39	+0.62	6.16	0.29	5.5	8	9	8	14
1897.....	37.5	+4.2	72	-2	1.94	+0.17	6.21	0.33	3.7	6	12	9	10
1898.....	23.0	-10.3	75	-16	1.62	-0.15	5.90	0.37	8.0	6	7	12	12
1899.....	30.7	-2.6	81	-13	2.06	+0.29	5.15	0.45	6.6	5	12	9	10
1900.....	34.2	+0.9	76	-8	2.64	+0.87	5.25	0.70	12.6	7	10	8	13
1901.....	39.1	+5.8	79	-12	1.45	-0.32	4.33	0.13	1.3	7	9	11	11
1902.....	38.8	+5.5	82	-6	1.38	-0.39	3.90	0.15	3.9	7	11	7	13
1904.....	34.8	+1.5	78	-3	2.18	+0.41	4.57	0.50	4.4	7	8	8	15
1905.....	41.5	+8.2	84	-1	2.04	+0.27	3.70	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	1.37	0.00	T.	1	22	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	10
1914.....	34.7	+1.4	78	-5	1.69	-0.08	3.84	0.28	1.8	7	12	8	11
1915.....	39.3	+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
1920.....	38.0	+4.7	80	-21	3.02	+1.25	5.70	0.47	2.4	7	15	7	9

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

CLIMATOLOGICAL DATA FOR MARCH, 1920

Table with columns: 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), No. of Days (Precipitation .01 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. Includes Northern and Central Divisions.

CLIMATOLOGICAL DATA FOR MARCH, 1920.

Table with columns: STATIONS, COUNTIES, Elevation-feet, Length of record, Temperature, in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date, Greatest daily range), Precipitation, in Inches (Total, Departure from normal, Greatest in 24 hours, Total snowfall, (unmelted), Precipitation 0.1 in. or more, Clear, Partly Cloudy, Cloudy), Number of Days (Clear, Partly Cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

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. 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 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, 53; Davenport, 60; Des Moines, 64; Dubuque, 65; Keokuk, 59; Sioux City, 59; Omaha, Neb. 61.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Table with columns: Stations, Barometric Pressure Inches (Sea level) (Mean, Highest, Date, Lowest), Relative Humidity (Per cent) (Mean, 7 A. M., Noon †, 7 P. M., Lowest, Date), WIND (Total movement, Average hourly velocity, Maximum Miles, From, Date), Sunshine (Per cent of possible, Departure from normal).

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

MISCELLANEOUS PHENOMENA.

Aurora: 4th, 5th, 22d, 23d, (See page 33). Birds: (migration of) Bedford, blue birds on the 10th; Boone robins and blue birds on the 12th, ducks flying north on the 19th; Corydon, robins on the 19th; Earlham, robins on the 1st, blue birds on the 11th, wild geese, ducks and black birds on the 13th, meadow larks on the 20th; Elkader, robins on the 15th; Jefferson, robins on the 8th; Milford, robins and meadow larks on the 18th, blue birds and red wing black birds 22d; Nora Springs, robins on the 22d; Oskaloosa, robins and blue birds on the 14th and 15th; Pocahontas, robins on the 9th; Postville, robins on the 14th; Rock Rapids, robins on the 13th; Whitten, robins on the 2d. Dust: (red) 15th, 18th. (See page 33). Fog: 1st, 10th, 11th, 21st, 25th. Hail: 3d, 14th, 18th, 23d, 24th, 28th, 31st. Halos: (lunar) 5th, 18th, 28th, 29th. Halos: (solar) 4th, 5th, 6th, 7th, 8th, 10th, 13th, 14th, 17th, 19th, 21st, 25th, 28th. Thunderstorms: 11th, 14th, 17th, 18th, 23d, 24th, 25th, 27th, 28th, 29th, 31st. Sleet: 3d, 4th, 6th 11th, 12th, 18th, 19th, 23d. Winds: (high) 2d, 4th, 12th, 14th, 15th, 16th, 17th, 18th, 22d, 23d, 25th, 27th, 28th, 29th, 31st.





Daily Maximum and Minimum Temperatures for the Month of March, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized into 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.

Daily Maximum and Minimum Temperatures for the Month of March, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized into 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.

**WEATHER NOTES, DUBUQUE, IOWA, MARCH, 1920.**

By James H. Spencer, Meteorologist.

**WIND STORM:** The wind storm which began early on the morning of March 15th, and continued through the 15th and 16th, was one of the worst ever experienced in this section of the country from a cyclonic storm area. The barometer fell steadily at Dubuque on the 15th until 12.20 p. m. when a reading of 29.17 inches occurred. After that hour it rose steadily until noon of the 17th, when 30.48 inches was recorded. The Low was centered at Moorhead, Minn., at 7 p. m. of the 15th, a sea level reading of 28.68 inches being recorded.

Although the maximum velocity of the wind at Dubuque was only 32 miles per hour from the south at 11.42 a. m. of the 15th, due doubtless to the sheltered position of the anemometer below the bluffs to the westward, the wind blew a gale on both dates, and considerable damage resulted. This low maximum was also due to the fact that the wind blew in terrific gusts lasting only a fraction of a minute.

A large plate glass window at Tasker's Studio, corner 13th and Main streets, and another at Lange's Dying establishment, corner 12th and Iowa streets, were blown in. A number of windows and doors at the Lincoln School were destroyed. Most of the damage occurred during the night of the 15th-16th. At 10.52 a. m. of the 16th a brick wall that had remained standing since a recent fire was blown over. Three workmen were buried in the debris, and injured. Property damage in Dubuque was approximately \$5,000, a large portion of which was merchandise that was destroyed when the wall at Grimm's Drug Store blew over.

The damage in many portions of northeast Iowa was heavy, probably in excess of \$50,000. Numerous wind mills and a number of barns were blown down, and some live stock killed. In cities and towns plate glass windows were blown in. The following are typical reports from postmasters:

Guttenberg: "Damage in this vicinity was 12 wind mills blown down and smashed, many sheds and one barn blown down, many barns unroofed; estimated damage, \$10,000."

Oelwin: "The heavy wind damaged the Catholic Church here to the extent of \$3,000. Also blew in two large plate glass windows."

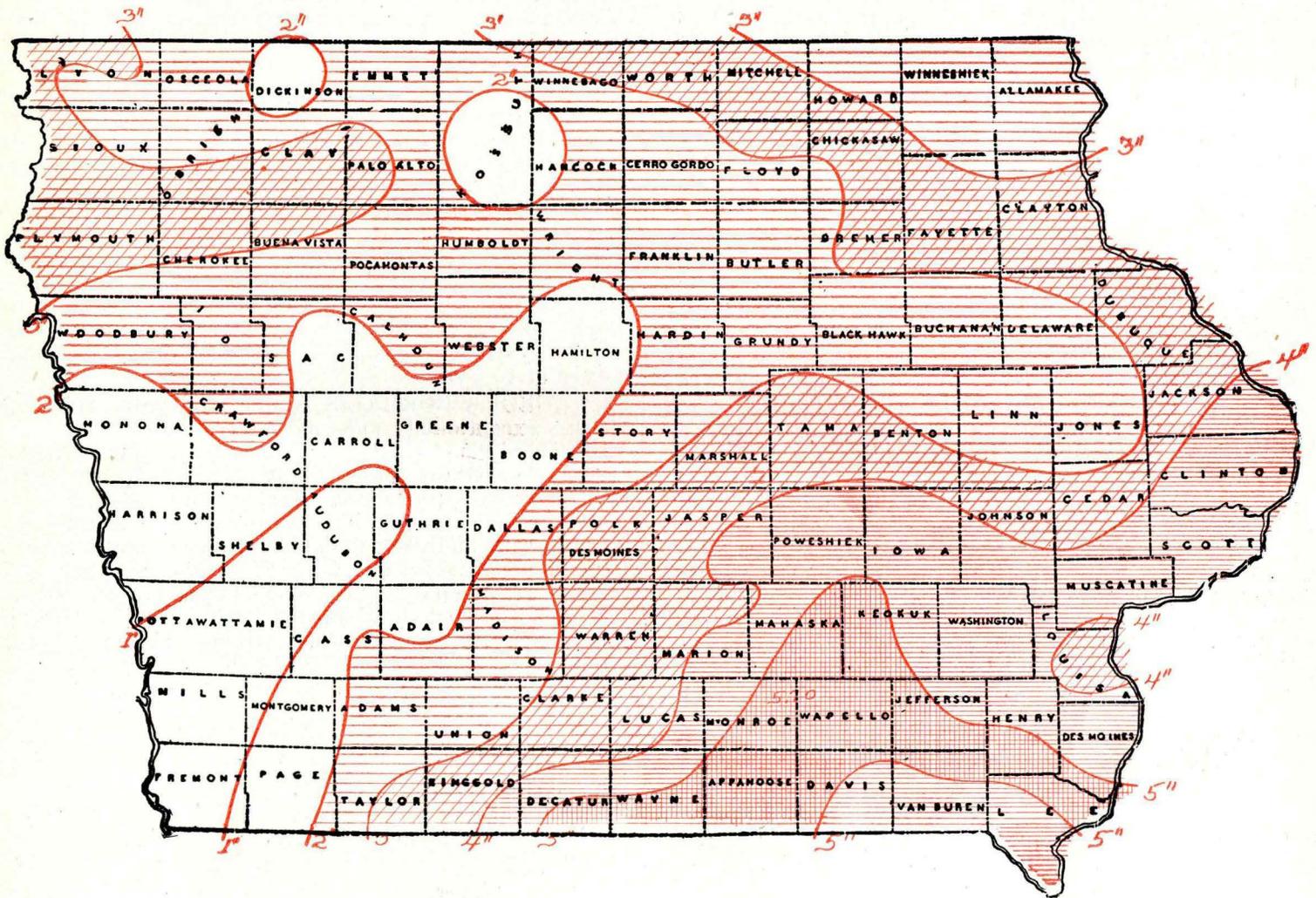
Lansing: "Anton Hanson's barn, in Taylor Township, blew down and 30 head of stock and hogs were killed. There was other minor damage."

**DIRT STORM OR "DUSTFALL",** March 19, 1920: A remarkably heavy deposit of dirt was brought down early this morning by the storm of rain or snow. Rain began around 2 a. m. and turned to snow before 5 a. m. Total amount of precipitation, 0.27 of an inch, of which amount about 1.0 inch was wet snow that partly melted as it fell.

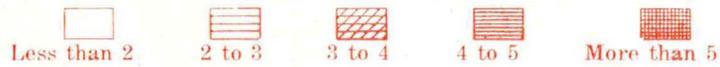
As soon as exposed objects, such as roofs, porches, windows etc., became dry late in the morning of the 19th it was noticed that they were covered with a thick coating of dust which was plastered on like mud. Upon being swept up, it felt like toilet powder between the fingers, and was greyish in color. All exposed objects were quite uniformly covered. The dust covering on a black tin roof, for instance, was so heavy that little of the black paint was visible. The deposit did not blow off when fully dry, and even a broom would not remove it all. While not the first storm of a similar character recorded at this station, it was by far the heaviest for at least a period of 15 years.

**AURORA BOREALIS,** March 22, 1920: This aurora was exceptionally fine, and lasted from early evening until midnight or later, but was most brilliant around 9 p. m. Practically the entire sky was filled with whitish streamers that converged, fanlike, overhead and formed a crown near the zenith. A prominent feature of the aurora were distinct patches or groups of light, resembling thin whitish clouds (Ci.) of irregular shape. The aurora was similar to the wonderful aurora of March 9, 1918, except that on March 22, 1920, green and red effects were not prominent and streamers did not pulsate much.

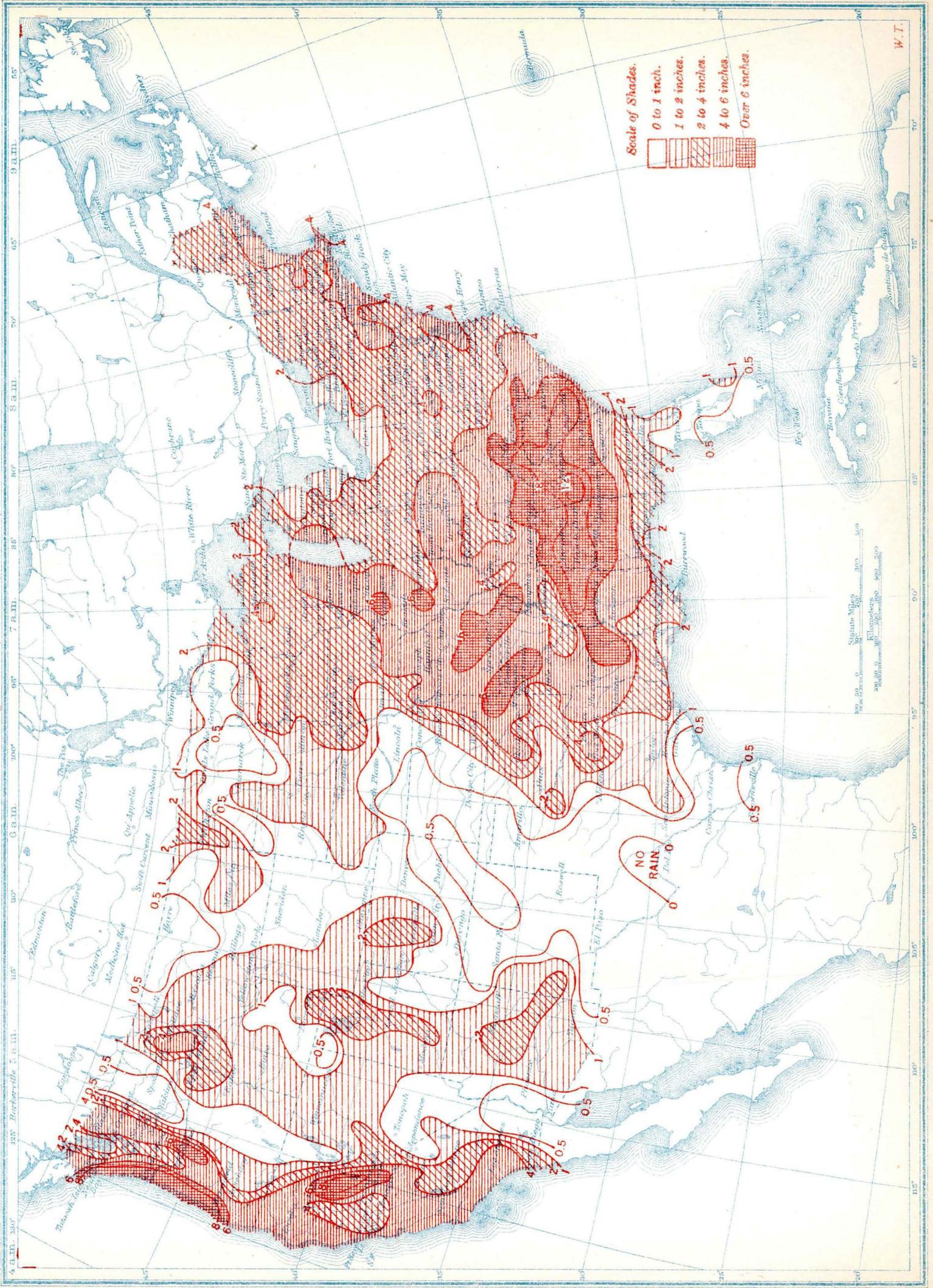
TOTAL PRECIPITATION, — MARCH, 1920.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, March, 1920.



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

Scale Miles  
0 100 200 300 400  
Kilometers  
0 100 200 300 400

W. 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

APRIL, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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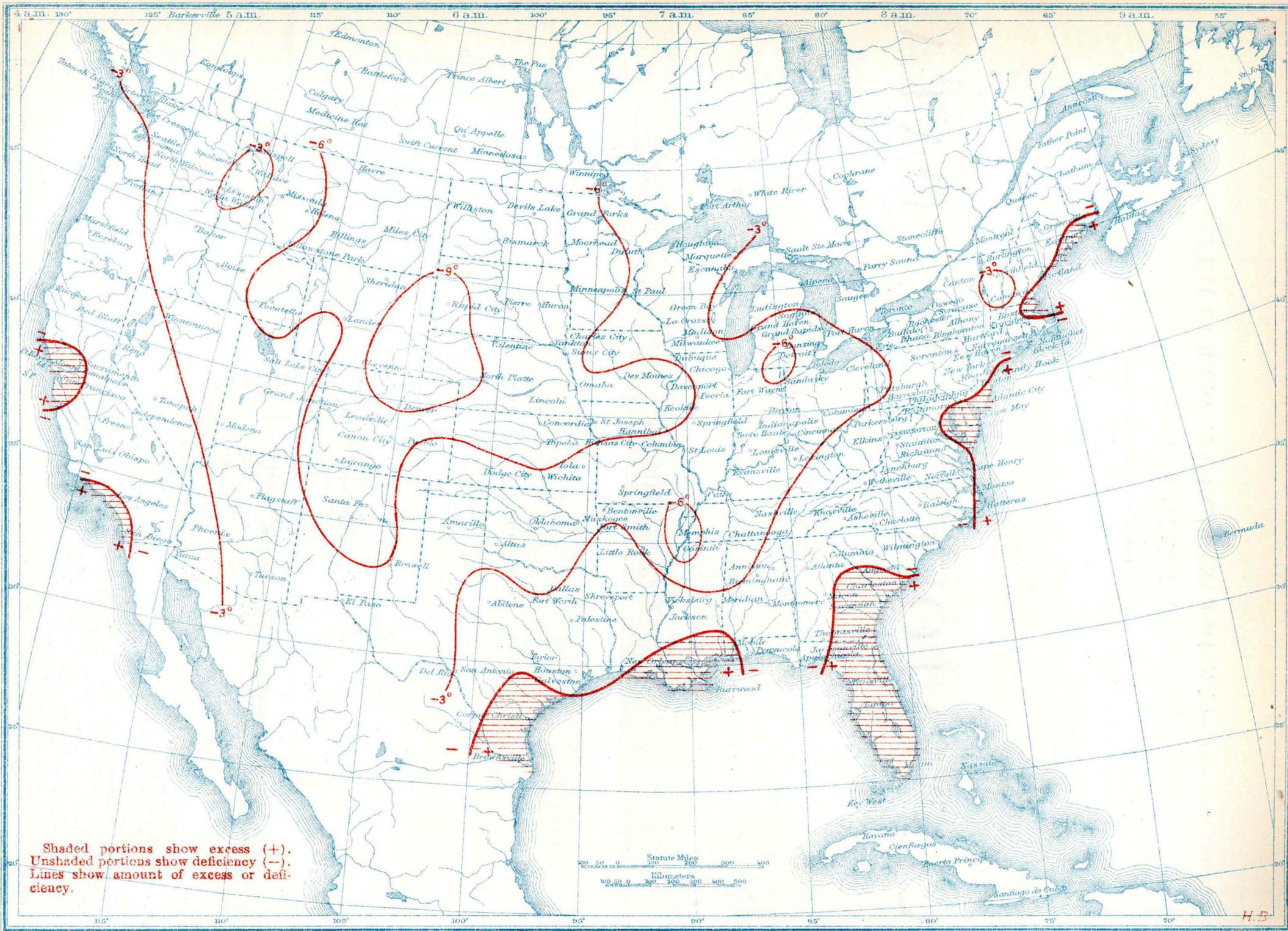


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA  
WEATHER BUREAU OFFICE



# Departure of the Mean Temperature from the Normal, April, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, April, 1920. No. 4

GENERAL SUMMARY

The month was cold and wet. Since 1890 there has been but one colder April and only four have had greater precipitation. The maximum temperature, 78° is the lowest of record and the minimum, 1°, is within 1° of the record for April.

Precipitation was much above normal over the entire State except a few small areas. An unusual feature was a heavy fall of snow on the 3d and 4th, over most of the southern third of the State.

On the 19th between 3 and 4 p. m. an unusual down-pour of rain in the vicinity of Leighton about 10 miles northwest of Oskaloosa raised the Skunk River 4.5 feet in 24 hours, washed out 300 feet of the C. R. I. & P. R. R. track northwest of Evans station, washed fields clean of recently plowed soil and eroded deep ditches where none had been before.

The month was unfavorable from an agricultural standpoint, being too cold for plant growth and too wet for plowing and seeding. The rain was especially heavy on the 18th and 19th, and amounted to considerably more than an inch over most of the State.

Unusual, complex optical phenomena were observed at Miller's Bay, West Okoboji Lake on April 8.

PRESSURE.

The mean pressure, (reduced to sea level), for the State was 29.85 inches. The highest recorded was 30.28 inches, at Dubuque on the 24th, and the lowest was 29.17 inches at Davenport and Dubuque on the 1st.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 103 stations, was 42.4°, or 6.3° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 40.3°, or 6.4° lower than the normal; Central, 42.8°, or 6.1° lower than the normal; Southern, 44.1°, or 6.5° lower than the normal.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 80 per cent, and at 7 p. m. it was 61 per cent. The mean for the month was 70 per cent, or 4 per cent above the normal.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 107 stations, was 4.59 inches, or 1.73 inches more than the normal. By divisions the averages were as follows; Northern, 4.26 inches, or 1.58 inches more than the normal; Central, 4.49 inches, or 1.63 inches more than the normal; Southern, 5.02 inches, or 1.97 inches more than the normal.

SNOW

The average snowfall for the State 2.0 inches, or 0.2 inch more than the normal. The averages by divisions were: Northern, 0.9 inch; Central, 0.6 inch; Southern, 4.6 inches. The greatest amount, 12.00 inches, occurred at Bloomfield.

COMPARATIVE DATA FOR THE STATE—APRIL.

Table with columns for Year, Temperature (Mean, Departure, Highest, Lowest), Precipitation (Total, Departure, Greatest, Least, Snowfall), and Number of Days (With precipitation, Clear, Partly cloudy, Cloudy). Rows list years from 1890 to 1920.

T. indicates an amount too small to measure, or less than .065 inch rainfall and less than .05 inch snowfall.

CLIMATOLOGICAL DATA FOR APRIL, 1920.

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperature (Mean, Departure from Normal, Highest, Date, Lowest, Date, Greatest daily range, Total, Departure from Normal, Greatest in 24 hours, Total snowfall, Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. Includes sections for Northern Division, Means and Extremes, and Central Division.

CLIMATOLOGICAL DATA FOR APRIL, 1920.—Continued

Main climatology table with columns: 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), No. of Days (Precipitation .01 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE.

Table with columns: Stations, Barometric Pressure (Inches), Relative Humidity (Per cent), WIND (Total movement, Average h'rly velocity, Maximum Miles), Sunshine (Per cent of possible, Departure from normal).

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 45, or about 15 per cent below normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 36; Davenport, 44; Des Moines, 47; Dubuque, 57; Keokuk, 47; Sioux City, 43; Omaha, Neb. 45. Clear days averaged 8; partly cloudy, 9; cloudy, 13.

MISCELLANEOUS PHENOMENA

- Aurora: 14th.
Birds: (Migration of): Earlham, Mockingbirds and Wrens, 28th.
Fog: 20th.
Hail: 1st, 4th, 11th, 14th, 15th, 17th, 18th, 20th, 21st, 28th.
Halo: (lunar or solar): 4th, 6th, 8th, 9th, 15th, 24th, 29th.
Sleet: 1st, 2d, 3d, 11th, 17th, 19th, 20th, 21st, 26th, 29th, 30th..
Thunderstorms: 1st, 10th, 11th, 12th, 14th, 15th., 16th, 17th, 18th, 19th, 20th, 21st, 22d, 26th, 29th, 30th.
Tornado: 1st.

‡Local meantime, †And other dates. §Dubuque, \*Davenport, †Omaha, Neb., ‡Sioux City.



DAILY PRECIPITATION FOR APRIL, 1920.—Continued.

Table with columns: Stations, Watersheds, DAY OF MONTH (1-31), Total. Rows include locations like Afton, Albia, Allerton, etc., with precipitation amounts for each day.

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 the 24-hour period, midnight to midnight.
\*\* Incomplete.
\*Precipitation included in the next following measurement.

Daily Maximum and Minimum Temperatures for the Month of April 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized 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.

**RIVERS**

The interior rivers did not reach flood stage, except the Des Moines from Ottumwa to the Mississippi. Very little damage resulted. The Missouri was high for the season during much of the month but the flood stage was not reached except for a very brief period on the 5th and 6th from Omaha southward. On the Mississippi one of the worst floods of record occurred. The following are the flood stages at stations on the Mississippi River and the stage reached during the April flood: Lansing, flood stage 18.0 feet, highest stage reached 17.2 feet; Dubuque, flood stage 18.0 feet, highest stage reached 21.0 feet; Clinton, flood stage 16.0 feet, highest stage reached 19.0 feet; Le Claire, flood stage 10.0 feet, highest stage reached 13.4 feet; Davenport, flood stage 15.0 feet, highest stage reached 17.1 feet; Muscatine, flood stage 16.0 feet, highest stage reached 17.7 feet; Keokuk, flood stage 14.0 feet, highest stage reached 16.8 feet. The damage was reduced to a minimum by timely warnings. At Keokuk the damage was negligible, being principally inconvenience to railroads. A broken levee that protected Muscatine Island caused the inundation of about 23,000 acres of truck land. A complete report of the flood at Dubuque, where it was especially severe, is published below.

**FLOOD OF MARCH-APRIL, 1920, DUBUQUE, IOWA DISTRICT**

By James H. Spencer, Meteorologist.

Weather Bureau Office, Dubuque, Iowa, May 25, 1920.

This Mississippi River flood was the worst in this district since 1888, and has been exceeded in the last 50 years only by the floods of June, 1880, and May, 1888. It was the earliest spring flood of such magnitude of which there is any record in this section. For rapidity of rise, it is comparable, only with the flood of June, 1880. The total rise in each of these two floods continued over a period of more than two weeks, and was between 13 and 14 feet, but slightly greater in 1920.

In the flood of June, 1880, the period of maximum rise was 6.0 feet in three days during the first half of the 15-day period, while in the flood of 1920 the period of maximum rise was also 6.0 feet in three days, but occurred during the last half of the 15-day period. There is no previous record of such a rise as occurred in 1920 during the week immediately preceding the peak of the flood.

Most of the flood waters came from the headwaters of the Mississippi. The Wisconsin River was above flood stage during the same period, a maximum stage of 15 feet being recorded at Portage on March 31. This flood added about 1.5 feet to the peak of the Mississippi River flood between Dubuque and Pr. du Chien. Heavy and general rains on April 1 also added 0.5 or 0.6 feet to the peak between Pr. du Chien and La Crosse. With these exceptions the flood waters came wholly from the region north of La Crosse.

The following table shows the progress of the flood in the Dubuque river district:

	Lansing,	Pr. du Chien,	Dubuque	Portage
March 22	8.0	7.2	7.1	10.0
" 23	8.3	7.4	7.4	9.8
" 24	8.9	7.9	8.2	9.5
" 25	9.4	8.5	8.7	9.8
" 26	9.7	9.3	9.8	10.2
" 27	10.2	9.8	10.5	11.1
" 28	10.7	10.2	11.0	12.6
" 29	11.3	10.8	11.4	14.0
" 30	12.5	11.9	11.8	14.8
" 31	13.9	13.2	12.4	14.9
April 1	15.1	15.4	13.5	14.7
" 2	16.2	17.2	15.8	14.5
" 3	16.9	18.7	18.0	14.2
" 4	17.2	19.6	19.5	13.7
" 5	17.2	19.6	20.5	13.0
" 6	16.9	19.1	20.9	12.4
" 7	16.5	18.7	21.0	12.1
" 8	.....	18.0	20.7	11.6

Flood stage at Lansing, Pr. du Chien, and Dubuque is 18.0 ft., and at Portage 14.0 feet.

In two particulars the floods of June, 1880, and March-April, 1920, were not comparable. The cause in 1880 was exceedingly heavy rains early in June over the headwaters of both the Mississippi and Wisconsin rivers. The cause in 1920 is probably indicated by the following paragraph from the National Snow and Ice Bulletin, Minnesota report, March 23, 1920: "Latter part of week abnormally warm and snow disappearing rapidly." Warm weather, the disappearance of snow in northern Minnesota, and the appearance of the flood at St. Paul were almost simultaneous. From Pr. du Chien to La Crosse the flood peak in 1880 was much higher than in 1920, but at Dubuque it was only 0.7 of a foot higher. The following table illustrates the difference:

	La Crosse,	Lansing,	Pr. du Chien,	Dubuque
Peak, June, 1880	16.2	.....	21.5	21.7
Peak, Mar.-Apr., 1920	14.2	17.2	19.6	21.0
Difference	2.0	.....	1.9	0.7

**WARNINGS.**—On Monday, March 29, nine days before the peak of the flood Reached Dubuque, flood warnings were issued for the entire district from the vicinity of Dubuque, to immediately below La Crosse. On this date stage of water was 11.5 ft. at Dubuque, 10.8 ft. at Pr. du Chien, and 11.3 ft. at Lansing. Warnings were generally heeded, and movable property, such as cord wood in large quantities, live stock, farm machinery, etc., was removed from the islands and lowlands of the Mississippi throughout the section.

Later in the week when it became certain that a flood of great magnitude was approaching whatever could be done to prevent damage was done. Upon advise from this office some of the factories raised machinery to higher levels and a number of firms within the wholesale district of Dubuque removed their stocks from cellars and basements.

This office was able to render valuable service over more than a 10-day period. Information was given daily over the 'phone to several hundred people. On Sunday, April 4, the office was open from 6 a. m. until 10 p. m., and the phone was in use every moment of the time. We were able to advise many families not to move and many business houses not to move stocks or machinery after ascertaining how many inches more of a rise they could stand. On this date a northeasterly gale added to the difficulties of the railroads on the west bank of the Mississippi. After that date winds were generally more favorable.

**THE FLOOD AROUND DUBUQUE**—The Seippel Lumber Co.'s plant at the extreme south end of the city, was badly flooded and lumber was saved only with difficulty. The Standard Oil plant in the same section also suffered some damage. The Jackson Vinegar Co., Schroeder-Kleine Co., Western Grocery Co., Ernsdorf Iron Co., International Harvester Co., Becker-Hazelton Co. and other firms in the lower end of town experienced flooded basements, necessitating the removal of stocks of merchandise.

For over a week the railroads fought the flood, and scores of carloads of material were used in building temporary dikes to keep the water from undermining the tracks. The same was true of the ice companies along the river bank, whose ice houses were threatened. While serious delays resulted, railroad traffic was not completely suspended, as trains ran through the water or detoured.

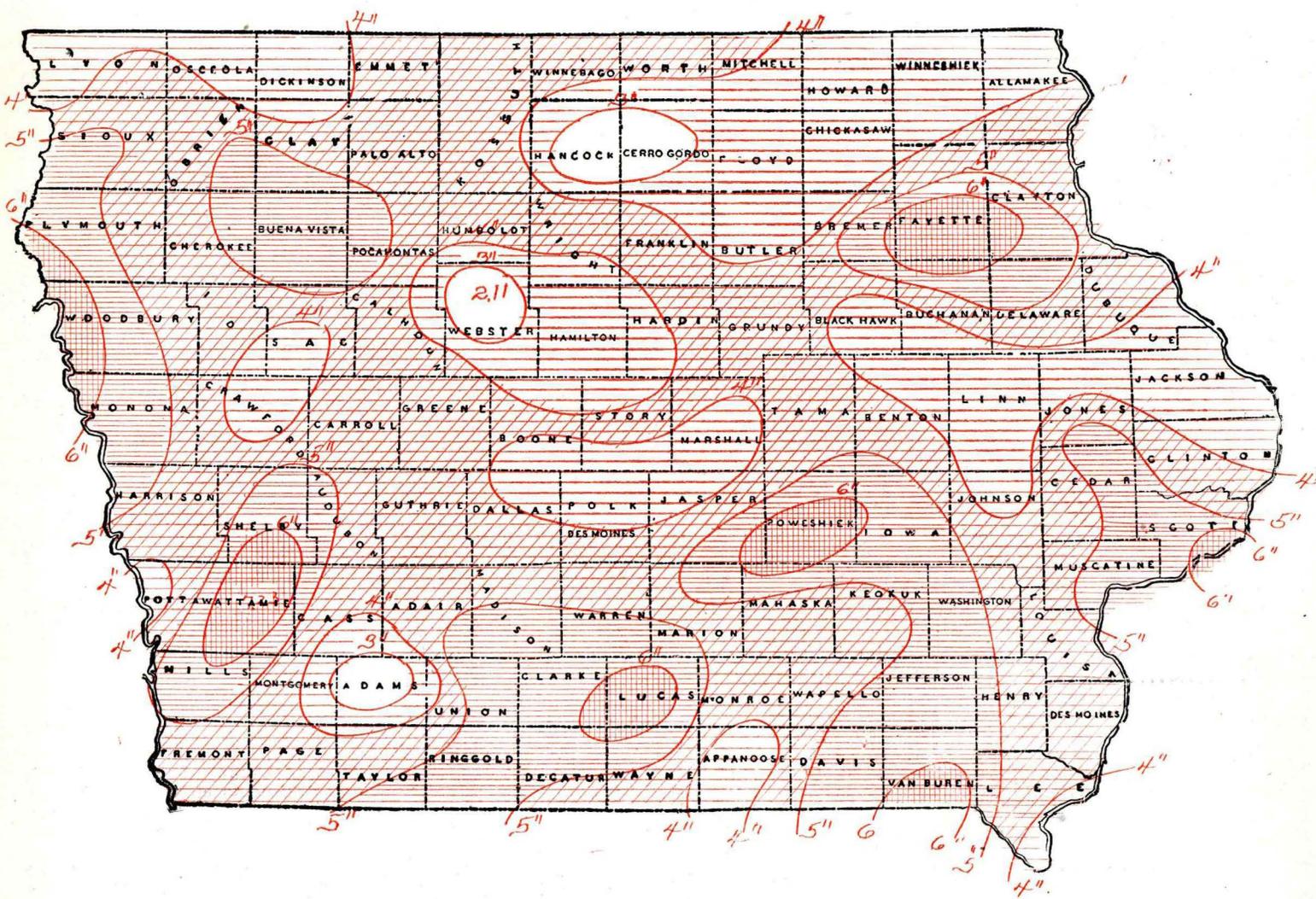
Water covered the tracks in front of the Illinois Central R. R. depot, and below the depot employees performed their duties in water half way to their knees or higher. The Mulgreiv Ice and Coal plant east of the Illinois Central R. R. depot was deep in water and could not be used for about 10 days. Water covered half of Jones street as far west as the railroad tracks, and the buildings at the foot of Jones street were completely surrounded. The pressure from below forced up the concrete cellar floor of the Iowa Oil Co.'s building. The road on the south side of the harbor was a foot under water, and on the north side of the harbor all buildings of the Dubuque Boat & Boiler works were flooded above the first floor, necessitating the raising of machinery. The road immediately south and east of the C., M. & St. P. R. R. depot was flooded.

East of Washington street for practically the entire length sewers backed up and flooded the basements of scores of homes. The packing house region near the foot of 17th street was flooded, and partial suspension of business resulted. Water covered streets around the Metz Manufacturing Co.'s plant, but did not run over the curb. At Eagle Point the Pumping Station, the yards of the Dubuque Lumber Co., and the Bathing Beach Buildings were badly flooded. The water was several inches above the floor of Bathing Beach buildings. The road beyond the Eagle Point High Bridge was closed during the period of the flood, and a large amount of work had to be done to save it.

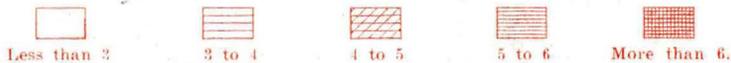
**STATISTICS OF MONEY LOSS BY FLOOD OF MISSISSIPPI RIVER, DUBUQUE RIVER DISTRICT, APRIL, 1920.**

Tangible property that can only be restored by the outlay of cash, either to clean it up and to put in serviceable condition, or to restore the property where the loss was total. This item includes loss to buildings, factories, highways, bridges, etc	Total, about	\$70,000.00
Loss to railroads, chiefly expenditures in saving track or other property, about		\$18,000.00
Loss of crops that were housed, about		1,000.00
Loss of prospective crops, chiefly strawberries, about		500.00
Loss of live stock and other movable property, about		5,000.00
Loss due to suspension of business, including wages of employees, about		5,500.00
Total loss, approximately		\$100,000.00
Money value of property saved by warnings, as reported to this office		\$125,000.00

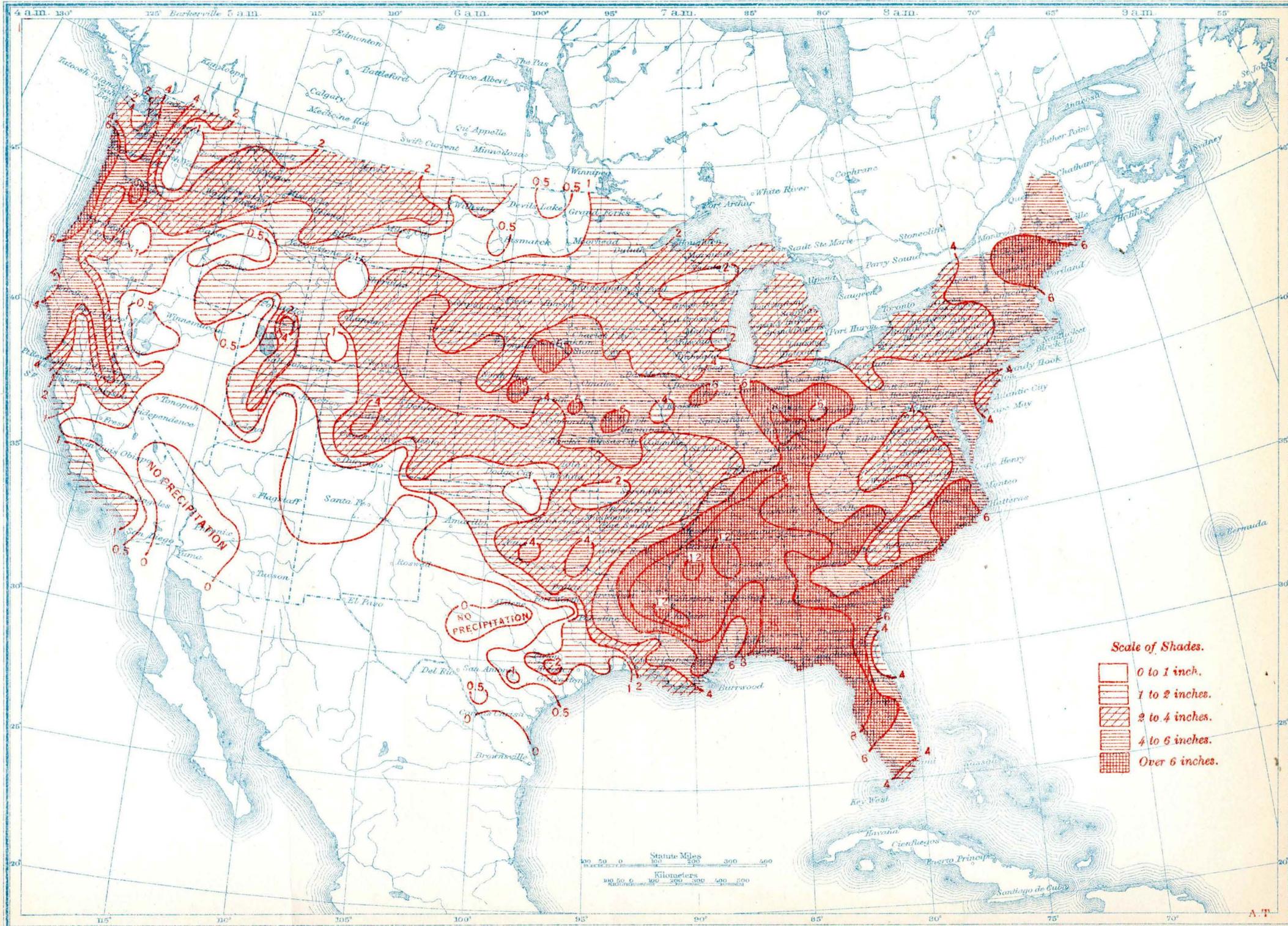
TOTAL PRECIPITATION, — APRIL, 1920.



SCALE OF SHADES—IN INCHES.



### Total Precipitation, Inches, April, 1920.



367.6

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, 1920

BY  
CHARLES D. REED  
METEOROLOGIST

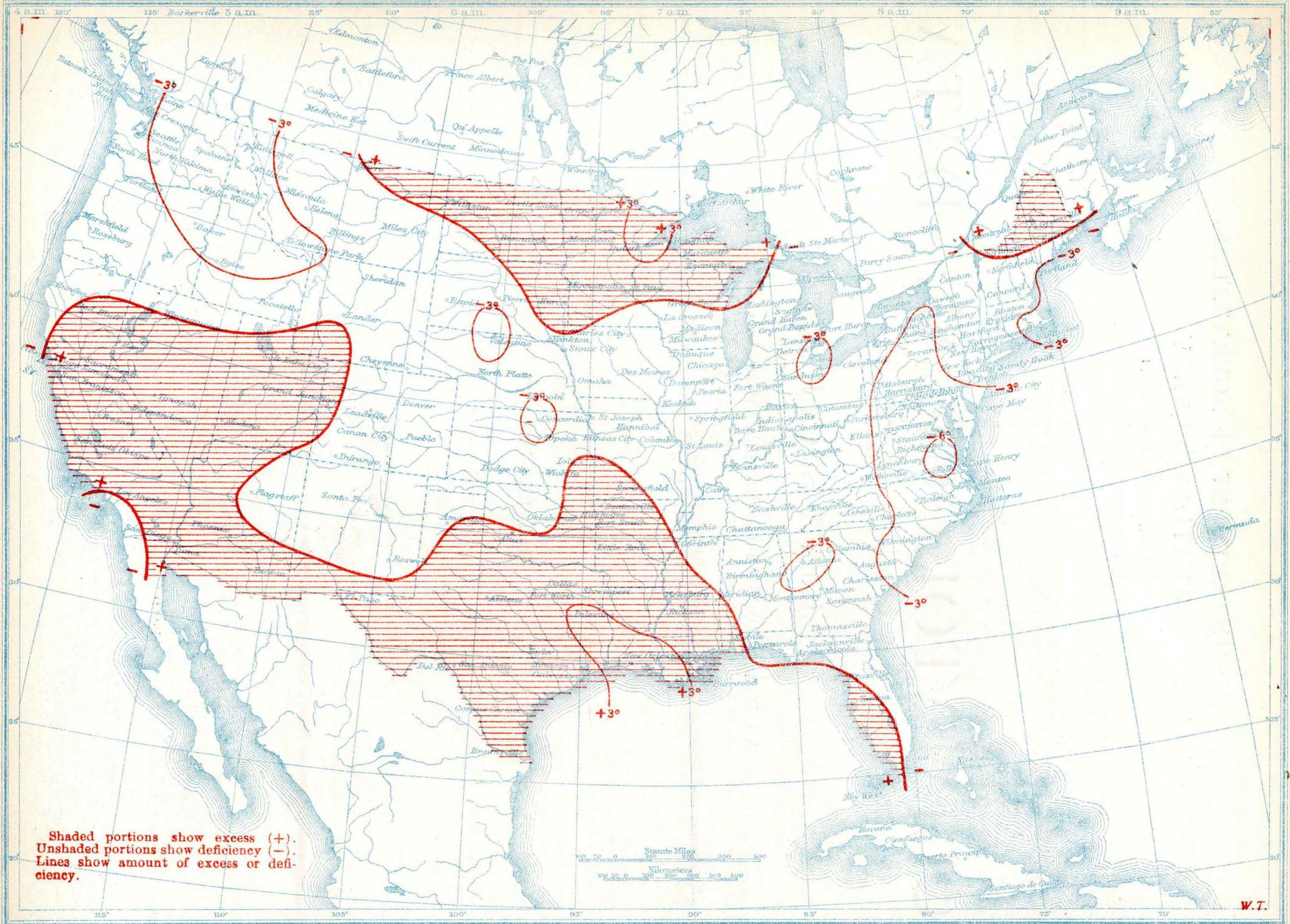


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E.C.

# Departure of the Mean Temperature from the Normal, May, 1920.













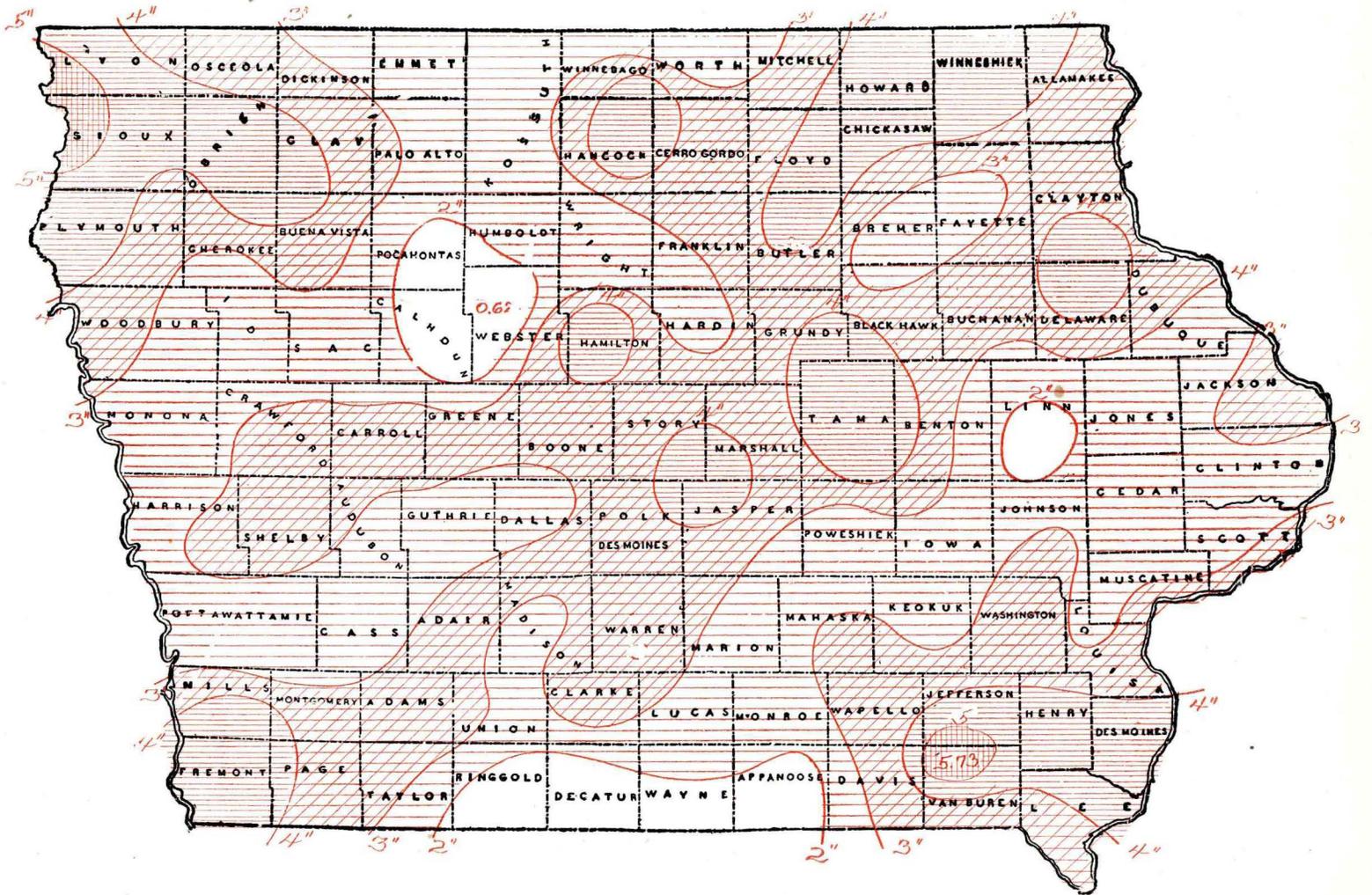
Daily Maximum and Minimum Temperatures for the Month of May, 1920.

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

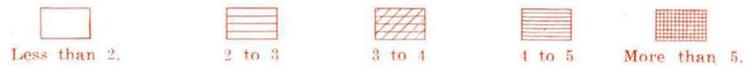
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§§ Instruments are read in the morning; the maximum temperature then read is charged to the preceding day, on which it almost always occurs.

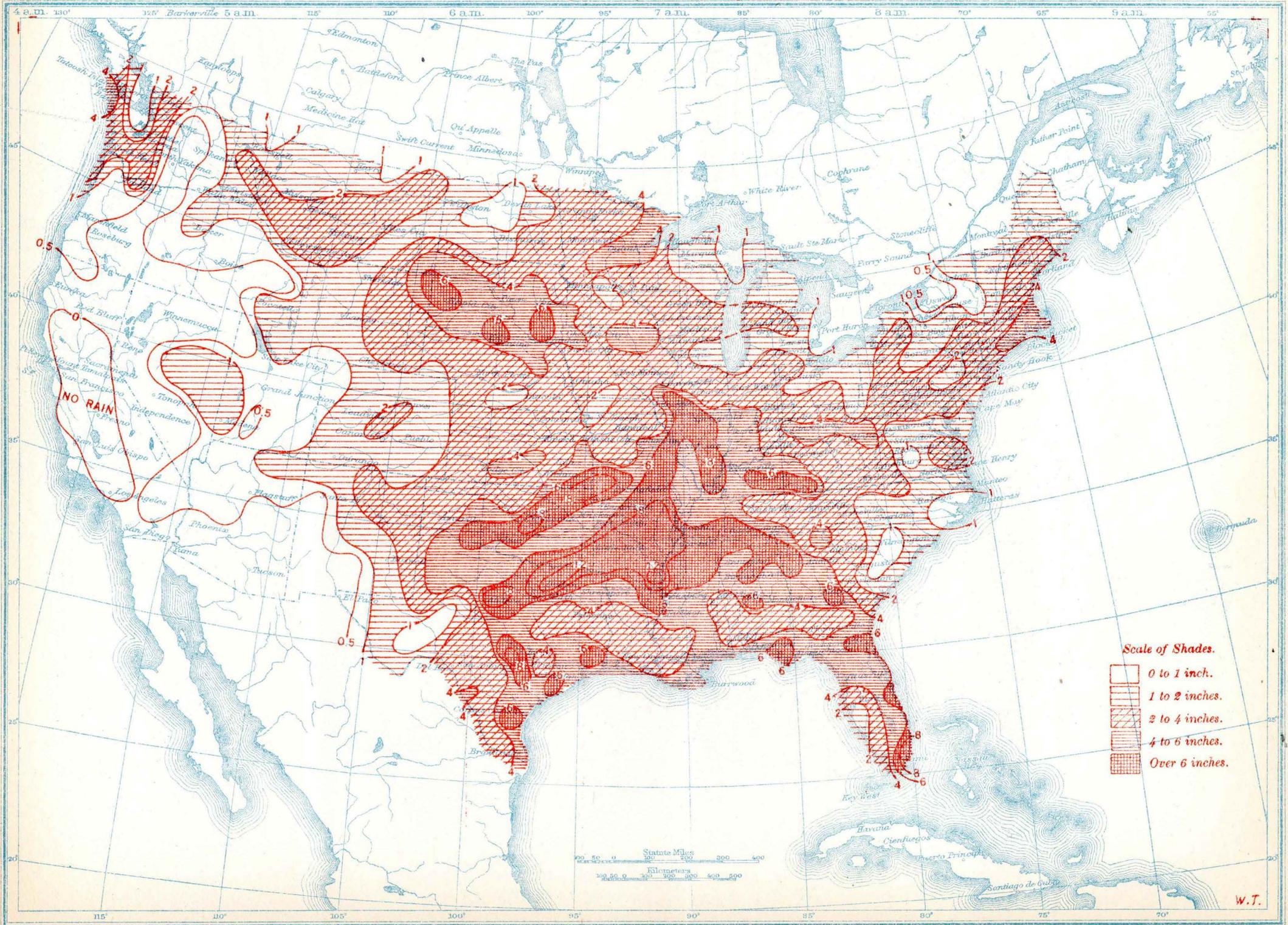
TOTAL PRECIPITATION, — MAY, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, May, 1920.



### Scale of Shades.

-  0 to 1 inch.
-  1 to 2 inches.
-  2 to 4 inches.
-  4 to 6 inches.
-  Over 6 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

JUNE, 1920

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BY

CHARLES D. REED

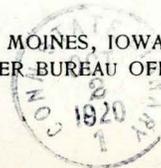
METEOROLOGIST

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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



E.C.

Departure of the Mean Temperature from the Normal, June, 1920.







CLIMATOLOGICAL DATA FOR JUNE, 1920.

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, Precipitation 0.1 in. or more, Clear, Partly Cloudy, Cloudy), Prevailing direction of wind, and Observers.

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.

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, Date), Relative Humidity (Mean, Noon, 7 P. M., Lowest, Date), WIND (Total movement, Average hourly velocity, Miles, From, Date), Sunshine (Per cent of possible, Departure from normal).

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

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 69, or about normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows; Charles City, 64; Davvenport, 80; Des Moines, 64; Dubuque, 70; Keokuk, 83; Cioux City, 54; Omaha, Nebraska, 66.

MISCELLANEOUS PHENOMENA

- Fog: 2d, 22d, 23d.
Frost: 3d, 5th, 18th.
Hail: 1st, 6th, 7th, 8th, 9th, 10th, 15th, 16th, 21st, 22d, 26th, 29th, 30th.
Halos: (lunar or solar): 2d, 4th, 8th, 10th, 13th, 15th, 17th, 18th, 19th, 20th, 26th, 30th.
Thunderstorms: All days during the month except on the 3d, 5th, 17th, 18th, 19th, 23d, 27th.

RIVERS.

Moderate stages prevailed on the Mississippi with a general falling tendency the first half of the month and rising stages the last half. On the Missouri moderate falling stages prevailed the first half and moderate to high increasing stages the last half of the month, the crest stage from the 27th to the 29th was about 1 foot below the flood stage. On the interior rivers low stages for the season prevailed.





Daily Maximum and Minimum Temperatures for the Month of June, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are grouped into Northern Division (Algona to Postville), Central Division (Belle Plaine to Sioux City), and Southern Division (Albia to Omaha, Nebr.). Each station row shows maximum and minimum temperatures for each day.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record.

HAIL STORMS DURING APRIL, 1920.

Date	County	Township	Direction from	Area Covered	Character	Size of Stones	Damage	Width of Path
1	Iowa	Pilot		1 sq. mi.	Light	Small	None	1 mile
1	Van Buren	Bonaparte			Light			
1	Madison	Madison			Light			
1	Wright	Pleasant			Light			
1	Floyd	Rock Grove			Light			
1	Floyd	Saint Charles			Light			
1	Scott	Davenport			Light			
3	Mahaska	Adams	N. W.	30 sq. mi.	Light	3/8 inch	None	Wide
11	Floyd	Rock Grove			Light			
15	Henry	Center			Light			
17	Fremont	Scott			Light			
17	Boone	Des Moines			Light			
18	Taylor	Bedford			Light			
18	Taylor	Platte			Light			
19	Wayne	Corydon		1 sq. mi.	Heavy	1/4 to 1/2 inch	None	1 mile
19	Van Buren	Jackson	E.		Light	Small	None	
19	Mahaska	Lincoln			Light			
19	Marion	Lake Prairie			Light			
19	Van Buren	Union			Light			
20	Louisa	Columbus City			Light			
21	Marion	Lake Prairie			Light			
30	Palo Alto	West Bend			Light			

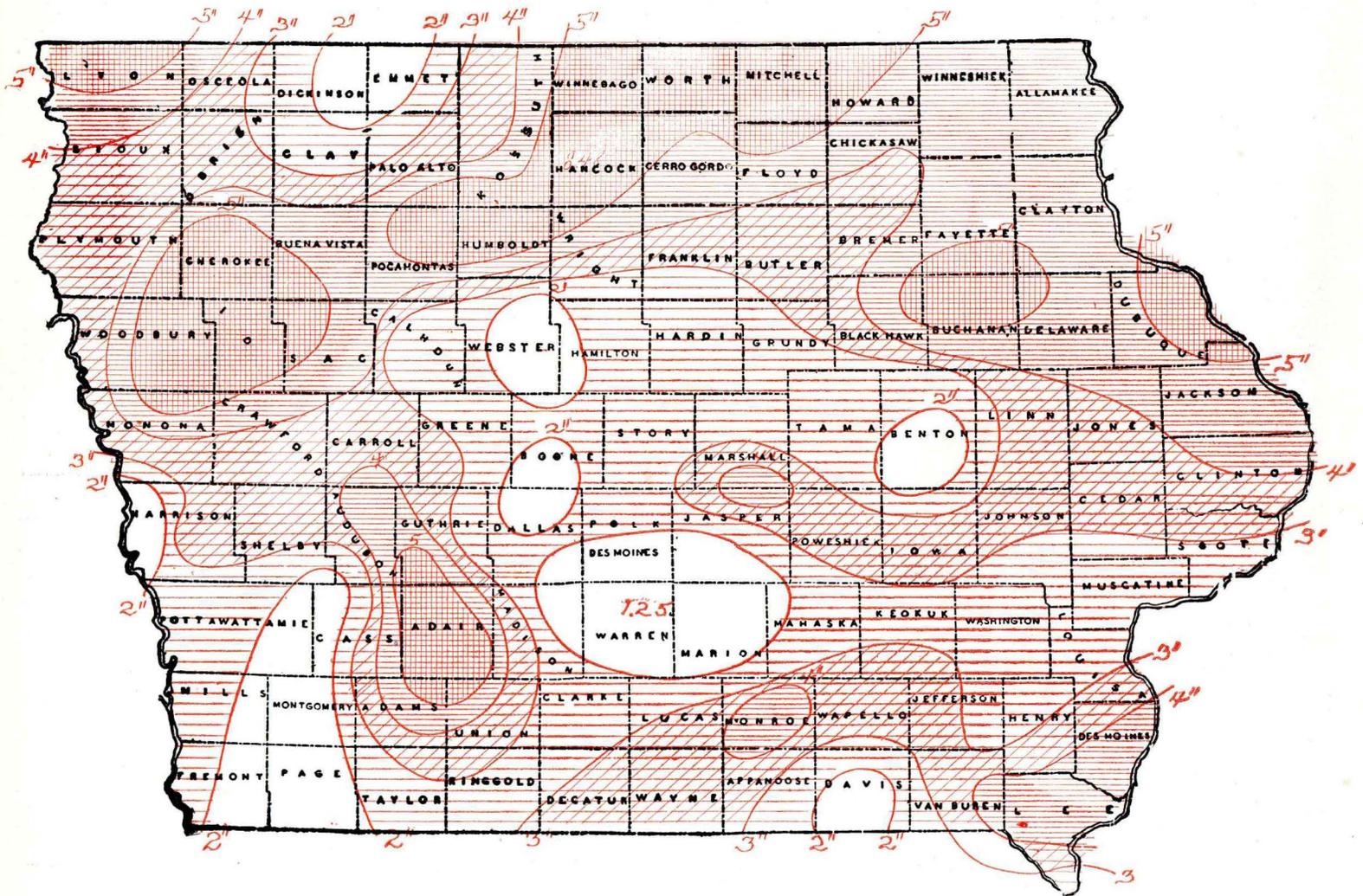
HAIL STORMS DURING MAY, 1920.

2	Fremont	Scott			Light	Small		
11	Sioux	Holland			Light			
11	Wright	Pleasant			Light			
12	Taylor	Bedford			Light			
18	Taylor	Bedford			Light			
22	Harrison	Lincoln	S. W.	10 sq. mi.	Light	3/4 inch	Considerable	2 miles
22	Polk	Jefferson	S. W.	Small	Light	Small	Light	Narrow
22	Jasper	Poweshiek	N. W.	3 sq. mi.	Heavy	1/2 inch	None	1/2 mile
22	Jones	Fairview	W.	Small	Light	Small	None	Narrow
22	Jasper	Independence			Light			
22	Cerro Gordo	Mason			Light			
22	Sioux	West Branch			Light			
26	Plymouth	America			Light			

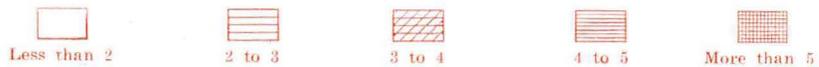
HAIL STORMS DURING JUNE, 1920.

1	Van Buren	Jackson	S.		Light	Small	Slight	
1	Wayne	Corydon			Light			
1	Sioux	West Branch			Light			
1	Cherokee	Willow			Light			
1	Dallas	Walnut			Light			
1	Scott	Davenport			Light			
6	Clarke	Ward	N. W.	4 sq. mi.	Light	1/2 to 1 inch	None	2 miles
6	Franklin	Osceola	S. W.	30 sq. mi.	Light	3/8 inch	None	5 miles
6	Franklin	Grant	S. W.	7 sq. mi.	Light	1/4 to 3/8 inch	None	2 to 3 miles
7	Guthrie	Stuart	S. W.	4 sq. mi.	Heavy	Large	\$9000	2 miles
7	Guthrie	Valley	N. W.	Large	Light	1/4 to 3/8 inch	Slight	Narrow
7	Guthrie	Beaver (south)	E.	17 sq. mi.	Moderate	Large	Slight	4 to 5 miles
7	Guthrie	Beaver (Central)	N. E.		Light	Small	None	Wide
7	Audubon	Greeley	N. W.	20 sq. mi.	Heavy	1/4 to 1/2 inch	Considerable	3 miles
7	Tama	Clark	W.	9 sq. mi.	Moderate	Large	Slight	1 mile
7	Tama	Onida	W.	9 sq. mi.	Light	Large	None	1 mile
7	Union	Jones	N. E.	4 sq. mi.	Light	3/8 inch	Slight	2 miles
7	Union	Highland	N. W.	6 sq. mi.	Light	1/2 inch	Considerable	Narrow
7	Union	Douglas			Light			
7	Harrison	Washington	S. W.	5 sq. mi.	Moderate	Small	None	2 miles
7	Adair	Lincoln	N. E.	1 sq. mi.	Heavy	1/2 inch	Considerable	Narrow
7	Crawford	Milford	N. W.		Moderate	1 to 2 inch.	None	
7	Carroll	Washington	S. W.	28 sq. mi.	Moderate	1/2 inch	Considerable	5 miles
7	Buena Vista	Nokomis			Light			
7	Sioux	Nassau			Light			
7	Buchanan	Washington			Light			
8	Decatur	Fayette	N.	36 sq. mi.	Light	1/4 inch	None	Wide
8	Clarke	Doyle	W.		Light	Small	None	
8	Adams	Jasper			Moderate		Slight	
8	Crawford	Dennison	N. W.	6 sq. mi.	Light	Small	None	2 miles
8	Ida	Corwin	N. W.	6 sq. mi.	Moderate	1/4 to 3/4 inch		
8	Audubon	Leroy	W.	12 sq. mi.	Heavy	Large	Slight	2 miles
8	Clayton	Highland	N. W.	10 sq. mi.	Light	3/8 inch	None	3 miles
9	Fayette	Bethel	N. W.	12 sq. mi.	Light	Small	Considerable	2 miles
9	Fayette	Union	W.		Light	1/4 inch	Considerable	
9	Fayette	Fremont	N. W.		Heavy	Large	Considerable	
9	Buchanan	Washington			Light			
10	Chicksaw	Stapelton	N. W.	10 sq. mi.	Light	Small	None	Narrow
10	Lyon	Lyon	W.	32 sq. mi.	Moderate	Large	Considerable	5 to 6 miles
10	Lyon	Richland			Light			
15	Mahashka	White Oak	N. W.	4 sq. mi.	Moderate	1/2 to 1 inch	Considerable	2 miles
15	Mahashka	Lincoln	N. W.	2 sq. mi.	Light	Small	None	1 mile
15	Obrien	Franklin			Light			
16	Grundy	Melrose	S. W.	32 sq. mi.	Light	Small	None	Wide
21	Polk	Allen	W.	16 sq. mi.	Light	3-16 inch	None	2 miles
21	Jefferson	Fairfield			Light	Small		
21	Keokuk	Sigourney			Light	Small		
22	Mahaska	Lincoln			Light	Small		
22	Marion	Lake Prairie			Light			
22	Lee	Jackson			Light			
26	Crawford	Dennison			Light	Small	None	
29	Wright	North Line of County			Light			
30	Boone	Des Moines			Light			

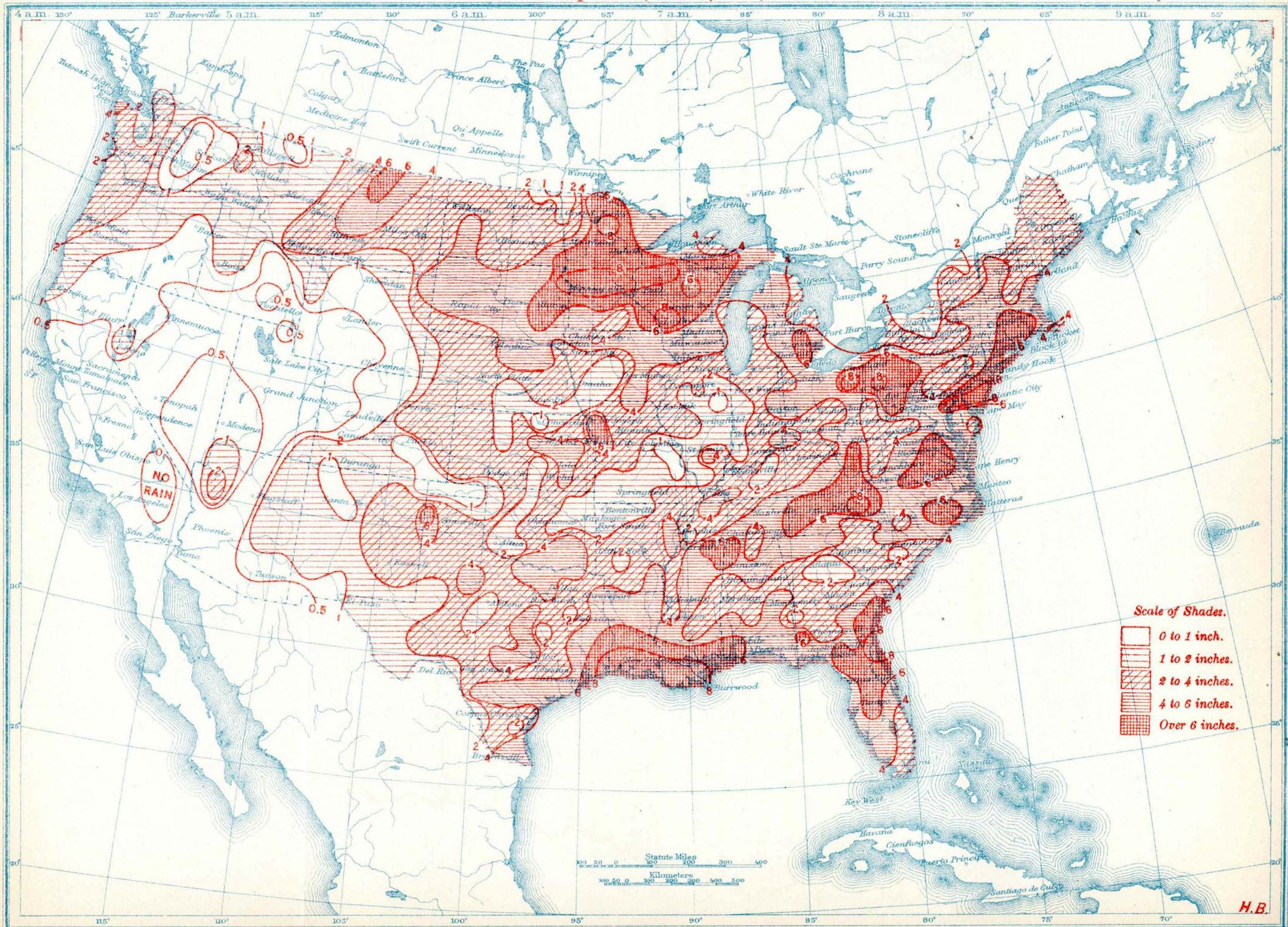
TOTAL PRECIPITATION, JUNE, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, June, 1920.



**Scale of Shades.**

- 0 to 1 inch.
- 1 to 2 inches.
- 2 to 4 inches.
- 4 to 6 inches.
- Over 6 inches.

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

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, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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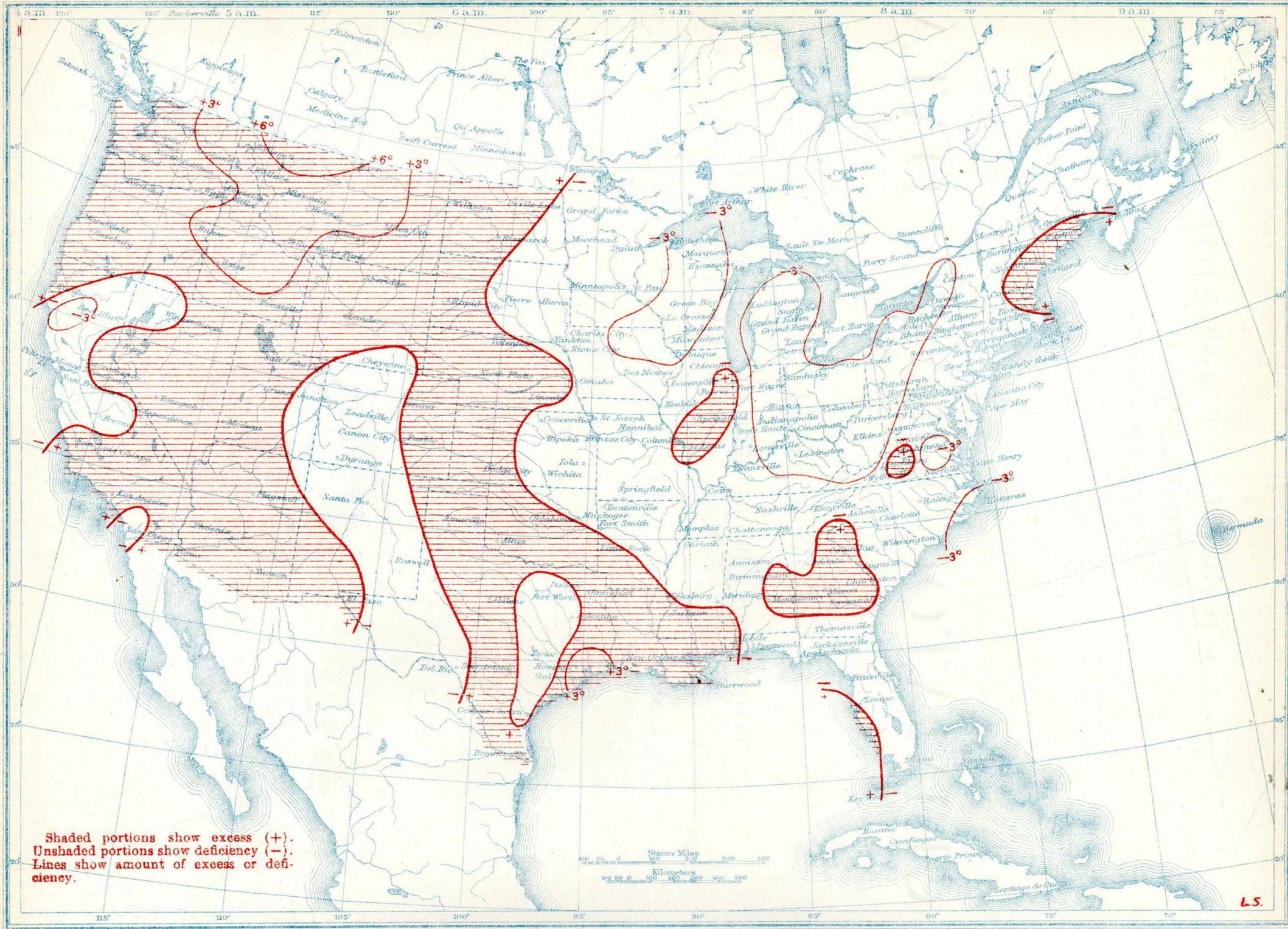


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA  
WEATHER BUREAU OFFICE



Departure of the Mean Temperature from the Normal, July, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, July, 1920. No. 7

GENERAL SUMMARY.

The temperature averaged below normal, the deficiency for each division being quite uniform, though a few stations in the western portion of the State showed a slight excess. The greatest deficiencies were confined almost entirely to the northeast section. The month was more pleasant than the average July, there being no protracted periods of hot, sultry weather and during the greater part of the month the temperature was below normal. Temperatures of 100°, or higher, were reported from but two stations.

The precipitation for the State as a whole showed a slight excess but the distribution was uneven, varying from slightly more than an inch to nearly 7.50 inches. The distribution as to time was also uneven, considerably more than half occurring during the first week and more than 80 per cent occurring during the first two weeks. During the last of the month only scattered thunder-showers occurred and rain was needed at the close of the month over the State generally. In large areas bordering the Mississippi and Missouri rivers the drouth was becoming serious.

During the afternoon of the 1st, from about 5:45 till 6:10 p. m. a tornado occurred in the southern portion of Adams County. The storm moved first from the northwest to southeast then turned and moved to the northeast, the total path being about 20 miles. The width of the storm was narrow and at points the funnel did not reach the earth, but where it was in contact with the earth everything in its way was destroyed, the loss to crops and buildings amounted to about \$100,000. There was no loss of lives but 4 persons were injured and the occupants of one residence had a remarkable escape from being burned to death in a wrecked house that caught fire and burned up.

Hail storms were unusually numerous, destructive and widely distributed over the State. The worst storm reported was in the northwest portion of Scott county on the 9th, and the damage there was estimated at about \$100,000. The principal damage was in a strip about 12 miles long, varying from about one and three-fourths to about 9 miles wide, extending from 3 miles southeast of New Liberty to about 3 miles south of Maysville. The path of greatest damage was about 6 miles long and about one and one-half miles wide. The stones varied from about 0.2 inch to 0.7 inch in diameter but some were said to be 1.5 inches. The damage from hail in other portions of the State was large. The storms reported shows losses to crops approximating \$1,000,000, but it is probable that the loss was considerably more than that amount. A table showing the hail storms during July is published elsewhere in this report.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.00 inches. The highest pressure recorded was 30.32 inches at Dubuque on the 26th, and the lowest was 29.64 at Des Moines on the 6th. The monthly range was 0.68 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 97 stations, was 72.3°, or 1.8°, lower than

the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 71.2°, or 1.5° lower than the normal; Central, 72.3°, or 2.0° lower than the normal; Southern, 73.5°, or 1.7° lower than the normal. The highest monthly mean was 76.4°, at Omaha, Neb., and the lowest was 67.6°, at Postville. The highest temperature reported was 102°, at Clarinda, on the 23d, and the lowest was 45°, at Earlham, on the 27th. The temperature range for the State was 57°.

HUMIDITY

The average relative humidity for the State at 7 a. m. was 78 per cent, and at 7 p. m. it was 55 per cent. The mean for the State was 66 per cent, or 2 per cent lower than the normal. The highest monthly mean was 70 per cent, at Charles City and the lowest was 64 per cent at Keokuk.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 104 stations, was 4.22 inches, or 0.26 inch more than the normal. By divisions the averages were as follows: Northern, 4.46 inches, or 0.58 inch more than the normal; Central, 3.59 inches, or 0.39 inch less than the normal; Southern, 4.61 inches, or 0.59 inch more than the normal. The greatest amount, 7.49 inches, occurred at Stockport, and the least, 1.11 inches at Dubuque. The greatest amount in 24 consecutive hours was 3.32 inches, at Albia, 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 57 miles per hour, from the west, at Sioux City, on the 4th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 73, or about 1 per cent below the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 69; Dav- enport, 83; Des Moines, 74; Dubuque, 72; Keokuk, 80; Sioux City, 64; Omaha, Neb., 77.

COMPARATIVE DATA FOR THE STATE—JULY.

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.....	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
1893.....	76.4	+2.3	109	39	0.63	-5.33	3.50	T.	.....	3	22	8	1
1894.....	72.1	-2.0	104	35	3.40	-0.56	10.10	0.45	.....	7	15	12	4
1895.....	73.6	-0.5	104	42	6.90	+2.94	12.67	1.61	.....	9	14	11	6
1896.....	75.6	+1.5	106	42	3.26	-0.70	7.60	1.01	.....	6	18	10	3
1897.....	73.4	-0.7	102	42	2.98	-0.98	12.88	0.55	.....	7	19	9	3
1898.....	73.1	-1.0	101	38	3.07	-0.89	8.66	0.42	.....	7	16	10	5
1899.....	73.4	-0.7	102	37	6.15	+2.19	18.45	1.80	.....	9	16	10	5
1900.....	82.4	+8.3	113	46	2.34	-1.62	5.97	0.27	.....	5	21	9	1
1901.....	73.1	-1.0	99	41	8.67	+4.71	13.57	4.82	.....	13	14	10	7
1902.....	72.9	-1.2	100	40	4.83	+0.87	12.72	0.94	.....	9	17	9	5
1903.....	70.6	-3.5	100	38	4.41	+0.45	11.97	1.28	.....	10	16	9	6
1904.....	70.6	-3.5	102	40	2.91	-1.05	7.08	0.69	.....	9	14	10	7
1905.....	70.9	-3.2	102	42	3.04	-0.92	7.05	0.26	.....	8	18	10	3
1906.....	73.7	-0.4	102	41	7.27	+3.31	13.66	3.97	.....	13	16	11	4
1907.....	73.0	-1.1	100	42	3.66	-0.30	9.21	0.70	.....	8	16	10	5
1908.....	72.3	-1.8	102	46	4.77	+0.81	12.20	1.20	.....	10	15	8	8
1909.....	74.5	+0.4	108	43	1.86	-2.10	5.69	0.12	.....	7	19	8	4
1910.....	75.5	+1.4	111	38	2.27	-1.69	6.62	0.08	.....	7	18	10	3
1911.....	71.6	-0.5	103	33	3.71	-0.25	7.56	1.17	.....	10	17	10	4
1912.....	76.1	-2.0	108	45	1.82	-2.14	6.23	T.	.....	5	21	8	2
1913.....	76.6	-2.5	109	43	2.27	-1.69	6.50	0.44	.....	5	20	8	3
1914.....	69.5	-4.6	92	40	8.32	+4.36	15.83	3.68	.....	14	10	12	9
1915.....	79.7	+5.6	105	48	1.78	-2.18	6.87	0.10	.....	5	23	7	1
1916.....	74.3	-0.2	106	33	2.27	-1.69	6.06	0.23	.....	7	21	8	2
1917.....	73.1	-1.0	105	40	3.17	-0.79	8.05	0.26	.....	8	19	8	4
1918.....	77.4	+3.3	104	41	2.86	-1.10	7.82	0.39	.....	6	22	8	1
1919.....	72.3	-1.8	102	45	4.22	+0.26	7.49	1.11	.....	9	19	9	3

T. indicates an amount too small to measure, or less than .065 inch rainfall and less than .05 inch snowfall.









Daily Maximum and Minimum Temperature for the Month of July, 1920.

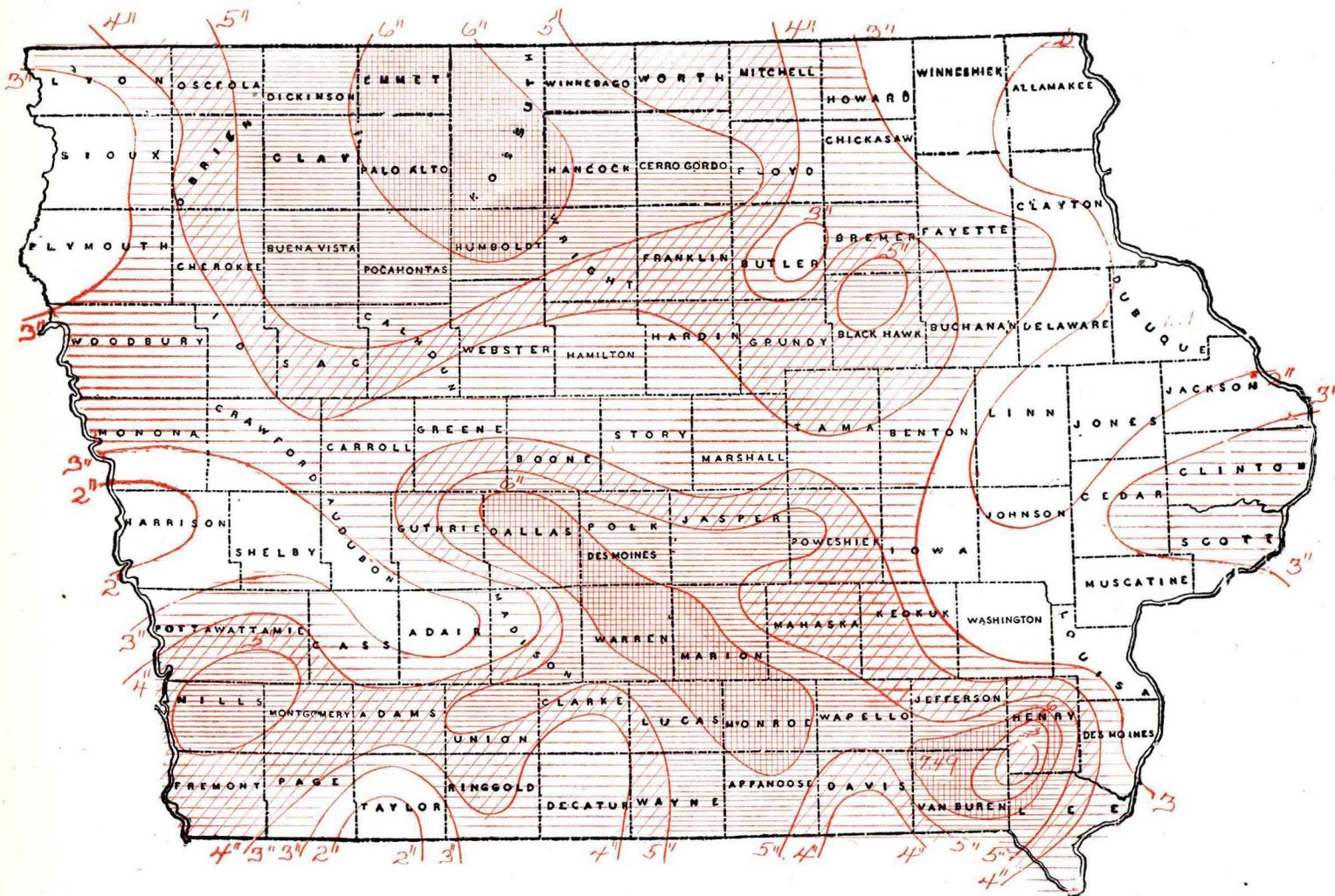
Table with columns for Stations, days 1-31, and Mean. Rows are categorized into Northern, Central, and Southern Divisions, listing various Iowa cities with their daily temperature ranges.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record.

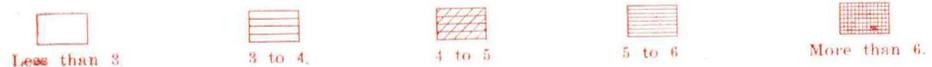
HAIL STORMS DURING JULY, 1920.

County	Location	Direction	Area (sq. mi.)	Intensity	Size (inches)	Severity	Distance (miles)	
1	Dallas	Walnut	N. W.	4 sq. mi.	Heavy	Large	Severe	Narrow
1	Dallas	Sugar Grove	N. W.	Small	Heavy	1/2 to 1 inch.	Considerable	1/4 to 1/2
1	Dallas	Adel		8 sq. mi.	Heavy	1 to 2 inches	Severe	1 and 1/2 miles
1	Dallas	Spring Valley	N. W.	Large	Heavy	Large	Severe	1 to 2 miles
1	Lyon	Richland	N.	6 sq. mi.	Heavy	Large	\$5000	1 mile
1	Lyon	Lyon	N.	8 sq. mi.	Heavy	Large	Severe	2 miles
1	Lyon	Logan	N.	6 sq. mi.	Heavy	Large	Severe	1 1/2 to 3 miles
1	Lyon	Rock	S. W.	Small	Heavy	Small	Severe	1 mile
1	Buena Vista	Washington		Small	Light	Small	Slight	Narrow
1	Buena Vista	Nokomis		Small	Light		Slight	
1	Harrison	Calhoun	N. W.	30 sq. mi.	Light	Small	Slight	5 miles
1	Harrison	Cincinnati	N. W.	10 sq. mi.	Light	1 inch	Considerable	2 to 3 miles
1	Harrison	Little Sioux		Small	Light		None	
1	Pocahontas	Lake	N. W.	24 sq. mi.	Heavy	1/4 to 1/2 inch.	Considerable	4 miles
1	Sioux	Nassau		Small	Light		Slight	
1	Story	Washington			Light		Slight	
1	Union	Union	S. W.	Small	Moderate	Small	None	Narrow
1	Union	Grant	W.	4 sq. mi.	Moderate	1/2 to 1 inch	Considerable	2 miles
1	Union	Douglas		Small	Moderate	1/2 to 3/4 inch	Considerable	Narrow
2	Winneshiek	Bloomfield	N.	12 sq. mi.	Heavy	Large	Considerable	1 to 3 miles
2	Winneshiek	Military	N.	Large	Heavy	Large	Severe	1 to 1 1/2 miles
2	Winneshiek	Fremont	N.	Large	Heavy	Large	Severe	1 to 2 miles
2	Winneshiek	Burr Oak	N.	Large	Heavy	Large	Severe	1 to 2 miles
2	Clayton	Highland	N. W.	5 sq. mi.	Heavy	1/2 to 1 inch	Considerable	2 miles
2	Clayton	Grand Meadow	N. W.		Heavy	1/2 inch	Considerable	
2	Allamakee	Post	N.	30 sq. mi.	Moderate	1/4 to 1 inch	Considerable	4 to 5 miles
3	Clayton	Grand Meadow		Small	Light		Slight	
4	Poweshiek	Bear Creek	S. E.	1 sq. mi.	Moderate	Small	Considerable	1 mile
7	Emmet	Ellsworth	E.	5 sq. mi.	Moderate	Small	Considerable	1 mile
7	Greene	Greenbrier	W.	9 sq. mi.	Moderate	Large	Considerable	2 to 3 miles
7	Greene	Franklin	W.	15 sq. mi.	Heavy	Large	Severe	2 to 3 miles
7	Lee	Jackson			Light		Slight	
7	Mahaska	White Oak	E.	Small	Moderate	1/4 inch	Slight	
7	Mahaska	Scott	N. W.	6 sq. mi.	Heavy	1/8 to 1/2 inch	Considerable	1 mile
7	Mahaska	Garfield	N. W.	4 sq. mi.	Heavy	1/8 to 1/2 inch	Considerable	1 mile
7	Mahaska	East Des Moines	N. W.	6 sq. mi.	Heavy	1/8 to 1/2 inch	Considerable	1 mile
7	Mahaska	Harrison	N. W.	4 sq. mi.	Heavy	1/8 to 1/2 inch	Considerable	1 mile
7	Mahaska	Lincoln			Light		None	
7	Marion	Knoxville	W.	6 sq. mi.	Moderate	Small	Considerable	Narrow
7	Union	Jones	W.	6 sq. mi.	Moderate	Large	Considerable	2 miles
7	Union	Douglas			Light		None	
7	Van Buren	Chequest	N. W.	6 sq. mi.	Light	1/2 inch	None	1 to 2 miles
7	Van Buren	Vernon	N. W.	4 sq. mi.	Heavy	3/4 inch	Severe	2 miles
7	Van Buren	Jackson	N. W.	Large	Heavy	1 to 2 inches	Severe	5 to 6 miles
7	Dallas	Spring Valley			Light		None	
7	Davis	Cleveland	N. W.	8 sq. mi.	Heavy	Large	Severe	2 miles
7	Davis	Perry	N. W.	28 sq. mi.	Heavy	Large	Severe	6 miles
7	Davis	Union	N. W.	12 sq. mi.	Heavy	Large	Severe	3 to 4 miles
7	Davis	Prairie	N. W.	24 sq. mi.	Heavy	Large	Severe	3 to 4 miles
7	Polk	Webster	N. W.	Small	Heavy	Large	Severe	4 miles
7	Polk	Des Moines	N. W.	Small	Heavy	1-6 to 1 inch	Slight	Narrow
7	Warren	Lincoln			Light		Slight	
8	Clayton	Boardman		Small	Light		Slight	
9	Adair	Lee			Light		Slight	
9	Audubon	Greeley	S. W.	8 sq. mi.	Heavy	Small	Severe	1 to 2 miles
9	Buchanan	Hazelton	S. W.	12 sq. mi.	Heavy	Small	Considerable	1 to 5 miles
9	Clarke	Madison	W.	8 sq. mi.	Moderate	1/2 inch	Considerable	1 to 2 miles
9	Clinton	Orange	W.	12 sq. mi.	Light	1/4 inch	None	2 miles
9	Davis	Cleveland			Light		Slight	
9	Harrison	Cincinnati	W.	8 sq. mi.	Light	1/4 inch	None	2 to 3 miles
9	Johnson	Hardin	N. W.	Large	Heavy	Large	Severe	1 to 3 miles
9	Johnson	Union	N. W.	Large	Heavy	3/4 inch	Severe	4 miles
9	Johnson	Washington	W.	10 sq. mi.	Heavy	1/2 inch	Severe	2 miles
9	Madison	Madison			Light		Slight	
9	Pottawattamie	Knox	N.	8 sq. mi.	Moderate	Small	Considerable	2 to 3 miles
9	Scott	Allens Grove	S.	12 sq. mi.	Moderate	Small	Considerable	2 miles
9	Scott	Cleona	S.	20 sq. mi.	Light	1/2 to 1 inch	Considerable	4 to 7 miles
9	Scott	Hickory Grove	S.	Small	Moderate	1/2 to 1 inch	Considerable	4 to 5 miles
9	Scott	Princeton		Small	Moderate	Small	Considerable	
9	Union	Douglas			Light		Slight	
9	Wapella	Richland	N. W.	8 sq. mi.	Light	1/2 inch	Slight	1 mile
9	Washington	Washington	N. W.	Small	Moderate	Small	Considerable	2 miles
9	Wayne	Corydon			Light		Slight	
9	Wright	Dayton	W.	8 sq. mi.	Heavy	Small	Severe	1 mile
9	Wright	Eagle Grove	W.	Small	Moderate	Small	Considerable	2 miles
9	Wright	Clarion	W.	10 sq. mi.	Moderate	1/2 to 3/4 inch	Considerable	2 to 3 miles
9	Wright	Lake	W.	Small	Moderate	Small	Considerable	1 to 2 miles
12	Ringold	Poo			Light		Slight	
13	Harrison	C. Ihoun	N.	8 sq. mi.	Light	Small	None	2 to 3 miles
14	Buena Vista	Nokomis			Light		Slight	
14	Warren	Lincoln			Light		Slight	
15	Charokey	Willow			Light	Small	Slight	3 to 4 miles
16	Wright	Vernon	N. W.	4 sq. mi.	Heavy	1/2 inch	Severe	1 mile
16	Wright	Iowa	N. W.	Small	Moderate	1/4 to 3/4 inch	Considerable	1/4 to 2 miles
17	Wright	Pleasant			Light		Slight	
17	Blackhaw	East Waterloo	S. W.	Small	Heavy	Large	Considerable	
20	Plymouth	Union	N. W.	10 sq. mi.	Moderate	Large	Considerable	1 to 2 miles
20	Buena Vista	Washington	W.	Small	Moderate	Large	Considerable	1 mile
20	Buena Vista	Scott	W.	Small	Moderate	Large	Considerable	2 miles
20	Buena Vista	Nokomis					Considerable	
20	Cherokee	Willow	S. W.	4 sq. mi.	Moderate	3/8 inch	Slight	1 mile
22	Winneshiek	Bluffton	S. E.	Small	Moderate	Small	Slight	1 mile
22	Dickinson	Lakeville			Light		None	
23	Winneshiek	Decorah		Small	Heavy		Considerable	

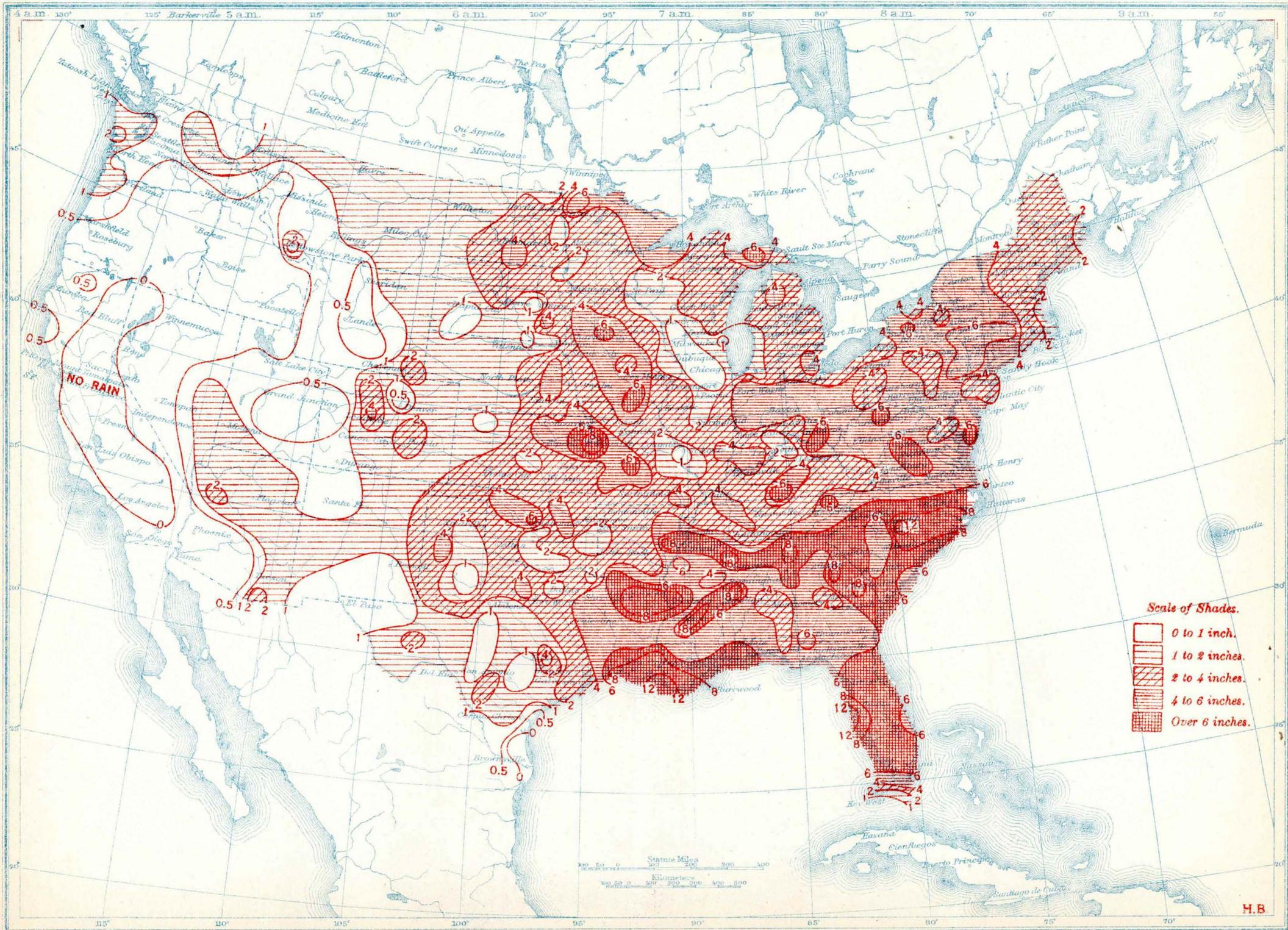
TOTAL PRECIPITATION, JULY, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, July, 1920.



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, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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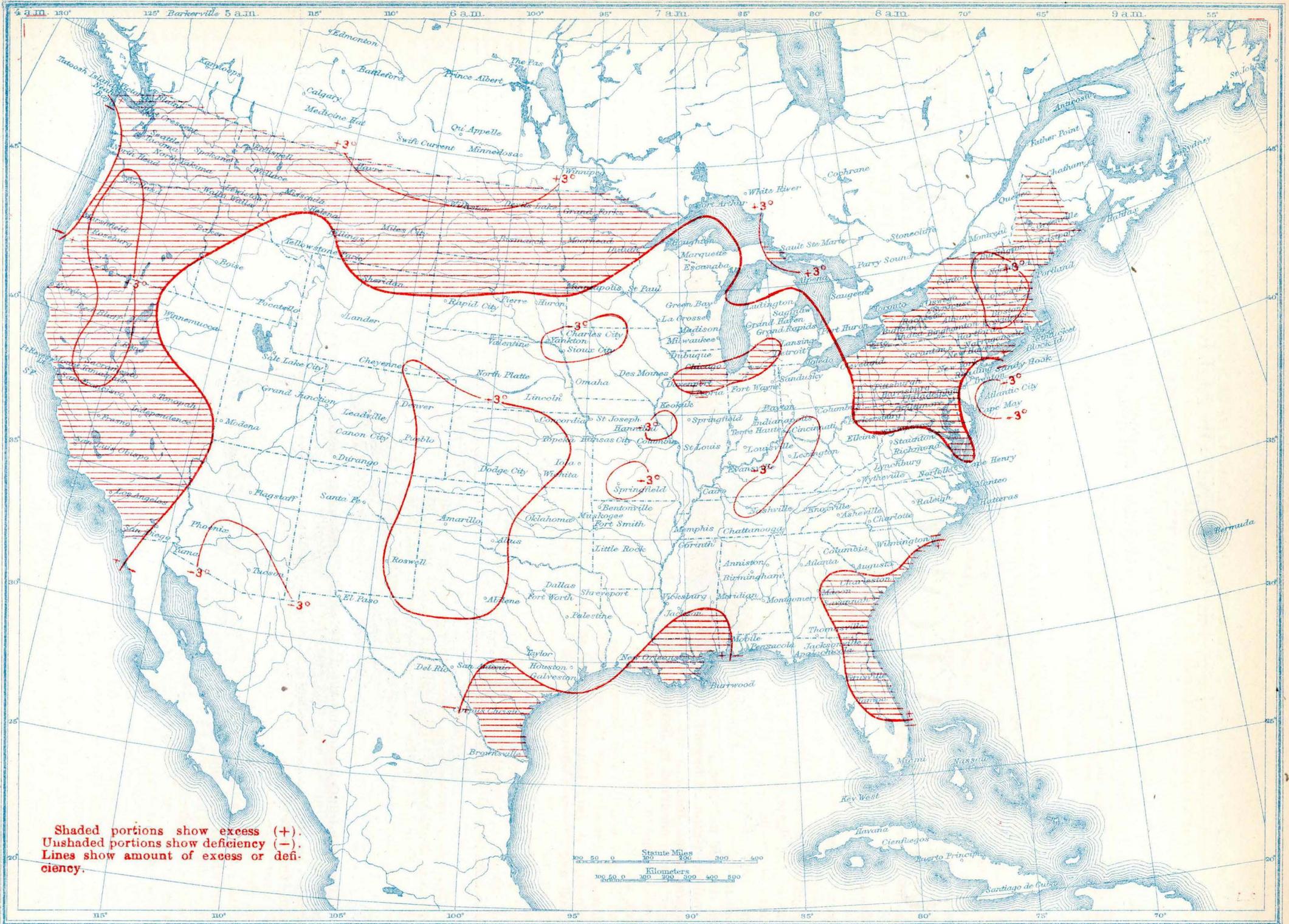
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DES MOINES IOWA  
WEATHER BUREAU OFFICE



E. C.

# Departure of the Mean Temperature from the Normal, August, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist.

Vol. XXXI Des Moines, Iowa, August, 1920 No. 8

GENERAL SUMMARY

August, like July, was deficient in temperature and too cool for the proper development of corn and at the close of the month much of the crop had not advanced beyond the roasting-ear stage. The deficiency was quite uniform over each division though the range varied greatly along the Mississippi. The usual hot periods were absent and the temperature was above normal for but short intervals and the hottest weather occurred during the first ten days. At a number of stations in each division the maximum temperature did not reach 90°.

The precipitation, while averaging slightly below normal, was very unevenly distributed. A large number of stations over the northern division and a few in the central and southern had a decided excess of precipitation and many stations that were decidedly deficient in July, particularly in the southeastern and southwestern portions of the State, showed a pronounced deficiency with drouth becoming serious at the close of the month. The heavy rains of the 19th-20th caused serious loss to crops in Carroll, Greene, Humboldt and Hancock Counties. Hail damage occurred principally on the 6th and 8th in Plymouth, Union, Ringgold, Jasper, Iowa, Allamakee, Clayton, Linn, Johnson and Des Moines Counties. The worst storm occurred in Ringgold County, the loss to growing crops in about 25 sections in Lots Creek, Middle Park and Poe Townships amounted to from 25 to more than 50 per cent. The damage was extensive also in Allamakee County over the northeast corner of Iowa Township. A very heavy downpour of rain occurred in Carroll and Greene Counties between Scranton and Glidden, amounting to 5 inches in from two to three hours, causing small streams to get out of banks and doing great damage to bridges and culverts. The loss to bridges and culverts is estimated at \$10,000 in each county and the loss to crops probably as great.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.02 inches. The highest recorded was 30.37 inches at Dubuque, on the 23d, and the lowest was 29.56 inches at Sioux City on the 28th. The monthly range was 0.81 of an inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 105 stations, was 69.3°, or 2.5° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 67.7°, or 2.7° lower than the normal; Central, 69.4°, or 2.3° lower than the normal; Southern, 70.7°, or 2.5° lower than the normal. The highest monthly mean was 73.4° at Burlington and Keokuk, and the lowest was 65.4°, at Decorah and Spencer. The highest temperature recorded was 98° at Monroe on the 5th and Clarinda on the 10th, and the lowest was 39° at Decorah and Stockport, on the 24th. The temperature range for the State was 59°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 109 stations, was 3.35 inches, or 0.33 inch less than the normal. By divisions the averages were as follows; Northern, 3.98 inches, or 0.50 inch more than the normal; Central, 3.41 inches, or 0.36 inch less than the

normal; Southern, 2.67 inches, or 1.11 inches less than the normal. The greatest amount, 8.52 inches occurred at Britt, and the least 0.44 inch, at Burlington. The greatest amount in 24 hours, 4.17 inches, occurred at Humboldt, on the 20th.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 81 per cent, and at 7 p. m. it was 58 per cent. The mean for the month was 70 per cent, or 2 per cent lower than the normal. The highest monthly mean was 74 per cent, at Charles City and Dubuque, and the lowest was 66 per cent at Keokuk.

WIND.

The prevailing direction of the wind was from the southeast. The highest velocity reported from a regular Weather Bureau station was at the rate of 39 miles per hour, from the northwest, at Sioux City, on the 6th.

SUNSHINE.

The average per cent of the possible amount of sunshine was 69, or 2 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau Stations was as follows: Charles City, 64; Davenport, 73; Des Moines, 71; Dubuque, 65; Keokuk, 71; Sioux City, 73; Omaha, Neb., 66.

MISCELLANEOUS PHENOMENA.

Aurora: 21st.

Fog: 4th, 6th, 8th, 9th, 14th, 15th, 20th, 24th.

Frost: (light): 23d, 24th, 25th.

Hail: 6th, 7th, 8th, 30th.

Halos: (lunar or solar): 7th, 10th, 22d, 28th, 30th, 31st.

Haze: 16th.

Rainbow: 19th.

Thunderstorms: 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 15th, 19th, 20th, 21st, 22d, 27th, 28th, 29th, 30th, 31st.

COMPARATIVE DATA FOR THE STATE—AUGUST

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.....	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	-1.26	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	3
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	6
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	.....	9	17	9	5
1909.....	76.1	+4.3	103	33	1.81	-1.87	8.21	T.	.....	5	21	8	2
1910.....	71.9	-0.1	104	36	3.88	+0.20	11.22	0.37	.....	8	15	10	6
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	6
1913.....	76.6	+4.8	108	40	2.68	-1.00	7.13	0.08	.....	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
1920.....	69.3	-2.5	98	39	3.35	-0.33	8.52	0.44	.....	7	18	8	5

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



CLIMATOLOGICAL DATA FOR AUGUST, 1920.—Continued

Table with columns: 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, Precipitation 0.1 in. or more, Clear, Partly Cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. Includes 'Southern Division' and 'Means and extremes'.

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 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: Stations, Barometric Pressure (Inches (Sea level)), Relative Humidity (Per cent), WIND (Total movement, Average hourly velocity, Miles, From, Date), Sunshine. Includes 'Means and extremes' and 'Normals and records'.

§Sioux City, ¶Omaha, \*Des Moines and Omaha, †Local mean time, ††And other dates



DAILY PRECIPITATION FOR AUGUST, 1920--Continued.

Table with columns: Stations, Watersheds, DAY OF MONTH (1-31), Total. Rows include locations like Afton, Albia, Atlantic, Bedford, Bloomfield, Bonaparte, Burlington, Centerville, Chariton, Clarinda, Columbus Jct., Corning, Corydon, Creston, Cumberland, Earlham, Fairfield, Glenwood, Greenfield, Indianola, Keokuk, Keosauqua, Knoxville, Lacona, Lamoni, Lenox, Mt. Ayr, Mt. Pleasant, Murray, Oakland, Oskaloosa, Ottumwa, Pella, Sigourney, Stockport, Thurman, Washington, Winterset, Omaha, Neb. etc.

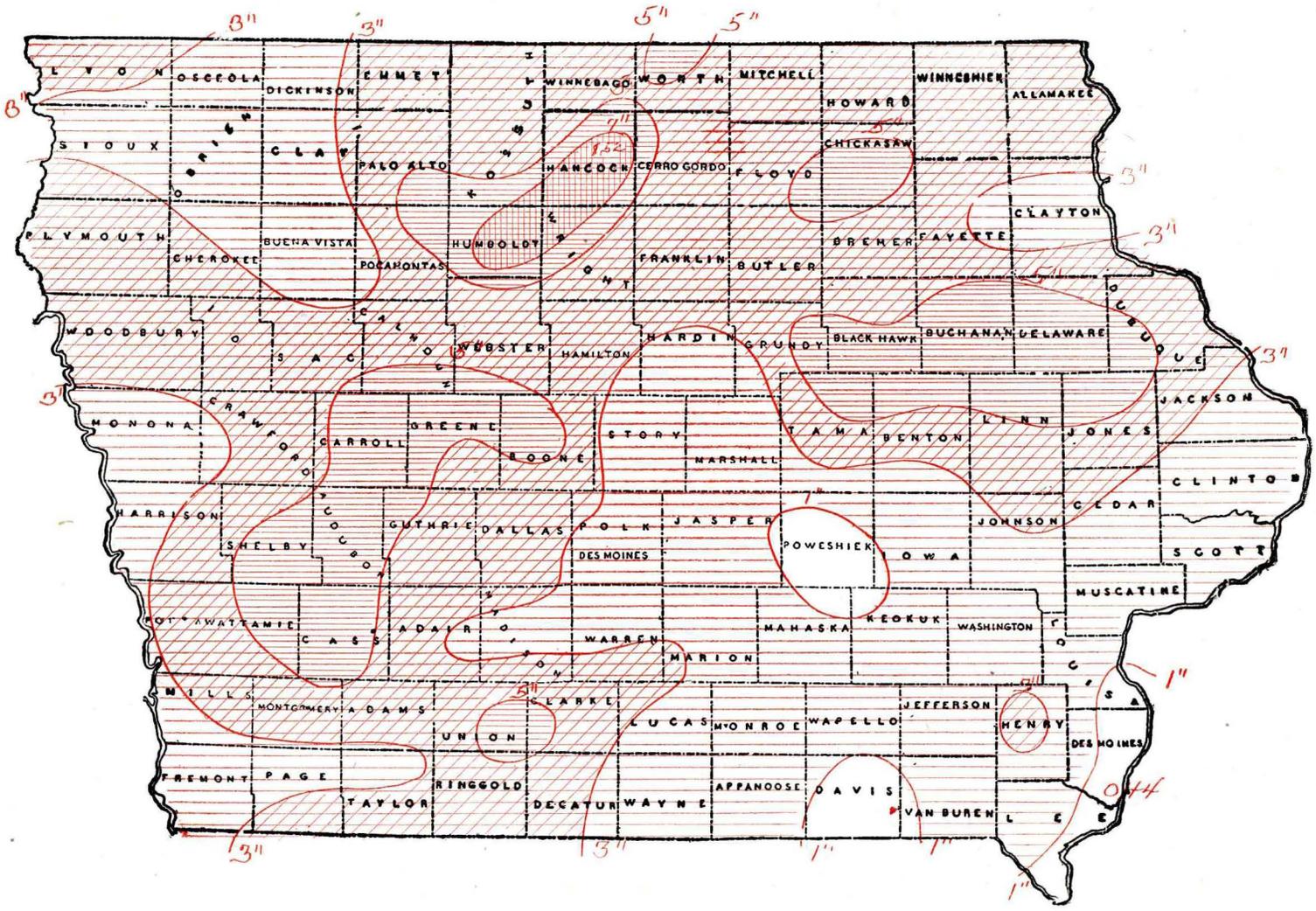
Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.
\*\*Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
\*\*\*Regular Weather Bureau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

RIVERS

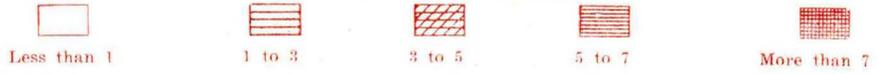
Except for a few slight and unimportant rises, moderate, falling stages prevailed on the principal rivers. On the main streams of the interior rivers no unusually high stages prevailed but on the smaller streams in Carroll, Greene, Humboldt and Hancock County local floods occurred following the heavy rains of the 19th-20th.



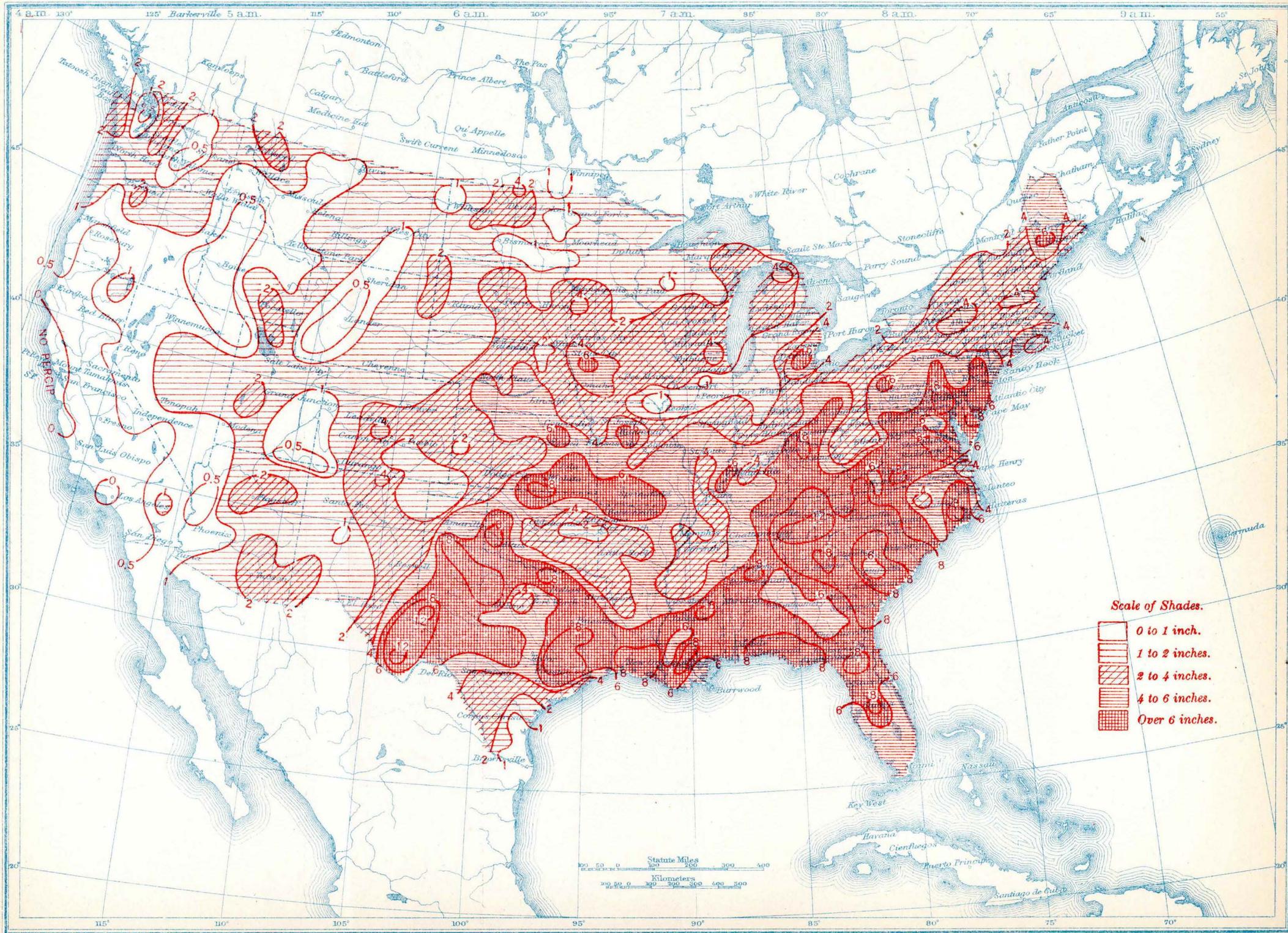
TOTAL PRECIPITATION, — AUGUST, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, August, 1920.



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

SEPTEMBER, 1920

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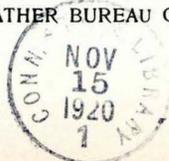
BY  
CHARLES D. REED  
METEOROLOGIST

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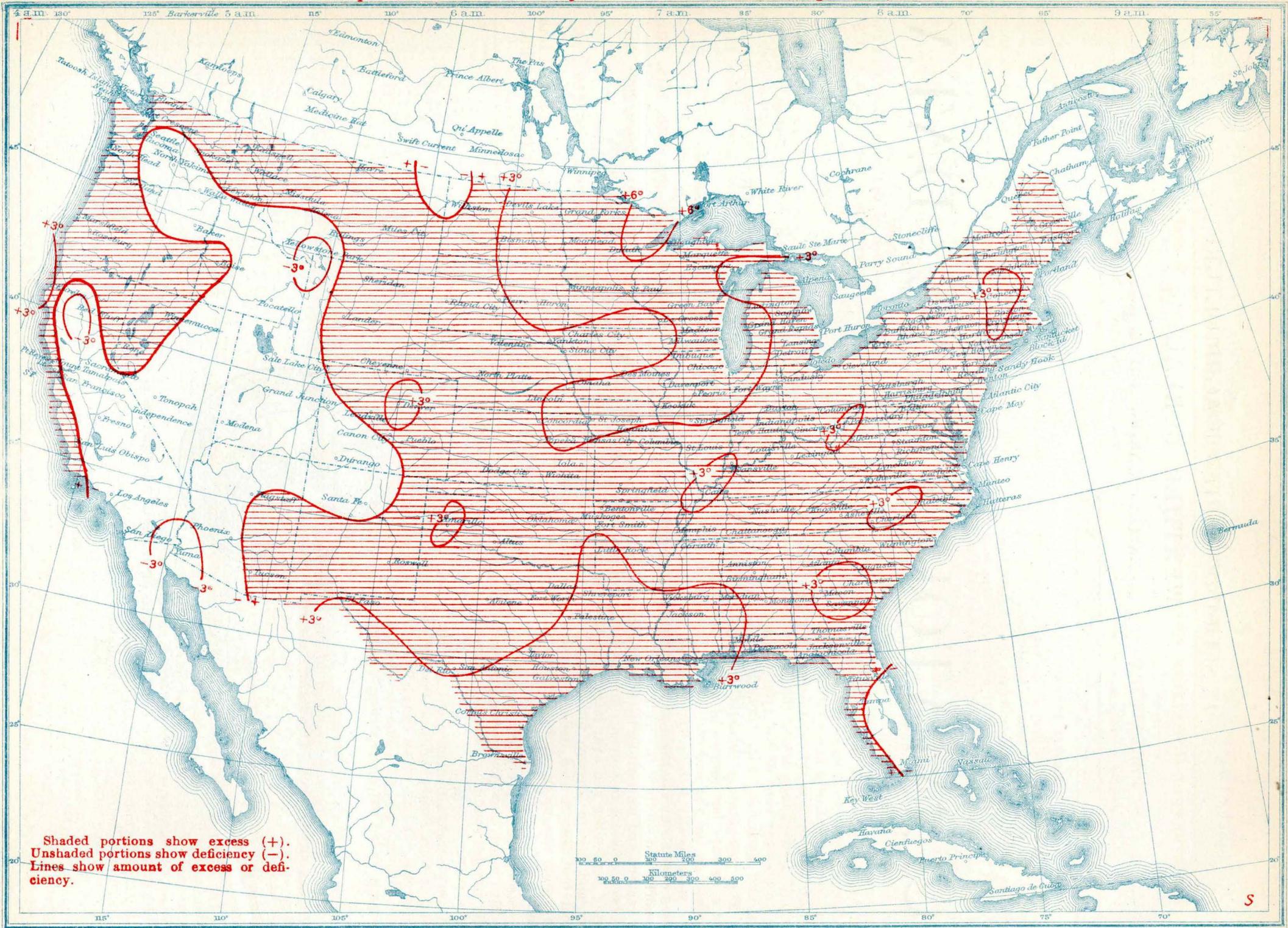


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WEATHER BUREAU OFFICE



# Departure of the Mean Temperature from the Normal, September, 1920.



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

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

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist.

Vol. XXXI Des Moines, Iowa, September, 1920. No. 9

GENERAL SUMMARY

The outstanding feature of the weather for September was the unusually favorable condition that prevailed from the 10th to the 28th, inclusive. Aside from the first day, which was warm, the first nine days were cold and wet and the prospects for a normal amount of the corn crop maturing were discouraging, as both July and August were too cool for the normal development of that crop. However on the 10th a warm period, that resembled July weather, set in and it continued unbroken till the 28th, when it was brought to an abrupt ending, with heavy to killing frosts over most of the western and central portions and light to heavy frosts over the eastern portion. During this warm period corn made rapid progress toward maturity and when frost came about 85 per cent of the crop was safe and fortunately over the western half of the State, where the frost was most severe, the greater per cent of the crop was out of danger of frost and much was in the shock.

The precipitation occurred principally during the first nine days but periods of general precipitation also occurred on the 23d and 26th but the amounts on these days were mostly light. The greatest precipitation occurred over about one third of the State in a strip running north and south in the middle section. Over much of the eastern and western sections the precipitation which had been deficient in previous months continued deficient during September and over large areas the soil was too hard and dry to prepare for winter grain, but where wheat had been seeded under favorable conditions the early sown was up in good condition at the end of the month.

Strong winds prevailed generally from the 20th to the 25th which blew down corn and many fields were in a badly tangled condition, but they hastened the maturity of the corn.

A very strange meteor was observed by Mr. Arthur Betts, at Nora Springs, during the early evening of September 6th. It was at an elevation of about 30° in the west-southwest and of about the brilliancy of Venus. It gradually faded out of existence, leaving no trail behind it.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.98 inches. The highest recorded was 30.43 inches, at Sioux City and Omaha, Neb. on the 29th, and the lowest was 29.38 inches, at Sioux City, on the 23d. The monthly range was 1.05 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 94 stations was 66.5°, or 3.1° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 65.1°, or 3.3° higher than the normal; Central, 66.6°, or 3.1° higher than the normal; Southern, 67.7°, or 2.7° higher than the normal. The highest monthly mean was 70.0°, at Burlington, and the lowest was 62.8°, at Northwood. The highest temperature reported was 98° at Onawa, on the 19th, and Maquoketa on the 20th, and the lowest was 24° at Little Sioux and Sanborn, on the 30th. The temperature range for the State was 74°.

HUMIDITY.

The average relative humidity for the State at 7:00 a. m. was 83 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 80 per cent at Charles City, and the lowest was 67 per cent at Sioux City.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 102 stations, was 3.30 inches, or 0.06 inch below the normal. By divisions, the averages were as follows: Northern, 3.54 inches, or 0.49 inch more than the normal; Central, 2.86 inches, or 0.60 inch less than the normal; Southern, 3.51 inches, or 0.05 inch less than the normal. The greatest amount, 7.21 inches, occurred at Afton, and the least, 0.69 inch, at Cedar Rapids. The greatest amount in 24 consecutive hours, 3.77 inches, occurred at Boone on the 9th.

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 53 miles an hour from the south at Sioux City, on the 25th.

SUNSHINE.

The average per cent of the possible amount of sunshine was 68, which is 5 per cent above normal. The per cent of the possible amount at regular Weather Bureau Stations was as follows: Charles City, 56; Davenport, 68; Des Moines, 68; Dubuque, 59; Keokuk, 66; Sioux City, 78; Omaha, Neb., 73.

MISCELLANEOUS PHENOMENA.

- Aurora:* 7th, 10th, 17th, 28th, 30th.
- Fog:* 2d, 3d, 4th, 5th, 6th, 9th, 10th, 11th, 12th, 20th, 27th, 28th, 30th.
- Frost, Light:* 28th, 29th, 30th; Heavy, 29th, 30th; Killing 29th, 30th.
- Hail:* 3d, 4th, 5th, 10th, 26th, 29th.
- Halos (Lunar or Solar):* 1st, 10th, 14th, 21st, 22d.
- Meteor:* 6th, 20th.
- Thunderstorms:* 1st, 2d, 3d, 4th, 5th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 19th, 23d, 24th, 25th, 26th.

COMPARATIVE DATA FOR THE STATE—SEPTEMBER.

YEAR	Temperature				Precipitation			Number of Days.				
	Mean	Departure	Highest	Lowest	Total	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	8	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	9.06	1.82	10	11	9	2
1897	70.9	+7.5	106	26	2.04	-1.32	5.88	0.00	4	23	5	10
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	9	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	9	8
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	0.99	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	9	10
1912	62.1	-1.3	104	24	3.98	+0.62	10.12	0.28	11	12	8	10
1913	64.5	+1.1	107	19	3.31	-0.05	7.44	0.45	9	15	8	7
1914	64.5	+1.1	99	30	7.88	+4.52	16.24	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	8	5
1917	62.6	-0.8	97	28	2.90	-0.46	8.68	0.39	7	15	7	8
1918	58.6	-4.8	93	20	1.87	-1.49	4.62	0.48	6	16	8	6
1919	67.5	+4.1	99	33	5.34	+1.98	11.82	1.49	8	16	6	8
1920	66.5	+3.1	98	24	3.30	-0.06	7.21	0.69	8	17	8	5

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

CLIMATOLOGICAL DATA FOR SEPTEMBER, 1920.

Table with columns: 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), No. of Days (Precipitation > 0.1 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

CLIMATOLOGICAL DATA FOR SEPTEMBER, 1920.—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.
<b>Southern Division</b>																				
Afton	Union	1212	26	67.7	+3.2	89	12†	32	30	33	7.21	+3.24	3.21	0	8	17	9	4	sw.	S. R. Brown
Albia	Monroe	959	22	67.6	+3.0	91	11†	32	30	33	3.90	+0.25	1.10	0	7	14	7	9	sw.	F. H. Holmes
Atlantic	Cass	1164	29	67.6	+3.5	90	19	29	30	43	1.57	-1.95	0.84	0	7	17	9	4	nw.	Joseph N. Reynolds
Bedford	Taylor		20						29	30	2.79	-0.79	0.85	0	8	16	8	6	s.	E. E. Healy
Ploomfield	Davis	881	13	68.0d		90d			14	35d	2.15	-1.83	0.98	0	5				sw.	Frank Battin
Bonaparte	Van Buren	565	29	68.2	+2.7	91	25	34	30	35	3.32	-0.88	1.33	0	7	21	4	5	w.	Bruce R. Vale
Burlington	Des Moines	544	24	70.0	+3.9	93	11	38	29†	34	4.01	+0.36	3.30	0	4	19	6	5	sw.	Mrs. E. M. Donnelly
Centerville	Appanoose	1013	15	68.0		94	25	33	30	39	2.84		1.53	0	9	12	11	7	se.	Leo. J. Allen
Chariton	Lucas	1042	25	67.7	+3.0	89	14	32	30	36	6.00	+2.68	2.58	0	6	12	15	3	s.	C. C. Burr
Clarinda	Pace	1009	30	68.4	+3.8	93	20	31	30	42	2.11	-0.88	0.52	0	10	14	9	7	s.	A. S. Van Sandt
Columbus Jet.	Louisa	595	19	69.2	+3.9	91	11	37	29†	28	1.43	-1.73	0.42	0	7	23	5	2	sw.	J. B. Johnston
Corning	Adams	1117	28	66.6	+2.7	90	20	29	30	43	3.30	+0.02	1.27	0	6	20	4	6	sw.	Jerome Smith
Corydon	Wayne	1101	27	68.7	+2.7	92	20	32	30	32	5.73	+2.25	2.01	0	12	13	11	6	se.	May C. Miller
Creston	Union	1312	15	66.0	+2.4	85	25	32	30	27	6.52		1.72	0	9	8	20	2	sw.	Dr. H. M. Stanley
Cumberland	Cass		21								1.00		0.40	0	3	22	6	2	sw.	C. H. Clark
Earlham	Madison	1126	18	65.8	+2.5	88	11	29	30	36	4.26	+0.66	3.05	0	6	21	4	5	sw.	Geo. Phillips
Fairfield	Jefferson	780	36	68.2f	+3.0	94f	14	34f	30	34f	3.61	+0.34	1.59	0	7				sw.	Prof. R. M. McKenzie
Glenwood	Mills	1100	32	68.2		92	19	29	30	35	1.03		0.27	0	5	16	9	5	se.	Dr. Geo. Mogridge
Greenfield	Adair		28	66.1	+2.4	88	20	29	30	34	5.12	+1.73	2.15	0	6	22	4	4	sw.	J. C. Patterson
Indianola	Warren	969	29																	Prof. E. D. McEwan
Keokuk	Lee	614	49	69.5	+3.1	91	25	38	30	29	2.65	-1.32	1.12	0	8	12	11	7	s.	U.S. Weather Bureau
Keosauqua	Van Buren	644	28	68.2	+3.7	93	14†	34	30	40	1.42	-2.84	0.32	0	10	12	13	5	se.	J. H. Landes
Knoxville	Marion	920	25	67.9	+2.6	92	14	33	30	36	5.09	+1.51	2.10	0	8	12	10	8	nw.	W. J. Casey
Lacona	Warren		21								4.95	+1.21	2.20	0	6	11	14	5		J. B. Alter
Lamoni	Decatur	1100	13	67.6	+2.3	92	20	31	30	36	5.72	+1.83	1.58	0	11	16	9	5	s.	E. D. Moore
Lenox	Taylor	1250	25	67.4	+2.7	92	20	32	30	34	4.46	+1.06	1.65	0	7	19	7	4	s.	J. L. Hurley
Mt. Ayr	Ringgold	1236	27	67.0	-1.1	90	20	31	30	33	5.31	+1.73	1.72	0	8	21	4	5	s.	Alex. Maxwell
Mt. Pleasant	Henry	729	39	68.6	+3.2	93	11	35	30	32	4.03	+0.80	2.22	0	9	11	14	5	se.	John H. Jericho
Murray	Clarke	1216	29	67.1	+1.8	87	20	32	30	29	6.22	+2.75	2.42	0	9	14	11	5	s.	M. T. Ashley
Oakland	Pottawattamie	1105	1	67.3		92	19	29	30	42	1.61		1.13	0	5	22	3	5	s.	M. E. Gray
Oskaloosa	Mahaska	825	44	67.2	+2.5	91	14	33	30	31	4.19	+1.14	1.44	0	12	13	9	8	se.	Roy R. Robinson
Ottumwa	Wapello	849	25	67.5		90	14†	35	30	37	2.40	+1.29	0.83	0	8	18	3	9	w.	Henry Eilers
Pella	Marion	877	27	67.4	+2.2	90	13	32	30	39	4.84	+1.61	2.00	0	7	22	2	6	s.	J. H. Ver Steeg
Stourney	Keokuk	877	24	67.5	+2.5	91	11†	33	30	34	2.35	-0.87	0.47	0	8	14	9	7	se.	W. E. Utterback
Stockport	Van Buren	754	18	67.6	+2.7	93	13†	33	30	40	2.86	-1.07	1.48	0	12	17	9	4	s.	C. L. Beswick
Thurman	Fremont		23	66.4	-1.2	91	19	28	30	41	1.10	-3.40	0.38	0	4	9	19	2	nw.	C. R. Paul
Washington	Washington	769	38	67.8	+3.1	91	14	36	29	31	1.89	-1.12	0.68	0	8	12	10	8	sw.	Wm. A. Cook
Winterset	Madison	1129	29	67.2	+2.4	89	25	30	30	34	3.33	-0.01	1.47	0	7	21	7	2	sw.	H. S. Ely
Omaha, Nebr.		1040	49	68.8	+3.0	94	19	34	30	36	1.03	-2.00	0.42	0	8	15	11	4	nw.	U.S. Weather Bureau
Means and extremes				67.7	+2.7	94	14†	28	30	43	3.51	-0.05	3.30	0	8	16	9	5	sw.	
State means and extremes				66.5	+3.1	98	19†	24	30	49	3.30	-0.06	3.77	0	8	17	8	5	s.	

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 included in determining means.  
Reference letters a, b, c, etc., 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 (Per cent)				WIND				Sunshine Per cent possible. Departure from normal.				
	Mean	Highest	Date	Lowest	Mean	7 A. M.	Noon †	7 P. M.	Total movement	Average hourly velocity.	Miles	From		Date			
Charles City	29.98	30.37	2	29.61	24	88	56	72	32	27	3973	5.5	22	se	19	56	-13
Davenport	29.99	30.30	2	29.70	9	84	50	57	25	16	4743	6.6	30	sw	15	68	+5
Des Moines	29.96	30.30	30	29.54	23	84	51	61	19	16	4692	6.5	36	sw	23	68	+5
Dubuque	30.00	30.33	2	29.68	11	83	58	67	35	28	4046	5.6	24	nw	28	59	+6
Keokuk	30.00	30.26	2	29.72	23	79	53	60	31	16	4733	6.6	34	nw	11	66	+6
Sioux City	29.95	30.43	29	29.38	23	83	62	11	26	11†	7656	10.6	53	s	25	78	+16
Omaha, Neb.	29.96	30.43	29	29.43	23	81	51	58	24	15†	4780	6.6	33	n	28	73	+9
Means and extremes	29.98	30.43	29	29.38	23	83	54	61			6.9					68	+5
Normals and records	30.02		26th		30th	83		64			7.2					7th	63
			*30 65	1909	\$29.27	1878										19th	1920

\*Dubuque § Omaha ¶ Des Moines || Davenport.  
† Local mean time. † And other dates.

DAILY PRECIPITATION FOR SEPTEMBER, 1920.

Stations	Watersheds.	DAY OF MONTH.																															Total
		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	.14	.42	.22	.20	.34	.05	.49	1.11	.02	.15	.86	.15	.25	.278																		2.78
Allison	Cedar	.11	.36	T	3.69	.49	1.11	.02	.15	.86	.15	.25	.278																		6.53		
Alta	Raccoon	.30	.15	.16	.22	.78	.02	.67	2.12	.05	.23	.68	.45	.73																		2.69	
Alton	Floyd	.22	.78	.02	.67	2.12	.05	.23	.68	.45	.73	.46	.15	.50																		2.36	
Belmond	Iowa	.05	.30	T	.64	.28	.67	2.12	.05	.23	.68	.45	.73	.12																		5.14	
Britt	Iowa	T	.52	T	.05	.25	.58	.57	.58	T	.61	T	.73	.47	.06																		4.42
Charles City ***	Cedar	.25	.14	.67	1.72	.82	.03	1.46	.01	.20	.36	.20	.10	.576																		5.76	
Decorah	Mississippi	.06	.45	.29	.09	2.11	.44	.06	.24	.32	.32	.20	.10	2.07																		2.07	
Elkader	Mississippi	.20	.15	.30	.10	.09	2.11	.44	.06	.24	.32	.20	.10	3.39																		3.39	
Etherville	Des Moines	.20	.15	.30	.10	.09	2.11	.44	.06	.24	.32	.20	.10	2.90																		2.90	
Fayette	Mississippi	T	.48	.05	.28	.03	.04	2.34	.82	.95	.04	.42	.12	.06																		5.21	
Forest City	Cedar	T	.48	.05	.28	.03	.04	2.34	.82	.95	.04	.42	.12	.06																		3.94	
Humboldt	Des Moines	T	.03	2.00	.35	.98	.17	.28	.74	.53	.06	.20	.27	1.16																		5.14	
Inwood	Big Sioux	.01	.56	.07	.05	.04	.07	.55	.09	.98	.29	.12	.73	.90																		2.27	
Lansing	Mississippi	.05	.04	.07	.55	.09	.98	.29	.12	.73	.90	.21	.239																		2.39		
Le Mars	Floyd	.35	.03	.24	.58	1.34	.26	.57	1.42	.30	1.18	.40	.40	.06																		5.89	
Mason City	Cedar	.24	.58	1.34	.26	.57	1.42	.30	1.18	.40	.40	.06	.272																		2.72		
Milford (near)	Little Sioux	.02	.11	2.30	.23	.13	.44	.14	.33	.09	.40	.10	.10	.01																		5.40	
New Hampton	Wapsipinicon	.05	T	1.14	.13	.44	.14	.33	.09	.40	.10	.10	.01																		2.72		
Nora Springs	Cedar	.12	.56	.28	1.09	.01	.70	.12	1.20	.17	.26	.78	.13	.05																		7.05	
Northwood	Cedar	.25	.30	.02	1.12	T	T	1.45	T	2.75	.98	.13	.05	.43																		1.39	
Pocahontas	Des Moines	.06	.20	.08	.10	.16	.05	2.22	.09	1.45	.32	.15	.20	.26																		5.11	
Postville	Mississippi	.62	.01	.05	2.22	.09	1.45	.32	.15	.20	.26	.78	.13	.05																		2.61	
Rock Rapids	Big Sioux	T	.47	.12	.02	.25	.05	.17	.05	.05	.01	.25	.26	.83																		4.97	
Sanborn	Floyd	2.84	.08	.02	.25	.05	.17	.05	.05	.01	.25	.26	.83	.86																		2.61	
Sioux Center	Floyd	T	.18	.22	.42	.52	1.10	.50	.65	.40	.40	.13	.40																		3.57		
Spencer	Little Sioux	.12	.15	1.00	.08	.35	.53	.02	.08	.18	.21	.93	.06	.06																		3.71	
Storm Lake	Raccoon	.08	T	.35	.53	.02	.08	.18	.21	.93	.06	.06	.06																		1.80		
Wachta	Little Sioux	.02	.11	.08	.06	.45	.07	.10	T	.35	.21	.93	.06	.06																		2.20	
Waverly	Cedar	T	.18	T	.95	.06	.45	.07	.10	T	.35	.21	.93	.06																		2.20	
West Bend	Des Moines	.25	.08	.21	.02	.07	.10	T	.35	.21	.93	.06	.06																		1.38		
<i>Central Division</i>																																	
Ames	Skunk	.02	.19	.02	.40	1.20	1.16	.73	.05	1.09	.15	.18	.10	.10																		3.34	
Audubon	Nishnabotna	.67	.06	.73	.05	1.09	.15	.18	.10	.10	.10	.10	.10																		2.78		
Baxter	Skunk	T	.16	.14	.37	.25	.93	.67	.05	.29	.05	.05	.05																		2.77		
Belle Plaine	Iowa	T	T	1.67	.08	.33	.42	.05	.05	.29	.05	.05	.05																		2.89		
Boone	Des Moines	.02	.29	.12	.29	.37	T	3.77	.33	.33	.24	.24	.24																		5.43		
Carroll	Raccoon	.30	.04	.82	.15	.82	.15	.82	.15	.82	.15	.82	.15																		2.67		
Cedar Rapids	Raccoon	T	T	.22	.08	.32	T	.32	T	.32	T	.32	T																		0.69		
Clinton	Mississippi	.01	.26	.09	.02	T	T	T	T	.05	.14	.02	.185																		1.85		
Davenport ***	Mississippi	.45	.28	.25	.20	.13	.20	.13	.12	.02	.20	.06	.13																		0.98		
Delaware	Mississippi	.05	.15	.24	.05	.17	.05	.05	.05	.09	.09	.13	.06																		4.44		
Denison	Missouri	T	.01	.32	1.95	.15	.65	.40	.20	T	.30	.12	.14																		1.46		
Des Moines ***	Des Moines	T	.01	.32	1.95	.15	.65	.40	.20	T	.30	.12	.14																		4.71		
Dubuque ***	Mississippi	T	.02	.16	.66	.74	.33	2.35	.85	.51	.50	.08	.08																		4.44		
Fort Dodge	Des Moines	T	1.60	.10	.14	.66	.74	.33	2.35	.85	.51	.50	.08																		4.98		
Grinnell	Iowa	.50	.10	.02	1.94	.66	.74	.33	2.35	.85	.51	.50	.08																		2.01		
Grundy Center	Cedar	.05	.05	.06	.26	.25	.85	.35	.85	.51	.50	.08	.08																		2.01		
Guthrie Center	Raccoon	.06	.26	.25	.85	.35	.85	.51	.50	.08	.08	.08	.08																		2.01		
Harlan	Nishnabotna	.84	.03	.23	.383																		3.83										
Independence	Wapsipinicon	T	1.12	.04	2.40	.21	.06	.13	T	.04	.01	T	.53																		1.20		
Iowa City	Iowa	.01	.08	.01	.06	.21	.06	.13	T	.04	.01	T	.53																		4.73		
Iowa Falls	Iowa	.03	.70	.34	.17	.07	2.85	.02	.04	.11	.08	.13	.08																		2.40		
Jefferson	Raccoon	1.00	.06	.08	.02	1.01	.04	T	.08	.11	.08	.13	.08																		1.74		
Le Claire	Mississippi	.01	.02	.01	.02	.24	.12	.37	.12	.14	.81	.81	.81																		2.59		
Little Sioux	Little Sioux	T	.02	1.13	T	.12	.37	.12	.14	.81	.81	.81	.81																		1.86		
Logan	Missouri	.04	.11	.66	.74	.33	2.35	.85	.51	.50	.08	.08																		1.43			
Maquoketa	Maquoketa	.05	.31	.75	.19	1.70	.02	T	.64	.64	.02	.04																		3.68			
Marshalltown	Iowa	.05	.31	.75	.19	1.70	.02	T	.64	.64	.02	.04																		5.27			
Monroe	Skunk	1.14	1.98	1.83	.95	.02	.01	.02	.18	T	.60	.45																		2.04			
Muscatine	Mississippi	.04	.22	.95	.02	.01	.02	.18	T	.60	.45																		0.95				
Olin	Wapsipinicon	T	T	.50	.48	.10	.08	.60	.36																		1.43						
Onawa	Missouri	.17	.05	1.70	1.82	.09	T	.16	.28	.40	.40	.40																		5.18			
Perry	Raccoon	.06	.26	.77	.05	1.70	1.82	.09	T	.16	.28	.40	.40																		2.64		
Rockwell City	Raccoon	.02	.30	.32	.11	.18	T	.18	T	.74	.04	.40																		1.94			
Sac City	Raccoon	.61	.16	.40	.11	.18	T	.18	T	.74	.04	.40																		1.47			
Sioux City ***	Missouri	.09	.05	.09	.03	.01	.52	T	.28	.79	.33	.03																		3.24			
Tipton	Cedar	.09	.05	.09	.03	.01	.52	T	.28	.79	.33	.03																		2.91			
Toledo	Iowa	.04	.50	1.27	.59	.14	1.66	.58	T	.04	T	.05																		1.71			
Van Meter	Raccoon	T	.43	.59	.14	1.66	.58	T	.04	T	.05																		3.76				
Waterloo	Cedar	.10	.02	.75	.02	.04	1.70	.34	T	.03	.03	.07																		4.69			
Wauke	Raccoon	T	.62	.28	.73	1.70	.34	T	.03	.03	.07																						
Webster City	Des Moines	.07	.54	T	.16	.43	.30	.24	.07	.15	.04																						
Whittem	Iowa	.22	.86	.10	.29	.11	.08																		1.85								
Williamsburg	Iowa	.22	.86	.10	.29	.11	.08																										

DAILY PRECIPITATION FOR SEPTEMBER, 1920.—Continued

Table with columns for Stations, Watersheds, and Day of Month (1-31) plus Total. Rows include locations like Afton, Albia, Atlantic, Bedford, Bloomfield, Bonaparte, Burlington, Centerville, Chariton, Clarinda, Columbus Jct., Corning, Corydon, Creston, Cumberland, Earham, Fairfield, Greenwood, Greenfield, Indianola, Keokuk, Keosauqua, Knoxville, Lacona, Lamoni, Lenex, Mt. Ayr, Mt. Pleasant, Murray, Oakland, Oskaloosa, Ottumwa, Pella, Sigourney, Stockport, Thurman, Washington, Winterset, and Omaha, Neb.

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.

On the principal rivers low, slowly falling stages prevailed during practically the entire month. On the interior rivers a few slight rises occurred resulting from locally heavy rainfall but during the greater part of the month low, and nearly stationary stages prevailed.

ERRATA

Report for July, 1920: Rockwell City, Page 76. Total precipitation recorded 4.38 inches, should be 5.98 inches, departure +2.08 inches and the number of days with .01 or more precipitation, 14. Page 78; precipitation on 21st should be 1.60 and the total 5.98 inches. Page 81; headings for hail table should be the same as in the June, 1920 report, page 69.

Daily Maximum and Minimum Temperatures for the Month of September, 1920.

Table with columns for Stations, days 1-31, and Total. Rows are categorized into Northern Division (Albion, Alta, Alton, Belmont, Charles City, Decorah, Forest City, Inwood, Mason City, Milford, New Hampton, Northwood, Pocahontas, Postville) and Southern Division (Belle Plaine, Boone, Carroll, Davenport, Des Moines, Dubuque, Ft. Dodge, Grinnell, Guthrie Center, Independence, Iowa City, Iowa Falls, Little Sioux, Marshalltown, Olin, Sioux City, Albia, Atlantic, Bloomfield, Burlington, Columbus Jet, Corning, Corydon, Fairfield, Keokuk, Laroni, Pella, Sigourney, Thurman, Winterset, Omaha, Nebr.).

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record.

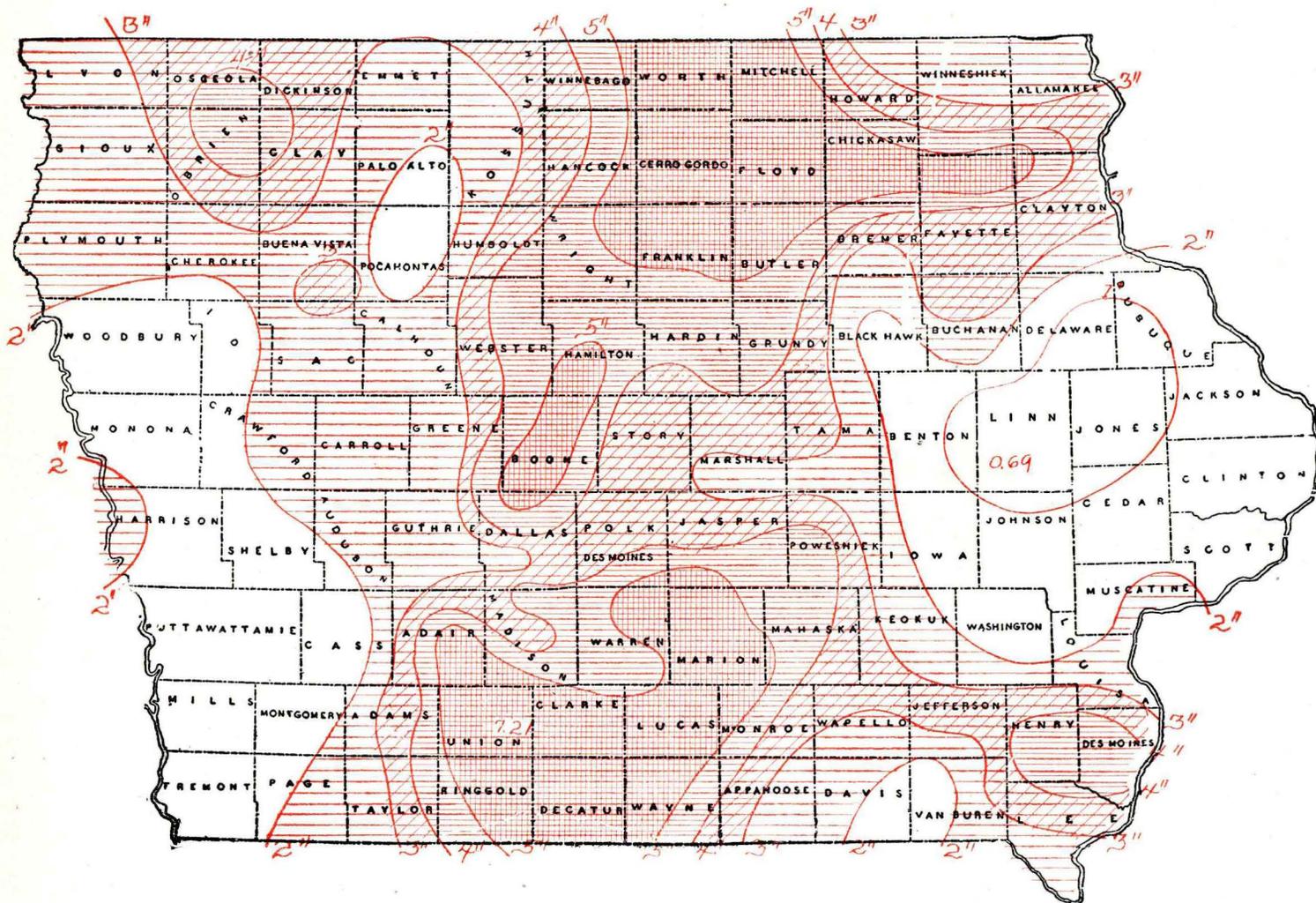
HAIL STORMS DURING AUGUST, 1920.

Date	County	Township	Direction from	Area Covered	Character	Size of Stones	Damage	Width of Path
6	Sioux	Nassau	.....	Small	Light	Peas	Slight	Narrow
6	Plymouth	Perry	S. W.	4 sq. mi.	Moderate	Marbles	Slight	1 mile
6	Plymouth	Hungerford	N. W.	Large	Light	Small	Slight	Wide
6	Union	Union	N.	12 sq. mi.	Light	Peas	Slight	2 miles
6	Jasper	Palo Alto	W.	Small	Light	Hazel Nuts	Slight	Narrow
6	Allamakee	Iowa	N. W.	6 sq. mi.	Severe	Large	Considerable	2 miles
6	Clayton	Jefferson	S. E.	8 sq. mi.	Heavy	1/2 to 3/4 in.	Considerable	1 1/2 miles
6	Linn	Washington	N.	Small	Moderate	Large	Considerable	Narrow
6	Johnson	Washington	S. E.	Small	Heavy	1/4 to 3/4 in.	Considerable	Narrow
6	Johnson	Hardin	S. E.	Large	Severe	Walnuts	Considerable	Wide
7	Buchanan	Washington	.....	Small	Light	Small	Slight	Narrow
7	Jasper	Fairview	.....	Small	Light	Small	None	Narrow
8	Ringgold	Poe	W.	5 sq. mi.	Severe	Walnuts	50% crop	1 to 2 miles
8	Ringgold	Middle Park	W.	12 sq. mi.	Severe	Walnuts	50 to 75% crop	2 miles
8	Ringgold	Lots Creek	S. E.	24 sq. mi.	Severe	1/2 to 3/4 in.	50 to 75% crop	2 1/2 miles
8	Iowa	English	N. W.	12 sq. mi.	Light	Hazelnuts	Slight	2 miles
8	Iowa	Pilot	N. W.	3 sq. mi.	Light	Hazelnuts	Slight	1 mile
8	Des Moines	Danville	S.	3 sq. mi.	Light	Peas	2% crop	1/2 mile
8	Des Moines	Pleasant Grove	S.	Small	Light	Peas	Slight	narrow
30	Harrison	Little Sioux	S. W.	3 sq. mi.	Light	1/2 inch	Slight	1/2 mile

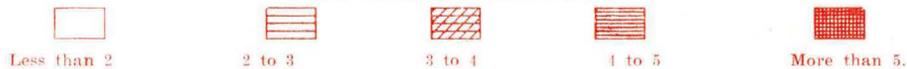
HAIL STORMS DURING SEPTEMBER, 1920.

4	Polk	Des Moines	W.	Large	Moderate	Peas	Slight	Wide
4	O'Brien	Franklin	.....	Small	Light	Small	Slight	Narrow
5	Dallas	Spring Valley	N. W.	Small	Light	Small	Slight	Narrow
10	Hancock	Britt	N. W.	Small	Heavy	Large	Considerable	Narrow
10	Hancock	Orthet	N. W.	Small	Heavy	Large	20% crop	Narrow
10	Cerro Gordo	Mason	N.	Small	Heavy	Small	Slight	Narrow
10	Winneshiek	Orleans	N. W.	Large	Moderate	Large	Considerable	1/2 mile
10	Winneshiek	Lincoln	N. W.	Small	Moderate	Small	Slight	Narrow
10	Winneshiek	Madison	N. W.	Large	Moderate	Large	Considerable	1/2 mile
10	Winneshiek	Canoe	N. W.	Large	Moderate	Large	Considerable	1/2 mile
10	Winneshiek	Pleasant	N. W.	Large	Moderate	Large	Considerable	1/2 mile
10	Winneshiek	Glenwood	N. W.	Large	Moderate	Large	Considerable	1/2 mile
11	Taylor	Benton	.....	Small	Light	Small	Slight	Narrow
11	Boone	Garden	S. W.	Large	Moderate	Hazelnuts	Considerable	2 miles
23	Carroll	Glidden	S. W.	Large	Moderate	Small	Slight	3 miles
26	Johnson	East Lucas	.....	Small	Light	Small	Slight	Narrow
29	Lee	Jackson	.....	Small	Light	Small	None	Narrow

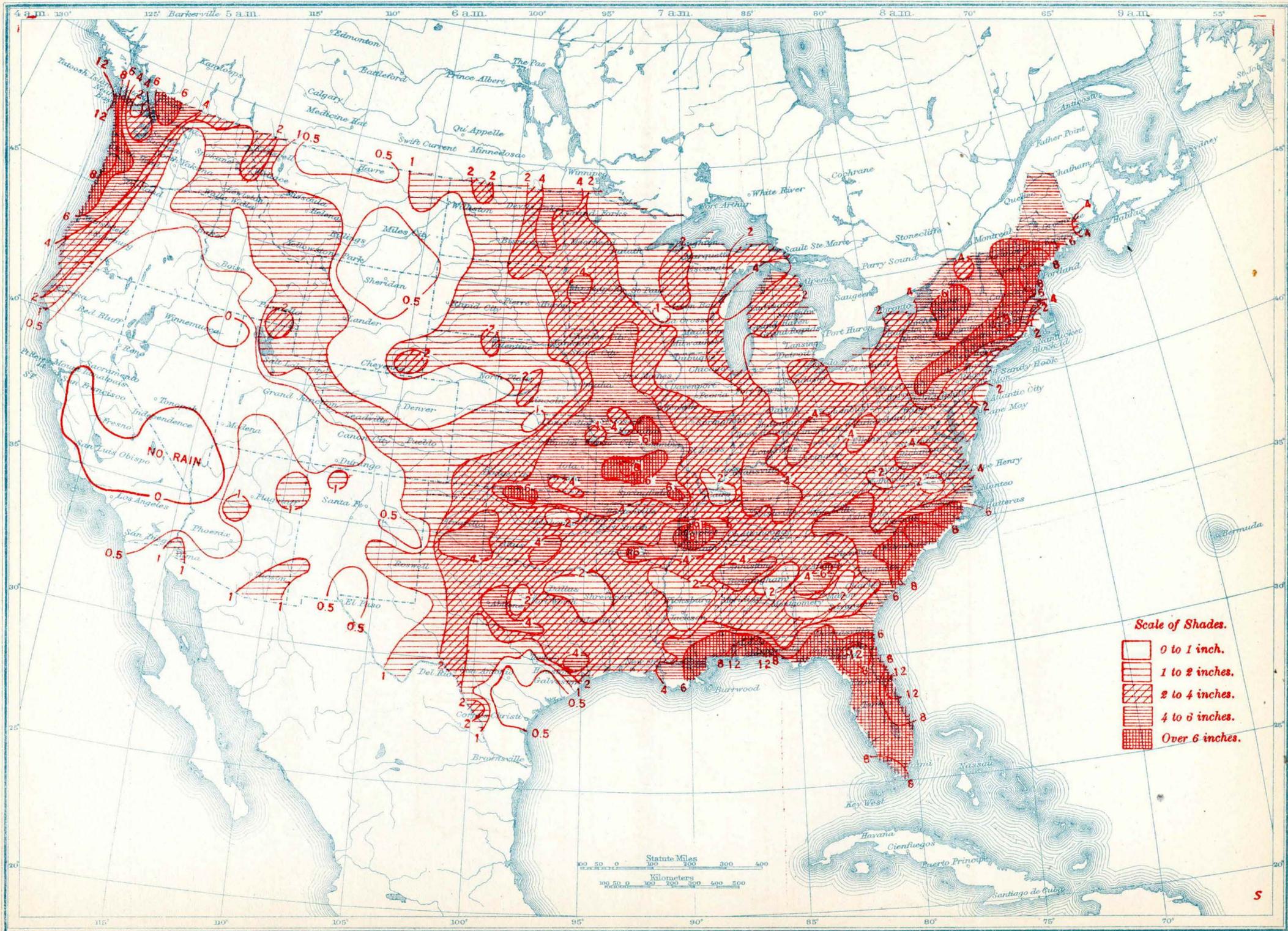
TOTAL PRECIPITATION — SEPTEMBER, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, September, 1920.



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

OCTOBER, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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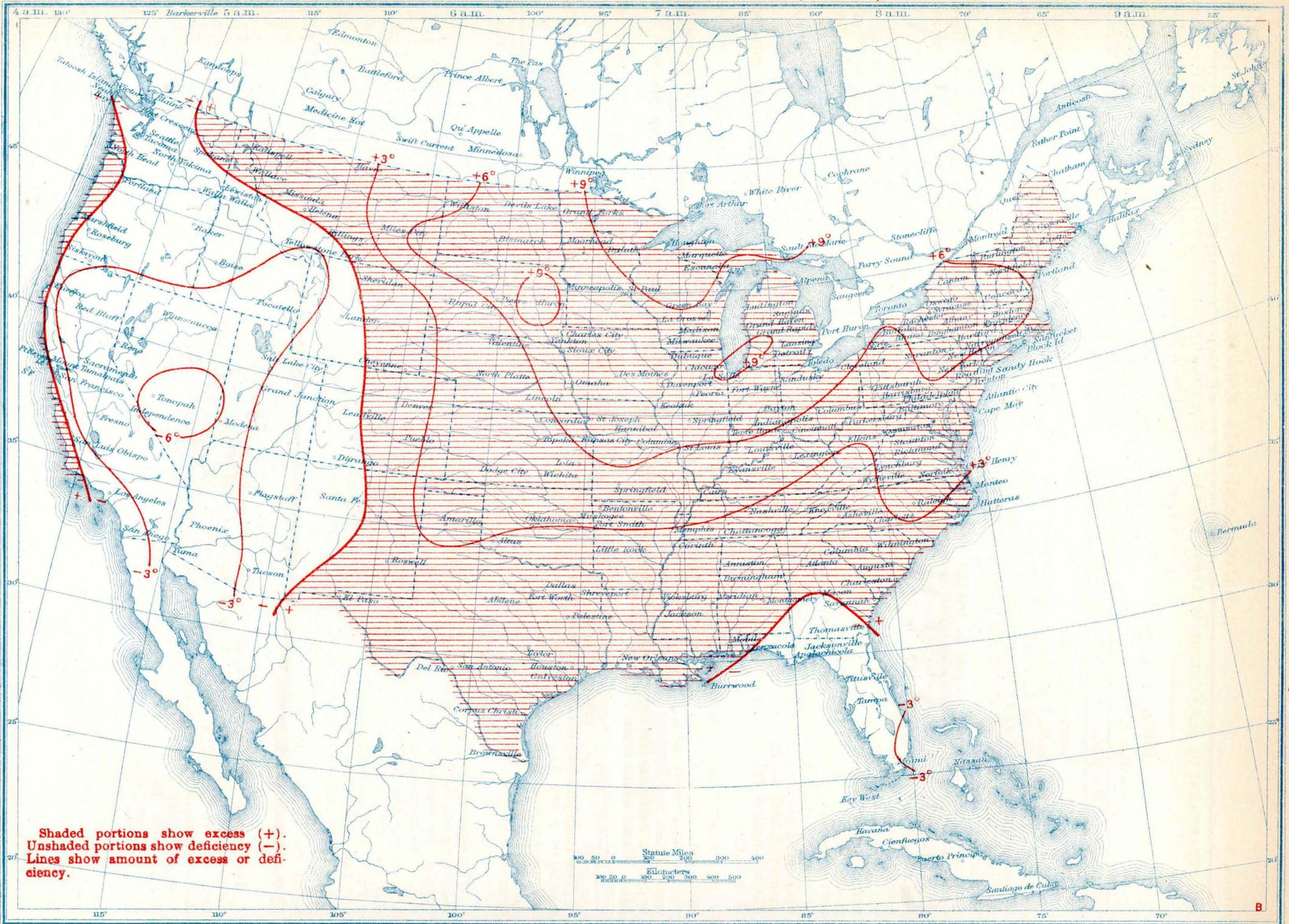


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA  
WEATHER BUREAU OFFICE



# Departure of the Mean Temperature from the Normal, October, 1920.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

IOWA SECTION

CHARLES D. REED, Meteorologist.

Vol. XXXI Des Moines, Iowa, October, 1920. No. 10

GENERAL SUMMARY

October, 1920, was next to the warmest October of record for the State as a whole. In 1900 the October mean temperature was 59.3° which is 1.6° higher than the current month. Cold weather at the beginning was followed by warmer on the 3d, after which temperatures continued above normal till the first part of the last week. Killing frost or freezing temperatures occurred at most stations on the 1st, except along the Mississippi River in the central and southern divisions. On the 29th, killing frost covered these sections also. Not more than 10 per cent of the corn crop was damaged by frost. There was some damage to late truck crops. Unusually favorable conditions during the last two-thirds of September and the greater part of October, matured the greatest corn crop of record in Iowa. During the latter half of October, corn husking made good progress generally but high temperatures in connection with locally heavy rains in the north-central district made it unsafe to crib corn in large quantities in that section.

The first 10 days were practically rainless and conditions were unusually favorable for farm work and harvesting sugar beets, potatoes, onions etc. After the 10th precipitation was frequent but the amounts were generally light to moderate and did not hinder farm work materially. Winter wheat made a vigorous growth and pastures improved greatly.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.04 inches. The highest recorded was 30.54 inches at Dubuque and Charles City, on the 5th, and the lowest was 29.54 inches, at Sioux City, on the 13th. The monthly range was 1.00 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 101 stations, was 57.7°, or 6.9° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 55.9°, or 6.9° higher than the normal; Central, 58.0°, or 7.1° higher than the normal; Southern, 59.3°, or 6.7° higher than the normal. The highest monthly mean was 61.6°, at Keokuk, and the lowest was 54.0°, at Northwood. The highest temperature reported was 90°, at Waterloo, on the 11th, and the lowest was 15°, at Decorah, Earlham, Pella, Sigourney and Williamsburg, on the 29th. The temperature range for the State was 75°.

HUMIDITY.

The average relative humidity for the State at 7 A. M. was 81 per cent, and at 7 P. M. it was 60 per cent. The mean for the month was 70 per cent, or 2 per cent less than the normal. The highest monthly mean was 81 per cent, at Charles City, and the lowest was 64 per cent, at Omaha, Neb. The lowest observed was 22 per cent, at Davenport, on the 4th.

PRECIPITATION.

The average precipitation for the State, as shown by the record of 106 stations, was 2.13 inches, or 0.33 inch less than the normal. By divisions the averages were as follows:

Northern, 2.51 inches, or 0.17 inch more than the normal; Central, 2.27 inches, or 0.22 inch less than the normal; Southern, 1.62 inches, or 0.92 inch less than the normal. The greatest amount, 4.64 inches, occurred at Charles City, and the least, 0.48 inch, occurred at Williamsburg. The greatest amount in 24 consecutive hours, 2.82 inches, occurred at Charles City, on the 14th-15th.

SNOW

Light snow flurries occurred in each division during the last few days of the month, but Dubuque, with 0.1 inch, was the only station that reported more than a trace of snow.

WIND.

The prevailing direction of the wind was south. The highest velocity reported from a regular Weather Bureau Station was 36 miles per hour, from the south, at Sioux City on the 13th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 65, or 3 per cent greater than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 53; Davenport, 62; Des Moines, 69; Dubuque, 59; Keokuk, 71; Sioux City, 72; Omaha, Neb. 69.

MISCELLANEOUS PHENOMENA.

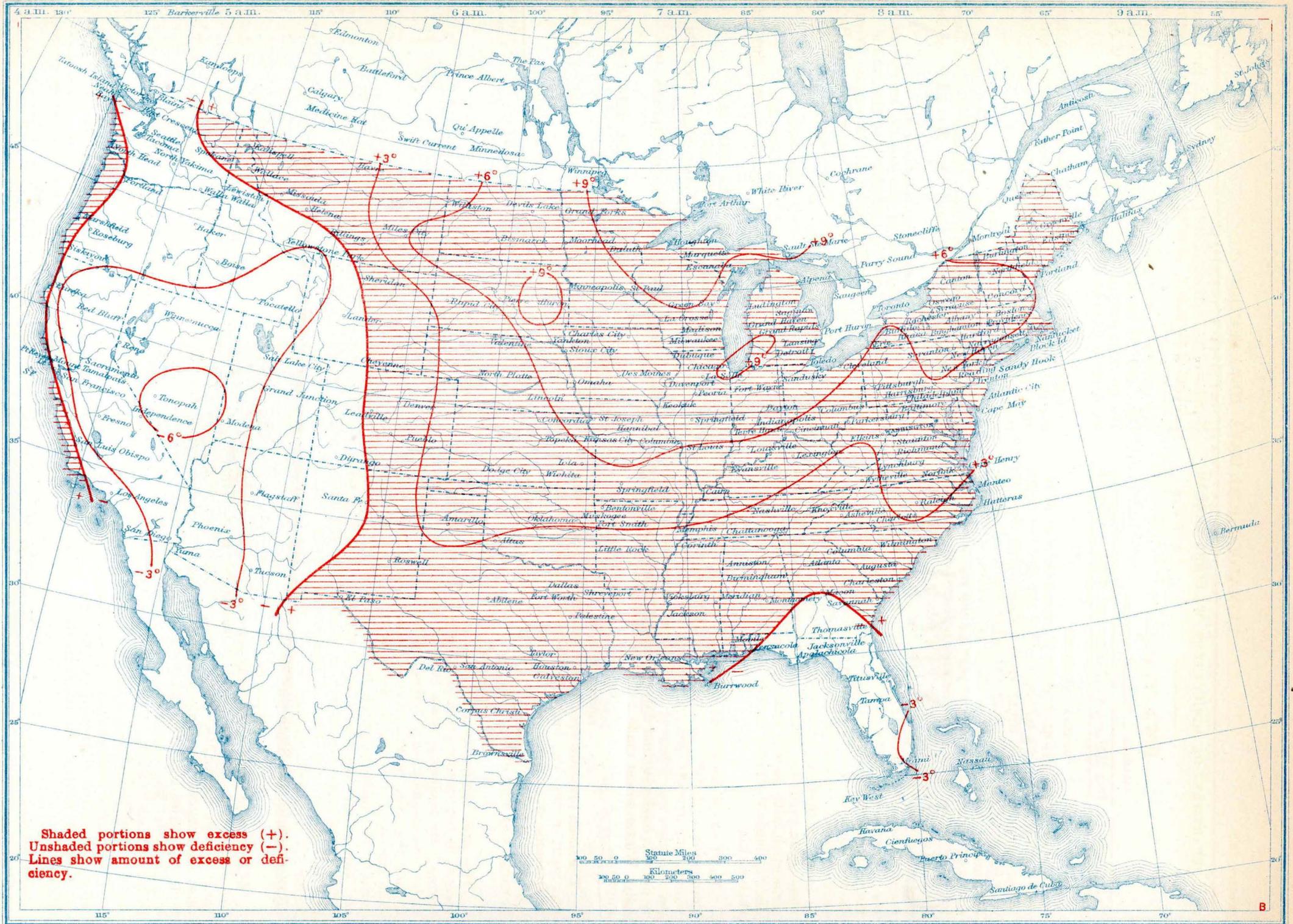
- Aurora: 7th, 9th, 10th, 17th, 18th, 22d.
Fog: 2d, 6th, 16th, 17th, 18th, 21st, 23d, 25th, 26th, 29th.
Frost, Killing: 1st, 2d, 24th, 28th, 29th.
Hail: 11th, 12th, 13th, 14th, 26th.
Halos: (Lunar or Solar): 17th, 19th, 20th, 22d, 23d, 24th, 30th.
Haze: 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 19th, 20th, 22d, 29th.
Meteors: 1st, 3d, 6th, 9th, 10th, 13th, 16th, 18th, 19th, 24th.
Rainbows: 15th, 20th, 22d.
Thunderstorms: 10th, 11th, 12th, 13th, 14th, 15th, 19th, 20th, 21st, 22d.

COMPARATIVE DATA FOR THE STATE—OCTOBER.

Table with columns for Year, Temperature (Mean, Departure, Highest, Lowest, Total), Precipitation (Departure, Greatest, Least, Snowfall, With precipitation .01 in., Clear, Partly cloudy, Cloudy), and Number of Days.

T indicates an amount too small to measure, or less than .005 inch precipitation, and less than .95 inch snowfall.

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U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU

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

CLIMATOLOGICAL DATA FOR OCTOBER, 1920.

Table with columns: 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), No. of Days (Precipitation .01 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. The table is divided into Northern Division, Central Division, and Means and extremes sections.

CLIMATOLOGICAL DATA FOR OCTOBER, 1920.—Continued.

Main climatology table with columns: STATIONS, COUNTIES, Elevation—feet, 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, Precipitation 0.1 in. or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

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 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: Stations, Barometric Pressure (Mean, Highest, Date, Lowest, Date), Relative Humidity (Mean, Total movement, Average h rly velocity, Maximum), WIND (Miles, From, Date), Sunshine (Per cent possible, Departure from normal).

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



DAILY PRECIPITATION FOR OCTOBER, 1920.—Continued.

Stations	Watersheds.	DAY OF MONTH.																															Total			
		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													.45	.22					.04	.11												.67	1.49		
Albia	Des Moines													.17	.06				.05	.15			T			.15	T	T				.33	1.23			
Atlantic	Nishnabotna									.40	.10	.01	.17	.06						.06	.15			T	.18							1.08	2.00			
Bedford	Missouri									.05	.05	.55	.06								.06	T		.03			T						.55	1.30		
Bloomfield	Mississippi												.25													.20	.20						.35	1.00		
Bonaparte	Des Moines										T	T	.02						T	T	.23		T	.39	T	.25	.14	T	T			.30	1.33			
Burlington	Mississippi									.21		.10	.18						.11	T	.05		T	.14	.11	.47	.26	T	T				1.63			
Centerville	Chariton											.10	.15						.10	.12	.15		.08			.07	.11		T				.36	1.70		
Chariton	Chariton											.17	.96						T	T	T		T			T							.33	1.46		
Clarinda	Nodaway									.33		.39	.69							.09	T		.02										.71	2.23		
Columbus Jct.	Iowa											.70	.15						T	T	.10		T	.34		.15	.28	.05	T				.27	2.04		
Corning	Nodaway								.93			.25	.19							T	T		T										.95	2.32		
Corrydon	Chariton											T	T	.44	.58				.01	.09	.03		T			.05	.07		T				.30	.99		
Creston	Missouri									.01		.44	.44							.10	.12		.05										.79	2.09		
Cumberland	Nodaway								.40			.40											.30									1.00		.20	2.30	
Earlham	Des Moines								.40		.50	.76								.17														.54	2.37	
Fairfield	Skunk										1.00	T							.02	.60	.03		T			.45		T	T				.36	2.46		
Glenwood	Missouri								.20			.90								T			.27											1.54	2.91	
Greenfield	Nodaway								.70				.14							.01	.09	.05		.05										.89	1.93	
Indianola	Des Moines																																			
Keokuk ***	Mississippi		T											T	.11			T	.14	.01	.05		.01	.14	.04	.30	.04	T	.01				.15	1.00		
Keosauqua	Des Moines		T									.20	.14								.23		.02	.13		.42	.23							.50	1.87	
Knoxville	Des Moines											.20	.24							T	.14	T												.58		
Lacona	Des Moines											.02	.33							.01	.20													.30	.86	
Lamoni	Grand										.02	.28								.09														.71	1.10	
Lenox	Missouri										.25	.28	.11							.02	.02		T											.72	1.40	
Mt. Ayr.	Grand										.02	.05	.60	.04							T	T		.02			T							.48	1.21	
Mt. Pleasant	Skunk		.02									.30	.15						.03	.02	.12		T	.40		.23	.21			.02				.29	1.79	
Murray	Grand										T	.02	.65	.14						T	.01			.02										.63	1.47	
Oakland	Nishnabotna										.23		.91											.35										1.27	2.76	
Oskaloosa	Des Moines								T			.15	.29							T	.28	.11	.02	.09		.04	.03							.48	1.49	
Ottumwa	Des Moines											.28								.08		.10		.05		.20								.46	1.17	
Pella	Skunk											.03	.25							T	.05	T		T								.10		.10	.53	
Sigourney	Skunk											T	T								T	.15		.03			T	T	T					.45	.63	
Stockport	Skunk		T						.11			.11	.12							.04	.02	.21		T	.10		.26	.12	.01	T				1.32	2.30	
Thurman	Missouri									.28		.55	T							T	T		.15											.25	1.35	
Washington	Skunk											.26									.23														1.32	2.30
Winterset	Des Moines									T		.05	.56	.28							.02	.03		T		.28								.49	1.26	
Omaha, Neb.***	Missouri									.01		.76								T	T	T		.07										.48	1.42	
																																		T	2.03	2.87

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.**

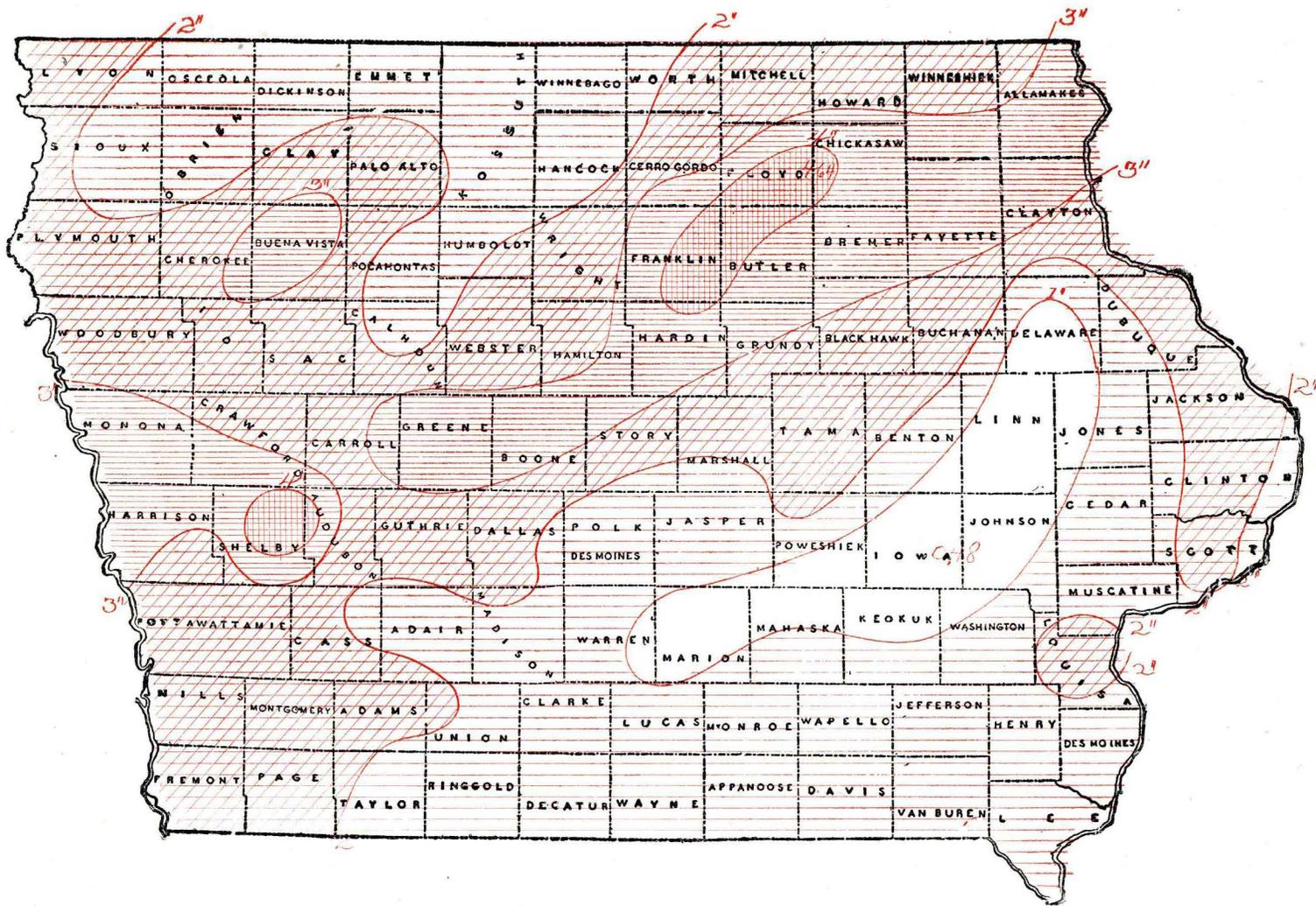
Moderate stages prevailed on all the rivers of the State with very little fluctuation and the extreme range in all stages was very small. The only rise of consequence occurred after the general rains on the 11-12th.

Daily Maximum and Minimum Temperatures for the Month of October, 1920.

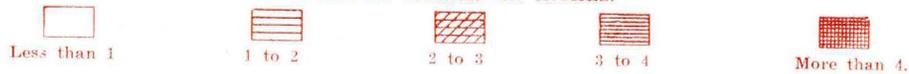
Table with columns for Stations, days 1-31, and Total. Rows are categorized by Northern Division, Central Division, and Southern Division, listing various Iowa locations and their daily temperature ranges.

a, b, c, etc., indicate respectively 1, 2, 3, etc., days missing from record.

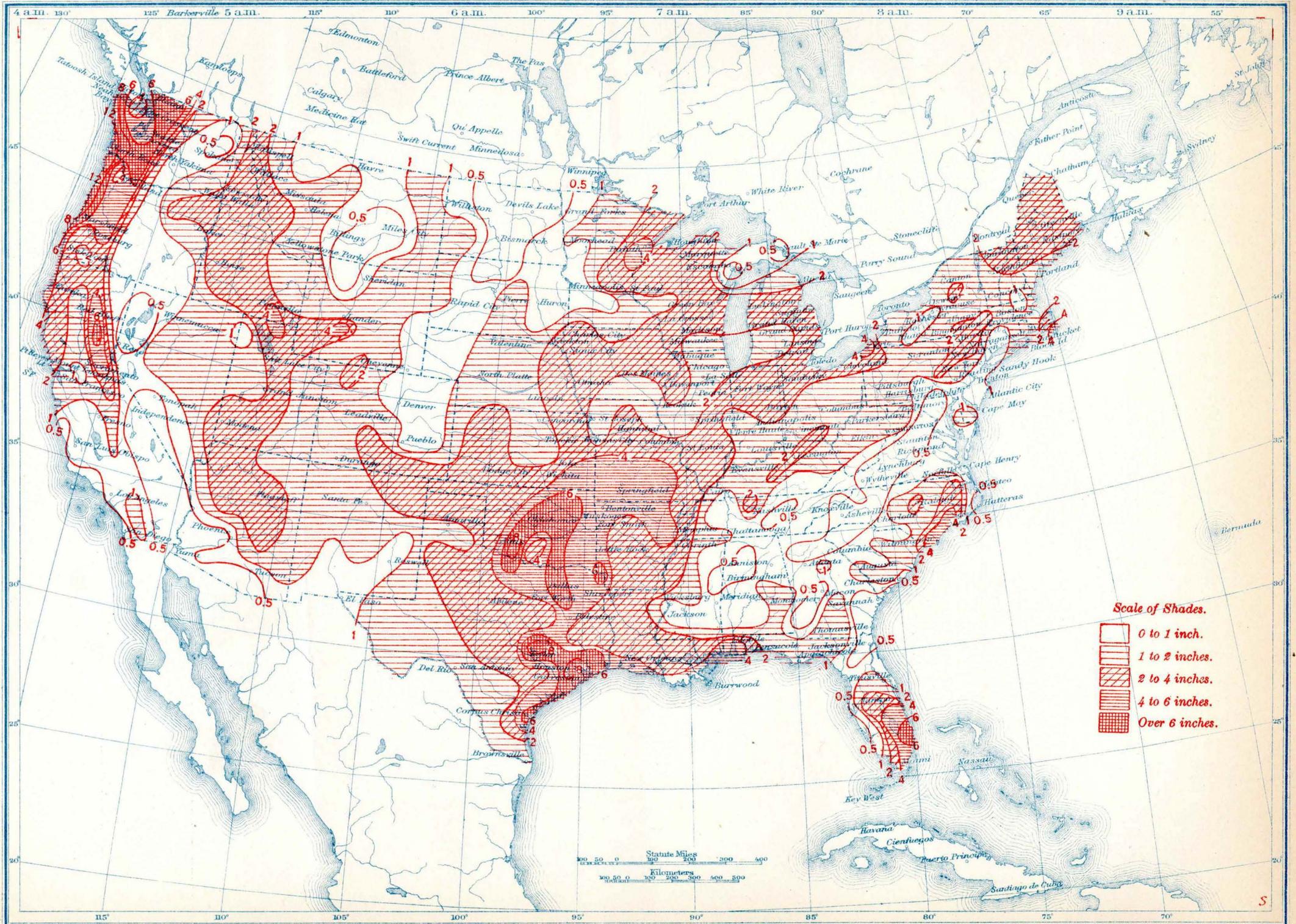
TOTAL PRECIPITATION — OCTOBER, 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, October, 1920.



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

NOVEMBER, 1920

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BY

CHARLES D. REED

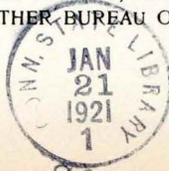
METEOROLOGIST

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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



Departure of the Mean Temperature from the Normal, November, 1920.



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. XXXI Des Moines, Iowa, November, 1920. No. 11

GENERAL SUMMARY.

The mean temperature for the State as a whole averaged less than one half degree above the normal, the excess being confined to the northern and central divisions, though there were small areas in both these divisions with the temperature below normal. Most of the first week was above normal, but on the 10th the first cold wave of the season spread over the State and the temperature remained below normal till the 17th, when a decided change to warmer occurred and during the rest of the month mostly mild weather prevailed. The first part of the month was favorable for farm work and good progress was made in gathering corn until the 19th, when the fields became too soft for wagons. As a result of this unfavorable condition only 77 per cent of the corn crop had been gathered at the end of November while the usual amount at this time is 90 per cent. However this warm weather and an ample supply of moisture was favorable for winter grain, which made good growth, and at the end of the month was well established. The weather was also favorable for harvesting sugar beets which was completed before the close of the month. The maximum temperature for the State was 71° and the minimum 5°, making an absolute range of 66° which is the least ever recorded since state wide records began in 1890.

Precipitation was evenly distributed throughout the month with an average of 8 rainy days for the State, which has been exceeded but once in November in 31 years. The per cent of sunshine was decidedly below normal and the number of cloudy days is the greatest in the history of the State.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.16 inches. The highest recorded was 30.82 inches, at Sioux City, on the 12th, and the lowest was 29.54 inches, at Davenport and Dubuque, on the 21st. The monthly range was 1.28 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 93 stations was 35.4°, or 0.4°, higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 33.5°, or 0.7° higher than the normal; Central, 35.7°, or 0.6° higher than the normal; Southern, 37.0°, or 0.1°, lower than the normal. The highest monthly mean was 39.2°, at Burlington and Keokuk, and the lowest was 32.4°, at Fayette and Sanborn. The highest temperature recorded was 71° at Oskaloosa, on the 19th, and Fairfield, on the 20th, and the lowest was 5°, at Sanborn, on the 11th, West Bend on the 12th and Earlham on the 16th. The temperatures range for the State was 66°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 84 per cent and at 7 p. m. 73 per cent. The mean for the month was 78 per cent or 2 per cent above normal. The highest mean was 81 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 98 stations, was 2.18 inches, or 0.67 inch above the normal. By divisions the averages were as follows: Northern, 2.69 inches, or 1.28 inches greater than the normal; Central, 2.23 inches, or 0.70 inch greater than the normal; Southern, 1.62 inches, or 0.04 inch greater than the normal. The greatest amount, 4.45 inches occurred at Humboldt, and the least, 0.73 inch, at Lamoni. The greatest amount in 24 consecutive hours, 1.60 inches, occurred at Humboldt, on the 29th.

SNOWFALL.

The average fall for the State was 1.2 inches, or 1.3 inches less than the normal. Many stations in all portions of the State reported but a trace and snow did not remain on the ground at any station for more than two days.

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 54 miles per hour, from the northwest, at Sioux City, on the 1st.

SUNSHINE.

The average per cent of the possible amount of sunshine was 37, or 17 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 26; Davenport, 41; Des Moines, 50; Dubuque, 34; Keokuk, 41; Sioux City, 32; Omaha, Neb. 38.

MISCELLANEOUS PHENOMENA.

Aurora: 13th.

Fog: 6th, 7th, 8th, 16th, 17th, 20th, 23d, 24th, 26th, 27th, 28th, 29th, 30th.

Halos: 5th, 17th, 18th, 20th, 23d, 25th, 27th.

Meteors: 5th, 9th, 16th.

Sleet: 9th, 22d, 23d, 26th.

Thunderstorms: 1st, 6th.

COMPARATIVE DATA FOR THE STATE—NOVEMBER.

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.....	38.6	+3.6	78	-2	1.46	-0.05	3.55	0.71	.....	3	15	8	7
1891.....	30.5	-4.5	84	-24	1.70	+0.19	3.64	0.66	.....	7	10	8	12
1892.....	33.3	-1.7	70	-3	1.10	-0.41	3.16	0.05	1.8	4	11	8	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	6	9	8	13
1896.....	29.6	-5.4	82	-15	1.83	+0.32	4.51	0.16	2.9	6	9	8	13
1897.....	34.3	-0.7	81	-19	0.66	-0.85	2.24	T.	1.2	5	12	8	10
1898.....	32.2	-2.8	78	-17	1.50	-0.01	3.61	0.33	8.7	6	14	8	8
1899.....	43.9	+8.9	86	8	1.20	-0.31	2.97	0.13	0.5	5	12	8	10
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	0.16	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	79	-8	1.42	-0.09	4.99	0.11	1.6	6	11	8	11
1912.....	40.1	+5.1	77	6	0.98	-0.53	2.38	0.00	T.	2	18	8	4
1913.....	44.1	+9.1	78	10	1.18	-0.33	3.49	0.20	0.4	6	11	7	12
1914.....	41.0	+6.0	80	-4	0.22	-1.29	0.95	0.00	T.	2	19	6	5
1915.....	40.2	+5.2	83	-5	1.94	+0.43	4.88	0.30	1.2	6	11	10	9
1916.....	37.3	+3.3	80	-3	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	0.70	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
1920.....	35.4	+0.4	71	5	2.18	+0.67	4.45	0.73	1.2	8	10	5	15

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



DAILY PRECIPITATION FOR NOVEMBER, 1920.—Continued.

Stations	Watersheds.	DAY OF MONTH.																														Total		
		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					.34	.22	.15							T													.21	T	.40	.04	1.36		
Albia	Des Moines		T			.32	T	.18							T						T							.28		.42	.31	1.51		
Atlantic	Nishnabotna	.32				.53	.19	.15						T									T					.18		.44	.02	1.83		
Bedford	Missouri	.05				.57	.37	.16				T	T		T	T							.05		T			.20		.49	.04	1.93		
Bloomfield	Mississippi					.14	.55	.15							T													.23		.62		1.69		
Bonaparte	Des Moines	.10	T			.07	.52	.12	T						T	T											T	.06		.13	.06	1.06		
Burlington	Mississippi	.40				.50	.11	.12							T												T				.35	1.48		
Centerville	Chariton		.04			.31	.51	.07							T	.02												T		.15		.23	1.51	
Chariton	Chariton					.30	.35								T													.16	T	.41	.28	1.50		
Earlinda	Nodaway	.15	T			.45	.34	.15							T													.21	.09	.89	.04	2.32		
Columbus Jct.	Iowa	.23	.05			.10	.25	.26							.03	T							.03			T	.13		.05	.04	1.17			
Corning	Nodaway	.17	T			.40	.25	.20							T	T												.32		.59	.12	2.05		
Corydon	Chariton	.10	.02			.19	.37	.18	.02						.03	.01												.18	.01	.36	.31	1.78		
Creston	Missouri	.17	.01			.33	.17	.13																				.30	.01	.41	.15	1.74		
Cumberland	Nodaway	.20			.10	.10	.20																.10					.20	.10	.10		1.10		
Earlham	Des Moines	.12	T			.39	.39	.14	.01						T													.30	T	.40	.11	1.86		
Fairfield	Skunk	.11	T			.18		.48	T						T													.18	.01		.20	1.16		
Glenwood	Missouri	.25	T			.44	.15	.18							T													.20		.02	1.05	1.02	3.39	
Greenfield	Nodaway	.16	.06			.83	.16	.17						T		.06												.23		.25	.20	2.12		
Indianola	Des Moines																																	
Keokuk ***	Mississippi	.04	T			.32	.03	.07							T	T												.02	.01	.45	.02	0.98		
Keosauqua	Des Moines	.14	T			.05	.50	.13					T			.03												.10		.43	.07	1.45		
Knoxville	Des Moines	.15	.05			.28	.20	.16							.05														.45		.40		1.74	
Lacona	Des Moines	.45				.30	.20	.28	.02						.10	.04													.25		.70	.05	2.39	
Lamoni	Grand	.10				.25	.21	.10							T																	.06	.073	
Lenox	Missouri	.17	T			.30	.24	.26							T														.24	.06	.50	.08	1.85	
Mt. Ayr	Grand	.04	T			.54	.25	.10							.03	T													.12	.02	.41	.13	1.64	
Mt. Pleasant	Skunk	.24	.01			.04	.41	.22							T														.16		.08	.04	1.22	
Murray	Grand	.06	.03			.39	.18	.10							.02														.17		.38	.03	1.37	
Oakland	Nishnabotna				T	.39	.16	.16							T														.25		T	.62	1.85	
Oskaloosa	Des Moines	.09	.01			.46	.21	.17	.05						T														.28	.08	.44	.09	1.97	
Ottumwa	Des Moines	.08				.38	.10	.15							T														.15		.60		1.46	
Pella	Skunk	T				.25	.27	.10	T						.10	T													.12	T	.05	.05	0.94	
Stamper	Skunk	.09	.03			.35	.21	.36	T						.04	T													.14	.07	.04	.03	1.36	
Stockport	Skunk	.19	T			.05	.48	.13	.04						.01	T													.14	T	.19	.12	1.36	
Thurman	Missouri	.24	T			.72	.36	.42							T	T													.30		T	.84	T	2.88
Washington	Skunk	.18	.01			.08	.29	.20							.04	T													.22		.05		1.13	
Winterset	Des Moines		T			.51		.37							.02	T													.26		.46		1.62	
Omaha, Neb.***	Missouri	.03			.03	.41	.03	.15	T						T	T													.12		.19	.47	.04	1.47

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.

On the Mississippi River nearly stationary stages prevailed, the extreme range being but a few tenths of a foot. On the Missouri a sharp fall occurred on the 17th and 18th due to ice gorges farther up stream; during the rest of the month the fluctuations were slight. In the interior rivers the only rise of consequence occurred about the middle of the second week, with gradually falling stages during the rest of the month.

Daily Maximum and Minimum Temperatures for the Month of November, 1920.

Table with columns for Stations, days 1-30, and Mean. Rows are categorized into 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.





## FINAL CROP REPORT OF THE STATE. 1920

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

**Corn.**--The estimated acreage was 10,300,000; average yield, 46.0 bushels per acre; total yield, 473,800,000 bushels; average price \$.47 per bushel; total value, \$222,686,000. Only 10 per cent of the crop was reported to be soft or immature and 77 per cent had been husked on December 1. The total production of corn in Iowa this year is the greatest of record. The quality is very good.

**Oats.**--The estimated area harvested was 5,893,600 acres; average yield, 39.0 bushels; total yield, 229,850,400 bushels; average price 36 cents; total value \$82,746,144.

**Spring Wheat.**--Area harvested, 400,000 acres; average yield, 11.3 bushels per acre; total yield, 4,520,000 bushels; price per bushel \$1.35; total value, \$6,102,000.

**Winter Wheat.**--Area harvested, 431,000 acres; average yield, per acre, 19.7 bushels; total yield, 8,490,700; average price \$1.41 per bushel; total value, \$11,971,887.

**Barley.**--Area harvested, 284,000 acres; average yield per acre, 27.5 bushels; total yield, 7,810,000 bushels; average price, 63 cents per bushel; total value, \$4,920,300.

**Rye.**--Area harvested, 80,000 acres; average yield, 16.2 bushels; total yield, 1,296,000 bushels; price per bushel, \$1.17; total value, \$1,516,320.

**Flax Seed.**--Average yield, 10.0 bushels; total yield, 120,000 bushels; total value at \$1.80 per bushel, \$216,000.

**Timothy Seed.**--Area harvested, 270,000 acres; average yield, 4.9 bushels; total yield, 1,323,000 bushels, total value at \$3.00 per bushel. \$3,969,000.

**Clover Seed.**--Area harvested, 134,000 acres; average yield 2.0 bushels; total value at \$11.65 per bushel, \$3,122,200.

**Potatoes.**--Area harvested, 104,500 acres; average yield, 110 bushels; total yield, 11,495,350 bushels; average price, \$1.22; total value \$14,024,327.

**Hay (Tame).**--Average yield, 1.44 tons per acre; total yield, 4,349,620 tons; average price, \$16.24 per ton, total value, \$70,637,829.

**Hay (Wild).**--Average yield, 1.27 tons; total yield, 647,700 tons; average price, \$12.69; total value, \$8,219,313.

**Alfalfa.**--Area harvested, 200,000 acres; average yield, 2.84 tons, total yield, 568,140 tons; average price, \$19.23 per ton; total value, \$10,925,332.

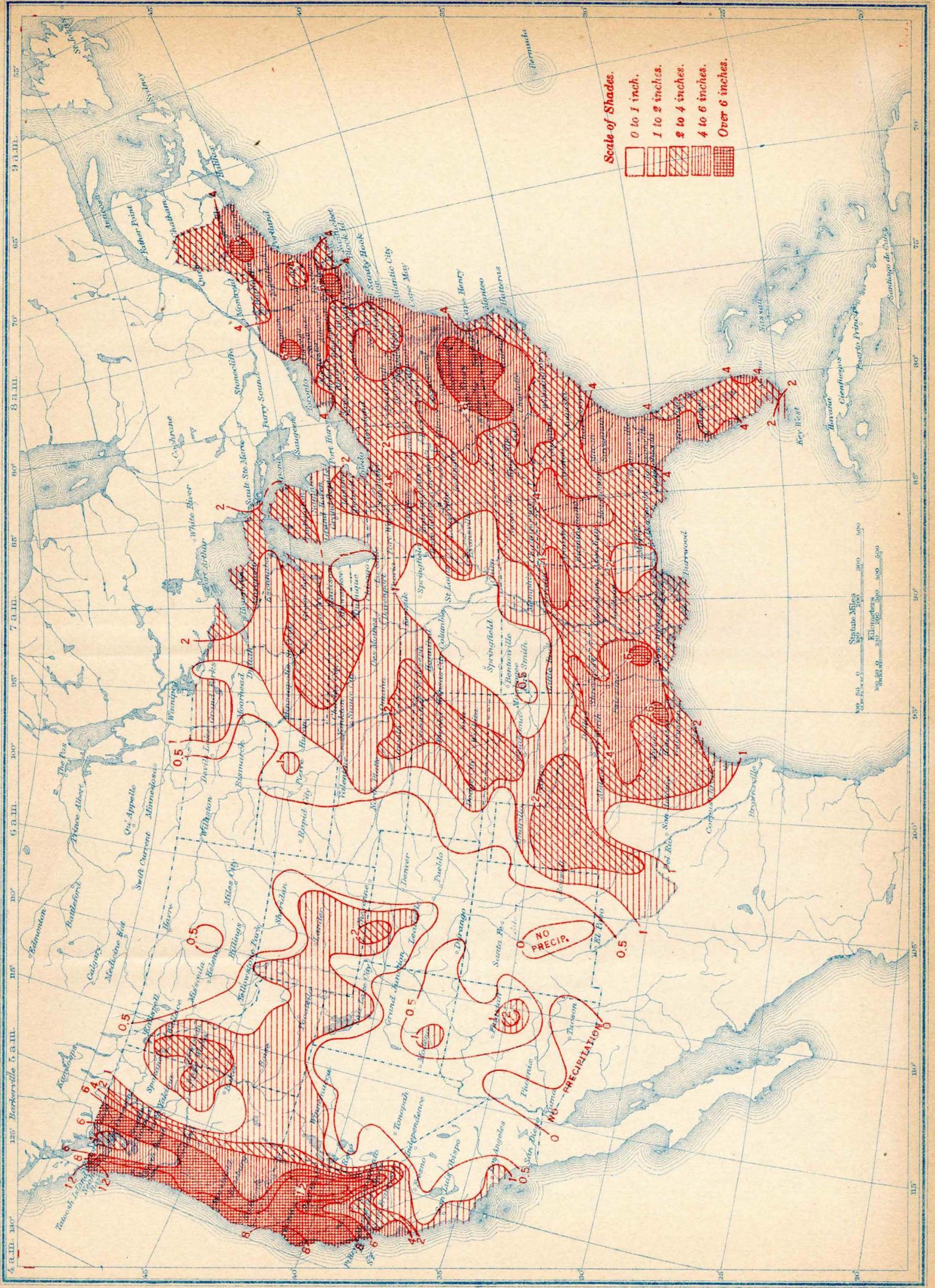
TABULATED CROP SUMMARY, 1920.

Crop	Acres	Average Yield	Average Price	Total Yield	Total Value
Corn .....	10,300,000	46.0 Bu.	\$ 0.47	473,800,000	\$222,686,000
Oats .....	5,893,600	39.0 "	0.36	229,850,400	82,746,144
Spring wheat .....	400,000	11.3 "	1.35	4,520,000	6,102,000
Winter wheat .....	431,000	19.7 "	1.41	8,490,700	11,971,887
Barley .....	284,000	27.5 "	0.63	7,810,000	4,920,300
Rye .....	80,000	16.2 "	1.17	1,296,000	1,516,320
Flax seed .....	12,000	10.0 "	1.80	120,000	216,000
Timothy seed .....	270,000	4.9 "	3.00	1,323,000	3,969,000
Clover seed .....	134,000	2.0 "	11.65	268,000	3,122,200
Potatoes .....	104,500	110.0 "	1.22	11,495,350	14,024,327
Hay, tame					
excluding alfalfa	3,020,850	1.44 tons	16.24	4,349,620	70,637,829
Hay, wild .....	510,000	1.27 "	12.69	647,700	8,219,313
Alfalfa .....	200,000	2.84 "	19.23	568,140	10,925,332
Pasture and Grazing	10,137,680		7.01		71,065,136
Ensilage, estimated					25,000,000
Sweet corn,					
subject to revision					1,960,000
Pop corn .....	30,000	30.0 Bu.	3.23	900,000	2,907,000
Buckwheat .....	7,500	17.0 "	1.34	127,500	170,850
Fruit crop estimated					7,000,000
Garden truck,					
estimated					4,000,000
Sugar beets for					
manufacture .....	17,250	9.2 tons	11.34	158,750	1,801,000
Miscellaneous crops					
estimated .....					5,500,000

Total value, not including live stock products, for the year, 1920 ....\$560,460,638  
Total value for the year, 1919 ....\$950,056,002

Frank S. Pinney, Agricultural Statistician, U. S. Bureau of Crop Estimates. Charles D. Reed, Director, Iowa Weather and Crop Service.

Total Precipitation, Inches, November, 1920.



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

DECEMBER AND ANNUAL SUMMARY, 1920

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BY  
CHARLES D. REED  
METEOROLOGIST

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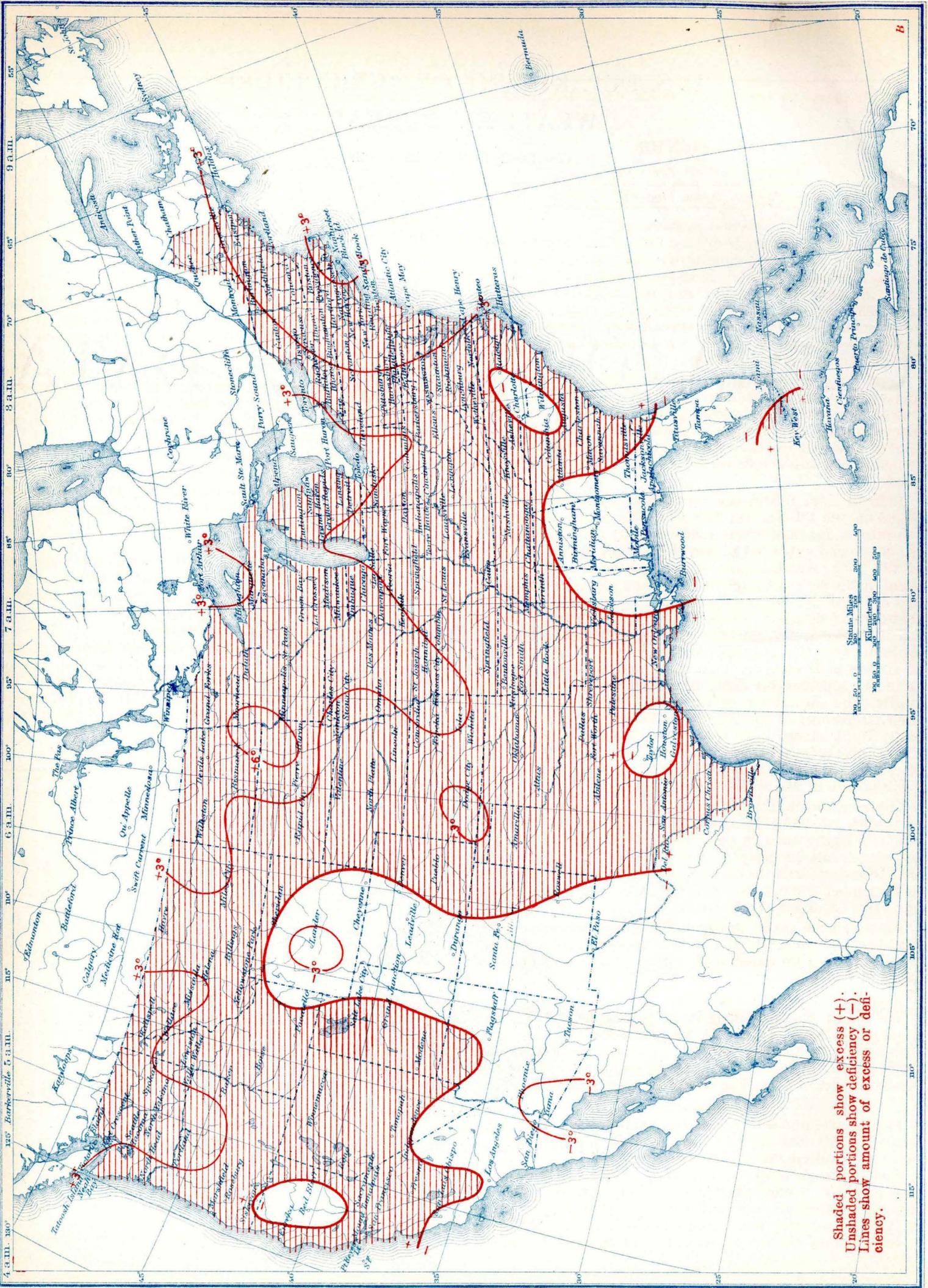


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DES MOINES, IOWA  
WEATHER BUREAU OFFICE



Departure of the Mean Temperature from the Normal, December, 1920.



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. XXXI Des Moines, Iowa, December, 1920. No. 12

GENERAL SUMMARY.

Mild winter weather prevailed during the greater part of December and the temperature was above normal continuously during the first 16 days. From the 17th to the 28th, the only cold weather occurred, with the temperature below normal except on a few days. Cold waves, beginning on the 22d and 26th, spread over the entire State but there were no unusually low temperatures reported. The last three days were warm.

Conditions were generally favorable for out door work and stock. Until the cold weather set in very little frost was in the ground and plowing was reported from many places during the greater portion of the second week. During the cold weather winter grain was well protected by snow and the condition at the end of the month was good.

Rain or sleet fell in the south and east portion of the State on the 3d-4th. On the 13th the first well defined snowstorm reached from southwest to northeast across the State and extended to the Mississippi by the morning of the 14th. Amounts up to 7.0 inches occurred at stations in the central counties. The snowstorm of the 20th-22d covered the entire State except a small area in the east-central division. Considerably more than 10 inches fell in areas in the northern and west-central divisions. At Sioux City the 24-hour fall, 13.6 inches, is the greatest of record in December. This snow drifted badly and resulted in considerable delay to street car and automobile traffic. The snowstorm of the 25th-26th was confined to the eastern half of the State, and the amounts were generally light except over the southeastern district. After the ground became covered it remained so during the rest of the month over practically the entire State but was becoming bare at the close of the month.

Thunderstorms, though unusual in December, occurred on the 3d, 4th and 13th at a large number of stations, particularly in the eastern portion of the State. At Dubuque thunderstorms occurred on the 3d and 13th. At this station thunderstorms have been recorded only three times in December during the last 46 years and never before have two occurred in one December.

An extensive glaze storm occurred in connection with the storm of the 20th-22d. It was preceded by a general snow cover, so no damage to winter grains and grass is believed to have resulted.

F. L. D.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.97 inches. The highest recorded was 30.52 inches, at Omaha, Neb., on the 24th and the lowest was 29.00 inches, at Dubuque, (the lowest of record for December) on the 13th. The monthly range was 1.52 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 99 stations was 26.4° or 2.5° higher than the normal. By divisions, three tiers of counties to the division, the mean temperatures were as follows: Northern, 23.6°, or 2.4° higher than the normal; Central, 26.7° or 2.6° higher than the normal; Southern, 29.0° or 2.5° higher than the normal. The highest monthly mean was 32.8°, at Keokuk, and the lowest was 21.2° at Inwood. The high-

est temperature recorded was 65°, at Burlington, on the 3d, and the lowest was -26°, at Inwood, on the 24th. The temperature range for the State was 91°.

HUMIDITY.

The average relative humidity for the State at 7 A. M. was 85 per cent, and at 7 P. M. it was 77 per cent. The mean for the month was 81 per cent, which is practically 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 104 stations, was 1.16 inches, or 0.06 inch less than the normal. By divisions, the average were as follows; Northern, 1.11 inches, or 0.04 inch greater than the normal; Central, 1.17 inches, or 0.08 inch less than the normal; Southern, 1.19 inches, or 0.16 inch less than the normal. The greatest amount, 2.64 inches, occurred at Knoxville and Olin, and the least, 0.26 inch at Denison. The greatest amount in any 24 consecutive hours, was 1.40 inches at Knoxville, on the 13th.

SNOWFALL.

The average snowfall for the State was 7.4 inches, or 1.2 inches greater than the normal. The greatest amount, 19.3 inches, occurred at Northwood, and the least 2.0 inches at Afton, Cumberland and Denison.

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 55 miles an hour, from the west, at Sioux City, on the 15th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 41, 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, 25; Davenport, 39; Des Moines, 53; Dubuque, 29; Keokuk, 45; Sioux City, 42; Omaha, Neb. 56.

COMPARATIVE DATA FOR THE STATE—DECEMBER.

YEAR	Temperature				Precipitation				Number of Days.				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With precipitation .01 in.	Clear	Partly cloudy	Cloudy
1890.....	29.1	+5.2	72	-13	0.45	-0.77	1.40	0.00	.....	3	17	7	7
1891.....	32.3	+8.4	72	-14	2.41	+1.19	4.60	1.21	.....	6	14	9	8
1892.....	18.9	-5.0	68	-29	1.65	+0.43	3.04	0.20	10.9	8	9	8	14
1893.....	22.0	-1.9	70	-21	1.31	+0.09	2.80	0.46	7.6	7	10	9	12
1894.....	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	8
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	0.57	-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	+0.08	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	15
1920.....	26.4	+2.5	65	-26	1.16	-0.06	2.64	0.26	7.4	5	10	8	13

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

CLIMATOLOGICAL DATA FOR DECEMBER, 1920.

STATIONS.	COUNTIES.	Elevation, Feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation in inches.				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	47	24.8	+3.5	48	11	-15	24	34	1.25	+0.28	1.20	11.0	2	12	3	16	nw	W. E. Laird	
Allison	Butler	1045	3	24.1	.....	50	11	-14	28	29	1.10	.....	0.55	6.0	3	5	11	15	nw	J. A. Bell	
Alta	Buena Vista	1513	29	23.6	-2.6	50	11	-13	24	35	0.68	-0.27	0.45	7.0	2	9	9	13	nw	David E. Hadden	
Alton	Sioux	1305	15	23.0	-1.7	47	11	-22	24	36	0.90	.....	0.50	9.0	3	8	13	10	nw	W. S. Slagle	
Belmond	Wright	1205	10	23.6	.....	50	11	-18	24	34	1.02	.....	0.65	9.1	7	8	7	16	nw	Geo. P. Hardwick	
Britt	Hancock	1236	23	23.6	-2.9	52	11	-18	24	34	0.64	-0.19	0.61	6.3	3	4	11	16	s	L. M. Goodman	
Charles City	Floyd	1015	29	23.7	-4.7	48	11	-14	24	27	1.83	+0.55	0.89	16.1	5	5	7	19	nw	U.S. Weather Bureau	
Decorah	Winneshek	875	27	24.6	-2.4	48	12	-13	28	26	1.99	+0.65	0.70	13.5	6	11	4	16	nw	William F. Baker	
Elkader	Clayton	751	41	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	C. L. Reinecke	
Estherville	Emmet	1298	25	23.8	-3.9	49	7	-15	24	32	0.55	-0.26	0.55	7.0	1	4	17	10	nw	A. O. Peterson	
Fayette	Fayette	1003	30	24.6	-3.7	49	12	-13	28	30	1.57	+0.04	0.91	8.2	6	9	9	13	nw	R. Z. Latimer	
Forest City	Winnebago	1226	26	23.4	-3.8	51	11	-14	28	30	0.62	-0.35	0.38	6.0	5	8	7	16	nw	M. B. Neil	
Humboldt	Humboldt	1095	32	24.9	-1.7	53	11	-19	24	32	1.06	+0.20	1.00	10.5	2	6	10	15	nw	H. C. Snitkey	
Inwood	Lyon	1474	16	21.2	-1.2	47	11	-26	24	39	1.34	+0.66	1.00	13.3	5	13	10	8	nw	F. B. Hanson	
Lansing	Allamakee	632	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Chas. R. Serene	
Le Mars	Plymouth	1224	24	23.8	+1.3	51	11	-16	24	36	1.00	+0.07	0.60	10.0	3	10	9	12	s	Mrs. M. C. Woolley	
Mason City	Cerro Gordo	1148	23	22.6	-1.1	45	12	-18	24	33	1.27	-0.13	0.90	11.0	4	18	4	9	nw	North'n Sugar Corp.	
Milford (near)	Dickinson	1430	.....	22.6	.....	45	11	-17	24	31	0.63	.....	0.41	6.1	3	6	13	12	nw	Dr. F. J. Smith	
New Hampton	Chickasaw	1169	23	23.3	+2.4	48	11	-18	24	26	1.70	+0.57	0.80	14.0	5	10	6	15	nw	A. F. Kemman	
Nora Springs	Floyd	1064	8	26.1	.....	55	11	-17	24	35	1.27	.....	0.71	6.1	8	8	10	13	s	Arthur Betts	
Northwood	Worth	1222	24	23.0	-3.0	46	11	-13	28	26	1.93	+0.69	1.00	19.3	7	7	7	17	nw	Chas. Dwelle	
Pocahontas	Pocahontas	1248	16	24.0	-2.1	52	11	-20	24	44	0.76	-0.10	0.70	8.0	2	11	6	14	nw	F. E. Hronek	
Postville	Clayton	1180	21	23.8	-2.4	49	13	-14	28	25	1.78	+0.32	1.12	9.1	8	5	9	17	nw	F. L. Williams	
Rock Rapids	Lyon	1358	21	22.3	-2.7	44	11	-21	24	31	1.08	+0.50	0.90	10.8	3	17	7	7	nw	J. K. Medberry	
Sanborn	O'Brien	1553	6	22.6	.....	46	11	-18	24	31	1.00	.....	0.50	10.0	2	8	8	15	nw	James W. Dow	
Sioux Center	Sioux	1426	21	.....	.....	.....	.....	-19	24	.....	2.80	-0.09	0.40	8.0	3	8	7	16	nw	J. de Ruyter	
Spencer	Clay	1319	6	22.4	.....	48	11	-20	24	34	0.85	.....	0.80	8.5	2	7	10	14	nw	E. W. Little	
Storm Lake	Buena Vista	1440	31	24.3	-1.9	50	11	-15	24	32	0.90	+0.08	0.80	9.3	3	16	4	11	nw	Geo. H. Fracker	
Washita	Cherokee	1157	22	23.6	-1.1	51	11	-23	24	40	0.88	+0.08	0.70	9.0	3	14	5	12	nw	H. L. Felter	
Waverly	Bremer	948	24	25.0	-2.2	51	1	-13	28	34	1.48	+0.22	0.55	10.5	8	9	3	19	nw	H. Arnold	
West Bend	Palo Alto	1197	27	23.0	-1.2	52	11	-16	28	38	0.53	-0.70	0.41	7.3	3	14	5	12	nw	Jos. Dorweiler	
<b>Means and extremes.</b>				23.6	+2.4	55	11	-26	24	44	1.11	+0.04	1.20	9.6	4	9	8	14	nw		
<i>Central Division</i>																					
Ames	Story	926	44	27.4a	+3.0	53a	11	-13a	27	35a	1.05	-0.17	0.60	8.0	3	.....	.....	.....	nw	Iowa State College	
Audubon	Audubon	1301	26	24.7	-0.8	53	11	-15	24	36	0.90	-0.09	0.70	8.0	2	11	11	9	nw	Geo. Kibby	
Baxter	Jasper	998	20	26.3	-2.0	52	11	-11	28	32	0.92	-0.08	0.77	4.2	4	6	9	16	nw	Rev. Paul Traeger	
Belle Plaine	Benton	886	30	27.2	-3.3	57	12	-11	28	28	1.57	+0.14	0.82	5.3	9	6	13	12	nw	O. C. Burrows	
Boone	Boone	1134	15	26.4	-3.3	54	11	-11	24	34	0.54	-0.43	0.30	5.0	4	8	5	18	nw	Carl F. Henning	
Carroll	Carroll	1265	30	25.2	-2.0	54	11	-15	24	39	0.90	-0.12	0.80	5.0	2	16	2	13	nw	Mrs. Jos. J. Wolfe	
Cedar Rapids	Linn	733	38	28.0	+4.0	54	12	-9	28	25	0.84	-0.56	0.35	4.3	5	16	1	14	w	R. S. Toogood	
Clinton	Clinton	593	47	29.8	-4.1	60	3	-14	28	29	1.55	-0.30	0.58	4.8	6	12	6	13	s	Dr. A. P. Bryant	
Davenport	Scott	580	49	29.6	-2.4	60	3	-7	28	30	1.19	-0.50	0.48	6.9	6	6	9	16	w	U.S. Weather Bureau	
Delaware	Delaware	1083	29	25.4	-3.4	52	12	-14	28	25	1.78	+0.44	0.95	5.5	6	8	11	12	n	Nettie E. Ball	
Denison	Crawford	1180	26	26.7	-2.2	51	11	-13	24	38	0.26	-0.67	0.26	2.0	1	11	6	14	n	Emma Brogden	
Des Moines	Polk	861	40	28.8	-3.1	55	11	-6	28	25	1.88	+0.07	0.89	8.8	5	6	9	16	nw	U.S. Weather Bureau	
Dubuque	Dubuque	639	47	27.3	-2.8	55	13	-9	28	34	0.96	-0.76	0.25	5.6	8	4	10	17	nw	U.S. Weather Bureau	
Fort Dodge	Dubuque	1126	20	25.1a	-3.2	57b	11	-17	24	36b	1.11	+0.49	0.93	12.2	5	8	7	16	n	Fred Heman	
Grinnell	Poweshiek	1031	26	25.8b	-0.3	52b	11	-8b	28	35b	.....	.....	.....	.....	.....	.....	.....	.....	nw	Wm. Bader	
Grundy Center	Grundy	976	29	26.3	-2.6	51	11	-11	28	27	1.15	-0.03	0.40	11.5	4	5	10	16	nw	M. G. Heiberger	
Guthrie Center	Guthrie	1077	25	30.0	-4.8	55	11	-11	24	39	0.70	-0.48	0.40	7.0	2	14	0	17	nw	E. L. Nesselroad	
Harlan	Shelby	1192	21	24.8d	-1.0	53d	12	-16d	24	36d	0.62	-0.44	0.58	5.8	2	.....	.....	.....	nw	W. K. Colburn	
Independence	Buchanan	921	56	26.7	-3.9	51	12	-11	28	32	0.99	-0.39	0.64	3.0	5	14	0	17	nw	Dr. Geo. Boody	
Iowa City	Johnson	733	60	28.1	-4.0	54	3	-13	28	33	2.45	+0.84	0.79	9.0	8	6	13	12	nw	Prof. J. F. Reilly	
Iowa Falls	Hardin	1107	27	24.8	-3.5	51	11	-13	24	32	1.55	+0.18	0.68	12.7	5	7	9	15	nw	J. B. Parmelee	
Jefferson	Greene	1052	21	25.4	-1.2	54	11	-14	24	38	1.39	.....	0.80	7.5	4	12	5	14	nw	Will I. Lyon	
LeClaire	Scott	576	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Margaret T. Disney	
Little Sioux	Harrison	1040	15	26.2	-0.8	54	5	-21	24	40	0.80	.....	0.70	8.0	2	9	8	14	nw	Geo. H. Gibson	
Logan	Harrison	928	53	27.5	-2.3	52	5	-19	24	38	0.45	-0.73	0.45	5.0	1	13	8	10	nw	Mary Jean Stern	
Maquoketa	Jackson	688	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	C. C. Martin	
Marshalltown	Marshall	947	28	26.8	+3.7	51	11	-9	28	29	1.28	-0.07	0.72	8.1	6	18	5	8	nw	J. A. Pigman	
Monroe	Jasper	922	8	28.2	.....	55	12	-8	28	30	1.19	.....	0.49	8.6	6	7	6	18	nw	J. A. Dibel	
Muscataine	Muscataine	554	60	.....	.....	.....	.....	.....	.....	.....	1.40	-0.64	0.45	5.0	6	.....	.....	.....	.....	Wm. P. Molis	
Olin	Jones	760	21	26.3	+1.3	54	3	-14	28	34	2.64	+1.15	1.00	.....	.....	.....	.....	.....	.....	Dr. F. W. Port	
Onawa	Monona	1051	20	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Mrs. H. E. Colby	
Perry	Dallas	975	19	26.4	+1.6	52															

CLIMATOLOGICAL DATA FOR DECEMBER, 1920.—Continued.

STATIONS.	COUNTIES.	Elevation—feet	Length of record, years.	Temperature, in Degrees Fahrenheit.						Precipitation, in Inche.					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.		
<b>Southern Division</b>																				
Afton	Union	1212	26	28.2	+2.0	54	11†	-9	24	33	0.69	-0.65	0.54	2.0	3	13	8	10	nw	S. R. Brown
Albia	Monroe	959	22	28.5	+3.2	56	2†	-8	28	37	1.27	+0.12	0.68	6.0	4	2	9	20	ne	F. H. Holmes
Atlantic	Cass	1164	29	26.7	-1.9	54	12	-13	24	35	0.68	-0.52	0.53	5.2	3	12	9	10	nw	Joseph N. Reynolds
Bedford	Taylor		20	29.5	+4.5	57	12	-8	24	35	1.16	+0.04	0.50	8.2	5	11	11	9	nw	E. E. Healy
Bloomfield	Davis	881	13	29.9a	.....	61a	3	-8a	28	32a	0.56	-1.21	0.30	4.0	3	.....	.....	.....	nw	Frank Battin
Bonaparte	Van Buren	565	29	30.4	+2.5	63	3	-13	28	34	1.18	-0.17	0.49	3.5	5	15	3	13	nw	Bruce R. Vale
Burlington	Des Moines	544	24	32.2	+4.3	65	3	-6	28	26	1.02	-0.76	0.20	3.0	6	17	4	10	sw	Mrs. E. M. Donnelly
Centerville	Anpanoose	1013	15	29.9	.....	60	2†	-11	28	39	1.18	.....	0.54	2.5	5	14	6	11	se	Leo. J. Allen
Chariton	Lucas	1042	25	31.2	+4.8	58	3	-5	28	28	1.41	+0.09	0.55	3.0	4	8	6	17	nw	C. C. Burr
Clarinda	Page	1009	30	30.0	+5.3	57	11†	-7	24	35	0.81	-0.36	0.41	6.6	4	10	12	9	nw	A. S. Van Sandt
Columbus Jet.	Louisa	595	19	29.9	+2.2	61	3	-10	28	28	1.96	+0.65	0.73	10.0	9	10	11	10	nw	J. B. Johnston
Corning	Adams	1117	28	28.1	+3.4	56	12	-10	24	34	0.58	-0.76	0.25	4.0	3	16	5	10	nw	Jerome Smith
Corydon	Wayne	1101	27	.....	.....	58	3	-5	28	31	1.60	+0.18	0.70	4.2	8	8	11	12	sw	May C. Miller
Creston	Union	1312	15	27.8	+3.1	53	12	-11	24	33	0.87	.....	0.61	5.5	5	9	9	13	nw	Dr. H. M. Stanley
Cumberland	Cass	1225	21	.....	.....	.....	.....	.....	.....	.....	0.45	-0.65	0.20	2.0	4	7	13	11	sw	G. M. Clark
Earlham	Madison	1126	18	27.0	+1.6	57	2	-14	24	37	0.44	-0.97	0.23	5.0	2	10	9	12	nw	Geo. Phillips
Fairfield	Jefferson	780	36	28.8a	+1.6	61b	3	-14	28	34b	1.83	+0.14	0.70	9.5	6	16	4	11	nw	Prof. R. M. McKenzie
Glenwood	Mills	1100	22	28.6	.....	55	5	-14	24	42	0.80	.....	0.60	8.0	4	8	10	13	nw	Dr. Geo. M. Grigge
Greenfield	Adair	.....	28	27.2	+2.2	56	12	-12	24	35	0.59	-0.59	0.55	5.9	2	18	5	8	nw	J. C. Patterson
Indianola	Warren	969	29	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	U.S. Weather Bureau
Keokuk	Lee	614	49	32.8	+3.4	63	3	-3	28	31	0.61	-1.26	0.28	2.1	6	6	12	13	w	J. H. Landes
Keosauqua	Van Buren	644	28	30.0	+3.3	63	3	-14	28	35	1.88	+0.45	0.55	6.0	7	9	11	11	nw	W. J. Casey
Knoxville	Marion	920	25	28.5	+2.0	55	11	-9	28	35	2.64	+1.27	1.40	8.1	7	8	6	17	nw	J. B. Alter
Lacona	Warren	.....	21	.....	.....	.....	.....	.....	.....	.....	1.60	-0.10	0.70	12.0	9	7	16	8	.....	E. D. Moore
Lamoni	Decatur	1100	13	29.5	+2.8	58	12	-6	28	35	0.58	-0.64	0.40	2.9	5	11	4	16	nw	J. L. Hurley
Lenox	Taylor	1250	25	28.2	-2.5	56	11†	-9	24	34	0.73	-0.40	0.45	6.0	3	8	12	11	nw	Alex Maxwell
Mt. Ayr	Ringgold	1236	27	30.0	+3.0	57	11†	-6	24†	36	0.79	-0.60	0.45	2.7	5	12	8	11	nw	John H. Jericho
Mt. Pleasant	Henry	729	39	30.6	+2.8	62	3	-3	27	33	1.82	+0.46	0.59	5.6	7	7	8	16	nw	M. T. Ashley
Murray	Clarke	1216	29	28.4	+2.2	57	12	-10	24	35	0.83	-0.29	0.50	2.2	3	5	12	14	nw	M. E. Gray
Oakland	Pottawattamie	1105	1	27.6	.....	54	11†	-18	24	40	0.55	.....	0.50	5.5	2	20	2	9	s	Roy R. Robinson
Oskaloosa	Mahaska	825	44	28.5	+2.4	56	3	-9	28	33	2.43	+1.28	0.78	9.8	8	7	9	15	nw	Henry Eilers
Ottumwa	Wapello	849	25	.....	.....	.....	.....	.....	.....	.....	2.11	+0.81	0.80	6.5	5	11	1	21	w	J. H. Ver Steeg
Pella	Marion	877	27	28.2	+1.6	54	11	-8	28	32	1.03	-0.05	0.60	10.0	4	10	0	21	nw	W. E. Utterback
Stockport	Keokuk	877	24	28.1	-1.4	56	3	-11	28	30	1.86	+0.63	0.47	7.3	7	12	6	13	nw	C. L. Beswick
Sturgis	Keokuk	754	18	29.7	+2.1	62	3	-18	28	38	1.92	+0.64	0.64	7.5	6	10	6	15	nw	C. R. Paul
Thurman	Van Buren	.....	23	27.0	-1.3	50	16	-21	24	44	1.25	-0.10	0.85	11.5	4	4	20	7	nw	Wm. A. Cook
Washington	Fremont	769	38	29.3	+2.2	62	3	-13	28	31	2.17	+0.81	0.72	8.0	6	10	11	10	nw	H. S. Ely
Washington	Washington	1129	29	27.8	-1.7	57	11	-11	24	34	0.95	-0.35	0.75	6.0	2	11	12	8	nw	U.S. Weather Bureau
Winterset	Madison	1040	49	28.7	+1.6	55	5	-8	24	36	0.81	-0.10	0.77	7.3	4	12	7	12	nw	
Omaha, Nebr.																				
Means and extremes				29.0	+2.6	65	3	-21	24	44	1.19	-0.16	1.40	5.8	5	11	8	12	nw	
State means and extremes				26.4	+2.5	65	3	-26	24	44	1.16	-0.06	1.40	7.4	5	10	8	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 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.

MISCELLANEOUS PHENOMENA.

Stations.	Barometric Pressure Inches (Sea level)					Relative Humidity (Per cent)					WIND						Sunshine. Per cent of possible. Departure from normal.
	Mean	Highest	Date	Lowest	Date	Mean					Total movement	Average hrly velocity.	Maximum				
						7 A. M.	Noon †	7 P. M.	Lowest	Date			Miles	From	Date		
Charles City	29.96	30.44	7	29.19	14	91	83	89	61	11	5689	7.6	30	nw	15	25	-26
Davenport	29.96	30.43	24	29.08	13	87	75	76	50	20	6393	8.6	33	sw	13	39	-5
Des Moines	29.94	30.46	24	29.24	13	80	74	75	46	23	5917	8.0	28	w	14	53	+1
Dubuque	29.96	30.44	7	29.00	13	91	79	80	51	16	5277	7.1	27	nw	14	29	-14
Keokuk	29.98	30.50	24	29.12	13	78	70	69	39	16	7094	9.5	37	nw	14	45	-1
Sioux City	29.98	30.49	23	29.31	12	85	75	80	34	31	9723	13.1	55	w	15	42	-7
Omaha, Neb.	29.98	30.52	24	29.28	12	81	70	73	37	15	6966	9.4	40	nw	14	56	+6
Means and extremes	29.97	30.52	24	29.00	13	85	75	77	.....	.....	.....	9.0	.....	.....	.....	41	-7
Normals and records	30.12	.....	29th	.....	13th	84	.....	77	.....	9th	.....	8.1	.....	.....	24th	48	.....

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

*Aurora:* 16th.  
*Fog:* 1st, 2d, 3d, 4th, 5th, 6th, 9th, 10th, 12th, 13th, 21st, 22d, 26th, 29th, 30th, 31st.  
*Hail:* 13th, 21st.  
*Halos:* lunar and solar: 13th, 14th, 16th, 19th, 20th, 22d, 23d, 24th, 25th, 26th, 27th, 29th, 31st.  
*Parhelia:* 16th, 23d.  
*Parselenae:* 23d.  
*Sleet:* 4th, 9th, 13th, 21st, 22d, 25th.  
*Thunderstorms:* 3d, 4th, 13th.

DAILY PRECIPITATION FOR DECEMBER, 1920.

Stations	Watersheds.	DAY OF MONTH.																															Total			
		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				
<b>Northern Division</b>																																				
Algona	Des Moines																				1.20						.05							1.25		
Allison	Cedar												.55								T	.45				.10							T	1.10		
Alta	Raccoon												.23									.45													.68	
Alton	Floyd												.20									.50		.20											.90	
Belmond	Iowa	T	T									.15									.06	.65	.06			.05	.03	.02							1.02	
Britt	Iowa												T	T							T	.61	.01		T		.02								.64	
Charles City ***	Cedar											.89									.12	.66	.08			.08	T								1.83	
Decorah	Mississippi											.61	.42								.02	.70	.07			.17									1.99	
Elkader	Mississippi																																			
Estherville	Des Moines																					.55														.55
Fayette	Mississippi											.03										.02	.85				.26								1.57	
Forest City	Cedar																				.08	.38	.02	.10		.04	T								.62	
Humboldt	Des Moines												T								.06	1.00	T				T	T							1.06	
Inwood	Big Sioux												.01									T	.30	1.00	.02										1.34	
Lansing III	Mississippi																																			
Le Mars	Floyd																						.60	.30												1.00
Mason City	Cedar	.05											.12									.20	.90												1.27	
Millford (near)	Dickinson																				.03	.41	.19		T										.63	
New Hampton	Wapsipinicon		T	T									.60								.10	.80	.10			.10									1.70	
Nora Springs	Cedar		.08										.28	.01			T	T			.03	.71	.08			.05	.03								1.27	
Northwood	Cedar		T										.15	.05	T		T	T			.03	1.00	.40			.20	.10								1.93	
Pocahontas	Des Moines																				.06	.70													.76	
Postville	Mississippi											.01									.05	.20	.05	.20		.15									1.78	
Rock Rapids	Big Sioux												.65	.47							.03	.90	.15												1.08	
Sanborn	Floyd																					.50	.50												1.00	
Sioux Center	Floyd																				.40	.10	.30					T							.80	
Spencer	Little Sioux																				.05	.80														.85
Storm Lake	Raccoon																				.04	.80	.06					T								.90
Washita	Little Sioux																				.08	.70	.10													.88
Waverly	Cedar		.03	T	T								.40	.55	T						T	.20	.68				.15	.05	T						1.48	
West Bend	Des Moines																				.05	.41	.07					T	T							.53
<b>Central Division</b>																																				
Ames	Skunk												.40									.60				.05									1.05	
Audubon	Nishnabotna												.20									.70														.90
Baxter	Skunk				T								.72	.05								.12	T			.03	T								T	.92
Belle Plaine	Iowa	T											.65	.17	T							.40	.04		.02		.22	.01								1.57
Boone	Des Moines				.01	.05							.16	T								.02	.80	T			.06	T								.54
Carroll	Raccoon																					.10	.80													.90
Cedar Rapids	Cedar				.11								.30	.05								.10	.10			.18										.84
Clinton III	Mississippi				.58								.01	.31								.24	.09			.32										1.55
Davenport ***	Mississippi		T	.11	.26								.08	.02	T							.22	.01	.01		.40	.08								T	1.19
Delaware	Mississippi												.70	.25								T	.33		.10	.20	.20									1.78
Denison	Missouri																					T	.26	T				T								.26
Des Moines ***	Des Moines	T		T		T							.89	T							.02	T	.44	.01		.02	T	T							1.38	
Dubuque ***	Mississippi		T	.02	.17								.22	.02	T	T	T					.02	.25	.04	T		.22	T	T	T					T	.96
Fort Dodge	Des Moines												.15	T	T	T						.02	.91	.02		.01	T								1.11	
Grinnell	Iowa				.01																	.20	T													*
Grundy Center	Cedar												.30	.40								.40	.05				T	T							1.15	
Guthrie Center	Raccoon												.30									.40														.70
Harlan	Nishnabotna												.04										.58													.62
Independence	Wapsipinicon												.27	.37								.11	T			.14	.10									.99
Iowa City	Iowa				.42	.37							.69	.09									.24	.05	T		.48	.11								2.45
Iowa Falls	Iowa												.68	.30								.02	.45	T		.10	T								1.55	
Jefferson	Raccoon												.05	T								.04	.80	T	T	.50	T								1.39	
Le Claire III	Mississippi																																			
Little Sioux	Little Sioux																						.70	.10												.80
Logan	Missouri																																			.80
Maquoketa	Maquoketa																						.45													.45
Marshalltown	Iowa	T			T								.72	.14								T	.31	.03		.07	.01								1.28	
Monroe	Skunk	T			T	.06							.49	.30									.26	T		.02								.06	1.19	
Muscatine III	Mississippi			.30	.10								.30									T	.15	.10		.45									1.40	
Olin	Wapsipinicon				1.00																		.50	.30	T	.34										2.64
Onawa	Missouri																																			
Perry	Raccoon												.22										.33													.55
Rockwell City	Raccoon												.03	T								.05	.75	.10			T	T							.93	
Sac City	Raccoon					T																.10	.80	T			T	T								.90
Sioux City ***	Missouri																					.20	.62	.58	T		T	T							1.40	
Tipton	Cedar			1.20									.40	T								.20				.50										2.40
Toledo	Iowa												.65	.44									.14				.08									1.31
Van Meter III	Raccoon																																			

DAILY PRECIPITATION FOR DECEMBER, 1920.—Continued.

Stations	Watersheds.	DAY OF MONTH.																															Total			
		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 .....												.12							.19		.54					T						.03	0.69		
Albia .....	Des Moines .....		T	.23									.68		T							.20	T	T			.16	T						1.27		
Atlantic .....	Nishnabotna .....												.10	T						T	.05	.53	T				T							0.68		
Bedford .....	Missouri .....		T										.50	T						.10	.48	T					T	.03			.05			1.16		
Bloomfield .....	Mississippi .....												.20								.30	T						.06						0.56		
Bonaparte .....	Des Moines .....		T	.47									.44	.05						T	.17						.05	T						1.18		
Burlington .....	Mississippi .....			.20									.13	.20							.19		T				.20	.10						1.02		
Centerville .....	Chariton .....		.25										.54						T	.02	.17	T					.20							1.18		
Chariton .....	Chariton .....			.55									.52	.22							.12					T								1.41		
Clarinda .....	Nodaway .....		T										.41							T		.25	.14					.01		T				0.81		
Columbus Jct. ....	Iowa .....		.08	.65					T				.27	.14								.25				.10	.30	.07						.10	1.96	
Corning .....	Nodaway .....			.08									.25									.25													0.58	
Corydon .....	Chariton .....		T	.36					T	T			.63	.07	T				T	.02	.34	T	.03			.13	.02			T				T	1.60	
Creston .....	Missouri .....			.08									.11		.02						.05	.61													0.87	
Cumberland .....	Nodaway .....												.45	.25								T	.05												0.45	
Earlham .....	Des Moines .....	T		T									.21	T	T							.23	T				T	T							0.44	
Fairfield .....	Skunk .....			.16	.12				T				.10	T	.25							.15													1.83	
Glenwood .....	Missouri .....												.10	T							.05	.60	.05												0.80	
Greenfield .....	Nodaway .....												.04									T	.55	T											0.59	
Indianola .....	Des Moines .....																																			
Keokuk *** .....	Mississippi .....		T	.01					T				.28	.01	T				T	T		.18	.01	T			.12							0.61		
Keosauqua .....	Des Moines .....		.02	.40					T				.55	.17								.24	T	T		.40	.10								1.88	
Knoxville .....	Des Moines .....		.10	.55					T				1.40									.38	.02	.04		.15									2.64	
Lacona .....	Des Moines .....		.10	.08					.02				.50	.20								.40	.10	.10		.10									1.60	
Lamoni .....	Grand .....		T										.40	T							.05	.01					.06	.06							0.58	
Lenox .....	Missouri .....		T	T									.18								.10	.45					T								0.73	
Mt. Ayr. ....	Grand .....		T										.29	.01	T						.03	T	.45	T			.01	T					T	0.79		
Mt. Pleasant ...	Skunk .....			.59									.25	.25								.24	.02	T		.29	.18								1.82	
Murray .....	Grand .....		.03										.30	T								.50	T				T	T							0.83	
Oakland .....	Nishnabotna .....												T	T								.50	T												0.55	
Oskaloosa .....	Des Moines .....		.07	.69					T				.78	.26								.26	T	.02		.29	.06	T							2.43	
Ottumwa    ..	Des Moines .....		.30	.40									.80									.20				.41									2.11	
Pella .....	Skunk .....		T	.05					T				.60	T								.23	T	T		.15	T								1.03	
Sigourney .....	Skunk .....			.47									.38	.14								.42	T	T		.28	.15								1.86	
Stockport .....	Skunk .....		T	.42					T				.60	.04								.26				.50	.10								1.92	
Thurman .....	Missouri .....												.30	T							.05	.05			.85	T		T						1.25		
Washington .....	Skunk .....			.72									.72	.13								.23	.02			.35									2.17	
Winterset .....	Des Moines .....												.20									.75	T			T									0.95	
Omaha, Neb.***	Missouri .....	T							T				T	T							.02	T	.48	.30	.01		T	T							0.81	

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.

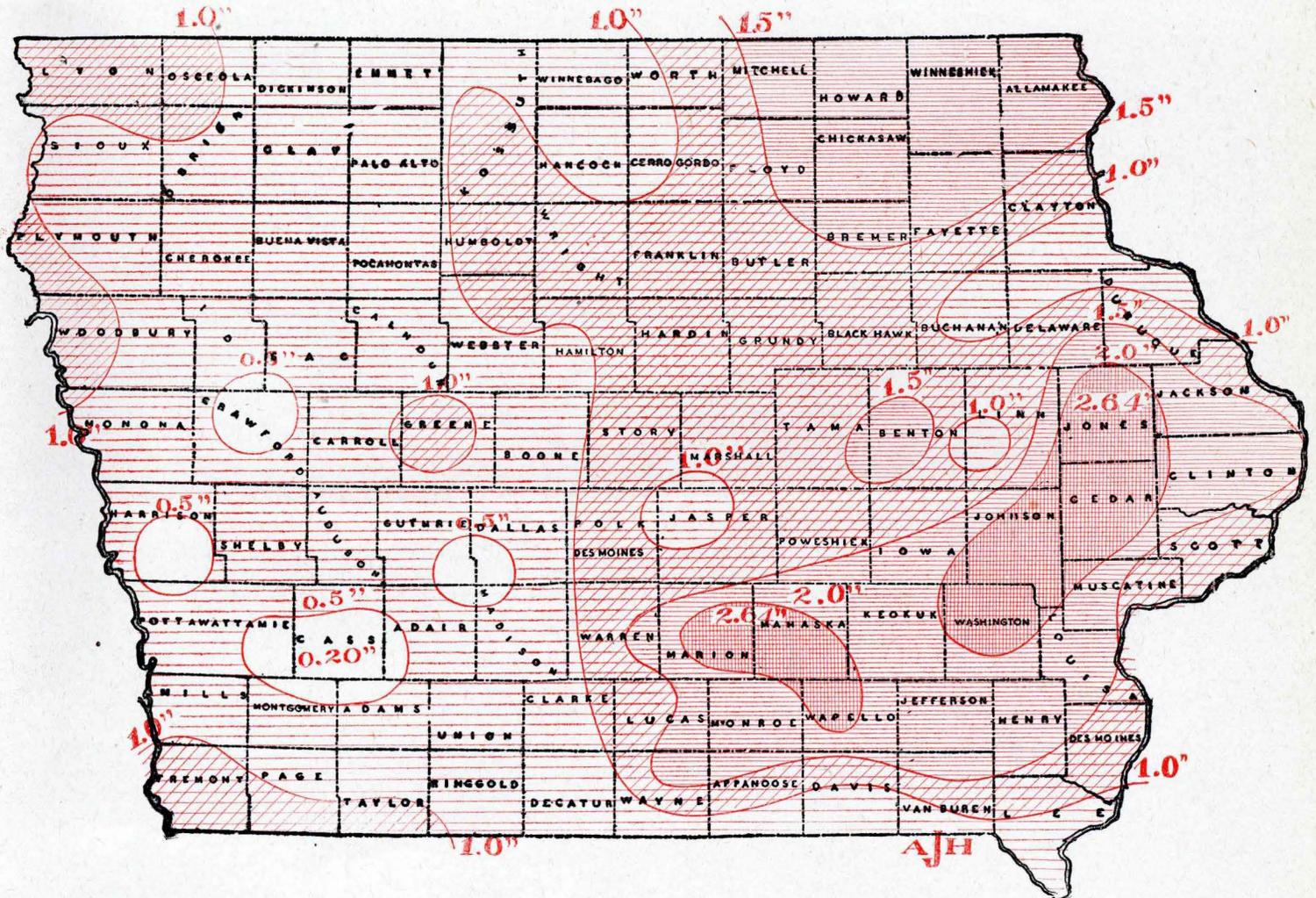
Moderate stages prevailed on all rivers with only slight fluctuations and were generally free of ice until the third week. The interior rivers froze from the 18th to 20th and the Mississippi and Missouri Rivers about a week later.

Daily Maximum and Minimum Temperatures for the Month of December, 1920.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized into Northern Division (Albion to Postville), Central Division (Belle Plaine to Guthrie Center), and Southern Division (Albia 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.

TOTAL PRECIPITATION, DECEMBER 1920.



SCALE OF SHADES—IN INCHES.



AJH

# CLIMATOLOGICAL DATA.

## IOWA SECTION

In cooperation with

## IOWA WEATHER AND CROP SERVICE

CHARLES D. REED, Meteorologist

Vol. XXXI Des Moines, Iowa, Annual, 1920. No. 13

### GENERAL SUMMARY.

The mean temperature,  $48.2^{\circ}$ , is  $0.8^{\circ}$  above normal. February, March, June, September, October, November and December were above normal; the other months below. The highest temperature recorded was  $102^{\circ}$ , at Clarinda, on July 23. The lowest was  $-26^{\circ}$ , at Elkader on January 4, and at Inwood on December 24. The annual variation in temperature within the State was  $128^{\circ}$ . The total precipitation averaged 31.75 inches, or 0.22 inch below normal.

Spring work was very backward, particularly in the southern districts. Fruit blooms were beneficially retarded.

The mid-summer was cool and pleasant for human beings and animals and favorable for cool weather crops such as potatoes, but unfavorable for maturing corn. However, abnormally warm, dry weather September 10th-28th and through most of October matured the largest corn crop of record in Iowa, both in yield per acre, which was 46.0 bushels, and in total production which amounted to 473,800,000 bushels. It is unusual that a record breaking corn crop and a large potato crop are raised in the same year. In fact, all crops raised in the State were bountiful except spring wheat, which was nearly a failure.

### SYNOPSIS BY MONTHS

Nearly normal winter weather prevailed in January, with snow cover throughout the month, over most of the State. Precipitation was deficient but winter grains and grasses were well protected except in the southeast portion of the State, where some injury occurred. An unusually large crop of ice of excellent quality was harvested.

Though the temperature averaged somewhat above normal in February, the period 12th-16th was very cold. On the 16th there was a remarkable rise in temperature from considerably below zero over most of the State to well above  $40^{\circ}$  in the afternoon, making the range for the day more than  $50^{\circ}$  at a number of stations. During the most severe temperatures, considerable areas were without snow cover in the south-central and southeast sections and wheat was damaged considerably. The total precipitation of the winter for the State as a whole averaged 1.52 inches, the least of record.

Warm, wet and windy weather prevailed in March, though there was a cold spell, 4th to 7th with zero temperatures throughout the State. By the end of the third week frost was generally out of the ground. As a result of the heavy and continuous snow blanket of the winter some stations reported that the ground did not become appreciably frozen. There was much damage from gales. The interior rivers broke up from the 12th to the 16th. The Mississippi broke up from the 11th to the 19th and a great rise occurred toward the close of the month, becoming one of the worst floods of record early in April.

April was cold and wet. Killing frosts or freezing temperatures of the 28th were the last of the spring season over most of the central and southern sections. The spring was so backward that no damage resulted. Fruit buds were beneficially retarded. Spring seeding was

greatly delayed by the wet, cold soil. A heavy fall of snow on the 3d and 4th over the southern part of the State drifted badly and delayed trains. Sleet damaged wires from Adair County to the Missouri River on the 11th.

The season continued abnormally cool till May 20, after which it turned warm and vegetation advanced rapidly. Though precipitation was below normal, the previously saturated soil dried very slowly, so that field work progressed slowly and much corn remained to be planted in the southern division at the close of the month. Tornadoes occurred on the 8th and 22d. Downpours of rain in the northern portion of Benton, Lima and Jones Counties on the 22d caused \$200,000 damage. The last killing frost of spring occurred in the northeastern part of the State on May 14.

Warm and cool periods alternated in June. The week, 9th-15th with an average temperature of  $80^{\circ}$  was the warmest of the season and the warmest June week since June 3d-9th, 1911. Humidities were low during this warm period and diseases of small grain did not flourish as they did during a similar warm period in June of last year. Precipitation was somewhat deficient and unevenly distributed. Tornadoes occurred on the 8th and 9th and damaging wind squalls on the 1st and 15th. Crops advanced to nearly normal.

Pleasant weather with moderate temperatures prevailed in July. Precipitation, though averaging above normal, was deficient and unevenly distributed in some sections, particularly along the Missouri and Mississippi rivers. Most of the rain fell in the first two weeks; the balance of the month was favorable for haying and harvest. Hail storms were unusually numerous, destructive and widely distributed. The most severe and destructive tornado of the season occurred in Adams County on the 1st.

Cool weather with generally deficient rainfall in August caused the corn crop to develop slowly. However, heavy rains on the 19th-20th in the west central and north central districts beat the corn down and caused damage from which it did not recover. In portions of Carroll and Greene counties the floods resulting from this rain seriously damaged roads, bridges and culverts.

The weather continued too cool for corn till September 10th when it turned warm and dry and continued so till the 28th. This caused the crop to make a remarkable recovery so that only about 10 per cent was caught by the killing frosts of the closing days of the month and October 1. High winds on the 25th blew down considerable corn but at the same time hastened maturity. Dry weather after the 9th was unfavorable for preparations for winter wheat seeding, but the earlier seeded wheat came up nicely.

October was next to the warmest of record, though freezing temperatures and killing frosts occurred in all but the central and southern Mississippi River counties on the 1st and in these counties also on the 29th. The first 10 days were practically rainless. These conditions matured the largest corn crop in the history of the State. Winter wheat made vigorous growth and pastures improved greatly, as a result of the rains in the latter part of the month.

November was mostly mild except a cold period 10th-17th, starting with the first cold wave of the season on the 10th. Corn husking made fair progress till the 19th when frost left the ground, and it became too soft for wa-

gons in the field. At the close of the month 23 per cent of the corn remained unhusked in the fields which is about 13 per cent more than normal. Sugar beet harvest was finished before the close of the month. Winter grains and grasses made good progress.

Though rather cold 17th-28th, with cold waves on the 22d and 26th, December was otherwise mild. Plowing was done during the greater portion of the second week. During the cold weather winter grains and grasses were well protected by snow. A snow storm extended across the State from southwest to northeast on the 13th-14th; another on the 20th-22d covered practically the entire State; and another on the 25th-26th was confined to the eastern half of the State. Thunderstorms occurred on the 3d, 4th and 13th.

SUPPLEMENTAL PRECIPITATION TABLE

Stations.	January	February	March	April	May	June	July	August	September	October	November	December	Annual
<i>Northern Division</i>													
Elkader .....	0.47	0.46	3.35	.....	.....	4.80	3.03	2.55	3.39	2.97	.....	.....	.....
Lansing .....	.....	.....	.....	3.89	3.63	4.86	1.35	4.25	2.19	3.73	4.32	.....	.....
Mason City .....	.....	0.04	.....	2.96	3.84	4.39	5.24	3.81	5.89	2.23	1.22	.....	1.27
<i>Central Division</i>													
Audubon .....	.....	.....	0.74	4.06	2.38	4.75	2.65	5.51	2.78	2.72	1.89	0.90	.....
Boone .....	0.24	.....	1.49	4.10	3.23	2.11	3.56	5.33	5.43	3.25	2.13	0.54	.....
Delaware .....	.....	.....	.....	4.26	4.74	4.26	2.38	5.31	0.98	0.82	3.06	1.78	.....
Fort Dodge .....	0.43	0.45	1.00	2.11	0.62	1.64	5.71	2.78	4.71	.....	.....	.....	1.11
Grinnell .....	0.56	0.32	3.00	.....	2.54	2.68	5.24	0.95	4.44	2.31	.....	.....	.....
Harlan .....	0.02	0.80	.....	5.74	3.75	.....	.....	.....	.....	4.43	1.81	0.62	.....
LeClaire .....	0.49	0.33	4.87	6.39	3.24	2.76	3.36	1.47	1.74	1.79	2.51	.....	.....
Maquoketa .....	0.90	0.24	4.27	3.62	3.49	4.65	3.14	2.44	1.43	2.07	1.99	.....	.....
Marshalltown .....	.....	0.88	3.90	4.02	3.46	2.82	3.96	1.84	3.68	2.47	2.72	1.28	.....
Onawa .....	0.08	0.68	1.19	5.49	2.45	4.53	3.34	1.85	1.43	3.15	.....	.....	.....
Rockwell City .....	0.31	0.68	2.33	4.18	1.79	2.73	5.98	4.26	.....	1.97	3.21	0.93	.....
Van Melter .....	.....	.....	2.98	4.12	3.18	1.79	3.70	3.66	2.91	1.70	1.85	0.15	.....
Whitten .....	0.24	0.30	.....	.....	.....	.....	.....	1.48	.....	.....	.....	.....	.....
<i>Southern Division</i>													
Creston .....	0.45	0.94	.....	4.92	3.34	4.11	5.22	3.19	6.52	2.09	1.74	0.87	.....
Cumberland .....	0.20	0.25	2.09	3.99	2.48	3.61	3.82	.....	1.00	2.30	1.10	0.45	.....
Greenfield .....	.....	.....	1.96	5.04	3.35	7.17	2.89	2.97	5.12	1.93	2.12	0.59	.....
Indianola .....	0.42	0.53	3.36	4.13	3.62	1.27	7.46	1.18	.....	.....	.....	.....	.....
Ottumwa .....	0.60	0.38	.....	5.18	3.43	3.72	5.29	1.76	2.40	1.17	1.46	2.11	.....

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	23.45	.....
1892..	46.6	104	July 11	-33	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 23	-33	February 1	26.77	35.25	18.57	26.0
1896..	48.6	104	July 3	-20	January 4	37.23	51.60	28.68	22.6
1897..	47.8	106	July* 23	-30	January 25	26.98	36.18	20.21	38.8
1898..	47.7	103	August 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	103	August* 15	-26	February* 15	40.01	53.48	27.20	49.0
1910..	48.6	108	July 16	-35	January 7	19.87	27.99	12.11	23.4
1911..	49.5	111	July* 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	46.84	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,	-36	December 10	36.76	48.16	26.88	26.6
1920..	48.2	102	July 23	-26	January *4	31.75	44.00	20.95	21.7

\* And other dates.

CLIMATOLOGICAL DATA FOR THE YEAR 1920.

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperature in degrees Fahrenheit (Mean, Highest, Date, Lowest, Date), Precipitation in Inches (Total, Greatest monthly, Month, Least Monthly, Month, Total snowfall), Number of Days (Precipitation, Clear, Partly Cloudy, Cloudy), and Prevailing direction of wind. Rows are categorized by Northern Division and Central Division.

CLIMATOLOGICAL DATA FOR THE YEAR 1920—Continued.

Table with columns: STATIONS, COUNTIES, Elevation, feet, Length of record, years, Temperature, in Degrees Fahrenheit (Mean, Highest, Date, Lowest, Date), Precipitation, in Inches (Length of record, years, Total, Greatest monthly, Month, Least Monthly, Month), Number of Days (Total snowfall, Precipitation 0.01 in. or more, Clear, Partly Cloudy, Cloudy), and Prevailing direction of wind.

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

MONTHLY STATE DATA FOR 1920.

Table with columns: MONTH, Barometric Pressure, Inches (Sea level), Temperature, Degrees, F., Relative Humidity, Per cent., Precipitation, Inches, Number of Days, Sunshine, and Wind.

†25th. ‡28th. §Local mean time. \*Normal central time. ¶7 a. m. and 7 p. m. observations only.

MEAN MONTHLY AND ANNUAL TEMPERATURES, WITH DEPARTURES FROM THE NORMAL, FOR 1920.

Table with columns for STATIONS, months (Jan-Dec), and Annual. Rows are categorized into Northern Division (e.g., Algona, Allison, Alto), Central Division (e.g., Baxter, Belle Plaine, Boone), and Southern Division (e.g., Afton, Albia, Atlantic). Each row contains temperature and departure values for each month and an annual total.

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

MONTHLY AND ANNUAL PRECIPITATION, WITH DEPARTURES FROM THE NORMAL, FOR 1920.

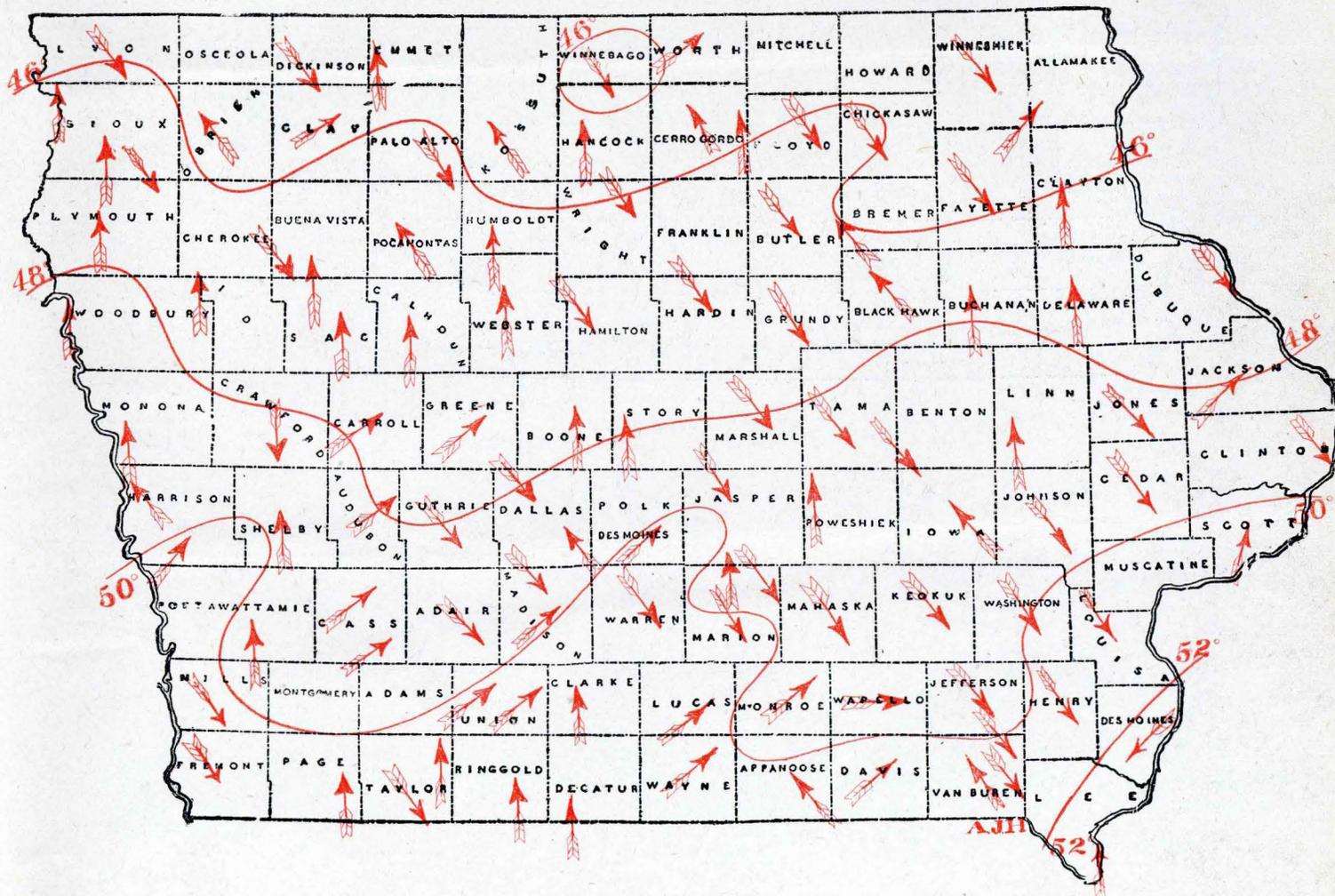
Table with columns for months (Jan-Dec) and Annual, and sub-columns for Precipitation (Prec.) and Departure (Dept.) for various stations. Stations are grouped into Northern, Central, and Southern Divisions.

DATES OF KILLING FROSTS, 1920.

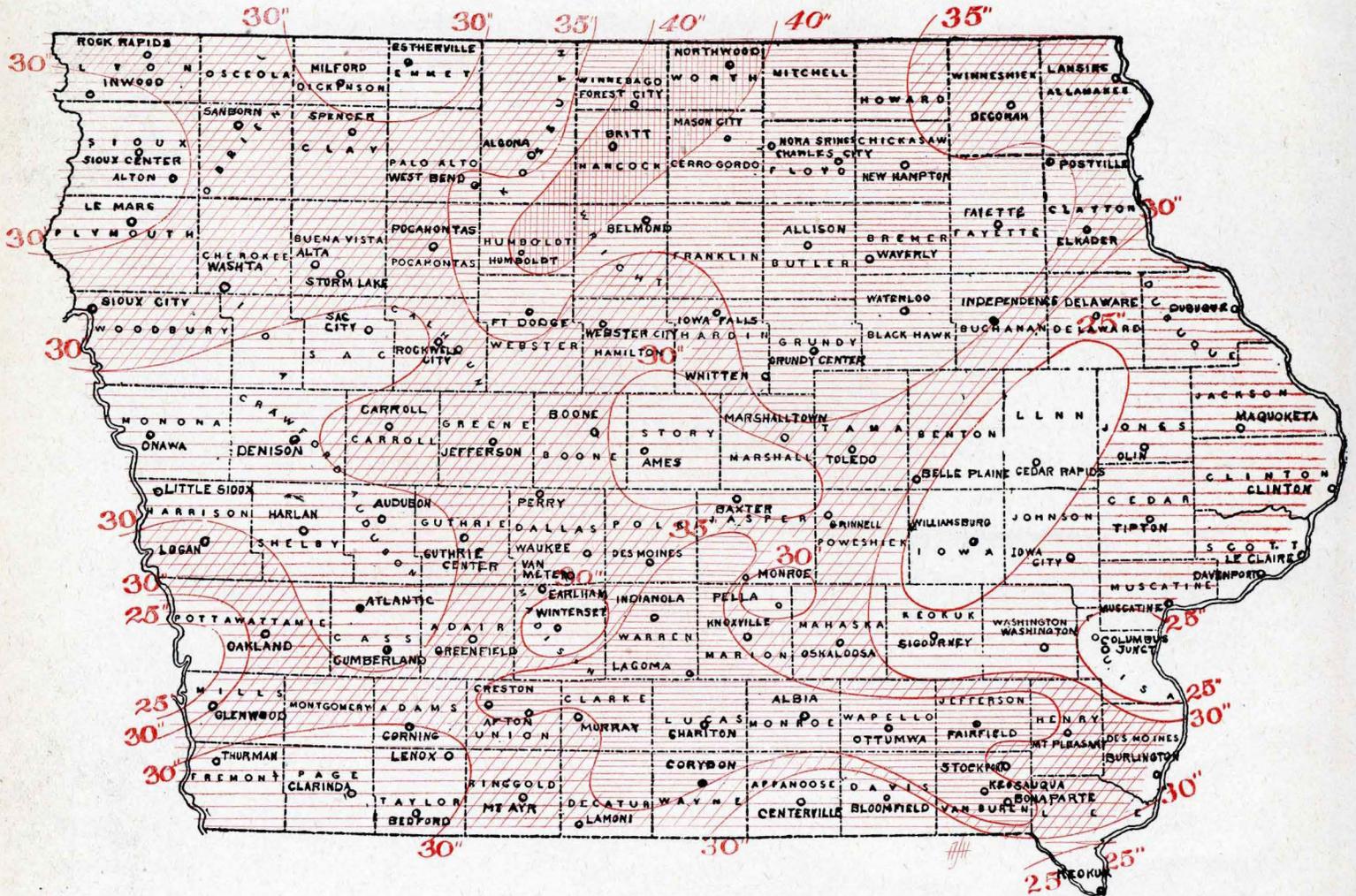
STATIONS	Killing Frosts		STATIONS	Killing Frosts		STATIONS	Killing Frosts	
	Last in Spring	First in Autumn		Last in Spring	First in Autumn		Last in Spring	First in Autumn
<i>Northern Division</i>			<i>Central Division</i>			<i>Southern Division</i>		
Algona	May 14	Sept. 29	Ames	Apr. 28	Sept. 30†	Afton	May 14†	Sept. 30
Allison	May 14	Oct. 1	Audubon	Apr. 28†	Sept. 30	Albia	May 14†	Sept. 30
Alta	May 14	Sept. 30	Baxter	Apr. 28†	Sept. 30	Atlantic	May 14†	Sept. 30
Alton	May 14	Sept. 30	Belle Plaine	Apr. 14†	Sept. 30	Bedford	Apr. 28†	Sept. 30
Belmond	May 14	Sept. 30†	Boone	Apr. 28	Sept. 30	Bloomfield	Apr. 17†	Oct. 1
Britt	May 13	Oct. 1	Carroll	Apr. 28	Sept. 30	Bonaparte	Apr. 17†	Oct. 29
Charles City	Apr. 14	Oct. 1	Cedar Rapids	Apr. 14†	Oct. 29	Burlington	Apr. 14†	Oct. 29
Decorah	May 14†	Sept. 30	Clinton	Apr. 14†	Sept. 30	Centerville	Apr. 15†	Oct. 1
Elkader	.....	Sept. 30	Davenport	Apr. 13	Oct. 29	Chariton	Apr. 28†	Sept. 30†
Estherville	May 14†	Sept. 30	Delaware	Apr. 18†	Oct. 1†	Clarinda	Apr. 28†	Sept. 30
Fayette	May 14	Sept. 30†	Denison	Apr. 28†	Sept. 29	Columbus Jct.	Apr. 14	Oct. 29
Forest City	Apr. 28†	Oct. 1	Des Moines	Apr. 28	Oct. 1	Corning	Apr. 28†	Sept. 30
Humboldt	Apr. 28†	Sept. 30†	Dubuque	Apr. 14	Oct. 29	Corydon	Apr. 28†	Oct. 1
Inwood	Apr. 28†	Sept. 30	Fort Dodge	Apr. 28†	.....	Creston	Apr. 28†	Sept. 30
Le Mars	Apr. 29†	Sept. 30	Grinnell	Apr. 28†	Oct. 1†	Cumberland	.....	Sept. 30
Mason City	May 14†	Sept. 30†	Grundy Center	Apr. 28†	Oct. 1†	Earlham	May 14†	Sept. 30
Milford (near)	Apr. 28†	Sept. 30	Guthrie Center	May 14†	Sept. 30	Fairfield	May 14†	Oct. 1
New Hampton	Apr. 28†	Sept. 30	Harlan	Apr. 28†	Sept. 30	Glenwood	Apr. 28†	Sept. 30
Nora Springs	Apr. 17	Oct. 1	Independence	Apr. 28†	Sept. 30†	Greenfield	Apr. 27	Sept. 30
Northwood	May 14†	Oct. 1	Iowa City	May 14†	Oct. 1	Indianola	Apr. 24†	.....
Pocahontas	May 14†	Sept. 30	Iowa Falls	Apr. 28†	Sept. 30†	Keokuk	Apr. 13†	Oct. 29
Postville	May 14	Sept. 30	Jefferson	Apr. 28	Sept. 30	Keosauqua	May 14†	Oct. 1
Rock Rapids	May 14	Sept. 30	Little Sioux	Apr. 28†	Sept. 30	Knoxville	May 14	Oct. 1
Sanborn	May 3†	Sept. 30	Logan	Apr. 28†	Sept. 30	Lacona	.....	Oct. 1
Sioux Center	Apr. 28†	Sept. 30	Maquoketa	May 14†	Oct. 2	Lamoni	Apr. 28†	Sept. 30
Spencer	Apr. 28†	Sept. 30	Marshalltown	Apr. 14†	Sept. 30†	Lenox	Apr. 28†	Sept. 30
Storm Lake	Apr. 28†	Sept. 30	Monroe	Apr. 28†	Sept. 30	Mt. Ayr	Apr. 28†	Sept. 30
Washita	May 14†	Sept. 30	Olin	May 14†	Oct. 1	Mt. Pleasant	Apr. 17†	Sept. 30
Waverly	May 14†	Sept. 30	Onawa	Apr. 28†	Sept. 30	Murray	Apr. 28†	Sept. 30†
West Bend	Apr. 28†	Sept. 30	Perry	Apr. 28†	Sept. 30	Oakland	Apr. 28†	Sept. 30
			Rockwell City	Apr. 28†	Sept. 30	Oskaloosa	Apr. 28†	Sept. 30
			Sac City	Apr. 28†	Sept. 30	Ottumwa	Apr. 14†	Oct. 1
			Sioux City	Apr. 28	Sept. 30	Pella	Apr. 15	Oct. 1
			Tipton	Apr. 17†	Oct. 1	Sigourney	Apr. 17†	Oct. 1
			Toledo	May 14†	Sept. 30†	Stockport	May 14†	Oct. 1
			Waterloo	May 14†	Sept. 30	Thurman	Apr. 28†	Sept. 30
			Waukeo	Apr. 28	Sept. 30	Washington	Apr. 17†	Oct. 1
			Webster City	Apr. 28†	Sept. 30	Winterset	Apr. 28	Sept. 30
			Whitten	.....	.....	Omaha, Neb.	Apr. 13	Oct. 28
			Williamsburg	Apr. 17†	Oct. 1			

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

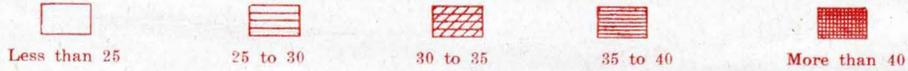
MEAN ISOTHERMS AND PREVAILING WINDS, YEAR 1920.



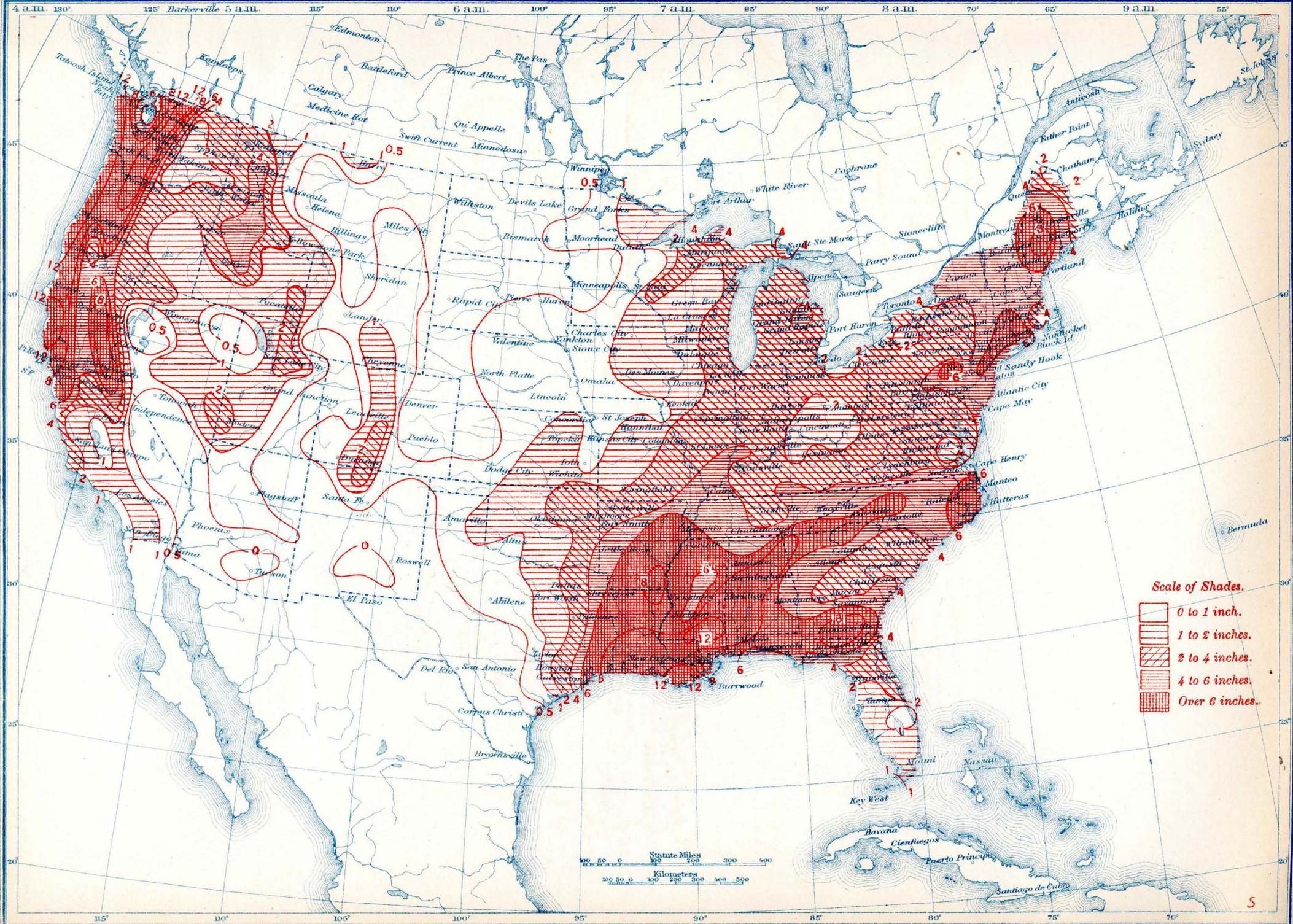
TOTAL PRECIPITATION, YEAR 1920.



SCALE OF SHADES—IN INCHES.



# Total Precipitation, Inches, December, 1920.



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