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

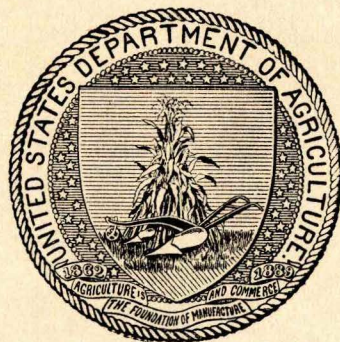
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JANUARY, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

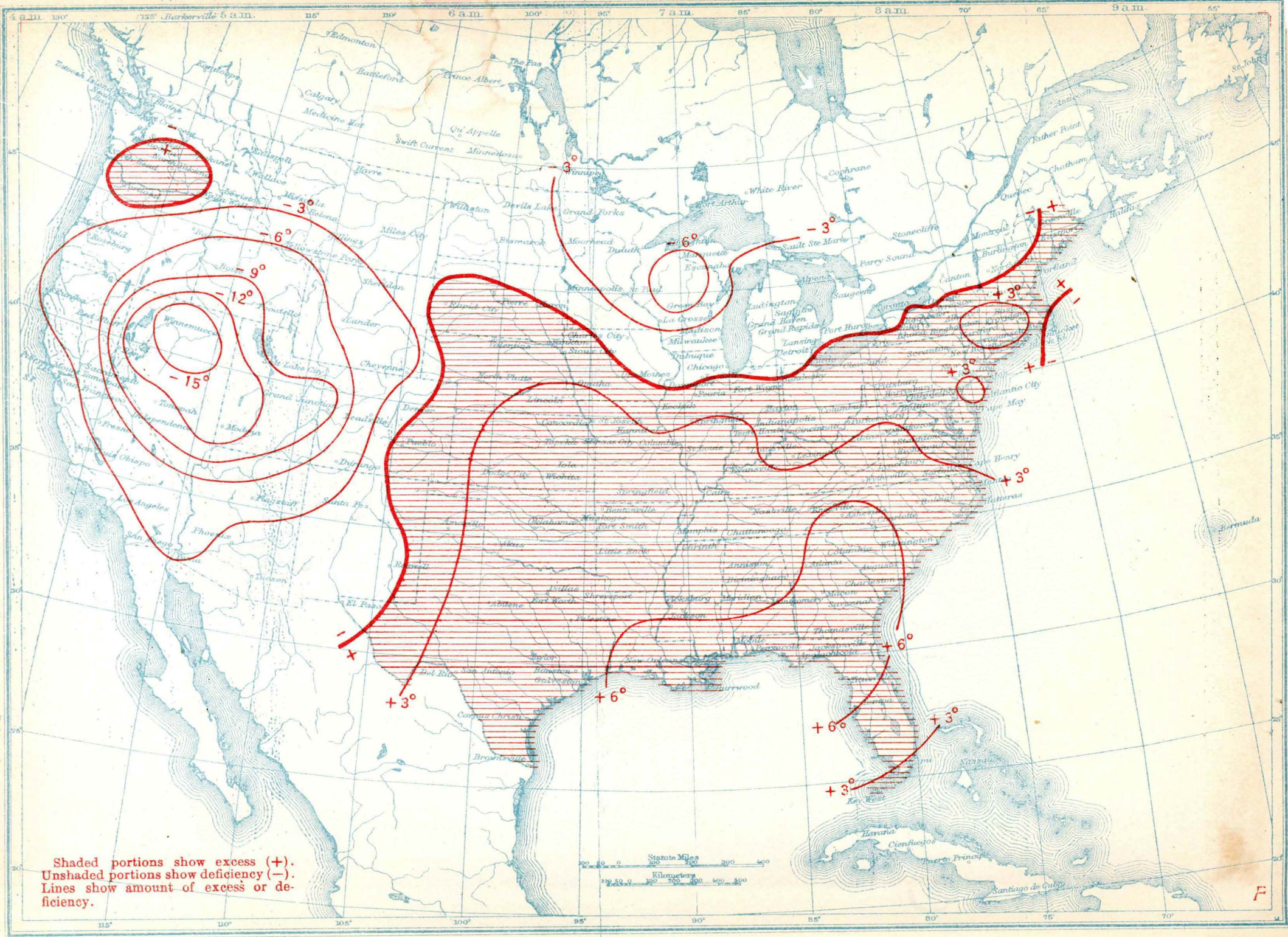


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

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Departure of the Mean Temperature from the Normal, January, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, JANUARY, 1917. NO. 1.

GENERAL SUMMARY.

Fair and mild weather till the 10th was followed by a cold wave, and temperatures of zero and lower occurred in nearly all portions of the State during the next few days. The coldest in the State during the month was -28° at Elkader on the 13th. A storm center in northern Arizona on the morning of the 20th passed over Iowa attended by snow on the 20-21st, and was followed by a cold wave. In the north part of the State, where the snow was heavy, it drifted and interfered seriously with rail traffic. The cold wave that followed was severe in the north portion of the State where temperatures 14 to 20 degrees below zero occurred. Temperatures of 50 to 60 degrees, the highest of the month, were general on the 28th. General snow on the 30-31st was followed by the most severe cold wave of the winter which was sweeping south-eastward across the State at midnight of the 31st.

As a whole, this may be regarded as a nearly normal Iowa January, though with an excess of precipitation and a deficiency in temperature in the northern and reverse conditions in the southern portions. Sunshine, averaging 67 per cent, is 17 per cent above normal and has seldom been equaled in January. Ice in the rivers averaged 9 to 13 inches thick at the beginning of the month and 11 to 22 inches at the close, and much ice of good quality was harvested.

Winter grain, which because of the deficiency in rainfall, did not become well established in the fall, is believed to have suffered somewhat from the glaze of December and the temperature extremes with deficient snow covering in January.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the state was 30.07 inches. The highest recorded was 30.99 inches, at Dubuque, on the 16th, and the lowest was 29.02, at Charles City on the 21st. The monthly range was 1.97 inches.

TEMPERATURE.

The mean temperature for the state, as shown by the records of 108 stations, was 17.0°, or 0.9° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 11.8°, or 2.8° lower than the normal; Central, 16.9°, or 1.3° lower than the normal; Southern, 22.4°, or 1.5° higher than the normal. The highest monthly mean was 26.1°, at Keokuk, and the lowest monthly mean was 8.1° at Estherville. The highest temperature reported was 60°, at eight stations in Wapello, Jefferson, Henry, Van Buren and Lee Counties, on the 28th, and the lowest temperature reported was -28° at Elkader, on the 13th. The temperature range for the state was 88°.

HUMIDITY.

The average relative humidity for the state at 7 a. m. was 81.1 per cent, and at 7 p. m. it was 77.2 per cent. The mean for the month was 79.2 per cent, or about 1.9 per cent less than the normal. The highest monthly mean was 88 per cent at Charles City, and the least was 73.6 at Omaha, Nebr.

PRECIPITATION.

The average precipitation for the state, as shown by the records of 112 stations, was 0.83 inch, or 0.22 inch less than the normal. By divisions the averages were as follows: Northern, 1.17, or 0.33 inch more than the normal; Central, 0.78 inch, or 0.33 inch less than the normal; Southern, 0.55 inch, or 0.64 inch less than the normal. The greatest amount, 2.07 inches, occurred at Rock Rapids, and the least, 0.17 inch, at Corning. The greatest amount in any 24 consecutive hours, 1.03 inches, occurred at Storm Lake, on the 21st.

SNOW.

The average snowfall for the state was 7.2 inches, or about the normal amount. The greatest amount, 20.7 inches, occurred at Rock Rapids, and the least, a trace, at Lamoni.

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 60 miles an hour from the northwest, at Sioux City, on the 10th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 67, or about 17 per cent higher than the normal. The percentage of the possible amount at the several regular Weather Bureau stations being as follows: Charles City, 62; Davenport, 58; Des Moines, 67; Dubuque, 67; Keokuk, 74; Omaha, Nebr., 77; Sioux City, 66. Clear days averaged 17, a record that has been equalled twice but never exceeded in 27 Januarys; partly cloudy days, 8; cloudy 6.

COMPARATIVE DATA FOR THE STATE—JANUARY.

YEAR	Temperature				Precipitation					Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipitation .01 in.	Clear	Partly cloudy	Cloudy	
1890	19.7	+1.8	61	-27	2.03	+0.38	3.46	0.35	-----	-----	4	13	7	11
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	1.00	+0.04	3.13	0.10	6.9	5	16	9	6	6
1893	9.3	-8.6	54	-34	0.74	-0.31	3.20	0.13	6.9	6	11	9	11	11
1894	19.3	+1.4	69	-37	1.09	+0.04	2.24	0.31	6.0	5	14	9	3	3
1895	13.6	-4.3	68	-31	0.85	-0.20	2.65	0.09	8.7	4	15	7	9	9
1896	23.4	+5.5	68	-20	0.48	-0.57	2.10	T.	2.8	3	10	10	11	11
1897	17.2	-0.7	66	-30	2.01	+0.96	6.16	0.15	8.2	7	12	7	12	12
1898	23.4	+5.5	52	-11	1.60	+0.55	5.32	T.	12.6	5	15	6	10	10
1899	19.8	+1.9	68	-34	0.28	-0.77	1.15	T.	1.5	3	15	10	6	6
1900	25.6	+7.7	66	-20	0.53	-0.52	2.47	T.	2.3	3	16	7	8	8
1901	23.7	+5.8	60	-21	0.74	-0.31	2.34	0.04	6.2	4	14	9	8	8
1902	22.4	+4.5	63	-31	0.88	-0.17	2.83	0.19	9.4	4	17	8	6	6
1903	23.0	+5.1	60	-12	0.28	-0.77	1.46	T.	2.0	4	13	7	11	11
1904	14.0	-3.9	37	-32	1.18	+0.13	3.68	0.02	6.1	6	12	8	11	11
1905	11.2	-6.7	56	-30	0.91	-0.14	1.82	0.12	11.1	7	14	7	10	10
1906	24.6	+6.7	69	-19	1.52	+0.47	4.71	0.28	11.3	5	14	6	11	11
1907	18.8	+0.9	68	-22	1.52	+0.47	5.39	0.10	6.0	7	8	7	16	16
1908	24.9	+7.0	60	-18	0.44	-0.61	1.50	0.06	4.6	2	17	8	6	6
1909	21.2	+3.3	72	-25	1.66	+0.61	3.74	0.41	7.8	6	9	6	16	16
1910	18.1	+0.2	56	-35	1.57	+0.52	3.15	0.55	12.6	6	13	7	11	11
1911	20.2	+2.3	66	-35	0.97	-0.08	3.73	0.11	7.3	5	9	8	14	14
1912	4.2	-13.7	49	-47	0.53	-0.52	1.90	T.	5.5	5	14	7	10	10
1913	20.9	+3.0	62	-25	0.77	-0.28	2.05	0.04	7.2	5	14	9	8	8
1914	27.8	+9.9	64	-10	0.88	-0.17	2.34	0.27	5.1	5	11	8	12	12
1915	17.5	-0.4	59	-32	1.63	+0.58	3.15	0.10	7.3	8	13	8	10	10
1916	17.8	-0.1	63	-34	2.02	+1.57	6.07	0.85	7.2	10	12	6	13	13
1917	17.0	-0.9	60	-28	0.83	-0.22	2.07	0.17	7.2	4	17	8	6	6

T indicates an amount too small to measure, or less than 0.05 inch precipitation, and less than .05 inch snowfall.

Climatological Data for January, 1917—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 of 1/16 in. or more.	Clear.			Partly cloudy.	Cloudy.
Webster City	Hamilton	1,044	12	15.2	-1.8	45	28	-19	26	38	0.75	-.35	0.50	7.5	3	19	2	10	nw.	C. B. Carpenter.
Whitten	Hardin	1,036	20	15.6	-0.6	44	8	-17	26	46	0.80	-.15	0.40	8.0	4	12	14	5	nw.	Dr. F. P. Butler.
Williamsburg	Iowa	765	1	17.9		50	28	-14	14	26	0.57		0.43	4.4	3	19	7	5	nw.	Dr. F. C. Schadt.
Means and extremes				16.9	-1.3	55	9	-23	31	50	0.78	-.28	0.80	6.4	5	17	7	7	nw.	
Southern Division																				
Afton	Union	1,212	23	21.8	+0.8	50	28	-7	22	35	0.43	-.41	0.10	4.3	5	18	9	4	sw.	J. E. Dietrick.
Albia	Monroe	979	19	20.8	+1.4	57	28	-8	14	37	0.68	-.61	0.55	3.0	3	15	2	14	w.	F. H. Holmes.
Allerton	Wayne	1,122	15	23.0 ^a	+1.0	58 ^a	28	-5 ^a	14	43 ^a	0.46	-.85	0.46	0.5	1	1			s.	R. D. Parks.
Atlantic	Cass	1,164	26	18.1	-1.3	47	28	-11	22 [†]	51	0.86	+.08	0.48	5.7	9	11	10	10	sw.	Thos. H. Whitney.
Bedford	Taylor		17	23.2	+2.0	53	28	-8	14 [†]	42	0.52	-.48	0.42	2.0	2	15	10	6	nw.	E. E. Healy.
Bloomfield	Davis	881	10	24.6		50	28	-6	14	37	0.74	-1.19	0.50	3.0	6	11	4	16	sw.	V. G. Warner.
Bonaparte	Van Buren	565	20	24.0	+2.0	60	28	-7	14	33	0.47	-1.13	0.47	4.7	1	20	3	8	w.	Bruce R. Vale.
Burlington	Des Moines	544	21	23.8	+1.4	59	29	-5	14 [†]	52	0.61	-1.12	0.45	3.5	4	21	2	8	sw.	Max E. Poppe, Jr.
Centerville	Appanoose	1,013	12	24.9		58	29	-7	14	36	0.60		0.48	0.5	3	21	6	4	w.	S. A. Martin.
Chariton	Lucas	1,042	22	21.8	+1.1	55	28	-12	14	36	0.45	-.71	0.45	1.0	1	17	10	4	nw.	C. C. Burr.
Clarinda	Page	1,009	27	22.2	+2.5	55	28	-7	22 [†]	52	0.67	-.28	0.39	2.8	4	16	5	10	ne.	A. S. Van Sandt.
Columbus Junction	Louisa	595	16	22.7	+0.7	60	28	-6	26	41	0.79	-.45	0.67	1.7	3	18	9	4	w.	J. B. Johnston.
Corning	Adams	1,117	25	21.8	+2.1	53	28	-10	14	39	0.17	-.72	0.15	0.2	2	22	2	7	nw.	Jerome Smith.
Corydon	Wayne	1,101	24	23.6	+1.8	57	28	-8	14	33	0.45	-.88	0.44	0.7	2	18	8	5	sw.	May C. Miller.
Creston	Union	1,312	12	20.0	+2.0	52	28	-10	23	54	0.86		0.47	4.5	6	14	11	6	sw.	Mrs. Estella McConnell.
Cumberland	Cass		18								0.20	-.68	0.20	2.0	1	16	12	3	sw.	J. H. Reppert.
Earlham	Madison	1,126	15	20.0	+0.9	50	28	-12	14	35	0.25	-1.00	0.25	2.0	1	18	6	7	nw.	Geo. Phillips.
Fairfield	Jefferson	780	33	24.1 ^b	+2.3	60 ^b	28			42 ^b	0.49	-1.06	0.41	1.5	3				nw.	R. Monroe McKenzie.
Fort Madison	Lee	516	68											4	22	0	9	nw.	F. M. Myers.	
Greenfield	Adair		25	20.2	+1.0	48	28	-9	23	31	0.45	-.45	0.40	2.5	2	15	13	3	sw.	Frank A. Ward.
Indianola	Warren	969	26	20.4 ^a	0.0	50 ^a	28	-7 ^a	14	37	0.37	-.84	0.23	3.4	4	13	6	12	sw.	Prof. J. L. Tilton.
Keokuk	Lee	516	68								2.72	-1.13	0.50	0.1	5	13	13	5	nw.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	25	22.8	+1.9	60	28	-7	14 [†]	53	0.53	-1.81	0.51	3.2	2	14	6	11	nw.	J. H. Landes.
Knoxville	Marion	920	22	20.8	-0.2	55	28	-15	14	35	0.80	-.40	0.60	3.5	3	17	2	12	sw.	W. J. Casey.
Lacona	Warren		18								1.80	-.42	0.50	13.0	7	12	14	5		J. B. Alter.
Lamoni	Decatur		10	22.3	+0.8	56	28	-12	24	46	0.43		0.43	T.	1				ne.	Chas. B. Woodstock.
Lenox	Taylor	1,250	22	22.3	+1.9	50	28	-8	22	38	0.18	-.52	0.10	1.3	3	23	4	4	nw.	J. L. Hurley.
Mt. Ayr	Ringgold	1,236	24	23.6	+1.8	55	28	-6	22	33	0.88	-.69	0.35	0.3	3	20	5	6	nw.	Alex Maxwell.
Mt. Pleasant	Henry	729	36	23.6	+1.5	60	28	-6	14	41	0.67	-.84	0.59	1.5	3	15	9	7	sw.	J. W. Edwards.
Murray	Clarke	1,216	26	21.8	+1.4	53	28	-8	13 [†]	35	0.64	-.24	0.53	3.1	3	12	13	6	nw.	M. T. Ashley.
Northboro	Page	1,046	5	25.2		53	28	-6	22	40	0.41		0.36	0.5	2	15	5	11	sw.	J. M. Darby.
Oskaloosa	Mahaska	843	41	20.0	0.0	55	28	-17	14	37	0.41	-.55	0.35	1.5	3	20	1	10	ne.	Jos. Boyd.
Ottumwa	Wapello	849	22	25.8		60	28	-10	14	38	0.18	-1.41	0.09	1.0	3	18	6	7	ne.	Thos. Ray.
Pella	Marion	877	14	19.8	-0.6	54	28	-19	14	37	0.52	-.50	0.40	3.5	4	21	1	9	nw.	John H. Ver Steeg.
St. Charles	Madison	1,070	16	21.6	+0.1	52	28	-6	14	39	0.53	-.75	0.45	1.3	3	16	10	5	nw.	R. D. Minard.
Sigourney	Keokuk	877	21	20.8 ^a	0.0	52 ^a	28	-12 ^a	14	35 ^a	0.76	-.56	0.64	4.0	2	7	17	7	nw.	J. T. Parker.
Stockport	Van Buren	754	15	23.1	+1.1	60	28	-9	14	39	0.53	-.84	0.53	2.5	1	16	7	8	nw.	C. L. Beswick.
Thurman	Fremont		20	22.6	+1.7	53	9	-8	14 [†]	35	0.50	-.12	0.40	2.0	2	10	13	8	nw.	C. R. Paul.
Washington	Washington	769	35	21.5	+0.9	56	28	-8	14	38	1.12	-.38	0.75	4.7	6	12	16	3	w.	Wm. A. Cook.
Winterset	Madison	1,129	26																nw.	Dr. Robt. S. Cooper.
Omaha, Nebr.		1,040	46	22.6	+2.1	53	9	-15	31	35	0.58	-.07	0.46	2.7	5	18	9	4	nw.	U. S. Weather Bureau.
Means and extremes				22.4	+1.5	60	28	-19	14	57	0.55	-.64	0.75	2.7	3	16	8	7	nw.	
State means and extremes				17.0	-0.9	60	28	-28	13	57	0.83	-.22	1.03	7.2	4	17	8	6	nw.	

Reference letters, ^a, ^b, ^c, appearing in the table indicate the number of days missing; for example, ^b represents two days, etc.
[†]Also other dates. T. Precipitation is less than 0.01 inch rain or melted snow.

MISCELLANEOUS PHENOMENA.

Halos, solar or lunar, occurred on the following dates: 3, 6, 7, 9, 13, 14, 20, 22, 24, 31. Fog: 2, 3, 4, 12, 21, 26, 27, 29, 31. Sleet: 4, 10, 20, 21, 26, 31.

ERRATA.

Report for December 1916: Page 136; Storm Lake; total precipitation published 0.59, should be 0.81; departure from

normal precipitation published -0.23, should be -0.01. Page 137; Bedford; total precipitation published 1.32, should be 1.36; departure from normal precipitation published +0.20, should be +0.24. Oskaloosa; maximum temperature published 62° on the 5th, should be 61° on the 4th; Ottumwa; mean monthly temperature published 23.3°, should be 23.2°. Page 138; Rock Rapids precipitation on the 25th and 26th published 0, should be a trace on each date.

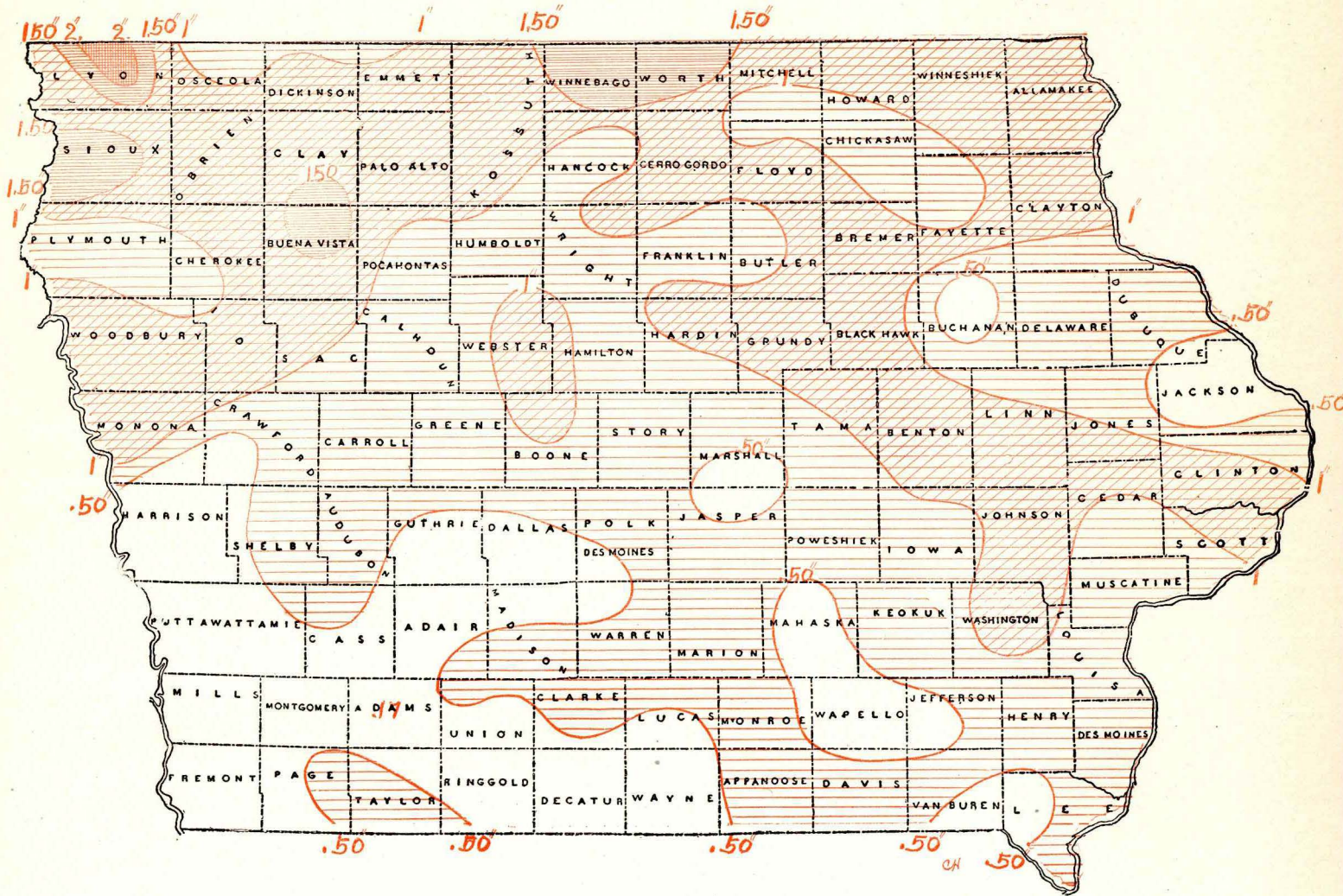
Daily Precipitation for January, 1917—Continued.

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>So. Division</i>																																					
Afton	Grand									.10		.10			.05							.08					.10								.43		
Albia	Des Moines	.08			T.						T.		.05									.55					T.						.63				
Allerton	Chariton										T.											.46											.46				
Atlantic	Nishnabotna	.23									T.	.01	.01	.01		.03	.04					.48	T.			.03							.02	.86			
Bedford	Missouri										T.					.10	T.					.42											T.	.52			
Bloomfield	Mississippi		.05	.02		.15					.01		.01									.50											T.	.74			
Bonaparte	Des Moines	T.	T.		T.						T.		T.									.47											T.	.47			
Burlington	Mississippi	.02				.02					T.	T.		.12			T.					.45	T.										T.	.61			
Centerville	Chariton		T.		.05	.07					T.		T.									.48					T.							.60			
Chariton	Chariton										T.		T.									.45												.45			
Clarinda	Nodaway	.20												.01		.04	.03	T.				.39	T.										T.	.67			
Columbus Jct.	Iowa					T.	T.						.10	T.								.67					.02	T.					T.	.79			
Corning	Nodaway												.02									.15												.17			
Corydon	Chariton		T.		T.	T.					T.						T.					.44	T.				T.	T.				T.		.45			
Creston	Missouri	.15									.02		.12			.04	.06	T.				.47					T.	T.					T.	.86			
Cumberland	Nodaway														T.							.20												.20			
Earlham	Des Moines										T.				T.							.25											T.	.25			
Fairfield	Skunk				.03								.05									.41												T.	.49		
Fort Madison	Mississippi																																				
Greenfield	Nodaway		T.								T.		T.			.05						.40													.45		
Indianola	Des Moines												.10			.02	T.					.23											.02	.37			
Keokuk	Mississippi		T.		.03						T.		.02									.42										.01		.56			
Keosauqua	Des Moines	.02		T.		T.								T.								.51												.53			
Knoxville	Des Moines										T.		.15			T.						.60												.05	.80		
Lacona	Des Moines					.10					.05		.20			.10						.50			.10									.25	1.30		
Lamoni	Grand													T.		T.						.43												.43			
Lenox	Missouri								.03							.05						.10												.18			
Mount Ayr	Grand										T.		.02			.01	T.					.35												T.	.33		
Mt. Pleasant	Skunk		T.	T.	T.	T.					.05	T.	.03	T.								.59	T.				T.	T.						T.	.67		
Murray	Grand										T.		.05			.06						.53												T.	.64		
Northboro	Missouri															.05						.36												T.	.41		
Oskaloosa	Des Moines				.02								.04									.35													.41		
Ottumwa	Missouri		T.		.09							.04										.05													T.	.18	
Pella	Skunk		T.		.03						.02		.07			T.						.40					T.								T.	.62	
St. Charles	Des Moines										T.		.06			.02						.45													T.	.53	
Sigourney	Skunk												.12									.64						T.	T.						T.	.76	
Stockport	Skunk				T.																	.53														T.	.53
Thurman	Missouri													T.		.10	T.					.40														T.	.50
Washington	Skunk				.23						.04		.08									.75						.01	.01								1.12
Winterset	Des Moines																																				
Omaha, Neb.	Missouri										T.		T.			.08	.02					.06	.40											T.	T.	.02	.53

Daily Maximum and Minimum Temperatures for the Month of January, 1917.

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

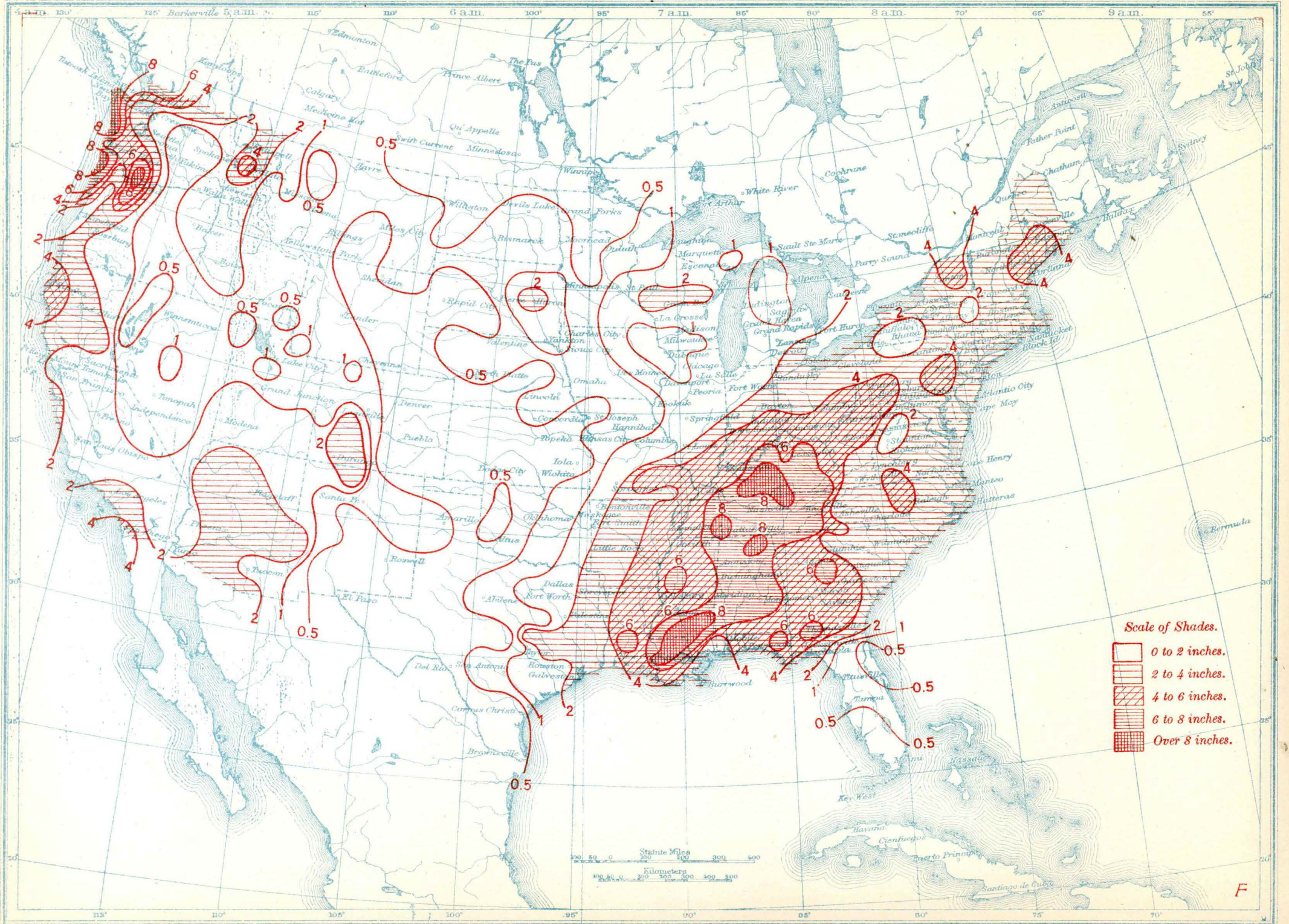
TOTAL PRECIPITATION, JANUARY, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, January, 1917.



OCT 30 1917

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

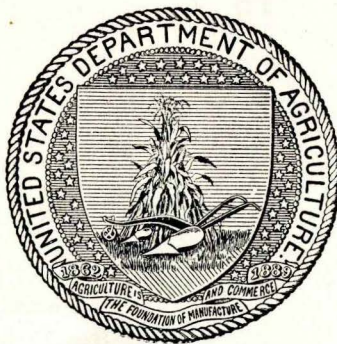
IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

FEBRUARY, 1917

BY

GEORGE M. CHAPPEL

SECTION DIRECTOR

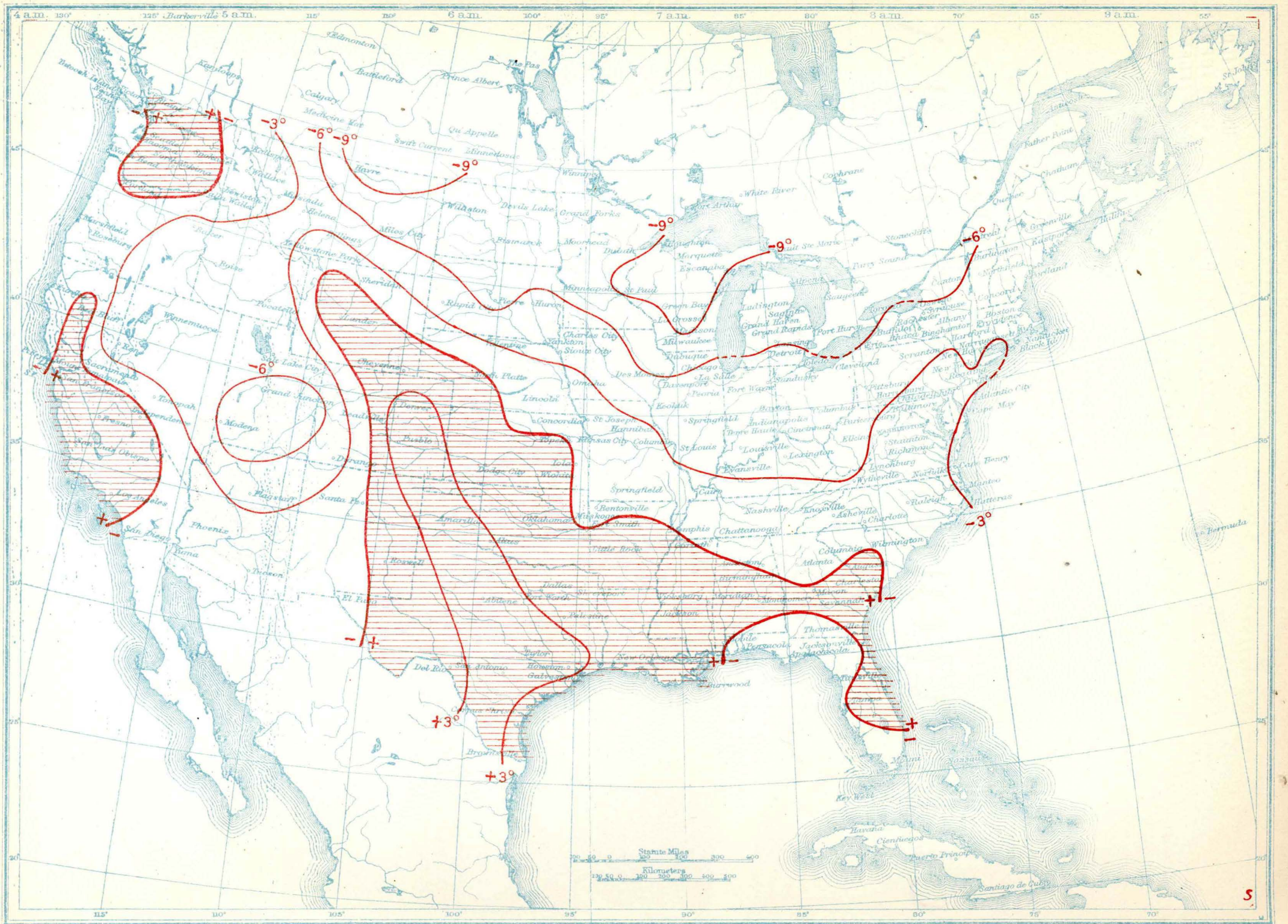


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

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Departure of the Mean Temperature from the Normal, February, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, FEBRUARY, 1917. NO. 2.

GENERAL SUMMARY.

February, 1917, was the driest month of that name since state-wide observations began in 1890, and it was the coldest February since 1905. It was, however, rather a pleasant winter month as there was only one bad storm which occurred on the 4th, when the temperature was below zero all day, north of Des Moines, and the minimum temperatures ranged from 8° below zero at Keokuk, in Lee County, to 28° below zero at Lake Park, in Dickinson County. The velocity of the wind ranged from 39 miles an hour at Des Moines to 69 miles an hour at Sioux City. Over the greater part of the State these conditions were accompanied by falling snow, which made the worst blizzard for many years. Railroad traffic was suspended for several days on some lines in the northern counties. Although cold, the remainder of the month was generally pleasant. Over the southern counties there was practically no snowfall, and the ground in that section has been practically bare during the entire winter, and it is thought that winter grains have been injured. Owing to the lack of moisture during last summer, fall and winter the ground is very dry and many wells have failed. At Des Moines there has been a deficiency of precipitation every month for 13 consecutive months; the aggregate deficiency from February 1, 1916, to March 11, 1917, inclusive, is 13.04 inches. On the other hand, the northern counties have received about the normal amount of precipitation and sleighing has been good most of the winter. Some spring wheat was sown in Davis County on the 26th, notwithstanding the fact that the ground was frozen to a depth of three feet, except a few inches on the surface. At the end of the month there were no indications of ice breaking up in any of the streams.

PRESSURE.

The mean pressure (reduced to sea level) for the state was 30.16 inches. The highest recorded was 30.92 inches, at Omaha, Neb., on the 2d and the lowest was 29.20 at Sioux City on the 16th. The monthly range was 1.70 inches.

TEMPERATURE.

The mean temperature for the state, as shown by the records of 107 stations, was 15.2°, or 5.3° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 9.9°, or 7.2° lower than the normal; Central, 15.3°, or 5.4° lower than the normal; Southern, 20.5°, or 3.1° lower than the normal. The highest monthly mean was 24.8° at Northboro, and the lowest monthly mean was 5.9° at Forest City. The highest temperature reported was 68°, at Northboro, on the 25th, and the lowest temperature reported was -37°, at Inwood, on the 2d. The temperature range for the state was 105°.

HUMIDITY.

The average relative humidity for the state at 7:00 a. m. was 80.2 per cent, and at 7 p. m. it was 70.2 per cent. The mean for the month was 75.5 per cent, or about 4.2 per cent

lower than the normal. The highest monthly mean was 87.0 per cent, at Charles City, and the lowest was 64.8 at Omaha, Neb.

PRECIPITATION.

The average precipitation for the state, as shown by the records of 114 stations, was 0.36 inch, or 0.79 inch less than the normal. By divisions, the averages were as follows: Northern, 0.59 inch, or 0.32 inch less than the normal; Central, 0.37 inch, or 0.93 inch less than the normal; Southern, 0.12 inch, or 1.23 inches less than the normal. The greatest amount, 1.19 inches, occurred at Nora Springs, and the least, a trace, at seven stations in the southern division. The greatest amount in any 24 consecutive hours, 1.00 inch, occurred at Nora Springs, on the 19th.

SNOW.

The average snowfall for the state was 3.5 inches, or 3.9 inches less than the normal. The greatest amount, 11.6 inches, occurred at Storm Lake, and the least, a trace, at 10 stations in the southern division.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was 69 miles an hour from the northwest, at Sioux City, on the 4th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 63, or about 8 per cent higher than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 58; Davenport, 56; Des Moines, 61; Dubuque, 62; Keokuk, 71; Sioux City, 59; Omaha, Neb., 73.

COMPARATIVE DATA FOR THE STATE-FEBRUARY

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	26.0	+5.5	67	-24	0.83	-0.22	2.13	0.11					
1891	19.4	-1.1	70	-31	1.16	+0.11	2.41	0.55		3	13	7	8
1892	28.1	+7.6	68	-20	1.20	+0.15	2.18	0.12	5.0	6	6	7	16
1893	16.4	-4.1	60	-28	1.39	+0.34	2.91	0.06	8.1	6	10	8	10
1894	19.7	-0.8	60	-19	0.89	-0.16	2.41	T	8.4	3	16	8	4
1895	16.4	-4.1	73	-33	0.49	-0.56	1.34	0.02	3.3	4	13	9	8
1896	27.4	+6.9	78	-13	0.71	-0.34	2.40	0.04	5.4	4	12	9	8
1897	24.7	+4.2	61	-24	0.89	-0.16	1.81	0.22	8.0	5	6	10	12
1898	24.2	+3.7	62	-18	1.20	+0.15	3.65	0.10	7.8	5	10	9	9
1899	12.2	-8.3	75	-40	0.89	-0.16	4.32	0.12	7.1	5	11	10	7
1900	14.8	-5.7	60	-27	1.30	+0.25	4.57	0.18	9.9	6	10	8	10
1901	17.5	-3.0	49	-21	1.01	-0.04	3.00	0.12	9.7	4	15	7	6
1902	17.6	-2.9	62	-21	0.73	-0.32	2.39	0.02	2.6	4	13	8	7
1903	19.8	-0.7	56	-21	1.18	+0.13	3.25	0.30	7.9	4	13	7	10
1904	14.8	-5.7	70	-26	0.41	-0.64	1.99	T	4.5	4	10	9	8
1905	12.8	-7.7	69	-41	1.57	+0.52	2.97	0.44	15.5	7	14	6	8
1906	23.6	+3.1	66	-32	1.29	+0.24	2.91	0.20	6.1	5	14	7	7
1907	25.0	+4.5	65	-31	0.71	-0.34	1.95	0.06	4.6	4	14	6	8
1908	24.3	+3.8	59	-16	1.69	+0.64	3.95	0.23	8.9	6	12	6	11
1909	26.2	+5.7	62	-26	1.54	+0.49	4.72	0.30	7.7	5	11	6	11
1910	17.8	-2.7	58	-21	0.46	-0.59	2.09	T	4.0	3	14	8	6
1911	27.3	+6.8	71	-13	2.76	+1.71	5.46	0.50	7.0	6	12	6	10
1912	18.1	-2.4	57	-30	1.21	+0.16	3.25	0.04	11.2	5	10	9	10
1913	20.2	-0.3	70	-24	0.82	-0.23	2.39	0.07	7.3	4	14	7	7
1914	16.8	-3.7	59	-29	0.87	-0.18	1.99	0.32	9.2	6	10	9	9
1915	29.1	+8.6	62	-8	2.93	+1.88	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

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

Climatological Data for February, 1917—Continued.

Stations.	Counties	Elevation—feet.		Temperature, in Degrees Fahrenheit							Precipitation, in Inches				Number of Days.				Prevailing direction of wind.	Observers
		Length of record—years.	Mean.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation 0.01 in. or more.	Clear.	Partly cloudy.	Cloudy.			
Waterloo	Black Hawk	862	34	9.0	-10.5	44	16	-25	3	33	0.39	-0.78	0.28	3.9	5	13	0	10	nw.	R. B. Slippy.
Waukee	Dallas	1,039	14	18.2	-3.6	61	25	-23	2	42	0.16	-0.97	0.06	1.3	3	17	9	2	nw.	Samuel F. Foft.
Webster City	Hamilton	1,044	12	12.2	-8.1	45	17	-27	2	42	0.80	-0.36	0.70	8.0	2				nw.	C. B. Carpenter.
Whitten	Hardin	1,036	20	14.4	-4.8	48	25	-26	2	43	0.60	-0.24	0.30	6.0	2	16	9	3	nw.	Dr. F. P. Butler.
Williamsburg	Iowa	765	1	16.5		55	25	-23	2	43	0.15		0.10	1.0	2	17	7	4	nw.	Dr. F. C. Schadt.
Means and Extremes.				15.3	-5.4	62	25	-30	2	48	0.37	-0.93	0.70	3.4	3	14	8	6	nw.	
<i>Southern Division</i>																				
Afton	Union	1,212	23	21.6	-1.8	62	25	-23	2	45	0.07	-1.08	0.05	0.8	2	12	10	6	n.	J. E. Deitrick.
Albia	Monroe	959	19	17.2	-4.9	64	26	-21	2	45	T.	-1.56	T.	T.	0	6	1	21	nw.	F. H. Holmes.
Allerton	Wayne	1,122	15	22.3	-2.4	63	25	-20	2	46	0.09	-1.50	0.07	1.0	2	20	1	7	n.	R. D. Parks.
Atlantic	Cass	1,164	26	15.6	-6.1	60	25	-25	2	48	0.21	-0.92	0.69	1.6	6	9	10	9	nw.	Thos. H. Whitney.
Bedford	Taylor		17	21.8	-2.1	64	25	-22	2	46	0.15	-1.23	0.10	0.5	2	13	9	6	nw.	E. E. Healy.
Bloomfield	Davis	881	10	22.4		65	25	-20	2	44	0.03	-1.39	0.01	1.5	3	9	14	5	nw.	V. G. Warner.
Bonaparte	Van Buren	565	26	21.8	-2.9	63	25	-19	2	55	0.06	-1.35	0.04	T.	2	22	0	6	w.	Bruce R. Vale.
Burlington	Des Moines	544	21	19.4	-5.5	60	25	-18	2	37	0.17	-1.81	0.08	1.0	4	21	2	5	nw.	Max E. Poppe, Jr.
Centerville	Appanoose	1,013	12	22.6		62	25	-21	2	45	T.		T.	T.	0	14	5	9	nw.	S. A. Martin.
Chariton	Lucas	1,042	22	20.2	-3.2	63	25	-23	2	45	T.	-1.20	T.	T.	0	13	11	4	nw.	C. C. Burr.
Clarinda	Page	1,009	27	19.4	-2.4	66	25	-21	2	44	0.13	-0.94	0.08	1.3	2	16	9	3	nw.	A. S. Van Sandt.
Columbus Junction	Louisa	595	16	20.0	-4.8	58	25	-18	2	36	0.06	-1.53	0.03	0.6	2	22	4	2	nw.	J. B. Johnston.
Corning	Adams	1,117	25	20.3 ^a	-1.3	64 ^a	25	-23 ^a	2	46 ^a	T.	-1.16	T.	T.	0				nw.	Jerome Smith.
Corydon	Wayne	1,101	24	21.8	-2.6	64	25	-22	2	44	0.08	-1.38	0.06	1.4	2	12	10	6	nw.	May C. Miller.
Creston	Union	1,312	12	17.1	-3.7	63	25	-24	2	54	0.15		0.05	0.5	4	19	5	4	nw.	Mrs. Estella McConnell.
Cumberland	Cass			18							0.10	-1.01	0.10	1.0	1	24	3	1	nw.	J. H. Reppert.
Earlham	Madison	1,126	15	19.7	-2.1	63	25	-25	2	40	0.20	-1.16	0.20	2.0	2	19	3	6	nw.	Geo. Phillips.
Fairfield	Jefferson	780	33	20.2	-4.6	64	25	-21	2	52	0.09	-1.59	0.07	0.8	2	23	0	5	nw.	R. Monroe McKenzie.
Fort Madison	Lee	516	68								0.21	-1.73	0.13	0.4	4	16	3	9	nw.	F. M. Myers.
Greenfield	Adair		25	18.9	-2.6	62	25	-24	2	41	0.60	-0.54	0.50	1.0	2	10	14	4	nw.	Frank A. Ward.
Indianola	Warren	969	26	19.8	-3.3	61	25	-21	2	41	0.11	-1.08	0.10	1.1	2	12	5	11	nw.	Prof. J. L. Tilton.
Keokuk	Lee	614	46	22.6	-4.0	62	25	-18	2	38	0.13	-1.49	0.08	1.0	4	16	7	5	nw.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	25	19.3	-4.0	63	25	-18	2	38	0.10	-1.50	0.05	0.5	2	7	7	14	nw.	J. H. Landes.
Knoxville	Marion	920	22	20.8	-3.6	64	25	-21	2	43	0.23	-0.97	0.10	1.3	3	18	5	5	nw.	W. J. Casey.
Lacona	Warren		18								0.55	-1.10	0.15	5.0	5	12	11	5		J. B. Alter.
Lamoni	Decatur		10	18.8	-6.2	63	25	-20	3	47	T.		T.	T.	0	17	4	7	w.	Chas. B. Woodstock.
Lenox	Taylor	1,250	22	21.4	-1.4	62	25	-22	2	46	0.03	-0.98	0.05	0.8	2	22	4	2	nw.	J. L. Hurley.
Mt. Ayr	Ringgold	1,236	24	22.4	-2.2	62	25	-21	2	44	0.05	-1.33	0.05	0.5	1	14	12	2	nw.	Alex Maxwell
Mt. Pleasant	Henry	729	36	20.8	-4.1	61	25	-20	2	40	0.08	-1.43	0.05	0.5	2	12	8	8	nw.	J. W. Edwards.
Murray	Clarke	1,216	26	20.8	-2.5	63	25	-22	2	43	0.10	-0.92	0.06	1.6	3	9	14	5	nw.	M. T. Ashby.
Northboro	Page	1,046	5	24.8		68	25	-20	2	45	0.05		0.05	T.	1	13	7	8	nw.	J. M. Darby.
Oskaloosa	Mahaska	843	41	19.1	-4.3	61 ^a	25	-22	2	41 ^a	0.09	-1.04	0.08	1.2	3	17	2	9	nw.	Jos. Boyd.
Ottumwa	Wapello	840	22	23.4		64	25	-20	2	42	T.	-1.51	T.	T.	0	15	6	7	nw.	Thos. Ray.
Pella	Marion	877	14	20.6 ^b	-3.1	61 ^c	25	-21 ^b	2	40 ^c	0.06	-1.24	0.04	0.1	2	22	0	6	nw.	John H. Ver Steeg.
St. Charles	Madison	1,070	16	21.0	-3.1	62	25	-22	2	42	0.24	-1.03	0.22	0.1	2	17	7	4	nw.	R. D. Minard.
Sigourney	Keokuk	877	21	19.2	-4.7	61	25	-21	2	40	0.10	-1.41	0.10	2.0	1	3	25	0	nw.	J. T. Parker.
Stockport	Van Buren	754	15	20.2	-4.9	62	25	-20	2	41	0.05	-1.58	0.05	T.	1	15	6	7	nw.	C. L. Beswick.
Thurman	Fremont		20	21.4 ^c		60 ^c	22	-22 ^c	2	41 ^c	T.	-1.26	T.	T.	0				nw.	C. R. Paul.
Washington	Washington	769	35	20.0	-3.8	61	25	-20	2	40	0.11	-1.20	0.05	0.8	3	12	12	4	nw.	Wm. A. Cook.
Winterset	Madison	1,129	26																	
Omaha, Nebr.		1,040	46	21.6	-2.1	68	25	-23	2	41	0.20	-0.56	0.12	2.0	2	11	14	3	nw.	U. S. Weather Bureau
Means and extremes.				20.5	-3.1	68	25	-25	2	55	0.12	-1.23	0.50	0.8	2	15	7	6	nw.	
State means and extremes.				15.2	-5.3	68	25	-37	2	55	0.36	-0.79	1.00	3.5	3	14	8	6	nw.	

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

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

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

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

MISCELLANEOUS PHENOMENA.

Dates of: Fog, 13, 14, 15, 19, 22, 26, 27. Halos, solar or lunar, 1, 2, 3, 4, 5, 6, 8, 9, 10, 11, 19, 28. Sleet or glaze occurred at several stations in the southern counties on the

19th. Thunder was heard or distant lightning observed during the night of the 22d-23d at a number of stations in the southern division. Migration of birds at Earlham, blue birds and robins on the 23d and wild ducks on the 25th At Bedford, wild ducks on the 22d.

Daily Precipitation for February, 1917—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					
<i>Southern Division</i>																																		
Afton	Grand				.05																												.07	
Albia	Des Moines	T.			T.	T.	T.																									T.	.07	
Allerton	Chariton				.07																												.09	
Atlantic	Noshnabotna				.01	.05				.01																	.01						.21	
Bedford	Missouri																																.15	
Bloomfield	Mississippi				.01		.01		.01																								.03	
Bonaparte	Des Moines				.02		T.		T.																								.06	
Burlington	Mississippi		.03		.08		T.		T.																								.17	
Centerville	Chariton				T.		T.		T.																								T.	
Chariton	Chariton	T.			T.																												T.	
Clarinda	Nodaway				.08	T.																											.13	
Columbus	Iowa				.03		T.		T.																								.06	
Corning	Nodaway																																T.	
Corydon	Chariton				.06																												.05	
Creston	Missouri				.05					.02																								.15
Cumberland	Nodaway				.10																												.10	
Earlham	Des Moines				.20		T.		T.																								.26	
Fairfield	Skunk				.07		T.		T.																								.09	
Fort Madison	Mississippi				.02					.02																								.21
Greenfield	Nodaway				.10																													.60
Indianola	Des Moines				.01																													.11
Keokuk	Mississippi				.04	T.			T.																									.13
Keosauqua	Des Moines	T.			.05				T.																									.10
Knoxville	Des Moines		.19		.03																													.23
Lacona	Des Moines				.10									.10																				.55
Lamon	Grand																																	T.
Lenox	Missouri				.05																													.08
Mount Ayr	Grand				.05																													.05
Mt. Pleasant	Skunk	T.			.05		T.		T.																									.08
Murray	Grand	T.			.06	T.			T.																									.10
Northboro	Missouri				T.	T.																												.05
Oskaloosa	Des Moines				.06	.02																												.09
Ottumwa	Missouri																																	T.
Pella	Skunk				.04																													.06
St. Charles	Des Moines				T.	.22																												.24
Sigourney	Skunk				.10		T.																											.10
Stockport	Skunk																																	.05
Thurman	Missouri				T.																													T.
Washington	Skunk				.05																													.11
Winterset	Missouri																																	
Omaha, Neb.	Missouri				.12	T.																												.24

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

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

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

*Precipitation included in the next following measurement.

**Incomplete.

THE WINTER OF 1916-1917

The mean temperature for the three winter months was 17.0°, which is 3.2° below the normal for the State. The highest temperature reported was 68° at Northboro, Page County, on February 25. The lowest temperature reported was 37° below zero at Inwood, Lyon County, on February 2.

The average monthly precipitation for the State was 0.74 inch, and the average total precipitation was 2.23 inches,

or 0.74 inch less than the winter normal. The average total snowfall, unmelted, was 17.4 inches, or 3.1 inches less than the normal and 0.4 inch less than the average fall for the winter of 1915-16.

The total number of days with .01 inch or more of precipitation was 13, or 6 less than the average for the winter of 1915-16. The average number of clear days was 46, partly cloudy 24, cloudy 20, as compared with 37 clear, 22 partly cloudy, and 32 cloudy days during the winter of 1915-16.

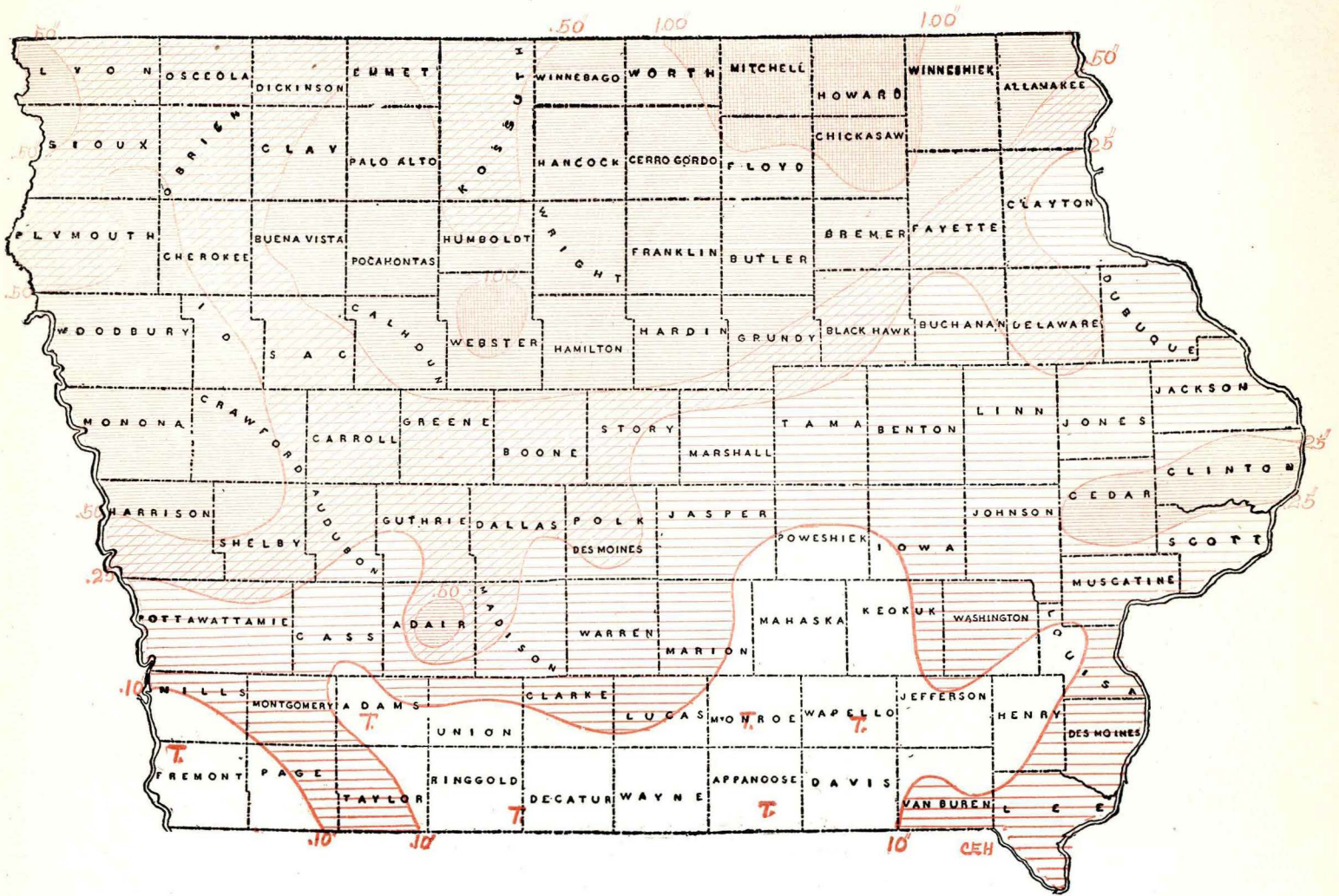
Daily Maximum and Minimum Temperatures for the Month of February, 1917.

Table with columns for Stations, days 1-28, 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.

TOTAL PRECIPITATION, FEBRUARY, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, February, 1917.



Scale of Shades.

- 0 to 2 inches.
- 2 to 4 inches.
- 4 to 6 inches.
- 6 to 8 inches.
- Over 8 inches.

Statute Miles
0 100 200 300 400

Kilometers
0 200 400 600 800

OCT 30 1917

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

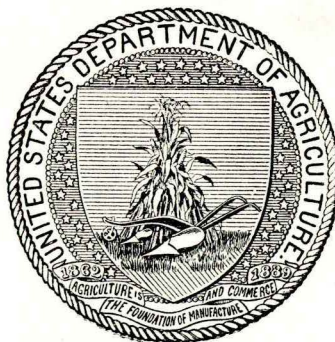
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

MARCH, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

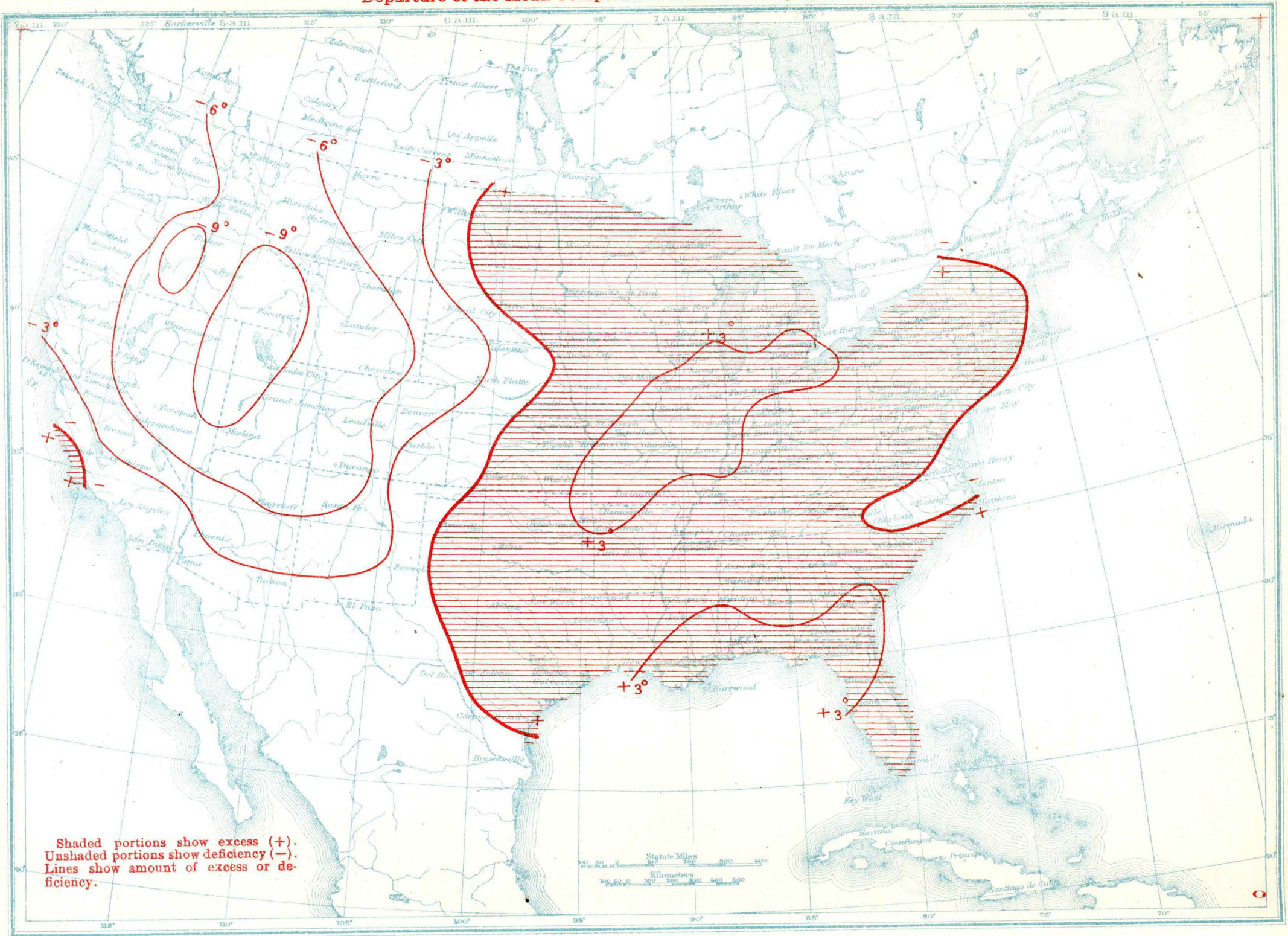


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

51

Departure of the Mean Temperature from the Normal, March, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, MARCH, 1917. No. 3

GENERAL SUMMARY.

March opened cold with temperatures of zero or lower in all but the southeastern counties on the 4th and 5th, the lowest being -13 degrees at Lake Park on the 4th. Excepting a warm period, 9th-11th, it continued rather cold till the 19th when a warm period set in that continued till the close of the month. At Des Moines the ground was frozen to a maximum depth of about 4 feet on March 6, but by the 26th, practically all frost had disappeared. In the southern portion of the state the average daily excess in temperature was about 2.5 degrees, while in the northern portion there was a slight deficiency.

Precipitation, as in the two preceding months, was above normal in the northern, normal in the central, and below normal in the southern divisions. The principal periods with precipitation were, 7th, 12th-13th, and 16th. During the latter two periods, there was considerable glaze, sleet and snow, particularly in the north and central divisions. Over an area extending from Fort Dodge to Des Moines and east to the Mississippi River the mist and light rain beginning on the 12th froze to all exposed surfaces, giving them a heavy coating of ice that in many places measured an inch in thickness. On the 13th a considerable increase in the wind force, acting upon the overburdened telephone wires, caused great damage. More than 1,600 poles were snapped off and 10,000 breaks occurred in long distance wires alone. The damage is estimated at \$175,000, besides the loss of business for nearly a week. Railway and telegraph wires seem to have suffered less. On the 16th, heavy snows, accompanied by shifting gales, occurred in the northern portion of the state, interrupting railway traffic for a few days.

There was no appreciable snow covering over the southeast one-third of the state or anywhere in the southern tier of counties, but in the western counties near the Minnesota line, the snow did not disappear till the closing days of the month.

By the close of the month grass was starting and field work was progressing rapidly in the southern division; seeding oats and spring wheat had been completed in a few southeastern counties; potato planting was reported well north in the central division; and sod plowing was being done as far north as Lyon county in the extreme northwest. Winter wheat, timothy, alfalfa, and clover both old and new, were seriously winter-killed, except that clover was favorably reported from some localities in the northern division, where it is most too early to form conclusions. The winter-killing in the southern division probably resulted from the prolonged drought that began last fall and continued through the winter, together with deficient snow covering and considerable extremes of temperature. In the central division, smothering seems to have occurred from a dense ice covering part of the winter. In the northern division the snow covering was deeper, continuous and more porous.

Live stock wintered well and ample feed remains.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the state was 30.02 inches. The highest recorded was 30.75 inches, at Sioux City, on the 3d; and the lowest was 29.26 inches, at Omaha, Neb., on the 16th. The monthly range was 1.49 inches.

TEMPERATURE.

The mean temperature for the state, as shown by the records of 102 stations, was 34.6°, or 1.3° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 31.2°, or 0.3° lower than the normal; Central, 35.1°, or 1.5° higher than the normal; Southern 38.6° or 2.5° higher than the normal. The highest monthly mean was 41.3°, at Ottumwa, and the lowest monthly mean was 27.2°, at Estherville. The highest temperature reported was 85°, at Lenox, on the 31st. The lowest temperature reported was -13°, at Lake Park on the 4th.

HUMIDITY.

The average relative humidity for the state at 7 a. m. was 78 per cent, and at 7 p. m. it was 62 per cent. The mean for the month was 70 per cent, or about 4 per cent lower than the normal. The highest monthly mean was 79 per cent, at Charles City, and the lowest was 62, at Keokuk.

PRECIPITATION.

The average precipitation for the state, as shown by the records of 107 stations, was 1.84 inches, or 0.07 inch more than the normal.

By divisions the averages were as follows: Northern, 1.90 inches or 0.37 inch more than the normal; Central, 1.83 inches, or 0.04 inch less than the normal; Southern, 1.78 inches, or 0.14 inch less than the normal. The greatest amount, 4.35 inches occurred at Sanborn, and the least, 0.57 inch, at Audubon. The greatest amount in any 24 consecutive hours, 2.50 inches, occurred at Sanborn, during a thunderstorm on the 16th.

COMPARATIVE DATA FOR THE STATE-MARCH

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipitation < .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	3.9	6	11	8	12
1893	31.8	-1.5	84	-8	2.14	+0.37	4.40	0.64	4.0	8	9	11	11
1894	41.0	+7.7	84	-5	2.03	+0.26	4.52	0.26	2.7	6	13	10	8
1895	34.4	+1.1	94	-11	0.83	-0.94	2.60	0.22	2.9	4	16	8	7
1896	30.9	-2.4	81	-12	1.10	-0.67	3.99	0.16	5.4	5	12	9	10
1897	32.0	-1.3	72	-22	2.39	+0.62	6.16	0.29	5.5	8	9	8	14
1898	37.5	+4.2	72	-2	1.94	+0.17	6.21	0.33	3.7	6	12	9	10
1899	23.0	-10.3	75	-16	1.62	-0.15	5.90	0.37	8.0	6	7	12	12
1900	30.7	-2.6	81	-13	2.06	+0.29	5.15	0.45	6.6	5	12	9	10
1901	34.2	+0.9	76	-8	2.64	+0.87	5.25	0.70	12.6	7	10	8	13
1902	39.1	+5.8	79	-12	1.45	-0.32	4.33	0.13	1.3	7	9	11	11
1903	38.8	+5.5	82	6	1.38	-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	0.39	4.1	7	8	8	15
1906	27.1	-6.2	65	-14	2.34	+0.57	4.55	0.58	8.9	10	8	7	16
1907	40.6	+7.3	92	-7	1.35	-0.42	5.05	0.23	4.1	6	14	7	10
1908	37.9	+4.6	85	-8	1.58	-0.19	3.74	0.45	1.1	6	13	7	11
1909	32.5	-0.8	71	-15	1.53	-0.24	5.00	0.28	9.8	6	12	10	9
1910	48.9	+15.6	92	-10	0.17	-1.60	1.32	0.00	T	1	23	6	2
1911	39.4	+6.1	83	2	0.93	-0.84	4.84	T	1.9	5	16	9	6
1912	24.9	-8.4	70	-19	2.01	+0.24	5.25	0.60	19.1	7	15	6	10
1913	31.9	-1.4	78	-23	2.48	+0.71	5.88	0.74	5.3	9	11	10	10
1914	34.7	+1.4	78	-5	1.69	-0.08	3.84	0.28	1.8	7	12	8	11
1915	29.3	-4.0	61	-5	0.96	-0.81	2.12	0.17	8.8	5	8	9	14
1916	35.2	+1.9	80	-18	1.57	-0.20	5.80	0.23	2.9	6	11	9	11
1917	34.6	+1.3	85	-12	1.84	+0.07	4.35	0.57	6.2	6	14	8	9

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

Climatological Data for March, 1917-Continued.

Stations	Counties	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit							Precipitation, in Inches				Number of Days.			Prevailing direction of wind.	Observers	
				Meas.	Departure from normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Precipitation 0.01 in. or more.	Clear.	Partly cloudy.			Cloudy.
Waterloo	Black Hawk	862	34	31.4	-1.1	69	30	-1	4†	33	1.85	+0.22	0.90	8.2	7	22	0	9	nw.	R. B. Slippy.
Waukegan	Dallas	1,039	14	36.4	+2.1	80	30	-1	4†	45	2.00	+0.47	0.96	2.9	7	18	7	6	nw.	Samuel F. Foft.
Webster City	Hamilton	1,044	12	33.8	+0.5	74	30	-6	4	42	1.10	-0.21	0.30	11.0	5	9	10	12	nw.	C. B. Carpenter.
Whitten	Hardin	1,036	20	35.5	+3.1	77	30	-5	4	43	---	---	---	---	---	---	---	---	nw.	Dr. F. P. Butler.
Williamsburg	Iowa	765	1	36.8	---	73	30	0	4	40	1.58	---	1.11	0.0	5	16	8	7	nw.	Dr. F. C. Schadt.
Means and extremes				35.1	+1.5	82	30	-6	4	49	1.83	-0.04	1.70	4.5	6	15	7	9	nw.	
Southern Division																				
Afton	Union	1,212	23	38.9	+3.0	80	30	0	5	50	1.90	-0.02	1.10	0.2	5	15	12	4	sw.	J. E. Deitrick.
Albia	Monroe	959	19	38.6	+3.6	80	30	0	5	40	2.17	+0.40	1.04	T.	5	11	2	18	w.	F. H. Holmes.
Allerton	Wayne	1,122	15	40.2	+3.6	80	30	1	4	42	1.56	-0.33	1.06	T.	2	18	7	6	n.	R. D. Parks.
Atlantic	Cass	1,164	26	35.2	+0.7	81	30	-2	4	42	1.52	-0.15	0.69	3.4	8	8	9	14	nw.	Thos. H. Whitney.
Bedford	Taylor	---	17	39.2	+2.9	80	30	-5	5	45	1.68	-0.21	1.30	0.8	5	18	6	7	nw.	E. E. Healy.
Bloomfield	Davis	881	10	40.3	---	79	30	-2	5	44	1.90	-0.31	1.25	0.5	7	9	17	5	nw.	V. G. Warner.
Bonaparte	Van Buren	565	24	40.0	+3.4	78	30	0	5	45	1.88	-0.43	1.28	T.	4	19	5	7	nw.	Bruce R. Vale.
Burlington	Des Moines	544	21	39.2	+2.1	75	30	4	5	34	1.47	-1.18	0.80	T.	6	18	8	5	nw.	Max E. Poppe, Jr.
Centerville	Appanoose	1,013	12	40.7	---	79	30†	-2	5	43	1.85	---	1.03	T.	5	18	2	11	nw.	S. A. Martin.
Chariton	Lucas	1,042	22	38.0	+2.6	80	30	-5	5	47	1.80	-0.19	1.30	T.	3	16	12	3	n.	C. C. Burr.
Clarinda	Page	1,009	27	36.9	+2.0	83	30	0	5	56	1.54	-0.21	0.84	2.0	4	20	6	5	nw.	A. S. Van Sandt.
Columbus Junction	Louisa	595	16	39.1	+2.7	73	30	4	4†	40	1.68	-0.38	1.00	T.	3	23	5	3	w.	J. B. Johnston.
Corning	Adams	1,117	25	37.4	+3.3	81	30	-8	5	48	1.50	-0.30	0.75	T.	3	22	2	7	nw.	Jerome Sniff.
Corydon	Wayne	1,101	24	39.4	+2.6	80	30	-1	4†	43	1.73	-0.17	1.14	T.	4	13	9	9	nw.	May C. Miller.
Creston	Union	1,312	12	35.0	+0.8	80	30	-3	4†	45	1.60	---	0.75	T.	6	11	8	12	nw.	Mrs. Estella McConnell.
Cumberland	Cass	---	18	---	---	---	---	---	---	---	0.77	-0.97	0.42	1.0	3	23	3	5	ne.	J. H. Reppert.
Earlham	Madison	1,126	15	36.7	+2.3	78	30	-3	5	48	2.02	+0.17	1.25	T.	5	18	4	9	nw.	Geo. Phillips.
Fairfield	Jefferson	780	33	38.8	+2.7	78	30	-3a	5	50a	1.25	-1.10	0.93	0.2	4	14	6	11	nw.	R. Monroe McKenzie.
Fort Madison	Lee	516	68	---	---	---	---	---	---	---	2.12	+0.58	1.44	1.0	6	15	6	10	nw.	F. M. Myers.
Greenfield	Adair	---	25	35.4b	+0.9	80†	30	-2b	4	48b	2.36	+0.38	1.23	4.0	6	---	---	---	nw.	Frank A. Ward.
Indianola	Warren	969	26	38.2	+2.6	79	30	0	4	42	1.66	+0.16	0.78	3.1	7	6	7	18	nw.	Prof. J. L. Tilton.
Keokuk	Lee	614	46	41.2	+3.3	77	30	6	4	37	3.46	+1.09	1.87	0.1	8	13	14	4	w.	U. S. Weather Bureau.
Keosauqua	Van Buren	644	25	38.0	+2.2	79	30	0	6	43	1.71	-0.61	1.30	0.3	5	9	13	9	nw.	J. H. Landes.
Knoxville	Marion	920	22	39.0	+2.8	80	30	-2	5	45	2.28	+0.63	0.80	0.2	7	15	5	11	nw.	W. J. Casey.
Lacona	Warren	---	18	---	---	---	---	---	---	---	1.63	-0.61	0.60	0	7	9	17	5	---	J. B. Alter.
Lamoni	Decatur	---	10	36.8	-0.2	80	30	0	4†	42	1.61	---	0.57	T.	5	18	5	8	n.	Chas. B. Woodstock.
Lenox	Taylor	1,250	22	39.2	+3.7	85	31	-1	4	47	1.68	+0.10	0.70	1.8	4	21	6	4	s.	J. L. Hurley.
Mt. Ayr	Ringgold	1,236	24	38.9	+2.1	80	30	-1	4	42	1.08	-0.90	0.76	T.	3	15	9	7	n.	Alex Maxwell.
Mt. Pleasant	Henry	729	36	39.3	+3.1	76	30	3	4†	42	2.43	+0.22	1.40	T.	4	12	12	7	sw.	W. Edwards.
Murray	Clarke	1,216	26	38.4	+2.8	81	30	-2	5	47	1.75	+0.10	0.98	0.3	5	9	13	9	nw.	M. T. Ashley.
Northboro	Page	1,046	5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	J. M. Darby.
Oskaloosa	Mahaska	843	41	37.0	+1.3	78	30	-5	5	48	2.27	+0.47	1.03	0.5	7	16	1	14	w.	Jos. Boyd.
Ottumwa	Wapello	849	22	41.3	---	79	30	1	5	43	1.67	-0.23	1.20	0.4	5	12	9	10	w.	Thos. Ray.
Pella	Marion	877	14	38.0	+2.2	79	30	-4	5	49	0.83	-0.59	0.48	1.5	5	20	0	11	nw.	John H. Ver Steeg.
St. Charles	Madison	1,070	16	38.5	+2.2	81	30	-1	4	46	1.78	-0.12	1.05	0.5	6	16	9	6	nw.	R. D. Minard.
Sigourney	Keokuk	877	21	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	W. E. Utterback.
Stockport	Van Buren	754	15	38.3	+2.0	77	30	-4	5	49	1.92	-0.15	1.63	T.	4	12	11	8	nw.	C. L. Beswick.
Thurman	Fremont	---	20	40.6	+4.9	84	30	-3	5	48	1.66	+0.01	0.62	2.5	3	11	13	7	nw.	C. R. Paul.
Washington	Washington	760	35	38.7	+2.8	77	30	2	4	42	2.61	+0.57	0.92	---	5	9	13	9	nw.	Wm. A. Cook.
Winterset	Madison	1,129	26	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Omaha, Neb.		1,040	46	38.5	+2.5	84	30	3	4	40	1.35	-0.04	0.53	3.5	7	12	12	7	nw.	U. S. Weather Bureau.
Means and extremes				38.6	+2.7	85	30	-8	5	56	1.73	-0.14	1.87	1.3	5	19	8	8	nw.	
State means and extremes				34.6	+1.3	85	30	-13	4	56	1.84	+0.07	2.50	6.2	6	14	8	9	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 division means.

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

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

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

SNOW.

The average snowfall for the state was 6.2 inches, or 1.0 inch more than the normal. The greatest amount, 20.0 inches, occurred at Sanborn; Williamsburg and Lacona reported no snow, and 18 stations reported only a trace.

WIND.

The prevailing direction of the wind was from the north-west. The highest velocity reported from a regular Weather Bureau station was at the rate of 56 miles an hour from the northwest, this occurring at Sioux City on the 16th.

Daily Precipitation for March, 1917—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						.02				.25	1.10	.05	.48																				1.90
Albia	Des Moines		T.								.33	.27	1.04	.48									.05										2.17	
Allerton	Chariton											1.06		.50																			1.56	
Atlantic	Nishnabotna		.01	.03				.01				.69	.40	.29	.07	T.									T.		.02						1.52	
Bedford	Missouri		.01			T.	.02					.10	1.30	T.	.25	T.										T.							1.68	
Bloomfield	Mississippi		.10				T.					.01	1.25	.01	.38	.05						.10											1.90	
Bonaparte	Des Moines		T.	T.	T.	T.						.21	1.28		.14	T.	T.					.25											1.88	
Burlington	Mississippi		T.		T.						.06	.10	.80	.25	.04							.22											1.47	
Centerville	Chariton		T.								.01	1.03	.02	.47	T.							.32											1.85	
Chariton	Chariton		T.				T.				.18	T.	1.30	T.	.32																		1.80	
Clarinda	Nodaway		T.	T.			T.					.84	.36	.33	T.	T.											.01	T.					1.54	
Columbus	Iowa	T.			T.		T.				.40	T.	1.00	.28									T.										1.69	
Corning	Nodaway									T.		.11	.64														T.						1.50	
Corydon	Chariton		T.				T.	T.				.02	1.14	.55	T.								.02										1.73	
Creston	Missouri		.01				T.	.04				.75	.33	.43													.04						1.60	
Cumberland	Nodaway		T.									.14	.21	.42																			0.77	
Earlham	Des Moines		T.				.02				T.	.27	1.25	.45													.03						2.02	
Fairfield	Skunk		.02									.02	.93	.28																			1.25	
Fort Madison	Mississippi		.05	.05					.07				1.44	.05								.46											2.12	
Greenfield	Nodaway		.05				.05				T.	.50	.50	1.23	T.											.03							2.35	
Indianola	Des Moines		.01			T.	.05			.30	T.	.13	.78	T.	.38	T.						.01					T.						1.66	
Keokuk	Mississippi		.01	T.			.01				.24	.34	1.73	.12	T.	T.						.04	.97										3.46	
Keosauqua	Des Moines		.03		T.						T.	.63	.67	.18	T.							.20											1.71	
Knoxville	Des Moines		.03								.28	.25	.80	.40	.48								T.				.04						2.23	
Lacona	Des Moines										.60	.27	.10	.08	.02	.48										.10							1.65	
Lamoni	Grand		T.			T.					.15	.31	.57	.23									.35										1.61	
Lenox	Missouri					T.				.12		.36	.70	.50																			1.63	
Mount Ayr	Grand		T.			T.	T.				T.	.02	.76	.30	T.																		1.08	
Mt. Pleasant	Skunk		.01				T.					.52	1.40	T.									.50										2.43	
Murray	Grand		.01			T.	T.			.24		.07	.98	.45	T.								T.										1.75	
Northboro	Missouri																																	
Oskaloosa	Des Moines		.02				.03				.98	.25	.78	.21																			2.27	
Ottumwa	Missouri		.02				T.				.05	T.	1.20	.30	T.							.10											1.67	
Pella	Skunk		T.	T.			.03				.08	.09	.48	.15	T.							T.											0.83	
St. Charles	Des Moines		T.			.01				.22		T.	.65	.40	.44							T.											1.78	
Sigourney	Skunk																																	
Stockport	Des Moines		T.								.09	1.63	.04	T.								.16											1.92	
Thurman	Missouri						T.				T.	.48	.56	T.	.62																		1.66	
Washington	Skunk		.01						.92			.32	.76	.40																			2.61	
Winterset	Missouri																																	
Omaha, Neb.***	Missouri		.01	T.	T.		.01					.42	.36	.20	.29	T.										T.	.06						1.35	

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

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

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 60, or about 2 per cent higher than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 51; Davenport, 52; Des Moines, 62; Dubuque, 61; Keokuk, 71; Sioux City, 53; Omaha, Nebr., 69.

MISCELLANEOUS PHENOMENA.

Fog occurred in the northeastern counties on the 2d, 6th, 7th, 10th, 11th and 15th. *Hail* in south and east portions of the state on the 10th. *Halos*, lunar or solar, on the 1st, 2d, 3d, 4th, 5th, 6th, 7th, 10th, 17th, 19th, 20th, 24th, 30th. A lunar halo of radius 46° was observed at Des Moines, 9:15 p. m. of the 5th. *Sleet* on the 6th, 7th, 11th, 12th, 13th in the southern and eastern portions of the state, and quite generally on the 16th, 22d and 23rd.

Birds first observed: Boone, robins, 13th; Centerville, robins, 20th; Des Moines, robins, 12th; Earlham, wild geese, 20th, peewees, 24th, cranes, 29th; Forest City, robins, 11th; Grinnell, blue birds, 18th; Nora Springs, wild geese, 17th, robins and black birds, 22d; Pocahontas, wild ducks, 8th,

brants, 9th, robins, 10th, meadow lark, 15th; Postville, robins, 21st, bluebirds, 30th.

Frogs appeared at Corydon on the 15th.

RIVERS.

The ice in the Mississippi River broke up and moved out at Muscatine and Davenport on the 11th; LeClaire on the 19th; Clinton on the 21st; and Dubuque on the 22nd. The stages were moderate. The smaller rivers broke up quietly about the middle of the month in the southern half of the state where very little precipitation had accumulated during the winter. Further north the breakup was caused by a rather sudden change to warmer weather on the 19th, acting upon more than a normal accumulation of snow and ice. The Cedar River at Cedar Rapids passed the flood stage of 14 feet during the night of the 25th-26th, reaching a crest stage of 17.3 feet at 6 p. m. of the 26th. The Des Moines River at Boone, passed the flood stage of 17 feet on the 23rd, reaching a crest stage of 20 feet on the 25th. Several small rivers in northern Iowa, gorged, overflowed, washed out bridges and culverts, and seriously delayed railway and other traffic. This was the only damage reported.

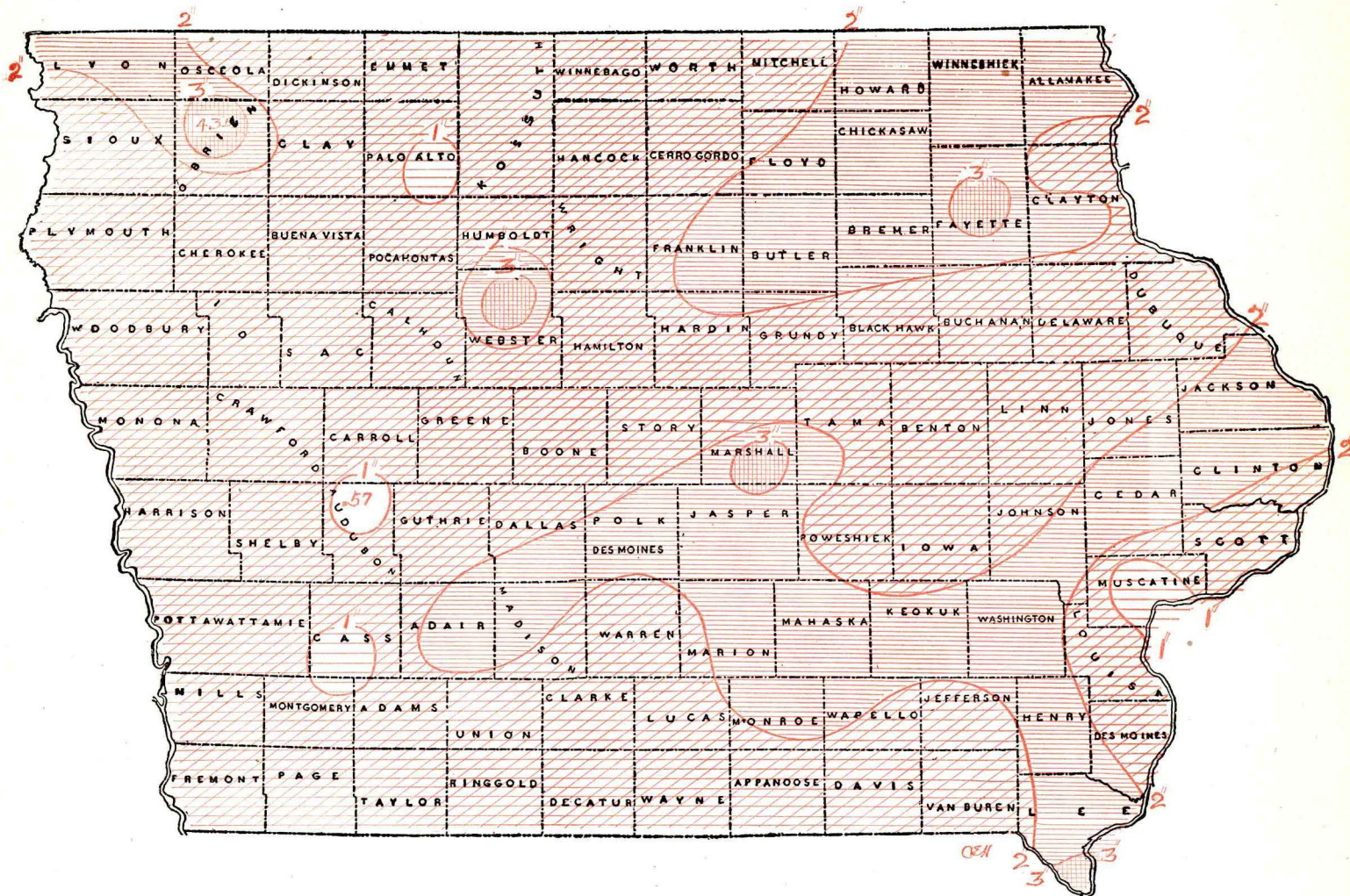
Daily Maximum and Minimum Temperatures for the Month of March, 1917.

Table with columns for Stations, 1-31, and Mean. Rows are grouped by division: No. Division, Central Division, and So. Division. Each station entry includes maximum and minimum temperature values for each day of the month.

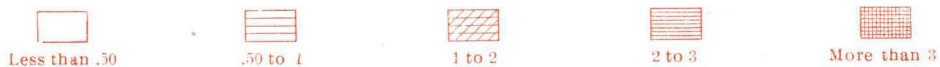
a, b, c, etc., indicate respectively, 1, 2, 3, etc., days missing from record.

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

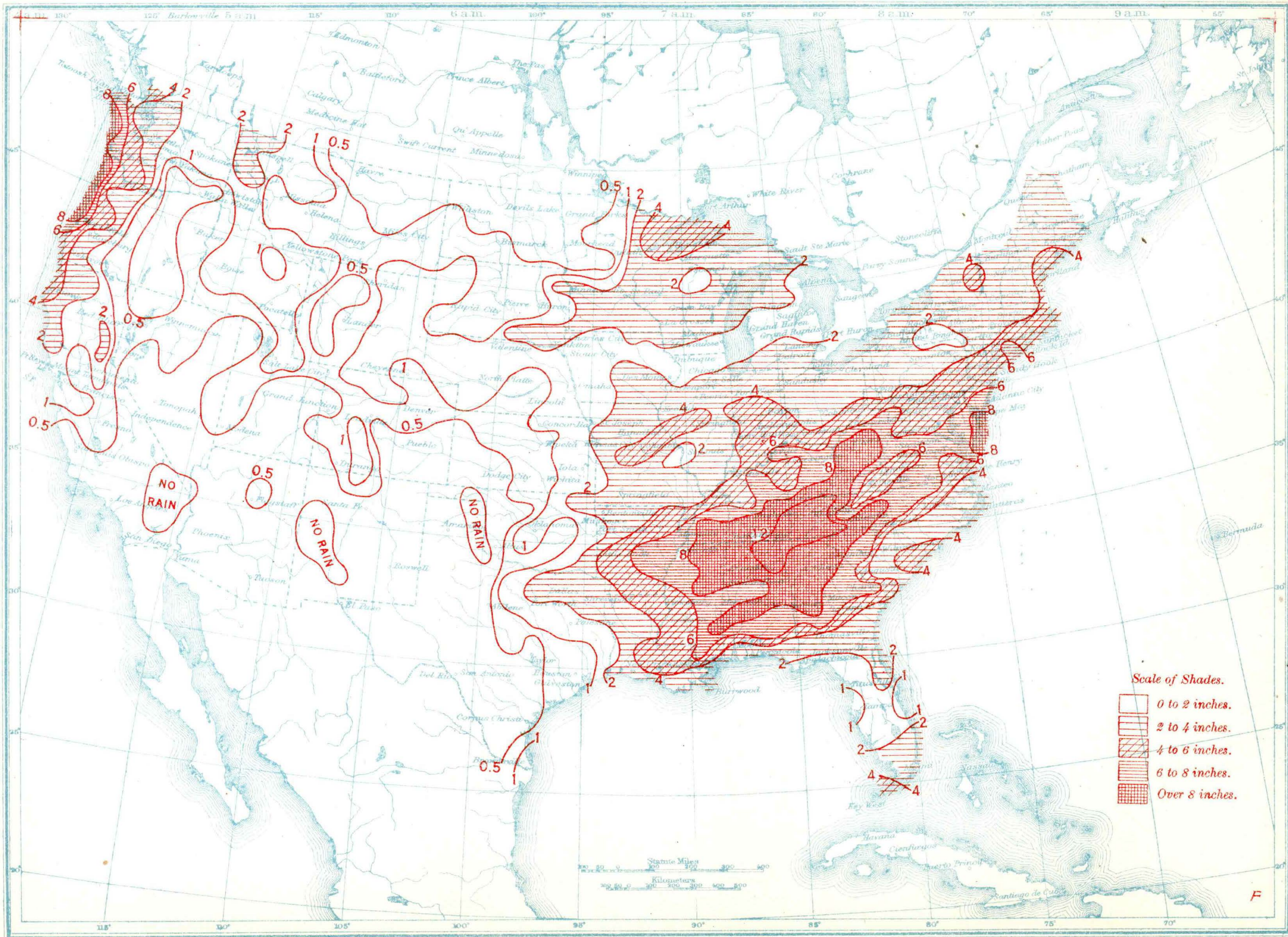
TOTAL PRECIPITATION, MARCH, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, March, 1917.



OCT 30 1917

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

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

APRIL, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

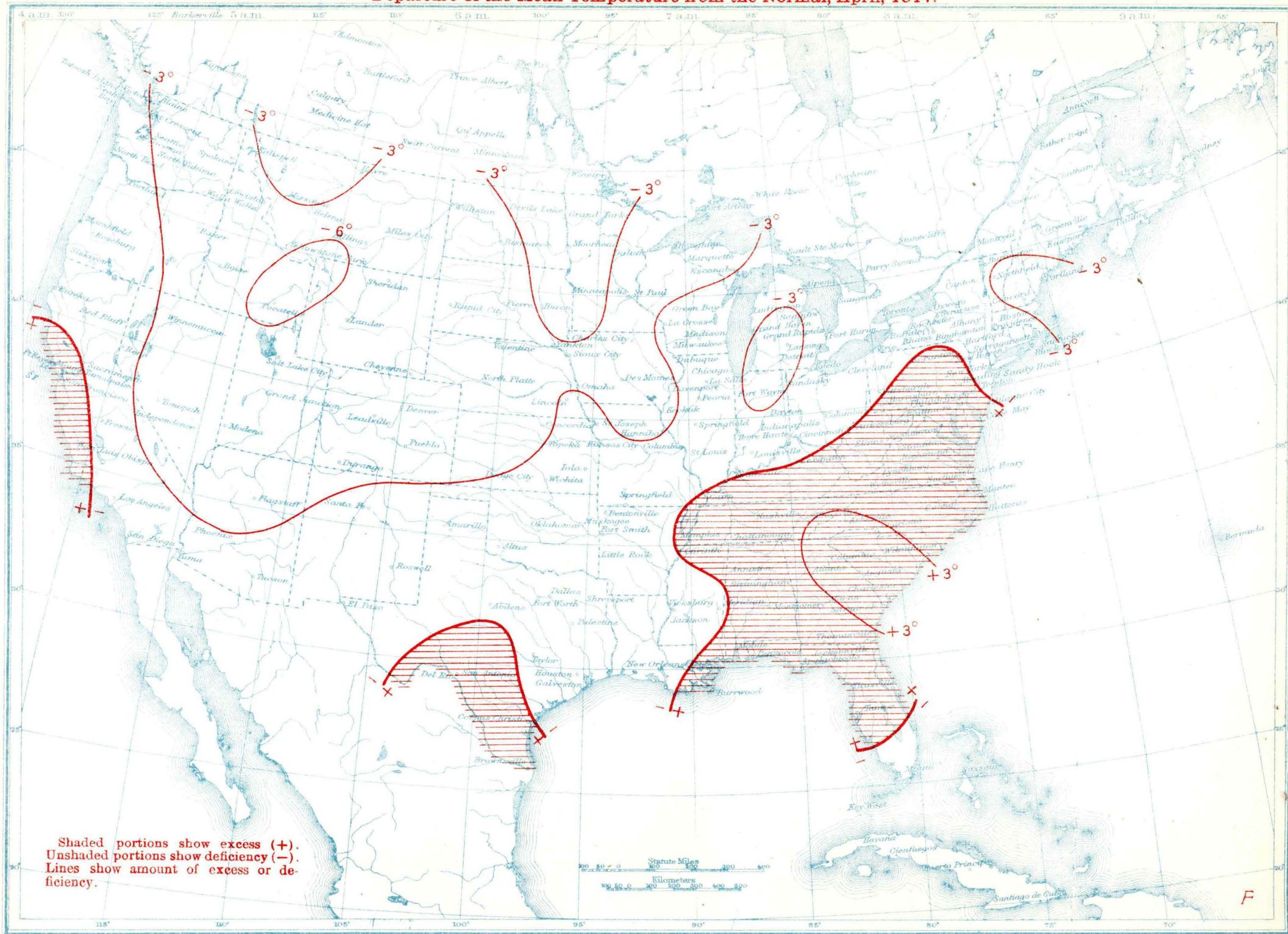


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

2

Departure of the Mean Temperature from the Normal, April, 1917.



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

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

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, APRIL, 1917. NO. 4.

GENERAL SUMMARY.

April, 1917, was generally cold, cloudy and rainy. Only a few days, particularly the 18th and 22d, were notably warm. The week, 9th-15th, was the least rainy, after which rain fell somewhere in the State every day, being heavy the last four days. Rainy days, averaging 11, nearly equaled the record of April, 1909, which had 12. Snowfall, 3.8 inches, has not been exceeded in April since 1896. It was heaviest in the southern division, where it averaged 5.4 inches which is greater than the total of the preceding three months. In Wayne and Decatur Counties it exceeded one foot. The drought of several months in the central and southern divisions was effectually broken. Cloudy days, 14, is the greatest of record for April; and sunshine was correspondingly deficient.

Vegetation made slow progress. Winter wheat and meadows had winter-killed so badly that a large acreage was plowed up and devoted to other crops, mainly corn, though there was also a large increase in the acreage of oats and potatoes. Where the stand was considered promising enough to allow the winter wheat to grow, and this was mostly on heavy bottom lands, it made fair progress, as did other small grains, the seeding of which was about completed by the third week. Wet weather delayed the preparation of corn ground so that at the close of the month only a little planting had been done in the southern counties. Pastures and meadows were too backward to turn in stock. The pig crop was reported as below normal. Trees and fruits were generally dormant.

C. D. R.

PRESSURE.

The mean pressure, (reduced to sea level) for the State was 29.99 inches. The highest recorded was 30.36 inches, at Sioux City, on the 8th, and the lowest was 29.51 inches at Omaha, Neb., on the 20th. The monthly range was 0.85 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 107 stations, was 45.5°, or 3.2° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 43.8°, or 2.9° lower than the normal; Central, 45.9°, or 3.0° lower than the normal; Southern, 46.8° or 3.8° lower than the normal. The highest monthly mean was 49.4°, at Mt. Pleasant and Tipton, and the lowest was 41.8°, at Sibley. The highest temperature reported was 88°, at Lenox, on the 19th, and the lowest was 17° at Guthrie Center on the 2d, and at Sibley on the 15th. The temperature range for the State was 71°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 78 per cent, and at 7 p. m. it was 63 per cent. The mean for the month was 70 per cent, or about 3 per cent above the normal. The highest monthly mean was 74 per cent, at Charles City and Sioux City, and the lowest was 64 per cent, at Dubuque.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 117 stations, was 4.55 inches, or 1.69 inches more than the normal. By divisions the averages were as follows: Northern, 3.93 inches, or 1.25 inches more than the normal; Central, 4.44 inches, or 1.58 inches more than the normal; Southern, 5.27 inches, or 2.22 inches more than the normal. The greatest amount, 7.84 inches, occurred at Allerton, and the least, 2.05 inches, at Dubuque. The greatest amount in any 24 consecutive hours, 2.05 inches, occurred at Chariton on the 28th.

SNOWFALL.

The average snowfall for the State was 3.8 inches, or 2.0 inches more than the normal. The averages by divisions were: Northern, 3.0 inches; Central, 3.0 inches; Southern, 5.4 inches. The greatest amount, 15.0 inches, occurred at Allerton.

WIND.

The prevailing direction of the wind was from the northeast. The highest velocity reported from a regular weather Bureau station was at the rate of 47 miles an hour from the northwest at Sioux City on the 25th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 45, or about 15 per cent lower than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 37; Davenport, 48; Des Moines, 42; Dubuque, 53; Keokuk, 50; Sioux City, 40; Omaha, Neb., 51. At Charles City, Davenport, Des Moines and Sioux City, the percentages were the least of record for April. Clear days averaged 9; partly cloudy 7, cloudy, 14, the latter being the greatest of record for April.

COMPARATIVE DATA FOR THE STATE—APRIL.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipi- tation .01 in.	Clear	Partly cloudy	Cloudy
1890	51.8	+3.1	88	2	1.80	-1.06	4.46	0.38	-----	6	14	9	7
1891	50.6	+1.9	93	13	2.15	-0.71	5.06	0.59	-----	8	14	7	9
1892	45.4	-3.3	88	14	4.75	+1.89	8.38	2.43	5.7	9	8	9	13
1893	45.5	-3.2	96	15	4.21	+1.35	8.51	1.24	6.0	10	8	9	13
1894	51.7	+3.0	93	12	3.07	+0.21	6.91	0.55	0.2	9	11	11	8
1895	54.2	+5.5	98	8	2.62	-0.24	5.88	0.28	2.1	5	14	8	8
1896	54.5	+5.8	94	10	5.02	+2.16	9.67	2.35	4.5	11	11	10	9
1897	47.9	-0.8	89	19	5.35	+2.49	9.86	2.22	T	11	9	9	12
1898	48.1	-0.6	91	14	2.56	-0.30	4.82	0.27	T	8	13	9	8
1899	48.9	+0.2	89	1	2.40	-0.46	5.76	0.56	2.0	7	12	11	7
1900	52.2	+3.5	89	19	2.67	-0.21	6.62	0.43	0.9	6	12	9	9
1901	49.9	+1.2	92	15	1.79	-1.07	3.47	0.66	2.0	5	14	8	8
1902	48.2	-0.5	96	9	1.71	-1.15	4.15	0.40	T	5	14	11	5
1903	49.8	+1.1	86	17	2.98	+0.12	6.00	0.74	0.8	9	11	9	10
1904	44.1	-4.6	86	13	3.63	+0.77	8.97	1.52	1.4	7	15	6	9
1905	47.5	-1.2	90	10	3.03	+0.17	5.49	0.63	1.2	8	12	8	10
1906	52.5	+3.8	94	22	2.42	-0.44	5.55	0.53	0.6	8	14	9	7
1907	41.5	-7.2	80	10	1.32	-1.54	3.22	0.24	2.7	6	12	8	10
1908	50.5	+1.8	91	8	2.24	-0.62	4.59	0.67	0.3	8	14	8	8
1909	43.8	-4.9	86	14	4.58	+1.72	9.43	0.83	3.1	12	9	9	12
1910	52.5	+3.8	99	15	1.48	-1.58	4.86	0.10	3.0	7	14	7	9
1911	46.7	-2.0	86	3	3.09	+0.23	6.04	1.33	3.6	9	11	8	11
1912	49.9	+1.2	84	20	2.66	-0.20	5.66	0.78	1.1	8	13	8	9
1913	50.2	+1.5	88	16	3.28	+0.42	7.43	1.12	2.7	9	15	5	10
1914	48.6	-0.1	88	11	2.52	-0.34	5.03	0.37	0.3	8	10	8	12
1915	57.2	+8.5	95	18	1.41	-1.45	4.02	0.05	T	7	15	10	5
1916	47.1	-1.6	90	11	2.62	-0.24	5.92	1.13	1.1	10	10	9	11
1917	45.5	-3.2	88	17	4.55	+1.69	7.84	2.05	3.8	11	9	7	14

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

Daily Precipitation for April, 1917.

Table with 31 columns for days of the month (1-30) and a 'Total' column. Rows list stations and their watersheds, including Northern Division (e.g., Algona, Allison, Alta) and Central Division (e.g., Ames, Audubon, Baxter). Precipitation values are listed for each day, with 'T' indicating trace amounts.

Daily Precipitation for April, 1917—Continued.

Table with columns: Stations, Watersheds, Day of Month (1-30), Total. Rows include Southern Division stations like Afton, Albia, Allerton, etc., with precipitation values for each day.

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 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. T. Trace, or less than 0.01 inch.
*Precipitation included in the next following measurement.

LATE REPORT

For January, 1917: Winterset: mean temperature, 21.2°; departure of mean from normal, +0.3°; highest temperature, 50° on the 28th; lowest temperature, -7° on the 22nd; greatest daily range of temperature, 34°; total precipitation, 0.30 inch; departure from normal, -0.66; greatest precipitation in 24 hours, 0.25 inch; total snowfall, 2.5 inches; number of days with 0.01 inch or more of precipitation, 2; clear, 17; partly cloudy, 5; cloudy, 9; prevailing wind direction, north-west.

For February, 1917: Winterset: mean temperature, 20.0°; departure of mean from normal, -3.1°; highest temperature, 61° on the 25th; lowest temperature, -23° on the 2nd; greatest daily range of temperature, 40°; total precipitation, trace; departure from normal, -1.03 inches; total snowfall, trace; number of days with 0.01 inch or more of precipitation, 0; clear, 15; partly cloudy, 6; cloudy, 7; prevailing wind direction, northwest.

MISCELLANEOUS PHENOMENA.

Earthquake; Keosauqua, 3 p. m. 19th. Dense fog at a few stations on 17th and 30th. Hail, 17th, 19th, 20th, 24th, 28th, 29th and 30th. Sleet, 1st, 7th, 16th, 17th, 26th, 27th, 28th and 30th. Thunderstorms, 3d, 7th, 11th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 24th, 25th, 28th and 29th.

Birds first observed: Earlham; turtle doves, 5th, mocking birds, 18th.

Frogs appeared at Earlham on the 10th.

RIVERS

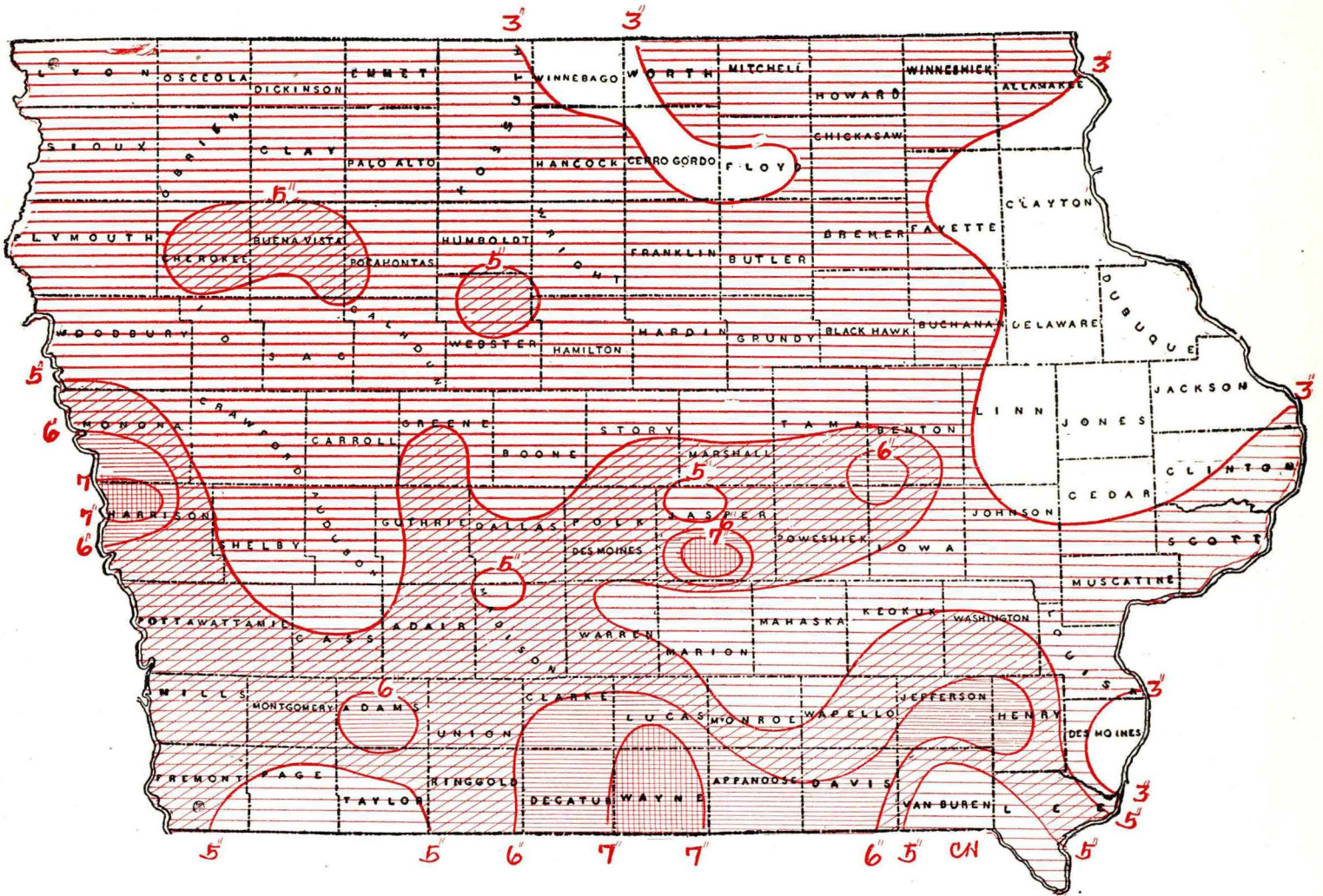
Flood stages did not occur in any of the rivers, but all of them carried considerably more than the normal volume of water. In the boundary rivers, distinct crests, originating from the spring break-up at the headwaters, passed along between the 17th and 27th in the Mississippi, and between the 13th and 19th in the Missouri. The short, interior rivers fell steadily till about the 18th to 20th, after which a slight rise resulted from frequent, general and heavy precipitation. At the close of the month the soil was saturated and other natural storage well filled so that the streams will probably respond rather quickly to heavy rainfalls.

Daily Maximum and Minimum Temperatures for the Month of April, 1917.

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

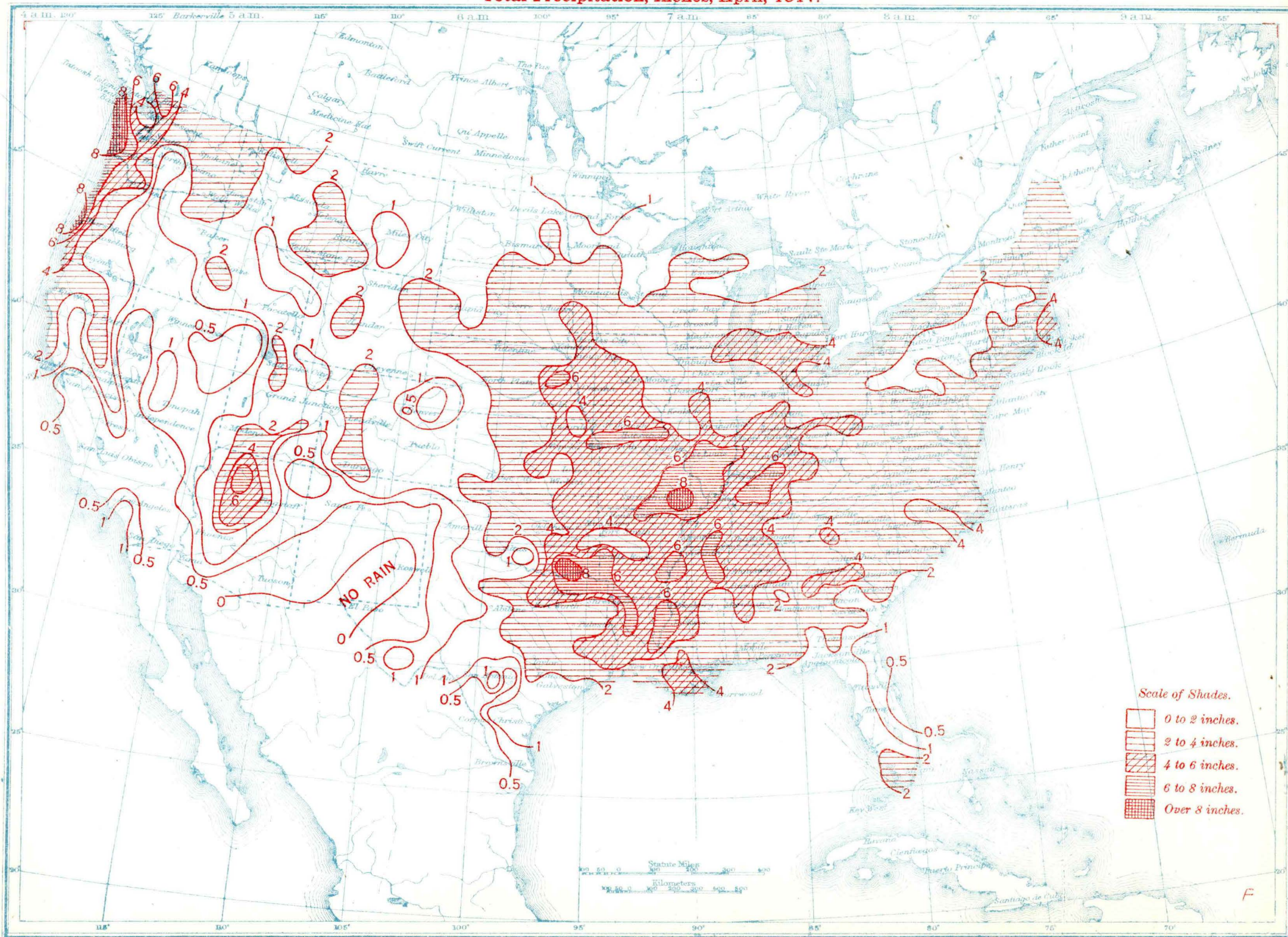
TOTAL PRECIPITATION, APRIL, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, April, 1917.



OCT 30 1917

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, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

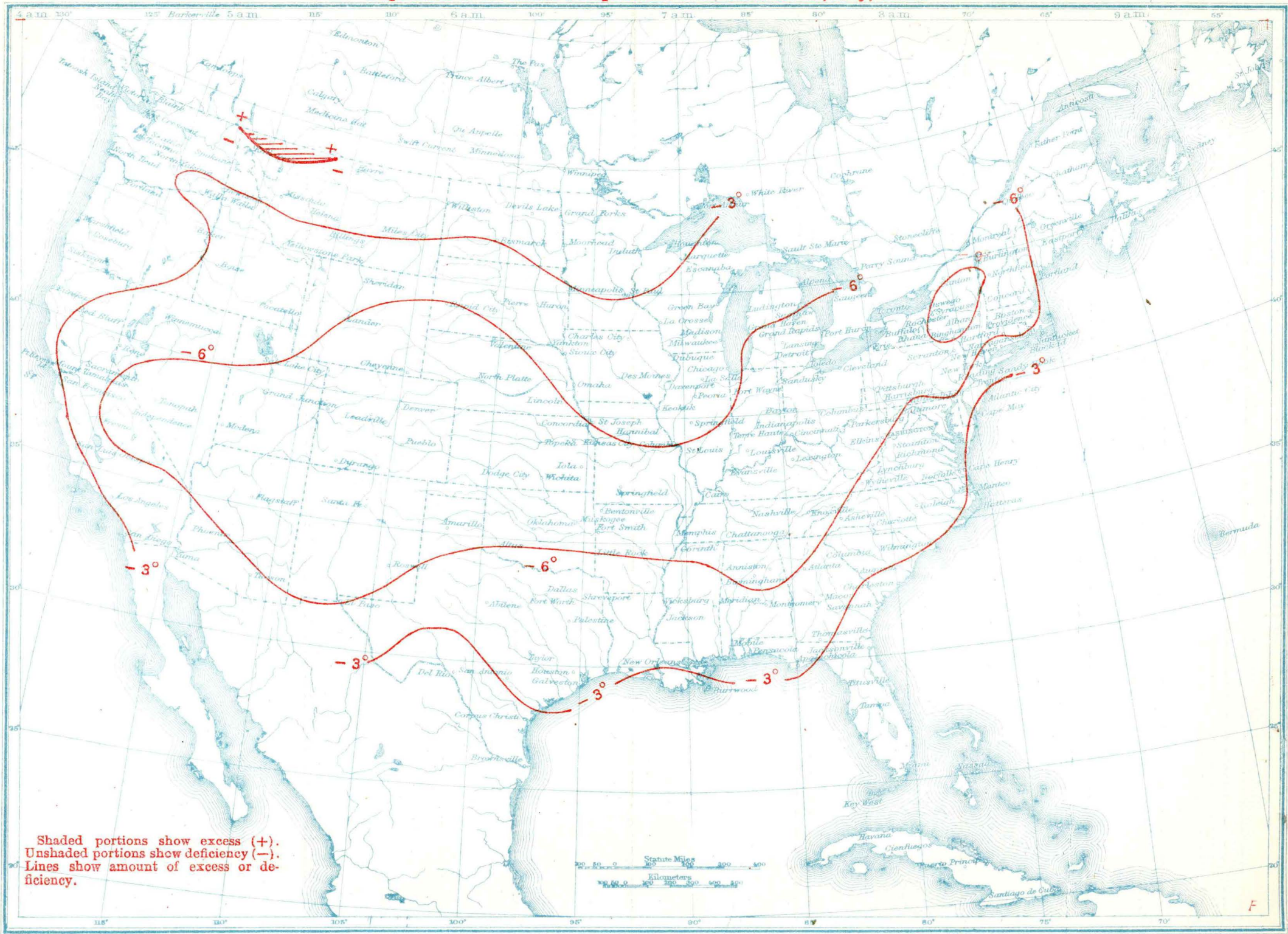


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

A

Departure of the Mean Temperature from the Normal, May, 1917.



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



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, MAY, 1917. No. 5.

GENERAL SUMMARY.

Temperature and total rainfall were below normal, only May, 1892 and 1907, being cooler in the 28 years of record. Rainy days were slightly less frequent than normal and the period, 12th-18th, was nearly rainless. Clear days and sunshine were above normal. On the night of the 18th-19th, following the warmest day of the month, with maximum temperatures near or above 90°, destructive wind and hail storms were general in the Northern Division of the State. Ice, heavy frost, or freezing temperatures were general during the first week. Frost on or about the 23d damaged potatoes, corn, garden truck and fruit buds in some localities, particularly in the northeast and east central sections.

Small grain made good progress. Meadows and pastures were slow, so that stock feeding had to be continued in many sections till the close of the month, thus depleting the grain supply. By the 20th of the month about 75 per cent of the corn had been planted, but frequent rains during the last decade delayed field work, and some planting remained to be done at the close of the month, at which time early planted corn was up and was of good stand and color. Apples, plums and cherries were backward, coming into full bloom in the southern counties about the 15th and in the northern counties about the 25th, but over most of the state the prospect is good.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.96 inches. The highest recorded was 30.42 inches, at Sioux City, on the 14th, and the lowest was 29.36, at Sioux City, on the 26th. The monthly range was 1.06 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 108 stations, was 55.1°, or 5.4° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 53.8°, or 5.2° lower than the normal; Central, 55.4°, or 5.3° lower than the normal; Southern, 56.0°, or 5.7° lower than the normal. The highest monthly mean was 58.1°, at Keokuk, and the lowest 52.2°, at Estherville. The highest temperature reported was 95° at Tipton, on the 18th, and the lowest was 25° at Chariton, on the 5th. The temperature range for the State was 70°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 73 per cent, and at 7 p. m. it was 52 per cent. The mean for the month, 63 per cent, is about 4 per cent below the normal. The highest monthly mean was 65 per cent, at Keokuk, and the lowest was 60 per cent, at Sioux City.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 115 stations, was 3.87 inches, or 0.70 inch less than the normal. By divisions the averages were as follows: Northern, 3.87 inches, or 0.61 inch less than the normal; Central, 3.80 inches, or 0.79 inch less than the normal; Southern, 3.95 inches or 0.69 inch less than the normal. The greatest amount, 7.33 inches, occurred at Iowa City, and the least, 1.69 inches, at Rockwell City. The greatest amount in 24 consecutive hours, 3.05 inches, occurred at Glenwood, on the 21-22d.

SNOWFALL.

The average snowfall for the State was 0.6 inch, or 0.5 inch more than the normal, and in the 26 Mays of record has been exceeded only in 1907 and 1911.

WIND.

The prevailing direction of the wind was from the northeast. The highest velocity reported from a regular Weather Bureau station was at the rate of 54 miles an hour from the west, at Sioux City, on the 18th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 62, or about 1 per cent more than the normal. The percent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 58; Davenport, 59; Des Moines, 58; Dubuque, 65; Keokuk, 68; Sioux City, 59; Omaha, Neb., 68.

COMPARATIVE DATA FOR THE STATE—MAY.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipi- tation, .01 in.	Clear	Partly cloudy	Cloudy
1890	57.7	- 2.8	90	26	3.56	-1.01	6.44	1.61	-----	9	10	13	8
1891	58.3	- 2.2	94	21	3.18	-1.39	7.10	1.46	-----	8	14	9	8
1892	54.0	- 6.5	88	29	8.77	+4.20	12.64	4.87	-----	16	5	9	17
1893	56.6	- 3.9	96	26	3.45	-1.12	5.82	1.65	0	9	13	9	9
1894	61.1	+ 0.6	96	22	1.87	-2.70	4.77	0.33	0	6	17	10	4
1895	61.7	+ 1.2	104	24	3.19	-1.38	5.79	0.84	0	9	11	12	8
1896	65.5	+ 5.0	100	34	6.69	+2.12	11.79	3.40	0	12	11	12	8
1897	58.5	- 2.0	96	20	1.92	-2.65	3.59	0.21	0	5	16	10	5
1898	59.6	- 0.9	92	26	4.67	+0.10	7.82	2.22	0	12	9	10	12
1899	60.2	- 0.3	90	27	6.23	+1.66	11.47	3.09	0	13	9	12	10
1900	63.2	+ 2.7	98	22	3.31	-1.26	6.98	0.96	0	8	14	10	7
1901	60.7	+ 0.2	95	28	2.35	-2.22	4.57	0.72	0	7	16	9	6
1902	63.8	+ 3.3	97	25	5.39	+0.82	18.04	0.87	0	13	10	12	9
1903	61.6	+ 1.1	91	24	8.55	+3.98	15.45	2.88	0	16	9	12	10
1904	50.6	- 0.9	93	27	3.78	-0.79	8.15	1.50	0	8	13	10	8
1905	58.3	- 2.2	88	28	5.95	+1.38	10.83	2.57	0	14	12	11	8
1906	60.8	+ 0.3	95	24	3.54	-1.03	10.72	0.89	0	11	13	10	8
1907	53.5	- 7.0	96	14	3.48	-1.09	7.68	0.71	1.0	10	11	10	10
1908	59.4	- 1.1	93	13	8.34	+3.77	14.33	1.33	0	15	9	11	11
1909	57.9	- 2.6	97	18	4.34	-0.23	7.85	1.86	0.1	9	12	12	7
1910	55.4	- 5.1	89	18	3.41	-1.16	6.91	1.29	T.	10	15	7	9
1911	64.9	+ 4.4	98	23	3.76	-0.81	8.73	0.42	0.7	9	16	9	6
1912	62.7	+ 2.2	97	29	3.33	-1.24	6.41	0.72	0	10	14	11	6
1913	59.4	- 1.1	102	30	6.24	+1.67	10.25	3.14	0	13	11	8	12
1914	62.2	+ 1.7	98	25	3.31	-1.26	6.90	0.30	T.	10	14	11	6
1915	56.1	- 4.4	99	25	7.34	+2.77	13.21	3.82	T.	14	9	9	13
1916	59.9	- 0.6	94	27	4.93	+0.36	10.44	2.14	T.	12	13	10	8
1917	55.1	- 5.4	95	18	3.87	-0.70	7.33	1.69	0.6	10	15	8	8

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

Daily Precipitation for May, 1917.

Table with columns for Stations, Watersheds, Day of Month (1-31), and Total. Rows are categorized by Division: No. Division, Cen. Division, and various station names like Algona, Allison, Alta, etc.

Daily Precipitation for May, 1917—Continued.

Table with columns for Stations, Watersheds, Day of Month (1-31), and Total. Rows include various Iowa locations like Afton, Albia, Allerton, etc., with their respective precipitation values for each day and a total for the month.

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 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. T. Trace, or less than 0.01 inch.

*Precipitation included in the next following measurement.

ERRATA.

Report for March, 1917: Page 28, Fayette; total snowfall, published 13.4 inches, should be 11.1 inches. Page 29; Albia; mean temperature; published 38.6°, should be 36.7°; departure of mean from normal, published +3.6°, should be +1.7°. Page 32; Albia; minimum temperature on 7th, published 31°, should be 26°; mean minimum temperature, published 23.9°, should be 23.8°.

Report for April, 1917: Page 41; Creston; total precipitation, published 5.80 inches, should be 5.52 inches; number of rainy days, published 14, should be 13. Mt. Ayr; mean temperature, published 47.4°, should be 46.8°; departure of mean from normal, published -3.8°, should be -4.4°. Keokuk; mean temperature, published 48.6°, should be 48.7°; departure of mean from normal, published -3.4°, should be -3.3°. Page 43; Creston; precipitation on 30th, published .28; should be 0; total precipitation, published 5.80, should be 5.52. Page 44; Keokuk; minimum tempera-

ture on 20th, published 41°, should be 45°; maximum temperature on 23d, published 63°, should be 66°; maximum temperature on 29th, published 48°, should be 50°; mean maximum temperature, published, 57.1°, should be 57.2°; mean minimum temperature, published 40.1°, should be 40.2°.

LATE REPORT

March, 1917: Belle Plaine; mean temperature, 36.6°; departure from normal, +3.3°, highest, 73° on the 30th; lowest, -1° on the 4th and 5th; greatest daily range, 41°; total precipitation, 1.95; departure from normal, -0.38; greatest in 24 hours, 1.32; total snowfall, 6.4; number of days with .01 inch or more of precipitation, 10; clear, 12; partly cloudy, 9; cloudy, 10; prevailing wind direction, northwest.

Daily Maximum and Minimum Temperatures for the Month of May, 1917.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized by No. Division, Cen. Division, and So. 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.

METEOR OF MAY 31, 1917

Shortly before 10 p. m., May 31, a meteor of greater brilliance than any other that has occurred in this section of the country for many years was observed in the north-west one-third of Iowa and territory in adjacent states. It appeared like a giant sky rocket, accompanied by a glare of light equalling the brightest lightning flash, and explosions of sufficient violence to rattle windows and shake houses in Woodbury and Plymouth Counties in Iowa, and adjoining counties in Nebraska and South Dakota. Accounts of the direction of motion of the meteor vary greatly, due probably to the different angles from which it was viewed by the observers. The flash was distinctly seen by observers as remote as Fayette, in the northeastern portion of the State, Des Moines and Omaha, but no noises were heard at those places. A trail of smoke marked the path of the meteor for ten or fifteen minutes, when it dissipated without showing any direction of the higher air currents. A piece of material believed to have been a fragment of the meteor was found in the barnyard of E. Vander Hoop, a farmer living two miles north of Sioux Center, Iowa, and another similar piece was found near Osmond, Neb., by N. Welch, an auctioneer. The specimens were of identical appearance, resembling coarse grained baked clay, the outer surface of which had been molten and burned to a crisp brown.

While meteors have no appreciable effect on weather and belong to the science of astronomy rather than meteorology, the intense popular interest in this instance justifies more than ordinary consideration. Published herewith is the report of Mr. David E. Hadden, Fellow of the Royal Astronomical Society, and Corn and Wheat Region Observer of the United States Weather Bureau, at Alta, Iowa. Being both an astronomer and a meteorologist, his report is doubly in-

C. D. R.

DETONATING METEOR

David E. Hadden, F. R. A. S., Alta, Iowa

Date, Thursday, May 31, 1917.

Time of flash, 9:55 p. m.

Time of report 10 p. m.—five minutes' interval.

Location—Meteor first appeared some distance west of the zenith and traced a path through constellation Leo. A minute after the flash the location was easily observed by a bright streak about ten degrees in length directly below the star Epsilon of Leo, the right ascension of the streak was about 9h 27m and declination north 15 degrees. The streak was nearly parallel to a line drawn from the star Gamma Leonis to Alpha Leonis. The streak indicated approximately the location of the explosions, two in number, which followed each other rapidly and created much excitement. Reports indicate that the flash was observed over a radius of 100 miles, but the explosions were heard only about sixty or seventy miles.

Fire-balls, or aerolites as these meteors are called when

they are large enough to explode and reach the earth, come from inter-planetary space, and when they reach the earth's atmosphere at about eighty miles above the earth's surface they either take fire or soon disappear, or take fire and burst in numerous fragments or fall to the ground as solid masses of stony matter fused with numerous metallic elements familiar to us on the earth.

Explosions take place from ten or fifteen to thirty-five miles above the earth's surface as a rule. At this height sound travels 700 or 800 feet a second, so that the distance of the explosion of the meteorite of Thursday night was between forty-five and fifty-five miles in a direct line from Alta a little south of a point due west.

Fire-balls occur at all seasons and places over the earth, but it is found that February, May and November are noticeable for their frequency. They have been recorded for more than 2,000 years in history. Specimens of them are found in all the leading museums of the world—they vary in weight from a few ounces to many hundreds of pounds, and some of tons weight are suspected to be of meteoric origin.

The last detonating one observed here was on May 2, 1890, at 5:10 p. m., in full daylight. This fell near the Minnesota line in northern Iowa and was the subject of litigation in the courts regarding its ownership.

No special significance attaches to meteors from a weather viewpoint. They are interesting scientifically to estimate the height and density of our atmosphere and indicate that space is strewn with matter which the earth attracts in its onward march around the sun and through the stellar spaces. Possibly they belong to lost comets or are the debris of shattered planets.

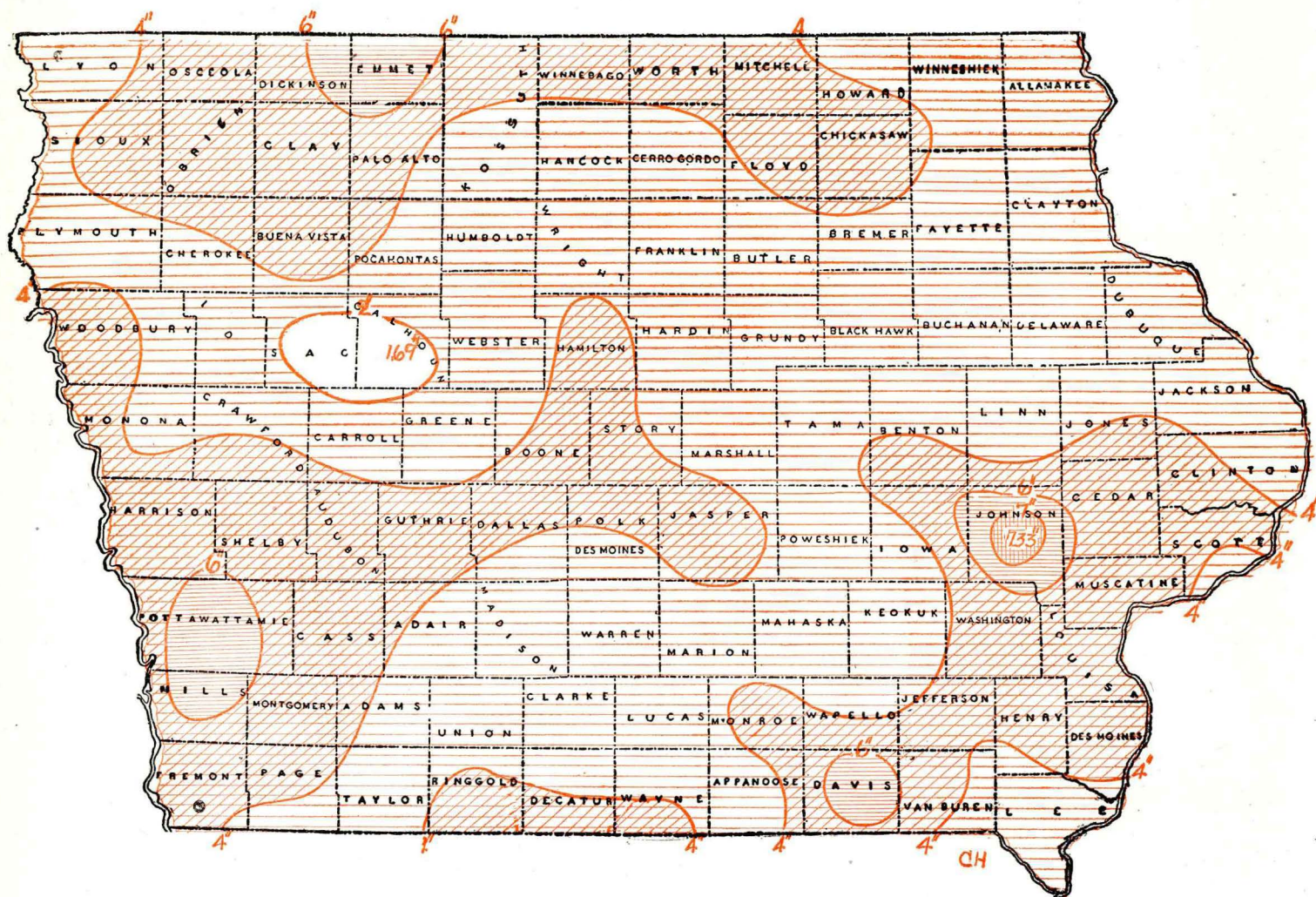
IOWA CROP REPORT, JUNE 1, 1917

Following is a summary showing the condition of crops on June 1st, as compared with the average of past years on that date:

Corn, 95 per cent; oats, 101; spring wheat, 98; winter wheat, 64; barley, 98; rye, 92; flax, 99; potatoes, 99; tame hay, 84; wild hay, 95; pastures, 90; alfalfa, 88 per cent. Last year on June 1st the conditions were as follows: Corn, 84 per cent; oats, 98; spring wheat, 96; winter wheat, 78; barley, 97; rye, 92; flax, 92; potatoes, 95; hay, 98; pastures, 102; alfalfa, 93 per cent.

The Secretary of the State Horticultural Society reports the condition of fruit as follows: "Apples, 80 per cent; pears, 61; American plums, 66; Domestic plums, 56; Japanese plums, 51; cherries, 71; grapes, 46; red raspberries, 45; black raspberries, 45; blackberries, 42; currants, 73; gooseberries, 77; strawberries, 66 per cent of a full crop. The average of all fruits is 56 per cent, or three points above the average for June last year. The condition of the apple crop is 2 per cent above the June average for any year since a percentage record has been kept by the Society. Grapes, raspberries and strawberries were injured during the winter in the southern part of the State, where there was no snow covering to protect them."

TOTAL PRECIPITATION, MAY, 1917.



SCALE OF SHADES—IN INCHES.

Less than 2

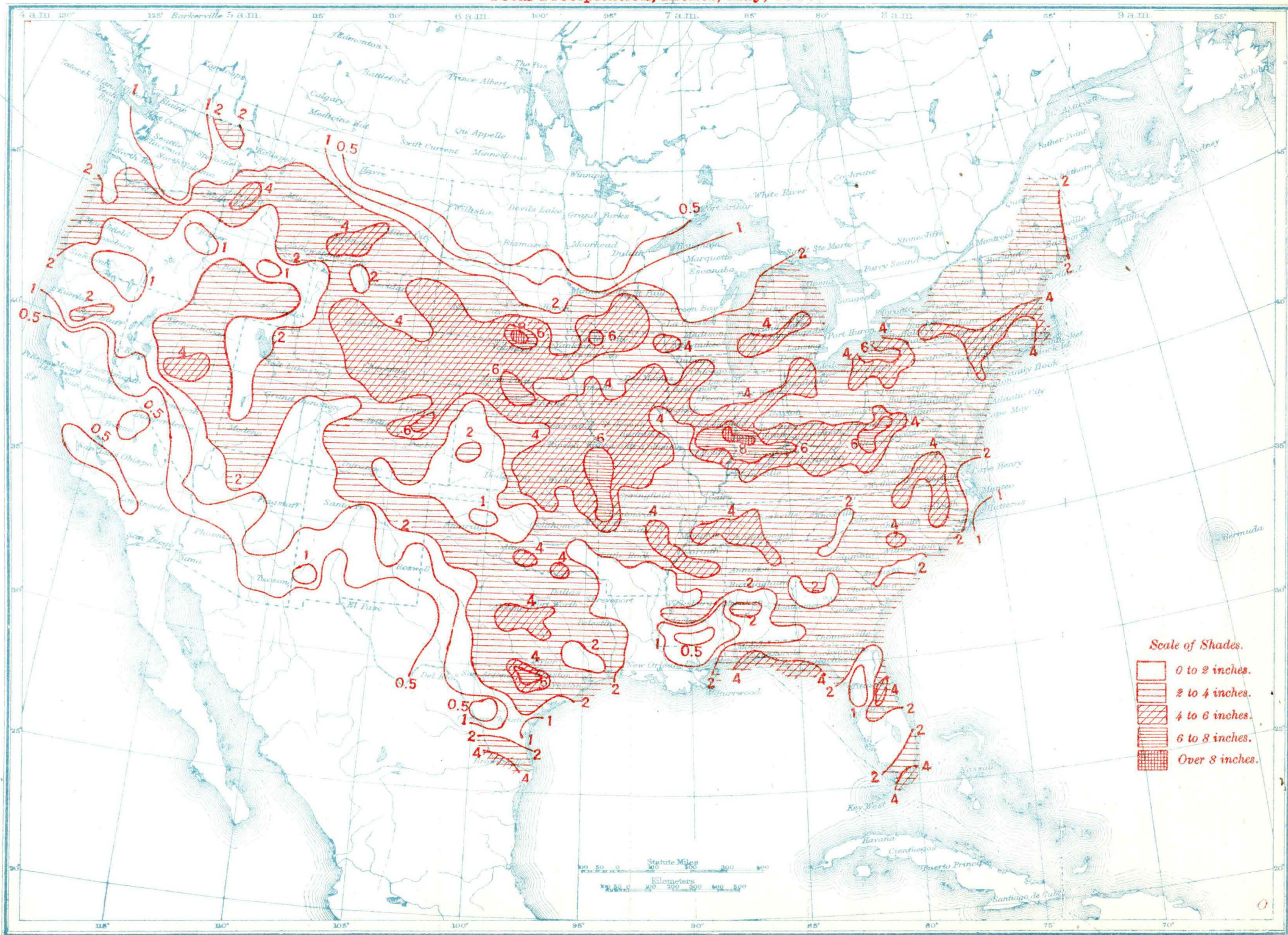
2 to 4

4 to 6






6 to 7

More than 7

Total Precipitation, Inches, May, 1917.



Scale of Shades.

-  0 to 2 inches.
-  2 to 4 inches.
-  4 to 6 inches.
-  6 to 8 inches.
-  Over 8 inches.

Statute Miles
0 50 100 150 200 250 300 350 400
Kilometers
0 50 100 150 200 250 300 350 400

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

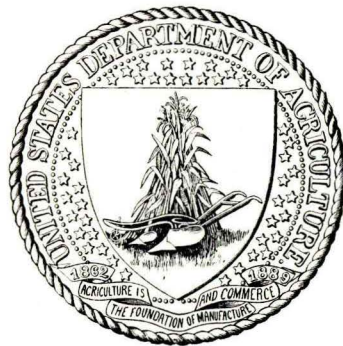
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JUNE, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

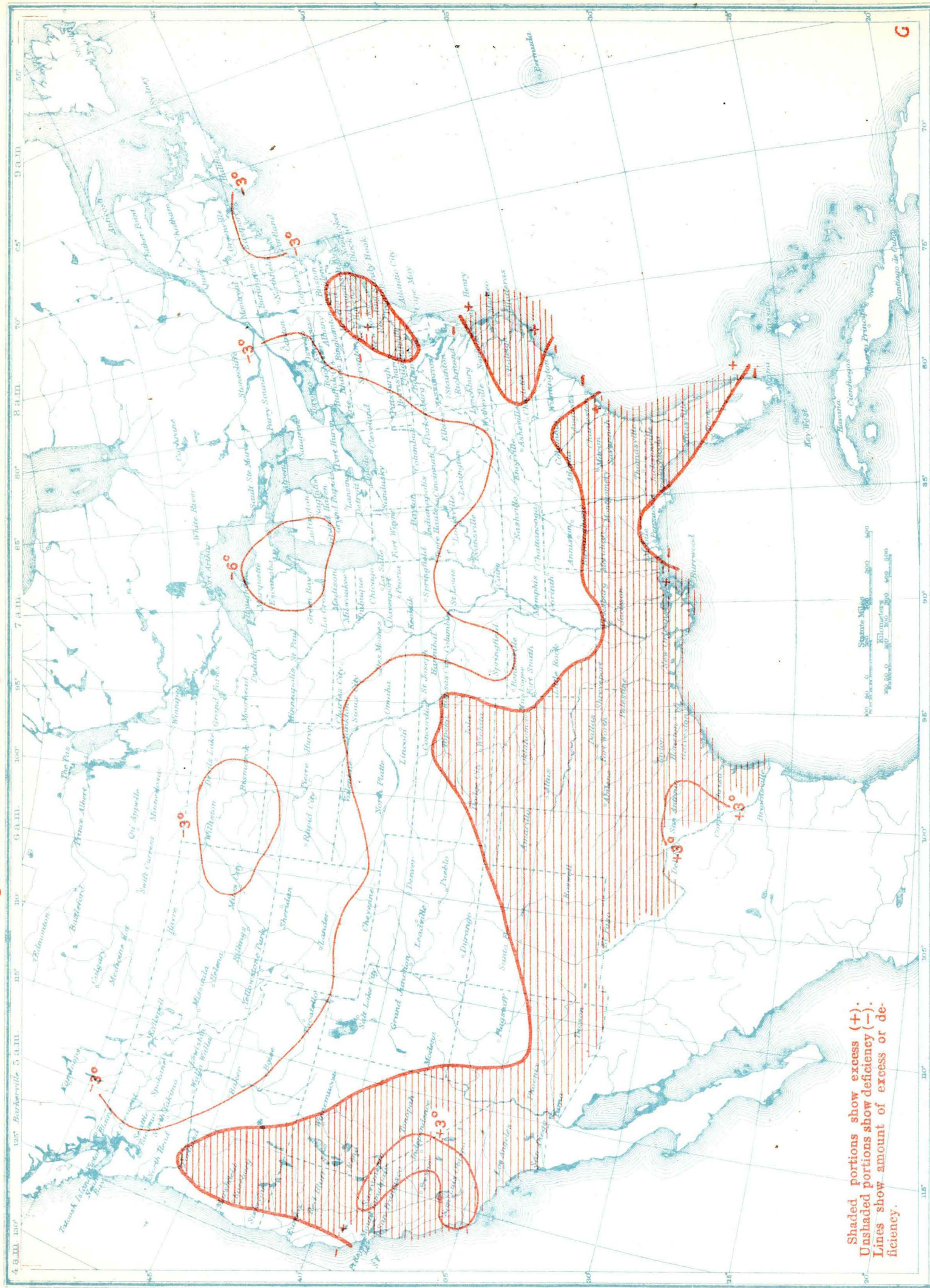


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

A

Departure of the Mean Temperature from the Normal, June, 1917.



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

G

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, JUNE, 1917. No. 6.

GENERAL SUMMARY.

June, 1917, was cool and wet, the rainfall being the greatest since 1890. In the central and southern divisions many stations had the greatest rainfall of record in June; some had three times the June normal, and 30 to 40 per cent of the annual normal. Excessive rains during the first week, particularly in the southern portion, seriously eroded hillsides and overflowed lowlands, destroying thousands of acres of crops. Similiar conditions prevailed in the northeastern portion of the State on the 23d-26th. Much of the overflowed land was replanted to corn toward the close of the month and the remainder will be used for various catch crops if seed is available. The last ten days of the month were favorable, but at the close corn averaged 10 days to two weeks late; early oats, rye, barley and winter wheat were heading in the Southern Division; hay short and thin, except alfalfa which was being cut and yielding a fair crop in some sections; potatoes excellent. The warm days at the close of the month brought on a better crop of strawberries than was expected.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.94 inches. The highest recorded was 30.39 inches, at Omaha, Neb., on the 14th, and the lowest was 29.11 at Charles City on the 6th. The monthly range was 1.28 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 106 stations, was 66.0°, or 3.1° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 64.5°, or 3.1° lower than the normal; Central, 66.1°, or 3.2° lower than the normal; Southern, 67.4°, or 2.8° lower than the normal. The highest monthly mean was 69.8°, at Thurman, in the extreme southwestern part of the State, and the lowest was 61.9°, at Postville, in the extreme northeast. The highest temperature reported was 100°, at Clarinda and Omaha, Neb., on the 30th, and the lowest was 32°, at Matlock and Sibley, on the 15th. The temperature range for the State was 68°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 79 per cent, and at 7 p. m. it was 62 per cent. The mean for the month was 71 per cent, or 2 per cent higher than the normal. The highest monthly mean was 76 per cent, at Charles City, and the lowest was 66 per cent, at Sioux City.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 115 stations, was 6.65 inches, or 2.27 inches more than the normal. By divisions the averages were as follows: Northern, 4.87 inches, or 0.44 of an inch more than the normal; Central, 6.99 inches or 2.67 inches more than the normal; Southern, 8.09 inches, or 3.70 inches more than the normal. The greatest amount, 13.82 inches, occurred at Keosauqua, and the least, 3.04 inches, at Mason City. The greatest amount in 24 consecutive hours, 5.06 inches, occurred at Atlantic, on the 6th.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was 85 miles an hour, from the west, at Sioux City, on the 22d.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 62, or about 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, 45; Davenport, 53; Des Moines, 63; Dubuque, 54; Keokuk, 77; Sioux City, 67; Omaha, Neb., 74.

TORNADOES AND WINDSTORMS

At 8:45 p. m. on the 5th a tornado visited Van Wert, causing a damage of \$2,500. On the 12th tornadoes occurred in Iowa, Jones and Jackson Counties; damage, about \$5,000. At Williamsburg, the hail accompanying the storm measured from one-half to one and three-fourths inches in diameter.

Nearly all sections of the State experienced violent wind squalls during the night of the 22d-23d. Wind mills, fruit and shade trees and farm buildings were blown down in large numbers. The total damage is difficult to estimate, but in some single localities, for example, Jefferson, the damage is placed at \$15,000. Destructive wind squalls occurred in some localities on the night of the 30th.

MISCELLANEOUS PHENOMENA.

Fog, dense: 10th, 24th.

Frost, light: 1st, 15th.

Hail: Northern Division, 14th, 22d, 24th, 30th; Central Division, 4th, 5th, 11th, 12th, 13th, 30th; Southern Division,

Halos; solar, or lunar: 1st, 2d, 3d, 16th, 17th, 18th, 22d, 24th, 26th, 29th.

Thunderstorms: All days except 10th and 17th.

COMPARATIVE DATA FOR THE STATE—JUNE.

YEAR	Temperature				Precipitation					Number of Days		
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With precipitation, .01 in.	Clear	Partly cloudy	Cloudy
1890	72.7	+3.6	106	44	7.76	+3.38	16.53	1.57	11	12	10	8
1891	69.1	0.0	99	37	5.39	+1.01	19.88	1.63	11	8	10	12
1892	69.2	+0.1	102	42	5.19	+0.81	14.16	0.67	10	12	11	7
1893	71.2	+2.1	100	40	3.91	-0.47	7.56	1.36	8	15	11	4
1894	73.2	+4.1	104	34	2.67	-1.71	6.20	0.57	7	16	10	4
1895	69.7	+0.6	102	34	4.32	-0.06	9.26	0.98	10	11	11	8
1896	69.1	0.0	100	40	3.11	-1.27	7.89	0.81	9	12	13	5
1897	69.1	0.0	103	29	3.81	-0.57	9.38	1.03	10	10	12	8
1898	71.4	+2.3	99	42	4.72	+0.34	12.48	1.90	9	13	10	7
1899	70.7	+1.6	100	42	5.04	+0.66	11.99	1.10	10	12	13	5
1900	69.7	+0.6	102	38	3.98	-0.40	12.35	0.67	5	17	10	3
1901	72.3	+3.2	106	30	3.71	-0.67	7.84	1.05	9	15	11	4
1902	65.2	-3.9	97	32	7.16	+2.78	16.04	1.46	14	8	11	11
1903	64.6	-4.5	96	30	2.86	-1.52	6.04	0.75	10	13	10	7
1904	67.1	-2.0	94	35	3.45	-0.93	8.85	0.44	7	13	10	7
1905	69.9	+0.8	100	36	5.53	+1.15	14.89	1.80	10	12	11	7
1906	67.9	-1.2	99	37	3.92	-0.46	8.27	1.48	8	15	10	5
1907	66.5	-2.6	98	36	5.35	+0.97	9.33	2.07	11	14	9	7
1908	67.1	-2.0	94	35	5.66	+1.28	11.88	1.77	13	12	10	8
1909	69.1	0.0	96	40	6.41	+2.03	13.30	2.80	13	12	10	8
1910	69.5	+0.4	105	33	1.99	-2.39	5.51	0.05	7	18	7	5
1911	75.7	+6.6	108	36	1.82	-2.56	6.28	0.06	5	20	8	2
1912	66.2	-2.9	101	34	2.74	-1.64	5.71	0.78	7	15	9	6
1913	71.5	+2.4	102	33	3.31	-1.07	8.95	0.74	7	19	8	3
1914	72.2	+3.1	101	40	5.57	+1.19	13.24	1.17	13	12	14	4
1915	65.1	-4.0	91	31	4.16	-0.22	9.99	1.72	11	12	12	6
1916	64.5	-4.6	96	38	3.71	-0.67	7.96	1.41	10	13	11	6
1917	66.0	-3.1	100	32	6.65	+2.27	13.82	3.04	12	13	10	7

Daily Precipitation for June, 1917—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	.05	1.95		2.05	.05	1.86		.12	.21																							8.44
Albia	Des Moines		2.47	T.		1.47	1.53	.05		.43		.62	1.51																			9.51	
Allerton	Chariton	.80	1.22		1.43	1.44	1.61		.26	.09		1.50	.55																			9.85	
Atlantic	Nishnabotna	T.	.43		2.55	.18	5.06	.02	.01	.10			.67																			11.19	
Bedford	Missouri	.38	1.64		2.00		0.8	1.96		.06																						9.20	
Bloomfield	Mississippi	.01	.60		2.00	1.75	1.26	.03	.35		.01	.75	3.00																			11.40	
Bonaparte	Des Moines	T.	.55		3.10	.73	.75	T.	.39			.24	3.27																			10.37	
Burlington	Mississippi		.28			2.12	.67	.04		.97			1.39																			6.52	
Centerville	Chariton	.08	1.68		2.05	.85	1.35		.53			2.60	1.90																			11.89	
Chariton	Chariton		2.50		1.45	.22	1.72		.20	.44			.72	1.64																		9.71	
Clarinda	Nodaway	.04	1.56		.05	1.50	1.63		.03	.04			.24																			7.63	
Columbus Jet.	Iowa		.95		.92	.85	.77	.05	.41	.12			.62	.38																		4.55	
Corning	Nodaway	.17	1.15		2.30	.19	1.85		.21				.29																			7.37	
Corydon	Chariton	.26	1.97		1.80	.74	1.56		.11			1.11	.94																			9.12	
Creston	Missouri		2.18		.03	1.75	3.51	.04	T.	.20			.18																			9.24	
Cumberland	Nodaway	.42			1.81		1.98		.19				.82																			6.02	
Earlham	Des Moines	T.	1.43		1.67	.12	1.37		.05	.25	.05		.73																			6.82	
Fairfield	Skunk	T.	.71		1.80	.80	1.22		.47				.23	.47																		6.95	
Fort Madison	Mississippi	.30	T.		3.66	.59	.03		.66				1.75																			8.15	
Glenwood	Missouri	.06	.29		1.47	.25	2.37		.42				.67																			8.03	
Greenfield	Nodaway		1.55		2.10	.25	1.93		.25	.10			1.13																			8.92	
Indianola	Des Moines	.63	1.94		1.09	.03	1.26		.34	.05			.08	.76																		6.19	
Keokuk	Mississippi	.24			3.47	.54			.28	T.			.18	.76																		7.35	
Keosauqua	Des Moines		.60	T.		4.96	2.58	.14		.25	T.		.42	2.66																		13.82	
Knoxville	Des Moines	T.	2.65		1.35	.07	1.25		.14	.78			.75	1.25																		9.68	
Lacona	Des Moines	.20	2.94		.50	.60	1.42	.01	.39				.32																			8.04	
Lamoni	Grand		2.10	.10		1.95	1.80	T.		.04			.08	1.54																		9.08	
Lenox	Missouri	.20	1.45		1.80	.07	2.47		.22				.30																			8.11	
Mount Ayr	Grand	.51	1.95		.90	.05	2.00		.04	.08		.03	T.	.11																		6.91	
Mt. Pleasant	Skunk	T.	.64		1.25	.98	1.09		.16				.31	1.05																			6.58
Murray	Grand	.21	1.83		1.39	.03	1.76		.05	.12	.06	T.	.52																			7.25	
Northboro	Missouri	.62	.49		.28	.05	1.33		.06				.03																			5.83	
Oskaloosa	Des Moines	.05	2.59		.82	.02	.83		.30			.88	.36	.35																		6.71	
Stockport	Missouri		1.45		.98	.58	.49					.63	.65	1.64																		7.28	
Ottumwa	Missouri		1.45		.98	.58	.49					.63	.65	1.64																		7.28	
Pella	Skunk	T.	3.05		2.25	.28	1.11		.18	.58		T.	1.50	.55																		10.33	
St. Charles	Des Moines	.62	2.00		1.04	.02	1.18		.09			.30	.54																			6.13	
St. Charles	Skunk		0.2	1.46		.88	.10	.52		T.	.17	T.	.73	.49	T.																	4.92	
Sigourney	Skunk		.65		3.03	.90	1.47		.63				1.13																			9.21	
Stockport	Missouri	.33	.56		.76	.21	3.32		.16				.52																			8.84	
Thurman	Missouri		.89		.75	.12		.97	.15				.48	.47																		4.37	
Washington	Skunk		.89		.75	.12		.97	.15				.48	.47																		4.37	
Winterset	Missouri	.02	1.52		1.13	.16	1.19		.03	.21			.57																			5.79	
Omaha, Neb.	Missouri	.02		.01	1.35	1.72	.59		.29				.38																			6.19	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 24 hours ending at the time of observation.
 ***Regular Weather Bureau Station; precipitation is for the 24-hour period, midnight to midnight.
 ||||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
 **Incomplete. T. Trace, or less than 0.01 inch.
 *Precipitation included in the next following measurement.

hay, especially clover, and pastures is more than made up in the increase in acreage of corn, oats and potatoes.

Barley. Acreage sown, 258,800 acres or a decrease of 2,000 acres. The condition is, however, 3 per cent better than last year, when it was 95 per cent.

Rye. Acreage, 35,275 acres, which is nearly the same as in 1916. The condition is 94 per cent, or one per cent better than last year.

Flax. Acreage, 7,400, as compared with 7,300 in 1916. Condition, 94, or 4 per cent better than last year.

Potatoes. Acreage 98,810, increase almost 11,000 acres, and the condition is 106, or 9 per cent better than last year.

Hay. Acreage of tame and wild hay, 3,196,000, or 452,000 acres less than in 1916. The condition is 83 per cent, or 13 per cent below last year.

Alfalfa. Acreage, 103,215; decrease, 50,000 acres.

Pastures. Acreage, 8,995,300; decrease, 400,000 acres; condition, 95 per cent.

Fruit. The Secretary of the State Horticultural Society reports the condition of fruit on July 1st to be as follows:

Summer apples, 75%; fall apples, 64%; winter apples, 54%; pears, 44%; American plums, 43%; Domestic plums, 24%; Japanese plums, 15%; cherries, 62%; grapes, 50%; red raspberries, 51%; black raspberries, 53%; blackberries, 47%; currants, 56%; gooseberries, 76% of a full crop. The average for all fruits is 51%, or 1% higher than the average for July last year. The apple crop promises to be 20% better than it was a year ago, while the small fruits will be 20% less than they were last year. Insects and fungus diseases about normal. Twig blight more abundant than usual.

RIVERS.

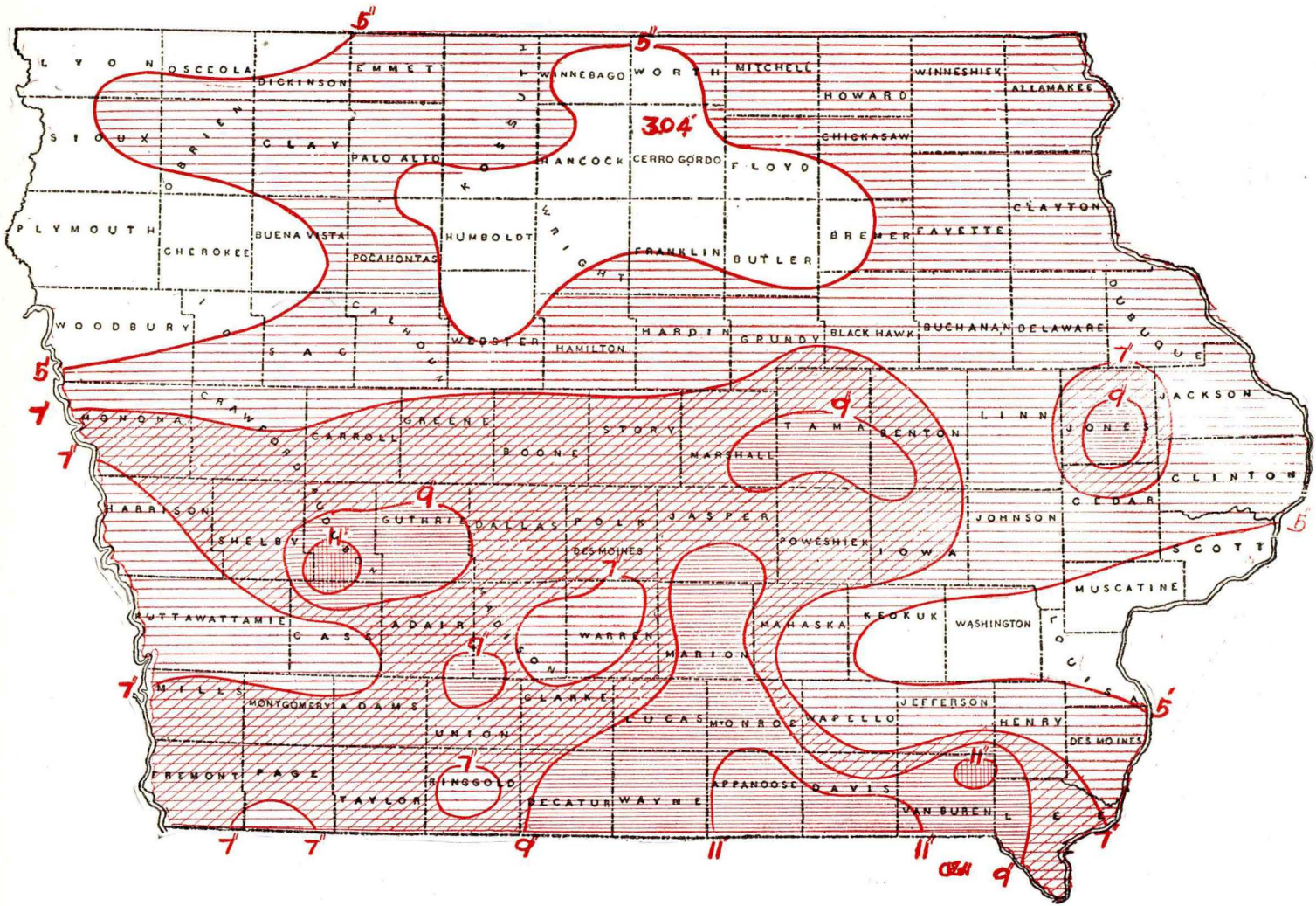
The Missouri River was moderately high throughout the month but no flood stages occurred. Nearly all of the interior rivers of the southern portion of the State overflowed between the 6th and 10th. In the Nishnabotna the water was said to have been the highest since 1861. The rivers of the northeastern part of the State were highest from the 23d to the 25th, when the stage reached was in some cases said to be the highest in 50 years. Moderate stages prevailed in the Mississippi.

Daily Maximum and Minimum Temperatures for the Month of June, 1917.

Table with columns for Stations, days 1-30, and Mean. Rows are grouped by Northern Division, Central Division, and Southern Division, listing various Iowa cities and their daily temperature ranges.

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

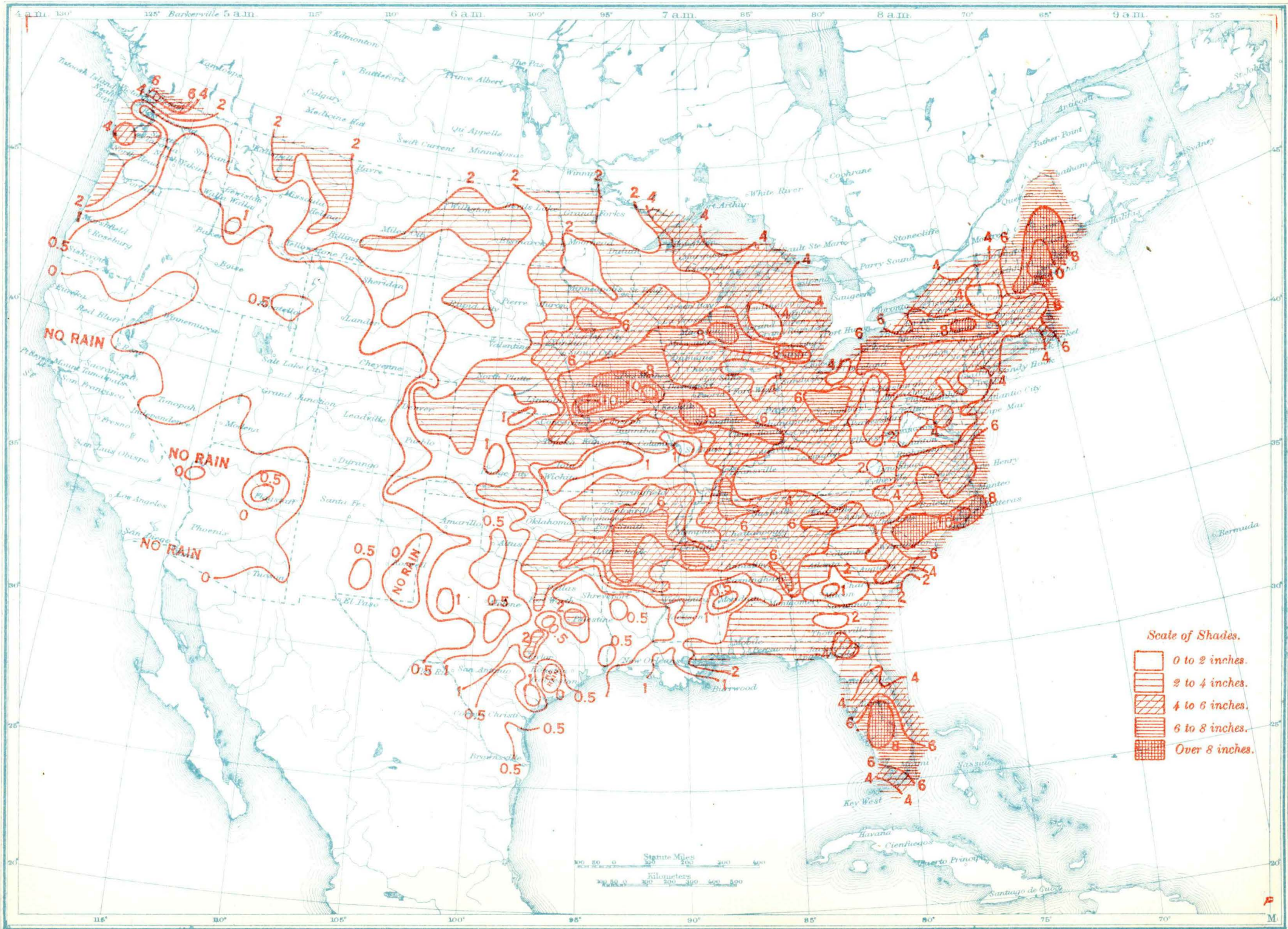
TOTAL PRECIPITATION, JUNE, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, June, 1917.



OCT 30 1917

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU

CHARLES F. MARVIN, CHIEF

CLIMATOLOGICAL DATA

IOWA SECTION

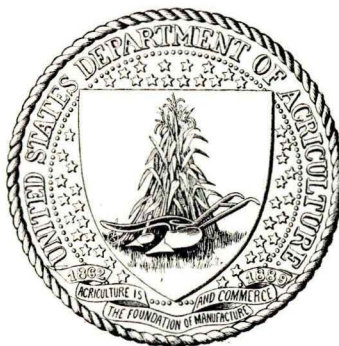
IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

JULY, 1917

BY

GEORGE M. CHAPPEL

SECTION DIRECTOR

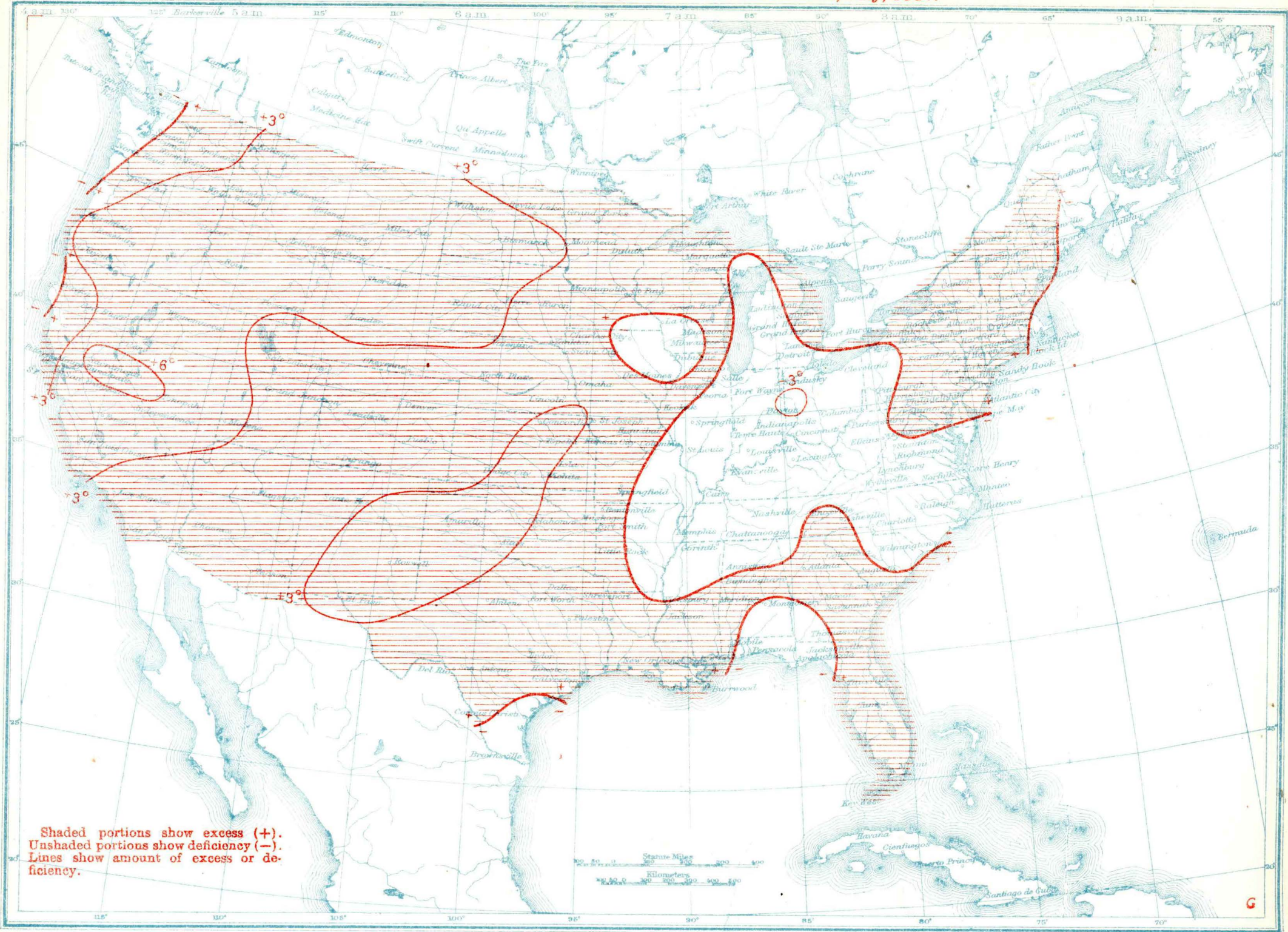


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

51

Departure of the Mean Temperature from the Normal, July, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, JULY, 1917. No. 7

GENERAL SUMMARY.

Cool weather prevailed during the first two decades, after which it was warm, with abnormally hot weather the last four days. Precipitation was deficient, but mostly well distributed till the last week of the month, when the drought accompanied by high temperature and hot winds damaged pastures, potatoes and garden truck. Corn which was 10 days to two weeks late at the close of June, made phenomenal growth the last half of July, but in the western part of the State the hot winds of the closing days of the month rolled the leaves considerably in the daytime. However, the abundant soil moisture caused a rapid recovery at night. It was beginning to tassel in all sections on the 31st. The season was generally favorable for small grain which, by the close of the month, was mostly harvested and some threshed, showing large yields and good quality.

Destructive wind squalls attended thunderstorms over Dallas and Polk counties between 7 and 10 p. m. of the 5th, unroofing many residences, uprooting large oak, walnut and linden trees and demolishing farm buildings. The destruction in the extreme western part of Des Moines was unusually large. Excessive rain fell in Allamakee County and adjacent territory in Wisconsin, on the 21st and 22d. At Lansing, the total precipitation for those days was 5.77 inches, of which 3.65 inches fell in a period of 4 hours and 5 minutes, beginning at 5 p. m. of the 21st.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 29.92 inches. The highest recorded was 30.16 inches, at Sioux City, on the 16th, and the lowest was 29.58 at Sioux City on the 13th, and at Omaha, Nebr., on the 12th. The monthly range was 0.58 of an inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 101 stations, was 74.3°, or 0.2° higher than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 72.6°, or 0.1° lower than the normal; Central, 74.7°, or 0.4° higher than the normal; Southern, 75.7°, or 0.5° higher than the normal. The highest monthly mean was 79.0°, at Omaha, Nebr., and the lowest was 70.2°, at Postville. The highest temperature reported was 106°, at Clarinda, on the 30th; the lowest was 38°, at Rock Rapids, on the 3d. The temperature range for the State was 68°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 78 per cent, and at 7 p. m. it was 54 per cent. The mean for the month was 66 per cent, or 1 per cent lower than the normal. The highest monthly mean was 72 per cent, at Charles City, and the lowest was 57 per cent, at Omaha, Nebr.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 111 stations, was 2.27 inches, or 1.69 inches less than the normal. By divisions the averages were as follows: Northern, 3.28 inches, or 0.60 inch less than the normal; Central, 2.25 inches, or 1.73 inches less than the normal; Southern, 1.28 inches, or 2.74 inches less than the normal. The greatest amount, 6.06 inches, occurred at Nora Springs, and the least 0.23 of an inch at Northboro. The greatest amount in 24 consecutive hours, 3.65 inches, occurred at Lansing, on the 21st.

WIND.

The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau station was 39 miles an hour, from the north, at Sioux City, on the 11th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 81, or 8 per cent more than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 68; Davenport, 76; Des Moines, 90; Dubuque, 72; Keokuk, 87; Sioux City, 87; Omaha, Nebr., 86. Twenty-nine stations reported no cloudy days.

MISCELLANEOUS PHENOMENA.

Aurora: 11th, 28th, 29th.

Fog: 7th, 9th.

Hail: Northern Division, 12th, 14th, 16th, 23d; Central Division, 15th, 18th; Southern Division, 12th 13th, 15th, 20th.

Thunderstorms: All days, except 3d, 7th, 9th, 19th, 27th and 28th.

COMPARATIVE DATA FOR THE STATE—JULY.

YEAR	Temperature				Precipitation					Number of Days		
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With precipitation (of in.)	Clear	Partly cloudy	Cloudy
1890	75.6	+1.5	110	45	1.98	-1.98	5.00	0.37	3	18	8	5
1891	68.5	-5.6	99	41	4.22	+0.26	8.20	1.67	8	13	13	5
1892	73.0	-1.1	104	38	5.29	+1.33	12.86	1.71	9	16	10	5
1893	75.0	+0.9	102	47	3.33	-0.63	8.84	1.49	7	19	10	2
1894	76.4	+2.3	109	39	0.63	-3.33	3.50	T	3	22	8	1
1895	72.1	-2.0	104	35	3.40	-0.56	10.10	0.45	7	15	12	4
1896	73.6	-0.5	104	42	6.90	+2.94	12.67	1.61	9	14	11	6
1897	75.6	+1.5	106	42	3.26	-0.70	7.60	1.01	6	18	10	3
1898	73.4	-0.7	102	42	2.98	-0.98	12.88	0.55	7	19	9	3
1899	73.1	-1.0	101	38	3.07	-0.89	8.66	0.42	7	16	10	5
1900	73.4	-0.7	102	37	6.15	+2.19	13.45	1.80	9	16	10	5
1901	82.4	+8.3	113	46	2.34	-1.02	5.97	0.27	5	21	9	1
1902	73.1	-1.0	99	41	8.67	+4.71	13.57	4.82	13	14	10	7
1903	72.9	-1.2	100	40	4.83	+0.87	12.72	0.94	9	17	9	5
1904	70.6	-3.5	100	38	4.41	+0.45	11.97	1.28	10	16	9	6
1905	70.6	-3.5	102	40	2.91	-1.05	7.08	0.69	9	14	10	7
1906	70.9	-3.2	102	42	3.04	-0.92	7.05	0.26	8	18	10	3
1907	73.7	-0.4	102	41	7.27	+3.31	13.66	3.97	13	16	11	4
1908	73.0	-1.1	100	42	3.66	-0.30	9.21	0.70	8	16	10	5
1909	72.3	-1.8	102	46	4.77	+0.81	12.20	1.20	10	15	8	8
1910	74.5	+0.4	108	43	1.86	-2.10	5.69	0.12	7	19	8	4
1911	75.5	+1.4	111	38	2.27	-1.69	6.62	0.68	7	18	10	3
1912	74.6	+0.5	103	38	3.71	-0.25	7.56	1.17	10	17	10	4
1913	76.1	+2.0	108	45	1.82	-2.14	6.23	T	5	21	8	2
1914	76.6	+2.5	109	43	2.27	-1.69	6.50	0.44	5	20	8	3
1915	69.5	-4.6	92	40	8.32	+4.36	15.83	3.68	14	10	12	9
1916	79.7	+5.6	105	48	1.73	-2.18	6.87	0.10	5	23	7	1
1917	74.3	+0.2	106	38	2.27	-1.69	6.06	0.23	7	21	8	2

Climatological Data for July, 1917

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, Precipitation 0.01 in. or more), Number of Days (Clear, Partly cloudy, Cloudy, Prevailing direction of wind), Observers.

Climatological Data for July, 1917-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 0.01 in. or more.	Clear.	Partly cloudy.	Cloudy.			
																					Mean.
Webster City	Hamilton	1,044	12	74.8	0.0	102	30	45	3	35	2.66	-0.80	0.74	0	9	23	7	1	se.	C. B. Carpenter.	
Whitten	Hardin	1,036	20	75.5	+1.6	102	31	44	3	35	2.31	-1.37	0.73	0	4	22	7	1	sw.	Dr. F. P. Butler.	
Williamsburg	Iowa	765	1	74.4	---	100	30†	46	3	32	1.90	---	0.74	---	8	22	8	1	se.	Dr. F. C. Schadt.	
Means and extremes	-----	-----	-----	74.7	+0.4	103	29†	42	3	38	2.25	-1.73	2.40	0	7	21	8	2	sw.	-----	
<i>Southern Division</i>																					
Afton	Union	1,212	23	76.0	+0.5	100	30†	48	3	30	1.45	-2.60	0.70	0	4	26	4	1	sw.	J. E. Deitrick.	
Albia	Monroe	950	19	74.7	0.0	103	30	45	3	30	0.75	-3.31	0.35	0	3	23	4	4	sw.	E. H. Holmes.	
Allerton	Wayne	1,122	15	76.1 ^d	+0.9	102 ^d	30	49 [†]	3	29 [†]	1.80	-2.56	0.65	0	7	---	---	---	se.	R. D. Parks.	
Atlantic	Cass	1,164	26	76.7	+2.0	102	29	48	3	33	1.12	-2.61	0.49	0	8	13	16	2	sw.	Thos. H. Whitney.	
Bedford	Taylor	---	17	74.8	+0.1	101	31	46	3	38	0.45	-3.95	0.23	0	6	25	6	0	se.	E. E. Healy.	
Bloomfield	Davis	881	10	75.8	---	102	30	48	3	31	1.46	-3.10	0.65	0	9	13	18	0	sw.	V. G. Warner.	
Bonaparte	Van Buren	565	26	75.2	+0.1	99	30†	50	3	33	2.05	-1.59	1.07	0	6	26	5	0	nw.	Bruce R. Vale.	
Burlington	Des Moines	544	21	77.0	+1.0	102	30	51	3	32	1.63	-1.91	0.88	0	7	22	9	0	sw.	Mrs. J. A. Donnelly.	
Chariton	Appanoose	1,013	12	75.8	---	100	30	47	3	32	1.62	---	0.95	0	5	21	7	3	sw.	S. A. Martin.	
Chariton	Lucas	1,042	22	73.8	0.0	102	30	44	3	35	0.62	-3.94	0.32	0	2	16	15	0	sw.	C. C. Burr.	
Clarinda	Page	1,009	27	77.0	+1.8	106	30	49	3	36	0.24	-4.24	0.16	0	3	27	4	0	s.	A. S. Van Sandt.	
Columbus Jct.	Louisa	595	16	75.2	+0.2	99	30	49	3	26	2.70	-1.21	1.40	0	7	28	3	0	sw.	J. B. Johnston.	
Corning	Adams	1,117	25	75.2	+0.8	101	29†	44	3	37	0.45	-3.56	0.41	0	2	25	6	0	nw.	Jerome Smith.	
Corydon	Wayne	1,101	24	75.4	-0.1	103	30	46	3	32	1.44	-2.33	0.75	0	6	22	7	2	nw.	May C. Miller.	
Creston	Union	1,312	12	74.2	+0.4	101	30	47	3	33	0.61	---	0.28	0	3	19	11	1	nw.	Mrs. Estella McConnell.	
Cumberland	Cass	---	18	---	---	---	---	---	---	---	0.39	-3.80	0.31	0	5	---	---	---	sw.	J. H. Reppert.	
Earlham	Madison	1,126	15	73.6	+0.3	101	28†	42	3†	37	0.83	-3.65	0.23	0	2	28	3	0	nw.	Geo. Phillips.	
Fairfield	Jefferson	780	33	75.8 ^b	-0.2	100 ^b	30†	46 ^b	4	33 ^b	2.57	-1.29	1.32	0	9	---	---	---	sw.	R. Monroe McKenzie.	
Fort Madison	Lee	516	68	---	---	---	---	---	---	---	2.36	-1.53	1.10	0	5	18	8	5	nw.	F. M. Myers.	
Greenwood	Mills	---	---	78.7	---	103	29	48	3	35	0.38	---	0.16	0	4	21	1	9	ne.	Dr. Geo. Mogridge.	
Greenfield	Adair	---	25	75.1 ^a	+0.5	105 ^a	29	48 ^a	3	35 ^a	0.83	-3.25	0.26	0	5	---	---	---	sw.	Frank A. Ward.	
Indianola	Warren	969	26	76.0	+0.9	100	30	54 ^a	4	26 ^a	2.06	-1.68	1.47	0	5	14	12	5	sw.	Prof. J. L. Tilton.	
Keokuk	Lee	614	46	76.6	-0.4	100	30	55	3	25	2.65	-1.38	1.77	0	9	17	14	0	s.	U. S. Weather Bureau.	
Keosauqua	Van Buren	644	25	75.4	-0.3	101 ^a	30†	46	3	33 ^a	2.27	-1.73	0.84	0	6	11	19	1	s.	J. H. Landes.	
Knoxville	Marion	920	22	72.8	-2.9	102	30†	46	3	33	1.03	-2.98	0.63	0	4	17	10	4	nw.	W. J. Casey.	
Lacona	Warren	---	18	---	---	---	---	---	---	---	1.57	-2.03	0.73	0	6	13	14	4	---	J. B. Alter.	
Lamoni	Decatur	---	10	75.2	-0.9	99	30	49	3	34	0.88	---	0.41	0	7	22	8	1	s.	Chas. B. Woodstock.	
Lenox	Taylor	1,250	22	---	---	---	---	---	---	---	0.38	-3.98	0.30	0	3	28	3	0	s.	J. L. Hurley.	
Mt. Ayr	Ringgold	1,236	24	75.3	-0.2	99	30	50	3	32	1.75	-2.92	1.57	0	5	21	9	1	s.	Alex. Maxwell.	
Mt. Pleasant	Henry	729	36	---	---	---	---	---	---	---	1.56	-1.86	0.54	0	5	21	10	0	sw.	J. W. Edwards.	
Murray	Clarke	1,216	26	76.4	+1.4	102	30	49	3	33	1.17	-2.99	0.65	0	8	23	7	1	s.	M. T. Ashley.	
Northboro	Page	1,120	5	77.6	---	102	29†	51	3	33	0.23	---	0.15	0	2	25	5	1	se.	J. M. Darby.	
Oskaloosa	Mahaska	843	41	74.2	-0.4	98	30†	46	3	33	2.80	-0.81	2.09	0	8	27	0	4	nw.	Jos. Bowd.	
Ottumwa	Wapello	849	22	76.6	---	101	30	49	3	31	0.71	-2.72	0.24	0	6	26	2	3	se.	Thos. Ray.	
Pella	Marion	877	14	75.2	0.0	103	30	46	3	31	1.76	-1.47	0.65	0	6	26	1	4	nw.	John H. Ver Steeg.	
St. Charles	Madison	1,070	16	75.4	+0.3	101	30†	50	3	27	0.99	-2.91	0.44	0	6	24	7	0	sw.	R. D. Minard.	
Sigourney	Keokuk	877	21	75.4	-0.2	102	30	47	3	32	1.85	-2.08	0.52	0	7	23	7	1	nw.	W. E. Utterback.	
Stockport	Van Buren	754	15	73.8	-1.2	99	30†	50	3†	35	1.22	-3.18	0.47	0	7	23	7	1	nw.	C. L. Beswick.	
Thurman	Fremont	---	20	76.8	+0.4	103	29	49	3	41	0.70	-4.34	0.21	0	6	15	15	1	sw.	C. R. Paul.	
Washington	Washington	769	35	75.4	+0.7	100	30	47	3	28	1.84	-1.55	0.98	0	8	12	18	1	sw.	Wm. A. Cook.	
Winterset	Madison	1,129	26	75.4	-0.4	101	30	47	3	32	0.48	-4.19	0.11	0	8	25	6	0	nw.	H. S. Ely.	
Omaha, Neb.	---	1,040	46	79.0	+2.5	104	29	58	3	26	0.78	-3.55	0.56	0	7	23	7	1	nw.	U. S. Weather Bureau.	
Means and extremes	-----	-----	-----	75.7	+0.5	106	30	42	3	41	1.28	-2.74	2.09	0	6	21	8	2	sw.	-----	
State means and extremes	-----	-----	-----	74.3	+0.2	106	30	38	3	41	2.27	-1.68	2.40	0	7	21	8	2	sw.	-----	

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

RIVERS.

Ample stages for navigation continued throughout the month in the Mississippi River; and moderately high stages in the Missouri River till toward the close of the month when a steady fall began. The interior rivers fell steadily and became rather low by the close of the month.

ERRATA.

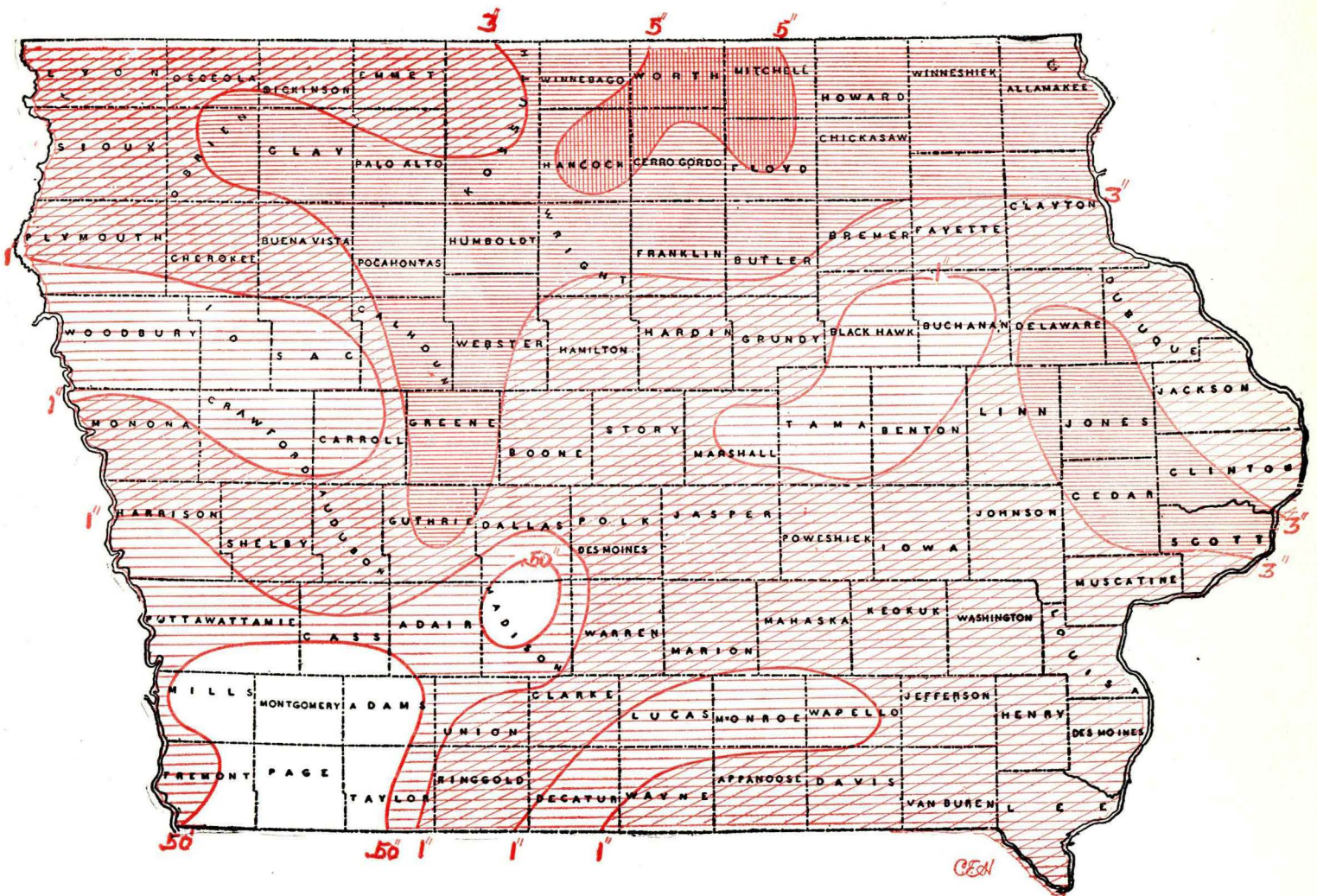
Report for May, 1917: Page 53; Mt. Pleasant; monthly mean temperature published 55.2°, should be 60.2°; departure of mean from the normal published -7.4°, should be -2.4°.
 Report for June, 1917: Page 64; Waterloo; number of days with .01 inch or more of precipitation published 11, should be 12.

Daily Maximum and Minimum Temperatures for the Month of July, 1917.

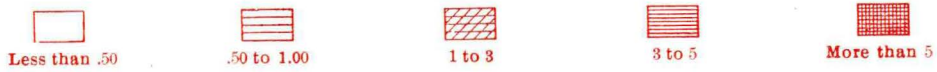
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by division: No. Division, Cen. Division, and So. Division. Each station entry includes maximum and minimum temperature values for each day.

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

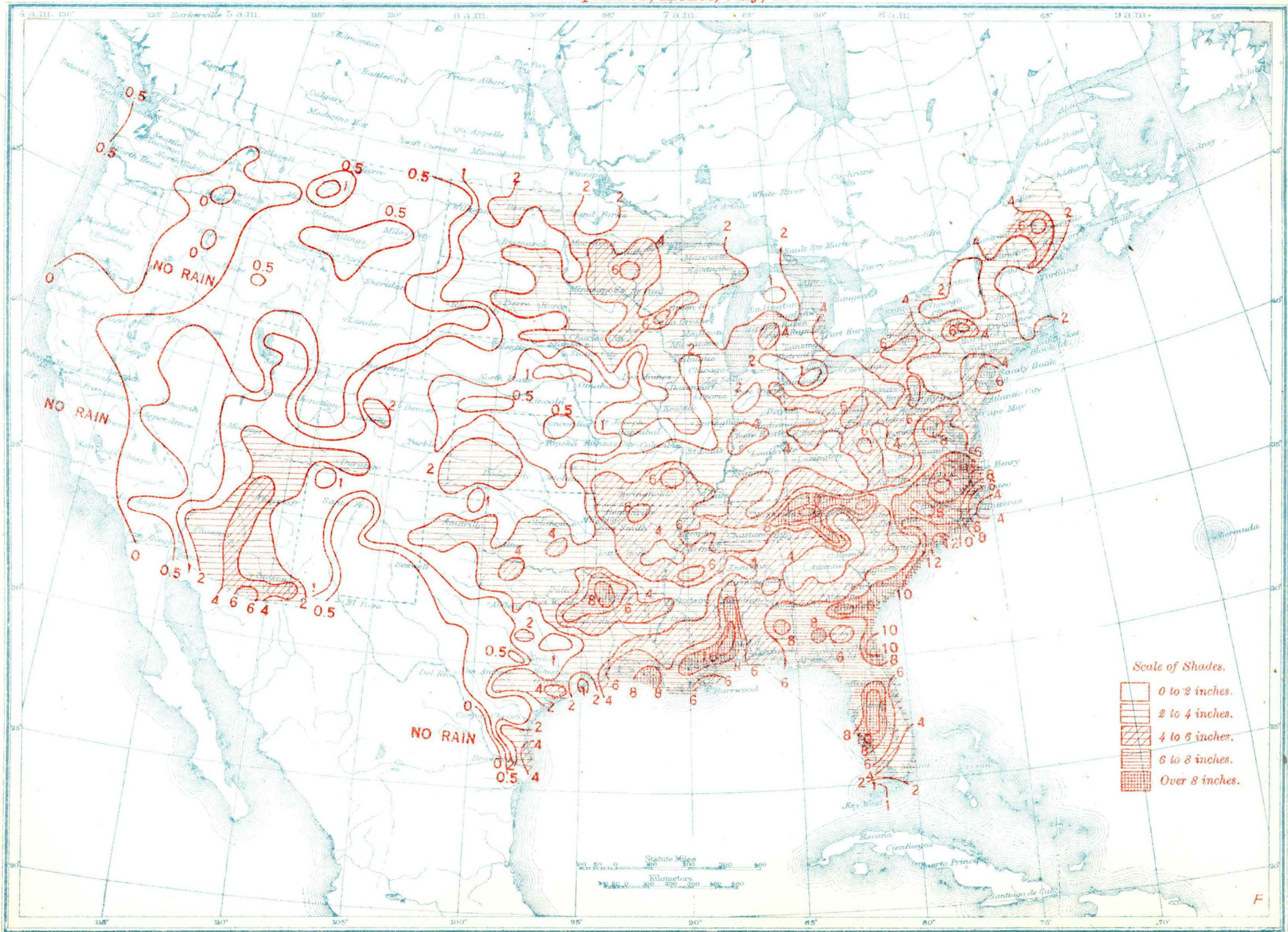
TOTAL PRECIPITATION, JULY, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, July, 1917.



OCT 30 1917

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

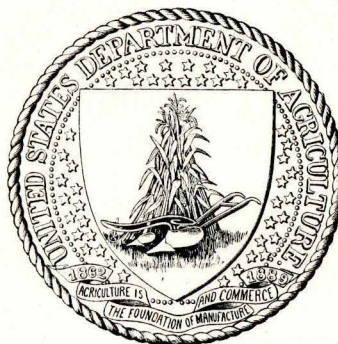
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

AUGUST, 1917

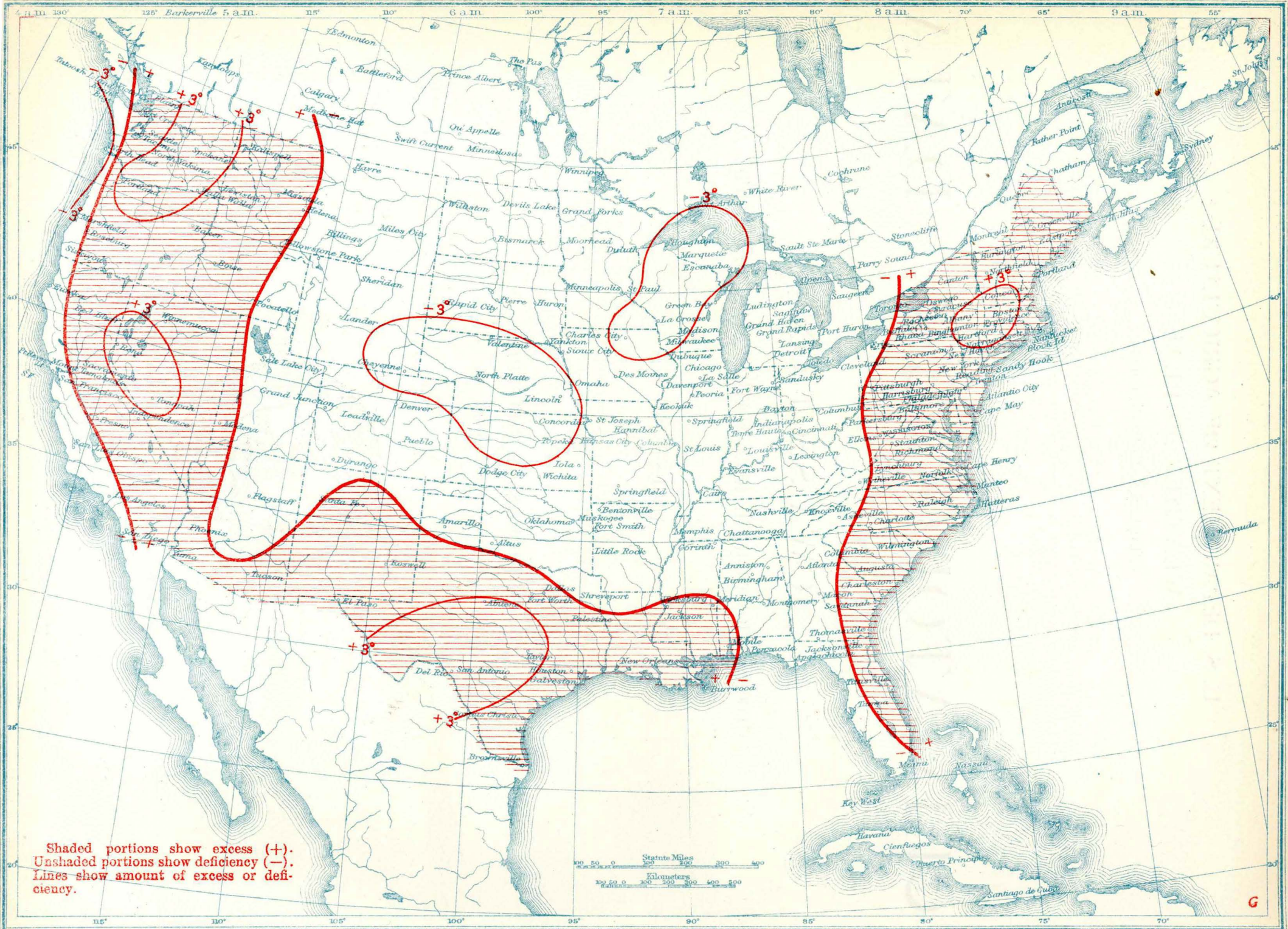
BY
GEORGE M. CHAPPEL
SECTION DIRECTOR



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DES MOINES, IOWA
WEATHER BUREAU OFFICE

Departure of the Mean Temperature from the Normal, August, 1917.



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



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

HUMIDITY.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, AUGUST, 1917. NO. 8

GENERAL SUMMARY.

Droughty conditions that prevailed at the close of July were relieved by frequent and quite general showers during the first 12 days of August, followed by a nearly rainless week, after which only occasional local rains occurred. In many sections, particularly the south-central and south-eastern, pastures had become brown and bare from drought and grasshoppers long before the close of the month, and stock was being fed. In the corn fields where a large supply of moisture had been stored earlier in the season and conserved by cultivation, the crop suffered little, though it would have been benefited by an additional supply. After the 4th, temperatures, especially at night, were generally so low that the crop made slow progress and only the earliest fields had reached the roasting ear stage by the close of the month. Threshing was 80 per cent finished, the yield and quality of all grains being exceptionally good and that of oats being the largest of record. Late potatoes and truck crops suffered somewhat from lack of moisture. Very little fall plowing could be done.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.01 inches. The highest recorded was 30.32 inches, at Omaha, Nebr., on the 2d, and the lowest was 29.69, at Dubuque, on the 24th. The monthly range was 0.63 of an inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 108 stations, was 69.4°, or 2.4° lower than the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 68.0°, or 2.4° lower than the normal; Central, 69.6°, or 2.1° lower than the normal; Southern, 70.7°, or 2.5° lower than the normal. The highest monthly mean was 74.1°, at Mt. Ayr, and the lowest was 65.4°, at Postville. The highest temperature reported was 102°, at Lenox, on the 4th, and the lowest was 31°, at Matlock, on the 28th. The temperature range for the State was 71°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 114 stations, was 2.29 inches, or 1.39 inches less than the normal. By divisions the averages were as follows: Northern, 2.21 inches, or 1.27 inches less than the normal; Central, 2.31 inches, or 1.46 inches less than the normal; Southern, 2.35 inches, or 1.43 inches less than the normal. The greatest amount, 6.31 inches, occurred at Onawa, and the least, 0.70 of an inch, at Davenport. The greatest amount in 24 hours, 2.80 inches, occurred at Olin, on the 7th.

The average relative humidity for the State at 7 a. m. was 80 per cent, and at 7 p. m. it was 54 per cent. The mean for the month was 67 per cent, or 4 per cent lower than the normal. The highest monthly mean was 74 per cent, at Charles City, and the lowest was 68 per cent, at Omaha, Nebr.

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 42 miles an hour, from the east, at Sioux City, on the 6th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 71, or about normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 60; Davenport, 72; Des Moines, 70; Dubuque, 74; Keokuk, 74; Sioux City, 77; Omaha, Nebr., 72.

MISCELLANEOUS PHENOMENA.

Aurora: 8th, 9th, 14th, 15th, and 25th, those of the 9th and 25th being particularly bright in some sections of the State.

Fog: 12th, 13th, 14th, 15th, 16th, 17th, 20th, 21st, 22d, 23d and 27th.

Frost: 10th, 28th, 30th.

Hail: Northern Division, 19th; Central Division, 21st and 27th; Southern Division, 21st.

Halos, (lunar or solar): 15th, 21st, 27th and 28th.

Thunderstorms: All days except 3d, 10th, 13th, 14th, 15th, 16th, 18th, 24th, 28th, 29th, and 30th.

COMPARATIVE DATA FOR THE STATE—AUGUST.

YEAR	Temperature				Precipitation					Number of Days		
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	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	105	34	4.24	-0.56	13.02	1.23	8	13	12	6
1892	71.4	-0.4	102	40	2.24	-1.34	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	2
1895	71.9	+0.1	103	37	4.43	+0.75	10.63	0.67	7	17	9	5
1896	71.7	-0.1	104	34	3.52	-0.16	12.25	0.86	8	15	11	5
1897	68.9	-2.9	104	35	1.86	-1.82	4.98	0.47	6	15	11	5
1898	71.2	-0.6	103	40	3.44	-0.24	10.55	0.58	6	17	9	5
1899	74.4	+2.6	100	41	3.68	0.00	10.45	1.12	7	17	10	4
1900	77.4	+5.6	103	44	4.65	+0.97	10.43	1.26	6	18	10	3
1901	73.8	+2.0	105	40	1.29	-2.39	4.46	T	5	20	9	2
1902	69.1	-2.7	98	37	6.58	+2.90	15.47	1.57	11	11	11	9
1903	69.1	-2.7	101	41	6.64	+2.96	17.74	2.55	11	12	10	9
1904	69.1	-2.7	97	35	3.43	-0.25	6.75	0.66	7	17	8	6
1905	74.3	+2.5	104	44	4.05	+0.37	8.47	1.04	9	16	9	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

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

Climatological Data for August, 1917

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 unmelted), Number of Days (Precipitation 0.01 in. or more, Clear, Partly cloudy, Cloudy, Prevailing direction of wind), and Observers. The table is divided into Northern Division, Central Division, and Means and Extremes.

Daily Precipitation for August, 1917—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 Div.</i>																																			
Afton	Grand	.24	.45					.32		.07		.26								.16	T.			.62				.20							2.32
Albia	Des Moines	.15	T.				.23	.91		.23			T.	T.							.10	T.	T.	T.					.36					1.98	
Allerton	Chariton																																		
Atlantic	Nishnabotna	.51		.28		.41		.39		.05			.62								.01	.01	.10	.19			.01	.48	.04		T.			3.10	
Bedford	Missouri	.15	.15			.08	T.	.55		.05		.02	.50								.50							.24						2.24	
Bloomfield	Mississippi	.14				.03		1.65														.03			.01			.40						2.26	
Bonaparte	Des Moines	.06				.09		.56				.02									T.	T.		T.			.38	.01						1.13	
Burlington	Mississippi		.08			.28	.04	.20	.04	.10												.56						.50						1.80	
Centerville	Chariton	.10			T.	.20		.20		.20			.05								T.			.01			.11	.05						1.72	
Chariton	Chariton	.31	T.			.44		.70		.15			T.								T.		.70	.18				.20						2.68	
Clarinda	Nodaway	.15		.98		.25		.57				.02	.85										.28	.13			.03	.04						3.30	
Columbus Jct.	Iowa	T.			.10	T.		.87		.05			.64								T.	T.				.43								2.09	
Corning	Nodaway	.08	.05			T.		.49		.14			.45											.20			.33							1.74	
Corydon	Chariton	.10	.04			.09		.06	T.	.17			.03									.01	.11				.31	.01						.93	
Creston	Missouri	.23		.18				.18		T.			.14									T.			.30				.30					1.33	
Cumberland	Nodaway	.27	.21			.41		.17	.01	.02			.63								T.		.01				.13							1.86	
Earlham	Des Moines	.88	.15		T.		T.		T.				.50									T.			.61		.26							2.40	
Fairfield	Skunk	.03						1.43		.03		.03														.12								1.64	
Fort Madison	Mississippi				T.	.10	T.			.08			.02										T.				.90							1.10	
Glenwood	Missouri	.90	1.00		.45	.20	T.	.70	T.			.04	.50		T.							.42	.10	.09			.10						4.50		
Greenfield	Nodaway	.36	.30		T.	.05		.42	.10				.68												.70									2.61	
Indianola	Des Moines	.58	T.			.03		.08	.16	.30			.10								.22	T.	1.39	.01	.24		.13						2.75		
Keokuk	Mississippi	T.				.08	.16	.30		.24			T.									T.	T.			.57	.02							1.37	
Keosauqua	Des Moines	.07				.11		.72					.18												T.		.27	.03						1.38	
Knoxville	Des Moines																																		
Lacona	Des Moines	.35				.01		.33					.02								.02		.82			.58								2.13	
Lamoni	Grand	.50		.03		.05	.91					T.	.11									T.	.28	.60			.60							3.08	
Lenox	Missouri	.28				.25		.60			.05		.50									1.00		.10		.10								T.	2.88
Mount Ayr	Grand	.59	.02			.67		1.02	T.	.02		T.	.29		T.						.08	T.	.15	.56		.09		.10						3.49	
Mt. Pleasant	Skunk	.06				.24	T.	.28		.05			T.									.01	.27			.21	.04							1.16	
Murray	Grand	.32	.29		T.		.37	T.	.06			.18									T.	.06	.38	.28		.26								2.20	
Northboro	Missouri	.08	.83			.75		.75	.25			.70										1.25	.05		.04									4.70	
Oskaloosa	Des Moines	.13	T.			T.	1.30	T.	.11			T.												.06		.10								2.25	
Ottumwa	Missouri	T.				.17	1.35		.14			T.										T.	T.		T.				.34					2.00	
Pella	Skunk	.28				T.		.42		.08			.08									T.	.15	T.		.05		.47						1.53	
St. Charles	Des Moines	.42	.08					.06	.02	.04			.14									.23		.32	.02	.55		.26						2.13	
Sigourney	Skunk	.02				.04	T.	1.20		.16			T.									T.				.43									1.85
Stockport	Skunk	.05				.09	.01	.45		.22																.12	.05								.99
Thurman	Missouri	.37	.75			.65		.62				T.	.46									.27	1.72	.37	T.									5.46	
Washington	Skunk	.04				.19		1.51		.20			.49	.01												.58	.11								3.13
Winterset	Missouri	.44	.16			.01		.01	.02				.29									T.	.01	1.53		.31								3.03	
Omaha, Neb.	Missouri	.22	.40		.35		1.08		T.			.31											.78		.27			T.						3.65	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 24 hours 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. T. Trace, or less than 0.01 inch.

*Precipitation included in the next following measurement.

RIVERS.

The rivers fell slowly and steadily and were generally quite low by the close of the month.

IOWA CROP REPORT, SEPTEMBER 1, 1917

Following is a summary showing the condition of crops on September 1st, as compared with the average of past years on that date: Corn, 84 per cent; potatoes, 95; flax 94; pastures, 80 per cent. On September 1, 1916, the conditions were: Corn, 83; potatoes, 58; flax, 88; pastures, 77 per cent.

Corn is unusually backward. Practically all of the earliest planted fields are only in the roasting ear stage and much of the crop is still in the milk or dough stage.

Preliminary reports indicate the average yield of winter wheat to be 19 bushels per acre; spring wheat, 21; oats, 50; barley, 37; rye, 20; timothy seed, 5 bushels per acre. If these estimates are maintained by final reports the State will produce about 2,500,000 bushels of winter wheat; 3,600,000 of spring wheat; 260,000,000 of oats; 9,500,000 of barley and 700,000 bushels of rye. The area of timothy cut for seed was only 60 per cent of last year's acreage. Eighty per cent of the threshing had been finished on September 1st.

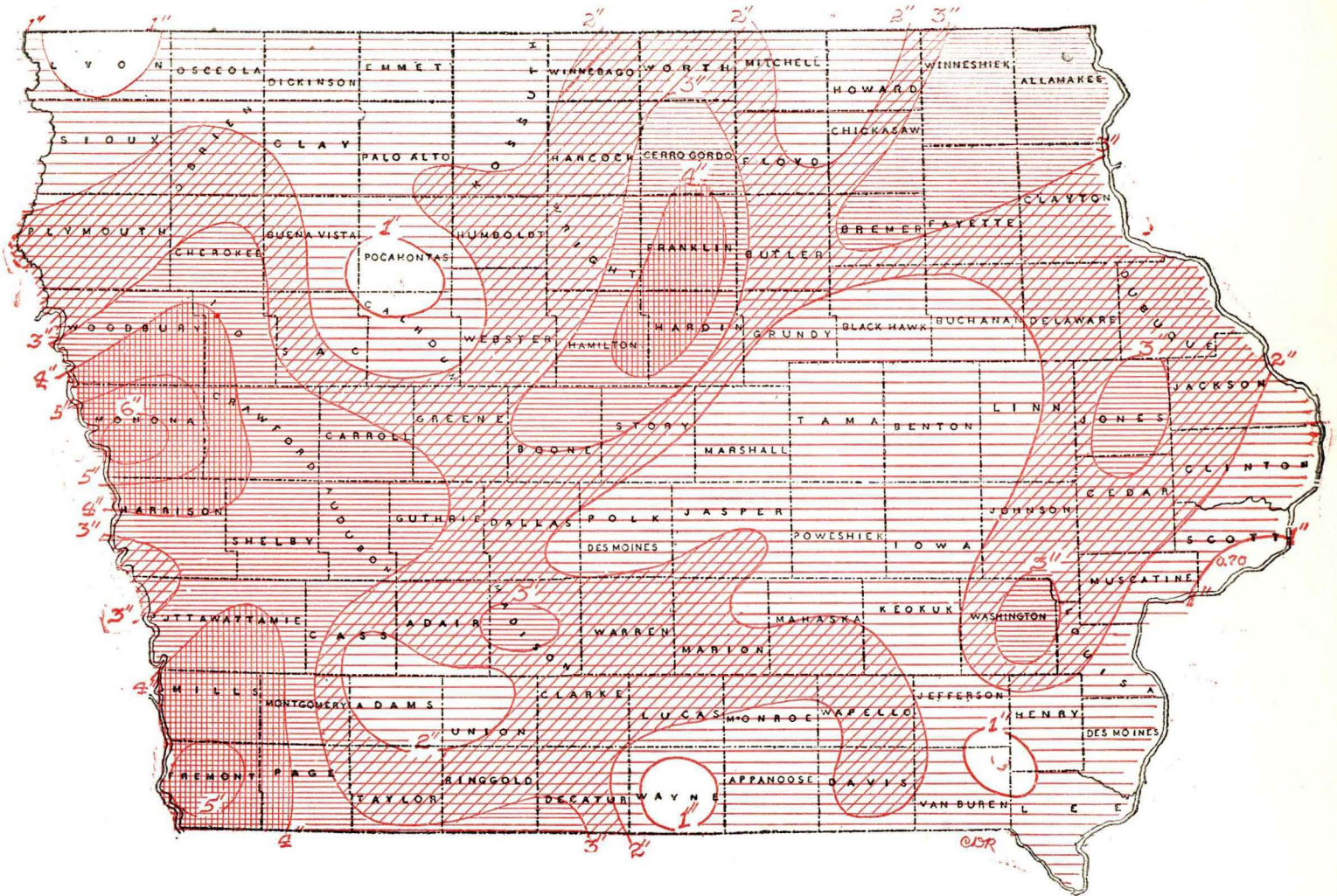
Daily Maximum and Minimum Temperatures for the Month of August, 1917.

Table with columns for Stations, days 1-31, and Mean. Rows are categorized by Northern Div., Central Div., and Southern Div., 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 read is charged to the preceding day, on which it almost always occurs.

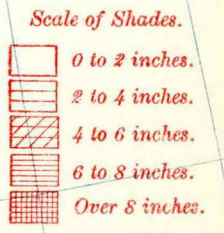
TOTAL PRECIPITATION, AUGUST, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, August, 1917.



NOV 13 1917

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

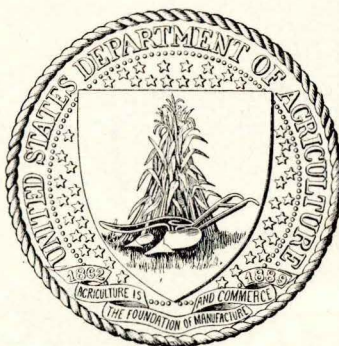
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

SEPTEMBER, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

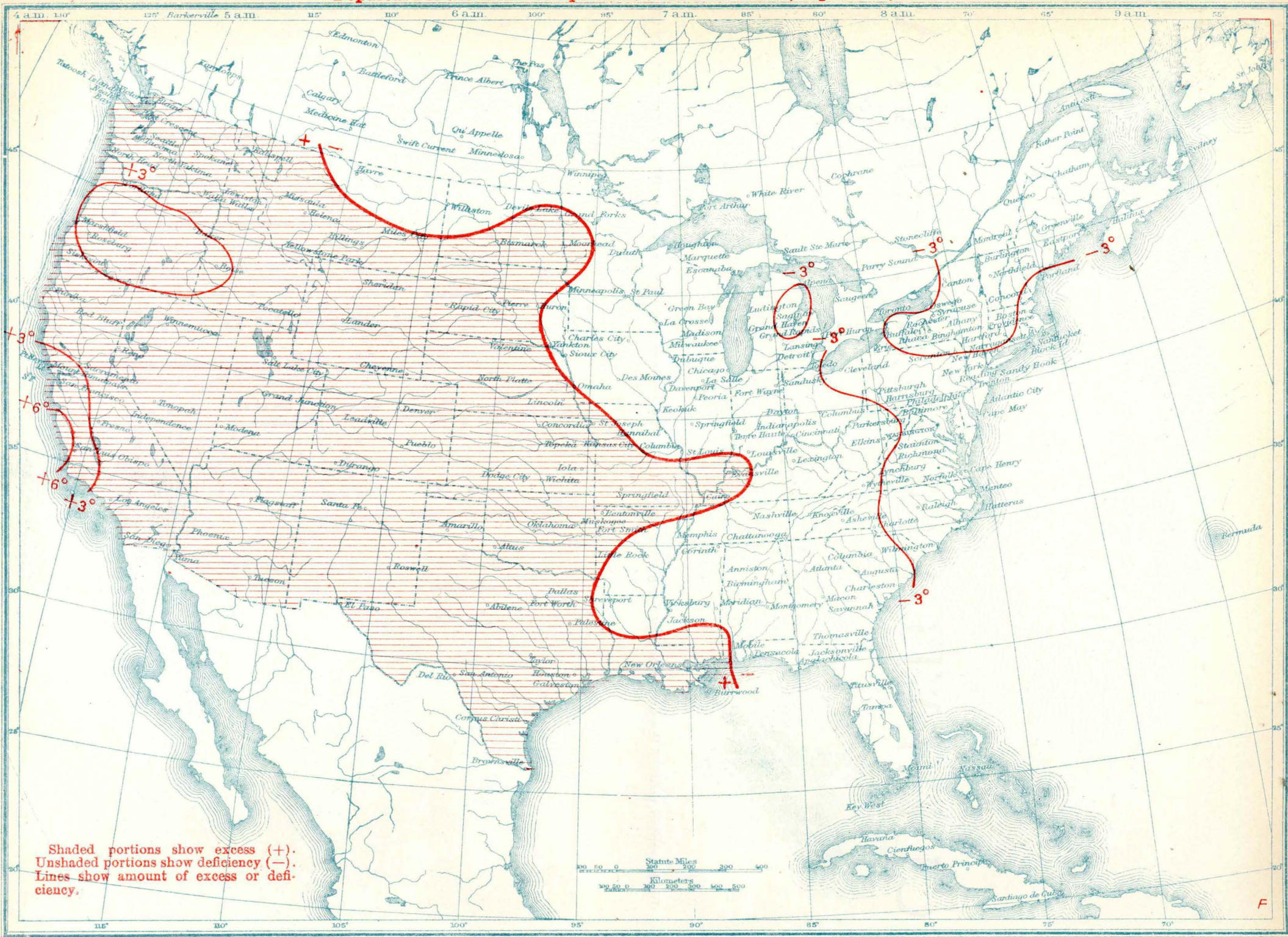


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

15

Departure of the Mean Temperature from the Normal, September, 1917.



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

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, SEPT. 1917. No. 9

GENERAL SUMMARY.

Temperatures were below normal in nearly all sections of the state, except a few stations in the western portion which reported slight excesses. A cool wave brought heavy to killing frosts to the lowlands of the northern and eastern sections on the morning of the 11th with freezing or near freezing temperatures at several stations, and considerable damage to corn, potatoes and other late crops. During a warm period that followed, the highest temperatures of the month occurred in the northern division on the 15th, though the high point was reached in the central and southern divisions on the 5th. It was during the 6-day period, 13th-18th, that corn made its best progress, but during most of the month the deficient temperature and sunshine made its progress very slow. At the close of the month, less than two-thirds of the crop was safe from an ordinary killing frost; and part of that was susceptible to serious damage by freezing temperatures. It was most backward in the northeastern one-third of the State and nearly all safe in the extreme south-western section. Much more than the usual amount was saved in silo and shock, to offset the general hay shortage; and much good seed corn was gathered.

In the region west of the divide between the Missouri and Des Moines rivers and in Story, Polk, northern Warren, Mahaska, Wapello, and Davis counties, precipitation was greatly deficient so that little or no fall plowing could be done and less than the usual acreage of winter wheat and rye could be sown. Just east of the divide from Greene southeastward to Lucas counties and in the eastern counties from Clinton and Cedar to Henry and Des Moines, there was a marked excess in precipitation. In other sections the precipitation was about normal in frequency and amount. There was a marked increase in the acreage of winter grains sown in the northern division. In the southern division the acreage, where conditions were favorable, was about the same as that sown in 1916.

In the areas of deficient precipitation, pastures failed, stock was extensively fed, and the potato crop will be moderate to light.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.09 inches. The highest recorded was 30.63 inches, at Dubuque, on the 10th, and the lowest was 29.75 inches, at Sioux City, on the 27th. The monthly range was 0.88 inch.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 102 stations, was 62.6°, or 0.8° below the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 60.6°, or 1.2° below the normal; Central, 62.6°, or 0.9° below the normal; Southern, 64.6°, or 0.4° below the normal. The highest monthly mean was 66.2°, at Northboro, and the lowest was 58.3°, at Decorah, Estherville, and Postville. The highest temperature reported was

97°, at Clarinda, on the 3d; the lowest was 28°, at Sibley, on the 27th. The range for the State was 69°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 106 stations, was 2.90 inches, or 0.46 inch less than the normal. By divisions, the averages were as follows: Northern, 2.85 inches, or 0.20 inch less than the normal; Central, 3.03 inches, or 0.43 inch less than the normal; Southern, 2.81 inches, or 0.75 inch less than the normal.

The greatest amount, 8.68 inches, occurred at St. Charles, and at least, 0.39 inch, at Audubon. The greatest amount in 24 consecutive hours, 5.74 inches, occurred at St. Charles on the 4th.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 85 per cent, and at 7 p. m. 65 per cent. The mean for the month was 75 per cent, or 1 per cent higher than the normal. The highest monthly mean was 80 per cent, at Charles City, and the lowest was 71 per cent at Omaha, Nebr.

WIND.

The prevailing direction of the wind was from the south-east. The highest velocity reported from a regular Weather Bureau Station was 40 miles an hour from the west, at Sioux City on the 18th.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 59 per cent, or 4 per cent less than the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 48; Davenport, 59; Des Moines, 54; Dubuque, 63; Keokuk, 69; Sioux City, 54; Omaha, Nebr., 67.

COMPARATIVE DATA FOR THE STATE—SEPTEMBER

YEAR	Temperature				Precipitation				Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	With pre. .01 in. or more	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	23	1.33	-2.06	3.60	0.13	4	20	7	8
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	9.96	1.82	10	11	9	10
1897	70.9	+7.5	106	26	2.04	-1.32	5.88	0.00	4	23	5	2
1898	65.3	+1.9	99	29	2.69	-0.67	8.45	0.41	7	16	9	9
1899	62.5	-0.9	104	15	0.93	-2.43	4.32	T	4	16	9	5
1900	61.4	+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	13.02	1.71	9	13	9	3
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	23	3.81	+0.45	8.79	1.42	10	14	6	10
1904	64.0	+0.6	94	30	2.78	-0.58	8.33	0.09	7	13	8	9
1905	65.8	+2.4	96	36	3.81	+0.45	13.18	0.50	8	14	8	8
1906	67.2	+3.8	100	27	4.16	+0.80	11.10	0.64	8	16	8	6
1907	62.8	-0.6	98	25	2.75	-1.61	6.06	1.38	8	15	9	6
1908	67.9	+4.5	98	20	1.20	-2.16	3.46	0.25	3	21	6	3
1909	62.4	-1.0	94	30	3.58	+0.22	7.34	1.39	9	14	8	8
1910	63.2	-0.2	99	30	3.69	+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
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

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

Climatological Data for September, 1917

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 0.01 in. or more, Clear, Partly cloudy, Cloudy, Prevailing direction of wind), Observers. The table is divided into Northern and Central Divisions and lists various Iowa locations and their corresponding climate data for September 1917.

Climatological Data for September, 1917—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 0.01 in. or more.	Clear.	Partly cloudy.	Cloudy.			
Waukee	Dallas	1,039	14	63.4	-1.0	90	5	38	27†	36	4.04	+0.62	2.52	0	13	17	8	5	se.	Samuel F. Foft.	
Webster City	Hamilton	1,044	12	61.8	-1.9	90	5	34	30	35	2.75	-1.47	1.32	0	9	13	7	10	se.	C. B. Carpenter.	
Whitten	Hardin	1,036	20	63.6 ^b	+0.6	91 ^b	5	35 ^b	11	35 ^b	2.55	-1.05	1.70	0	4	—	—	—	s.	Dr. F. P. Butler.	
Williamsburg	Iowa	765	1	62.6	—	87	5	32	11	38	4.24	—	1.56	0	9	17	6	7	se.	Dr. F. C. Schadt.	
Means and extremes				62.6	-0.9	96	3	31	11	42	3.03	-0.43	3.65	0	8	16	6	8	se.		
<i>Southern Division</i>																					
Afton	Union	1,212	23	66.1	+1.6	91	3†	40	22†	33	1.94	-2.03	0.68	0	5	14	9	7	sw.	J. E. Deitrick.	
Albia	Monroe	959	19	63.4	-1.2	89	5	38	22	36	2.46	-1.19	0.84	0	8	15	1	14	e.	F. H. Holmes.	
Allerton	Wayne	1,122	15	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Atlantic	Cass	1,164	26	64.3	+0.2	91	3	37	27†	34	0.89	-2.63	0.51	0	9	11	11	8	sw.	Thos. H. Whitney.	
Bedford	Taylor	—	17	65.6	+0.2	92	3	34	27	36	1.84	-1.74	0.49	0	7	19	4	7	s.	E. E. Healy.	
Bloomfield	Davis	881	10	65.6	—	90	1†	35	11	34	2.10	-1.88	0.60	0	10	11	15	4	s.	V. G. Warner.	
Bonaparte	Van Buren	565	26	64.6	-0.9	89	1†	35	11	33	2.88	-1.32	1.14	0	5	18	5	7	ne.	Bruce R. Vale.	
Burlington	Des Moines	544	21	64.7	-1.4	91	1	38	11	34	5.55	+1.90	3.50	0	9	16	7	ne.	Mrs. J. A. Donnelly.		
Centerville	Appanoose	1,013	12	65.4	—	89	7	37	30	35	2.92	—	1.15	0	10	10	5	15	se.	S. A. Martin.	
Chariton	Lucas	1,042	22	63.4	-1.3	87	5	38	11†	36	4.13	+0.81	2.65	0	4	15	10	5	se.	C. C. Burr.	
Clarinda	Page	1,009	27	65.8	+1.2	97	3	35	27	38	0.95	-2.04	0.43	0	7	16	7	7	ne.	A. S. Van Sandt.	
Columbus Jet.	Louisa	595	16	64.2	-1.1	88 ^a	7	40	11†	32 ^a	5.03	+1.87	1.70	0	9	—	—	—	s.	J. B. Johnston.	
Corning	Adams	1,117	25	64.6	+0.7	93	3	32 ^a	27	40 ^a	0.91	-2.37	0.37	0	6	17	4	9	s.	Jerome Smith.	
Corydon	Wayne	1,101	24	63.2 ^a	-2.8	91 ^b	3	38	11†	35	2.84	-0.64	1.70	0	8	17	6	7	se.	May C. Miller.	
Creston	Union	1,312	12	64.4	+0.8	92	3	36	27†	38	1.29	—	0.70	0	7	7	12	11	se.	Mrs. Estella McConnell.	
Cumberland	Cass	—	18	—	—	—	—	—	—	—	1.12	-2.66	0.67	0	3	23	1	6	sw.	J. H. Reppert.	
Earlham	Madison	1,126	15	63.4	+0.1	90	5	33	27	37	2.25	-1.35	1.45	0	5	15	3	12	se.	Geo. Phillips.	
Fairfield	Jefferson	780	33	64.2 ^b	-1.0	89 ^b	1†	32 ^b	11	45 ^b	2.93	-0.34	0.87	0	7	—	—	—	sw.	H. Monroe McKenzie.	
Fort Madison	Lee	516	68	—	—	—	—	—	—	—	3.41	-0.47	1.75	0	6	13	7	10	nw.	F. W. Myers.	
Glenwood	Mills	—	—	65.0	—	94	3	35	27	36	0.80	—	0.42	0	3	7	0	23	se.	Dr. Geo. Mogridge.	
Greenfield	Adair	—	25	63.2	-0.5	94	3	40	27†	34	0.78	-2.61	0.50	0	2	9	14	7	se.	Frank A. Ward.	
Indianola	Warren	969	26	65.0 ^a	0.0	91 ^a	1	41 ^a	27	30 ^a	1.83	-1.59	0.75	0	10	—	—	—	se.	Prof. J. L. Tilton.	
Keokuk	Lee	614	46	65.6	-0.8	90	1	41	11	28	5.29	+1.32	3.30	0	8	14	9	7	ne.	U. S. Weather Bureau.	
Keosauqua	Van Buren	644	25	64.8	+0.3	91	1	31	11	41	2.38	-1.88	0.86	0	5	14	4	12	se.	J. H. Landes.	
Knoxville	Marion	920	22	64.4	-0.9	90	5	35	11	39	2.05	-1.53	1.42	0	5	15	3	12	se.	W. J. Casey.	
Lacona	Warren	—	18	—	—	—	—	—	—	—	6.18	+2.44	2.88	0	7	13	11	6	—	J. B. Alter.	
Lamoni	Decatur	—	10	63.8	-1.5	90	3	38	27	32	1.78	—	0.68	0	6	14	7	9	s.	Chas. B. Woodstock.	
Lenox	Taylor	1,250	22	65.9	+1.2	91	3	37	27	31	1.33	-2.07	0.33	0	7	21	5	4	s.	J. L. Hurley.	
Mt. Ayr	Ringgold	1,236	24	65.2	-0.7	91	3	39	27	31	2.24	-1.34	0.92	0	6	15	6	9	s.	Alex Maxwell.	
Mt. Pleasant	Henry	729	36	64.2	-1.2	90	1	36	11	35	7.00	+3.77	2.15	0	10	17	5	8	sw.	J. W. Edwards.	
Murray	Clarke	1,216	26	65.8	+0.5	92	3	40	11	35	2.84	-0.63	1.78	0	8	14	11	5	s.	M. T. Ashley.	
Northboro	Page	1,120	5	66.2	—	93	3	38	27	34	1.58	—	0.53	0	8	18	2	10	se.	J. M. Darby.	
Oskaloosa	†Mahaska	842	41	63.5	-1.2	87	5	33	11	35	1.44	-1.61	0.50	0	8	19	2	9	se.	Jos. Boyd.	
Ottumwa	Wapello	849	22	64.6	—	89	2	37	11	40	1.34	-2.35	0.37	0	9	14	10	6	se.	Thos. Ray.	
Pella	Marion	877	14	63.8	-1.4	90	5	33	11	38	1.73	-1.50	0.60	0	6	—	—	—	se.	John H. Ver Steeg.	
St. Charles	Madison	1,070	16	64.0	-1.6	89	5	41	27	39	8.68	+5.19	5.74	0	9	13	9	8	sw.	R. D. Minard.	
Sigourney	Keokuk	877	21	63.6†	-1.4	88†	5	33†	11	36†	3.32	+0.10	1.45	0	10	—	—	—	se.	W. E. Utterback.	
Stockport	Van Buren	754	15	63.2	-1.7	85	5	32	11	38	2.90	-1.03	0.86	0	7	15	6	9	s.	C. L. Beswick.	
Thurman	Fremont	20	64.6	-0.6	92	3	32	27	38	0.99	-3.51	0.48	0	3	11	10	9	nw.	C. R. Paul.		
Washington	Washington	769	35	64.2	-0.5	86	5	38	11	28	5.80	+2.79	2.46	0	8	13	8	9	sw.	Wm. A. Cook.	
Winterset	Madison	1,129	26	64.4	-0.4	90	5	37	27	32	5.16	+1.82	4.02	0	9	14	13	3	sw.	H. S. Ely.	
Omaha, Neb.	—	1,040	46	66.2	+0.4	93	3	43	27	29	0.91	-2.12	0.40	0	6	15	8	7	se.	U. S. Weather Bureau.	
Means and extremes				64.6	-0.4	97	3	31	11	45	2.81	-0.75	5.74	0	7	14	7	9	se.		
State means and ext's				62.6	-0.8	97	3	28	27	45	2.90	-0.46	5.74	0	7	15	7	8	se.		

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

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

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

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

DESTRUCTIVE HAILSTORM.

Probably the most destructive storm of hail, wind and lightning of the season occurred in Keokuk County, on Monday, September 3d. The storm began in Washington Township in the vicinity of Springfield near the middle of the west line of the County about 7 o'clock p. m. and moved east-south-eastward through Van Buren and German Townships to Clear Creek Township on the east side. The path of the storm was from 2 to 4 miles wide and about 20 miles long,

the destruction of crops being complete over much of that area. Scores of farmers lost 100 acres or more of corn each. While most of the damage resulted from hail, there was also much damage to houses, barns, silos, and other structures by wind and lightning. There was much loss of live stock. The hail stones were so large that they cut through wire window screens and in some cases broke the siding of houses. Very few window panes in the path of the storm remained unbroken. One hail stone measured 6 inches in circumference.

Daily Precipitation for September, 1917—Continued.

Table with columns for Stations, Watersheds, Day of Month (1-30), and Total. Rows include various locations like Afton, Albia, Allerton, etc., with precipitation values for each day and a total for the month.

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

MISCELLANEOUS PHENOMENA.

Fog: 9th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 20th, 21st, 22d, 26th, 27th.
Frost: 10th, 11th, 22d, 25th, 26th, 27th, 30th.
Hail: Northern Division, none; Central Division, 3d, 4th, 5th; Southern Division, 3d.
Halos: (lunar or solar) 2d, 6th, 25th.
Haze: 1st, 3d, 4th, 5th, 15th, 16th, 27th.
Smoke: 16th, 17th, 18th, 26th.
Thunderstorms: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 9th, 11th, 12th, 13th, 14th, 15th, 18th, 19th, 20th, 23d, 25th, 26th, 27th.

RIVERS.

The rivers generally were nearly stationary and at rather low stages throughout the month. In the upper Mississippi, the stages were so low as to interfere to some extent with navigation.

ERRATA.

Report for August, 1917: Page 88; Belle Plaine; monthly mean temperature published 70.3°, should be 68.5°; departure of mean from the normal published -1.0°, should be -2.8°; Carroll; monthly mean temperature published 70.8°, should be 68.6°; departure of mean from the normal published

+0.2°, should be -2.0°; Decorah; monthly mean temperature published 71.4°, should be 66.2°; departure of mean from normal published, +0.2°, should be -5.0°; Fort Dodge; monthly mean temperature published 70.8°, should be 68.6°; departure of mean from normal published -0.8, should be -3.0°; Storm Lake; monthly mean temperature published 70.6°, should be 69.4°; departure of mean from the normal published -0.5°, should be -1.7°. Page 89; Williamsburg; monthly mean temperature published 69.6°, should be 68.8°. Page 92; Belle Plaine; mean minimum temperature published 59.4°, should be 55.8°; Carroll; mean minimum temperature published 59.1°, should be 54.7°; Decorah; mean minimum temperature published 63.5°, should be 53.3°; Fort Dodge; mean minimum temperature published 60.6°, should be 56.2°.

LATE REPORT

August, 1917; Knoxville; mean temperature, 71.0°; departure from normal, -2.6°; highest, 99° on the 4th; lowest, 44° on the 29th; greatest daily range, 39°; total precipitation, 1.41; departure from normal, -2.66; greatest in 24 hours, 0.52; number of days with .01 inch or more of precipitation, 6; clear, 18; partly cloudy, 6; cloudy, 7; prevailing wind direction, northwest.

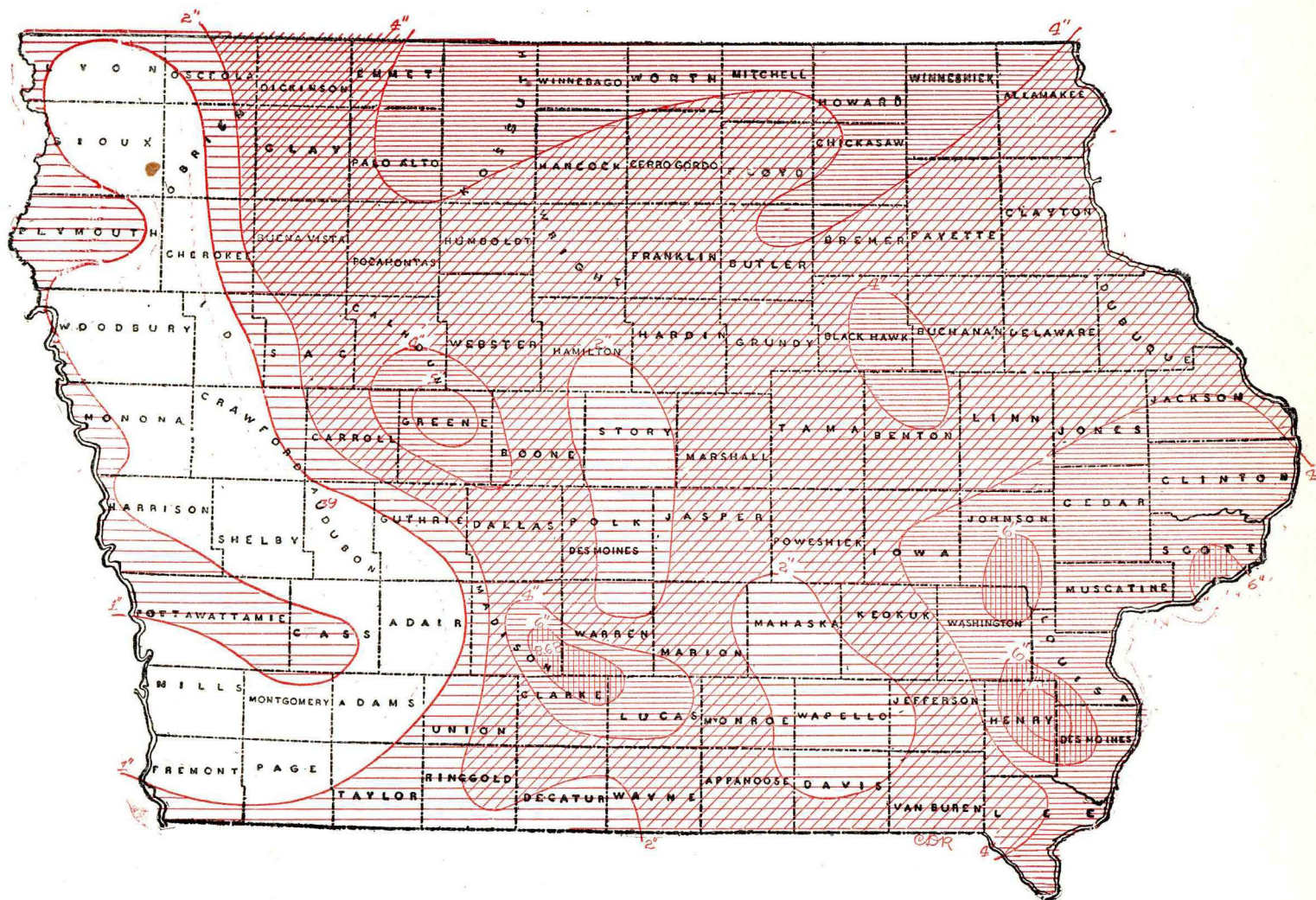
Daily Maximum and Minimum Temperatures for the Month of September, 1917.

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.

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

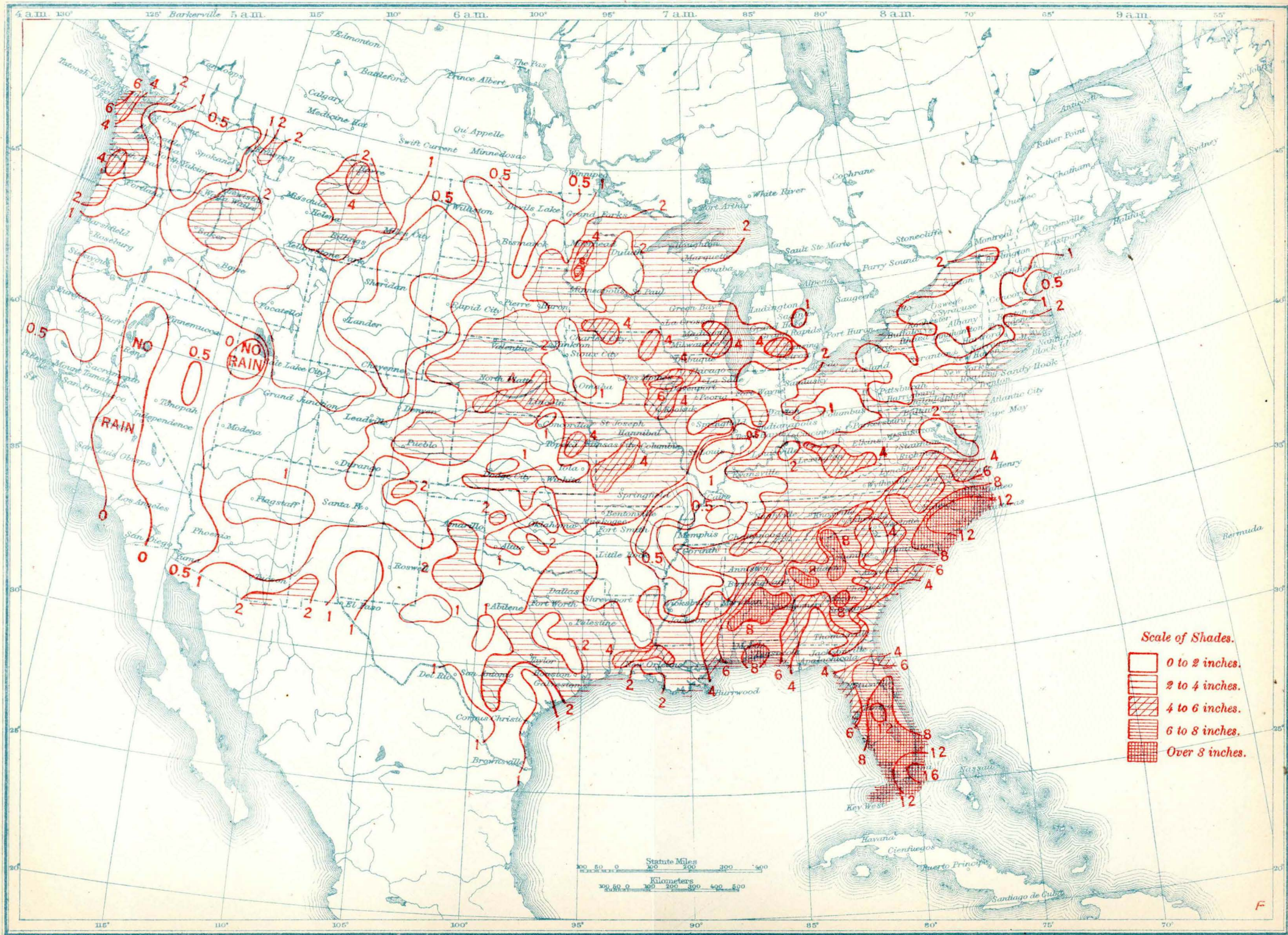
TOTAL PRECIPITATION, SEPTEMBER, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, September, 1917.



DEC 17 1917

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

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

OCTOBER, 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

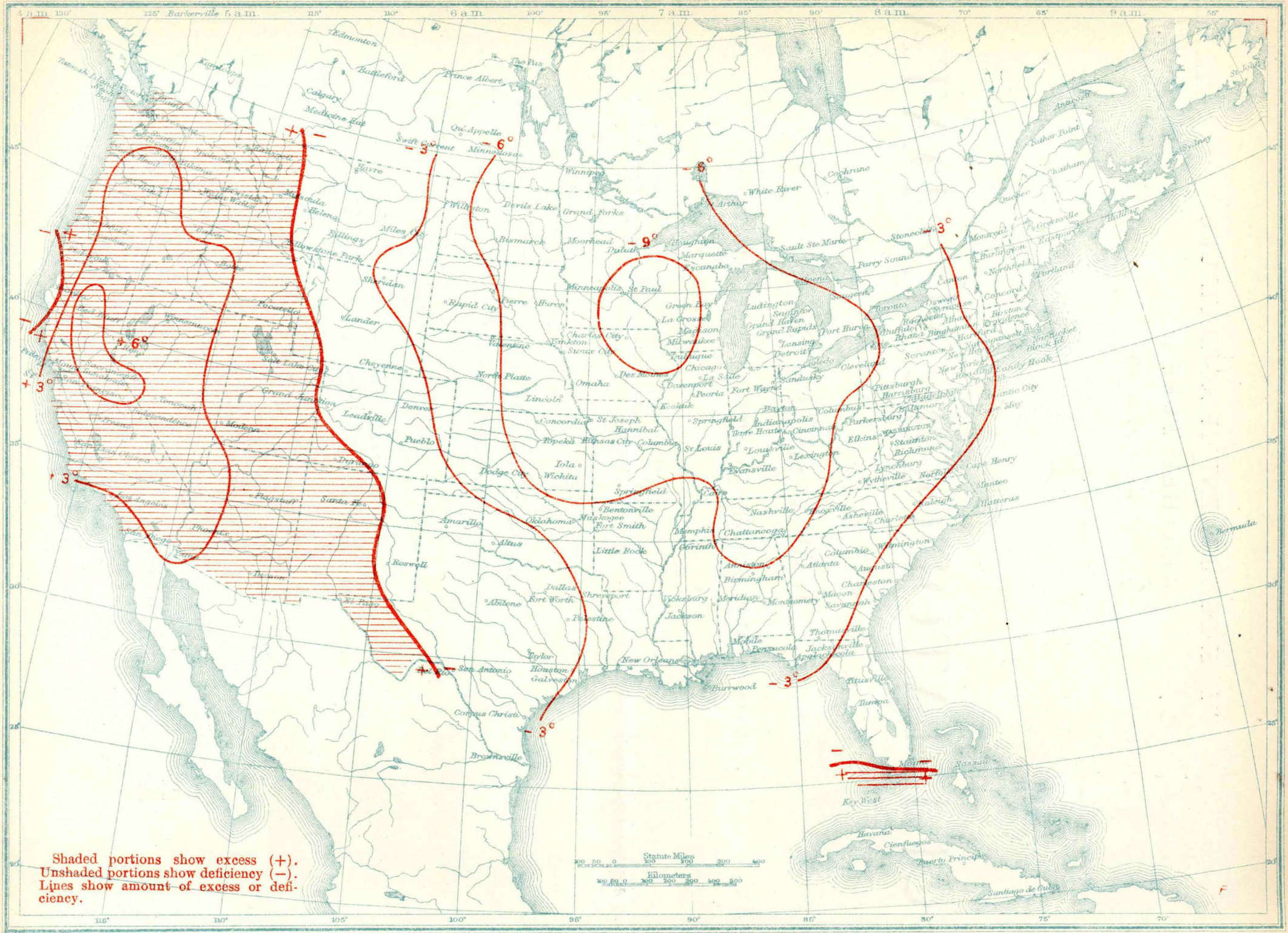


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DES MOINES, IOWA
WEATHER BUREAU OFFICE

2

Departure of the Mean Temperature from the Normal, October, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, OCT. 1917. No. 10

GENERAL SUMMARY.

October, 1917, was 3.1° colder than October, 1895, which has heretofore been the coldest since state-wide records began in 1890. Killing frosts visited some sections of the State on the 1st, all but the southwest portion on the 6th, and all sections on the 8th. During a well defined cold wave that swept over the State on the 28th-30th, the temperature fell nearly to zero in the northern and western counties, the lowest being just zero at Galva. Precipitation was deficient, except in a few northeast and east-central counties. A general snowstorm on the 28th-29th was remarkably heavy for the season in the northeastern counties. Cloudiness was nearly the greatest of record; and sunshine was correspondingly deficient, particularly in the northeastern portion of the State where it was less than one-third of the possible amount.

Corn was seriously damaged by the unfavorable conditions; very little of it was fit to crib at the close of the month; that which was cribbed, heated so that it had to be dried and sorted; much soft corn in the fields, molded; and seed corn gathered since the freezes shows very low germination tests. Germination and growth of winter grains was much retarded. Less than the usual amount of fall plowing was done. Apples on the trees and potatoes in the ground were damaged in some sections. A few localities reported deficient water supply.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.03 inches. The highest recorded was 30.59 inches, at Sioux City, on the 23d, and the lowest was 29.32 inches, at Davenport, on the 26th. The monthly range was 1.27 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 102 stations, was 42.9°, or 7.9° below the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 40.8°, or 8.2° below the normal; Central, 42.9°, or 8.0° below the normal; Southern, 45.1°, or 7.5° below the normal. The highest monthly mean was 47.8°, at Northboro, and the lowest 38.1°, at Northwood. The highest temperature reported was 85°, at Mason City, on the 2d; the lowest was 0°, at Galva, on the 30th. The range for the State was 85°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 108 stations, was 1.41 inches, or 1.05 inches less than the normal. By divisions the averages were as follows: Northern, 1.31 inches, or 1.03 inches less than the normal; Central, 1.49 inches, or 1.00 inch less than the normal; Southern, 1.44 inches, or 1.10 inches less than the normal. The greatest amount, 4.00 inches, occurred at Davenport, and the least, 0.15 inch, at Rock Rapids. The greatest amount in 24 consecutive hours, 2.02 inches, occurred at Davenport on the 16th-17th.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 75 per cent, and at 7 p. m., 55 per cent. The mean for the month was 65 per cent, or 6 per cent below the normal. The highest monthly mean was 77 per cent, at Charles City, and the lowest, 54 per cent, at Omaha, Nebr.

SNOW

The first light snow flurries of the season occurred in nearly all portions of the State on the 11th. Other snows covered portions of the State on the 22d-23d and 26th-27th, but the first large, general snow storm occurred on the 28th-29th, when the amount varied from 11.0 inches at Decorah in the northeast to none at Rock Rapids in the extreme northwest and Thurman in the southwest. At Decorah this snowfall is said to be the greatest in October for more than 40 years.

The average fall for the month for the whole State is 2.2 inches which has been exceeded but twice since 1892. The greatest monthly amount is 12.5 inches at Decorah.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported from a regular Weather Bureau station was 57 miles an hour from the northwest, at Sioux City, on the 22d.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 44, or 17 per cent below the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 19; Davenport, 41; Des Moines, 51; Dubuque, 38; Keokuk, 45; Sioux City, 54; Omaha, Nebr., 59.

COMPARATIVE DATA FOR THE STATE—OCTOBER.

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With pre. of in. or more	Clear	Partly cloudy	Cloudy
1890	49.2	-1.6	86	16	3.48	+1.02	6.82	1.59	-----	7	11	11	9
1891	50.0	-0.8	92	19	2.77	+0.31	6.53	0.85	-----	6	18	7	6
1892	54.5	+3.7	96	14	1.55	-0.91	2.58	0.00	0.0	4	21	6	4
1893	52.4	+1.6	94	10	1.28	-1.18	4.56	0.02	0.0	4	16	9	6
1894	51.7	+0.9	90	20	2.67	+0.21	5.25	0.03	0.2	8	14	8	9
1895	46.0	-4.8	88	4	0.47	-1.99	1.38	0.00	T.	2	19	8	4
1896	47.9	-2.9	88	12	3.13	+0.67	5.05	1.51	0.0	5	18	6	7
1897	56.8	+6.0	97	12	1.14	-1.32	3.30	0.03	0.0	4	17	8	6
1898	47.5	-3.3	88	17	3.56	+1.10	5.75	1.27	3.6	8	7	9	15
1899	56.7	+5.9	95	17	1.73	-0.73	4.64	0.15	0.0	5	17	8	6
1900	59.3	+8.5	90	21	3.91	+1.45	8.00	1.20	0.0	7	16	7	8
1901	54.2	+3.4	88	20	1.98	-0.48	4.23	0.45	T.	6	17	7	7
1902	53.5	+2.7	83	20	2.54	+0.08	6.66	0.28	T.	5	16	8	7
1903	52.2	+1.4	90	16	1.95	-0.51	4.50	0.32	0.0	5	19	6	6
1904	53.1	+2.3	96	16	1.67	-0.79	4.43	0.14	T.	6	15	8	8
1905	49.2	-1.6	95	16	3.40	+0.94	5.36	1.20	1.6	8	16	6	9
1906	50.5	-0.3	87	7	1.96	-0.50	4.25	0.50	0.1	6	14	7	10
1907	50.4	-0.4	85	10	1.50	-0.96	3.71	0.30	0.0	5	20	5	6
1908	51.1	+0.3	89	17	3.38	+0.92	8.83	0.58	2.6	8	16	6	9
1909	49.7	-1.1	97	10	2.22	-0.24	4.70	0.43	T.	6	16	6	9
1910	55.2	+4.4	93	10	0.77	-1.69	1.73	T.	0.1	4	21	4	6
1911	48.7	-2.1	87	14	3.34	+0.88	7.03	0.73	0.6	10	12	8	11
1912	52.2	+1.4	92	16	2.98	+0.52	5.77	1.03	T.	6	21	3	7
1913	49.2	-1.6	89	-2	3.03	+0.57	7.29	0.35	1.2	9	15	8	8
1914	55.9	+5.1	88	14	3.23	+0.77	6.64	0.74	T.	9	16	6	9
1915	54.4	+3.6	86	19	1.31	-1.15	3.25	T.	T.	5	19	6	8
1916	50.9	+0.1	92	6	2.00	-0.46	4.33	0.20	2.0	8	16	7	8
1917	42.9	-7.9	85	0	1.41	-1.05	4.00	0.15	2.2	6	10	11	10

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

Climatological Data for October, 1917—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, Unmelted), Number of Days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, Observers.

The departures from normal temperature and precipitation are computed only for such stations as have ten or more years of record, but all complete records are used in determining division means. Reference letters a, b, c, appearing in the table indicate the number of days missing; for example, b represents two days, etc.

MISCELLANEOUS PHENOMENA.

Fog: 1st, 3d, 6th, 11th, 17th, 18th, 19th, 24th, 25th, 28th, 29th. Frost: 1st, 6th, 8th (not recorded after first killing). Hail: 9th, 10th, 11th, 17th, 18th, 20th.

RIVERS.

The rivers remained nearly stationary during the month.

ERRATA.

Report for September, 1917: Page 101; Keosauqua; monthly mean temperature published 64.8°, should be 64.7°; departure of mean from the normal published +0.3°, should be +0.2°; Pella; total precipitation published 1.73 inches, should be 1.70 inches; departure from the normal published -1.50, should be -1.53.

Daily Precipitation for October, 1917—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																	.05	1.02					.05		.15	.10								1.37	
Albia	Des Moines		T															T	0.72					T			.78	T		T				1.50		
Allerton	Chariton																			.66				T	.05		.45	.06			.05				1.28	
Atlantic	Nishnabotna						.01													.66				T	.05		.45	.06			.05				1.28	
Bedford	Missouri											T							.01	.44				T	.05		.18	.07	.05		.10				0.90	
Bloomfield	Mississippi										.01								.10	1.00				.01	.01		.70	.10			.01				1.94	
Bonaparte	Des Moines		T	T						T	.06								.20	.50			T	.05	.01	.09		.41	.10	T	.07				0.99	
Burlington	Mississippi								.05			.08							.20	.50				T	.05		.56	.18		.13	.10				1.80	
Centerville	Chariton		T							.01		T						.02	.54					T			.86	.05		.01					1.49	
Chariton	Chariton									T								T	.62					T	T		.86	.05			T				1.48	
Clarinda	Nodaway												T						1.65					T			.40	T		.23					2.28	
Columbus Jet.	Iowa		T	T						T	.19	.08						.28	.20				T	.01		.23	.50	.05		.15					1.60	
Corning	Nadaway																		.73					.01		.19	.07			.02					1.02	
Corydon	Chariton																T	.15	.31					.01	.01		.19	.60	.04		.10				1.41	
Creston	Missouri																		.90						.05		.18	.02		.08	T				1.23	
Cumberland	Nodaway																				.20			T			.27			.10					0.57	
Earlham	Des Moines										T								T	.05				T			.37	.10	.05		.14	T			0.71	
Fairfield	Skunk								.30			.05							.23	.43					.02		.55		T	.05					1.63	
Ft. Madison	Mississippi		T															.03	.48					T	.07		.38		.12	T	.20				1.30	
Glenwood	Missouri		T			T													.35					T	.07		T	.41	.35						1.11	
Greenfield	Nodaway												T						T	.38					.10		.16	.20	.10		.10				0.98	
Indianola	Des Moines									T									.25	.26				T		.21	.35			.01					1.08	
Keokuk**	Mississippi			.11						T								.01	.38	.62				.05	T		.38	.02	.12	.16		.04			1.93	
Keosauqua	Des Moines			T	T					T								.16	.02	.15				.20	.05		.17	.20	.05		.03				1.03	
Knoxville	Des Moines									T									.06	.35	T				.05		.12	.65	.05		.05					1.33
Lacona	Des Moines								.01		.01								.13	.37					.05		.12	.73	.05		.10				1.57	
Lamoni	Grand		T																.01	.34				T			.40			.15					0.90	
Lenox	Missouri												T						1.10						.03			.10	.05		.08					1.36
Mount Ayr	Grand		T																.01	.23					T	T		.23	.05		.10				0.62	
Mt. Pleasant	Skunk			.01					.05	.01		.06							.10	.41					.06	.05		.10	.49	.10		.12				1.56
Murray	Grand		T	.03															.05	.99					.01		.08	.08			.03				1.27	
Northboro	Missouri		T																.67					T	T		.43	.15	.04		.11				1.40	
Oskaloosa	Des Moines								.24			T						.46	.71						.02		.03	.66	.07	T	.06				2.25	
Ottumwa	Des Moines									T				T					.30	.58							.85	.06		.03	T				1.85	
Pella	Skunk										T								.18	.42					.02		T	.53	.08	T	.02				1.25	
St. Charles	Des Moines										T								.09	.34					T			T	.36	.09					0.88	
Sigourney	Skunk			T			T			.09		.02							.20	.70						T	.04	.09	.66	.07	T	.03			1.90	
Stockport	Skunk			.03					.06		.07								.18	.21						.04	.06	.08	.47	.15		.04			1.39	
Thurman	Missouri		T																.42						T	T		.16	.31	.12		T			1.01	
Washington	Skunk								.07	.07		.07							.56	.42	.28					.01	.07	T		.60	.10		.12			2.37
Winterset	Des Moines																		.05	.28					T			.10	.10						0.53	
Omaha, Nebr.**	Missouri			.01															.15	T					T		.27	.11		.01	T				0.55	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for the 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. T, Trace, or less than 0.01 inch.
 *Precipitation included in the next following measurement.

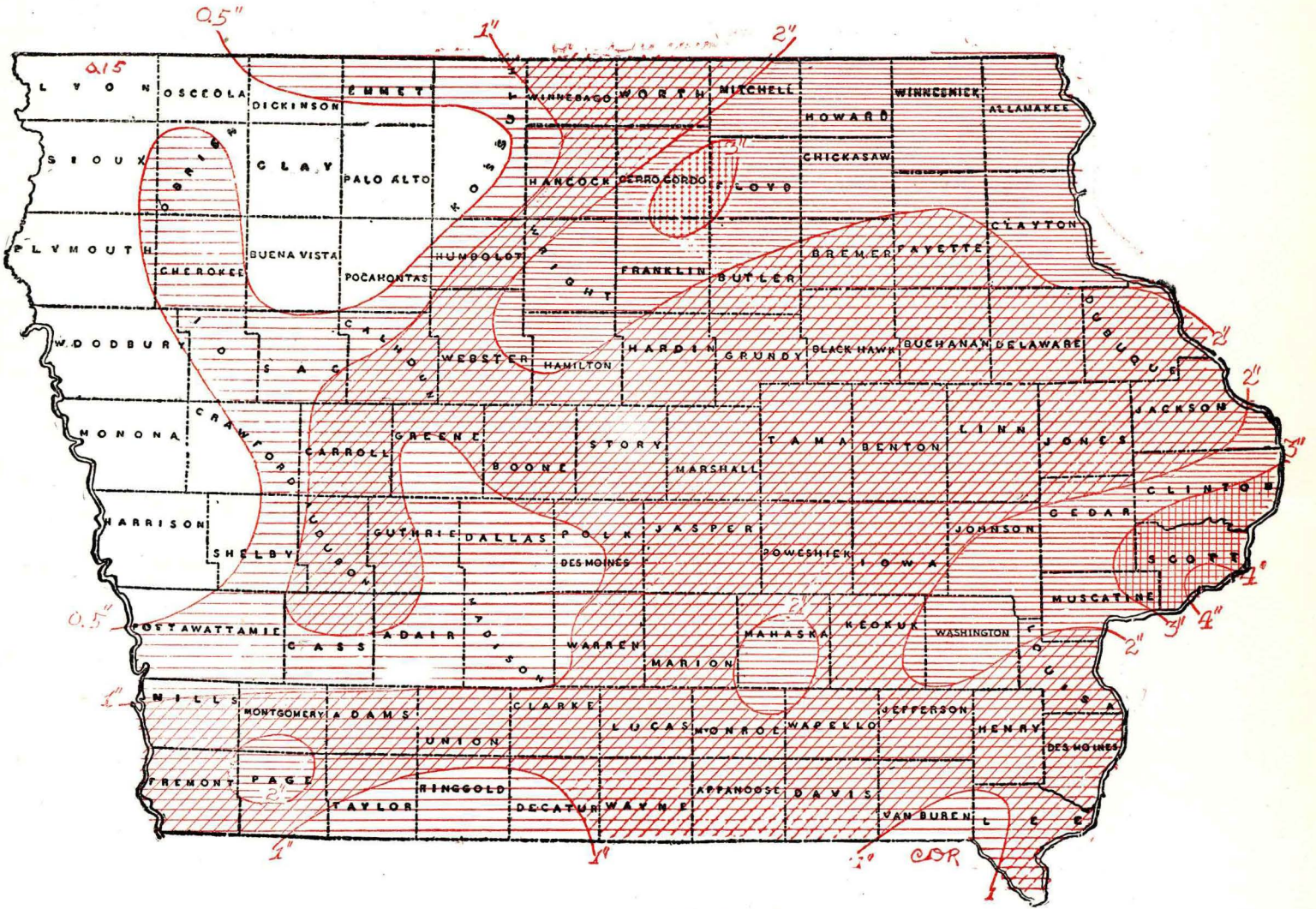
Daily Maximum and Minimum Temperatures for the Month of October, 1917.

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.

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

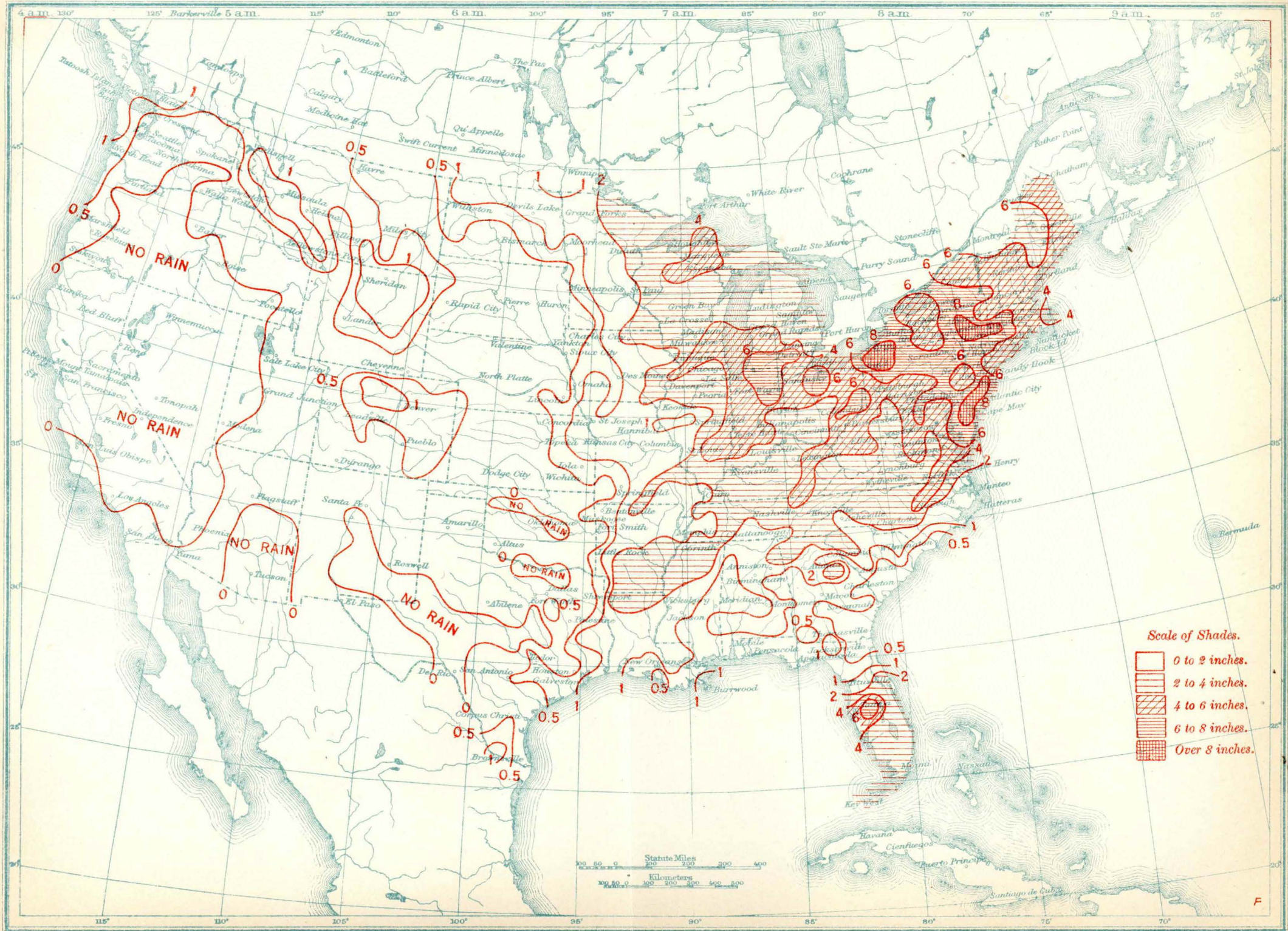
TOTAL PRECIPITATION, OCTOBER, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, October, 1917.



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

CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

NOVEMBER, 1917

BY

GEORGE M. CHAPPEL

SECTION DIRECTOR

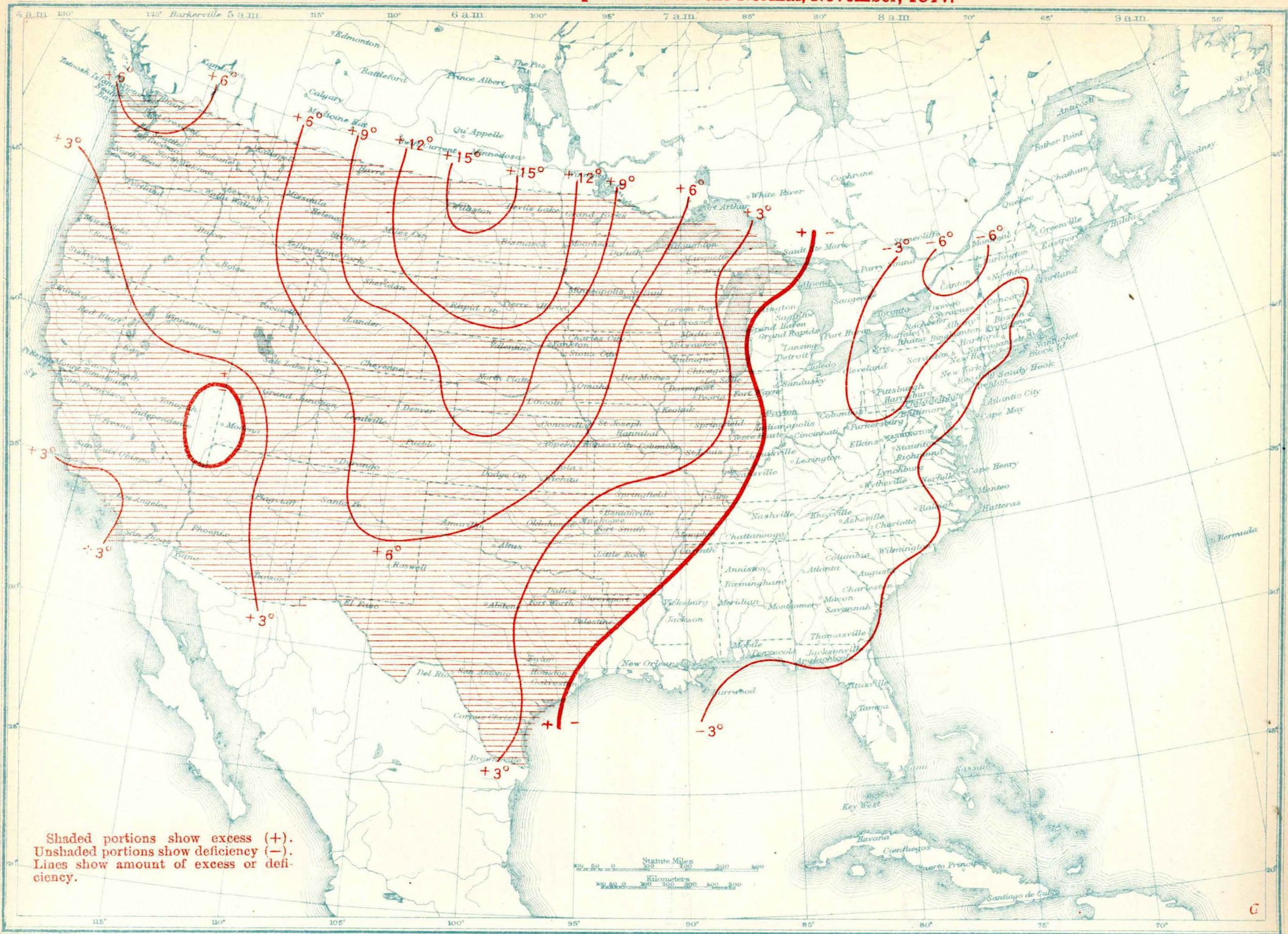


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

5

Departure of the Mean Temperature from the Normal, November, 1917.



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



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU,

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, NOV. 1917. NOV. 11

GENERAL SUMMARY.

The weather was mild and dry. The full magnitude of the damage to corn by the frosts and freezes of October, became apparent when cribbing was attempted in November. In spite of favorable conditions for drying, the husked corn, though carefully sorted, heated in the cribs so badly that it had to be spread out to dry. Husking ceased generally the last week of the month with 43 per cent of the crop still in the fields; and unusual methods were adopted to save it. Many cattle and hogs were shipped into the State to consume the soft corn.

Because of the cold in October and drought in November, winter wheat made slow growth and is not entering the winter in resistant condition. Where it has germinated, the stand is fair, but up to the close of November many fields had not yet germinated.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.21 inches. The highest recorded was 30.66 inches at Davenport on the 26th, and the lowest was 29.47 inches, at Dubuque, on the 21st. The monthly range was 1.19 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the records of 102 stations, was 40.7°, or 5.7° above the normal. By divisions, three tiers of counties to the division, the means were as follows: Northern, 39.2°, or 6.4° above the normal; Central, 40.8°, or 5.7° above the normal; Southern, 42.0° or 4.9° above the normal. The highest monthly mean was 45.8° at Omaha, Nebr., and the lowest was 36.3° at Elkader and Estherville. The highest temperature reported was 77° at Indianola on the 7th; the lowest was 3° at Whitten on the 24th. The range for the state was 74°.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 108 stations, was 0.28 inches, or 1.23 inches below the normal. By divisions the averages were as follows: Northern, 0.41 inch, or 1.00 inch below the normal; Central, 0.28 inch, or 1.25 inches less than the normal; Southern, 0.14 inch, or 1.23 inches less than the normal. The greatest amount, 1.02 inches, occurred at Sanborn, and the least, a trace, at Chariton, Cumberland, Greenfield, and Maquoketa. The greatest amount in 24 consecutive hours, 0.60 inch, occurred at Rock Rapids on the 21st.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 83 per cent, and at 7 p. m. 68 per cent. The mean for the month was 76 per cent, or 2 per cent above the normal. The highest monthly mean was 84 per cent, at Charles City and the lowest, 66 per cent, at Omaha, Nebr.

SNOW

The average fall for the whole State was 1.4 inches. The greatest amount was 5.0 inches, at Sanborn.

WIND.

The prevailing direction of the wind was from the southwest. The highest velocity reported from a regular Weather Bureau station was 50 miles an hour from the northwest, at Sioux City on the 21st.

SUNSHINE AND CLOUDINESS.

The average per cent of the possible amount of sunshine was 49, or 5 per cent below the normal. The per cent of the possible amount at the regular Weather Bureau stations was as follows: Charles City, 40; Davenport, 41; Des Moines, 53; Dubuque, 46; Keokuk, 49; Sioux City, 55, and Omaha, Nebr., 58.

MISCELLANEOUS PHENOMENA.

Fog: 3d, 6th, 7th, 8th, 9th, 10th; 11th, 12th, 13th, 14th, 15th, 16th, 20th, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

Glaze: 30.

Haze: 4th, 5th, 7th, 9th, 10th, 11th, 14th, 15th, 16th, 17th, 18th.

Halos (solar or lunar): 10th, 19th, 24th, 25th, 29th.

Sleet: 24th, 25th, 26th, 30th.

Thunderstorms: 9th, 10th, 11th, 21st.

RIVERS.

Rivers remained nearly stationary and at a low stage during the month.

ERRATA.

Report for August, 1917: page 87; highest monthly mean temperature in the State published 74.1° at Mt. Ayr, should be 72.5° at Burlington.

Report for October, 1917: page 112: Charles City; total precipitation published 2.18 inches, should be 2.22; departure from the normal published +0.15, should be +0.19. Page 114; Charles City; precipitation on the 17th published .50, should be .54; total precipitation published 2.18, should be 2.22.

COMPARATIVE DATA FOR THE STATE—NOVEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1890	88.6	+3.6	78	-2	1.46	-0.05	3.55	0.71	---	8	15	8	7
1891	80.5	-4.5	84	-24	1.70	+0.19	3.64	0.66	---	7	10	8	12
1892	83.3	-1.7	70	-3	1.10	-0.41	3.16	0.05	1.8	4	11	8	11
1893	84.0	-1.0	86	-13	1.17	-0.34	2.56	0.05	4.6	4	16	8	6
1894	82.7	-2.3	72	-5	0.92	-0.50	2.42	T	0.4	4	9	11	10
1895	84.3	-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	84.3	-0.7	81	-19	0.66	-0.85	2.24	T	1.2	5	12	8	10
1898	82.2	-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	0.00	0.6	5	16	7	7
1906	35.4	+0.4	76	-5	2.03	+0.52	3.86	0.85	4.4	8	9	7	14
1907	36.7	+1.7	68	-4	1.03	-0.43	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	11.43	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	-0.69	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	33	-5	1.04	+0.43	4.86	0.30	1.2	6	11	10	9
1916	37.3	+3.3	30	-8	1.61	+0.10	3.65	0.05	3.6	5	16	6	8
1917	40.7	+5.7	77	3	0.28	-1.23	1.02	T	1.4	3	14	6	10

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

Climatological Data for November, 1917

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-unmelted), Number of Days (Precipitation 0.01 in. or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, Observers.

Climatological Data for November, 1917—Continued.

Stations	Counties	Elevation—feet.	Length of record—years.	Temperature, in Degrees Fahrenheit						Precipitation, in Inches				Number of Days.			Prevaling 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 0.01 in. or more.	Clear.			Partly cloudy	Cloudy.
Waukee	Dallas	1,039	14	42.6	+6.3	73	7	12	24	35	0.33	-1.22	0.19	0.2	5	15	9	6	se	Samuel F. Foit.
Webster City	Hamilton	1,044	12	40.0	+5.2	71	5	12	24	39	0.46	-1.17	0.26	2.0	2	11	7	12	se	C. B. Carpenter.
Whitten	Hardin	1,036	20	41.6	+7.0	73	6	3	24	46	0.42	-0.90	0.22	2.0	12	14	7	9	se	Dr. F. P. Butler.
Williamsburg	Iowa	765	1	41.6		72	6	11	24	38	0.20		0.16	1.2	3	13	9	8	se	Dr. F. C. Schadt.
Means and extremes				40.8	+5.7	74	6†	3	24	47	0.28	-1.25	0.35	1.5	3	13	6	11	se	
<i>Southern Division</i>																				
Afton	Union	1,212	23	44.5	+7.5	73	8	15	24	37	0.21	-1.28	0.14	0	2	17	7	6	sw	J. E. Deitrick.
Albia	Monroe	959	19	41.0	+4.2	75	7	10	24†	40	0.10	-1.60	0.10	T	1	8	4	18	sw	F. H. Holmes.
Allerton	Wayne	1,122	15																	
Atlantic	Cass	1,104	26	41.0	+5.4	71	7†	15	24	36	0.17	-1.05	0.05	0.7	4	12	6	12	sw	Thos. H. Whitney.
Bedford	Taylor		17	42.8	+6.2	72	7	10	24	36	0.30	-1.12	0.26	T	2	15	5	10	s	E. E. Healy.
Bloomfield	Davis	881	10	44.4		75	7	14	24	33	0.11	-1.75	0.08	T	3	10	13	7	n	V. G. Warner.
Bonaparte	Van Buren	565	26	43.4	+5.2	75	7	10	24	38	0.05	-1.78	0.05	T	1	13	5	12	nw	Bruce R. Vale.
Burlington	Des Moines	544	21	42.4	+4.2	75	6†	15	24	35	0.08	-1.81	0.08	T	1	10	8	12	sw	Mrs. J. A. Donnelly.
Centerville	Appanoosa	1,013	12	44.2		73	6†	12	24	33	0.14		0.11	T	3	13	8	9	sw	S. A. Martin.
Chariton	Lucas	1,042	22	43.1	+6.0	74	7	11	24	42	T	-1.47	T	T	0	10	10	10	sw	C. C. Burr.
Clarinda	Page	1,009	27	42.0	+6.0	75	7	12	24	39	0.29	-1.15	0.29	0	1	21	3	6	s	A. S. Van Sandt.
Columbus Jet	Louisa	595	16	43.4	+5.9	71	6	16	24	27	0.09	-1.77	0.05	0.5	3	19	3	8	e	J. B. Johnston.
Corning	Adams	1,117	25	42.7	+7.0	74	7	8	24	35	0.25	-1.12	0.18	T	2	18	2	10	nw	Jerome Smith.
Corydon	Wayne	1,101	24	43.0	+4.8	74	7	11	24	37	0.05	-1.39	0.02	T	3	13	8	9	sw	May O. Miller.
Creston	Union	1,312	12	41.0	+5.8	76	7	12	24	40	0.08		0.08	T	1	8	12	10	sw	Mrs. Tillie E. McConnell.
Cumberland	Cass		18								T	-1.05	T	0	0	16	7	7	n	J. H. Reppert.
Earlham	Madison	1,126	15	42.5	+7.7	76	7	6	24	41	0.10	-1.56	0.10	1.0	1	17	3	10	sw	George Phillips.
Fairfield	Jefferson	780	33	42.5 ^a	+4.6	75 ^a	7	8 ^a	24	39 ^a	0.04	-2.22	0.02	0.2	2				sw	R. Monroe McKenzie.
Fort Madison	Lee	516	68								0.20	-1.96	0.20	0	1	11	2	17	nw	F. W. Myers.
Greenwood	Mills	1,100	20	44.5		73	8	15	24†	38	0.24		0.20	T	2	7	11	12	se	Dr. George Mogridge.
Greenfield	Adair		25	43.8 ^c	+7.7	73 ^c	15	21 ^c	1	43 ^c	T	-1.14	T	0	0				sw	Frank A. Ward.
Indianola	Warren	969	26	43.3	+6.2	77	7	16	24	33	0.14	-1.34	0.12	T	3	13	7	10	nw	Prof. J. L. Tilton.
Keokuk	Lee	614	46	44.4	+5.0	74	7	17	24	31	0.01	-1.84	0.01	T	1	13	4	13	sw	U. S. Weather Bureau.
Keosauqua	Van Buren	644	25	42.8	+5.6	74	6†	9	24	38	0.20	-1.37	0.20	T	1	7	6	17	s	J. H. Landes.
Knoxville	Marion	920	22	43.0	+5.1	76	7	10	24	33	0.09	-1.43	0.07	0.2	2	14	4	12	ne	W. J. Casey.
Lacona	Warren		18								0.42	-1.27	0.18	0	6	8	11	11		J. B. Alter.
Lamoni	Decatur		10	41.9	+4.0	73	6	15	24	37	0.02		0.01	0	2	14	11	5	nw	Chas. B. Woodstock.
Lenox	Taylor	1,250	22	43.2	+6.7	70	7	14	24	33	0.15	-1.25	0.10	0	2	21	3	6	s	J. L. Hurley.
Mount Ayr	Ringgold	1,236	24	43.5	+5.6	74	7	16	24	38	0.13	-1.30	0.10	T	2	16	4	10	s	Alex Maxwell.
Mt. Pleasant††	Henry	729	36	43.2	+5.4	75	6†	13	24	37	0.08	-1.71	0.08	T	1	11	7	12	sw	J. W. Edwards.
Murray	Clarke	1,216	26	43.4	+6.5	74	6	15	24	37	0.20	-1.11	0.08	T	4	9	11	10	s	M. T. Ashley.
Northboro	Page	1,046	5	45.2		74	7†	16	24	37	0.27		0.27	0	1	17	5	10	se	J. M. Darby.
Oskaloosa	Mahaska	843	41	42.8	+6.0	73	7	10	24	36	0.13	-1.42	0.07	0.5	3	16	1	13	se	Jos. Boyd.
Ottumwa	Wapello	849	22	42.8		75	7	13	24	39	0.02	-1.31	0.02	T	1	15	6	9	se	Thomas Ray.
Pella	Marion	877	14	42.5	+5.1	75	7	9	24	40	0.20	-1.48	0.15	0.5	2	17	0	13	s	John H. Ver steeg.
St. Charles	Madison	1,070	16	44.1	+5.6	76	7	16	24	36	0.29	-1.36	0.23	T	4	14	5	11	nw	R. D. Minard.
Sigourney	Keokuk	877	21	43.0	+6.1	74	6†	11	24	37	0.08	-1.59	0.04	0.5	3	14	6	10	nw	W. E. Utterback.
Stockport	Van Buren	754	15	41.8	+4.3	75	7	6	24	40	0.03	-1.64	0.03	T	1	13	6	11	sw	C. L. Beswick.
Thurman	Fremont		20	43.5	+6.7	72	9	12	24	41	0.12	-1.40	0.12	T	1	12	12	6	sw	C. R. Paul.
Washington	Washington	769	35	44.1	+6.9	74	6	22	2	36	0.10	-1.57	0.08	0.5	2	11	6	13	sw	Wm. A. Cook.
Winterset	Madison	1,129	26	43.6	+7.0	75	7	14	24	34	0.34	-1.15	0.22	T	2	13	11	6	sw	H. S. Ely.
Omaha, Neb.		1,040	46	45.8	+8.1	72	8	24	28	32	0.12	-0.94	0.06	0.5	2	14	8	8	s	U. S. Weather Bureau.
Means and extremes				42.0	+4.9	77	7	6	24	43	0.14	-1.44	0.29	0.1	2	14	6	10	sw	
State means and extremes				40.7	+5.7	77	7	3	24	47	0.28	-1.23	0.60	1.4	3	14	6	10	sw	

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

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

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

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

Daily Precipitation for November, 1917—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.....										.14	.07																									0.21
Albia	Des Moines.....										.19	T		T	T																					0.10	
Allerton.....	Chariton.....																																				
Atlantic	Nishnabotna.....										.05	.05												T													0.17
Bedford.....	Missouri.....										.26	.04	T													T										0.30	
Bloomfield.....	Mississippi.....	T									.02	.08	T	.01																						0.11	
Bonaparte.....	Des Moines.....	T									.05	T																								0.05	
Burlington	Mississippi.....	T									.08																									0.08	
Centerville.....	Chariton.....	T									.11			.02																						0.14	
Chariton.....	Chariton.....										T															T											T
Clarinda	Nodaway.....										T	.29		T																							T
Columbus Jct.....	Iowa.....										.01																										0.09
Corning.....	Nodaway.....										.18	.07																									0.25
Corydon.....	Chariton.....	T									.02	.02	T	T	T																					0.05	
Creston.....	Missouri.....											T	.08																								0.08
Cumberland.....	Nodaway.....																																				T
Earlham.....	Des Moines.....										T	T	T																								T
Fairfield.....	Skunk.....										.02		T		T																						0.04
Ft. Madison.....	Mississippi.....										.20		T	T																							0.20
Glenwood.....	Missouri.....										.04	.20																									0.24
Greenfield.....	Nodaway.....											T																									T
Indianola.....	Des Moines.....	T									.12	T	.01																								0.14
Keokuk***	Mississippi.....	T									.01	T	T	T																						0.01	
Keosauqua.....	Des Moines.....											T	.20	T	T																						0.20
Knoxville.....	Des Moines.....											T	.07																								0.09
Lacona.....	Des Moines.....				.18							.05	.07																								0.42
Lamoni	Grand.....											T	.01	.01	T																					0.02	
Lenox.....	Missouri.....										.10	.05																									T
Mount Ayr.....	Grand.....										.10																										T
Mt. Pleasant.....	Skunk.....										.08		T	T																							0.08
Murray.....	Grand.....										.07	.04																									0.20
Northboro.....	Missouri.....										.27																										0.27
Oskaloosa.....	Des Moines.....		.03																																		0.13
Ottumwa	Des Moines.....	T																																			0.02
Pella.....	Skunk.....	T										.15																									0.20
St. Charles.....	Des Moines.....											T	T	.01	.23	.03																					T
Sigourney.....	Skunk.....	T										.03	T	T	T																						0.08
Stockport.....	Skunk.....											.03																									0.03
Thurman.....	Missouri.....											T	.12																								0.12
Washington.....	Skunk.....																																				0.10
Winterset.....	Des Moines.....											.12	.22	T																							0.34
Omaha, Neb.***	Missouri.....											T	.06		T																						0.12

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

Daily Maximum and Minimum Temperatures for the Month of November, 1917.

Table with columns for Stations, days 1-30, and Mean. Rows are grouped by division: Northern Division, Central Division, and Southern Division. Each station has two rows for Maximum and Minimum temperatures.

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.

FINAL CROP REPORT OF THE STATE, 1917.

Following is a summary of reports from crop correspondents of the Iowa Weather and Crop Service, showing the average yield per acre and total yields of staple soil products, and the average price at the nearest station, December 1, 1917. This report does not include or take into consideration live stock, poultry or dairy products.

The crop season of 1917 was an exceptional one; most of the crops being produced under great handicaps. The winter of 1916-17 was cold and the precipitation was generally deficient, particularly in the southern portion of the State. The snowfall was about normal in the northern counties, but very deficient in the southern sections until March and April, when in the latter month it exceeded the total amount for the three preceding months. A glaze storm on the night of December 25-26 covered nearly the entire state with a heavy coating of ice; and another on March 12-13 covered the region from the Des Moines to the Mississippi Rivers. April, May and June were abnormally cold, and April and June were excessively wet. Cold weather continued until July 20th, after which it was hot and relatively dry till August 4th. The remainder of August was cool and the showers were light and scattered. Drought and grasshoppers became serious in some of the south-central and southeastern counties. September was cooler than normal with heavy frosts on the 11th, on the lowlands in the northern and eastern sections; there was, however, a warm period from the 13th to the 18th. Killing frosts occurred in some sections of the State on October 1st, in all but the southwestern portion on the 6th, and throughout the State on the 8th; and the entire month was cold, being the coldest of record, and 3.1 degrees colder than October, 1895, which heretofore held the record. Sunshine was unusually deficient, particularly in the northeast portion where it was less than one-third of the possible amount. November was much warmer and drier than usual with about the normal amount of sunshine.

Considering the various crops in their relations to the weather, some of the outstanding features may be noted as follows: Winter-killing was unusually prevalent, particularly in the central and southern divisions. Wheat, rye, clover, both old and new, timothy, blue grass, lawns, cane fruits and grapes all suffered seriously.

The winterkilling of wheat was due to the following causes: First, the plants were not well established at the beginning of winter. In the central and southern divisions, which include the bulk of the winter wheat acreage, drought, August 16-31, September 13-24, and October 1-14, 1916, delayed plowing, seeding and germination. November was warm with plenty of moisture, and the young plants got a fair start but were not sufficiently strong to resist the rigorous winter that followed. Second, the general glaze storm of Christmas night covered almost the entire area with a smothering coat of ice. Third, the snow covering was absent or generally deficient. In the central portion of the State there was considerable snow covering, but subsequent weather conditions reduced it to an impervious layer of ice equal in smothering properties to a covering of glaze. Where the snow covering was absent the plants were subjected to unusual extremes of temperature. Fourth, drought prevailed throughout the winter. The last three causes were responsible for the winterkilling of grasses.

In the northern portion of the State, where the snow covering was deeper, more porous and continuous, grasses and the small acreage of winter wheat that was sown did not suffer so seriously. The warm and normally moist March and the cool and generally wet spring and early summer were especially favorable for oats, spring wheat and barley, all of which made large yields, barley making a record yield. The yield of winter wheat on the acreage that was considered promising enough to let grow was good.

The corn acreage was greatly increased by plowing up the winter-killed wheat fields and meadows. This, together with the cold, wet, unfavorable spring, started it out about two weeks late. Large areas in the southern portion of the State were washed out or drowned out and replanted, some as late as the closing days of June. The abnormally cool weather of May, June and the first half of July did not give the corn a chance to catch up. About the only good corn weather of the season occurred from July 20th to August 4th. Two weeks more of good corn weather would have matured a phenomenal crop, but a cold and cloudy October caught it unprepared. The yield is good but the quality is unusually poor. November, though much warmer and drier than normal, closed with the crop generally unfit for cribbing. Seed corn gathered since October 8th almost without exception shows very low germination tests. Considerable care will need to be exercised before another planting season to discover the unreliable seed, locate supplies of good seed and effect the proper distribution. Droughty conditions and grasshoppers during August, in some of the south-central and southeastern counties, made the pastures brown and bare. The Iowa

Weather and Crop Service was consulted by several cattle men seeking pasturage in more favorable sections of the State to avoid the use of high-priced dry feed or immature corn fodder.

Looking forward to the winter wheat crop of 1918, it should be noted that in certain portions of the State, particularly the south-central and western, plowing, seeding and germination were delayed by dry, hard soil and droughty conditions, and October was too cold, and in some sections grasshoppers kept it eaten down so that the plants are not entering the winter in a resistant condition. There has been a great increase in the acreage sown as compared with the area harvested in 1917, but the acreage is considerable below the normal, and in order that we may have a normal wheat crop next year, it will be necessary to greatly increase the acreage of spring wheat.

The yields and values are as follows:

Corn.—The estimated acreage was 10,242,000 acres, or 763,000 acres more than in 1916; average yield, 40 bushels per acre; total yield, 409,667,000 bushels; average price, 97 cents per bushel; total value, \$397,376,990. Fifty-one per cent of the crop was reported to be soft or immature and only 57 per cent had been husked on December 1st.

Oats.—The estimated area harvested was 5,238,500 acres, or about 50,000 acres more than in 1916. Average yield, 46 bushels; total yield, 239,416,200 bushels; average price, 61 cents; total value, \$146,043,882.

Spring Wheat.—Area harvested, 173,460 acres; average yield, 18 bushels per acre; total yield, 3,199,820 bushels; price per bushel, \$1.94; total value, \$6,207,652.

Winter Wheat.—Area harvested, 133,930 acres; average yield per acre, 18 bushels; total yield, 2,397,560; average price, \$1.97 per bushel; total value, \$4,723,193.

Barley.—Area harvested, 258,775; average yield per acre, 35 bushels, which is a record for the State; total yield, 9,111,590 bushels; average price, \$1.15; total value, \$10,478,328.

Rye.—Average yield, 20 bushels per acre; total yield, 722,410 bushels; farm price, \$1.58; total value, \$1,141,408.

Flax Seed.—Average yield, 11 bushels; total yield, 80,810 bushels; total value at \$2.87 per bushel, \$231,925.

Timothy Seed.—Area harvested, 290,000 acres; average yield, 4.5 bushels; total yield, 1,306,093; total value, at \$3.37 per bushel, \$4,401,533.

Clover Seed.—Area harvested, 61,560 acres; average yield, 1.5 bushels; value at \$14.00 per bushel, \$1,292,760.

Potatoes.—Area harvested, 99,610 acres; average yield, 109 bushels; total yield, 10,793,600 bushels; average price, \$1.32; total value, \$14,247,552.

Hay (Tame).—Average yield, 1.3 tons per acre; total yield, 3,584,400 tons; average price, \$18.82 per ton; total value, \$67,458,408.

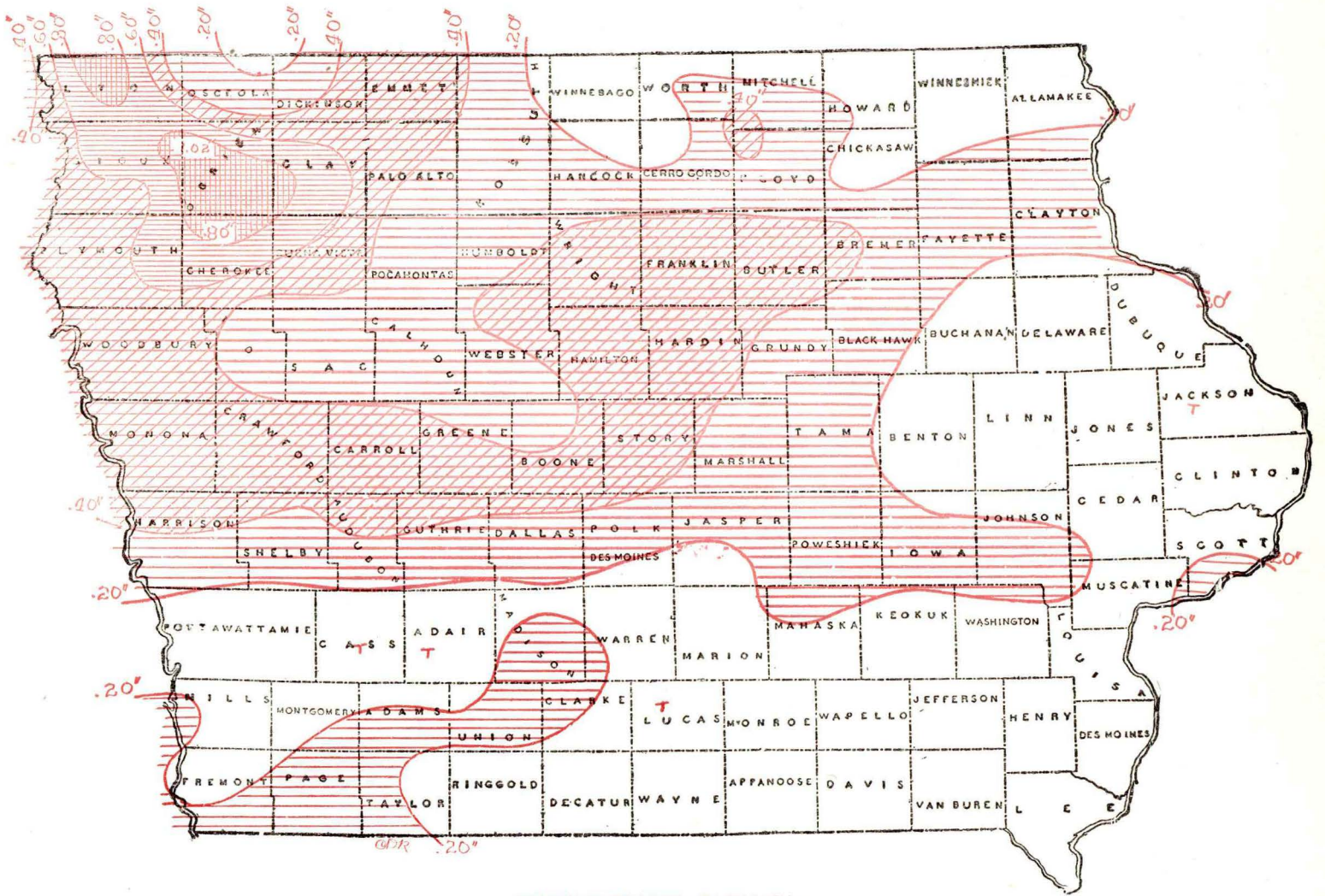
Hay (Wild).—Average yield, 1.2 tons; total yield 636,947 tons; average price, \$14.79 per ton; total value, \$9,420,446.

Alfalfa.—Area 103,215 acres; average yield, 3.4 tons; total yield, 353,830 tons; average price, \$23.40 per ton; total value, \$8,279,622.

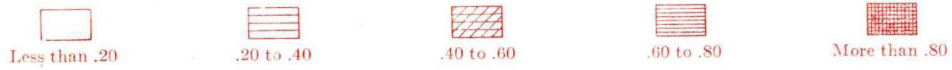
TABULATED CROP SUMMARY.

	Acre	Average yield	Average price	Total yield	Total value
Corn	10,242,000	40 Bu.	\$.97	409,667,000	\$ 397,376,990
Oats	5,238,500	46 Bu.	.61	239,416,200	146,043,882
Spring Wheat	173,460	18 Bu.	1.94	3,199,820	6,207,652
Winter Wheat	133,930	18 Bu.	1.97	2,397,560	4,723,193
Barley	258,775	35 Bu.	1.15	9,112,590	10,479,478
Rye	35,275	20 Bu.	1.58	722,600	1,141,350
Flax Seed	7,430	11 Bu.	2.87	80,810	231,925
Timothy Seed	290,243	4.5 Bu.	3.37	1,306,093	4,401,533
Clover Seed	61,560	1.5 Bu.	14.00	92,340	1,292,760
Potatoes	99,610	109 Bu.	1.32	10,793,600	14,247,552
Hay (Tame)	2,671,100	1.3 tons	18.82	3,581,400	67,458,408
Hay (Wild)	524,912	1.2 tons	14.79	636,947	9,420,446
Alfalfa	103,215	3.4 tons	23.40	353,830	8,279,622
Pastures and Grazing			Estimated		160,000,000
Ensilage					16,686,000
Sweet Corn					5,800,000
Pop Corn					900,000
Buckwheat					370,000
Fruit Crop					7,000,000
Garden Truck					8,000,000
Miscellaneous					12,000,000
Total					\$ 822,061,291
The value of soil products for 1916 was					\$ 597,165,673

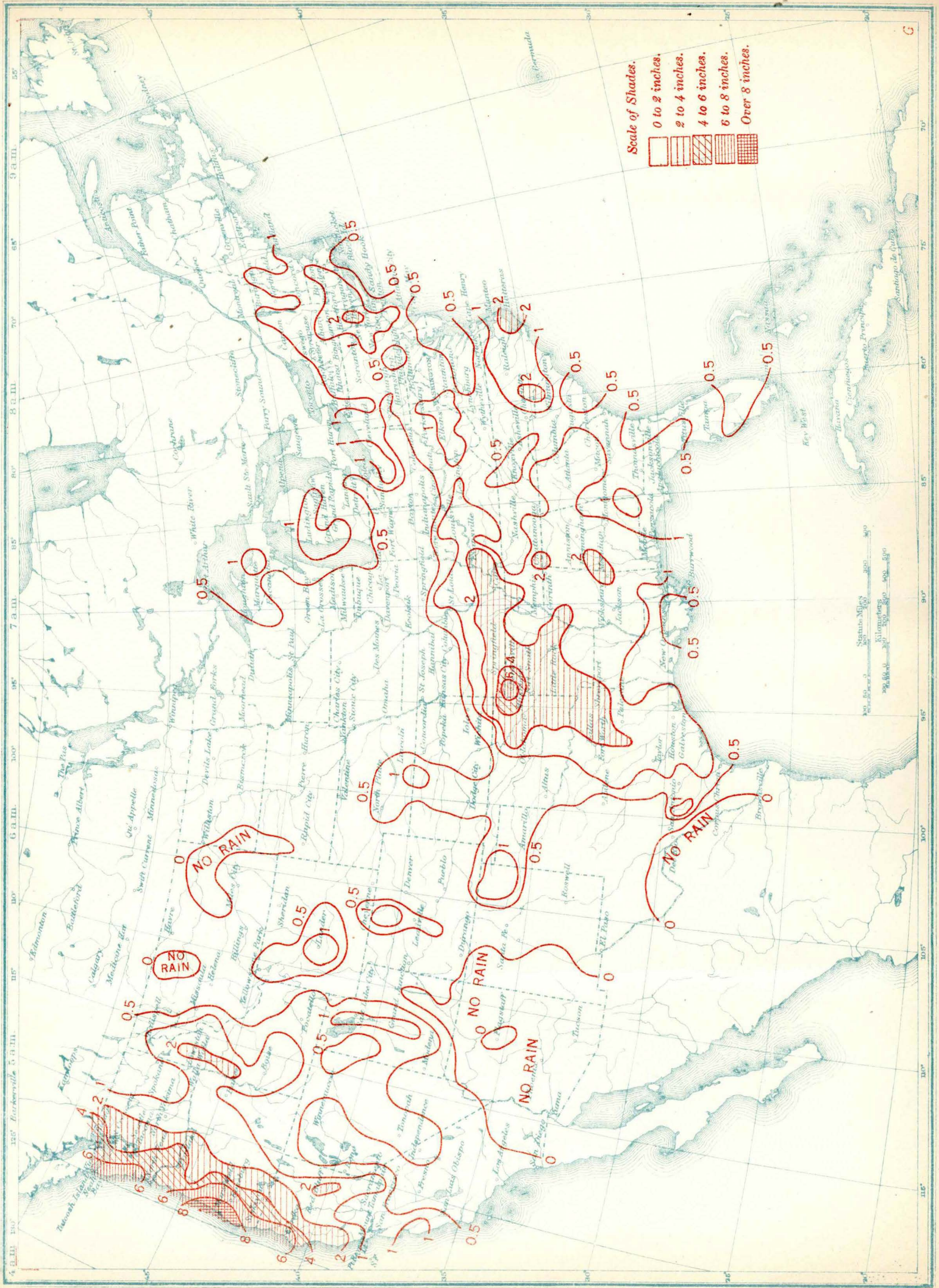
TOTAL PRECIPITATION, NOVEMBER, 1917.



SCALE OF SHADES—IN INCHES.



Total Precipitation, Inches, November, 1917.



FEB 19 1918

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

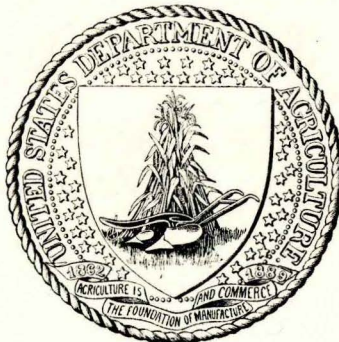
CLIMATOLOGICAL DATA

IOWA SECTION

IN COOPERATION WITH THE IOWA WEATHER AND CROP SERVICE

DECEMBER, 1917
AND
Annual Summary for 1917

BY
GEORGE M. CHAPPEL
SECTION DIRECTOR

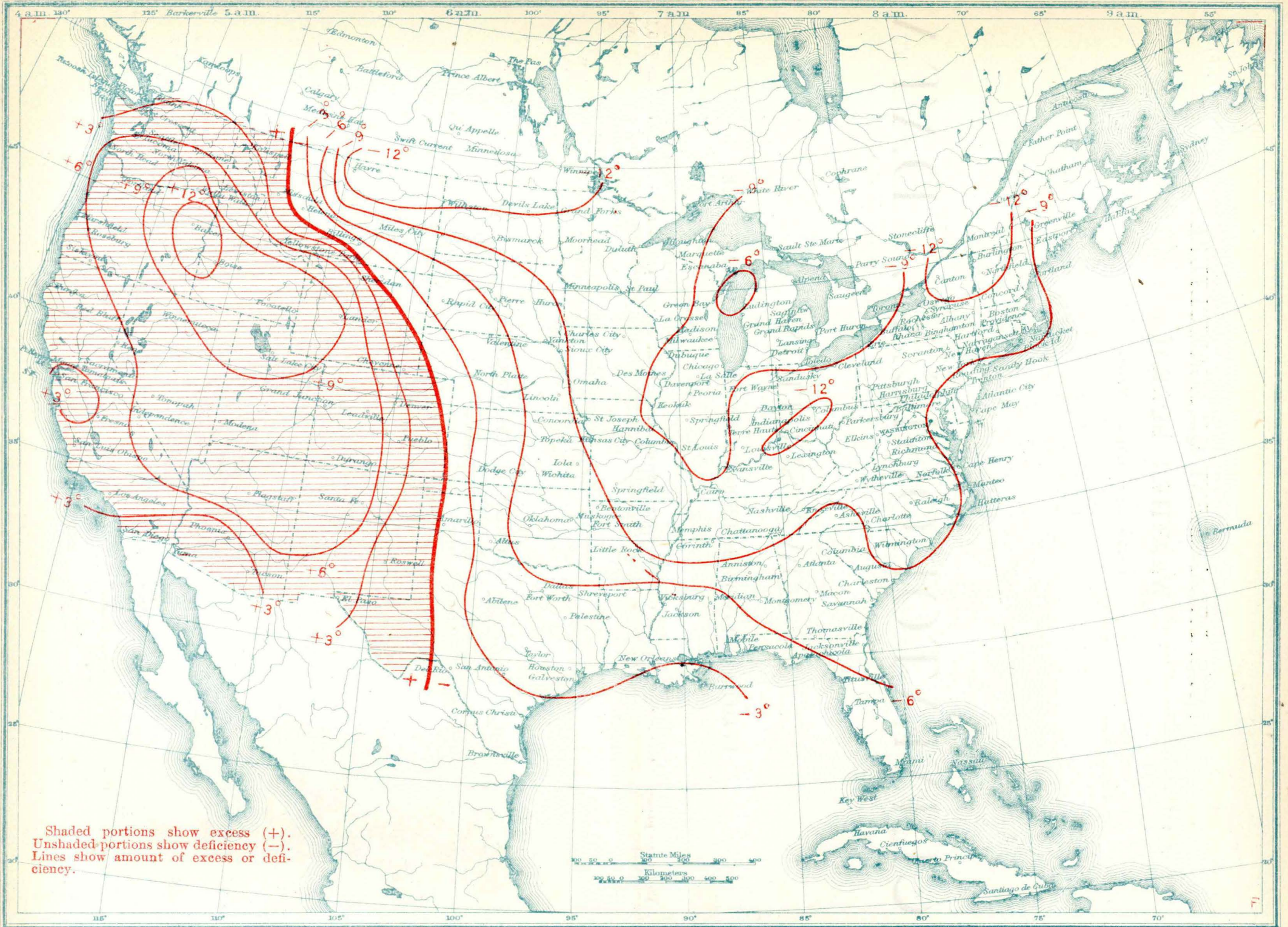


PRINTED BY ORDER OF THE IOWA GENERAL ASSEMBLY

DES MOINES, IOWA
WEATHER BUREAU OFFICE

12

Departure of the Mean Temperature from the Normal, December, 1917.



U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

VOL. XXVIII. DES MOINES, IOWA, DEC., 1917. No. 12

GENERAL SUMMARY.

December, 1917, mean temperature, 14.5°, is the lowest in the 28 years of state-wide records, the next coldest being 15.1° in December, 1909. Zero days were the most frequent of record. The largest temperature deficiencies were in the northwestern portion of the State. Sunshine was deficient, particularly in the eastern portion. Precipitation was deficient, except in portions of Lyon, Sioux, O'Brien, Cherokee, Webster and Hamilton counties. The ground was snow-covered about 25 days in the extreme northwestern portion of the State, and less than 15 days in the southwestern and east-central counties.

Although weather conditions seemed unfavorable, corn husking progressed, so that at the close of the month not more than 15 per cent of the crop remained in the field. Conditions were favorable for cribbed corn. Though severe temperatures prevailed for considerable periods, they were preceded and accompanied by porous snow covering, so it is believed that such winter wheat as was well established at the beginning of winter, is in good condition.

C. D. R.

PRESSURE.

The mean pressure (reduced to sea level) for the State was 30.29 inches. The highest recorded was 31.09 inches, at Sioux City on the 29th, and the lowest was 29.62 inches at Sioux City on the 23d. The monthly range was 1.47 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the means of 105 stations, was 14.5°, or 9.4° lower than the normal. By divisions, three tiers of counties to the division, the mean temperatures were as follows: Northern, 11.2°, or 10.0° lower than the normal; Central, 14.7°, or 9.4° lower than the normal; Southern, 17.6°, or 8.8° lower than the normal. The highest monthly mean was 20.9°, at Keokuk, and the lowest monthly mean was 6.3°, at Inwood. The highest temperature reported was 62°, at Keokuk, on the 2d, and the lowest temperature reported was -40°, at Washta, on the 29th, the range for the State being 102°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 83 per cent, and at 7 p. m. it was 77 per cent. The mean for the month was 80 per cent, or about normal. The highest monthly mean was 86 per cent at Charles City, and the least reported was 74 per cent at Omaha, Nebr.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 110 stations, was 0.56 inch, or 0.66 inch less than the normal. By divisions, the averages were as follows: Northern, 0.51 inch, or 0.56 inch less than the normal; Central, 0.63 inch, or 0.62 inch less than the normal; Southern, 0.54 inch, or 0.81 inch less than the normal. The greatest amount, 1.70 inches, occurred at Lacona, and the least, 0.14 inch, at Algona. The greatest amount in any 24 consecutive hours, 0.45 inch, occurred at Iowa Falls, on the 12th.

SNOW

The average snowfall for the State was 6.7 inches. The greatest amount, 17.0 inches, occurred at Lacona, and the least, 1.8 inches at Lenox.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported was at the rate of 51 miles an hour from the northwest at Sioux City, on the 9th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 38 per cent, or about 11 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, 20; Des Moines, 46; Dubuque, 40; Keokuk, 44; Sioux City, 45; and Omaha, Neb., 40 per cent. The average number of clear days was 10; partly cloudy, 9; cloudy, 12.

MISCELLANEOUS PHENOMENA.

Fog: 1st, 2d, 3d, 7th, 16th, 17th, 18th, 19th, 20th, 22d, 23d.

Halos (lunar or solar): 2d, 3d, 5th, 6th, 8th, 9th, 10th, 13th, 21st, 23d, 24th, 25th, 26th, 27th, 28th.

Haze: 16th, 17th, 18th, 19th, 27th.

Parhelia: 8th, 9th, 27th, 29th.

Sleet: 5th, 29th, 30th (at only four stations).

ERRATA.

Report for November, 1917: Page 125: Charles City; total snowfall published 3.4 inches, should be 3.6; Keokuk; monthly mean temperature published 44.4°, should be 44.5°; departure of mean from normal published +5.0° should be +5.1°. Page 128: Keokuk; maximum temperature on the 8th published 54, should be 56; minimum temperature on the 12th published 39, should be 40; maximum temperature on the 18th published 47, should be 49; mean maximum temperature published 52.8°, should be 53.0°.

COMPARATIVE DATA FOR THE STATE—DECEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipi- tation .01 in.	Clear	Partly cloudy	Cloudy
1890	29.1	+5.2	72	-18	0.45	-0.77	1.40	0.00	-----	3	17	7	7
1891	32.3	+8.4	72	-14	2.41	+1.19	4.50	1.21	-----	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	+0.69	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	6	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	23.8	+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	2.13	+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	0.90	1.3	4	15	5	11
1914	15.7	-8.2	63	-31	1.30	+0.80	2.24	0.57	11.1	9	10	6	15
1915	25.0	+1.1	56	-10	0.69	-0.53	1.70	T	4.6	5	11	8	12
1916	18.7	-5.2	67	-25	1.04	-0.18	2.00	0.35	6.7	6	15	8	8
1917	14.5	-9.4	62	-40	0.56	-0.66	1.70	0.14	6.7	6	10	9	12

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

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU.

IOWA SECTION.

GEO. M. CHAPPEL, SECTION DIRECTOR.

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The mean pressure (reduced to sea level) for the State was 30.29 inches. The highest recorded was 31.09 inches, at Sioux City on the 29th, and the lowest was 29.62 inches at Sioux City on the 23d. The monthly range was 1.47 inches.

TEMPERATURE.

The mean temperature for the State, as shown by the means of 105 stations, was 14.5°, or 9.4° lower than the normal. By divisions, three tiers of counties to the division, the mean temperatures were as follows: Northern, 11.2°, or 10.0° lower than the normal; Central, 14.7°, or 9.4° lower than the normal; Southern, 17.6°, or 8.8° lower than the normal. The highest monthly mean was 20.9°, at Keokuk, and the lowest monthly mean was 6.3°, at Inwood. The highest temperature reported was 62°, at Keokuk, on the 2d, and the lowest temperature reported was -40°, at Washta, on the 29th, the range for the State being 102°.

HUMIDITY.

The average relative humidity for the State at 7 a. m. was 83 per cent, and at 7 p. m. it was 77 per cent. The mean for the month was 80 per cent, or about normal. The highest monthly mean was 86 per cent at Charles City, and the least reported was 74 per cent at Omaha, Nebr.

PRECIPITATION.

The average precipitation for the State, as shown by the records of 110 stations, was 0.56 inch, or 0.66 inch less than the normal. By divisions, the averages were as follows: Northern, 0.51 inch, or 0.56 inch less than the normal; Central, 0.63 inch, or 0.62 inch less than the normal; Southern, 0.54 inch, or 0.81 inch less than the normal. The greatest amount, 1.70 inches, occurred at Lacona, and the least, 0.14 inch, at Algona. The greatest amount in any 24 consecutive hours, 0.45 inch, occurred at Iowa Falls, on the 12th.

SNOW

The average snowfall for the State was 6.7 inches. The greatest amount, 17.0 inches, occurred at Lacona, and the least, 1.8 inches at Lenox.

WIND.

The prevailing direction of the wind was from the northwest. The highest velocity reported was at the rate of 51 miles an hour from the northwest at Sioux City, on the 9th.

SUNSHINE AND CLOUDINESS.

The average percentage of the possible amount of sunshine was 38 per cent, or about 11 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, 20; Des Moines, 46; Dubuque, 40; Keokuk, 44; Sioux City, 45; and Omaha, Neb., 40 per cent. The average number of clear days was 10; partly cloudy, 9; cloudy, 12.

MISCELLANEOUS PHENOMENA.

Fog: 1st, 2d, 3d, 7th, 16th, 17th, 18th, 19th, 20th, 22d, 23d.

Halos (lunar or solar): 2d, 3d, 5th, 6th, 8th, 9th, 10th, 13th, 21st, 23d, 24th, 25th, 26th, 27th, 28th.

Haze: 16th, 17th, 18th, 19th, 27th.

Parhelia: 8th, 9th, 27th, 29th.

Sleet: 5th, 29th, 30th (at only four stations).

ERRATA.

Report for November, 1917: Page 125: Charles City; total snowfall published 3.4 inches, should be 3.6; Keokuk; monthly mean temperature published 44.4°, should be 44.5°; departure of mean from normal published +5.0° should be +5.1°. Page 128: Keokuk; maximum temperature on the 8th published 54, should be 56; minimum temperature on the 12th published 39, should be 40; maximum temperature on the 18th published 47, should be 49; mean maximum temperature published 52.8°, should be 53.0°.

COMPARATIVE DATA FOR THE STATE—DECEMBER.

YEAR	Temperature				Precipitation					Number of Days			
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snow fall	With precipi- tation .01 in.	Clear	Partly cloudy	Cloudy
1890	29.1	+5.2	72	-18	0.45	-0.77	1.40	0.00	-----	3	17	7	7
1891	32.3	+8.4	72	-14	2.41	+1.19	4.50	1.21	-----	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	+0.69	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	+0.80	2.24	0.57	11.1	9	10	6	15
1915	25.0	+1.1	56	-10	0.69	-0.53	1.70	T	4.6	5	11	8	12
1916	18.7	-5.2	67	-25	1.04	-0.18	2.00	0.35	6.7	6	15	8	8
1917	14.5	-9.4	62	-40	0.56	-0.66	1.70	0.14	6.7	6	10	9	12

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

Climatological Data for December, 1917

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, unmelted), Number of Days. (Precipitation 0.01 in. or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind., Observers.

Climatological Data for December, 1917—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 0.01 in. or more.	Clear.	Partly cloudy.			Cloudy.
Webster City	Hamilton	1,044	12	13.2	-10.4	45	20	-23	29	35	1.30	+0.31	0.40	13.0	6	4	8	19	nw	C. D. Carpenter. Dr. F. P. Butler. Dr. F. C. Schadt.
Whitten	Hardin	1,036	20	14.1	-8.9	51	20	-22	8†	37	0.62	-0.43	0.30	9.0	4	10	5	16	nw	
Williamsburg	Iowa	765	1	15.5		53	20	-20	29	30	0.47		0.18	5.6	6	10	7	14	nw	
Means and extremes				14.7	-9.4	56	20	-32	29	42	0.63	-0.62	0.45	7.5	6	9	8	14	nw	
Southern Division																				
Afton	Union	1,212	23	17.4	-8.8	53	20	-21	29	30	0.19	-1.15	0.05	1.9	5	10	11	10	n	J. E. Deitrick. F. H. Holmes. Noel C. Huston. Thos. H. Whitney. E. E. Healy.
Albia	Monroe	959	19	15.7	-9.6	55	20	-21	29	35	0.44	-0.71	0.15	8.3	7	4	2	25	nw	
Allerton	Wayne	1,122	15	16.4 ^b	-11.1	55 ^b	20	-18 ^h	29	32 ^h									s	
Atlantic	Cass	1,164	26	14.2	-10.6	50	1	-22	29†	35	0.71	-0.49	0.12	7.2	11	7	8	16	ne	
Bedford	Faylor		17	18.2	-6.8	56	2	-19	29	32	0.55	-0.57	0.25	4.4	6	8	12	11	n	
Bloomfield	Davis	881	10	19.8		55	2	-17	29	30	1.15	-0.62	0.30	12.8	8	5	26	6	nw	V. G. Warner. Bruce R. Vale. Mrs. J. A. Donnelly. S. A. Martin. C. C. Burr.
Bonaparte	Van Buren	565	26	19.2	-8.7	55	2	-19	29	30	0.26	-1.09	0.08	16.0	5	15	3	13	nw	
Burlington	Des Moines	544	21	18.0	-9.9	56	2	-15	29†	35	0.91	-0.87	0.30	9.1	8	10	7	14	sw	
Centerville	Appanoose	1,013	12	20.0		55	20	-18	29	31	0.25		0.07	2.7	6	13	6	12	ne	
Chariton	Lucas	1,042	22	16.2	-10.2	56	20	-22	29†	41	0.44	-0.88	0.14	5.0	4	6	13	12	n	
Clarinda	Page	1,069	27	16.7	-8.0	55	20	-17	29†	42	0.22	-0.95	0.08	2.2	7	10	12	9	ne	A. S. Van Sandt. J. B. Johnston. Jerome Smith. May C. Miller. Mrs. Tillie E. McConnell.
Columbus Junction	Louisa	595	16	19.6	-8.1	50	23†	-15	29	32	0.52	-0.79	0.09	5.6	9	15	9	7	nw	
Corning	Adams	1,117	25	16.8	-7.9	56	20	-21	29	33	0.70	-0.64	0.20	7.0	4	15	2	14	ne	
Corydon	Wayne	1,101	24	17.6	-9.8	56	20	-21	29	31	0.42	-1.00	0.10	6.2	8	9	7	15	s	
Creston	Union	1,312	12	13.6	-11.1	54	20	-22	29†	39	0.37		0.12	2.5	6	8	9	14	nw	
Cumberland	Cass		18								0.30	-0.80	0.20	3.0	2	19	6	6	n	J. H. Reppert. George Phillips. R. Monroe McKenzie. F. M. Myers. Dr. George Mogridge.
Earlham	Madison	1,126	15	15.2	-10.2	54	20	-26	29	43	0.86	-0.55	0.15	13.0	9	16	4	11	nw	
Fairfield†	Jefferson	780	33	17.7 ^a	-9.5	53 ^a	20†	-21 ^a	30	35 ^a	0.52	-1.17	0.17	7.1	7				nw	
Fort Madison	Lee	516	68								0.94	-0.92	0.25	9.4	9	11	5	15	nw	
Glenwood	Mills	1,160	20	19.1		54	1†	-19	29	27	0.40		0.30	4.0	2	6	1	24	se	
Greenfield	Adair		25	16.4 ^a	-8.6	51 ^a	1	-23 ^a	29	33 ^a	0.80	-0.38	0.30	8.0	4				nw	
Indianola	Warren	969	26	17.2 ^a	-9.1	53 ^b	1†	-23	29	34 ^b	0.96	-0.49	0.18	9.6	9	7	6	18	nw	
Keokuk	Lee	614	46	20.9	-8.5	62	2	-14	29	29	0.36	-1.51	0.14	6.0	7	12	10	9	nw	
Keosauqua	Van Buren	644	25	19.4	-7.3	56	2	-19	29	31	0.77	-0.66	0.25	8.0	10	5	3	23	se	
Knoxville	Marion	920	22	17.2	-9.3	56	20	-22	29	34	0.69	-0.68	0.15	6.9	9	13	3	15	nw	
Lacoma	Warren		18								1.70	0.00	0.35	17.0	9	7	15	9	-----	J. B. Alter. Chas. B. Woodstock. J. L. Hurley. Alex Maxwell. J. W. Edwards.
Lamoni	Decatur		10	16.2	-10.5	52	1	-19	29†	39	0.29		0.12	3.4	3	12	6	13	nw	
Lenox	Faylor	1,250	22	17.4	-8.3	52	20	-20	29	29	0.18	-0.95	0.05	1.8	5	19	4	8	nw	
Mount Ayr	Ringgold	1,236	24	18.1	-8.9	55	20	-19	29	32	0.31	-1.08	0.15	3.1	4	9	8	14	s	
Mt. Pleasant	Henry	729	36	19.4	-8.4	55	2†	-17	29	31	0.89	-0.47	0.22	8.7	10	11	4	16	nw	
Murray	Clarke	1,216	26	16.6	-9.6	55	20	-21	29	31	0.27	-0.85	0.07	3.3	7	6	11	14	n	M. T. Ashley. J. M. Darby. Jos. Boyd. Thomas Ray. John M. Ver Steeg.
Northboro	Page	1,046	5	19.6		56	20	-17	29	29	0.25		0.25	2.5	1	8	6	17	nw	
Oskaloosa	Mahaska	843	41	17.1	-9.0	55	20	-23	29	35	0.49	-0.66	0.12	8.5	7	10	1	20	nw	
Ottumwa	Wapello	849	22	17.0		56	20	-21	29†	40	0.82	-0.48	0.25	7.9	6	10	8	13	nw	
Pella	Marion	877	14	17.7	-8.9	56	20	-25	29	36	0.82	-0.26	0.40	8.8	7				nw	
St. Charles	Madison	1,070	16	16.9	-10.6	55	20	-22	29	31	0.42	-1.05	0.14	4.8	6	16	6	9	nw	R. D. Minard. W. E. Utterback. C. L. Beswick. C. R. Paul. Wm. A. Cook.
Sigourney	Keokuk	877	21	17.5	-9.2	53	20	-19	29	27	0.54	-0.69	0.08	8.0	11	14	4	13	nw	
Stockport	Van Buren	754	15	17.8	-9.8	54	2	-22	30	35	0.63	-0.65	0.25	7.5	7	9	11	11	s	
Thurman	Fremont		20	18.2	-7.5	54	1	-18	10†	35	0.60	-0.75	0.30	6.5	3	4	14	13	nw	
Washington	Washington	769	35	18.2	-8.9	52	20	-17	29	29	0.45	-0.91	0.14	8.0	6	11	6	14	nw	
Winterset	Madison	1,129	26	17.2	-8.9	54	20	-23	29	32	0.44	-0.86	0.18	7.0	5	7	18	6	nw	H. S. Ely. U. S. Weather Bureau.
Omaha, Neb.		1,040	46	18.0	-9.1	53	1	-20	29	30	0.48	-0.43	0.16	6.8	7	6	9	16	s	
Means and extremes				17.6	-8.8	62	2	-26	29	43	0.54	-0.81	0.40	6.7	6	10	8	13	nw	
State means and extremes				14.5	-9.4	62	2	-40	29	45	0.56	-0.66	0.45	6.7	6	10	9	12	nw	

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

Daily Maximum and Minimum Temperatures for the Month of December, 1917.

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.

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

APPENDIX

ANNUAL SUMMARY

GENERAL SUMMARY.

The mean temperature, 44.8°, is the lowest in the 28 years of record and 2.6° below the normal. The temperature deficiency was accumulated chiefly in February, April, May, June, August, October and December. High temperatures occurred toward the close of July, and November was abnormally warm. The total precipitation, 27.81 inches, is 4.16 inches below normal. April and June were excessively wet, particularly in the latter month in the southern portion of the State, while deficiencies occurred in all other months but February. November was droughty. The season was favorable for small grains, but unfavorable for corn, about half of which was caught by frosts, October 1-8. Considerable frost damage occurred in the northeastern counties on September 11. About 15 per cent of the crop remained unhusked in the fields at the close of the year, and much that was cribbed was damaged by heating. The low yields of winter wheat, clover, timothy and alfalfa, were due to unfavorable conditions during the winter of 1916-17.

C. D. R.

SYNOPSIS BY MONTHS

January was fair and mild until the 10th, when it was followed by a cold wave, and temperatures of zero and lower occurred in nearly all portions of the State during the next few days. A storm center attended by snow passed over the State on the 20-21st, and was followed by a cold wave with temperatures of 14 to 20° below zero in the northern counties. In the north part of the State, where the snow was heavy, it drifted and interfered seriously with rail traffic. Temperatures of 50 to 60°, the highest of the month, were general on the 28th. General snow on the 30-31st was followed by the most severe cold wave of the winter, which was sweeping southeastward across the State at midnight of the 31st.

February was the driest month of that name since statewide observations began in 1890, and the coldest since 1905. It was, however, rather a pleasant winter month as there was only one bad storm which occurred on the 4th when the temperature was below zero all day north of Des Moines, and the minimum temperatures ranged from 8° below zero at Keokuk to 28° below zero at Lake Park. The velocity of the wind ranged from 39 miles an hour at Des Moines to 69 miles an hour at Sioux City. Over the greater part of the State these conditions were accompanied by falling snow, which made the worst blizzard for many years. Railroad traffic was suspended for several days on some lines in the northern counties. Although cold the remainder of the month was generally pleasant. Some oats were seeded in Davis County on the 26th.

March opened cold with temperatures of zero or lower in all but the southeastern counties on the 4th and 5th, the lowest being -13° at Lake Park on the 4th. Excepting a warm period, 9-11th, it continued cold till the 19th, after which it was warm. Precipitation, as in the two preceding months, was above normal in the northern, normal in the

central, and below normal in the southern division. A severe glaze storm occurred on the 12th from Fort Dodge to Des Moines and east to the Mississippi river, which did \$175,000 worth of damage to telephone and telegraph lines. By the close of the month grass was starting and field work was progressing rapidly in the southern counties. Oats and spring wheat seeding had been completed in a few southeastern counties; potato planting was reported well north in the central division, and sod plowing was being done as far north as Lyon County in the extreme northwest. Winter wheat, timothy, alfalfa, and clover both old and new were seriously winter-killed.

Cold, cloudy and rainy weather prevailed during most of April. More snow fell in the southern counties than in the preceding three months. Vegetation made slow progress. The acreage of oats, potatoes and corn was increased on account of so much winter-killing of winter wheat and meadows.

The temperature and rainfall for May were below normal, only May, 1892 and 1907, being cooler in the 28 years of record. Ice, heavy frost, or freezing temperatures were general during the first week, and frost on or about the 23rd damaged potatoes, corn, garden truck and fruit buds in some localities, particularly in the northeast and east central sections. Small grain made good progress but meadows and pastures were slow so that stock feeding had to be continued in many sections until the close of the month. By the 20th about 75 per cent of the corn had been planted, but frequent rains during the last decade delayed field work and some planting remained to be done at the close of the month, at which time early planted corn was up and was of good stand and color. Apples, plums and cherries were backward, coming into full bloom in the southern counties about the 15th and the northern counties about the 25th.

June was cool and wet, the rainfall being the greatest since 1890. In the central and southern counties many stations had the greatest rainfall of record in June; some had three times the June normal, and 30 to 40 per cent of the annual normal. Excessive rains during the first week, particularly in the south, overflowed lowlands, destroying thousands of acres of crops. Similar conditions prevailed in the northeastern portion of the State on the 23-26th. Much of the overflowed land was replanted to corn toward the close of the month. The last 10 days of the month were favorable but at the close corn averaged 10 days to two weeks late.

Cool weather prevailed during the first two decades of July, after which it was warm, with abnormally hot weather the last four days. Precipitation was deficient but mostly well distributed till the last week when the drought accompanied by high temperature and hot winds damaged pastures, potatoes and garden truck. The season was generally favorable for small grain which, by the close of the month, was mostly harvested and some threshed, showing large yields and good quality. Corn was beginning to tassel in all sections on the 31st.

Droughty conditions that prevailed at the close of July were relieved by frequent and quite general showers during the first 12 days of August, followed by a nearly rainless week, after which only occasional local rains occurred. After the 4th, temperatures, especially at night, were generally so low that corn made slow progress and only the earliest fields had reached the roasting ear stage by the close of the month. Late potatoes and truck crops suffered somewhat from lack of moisture and very little fall plowing could be done.

Heavy to killing frost occurred on the 11th of September, in the northern and eastern sections which did considerable damage to corn, potatoes and other late crops. Corn made its best progress between the 13th and 18th, but during most of the month the deficient temperature and sunshine made its progress very slow. At the close of the month less than two-thirds of the crop was safe from any ordinary killing frost, and part of that was susceptible to serious damage by freezing temperatures.

October was 3.1° colder than October, 1895, which has heretofore been the coldest since state-wide records began in 1890. Killing frost occurred in some sections on the 1st, all but the southwest portion on the 6th and in all sections on the 8th. During a cold wave on the 28-30th, the temperature fell nearly to zero in the northern and western counties, the lowest being just zero at Galva. Precipitation was deficient except in a few northeastern and east-central counties, but a general snowstorm on the 28th-29th was remarkably heavy for the season in the northeastern counties. Corn was seriously damaged by the unfavorable conditions; very little of it was cribbed at the close of the month, and that which was cribbed heated so that it had to be dried and sorted; much soft corn in the fields molded.

November was mild and dry, but in spite of favorable conditions for drying, the husked corn, though carefully sorted, heated in the cribs so badly that it had to be spread out to dry. Husking ceased generally the last week of the month with 43 per cent of the crop still in the fields. Because of the cold in October and drought in November winter wheat made slow growth and is not entering the winter in resistant condition.

The mean temperature for December, 14.5°, is the lowest of record. Zero days were the most frequent of record. Sunshine was deficient and also the precipitation except in the northwestern and north-central counties. The ground was

snow-covered about 25 days in the extreme northwestern portion of the State, and less than 15 days in the southwestern and east-central counties. Corn husking progressed, and not more than 15 per cent of the crop remained in the fields at the close of the month. Though severe temperatures prevailed for considerable periods, they were preceded and accompanied by porous snow covering, so it is believed that such winter wheat as was well established at the beginning of winter is in good condition.

ERRATA

Annual report for 1916: page 146; Albia should read Afton; and Afton should read Albia.

SUPPLEMENTAL PRECIPITATION TABLE.

STATION.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Annual.
Northern Division													
Algona	0.26	1.28	3.50	3.98	5.03	2.17	1.65	4.52	0.20	0.14	0.90	0.14	22.52
Allison	0.96	0.55	3.66	2.85	4.68	3.91	2.15	4.05	2.11	0.43	0.90	0.90	28.49
Alton	1.43	0.57	1.30	4.22	4.57	4.47	1.69	2.01	0.71	0.32	0.53	0.70	22.52
Belmond	1.48	0.82	1.26	3.72	3.66	4.55	3.66	2.53	3.27	2.12	0.43	0.99	28.49
Lake Park	1.00	0.30	4.58	4.72	1.73	1.29	2.43	0.69	0.20	0.45	0.55	0.55	36.00
Matlock	1.45	T.	2.30	4.45	4.10	6.87	2.06	1.90	3.56	3.44	0.57	0.49	36.00
Nora Springs	0.85	1.19	1.80	3.68	5.17	6.87	6.06	2.32	4.77	1.45	0.20	0.43	31.20
Northwood	1.75	1.00	1.85	4.47	4.25	5.28	2.61	4.77	1.45	0.20	0.43	0.43	31.20
Sanborn	1.10	0.36	4.35	5.52	5.43	5.41	3.50	2.26	1.06	0.76	1.02	0.43	31.20
Washta	0.90	0.50	1.75	5.12	2.83	4.16	3.16	0.98	0.65	0.60	0.83	0.83	28.83
Central Division													
Denison	0.50	0.62	1.63	3.50	4.01	6.99	0.77	3.27	0.71	0.34	0.36	0.36	28.83
Galva	1.50	0.30	1.80	4.13	2.39	7.00	2.66	1.52	2.82	1.21	0.36	0.36	28.83
Grundy Center	0.40	0.25	1.65	5.94	4.26	9.36	3.11	3.67	0.71	1.12	0.32	0.32	28.83
Guthrie Center	0.50	0.50	4.27	5.18	8.04	2.47	3.17	0.57	0.40	0.28	0.50	0.50	32.64
Harlan	0.77	0.40	1.27	5.58	3.03	8.07	3.39	2.23	5.71	0.92	0.44	0.83	32.64
Jefferson	0.42	0.55	1.75	7.19	4.62	5.46	1.57	4.02	0.80	0.36	0.52	0.47	27.73
Little Sioux	0.53	0.11	2.40	7.22	4.85	9.28	2.37	2.62	3.05	1.48	0.02	0.58	34.51
Monroe	0.27	1.30	4.13	1.76	5.07	0.93	1.90	2.15	0.75	0.20	0.20	0.20	28.83
Sac City	0.80	0.60	4.37	2.77	6.62	2.31	2.04	2.55	1.73	0.42	0.62	0.62	28.83
Whitten	0.57	0.15	1.58	4.84	3.58	8.14	1.90	1.38	4.24	1.78	0.20	0.47	28.83
Williamsburg	0.46	0.09	1.56	7.84	4.02	9.85	1.80	0.68	2.92	1.49	0.14	0.25	32.37
Southern Division													
Allerton	0.60	T.	1.85	6.35	3.54	11.89	1.62	1.72	1.29	1.23	0.68	0.37	25.08
Centerville	0.86	0.15	1.60	5.52	2.80	9.24	0.61	1.33	1.29	1.23	0.68	0.37	25.08
Creston	0.21	2.12	5.30	2.92	8.15	2.36	1.10	3.41	1.30	0.20	0.94	0.94	28.74
Fort Madison	5.08	6.30	8.03	0.38	4.50	0.80	1.11	1.11	1.11	0.24	0.40	0.40	28.74
Glenwood	0.43	T.	1.61	6.11	4.56	9.08	0.88	3.08	1.78	0.90	0.02	0.29	28.74
Lamoni	0.41	0.05	4.03	3.65	5.83	0.23	4.70	1.58	1.40	0.27	0.25	0.25	28.74
Northboro	0.76	0.10	5.46	3.38	4.92	1.85	1.85	3.32	1.90	0.08	0.54	0.54	28.74
Sigourney	0.30	T.	5.23	3.14	5.79	0.48	3.66	5.16	0.53	0.34	0.44	0.44	28.74
Winterset	0.30	T.	5.23	3.14	5.79	0.48	3.66	5.16	0.53	0.34	0.44	0.44	28.74

CLIMATOLOGICAL DATA FOR THE YEAR 1917-Continued.

Main table with columns: STATIONS, COUNTIES, Elevation, Length of record, TEMPERATURE, IN DEGREES, FAHR., PRECIPITATION, IN INCHES., NUMBER OF DAYS. Includes stations like Afton, Albia, Allerton, Atlantic, Bedford, etc.

COMPARATIVE DATA FOR THE STATE--Annual

Table with columns: Year, Mean annual, Highest, Date, Lowest, Date, Annual, Greatest annual, Least annual, Av. snowfall. Lists data for years 1890-1917.

*And other dates.

Monthly State Data for 1917.

Table with columns: YEAR, Temperature (Mean, Departure from normal, Highest, Lowest, Average), Precipitation (Departure from normal, Greatest, Least, Snow fall), Number of Days (Clear, Partly cloudy, Cloudy), Prevailing direction of wind. Lists monthly data for 1917.

MONTHLY AND ANNUAL PRECIPITATION, WITH DEPARTURE FROM THE NORMAL, FOR 1917.

Table with columns for STATIONS, months (Jan to Dec), and Annual. Rows are categorized into Northern, Central, and Southern Divisions, listing various Iowa locations and their precipitation data for 1917 relative to the normal.

CLIMATOLOGICAL DATA: IOWA SECTION.

MEAN MONTHLY AND ANNUAL TEMPERATURES, WITH DEPARTURES FROM THE NORMAL, FOR 1917.

Table with columns for STATION, months (Jan. to Dec.), and Annual. Each month has Temp. and Dept. sub-columns. Rows are categorized into Northern Division, Central Division, and Southern Division.

CLIMATOLOGICAL DATA: IOWA SECTION.

MONTHLY MINIMUM TEMPERATURE FOR 1917, WITH DATES.

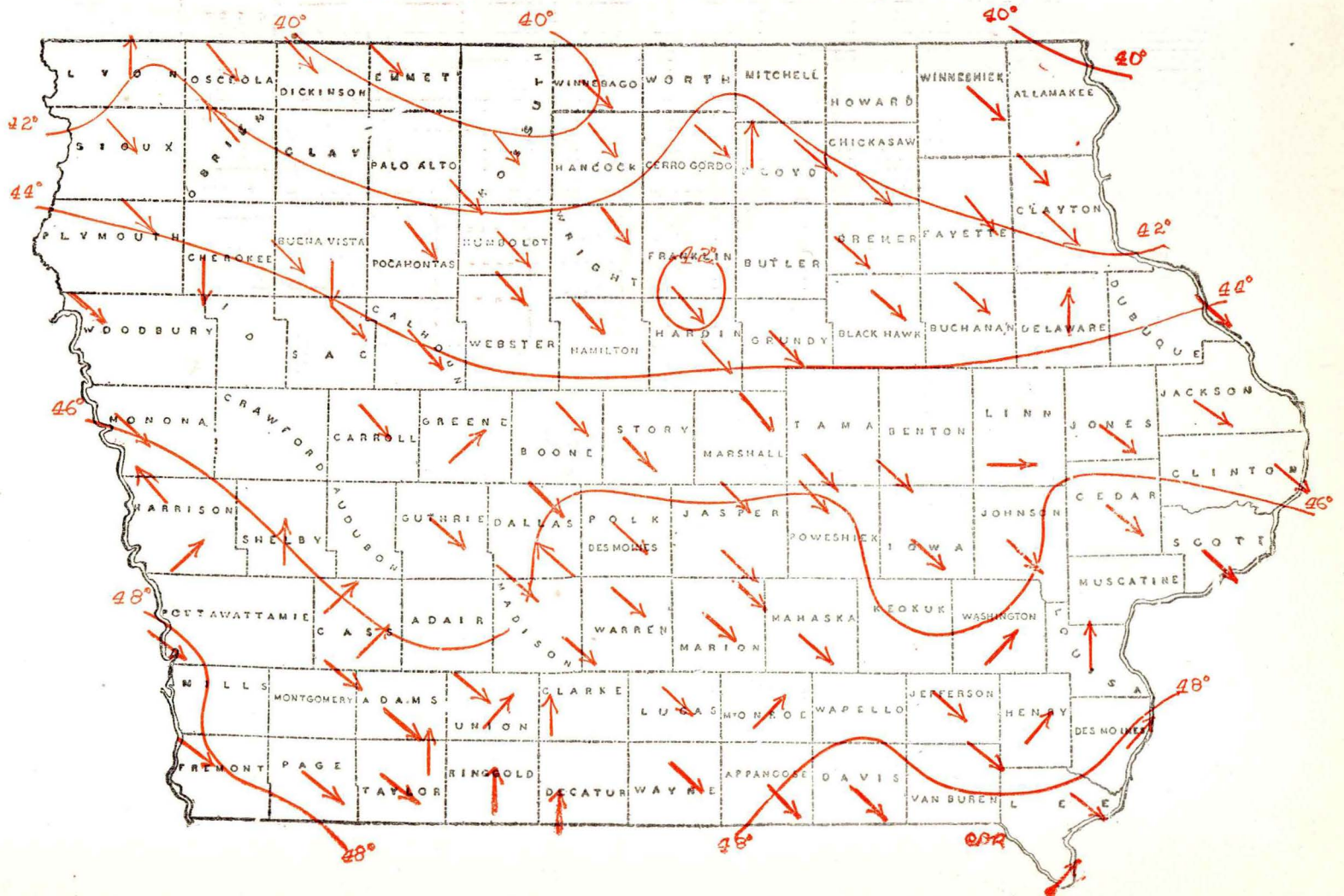
Table with columns for STATIONS, months (Jan-Dec), and temperature data (Min., Date). Rows are categorized into Northern Division, Central Division, and Southern Division.

DATES OF KILLING FROSTS, 1917.

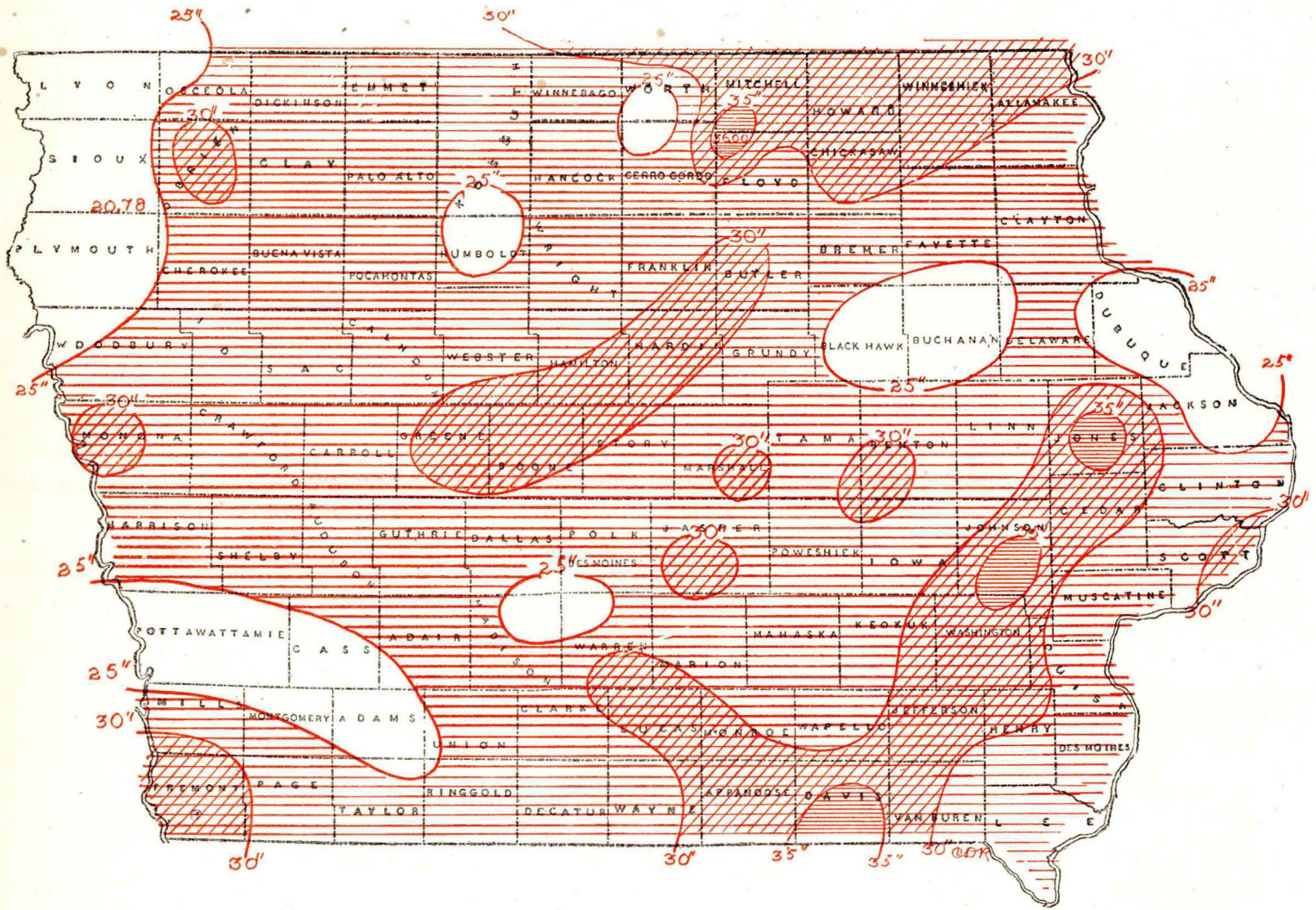
STATIONS	Killing Frosts.		STATIONS	Killing Frosts.		STATIONS	Killing Frosts.	
	Last in Spring.	First in Autumn.		Last in Spring.	First in Autumn.		Last in Spring.	First in Autumn.
Northern Division			Central Division			Southern Division		
Algona	May 23	Oct. 6	Ames	May 7†	Oct. 1	Afton	May 5†	Oct. 6†
Allison	May 23	Oct. 6	Audubon	May 7†	Oct. 6†	Albia	May 7†	Oct. 6
Alta	May 4	Oct. 8	Baxter	April 15	Oct. 6†	Allerton	April 26	Oct. 6
Alton	May 8	Oct. 6†	Belle Plaine	May 23	Sept. 11	Atlantic	May 7	Oct. 6
Belmond	May 7†	Oct. 6†	Boone	May 5†	Oct. 8	Bedford	May 8	Oct. 6
Britt	May 23†	Oct. 6†	Carroll	May 7	Oct. 8	Bloomfield	April 15†	Oct. 5
Charles City	May 5	Oct. 6	Cedar Rapids	April 15	Oct. 8†	Bonaparte	May 5†	Oct. 6†
Decorah	May 24†	Sept. 11†	Clinton	May 23†	Oct. 6	Burlington	April 16†	Oct. 8†
Elkader	May 24†	Sept. 11†	Davenport	April 13	Oct. 8	Centerville	May 5†	Oct. 6†
Estherville	May 22†	Oct. 6†	Delaware	May 23†	Oct. 6†	Chariton	May 30†	Oct. 6†
Fayette	May 23†	Sept. 11†	Denison	May 24†	Oct. 6	Clarinda	May 7†	Oct. 6
Forest City	May 7†	Sept. 27†	Des Moines	April 15†	Oct. 6	Columbus Jet.	May 23	Oct. 8
Humboldt	May 6†	Oct. 2†	Dubuque	April 15	Oct. 6	Corning	May 25†	Sept. 27†
Inwood	May 13†	Sept. 30†	Fort Dodge	May 2†	Oct. 6†	Corydon	May 7	Oct. 6†
Lake Park		Oct. 6†	Galva		Oct. 6†	Creston	May 8†	Oct. 6
Le Mars	May 13†	Oct. 8	Grinnell	May 5	Oct. 6	Earlham	May 7†	Oct. 6†
Mason City	May 23†	Oct. 11	Grundy Center	May 6†	Oct. 6†	Fairfield	May 7†	Sept. 11†
Matlock	June 27†	Sept. 27†	Guthrie Center	May 8†	Oct. 6†	Glenwood	May 7†	Oct. 8
New Hampton	May 23†	Oct. 6	Harlan	May 7†	Sept. 27†	Greenfield	May 7†	Oct. 8
Nora Springs	May 6	Sept. 11	Independence	May 23	Sept. 11	Indianola	May 5	Oct. 8
Northwood	May 6†	Oct. 1†	Iowa City	May 23†	Oct. 6	Keokuk	May 5	Oct. 8
Pocahontas	May 6†	Oct. 8	Iowa Falls	May 23†	Sept. 11†	Keosauqua	May 7†	Oct. 6
Postville	May 23†	Oct. 6†	Jefferson	May 7†	Oct. 7†	Knoxville	May 7†	Oct. 6
Rock Rapids	May 23†	Oct. 6†	Little Sioux	May 7†	Oct. 8†	Lamoni	May 4†	Oct. 6
Sanborn	May 6†	Oct. 7†	Logan	May 7†	Oct. 6	Lenox	May 7†	Oct. 6
Sibley	June 15†	Sept. 27†	Maquoketa	May 23†	Sept. 11†	Mt. Ayr	May 4†	Oct. 8
Sioux Center	May 4†	Oct. 8†	Marshalltown	May 7†	Oct. 1	Mt. Pleasant	May 5†	Oct. 6
Storm Lake	May 6†	Oct. 8	Monroe	May 5	Oct. 6	Murray	May 4†	Oct. 6
Washta	May 29†	Sept. 27†	Olin	May 23†	Oct. 1†	Northboro	May 7	Oct. 6
Waverly	May 23	Sept. 11†	Onawa	May 7†	Oct. 8	Oskaloosa	May 7	Oct. 6†
West Bend	May 25†	Oct. 8	Perry	May 7†	Oct. 6	Ottumwa	May 7†	Oct. 6†
			Rockwell City	May 7†	Oct. 6	Pella	May 6	Oct. 1†
			Sac City	May 4†	Oct. 6	St. Charles	May 4†	Oct. 8†
			Sioux City	May 5	Oct. 8	Sigourney	May 7†	Oct. 1
			Tipton	May 7†	Oct. 7†	Stockport	May 7	Sept. 11†
			Toledo	May 23†	Sept. 11†	Thurman	May 7†	Sept. 27†
			Waterloo	May 23†	Sept. 11†	Washington	May 23	Oct. 6
			Waukeo	May 7	Oct. 6	Winterset	May 8†	Oct. 8
			Webster City	May 11†	Oct. 6	Omaha, Neb.	April 9†	Oct. 8
			Williamsburg	May 23†	Oct. 6†			

†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 1917.

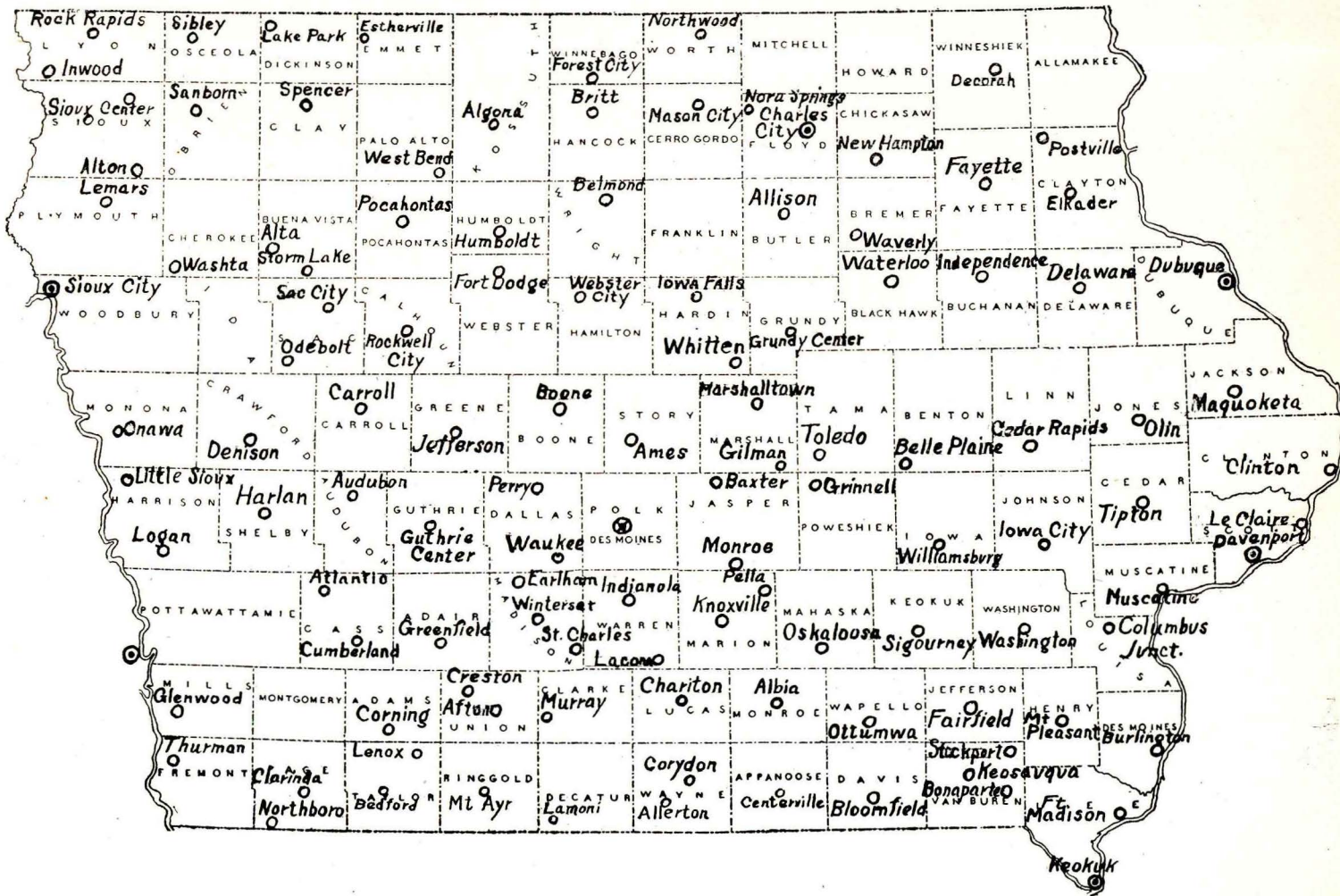


TOTAL PRECIPITATION, YEAR, 1917

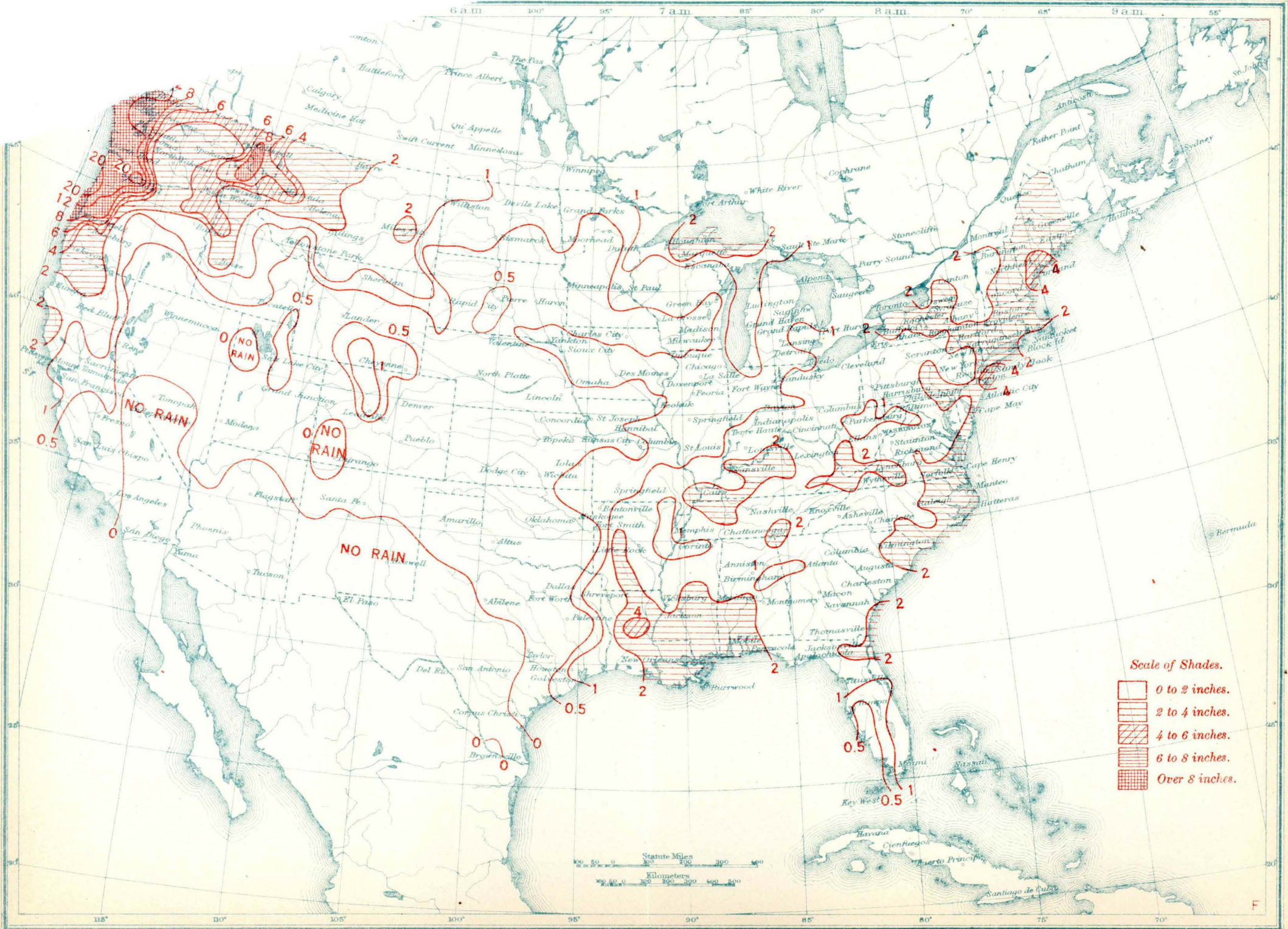


LIST OF CO-OPERATIVE STATIONS AND OBSERVERS.

Stations	Observers	Years of Service	Stations	Observers	Years of Service	Stations	Observers	Years of Service
Afton	J. E. Deitrick	2	Elkader	Chas. Reinecke	25	Murray	M. T. Ashley	27
Albia	F. H. Holmes	4	Estherville	A. O. Peterson	12	Muscatine	Wm. P. Molis	13
Algona	W. E. Laird	2	Fairfield	R. Monroe McKenzie	10	New Hampton	A. F. Kemman	13
Allerton	Noel C. Huston	0	Fayette	R. Z. Latimer	30	Nora Springs	Arthur Betts	35
Allison	J. A. Bell	4	Forest City	Eugene Secor	0	Northboro	J. M. Darby	6
Alta	David E. Hadden	27	Fort Dodge	J. F. Monk	14	Northwood	Chas. Dwelle	13
Alta (near)	Warren Minard	2	Fort Madison	F. M. Myers	2	Olin	Dr. F. W. Port	6
Alton	W. S. Slagle	13	Gilman	Jas. L. Wylie	19	Omaha	U. S. Weather Bureau	46
Ames	Iowa State College	27	Glenwood	Dr. Geo. Mogridge	1	Onawa	C. G. Perkins	19
Atlantic	Thomas H. Whitney	9	Greenfield	Frank A. Ward	5	Oskaloosa	Jos. Boyd	27
Audubon	Geo. E. Kellogg	15	Grinnell	D. W. Brainard	9	Ottumwa	Thos. Ray	3
Baxter	W. R. Vandike	11	Grundy Center	M. G. Heiberger	2	Pella	J. H. Ver Steeg	9
Bedford	E. E. Healy	16	Guthrie Center	C. T. Harney	3	Perry	Mrs. C. E. Anthony	1
Belle Plaine	O. C. Burrows	5	Harlan	E. L. Tilton	1	Pocahontas	F. E. Hronek	14
Belmond	Geo. P. Hardwick	21	Humboldt	E. A. Selby	3	Postville	F. L. Williams	27
Bloomfield	V. G. Warner	4	Independence	Dr. H. A. Lindsay	3	Rock Rapids	W. C. Wyckoff	17
Bonaparte	Bruce R. Vale	3	Indianola	J. L. Tilton	28	Rockwell City	A. W. McIsaac	1
Boone	H. A. Grabau	3	Inwood	F. B. Hanson	12	Sac City	E. N. Bally	8
Britt	L. M. Goodman	8	Iowa City	John F. Reilly	1	Saint Charles	R. D. Minard	22
Burlington	Edna N. Donnelly	1	Iowa Falls	J. B. Parmelee	37	Sanborn	J. W. Dow	37
Carroll	Mrs. Jos. J. Wolfe	9	Jefferson	W. I. Lyon	4	Sibley	H. F. Olds	1
Cedar Rapids	R. S. Toogood	7	Keokuk	U. S. Weather Bureau	46	Sigourney	W. E. Utterback	1
Centerville	S. A. Martin	3	Keosauqua	J. H. Landes	27	Sioux Center	J. de Ruyter	19
Chariton	C. C. Burr	15	Knoxville	W. J. Casey	25	Sioux City	U. S. Weather Bureau	28
Charles City	U. S. Weather Bureau	26	Lacona	J. B. Alter	19	Stockport	C. L. Beswick	17
Clarinda	A. S. Van Sandt	30	Lake Park	A. E. Woodruff	5	Storm Lake	Geo. H. Fracker	5
Clinton	H. Burde	4	Lamoni	C. B. Woodstock	1	Thurman	C. R. Paul	21
Columbus Jet.	J. B. Johnston	15	Le Claire	Margaret T. Disney	1	Tipton	C. N. Wallick	1
Corning	Jerome Smith	27	Lenox	J. L. Hurley	22	Toledo	I. F. Giger	11
Corydon	May C. Miller	6	Le Mars	G. A. C. Clarke	22	Washington	W. A. Cook	38
Creston	Mrs. T. E. McConnell	1	Little Sioux	Geo. H. Gibson	13	Washta	H. L. Felter	21
Cumberland	J. H. Reppert	19	Logan	Ted Stern	3	Waterloo	R. B. Slippy	7
Davenport	U. S. Weather Bureau	46	Maquoketa	Ira H. Stephens	4	Waukeo	Samuel F. Foft	9
Decorah	W. F. Baker	3	Marshalltown	Ed. F. Duntman	1	Waverly	H. Arnold	2
Delaware	Nettie E. Ball	5	Mason City	Dr. Roy DeSart	5	Webster City	C. D. Carpenter	13
Denison	Prof. Webb Stump	0	Matlock	H. O. Tuttle	2	West Bend	Jos. Dorweiler	3
Des Moines	U. S. Weather Bureau	38	Monroe	J. A. Dibel	6	Whitten	Dr. F. P. Butler	21
Dubuque	U. S. Weather Bureau	44	Mount Ayr	Alex Maxwell	5	Williamsburg	Dr. F. C. Schadt	2
Earlham	Geo. Phillips	16	Mount Pleasant	J. W. Edwards	14	Winterset	H. S. Ely	1



Precipitation, Inches, December, 1917.



Scale of Shades.

- 0 to 2 inches.
- 2 to 4 inches.
- 4 to 6 inches.
- 6 to 8 inches.
- Over 8 inches.

Statute Miles
0 50 100 200 300 400

Kilometers
0 50 100 200 300 400 500 600

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