

# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU  
CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, JANUARY, 1931 No. 1

## COMPARATIVE DATA FOR THE STATE—JANUARY

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
1873	12.0	- 6.5	55	-38	2.53	+ 1.46	3.56	0.50					
1874	19.6	+ 1.1	64	-21	1.67	+ 0.60	4.72	0.22					
1875	4.9	-13.6	48	-30	0.82	+ 0.25	1.61	0.38					
1876	23.5	+ 5.0	62	-16	1.49	+ 0.42	3.96	0.00					
1877	13.7	- 4.8	58	-31	1.09	+ 0.02	3.04	0.37					
1878	25.4	+ 6.9	55	-13	0.48	+ 0.59	5.00	0.00					
1879	16.1	- 2.4	51	-30	0.48	+ 0.59	1.18	0.00					
1880	32.0	+13.5	68	- 6	1.36	+ 0.29	4.52	0.20					
1881	9.6	- 8.9	48	-40	0.94	+ 0.13	3.10	0.04					
1882	23.4	+ 4.9	60	-17	0.65	+ 0.42	1.80	0.09					
1883	8.0	-10.5	46	-38	1.31	+ 0.24	2.85	0.35					
1884	13.3	- 5.2	52	-38	0.52	+ 0.55	1.50	0.02					
1885	9.4	- 9.1	51	-42	1.28	+ 0.21	3.72	0.18					
1886	8.1	-10.4	52	-33	2.59	+ 1.52	4.85	0.68					
1887	8.8	- 9.7	55	-31	1.13	+ 0.06	2.92	0.04					
1888	5.4	-13.1	58	-43	1.30	+ 0.23	4.00	0.40					
1889	21.6	+ 3.1	62	-25	1.22	+ 0.15	2.30	0.50					
1890	18.0	- 0.5	64	-27	1.79	+ 0.72	3.46	0.35					
1891	26.0	+ 7.5	58	- 4	1.75	+ 0.88	3.99	0.61					
1892	15.3	- 3.2	76	-38	1.09	+ 0.02	3.13	0.10	6.9	4	13	7	11
1893	9.3	- 9.2	54	-34	0.74	+ 0.33	3.20	0.13	6.9	5	16	9	6
1894	19.3	+ 0.8	69	-37	1.09	+ 0.02	2.24	0.31	6.0	5	14	9	8
1895	13.6	- 4.9	68	-31	0.85	+ 0.22	2.65	0.09	8.7	4	15	7	9
1896	23.4	+ 4.9	68	-20	0.48	+ 0.59	2.10	T.	2.8	3	10	10	11
1897	17.2	- 1.3	66	-30	2.01	+ 0.94	6.16	0.15	8.2	7	12	7	12
1898	23.4	+ 4.9	52	-11	1.60	+ 0.53	5.32	T.	12.6	5	15	6	10
1899	19.8	+ 1.3	68	-34	0.28	+ 0.79	1.15	T.	1.5	3	15	10	6
1900	25.6	+ 7.1	66	-20	0.53	+ 0.51	2.47	T.	2.3	3	16	7	8
1901	23.7	+ 5.2	60	-21	0.74	+ 0.33	2.34	0.04	6.2	4	11	9	8
1902	22.4	+ 3.9	63	-31	0.88	+ 0.19	2.83	0.19	9.4	4	17	8	6
1903	23.0	+ 4.5	60	-12	0.28	+ 0.79	1.46	T.	2.0	4	13	7	11
1904	14.0	- 4.5	57	-32	1.18	+ 0.11	3.68	0.02	6.1	6	12	8	11
1905	11.2	- 7.3	56	-30	0.91	+ 0.16	1.82	0.12	11.1	7	14	7	10
1906	24.6	+ 6.1	69	-19	1.52	+ 0.45	4.71	0.28	11.3	5	14	6	11
1907	18.8	+ 0.3	68	-22	1.52	+ 0.45	5.30	0.10	6.0	7	8	7	16
1908	24.9	+ 6.4	60	-18	0.44	+ 0.63	1.50	0.06	4.8	2	17	8	6
1909	21.2	+ 2.7	72	-25	1.66	+ 0.59	3.74	0.41	7.8	6	9	6	16
1910	18.1	- 0.4	56	-35	1.57	+ 0.50	3.15	9.55	12.6	6	13	7	11
1911	20.2	+ 1.7	66	-35	0.97	+ 0.10	3.73	0.11	7.3	5	9	8	14
1912	4.2	-14.3	49	-47	0.53	+ 0.54	1.90	T.	5.5	5	14	7	10
1913	20.9	+ 2.4	62	-25	0.77	+ 0.30	2.05	0.04	7.2	5	14	9	8
1914	27.8	+ 9.3	64	-10	0.88	+ 0.19	2.31	0.27	5.1	5	11	8	12
1915	17.5	- 1.0	59	-32	1.63	+ 0.56	3.15	0.10	7.3	8	13	8	10
1916	17.8	- 0.7	63	-31	2.62	+ 1.55	6.07	0.85	7.2	10	12	6	13
1917	17.0	- 1.5	60	-28	0.83	+ 0.24	2.07	0.17	7.2	4	17	8	6
1918	8.6	- 9.9	53	-35	1.02	+ 0.05	2.79	0.26	11.2	7	13	8	10
1919	26.8	+ 8.3	64	-32	2.41	+ 0.83	0.86	T.	2.8	2	20	5	6
1920	16.7	- 1.8	58	-26	0.42	+ 0.65	1.05	T.	4.6	4	12	8	11
1921	28.4	+ 9.9	67	- 9	0.51	+ 0.56	1.92	0.10	4.1	4	11	7	13
1922	19.8	+ 1.3	57	-29	0.89	+ 0.18	2.30	0.32	5.3	4	17	6	8
1923	26.7	+ 8.2	58	-10	0.85	+ 0.22	2.34	T.	6.5	6	10	7	14
1924	13.9	- 4.6	59	-36	0.89	+ 0.18	2.47	0.06	5.5	5	17	7	7
1925	19.4	+ 0.9	55	-24	0.40	+ 0.67	1.23	0.05	4.2	3	17	7	7
1926	22.7	+ 1.2	58	-22	1.09	+ 0.02	2.68	0.31	5.0	7	11	8	12
1927	21.7	+ 3.2	59	-27	0.29	+ 0.78	1.10	T.	3.0	4	14	8	9
1928	25.2	+ 6.7	70	-20	0.17	+ 0.90	1.04	T.	0.9	3	15	8	8
1929	10.2	- 8.3	47	-29	2.06	+ 0.99	4.10	0.40	17.5	9	11	6	14
1930	10.5	- 8.0	58	-37	1.33	+ 0.26	2.51	0.51	14.7	8	14	8	9
1931	28.9	+10.4	61	-15	0.50	+ 0.57	0.97	T.	5.1	2	18	6	7

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

**GENERAL SUMMARY**

January weather was abnormally mild and dry. The mean temperature for the State was 28.9°, or 10.4° above normal and 18.4° warmer on the average than the same month a year ago. With the exception of the 32.0° recorded in 1880, this is the warmest January of record. The mean temperature, 31.2°, recorded at Sioux City, establishes a new record for that station. Many new daily maximum temperature records were established during the month. At Des Moines on the 28th, the maximum temperature of 55.8° exceeded the previous, 55.4°, recorded in 1914. Also on the 30th the new maximum of 53.9° broke the previous record of 51.0° recorded in 1924. At Sioux City the monthly maximum temperature, 63°, recorded on the 29th, surpassed the previous record by 0.3°, recorded on January 10, 1896. At several stations in the southeast district, the thermometer did not reach the zero mark. Cold waves passed over the State on the 14th and 21st. The first was felt most severely in the west-central and northwest districts, while the second was mostly in the northeast and east-central districts.

Precipitation averaged approximately 47% of normal, and was below normal in all of the districts. Nearly all of the precipitation of the month fell on the 13th, 18th and 19th. Several of the stations received all of their precipitation for January on the 18th.

Snow fell mostly on the 13th, 18th and 19th, and averaged 76% of the normal. It was above normal in the northeast and east-central districts and near or below normal in the rest of the State. The snow cover was the heaviest where the temperature was the severest.

Ice harvest was completed before the close of the month, the ice being from 4 to 11 inches thick, and very poor quality.

The favorable weather permitted much outdoor work. Much plowing and some discing were done in the southern half and western portions of the State, and as far north as the northwest corner of Lyon County. Pastures, clover and winter wheat began to green by the close of the month. Some fruit trees, shrubs and lilac bushes were severely damaged because of abnormal advancement.

Building operations were carried on with very little interruption.

The water supply in general continued seriously deficient.

N. G. R.

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 104 stations, was 28.9°, or 10.4° above normal. There was an ex-

cess departure in temperature at all the stations. The greatest excess, 12.6°, was in the northwest district, and the least, 8.7°, in the east-central district. The highest monthly mean was 33.9° at Keokuk, and the lowest was 23.9° at Decorah. The absolute range for the State was 79°, from 64° at Keokuk on the 24th and Rock Rapids and Alton on the 29th, to -15° at Decorah on the 21st. The average number of days with the maximum temperature 32° or lower was 8, ranging from 14 days at Delaware (near) and Postville (near), to 2 days at Onawa and Thurman. The average number of days with the minimum temperature 32° or lower was 29, ranging from 31 days at 12 stations to 24 days at Burlington. The average number of days with the minimum temperature zero or lower was 2, ranging from 6 days at Decorah, to none at 10 stations. The greatest daily range in temperature at any one station was 46° at Bonaparte (near) on the 1st, and Rock Rapids on the 29th.



Climatological Data for January, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit					Precipitation, in inches				Number of Days				Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, 0.1 in. or more	Clear			Partly cloudy
<i>Northwest District</i>																			
Akron.....	Plymouth	1,153	4															Orlan C. Moore	
Alta.....	Buena Vista	1,513	41	27.3	+11.3	57	29	-9	11	33	0.17	-0.42	0.08	4.5	3	21	7	3	D. E. Hadden
Alton.....	Sioux	1,305	26	29.2	+13.7	64	29	-8	14	43	0.53	-0.23	0.45	6.1	3	21	6	4	W. S. Slagle
Cherokee.....	Cherokee	1,196	11	28.0	+12.8	58	29	-8	14	32	0.16	-0.60	0.12	4.0	2	17	8	6	J. E. Wirth
Estherville.....	Emmet	1,298	37	27.0	+14.1	55	28	-9	14	31	0.24	-0.38	0.18	3.2	3	16	10	5	A. O. Peterson
Hawarden.....	Sioux	1,181	5								0.23	-0.35	0.20	3.0	2	13	13	5	
Inwood (near).....	Lyon	1,474	28	27.6	+13.6	63	29	-12	14	37	0.09	-0.47	0.05	3.0	2	23	4	4	Earl V. Slife
Lake Park (near).....	Dickinson	1,439	19	26.4	+13.1	56	29	-10	14	36	0.07	-0.58	0.06	0.8	2	23	2	6	A. C. Hanson
Le Mars.....	Plymouth	1,224	40	30.0	+12.9	61	29	-6	14	37	0.71	-0.62	T.	T.	0	16	8	7	P. M. Lawrence
Marathon.....	Buena Vista	1,390	5								0.35	-0.22	0.20	3.8	3	21	5	5	Henry Newell
Pocahontas.....	Pocahontas	1,248	27	27.6	+11.6	55	28	-6	14	34	0.32	-0.22	0.26	3.2	2	20	1	10	E. G. Smith
Rock Rapids.....	Lyon	1,349	34	28.1	+14.6	61	29	-10	14	46	0.09	-0.47	0.05	3.0	2	23	4	4	F. E. Hronek
Sanborn.....	O'Brien	1,553	18	27.3	+12.7	58	29	-10	14	37	0.02	-0.67	0.02	0.2	1	26	1	4	Nellie F. Medberry
Sheldon.....	O'Brien	1,418	25	27.6	+13.0	61	29	-11	14	41	0.41	-0.26	0.40	5.5	2	15	11	5	J. W. Dow
Sioux Center.....	Sioux	1,461	32	27.8	+12.7	61	29	-11	14	39	0.21	-0.51	0.14	2.1	3	16	10	5	Ross E. Forward
Spencer.....	Clay	1,319	23	27.4	+12.7	56	28	-9	14	34	0.22	-0.52	0.22	2.7	2	21	5	5	F. C. Aue
Storm Lake.....	Buena Vista	1,442	41	27.0	+10.2	57	28	-10	14	36	0.17	-0.53	0.15	4.2	2	16	11	4	E. W. Little
Washta.....	Cherokee	1,157	34	27.4	+10.8	61	29	-9	14	41	0.31	-0.39	0.25	5.3	2	19	7	5	Russel M. Edwards
West Bend.....	Palo Alto	1,197	44	27.1	+12.1	56	28	-10	14	32	0.33	-0.28	0.30	3.5	2	22	5	4	H. L. Felter
Means and extremes.....				27.7	+12.6	64	29	-12	14	46	0.12	-0.83	0.09	2.5	2	19	10	2	Jos. Dorweiler
<i>North Central District</i>																			
Algona.....	Kossuth	1,207	70	27.4	+12.0	57	30	-5	14	28	0.27	-0.55	0.27	3.0	1	18	5	8	Leon M. Merritt
Allison (near).....	Butler	1,000	17	26.8	+11.5	53	28	-6	21	36	0.48	-0.49	0.48	6.0	1	14	10	7	George H. Bell
Belmond.....	Wright	1,181	22	26.4	+11.7	54	28	-6	21	37	0.26	-1.00	0.25	4.2	2	16	2	13	H. F. Luick
Britt.....	Hancock	1,236	46	26.5	+12.3	52	28	-4	14	39	0.22	-0.46	0.22	4.0	1	25	1	5	E. P. Healy
Charles City.....	Floyd	1,015	50	25.5	+11.8	51	28	-7	21	37	0.65	-0.40	0.65	6.5	1	12	8	11	U. S. Weather Bureau
Forest City.....	Winnebago	1,226	41	25.6	+11.3	51	28	-7	21	37	0.50	-0.38	0.30	5.0	3	15	4	12	Dr. W. B. Neil
Hampton.....	Franklin	1,112	40	27.5		53	28	-4	21	36	0.40	-0.81	0.40	4.0	1	22	2	7	Howard J. Haydon
Humboldt.....	Humboldt	1,095	47	26.4	+9.9	55	28	-4	18	36	0.50	-0.31	0.50	3.5	1	15	9	7	H. C. Snitkey
Mason City.....	Cerro Gordo	1,148	39	25.4	+11.2	51	28	-9	21	38	0.40	-0.57	0.40	6.0	2	9	14	8	American Beet Sugar Co
Northwood.....	Worth	1,222	35	24.8	+12.1	51	28	-9	21	40	0.80	-0.34	0.60	8.0	2	13	10	8	Charles Dwelle
Osage.....	Mitchell	1,163	42	25.2	+11.9	50	28	-5	21	31	0.36	-0.65	0.32	4.5	2	11	13	7	Dr. C. E. Juhl
Means and extremes.....				26.2	+11.8	57	30	-9	21	40	0.41	-0.54	0.65	5.0	2	16	7	8	
<i>Northeast District</i>																			
Cedar Falls.....	Black Hawk	875	12								0.91	-0.60	0.81	10.8	2	12	9	10	E. J. Cable
Decorah.....	Winnebago	872	17	23.9	+8.7	45	28	-15	21	35	0.64	-0.60	0.64	7.5	1	12	8	11	M. D. Whitney
Delaware (near).....	Delaware	1,083	52	26.0	+11.5	45	30	-8	21	35	0.81		0.81	8.9	2	16	5	10	E. J. Paris
Dubuque.....	Dubuque	700	80	28.6	+9.5	49	24	-2	21	29	0.79	-0.51	0.70	7.9	4	12	4	15	U. S. Weather Bureau
Fayette.....	Fayette	1,003	43	25.4	+10.0	47	24	-13	21	35	0.58	-0.67	0.50	10.0	2	15	6	10	W. C. Van Ness
Independence.....	Buchanan	956	71	26.8	+9.9	47	16	-10	21	37	0.59	-0.58	0.46	6.5	2	13	9	9	Dr. Geo. Boody
Lansing.....	Allamakee	632	28								0.50	-0.48	0.50	8.0	1	16	6	9	Mrs. Mary Spinner
New Hampton.....	Chickasaw	1,169	34	25.4	+10.9	53	3	-11	21	37	0.50	-0.48	0.50	8.0	1	16	6	9	D. W. Dawson
Oelwein.....	Fayette	1,036	8	26.6	+10.2	48	30	-8	21	34	0.61	-0.52	0.61	8.0	1	15	5	11	John T. Ridler
Postville (near).....	Clayton	1,192	40	24.8	+9.6	45	16	-8	21	30	0.60	-0.63	0.60	6.0	1	16	8	7	P. L. Williams
Waterloo.....	Black Hawk	854	49	27.2	+9.8	51	28	-11	21	36	0.65	-0.47	0.60	10.5	2	20	2	9	R. B. Slippy
Waverly.....	Bremer	936	12	26.0	+9.8	50	29	-11	21	36	0.97	-0.11	0.97	8.0	1	24	5	2	D. H. Murphy
Means and extremes.....				26.1	+9.8	53	3	-15	21	37	0.70	-0.48	0.97	8.4	2	16	6	9	
<i>West Central District</i>																			
Audubon (near).....	Audubon	1,297	38	29.2	+12.1	59	29	-5	14	35	0.39	-0.44	0.35	3.9	3	19	9	3	George Kibby
Carroll.....	Carroll	1,265	45	29.0	+11.6	56	29	-6	14	33	0.40	-0.38	0.30	4.0	3	23	3	5	Mrs. J. J. Wolfe
Denison.....	Crawford	1,200	47	29.8	+11.6	61	28	-6	14	39	0.78	+0.12	0.78	4.1	1	15	10	6	J. McMinimee
Guthrie Center.....	Guthrie	987	36	29.2	+11.0	58	29	-6	14	40	0.56	-0.22	0.48	7.0	2	21	7	3	Floyd H. Bainter
Harlan.....	Shelby	1,210	39	29.2	+11.1	59	29	-5	14	41	0.28	-0.52	0.25	3.7	2	21	5	5	Elmer Buss
Jefferson.....	Greene	1,052	39	29.2	+11.1	58	28	-4	14	39	0.50	-0.36	0.45	5.0	2	21	4	6	W. I. Lyon
Little Sioux.....	Harrison	1,040	30	29.6	+10.3	63	29	-6	14	40	0.60	-0.15	0.55	6.0	2	20	8	3	H. W. Kerr
Logan.....	Harrison	1,120	65	29.8	+9.5	59	29	-5	14	34	0.44	-0.56	0.30	6.2	3	20	10	1	Amy Ann Stern
Onawa.....	Monona	1,051	46	29.8	+11.0	59	29	-6	14	36	0.50	-0.49	0.50	6.0	1	19	6	6	Mrs. H. E. Colby
Rockwell City.....	Calhoun	1,232	44	27.5	+10.2	55	28	-7	14	34	0.89	-0.20	0.60	8.0	2	17	7	7	A. W. McIsaac
Sac City.....	Sac	1,209	62	28.4	+11.2	58	28	-6	21	41	0.50	-0.51	0.40	6.2	3	18	7	6	P. P. Kessler
Sioux City.....	Woodbury	1,135	56	31.2	+13.4	63	29	-3	14	36	0.40	-0.34	0.28	4.2	5	15	7	9	U. S. Weather Bureau.
Means and extremes.....				29.3	+11.1	63	29	-7	14	41	0.51	-0.34	0.78	5.3	2	19	7	5	
<i>Central District</i>																			
Ames.....	Story	926	55	28.5	+10.0	55	28	-2	14	38	0.73	-0.17	0.45	8.0	2	22	3	6	Iowa State College
Baxter.....	Jasper	993	32			52	30	-4	21	34	0.51	-0.39	0.51	6.0	1	18	9	4	Geo. R. Geise
Boone (near).....	Boone	894	47	27.2	+9.3	57	29	-6	21	41	0.30	-0.54	0.25	5.0	2	20	7	4	Carl Fritz Henning
Des Moines.....	Polk	861	54	30.3	+10.2	56	29	0	14	35	0.57	-0.50	0.52	8.6	3	9	10	12	U. S. Weather Bureau
Fort Dodge.....	Webster	1,114	43	27.2	+10.5	54	28	-7	14	33	0.40	-0.44	0.33	6.0	2	22	3	6	Mrs. Emma Sampson
Grinnell.....	Poweshiek	1,031	17	29.4	+9.2	52	30	-5	21	36	0.45	-0.70	0.45	8.0	1	18	3	10	R. E. Bates
Grundy Center.....	Harrison	976	40	28.2	+9.7	53	28	-6	21	38	0.80	-0.17	0.80	9.5	1	17	7	7	M. G. Heiberger
Iowa Falls.....	Hardin	1,127	49	27.4	+11.7	52	28	-6	21	39	0.90	-0.34	0.90	6.0	1	18	4	9	C. H. Gilbert
Marshalltown.....	Marshall	947	53	29.2	+9.2														

Climatological Data for January, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days			OBSERVERS			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear		Partly cloudy	Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	28.8	+10.0	53	8	-6	21	36	0.58	-0.98	0.58	6.3	1	16	9	6	nw.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly
Cedar Rapids.....	Linn	737	49	27.6	+8.7	52	30	-3	21	39	0.85	-0.55	0.85	8.5	1	16	4	11	nw.	
Clinton.....	Clinton	595	60	29.2	+8.6	50	24†	-3	21	35	0.86	-0.96	0.76	6.7	3	14	6	11	s.	
Davenport.....	Scott	580	60	31.4	+9.6	55	24	-3	21	29	0.58	-0.84	0.53	4.3	3	12	8	11	sw.	
Iowa City.....	Johnson	733	74	29.4	+9.4	50	28†	-5	21	36	0.75	-0.89	0.72	6.0	2	11	13	4	nw.	
Le Claire.....	Scott	576	54								0.52	-0.98	0.28	3.5	3				sw.	Margaret T. Disney John Strodthoff William Molis Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	26.9	+8.3	49	24	-10	21	39	0.44	-0.91	0.41	7.0	2	17	3	11	sw.	
Muscataine.....	Muscataine	546	85								0.84	-1.00	0.50	10.0	2				sw.	
Olin.....	Jones	750	33	26.4	+8.2	47	30	-13	21	41	0.71	-0.72	0.71	7.0	1	19	3	9	sw.	
Tipton (near).....	Cedar	806	39	28.1	+8.7	50	31	-12	21	34	0.65	-0.80	0.65	5.0	1	11	11	9	w.	
Williamsburg.....	Iowa	805	16	28.3	+9.3	53	30	-7	21	30	0.90	-0.50	0.90	9.0	1	21	7	3	nw.	Dr. F. C. Schadt
Means and extremes.....				28.5	+8.7	55	24	-13	21	41	0.70	-0.84	0.90	6.7	2	16	7	8	nw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	41	30.0	+10.7	59	29	-4	14	40	0.26	-0.58	0.26	3.0	2	21	6	4	sw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock
Bedford.....	Taylor	1,200	27								0.15	-0.79	0.15	1.0	1	20	4	7	nw.	
Clarinda.....	Page	1,009	59	30.6	+8.2	62	24	-3	14	37	0.30	-0.66	0.30	3.0	1	22	8	1	nw.	
Corning.....	Adams	1,287	43	31.8	+10.8	62	24	-3	14	38	0.42	-0.50	0.30	3.5	2	19	7	5	sw.	
Cumberland (near).....	Cass	1,225	32								0.27	-0.50	0.27	3.0	1	20	3	8	sw.	
Glenwood.....	Mills	1,100	41	32.0	+10.1	62	29	0	14	36	0.20	-0.51	0.20	2.0	1	20	7	4	nw.	Dr. George Mogridge P. C. Cornell J. L. Hurley W. S. Matthews B. R. Bridge
Greenfield.....	Adair	1,368	35								0.27	-0.27	0.25	3.2	2	16	9	6	sw.	
Lenox.....	Taylor	1,250	36	31.7	+10.1	63	21	-3	14	35	0.21	-0.46	0.15	2.1	4	20	6	5	nw.	
Oakland.....	Pottawattamie	1,139	18	31.5	+11.6	61	29	-1	21	43	0.24	-0.56	0.16	3.0	2	21	2	8	sw.	
Red Oak (near).....	Montgomery	1,030	24								0.44	-0.37	0.40	2.5	2	18	9	4	nw.	
Riverton (near).....	Fremont	920	5								0.09	-0.71	0.08	1.0	2	17	5	0	nw.	George C. Rader H. H. Askew U. S. Weather Bureau
Thurman.....	Fremont	960	41	32.2	+9.6	63	23	-1	14	43	0.04	-0.64	0.04	1.0	1	20	2	9	s.	
Omaha, Neb.....		1,105	66	33.8	+11.9	63	29	1	14	30	0.38	-0.32	0.35	4.3	4	18	7	6	nw.	
Means and extremes.....				31.7	+10.4	63	23†	-4	14	43	0.25	-0.55	0.40	2.5	2	19	6	6	nw.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	31.0	+9.9	60	24	-3	14	35	0.23	-0.63	0.23	3.0	1	23	2	6	sw.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis
Albia.....	Monroe	949	40	32.4	+11.5	59	24	1	14	35	0.42	-0.77	0.42	3.5	1	19	0	12	sw.	
Centerville.....	Appanoose	1,013	38	32.5	+9.9	60	24	0	14	35	0.60	-0.65	0.48	6.1	3	22	4	5	sw.	
Chariton (near).....	Lucas	1,042	37	30.2	+9.2	57	21	-2	14	32	0.42	-0.65	0.42	4.0	1	20	3	8	sw.	
Corydon (near).....	Wayne	1,050	47	31.0	+9.1	59	24	-1	14	36	0.32	-0.95	0.26	3.7	3	19	4	8	nw.	
Creston.....	Union	1,291	30	29.7	+9.6	60	24	-5	14	37	0.13	-0.92	0.07	1.5	3	19	8	4	s.	Mrs. N. Spangler George Phillips Seth F. Shenton W. J. Casey J. B. Alter
Earlham (near).....	Madison	1,226	34	29.7	+10.5	57	29	-6	21	41	0.52	-0.66	0.24	6.5	4	20	2	9	sw.	
Indianola.....	Warren	972	50	30.7	+11.0	57	29	-2	21	36	0.70	-0.45	0.50	7.1	2	17	6	8	w.	
Knoxville.....	Marion	920	41	31.0	+9.6	56	24†	0	14	35	0.60	-0.63	0.50	6.0	2	17	5	9	sw.	
Lacona.....	Warren	821	32								0.90	-0.75	0.80	9.0	2	14	12	5	nw.	
Lamoni.....	Decatur	1,123	27	30.8	+9.4	59	24	-3	14	35	0.29	-0.77	0.27	2.7	3	20	1	10	nw.	F. S. Parks J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely
Melrose.....	Monroe	871	1								0.29	-0.29	0.25	3.5	2	24	1	6	sw.	
Mt. Ayr.....	Ringgold	1,220	30	31.4	+9.2	61	24	-2	14	33	0.43	-0.59	0.28	2.5	2	23	5	3	s.	
Tingley.....	Ringgold	1,275	7	31.2	+10.1	60	24	-3	14	32	0.35	-0.55	0.27	3.3	3	21	6	4	sw.	
Winterset.....	Madison	1,118	40	31.4	+10.7	59	24	-3	14	32	0.48	-0.44	0.32	6.0	3	21	6	1	sw.	
Means and extremes.....				31.0	+10.0	61	24	-6	21	41	0.45	-0.67	0.80	4.6	2	20	4	7	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	31.5	+9.3	59	24	1	14	46	0.53	-1.01	0.51	0.7	2	18	8	5	s.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau
Burlington.....	Des Moines	541	41	32.3	+8.1	57	24	6	14	28	0.56	-1.20	0.47	5.0	2	17	6	8	sw.	
Columbus Junction.....	Louisa	595	40	30.6	+8.5	52	24†	0	21	34	0.57	-0.74	0.55	5.7	2	16	11	4	nw.	
Fairfield.....	Jefferson	780	51	29.8	+8.2	52	30	-2	15	38	0.60	-0.92	0.45	3.5	2	17	5	9	s.	
Keokuk.....	Lee	614	60	33.9	+9.0	64	24	6	14	30	0.54	-1.02	0.52	1.2	3	11	13	7	sw.	
Keokuk No. 2.....	Lee	651	2	33.2		63	24	3	14	32	0.89		0.85	1.4	2				sw.	J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesh
Kosauqua.....	Van Buren	639	44	31.4	+9.4	62	24	2	14	40	0.54	-1.02	0.50	1.0	2	14	11	6	nw.	
Mt. Pleasant.....	Henry	730	55	32.0	+9.5	56	24	2	14	34	0.39	-0.95	0.57	3.5	2	13	12	6	s.	
Oskaloosa.....	Mahaska	835	55	30.7	+10.0	55	24	-2	14	34	0.75	-0.28	0.64	8.6	3	13	10	8	nw.	
Ottumwa.....	Wapello	649	44	31.2	+8.6	59	24	-1	14†	39	0.61	-0.91	0.51	3.3	2	18	3	10	nw.	
Sigourney.....	Keokuk	785	36	30.3	+9.8	54	24†	-3	21	37	0.80	-0.46	0.80	5.0	1	20	6	5	w.	John B. Slate C. L. Beswick D. D. Sherman H. D. Liddle
Stockport (near).....	Van Buren	747	30	30.3	+8.9	58	21	-2	15	39	0.58	-0.80	0.53	2.5	2	22	2	7	s.	
Washington.....	Washington	757	54	30.7	+9.7	55	30	1	21	36	0.72	-0.76	0.72	3.5	1	17	7	7	sw.	
Wever.....	Lee	552	3																sw.	
Means and extremes.....				31.4	+9.3	64	24	-3	21	46	0.64	-0.82	0.85	3.4	2	16	8	7	s.	
State means and extremes.....				28.9	+10.4	64	24†	-15	21	46	0.50	-0.57	0.97	5.1	2	18	6	7	nw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 120 stations, was 0.50 inch, or 0.57 inch below normal. The greatest district deficiency was in the east-central district, 0.84 inch, and the west-central district had the least deficiency, 0.34 inch. Denison was the only station that had precipitation in excess of normal, 0.12 inch. The greatest precipitation deficiency for any

one station was at Burlington, 1.20 inches. The greatest amount at a single station was 0.97 inch at Waverly, and the least was a trace at Lake Park (near). The greatest amount occurring in 24 consecutive hours was 0.97 inch at Waverly on the 18th. The average number of days with 0.01 inch or more of precipitation for the State was 2, and averaged 2 days in all 9 districts. For individual stations the range was from 5 days at Sioux City, to none at Lake Park (near).





Daily Maximum and Minimum Temperature for the Month of January, 1931

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Mean	
<i>Northern Division</i>																																	
Algona.....	(Maximum.....	37	46	37	33	30	30	32	35	41	35	38	30	20	13	35	45	33	29	26	26	28	30	38	48	41	45	40	55	53	57	40	36.3
	(Minimum.....	12	25	18	23	18	19	20	21	16	25	23	14	4	-5	9	21	20	24	7	6	0	10	18	31	27	24	29	29	26	32	27	18.5
Alta.....	(Maximum.....	39	45	40	39	27	21	35	38	42	40	34	27	20	19	35	45	29	26	29	25	23	31	40	47	38	45	43	55	57	51	42	36.8
	(Minimum.....	8	24	20	21	16	11	18	21	19	26	22	12	1	-9	11	20	19	23	4	1	0	12	19	32	28	23	31	30	26	37	27	17.8
Alton.....	(Maximum.....	10	48	43	44	27	30	38	43	45	45	38	29	21	20	41	51	28	30	25	30	46	36	45	53	41	54	50	60	64	58	50	41.2
	(Minimum.....	9	20	18	18	22	14	20	23	13	21	23	13	1	-8	13	12	15	25	3	3	3	10	21	24	28	20	30	29	24	37	25	17.1
Belmond.....	(Maximum.....	38	44	43	39	29	31	33	34	41	32	39	30	17	19	33	47	28	29	25	25	26	30	39	47	41	47	39	51	53	51	37	36.1
	(Minimum.....	1	25	18	21	19	20	22	18	15	19	20	9	4	-5	8	18	24	4	5	-6	9	17	19	28	22	28	25	26	34	27	16.7	
Charles City.....	(Maximum.....	37	42	36	37	27	33	32	34	42	36	38	28	16	19	33	45	31	29	27	21	16	28	35	46	36	44	38	51	43	49	37	34.4
	(Minimum.....	0	22	18	22	20	23	23	21	16	22	22	14	8	1	9	15	20	25	12	2	-7	0	16	20	20	16	25	25	28	33	25	16.6
Decorah.....	(Maximum.....	29	39	35	35	32	30	30	33	38	38	34	34	18	14	32	42	33	30	27	17	15	31	36	43	40	41	38	45	38	45	38	33.2
	(Minimum.....	6	23	15	15	17	17	20	24	15	13	24	14	5	-2	0	16	23	15	0	-15	-1	5	25	22	10	28	20	28	32	25	14.6	
Dubuque.....	(Maximum.....	29	42	41	37	32	32	32	35	39	37	38	33	22	20	31	44	32	33	33	22	17	29	37	49	43	40	41	45	39	46	39	35.2
	(Minimum.....	0	27	27	20	25	28	27	31	26	26	32	20	13	11	10	26	22	29	20	9	-2	7	9	26	28	18	34	30	34	38	28	21.9
Forest City.....	(Maximum.....	37	42	36	34	22	31	33	33	43	33	38	34	20	29	35	45	35	29	26	22	25	30	39	47	39	41	39	54	49	50	45	36.9
	(Minimum.....	0	20	24	18	16	18	20	17	15	22	18	10	2	-6	6	16	17	22	4	2	-7	8	16	16	21	18	29	24	22	33	31	15.2
Independence.....	(Maximum.....	32	42	39	40	39	32	31	35	42	35	36	35	26	19	32	47	36	32	32	27	27	26	35	44	36	38	37	45	43	47	42	35.8
	(Minimum.....	-4	22	20	23	20	23	20	25	19	24	26	18	10	3	9	17	21	26	17	5	-10	1	7	21	30	12	27	25	30	34	30	17.8
Inwood (near).....	(Maximum.....	31	47	40	38	26	27	35	38	42	45	35	30	24	18	39	45	27	32	28	28	41	38	48	62	42	51	46	54	63	53	43	39.3
	(Minimum.....	8	18	19	14	19	16	15	21	11	19	15	11	0	-12	12	15	13	23	6	2	4	6	20	25	27	19	29	31	31	32	21	15.8
Lake Park (near).....	(Maximum.....	38	42	36	40	25	34	35	41	42	45	34	26	21	13	35	42	29	28	25	24	32	37	47	55	43	51	45	51	56	50	39	37.5
	(Minimum.....	6	18	12	15	11	17	17	12	22	20	20	11	0	-10	8	21	15	22	6	3	2	9	19	25	22	20	30	26	20	34	23	15.4
Mason City.....	(Maximum.....	37	43	35	34	27	33	33	34	39	34	37	30	18	19	33	41	31	29	25	24	21	30	37	46	41	45	39	51	50	49	39	35.1
	(Minimum.....	-1	24	18	16	20	19	18	14	19	21	14	5	-3	9	18	17	23	5	3	-9	-1	17	16	26	20	26	25	25	35	26	15.6	
New Hampton.....	(Maximum.....	33	39	53	40	36	33	31	33	42	37	37	35	19	20	32	45	30	32	30	23	14	29	35	44	41	39	38	45	45	48	40	35.4
	(Minimum.....	-3	19	16	20	18	21	20	22	13	19	22	15	6	-2	6	13	18	21	13	-1	-11	1	12	20	24	12	27	21	28	34	27	15.3
Northwood.....	(Maximum.....	37	42	35	32	25	32	32	33	40	36	36	28	18	19	33	41	32	26	28	22	18	31	37	45	40	43	40	51	49	48	40	34.5
	(Minimum.....	-3	18	18	16	18	18	18	19	16	21	20	10	4	-4	3	19	21	23	7	1	-9	1	17	17	26	17	25	25	33	26	15.0	
Pocahontas.....	(Maximum.....	40	47	39	41	31	30	34	40	44	38	37	31	22	20	36	44	33	28	26	26	32	33	42	48	39	45	41	55	54	51	40	37.6
	(Minimum.....	6	24	20	19	21	16	19	19	16	24	22	12	3	-6	8	18	24	4	3	3	8	17	27	29	23	30	29	23	38	28	17.6	
Postville (near).....	(Maximum.....	28	38	38	36	32	26	29	34	41	36	36	30	28	20	30	45	29	28	30	18	17	28	34	44	35	39	37	45	40	45	40	33.4
	(Minimum.....	-1	26	18	16	20	21	23	20	17	23	28	15	6	1	8	19	22	24	13	2	-8	2	15	15	24	16	24	16	24	20	26	16.3
Rock Rapids.....	(Maximum.....	40	49	44	39	31	31	40	38	40	44	34	34	24	20	40	43	43	34	32	28	41	41	49	60	42	54	51	55	61	58	49	41.7
	(Minimum.....	7	14	14	11	20	13	14	20	8	17	18	13	0	-10	10	14	9	23	8	4	4	5	18	18	28	18	33	26	18	30	20	14.5
<i>Central Division</i>																																	
Ames.....	(Maximum.....	43	48	44	41	38	33	33	37	46	38	41	37	25	18	35	48	37	29	28	26	27	29	41	51	42	48	47	55	53	45	38.9	
	(Minimum.....	5	31	18	23	22	22	19	12	24	22	15	7	-2	3	14	13	26	10	11	-1	10	10	27	31	22	30	27	24	38	27	18.1	
Belle Plaine.....	(Maximum.....	37	46	41	45	37	34	33	53	45	38	34	34	24	22	34	47	31	33	32	24	21	29	34	48	42	45	44	50	44	52	43	37.9
	(Minimum.....	1	28	20	27	23	23	25	30	22	25	27	18	12	5	9	21	16	27	14	6	-6	3	9	28	29	18	31	28	30	36	26	19.7
Carroll.....	(Maximum.....	41	45	47	45	32	28	35	41	44	35	37	30	20	16	38	48	36	26	29	25	32	31	44	49	42	46	43	54	56	51	44	38.4
	(Minimum.....	8	28	25	23	21	14	18	22	19	26	25	12	4	-6	10	21	17	19	8	5	1	15	21	34	30	25	34	31	28	37	28	19.5
Cedar Rapids.....	(Maximum.....	35	44	43	45	35	39	33	33	39	35	40	35	25	24	34	41	34	34	34	23	20	31	38	47	42	41	44	48	43	52	41	37.2
	(Minimum.....	-4	16	19	23	23	24	25	27	18	21	31	20	13	7	9	19	15	18	8	-8	-1	3	15	28	12	27	42	34	28	18	18.1	
Davenport.....	(Maximum.....	36	50	48	42	35	34	34	39	43	34	30	32	27	23	33	46	37	36	33	24	24	30	41	55	48	45	44	50	41	51	40	38.5
	(Minimum.....																																

## MISCELLANEOUS PHENOMENA

*Bird* (migration of): Cedar Rapids, robins on 30th. Des Moines, robins on 31st. Oskaloosa, wild ducks and geese flying on the 30th. Robins on the 30th.

*Cold Wave*: 14th, 21st.

*Corona*, lunar: 1st, 8th, 23d, 24th, 25th, 28th.

*Corona*, venus: 8th:

*Fog*, dense: 3d, 4th, 8th, 9th, 10th, 11th, 17th, 29th.

*Fog*, light: 3d, 4th, 8th, 9th, 10th, 11th, 17th, 23d, 24th, 29th.

*Gales*: 1st, 2d, 12th, 13th, 17th, 20th, 27th, 30th.

*Halo*, lunar: 1st, 2d, 3d, 4th, 8th, 11th, 24th, 25th, 26th, 28th, 29th.

*Halo*, solar: 3d, 7th, 8th, 11th, 13th, 22d, 23d, 24th, 25th, 26th, 28th, 29th.

*Haze*: 1st, 8th, 17th.

*Hoar Frost*: 8th, 17th.

*Parhelia*: 13th.

*Sleet*: 5th, 27th.

*Smog*, dense (mixture of smoke and fog): 3d, 4th, 9th.

*Snow*: 2d, 5th, 8th, 10th, 12th, 13th, 18th, 19th, 20th.

*Sudden Fall in Temperature*: 14th, 21st.

*Sudden Rise in Temperature*: 1st, 23d.

*Temperature*, record high: 28th, 30th.

*Zodiacal Light*: 20th.

## ERRATA

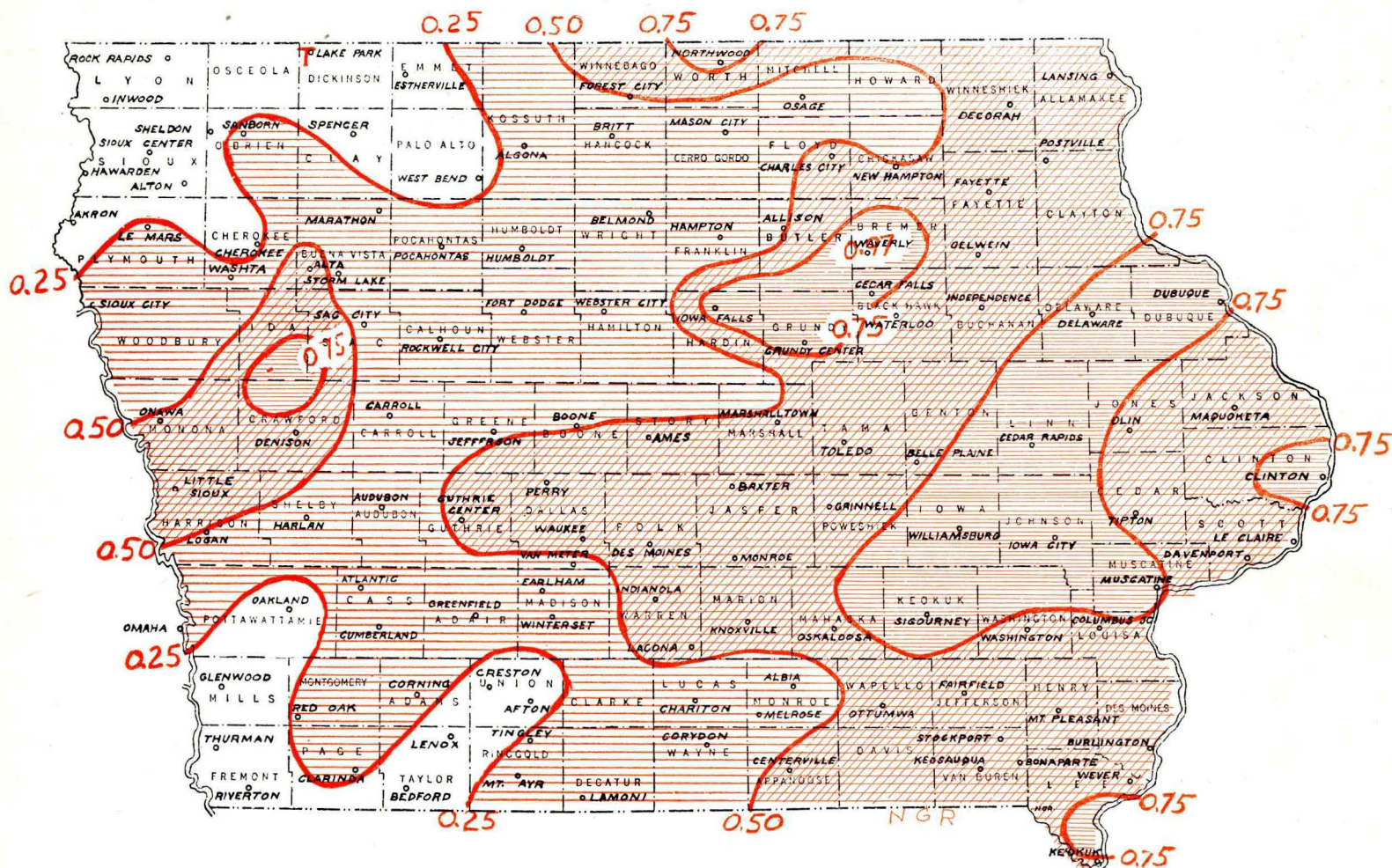
Report for October, 1930; Page 77, Clarinda; monthly mean temperature published 52.1°, should be 52.4°. Temperature departure from normal published -1.9°, should be -1.6°. Greatest daily range in temperature published 44°, should be 38°.

Report for November, 1930; Page 86, Williamsburg; precipitation on the 19th published none should be 0.26 inch.

Report for December, 1930; Page 96, Fairfield; maximum temperature on the 20th published 28°, should be 30°. Minimum temperature on the 19th published 21°, should be 26°. Monthly mean minimum temperature published 20.8°, should be 21.0°.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, JANUARY, 1931



SCALE OF SHADE IN INCHES





# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU  
CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, FEBRUARY, 1931 No. 2

## COMPARATIVE DATA FOR THE STATE—FEBRUARY

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
1873	19.2	-3.4	49	-25	1.17	-0.04	2.52	0.30					
1874	21.2	-1.4	59	-20	1.28	+0.07	2.88	0.16					
1875	6.4	-16.2	48	-31	1.72	+0.51	6.75	0.82					
1876	25.5	+2.9	68	-16	1.11	-0.10	3.63	0.15					
1877	34.0	+11.4	63	-5	0.21	-1.00	0.65	0.00					
1878	34.4	+11.8	60	-8	0.59	-0.62	2.95	0.00					
1879	21.6	+1.0	57	-20	0.68	-0.53	1.90	0.10					
1880	27.4	+4.8	68	-12	0.64	-0.57	2.15	0.02					
1881	17.0	-5.6	57	-24	3.10	+1.89	6.35	0.97					
1882	33.5	+10.9	72	-12	0.91	-0.30	1.85	0.10					
1883	17.7	-4.9	62	-33	1.89	+0.68	6.13	0.06					
1884	18.3	-4.3	56	-23	1.32	+0.11	3.50	0.30					
1885	12.5	-10.1	54	-32	0.82	-0.39	2.50	0.10					
1886	21.2	-1.4	56	-31	0.59	-0.62	1.96	0.24					
1887	17.1	-5.5	60	-25	2.11	+0.93	5.64	0.12					
1888	20.2	-2.4	64	-34	1.01	-0.20	3.10	0.15					
1889	17.8	-4.8	62	-28	0.47	-0.74	1.70	0.00					
1890	25.1	+2.5	68	-21	0.83	-0.38	2.18	0.25					
1891	19.4	-3.2	70	-31	1.16	-0.05	2.41	0.55		3	13	7	8
1892	28.1	+5.5	68	-20	1.20	-0.01	2.18	0.12	5.0	6	6	7	16
1893	16.0	-6.6	60	-28	1.39	+0.18	2.91	0.06	8.1	6	10	8	10
1894	19.7	-2.9	60	-19	0.89	-0.32	2.41	T.	8.4	3	16	8	4
1895	16.4	-6.2	73	-33	0.49	-0.72	1.34	0.02	3.3	4	13	9	8
1896	27.4	+4.8	78	-13	0.71	-0.50	2.40	0.04	5.4	4	12	9	6
1897	24.7	+2.1	61	-21	0.89	-0.32	1.81	0.22	8.0	5	6	10	12
1898	24.2	+1.6	62	-18	1.20	-0.01	3.65	0.10	7.8	5	10	9	9
1899	12.2	-10.4	75	-40	0.89	-0.32	4.32	0.12	7.1	5	11	10	7
1900	14.8	-7.8	66	-27	1.30	+0.09	4.57	0.18	9.9	6	10	8	10
1901	17.5	-5.1	49	-21	1.01	-0.20	3.00	0.12	9.7	4	15	7	6
1902	17.6	-5.0	62	-21	0.73	-0.48	2.39	0.02	2.6	4	13	8	7
1903	19.8	-2.8	56	-21	1.18	-0.03	3.25	0.30	7.9	4	13	7	8
1904	14.8	-7.8	70	-26	0.41	-0.80	1.99	T.	1.5	4	10	9	10
1905	12.8	-9.8	69	-41	1.57	+0.36	2.97	0.44	15.5	7	14	6	8
1906	23.6	+1.0	66	-32	1.29	+0.08	2.91	0.20	6.1	5	14	7	7
1907	25.0	+2.4	65	-31	0.71	-0.50	1.95	0.06	4.6	4	14	6	8
1908	24.3	+1.7	59	-16	1.69	+0.48	3.95	0.23	8.9	6	12	6	11
1909	26.2	+3.6	62	-26	1.54	+0.33	4.72	0.30	7.7	5	11	6	11
1910	17.8	-4.8	58	-21	0.46	-0.75	2.09	T.	4.0	3	14	8	6
1911	27.3	+4.7	71	-13	2.76	+1.55	5.46	0.50	7.0	6	12	6	10
1912	18.1	-4.5	57	-30	1.21	-0.00	3.25	0.01	11.2	5	10	9	10
1913	20.2	-2.4	70	-24	0.82	-0.39	2.39	0.07	7.3	4	14	7	7
1914	16.8	-5.8	59	-29	0.87	-0.31	1.99	0.32	9.2	6	10	9	9
1915	29.1	+6.5	62	-8	2.93	+1.72	5.99	0.43	9.4	9	9	5	14
1916	19.0	-3.6	62	-32	0.55	-0.66	1.38	0.05	6.0	4	14	8	7
1917	15.2	-7.4	68	-37	0.36	-0.85	1.19	T.	3.5	3	14	8	6
1918	23.0	+0.4	70	-36	0.95	-0.26	2.10	0.09	6.6	5	14	7	7
1919	24.9	+2.3	65	-16	2.42	+1.26	4.12	1.32	9.9	8	11	5	12
1920	24.0	+1.1	59	-22	0.56	-0.65	1.75	0.04	4.1	5	9	6	11
1921	31.0	+8.4	76	-5	0.77	-0.14	2.00	T.	6.5	5	13	7	8
1922	23.7	+1.1	70	-20	1.59	+0.38	4.56	0.40	1.3	4	14	7	7
1923	20.1	-2.5	61	-23	0.40	-0.81	1.71	0.00	3.2	3	13	8	7
1924	25.8	+3.2	70	-15	1.27	+0.06	4.00	0.30	11.2	7	15	5	9
1925	28.4	+5.8	66	-16	0.82	-0.39	3.69	T.	2.6	4	11	7	10
1926	31.2	+8.6	67	-2	0.76	-0.45	2.13	0.04	3.3	4	10	7	11
1927	30.6	+8.0	65	-17	1.15	-0.06	3.60	0.13	4.4	5	13	6	9
1928	28.6	+6.0	65	-14	1.95	+0.74	3.97	0.62	4.4	7	15	5	9
1929	14.0	-8.6	52	-35	1.31	+0.10	3.03	0.34	12.5	8	10	7	11
1930	35.5	+12.9	80	-34	0.67	-0.51	2.45	0.06	2.8	5	11	10	7
1931	35.4	+12.8	65	-4	0.25	-0.96	1.13	T.	0.9	2	16	5	7

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

## TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 105 stations, was 35.4°, or 12.8° above normal. There was an excess in temperature at all the stations. The greatest excess, 15.1°, was in the northwest and north-central districts, and the least, 10.5°, in the southeast district. The highest monthly mean temperature was 38.8° at Keokuk, and the least was 30.4° at Decorah. The absolute range for the State was 69°, from 65° at Alton on the 16th, Lenox on the 2d, and Keokuk No. 2 on the 3d, to -4° at Decorah and Postville (near) on the 10th. The average number of days with the maximum temperature 32° or lower, was 1, ranging from 5 days at Postville (near) to none at 50 stations. The average number of days with the minimum temperature 32° or lower, was 25, ranging from 28 days at 21 stations, to 12 days at

**GENERAL SUMMARY**

February weather was abnormally mild and dry. The mean temperature for the State was 35.4°, or 12.8° above normal, and only 0.1° lower than the record high mean of February. New high February mean temperature records were established at all stations in the northern half of the State. There were no record breaking extremes in temperature, and at most of the stations the thermometer did not reach the zero mark. The only cold weather occurred on the 9th, 10th, 13th and 14th.

Precipitation averaged approximately 21% of normal, and was below normal in all districts. Nearly all of the precipitation of the month fell on the 6th, 18th, 22d, 23d and 27th. Several of the stations received all of their precipitation for February on the 6th. Comparing the February mean precipitation, 0.25 inch, with that of previous records, it is interesting to note that only once since 1873 has the total mean precipitation been less than it was this month, 0.21 inch being recorded in 1877. The number of days with precipitation 0.01 inch or more, averaged 2, which is the least of record.

Snow fell mostly on the 6th and 18th, and averaged approximately 13% of the normal. It was nearly normal in the northeast quarter of the State, and much below normal in the rest of the State. The snow cover was the heaviest where the temperature was the severest. Several scattered stations received the least snowfall of record for February.

The favorable weather permitted much outdoor work. Plowing and disking progressed above normal in the southern and western portions of the State. Some oats seeding had been done in the extreme southern counties, and is the earliest known for such work. Pastures, clover and winter wheat made considerable advancement during the month. Some garden and flower planting had been done by the close of the month. Spring pigs and baby chicks were vigorous and growing rapidly because of the mild weather and abundance of sunshine. Some fruit trees, shrubs and early flowers were abnormally advanced for February.

Building operations were carried on with no interruption because of weather conditions. Some road paving was attempted in the southwestern counties.

The water supply in general continued seriously deficient.



Climatological Data for February, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind	
<i>Northwest District</i>																					
Akron.....	Plymouth	1,153	4									0.08	-0.80	0.06	0	2	20	4	4	n.	Orlan C. Moore
Alta.....	Buena Vista	1,513	41	31.3	-14.6	60	24	5	10	34	0.07	-0.95	0.07	T.	1	17	5	6	6	s.	D. E. Hadden
Alton.....	Sioux	1,305	26	35.5	-16.6	65	16	5	10	43	0.04	-0.92	0.01	0	1	15	8	5	5	nw.	W. S. Slagle
Cherokee.....	Cherokee	1,196	11	31.6	-15.1	59	21	7	10 <sup>+</sup>	32	0.02	-0.97	0.02	T.	1	18	5	5	5	nw.	J. E. Wirth
Estherville.....	Emmet	1,298	37	33.4	-15.1	62	21	2	13	37	0.12	-0.72	0.07	1.0	2	19	4	5	5	nw.	A. O. Peterson
Hawarden.....	Sioux	1,181	5								T.	-0.79	T.	T.	0	18	5	5	5	nw.	Earl V. Slife
Inwood (near).....	Lyon	1,474	28	32.6	-14.8	58	16	2	13	36	T.	-0.87	T.	0	0	21	2	5	5	nw.	A. C. Hanson
Lake Park (near).....	Dickinson	1,489	19	32.6	-14.8	60	21	2	10	38	0.22	-0.70	0.13	0.8	2	17	4	7	7	n.	P. M. Lawrence
La Mars.....	Plymouth	1,224	40	35.8	-14.9	61	24	8	10	38	0.04	-0.76	0.04	0	1	18	3	7	7	nw.	Henry Newell
Marathon.....	Buena Vista	1,390	5								0.13		0.13	0.4	1	20	2	6	6	nw.	E. G. Smith
Pocahontas.....	Pocahontas	1,248	27	34.4	-14.7	61	24	5	10 <sup>+</sup>	36	0.18	-0.94	0.10	T.	3	19	4	5	5	sw.	F. E. Hronek
Rock Rapids.....	Lyon	1,319	34	33.6	-15.7	57	15	2	10	42	T.	-0.68	T.	T.	0	20	2	6	6	n.	Nellie F. Medberry
Sanborn.....	O'Brien	1,552	18	33.8	-15.3	60	16	4	10 <sup>+</sup>	36	0.02	-0.98	0.02	0	1	13	8	7	7	ne.	J. W. Dow
Sheldon.....	O'Brien	1,418	25	33.9	-15.4	61	16	3	10	38	0.12	-0.86	0.11	T.	2	16	5	7	7	nw.	Ross E. Forward
Sioux Center.....	Sioux	1,461	32																		F. C. Aue
Spencer.....	Clay	1,319	23	34.2	-15.7	61	24	4	10 <sup>+</sup>	38	0.05	-0.86	0.03	0.2	2	16	5	7	7	nw.	E. W. Little
Storm Lake.....	Buena Vista	1,442	41	31.0	-13.6	60	21	6	13	31	0.11	-0.88	0.11	T.	1	17	7	4	4	nw.	Russel M. Edwards
Washa.....	Cherokee	1,157	34	35.2	-14.4	62	21	1	10	44	0.10	-0.81	0.10	0	1	18	6	4	4	n.	H. L. Felter
West Bend.....	Palo Alto	1,197	44	34.2	-15.0	61	24	4	14	36	0.10	-0.88	0.08	1.0	2	17	6	5	5	sw.	Jos. Dorweiler
Means and extremes.....				31.1	-15.1	65	16	1	10	44	0.08	-0.84	0.13	0.2	1	18	4	6	6	nw.	
<i>North Central District</i>																					
Algona.....	Kossuth	1,207	70	34.6	-15.8	60	24	4	10	32	T.	-1.09	T.	T.	0	20	2	6	6	nw.	Leon M. Merritt
Allison (near).....	Butler	1,000	17	31.0	-14.7	59	24	4	10	28	0.20	-1.01	0.20	2.5	1	15	6	7	7	s.	George H. Bell
Belmond.....	Wright	1,181	22	33.3	-15.0	59	24	3	14	32	0.35	-0.76	0.33	3.5	2	10	6	12	12	nw.	H. F. Luick
Britt.....	Hancock	1,236	16	33.4	-15.8	57	24	3	10	32	0.15	-0.66	0.09	0.5	2	21	0	7	7	sw.	E. P. Healy
Charles City.....	Floyd	1,015	56	32.6	-15.5	58	24	5	10	29	0.61	-0.49	0.39	4.3	4	14	7	7	7	se.	U. S. Weather Bureau
Forest City.....	Winnebago	1,226	41	32.7	-14.1	60	24	0	14	36	0.15	-0.49	0.25	4.5	2	15	4	9	9	sw.	Dr. M. B. Neil
Hampton.....	Franklin	1,112	40	34.3		59	24	4	10 <sup>+</sup>	33	0.34	-0.96	0.34	1.0	1	19	3	6	6	nw.	Howard J. Hayden
Humboldt.....	Humboldt	1,095	47	33.6	-13.1	59	24	3	14	37	T.	-0.92	T.	T.	0	16	5	7	7	sw.	H. C. Snitkey
Mason City.....	Cerro Gordo	1,148	39	32.3	-14.2	56	24	1	10	31	0.87	-0.08	0.50	7.0	4	14	7	7	7	s.	American Beet Sugar Co
Northwood.....	Worth	1,222	35	32.2	-15.9	58	21	1	10	33	0.80	-0.58	0.20	7.5	5	18	1	9	9	nw.	Charles Dwelle
Osage.....	Mitchell	1,163	46	32.2	-15.4	57	24	1	10	32	0.99	-0.07	0.30	3.0	4	10	12	6	6	sw.	Dr. C. E. Juhl
Means and extremes.....				33.2	-15.1	60	24	-1	10	37	0.43	-0.65	0.50	3.1	2	16	5	7	7	sw.	
<i>Northeast District</i>																					
Cedar Falls.....	Black Hawk	875	12								0.37		0.30	2.2	4	12	6	10	10	sw.	E. J. Cable
Decorah.....	Winneshiek	872	48	36.4	-12.6	55	24	-4	10	33	0.73	-0.32	0.40	1.0	3	15	4	9	9	nw.	M. D. Whitney
Delaware (near).....	Delaware	1,083	52	33.0		52	24	5	14	30	0.12		0.07	T.	2	16	4	8	8	sw.	E. J. Paris
Dubuque.....	Dubuque	700	80	31.3	-12.1	51	21	8	14	26	0.25	-1.13	0.24	1.4	3	10	6	12	12	s.	U. S. Weather Bureau
Fayette.....	Fayette	1,003	43	32.3	-13.3	56	24	-1	14	34	0.44	-0.84	0.25	3.0	2	15	5	8	8	s.	W. C. Van Ness
Independence.....	Buchanan	956	71	34.0	-12.8	55	24	6	10 <sup>+</sup>	29	0.11	-0.91	0.07	0.7	3	16	4	8	8	sw.	Dr. Geo. Boody
Lansing.....	Allamakee	632	28																		Mrs. Mary Spinner
New Hampton.....	Chickasaw	1,169	34	32.6	-13.9	56	24	-1	10	32	0.38	-0.67	0.25	5.0	3	16	5	7	7	sw.	D. W. Dawson
Oelwein.....	Fayette	1,036	8	33.2	-12.9	56	24	6	10 <sup>+</sup>	32	0.32	-0.86	0.32	4.0	1	16	3	9	9	s.	John T. Ridler
Postville (near).....	Clayton	1,192	40	31.0	-12.7	56	24	-4	10	34	0.51	-0.63	0.40	4.0	2	21	2	5	5	sw.	F. L. Williams
Waterloo.....	Black Hawk	854	49	31.9	-14.0	60	24	5	14	30	0.33	-0.85	0.26	2.5	2	19	3	6	6	w.	R. B. Slippy
Waverly.....	Bremer	936	42	33.3	-13.3	57	24	4	10	28	0.71	-0.50	0.60	4.0	3	22	1	5	5	nw.	D. H. Murphy
Means and extremes.....				32.9	-13.1	60	24	-4	10	34	0.39	-0.77	0.60	2.8	3	16	4	8	8	sw.	
<i>West Central District</i>																					
Audubon (near).....	Audubon	1,297	38	36.4	-14.9	58	24	5	10	34	0.16	-0.87	0.16	0	1	19	5	4	4	n.	George Kibby
Carroll.....	Carroll	1,265	45	35.8	-13.9	58	24	7	10 <sup>+</sup>	33	0.07	-0.99	0.07	0	1	21	4	3	3	nw.	Mrs. J. J. Wolfe
Denison.....	Crawford	1,200	47	36.9	-14.5	60	24	7	10 <sup>+</sup>	37	0.18	-0.76	0.18	0	1	10	14	4	4	nw.	J. McMinnee
Guthrie Center.....	Guthrie	987	36	36.6	-13.0	60	24	4	14	38	0.08	-1.03	0.08	0	1	20	3	5	5	n.	Floyd H. Bainter
Harlan.....	Shelby	1,210	39	36.1	-13.2	60	24	3	10	39	0.06	-1.07	0.04	0.3	2	13	10	5	5	nw.	Elmer Buss
Jefferson.....	Greene	1,052	39	36.0	-13.5	61	24	5	10 <sup>+</sup>	38	0.12	-0.91	0.12	T.	1	17	4	7	7	nw.	W. I. Lyon
Little Sioux.....	Harrison	1,040	30	36.4	-12.5	61	24	10	9 <sup>+</sup>	36	0.21	-1.07	0.09	0.6	3	17	8	3	3	sw.	H. W. Kerr
Logan.....	Harrison	1,120	65	36.8	-11.8	59	24	8	10	35	0.10	-1.09	0.10	T.	1	15	11	2	2	sw.	Amy Ann Stern
Onawa.....	Monona	1,051	46	36.1	-12.9	60	21	6	10	35	T.	-1.28	T.	T.	0	18	7	3	3	nw.	Mrs. H. E. Colby
Rockwell City.....	Calhoun	1,232	44	34.6	-13.4	60	21	5	10 <sup>+</sup>	37	0.10	-1.23	0.10	T.	1	22	5	1	1	nw.	A. W. McIsaac
Sac City.....	Sac.	1,209	62	35.4	-14.9	60	24	6	14	36	0.04	-1.07	0.04	0.5	1	16	8	4	4	sw.	F. P. Kessler
Sioux City.....	Woodbury	1,135	56	36.4	-15.4	59	24	12	13	30	0.04	-0.78	0.04	T.	1	14	6	8	8	nw.	U. S. Weather Bureau.
Means and extremes.....				36.1	-13.6	61	24	3	10	39	0.10	-1.01	0.18	0.1	1	17	7	4	4	nw.	
<i>Central District</i>																					
Ames.....	Story	926	55	36.6	-14.1	59	24	6	14	32	0.05	-0.89	0.05	0	1	19	3	6	6	s.	Iowa State College
Baxter.....	Jasper	993	32	36.1	-13.2	63	27	3	14	37	T.	-1.02	T.	0	0	14	9	5	5	nw.	Geo. R. Geise
Boone (near).....	Boone	894	47	34.6	-11.3	60	24	2	10 <sup>+</sup>	39	0.17	-0.83	0.17	T.	1	15	7	6	6	nw.	Carl Fritz Henning
Des Moines.....	Polk	861	54	36.8	-13.1	58	27	10	10	30	0.09	-1.03	0.09	T.	1	11	9	8	8	s.	U. S. Weather Bureau
Fort Dodge.....	Webster	1,114	43	34.2	-11.9	59															

Climatological Data for February, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit							Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	35.5	+12.6	60	27	6	10†	32	0.11	-1.49	0.08	0.4	3	17	3	8	n.w.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly  Margaret T. Disney John Strodtfoff William Molis Mrs. L. Stingley John Kroepfen  Dr. F. C. Schadt
Cedar Rapids.....	Linn	737	49	35.0	+12.5	58	27	8	10	31	0.08	-1.32	0.08	0.3	1	14	2	12	n.w.	
Clinton.....	Clinton	595	60	34.8	+10.2	52	5†	9	11	30	0.20	-1.76	0.16	0.2	3	11	5	12	s.	
Davenport.....	Scott	580	60	36.8	+11.9	59	27	11	14	26	0.11	-1.44	0.13	T.	3	10	9	9	sw.	
Iowa City.....	Johnson	733	74	35.6	+11.4	60	27	8	14	31	0.23	-1.28	0.20	T.	2	15	2	11	sw.	
La Claire.....	Scott	576	54								0.18	-1.49	0.17	0.5	2	13	3	8	n.w.	
Maquoketa (near).....	Jackson	692	38	33.4	+11.6	54	27	6	14	32	0.16	-1.19	0.11	1.0	3	12	5	11	n.w.	
Muscatine.....	Muscatine	546	85								0.12	-1.80	0.06	0	3	11	5	12	s.	
Ohn.....	Jones	750	53	34.0	+11.9	52	27	8	14	31	0.25	-1.40	0.25	0	1	16	2	10	sw.	
Tipton (near).....	Cedar	806	39	35.4	+11.6	57	27	7	11	30	0.05	-1.44	0.05	1.0	1	6	12	10	n.	
Williamsburg.....	Iowa	805	15	36.0		54	15†	8	10†	34	0.15	-1.15	0.12	T.	3	20	5	3	se.	
Means and extremes.....				35.2	+11.7	60	27	6	10†	34	0.15	-1.45	0.25	0.3	2	13	5	10	sw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	36.8	+12.9	62	27	1	10	40	0.02	-1.12	0.02	T.	1	15	9	4	sw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock  Dr. George Mogridge P. C. Cornell J. L. Hurley W. S. Matthews B. R. Bridge  George C. Rader H. H. Askew U. S. Weather Bureau
Bedford.....	Taylor	1,200	27								0.90	-0.46	0.80	1.0	3	14	6	8	n.w.	
Clarinda.....	Page	1,009	59	37.4	+9.6	62	2	3	10	38	0.72	-0.12	0.40	1.2	3	18	5	5	s.	
Corning.....	Adams	1,287	43	37.6	+12.5	62	2	3	10	34	0.76	-0.42	0.57	T.	3	15	7	6	s.	
Cumberland (near).....	Cass	1,225	32								T.	-1.09	T.	0	0	16	6	6	sw.	
Glenwood.....	Mills	1,100	41	37.4	+10.9	60	11	4	10	38	0.28	-0.59	0.16	1.0	3	13	8	7	se.	
Greenfield.....	Adair	1,368	35								T.		T.	0	0	13	9	6	n.w.	
Lenox.....	Taylor	1,250	36	38.1	+12.6	65	2	5	10	35	0.39	-0.60	0.20	2.0	3	14	7	7	n.w.	
Oakland.....	Pottawattamie	1,139	18	37.3	+12.7	60	11	3	10	37	0.20	-0.85	0.15	0.5	2	19	4	5	sw.	
Red Oak (near).....	Montgomery	1,030	24								0.43	-0.70	0.31	0	3	15	9	4	s.	
Riverton (near).....	Fremont	920	5								0.26	-0.92	0.20	3.0	3	14	3	11	s.	
Thurman.....	Fremont	960	41	38.0	+10.1	62	11	5	10	41	0.10	-1.28	0.10	2.0	1	15	5	8	n.	
Omaha, Neb.....	Fremont	1,105	66	38.6	+13.1	59	11	15	10	29	0.03	-0.86	0.03	0.4	1	17	5	6	n.w.	
Means and extremes.....				37.6	+11.8	65	2	1	10	41	0.31	-0.81	0.80	0.9	2	15	7	6	s.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	38.0	+12.4	64	2	5	10	34	0.32	-0.85	0.16	T.	2	15	6	7	ne.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis  Mrs. N. Spangler George Phillips Seth F. Shenton W. J. Casey J. B. Alter  F. S. Parks J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely
Albia.....	Monroe	949	40	36.4	+11.0	64	2	6	10	34	0.46	-0.90	0.16	0	2	18	0	10	sw.	
Centerville.....	Appanoose	1,013	38	37.8	+10.7	60	27	8	10	39	0.51	-0.96	0.42	T.	4	17	2	9	sw.	
Chariton (near).....	Lucas	1,042	37	36.9	+11.8	60	27	5	10	34	0.42	-0.71	0.42	T.	1	16	1	8	sw.	
Corydon (near).....	Wayne	1,050	47	36.8	+10.6	62	27	6	10	31	0.41	-0.99	0.40	0.2	3	15	7	6	n.w.	
Creston.....	Union	1,291	30	36.0	+11.3	61	2	1	10	37	0.24	-1.10	0.23	0.1	3	13	8	7	n.w.	
Earlham (near).....	Madison	1,226	34	35.9	+12.6	60	2	0	10	38	T.	-1.41	T.	0	0	21	1	6	sw.	
Indianola.....	Warren	972	50	37.0	+12.4	62	2†	7	13	42	0.05	-1.16	0.05	0	1	16	8	4	w.	
Knoxville.....	Marion	920	41	37.4	+11.7	60	2	8	10†	33	T.	-1.25	T.	T.	0	15	5	8	sw.	
Lacona.....	Warren	824	32								0.02	-1.66	0.02	0	2	12	11	5	.....	
Lamoni.....	Decatur	1,123	27	37.0	+9.6	64	2	4	10	35	0.53	-0.71	0.48	0.5	4	18	3	7	n.w.	
Melrose.....	Monroe	871	1								0.51		0.51	0	2	16	7	5	sw.	
Mt. Ayr.....	Ringgold	1,220	39	38.0	+11.6	64	2	4	10	36	0.63	-0.67	0.60	T.	3	19	2	7	s.	
Tingley.....	Ringgold	1,275	7	37.2	+11.1	62	2	5	10	33	0.45	-0.73	0.35	1.5	3	17	6	5	n.w.	
Winterset.....	Madison	1,118	40	38.0	+13.2	61	27	7	14	37	0.06	-1.02	0.06	0	1	20	3	5	n.w.	
Means and extremes.....				37.2	+11.6	64	2	0	10	36	0.31	-0.99	0.60	0.2	2	16	5	7	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	36.4	+9.6	61	27	8	10†	33	0.25	-1.01	0.25	T.	2	16	2	10	s.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzia U. S. Weather Bureau  J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesh  John B. Slate John L. Beswick D. D. Sherman H. D. Liddle
Burlington.....	Des Moines	541	41	37.8	+9.1	60	27	12	14	28	0.63	-1.18	0.27	T.	6	14	5	9	ne.	
Columbus Junction.....	Louisa	595	40	36.1	+10.1	61	27	8	14	30	0.04	-1.36	0.04	T.	1	15	5	8	n.w.	
Fairfield.....	Jefferson	780	51	35.4	+9.9	61	27	7	10	31	1.20	-1.39	0.19	T.	3	14	5	9	s.	
Keokuk.....	Lee	614	60	38.8	+10.5	63	3	14	10	29	0.08	-0.47	0.13	0.1	6	13	4	11	sw.	
Keokuk No. 2.....	Lee	651	2	38.2		65	3	11	10	35	1.13		0.46	0	5				.....	
Keosauqua.....	Van Buren	639	44	35.8	+8.5	62	27	7	10	36	0.30	-1.17	0.30	0	1	11	11	6	n.w.	
Mt. Pleasant.....	Henry	730	55	37.8	+11.3	62	27	10	14	31	0.12	-1.32	0.09	T.	4	12	8	8	sw.	
Oskaloosa.....	Mahaska	835	55	37.2	+12.5	63	27	7	10†	33	T.	-1.15	T.	T.	0	15	6	7	n.w.	
Ottumwa.....	Wapello	649	44	37.2	+10.5	62	2†	8	10	38	0.30	-1.15	0.25	0	3	12	7	9	n.w.	
Sigourney.....	Keokuk	785	36	36.3	+11.6	64	27	8	10†	35	0.05	-1.35	0.05	0	1	16	6	6	s.	
Stockport (near).....	Van Buren	747	30	35.8	+10.1	62	27	9	10†	33	0.25	-1.14	0.22	T.	3	16	5	7	s.	
Washington.....	Washington	757	56	36.8	+11.3	59	27	8	10	33	0.03	-1.26	0.03	T.	1	12	4	12	sw.	
Wever.....	Lee	552	3																.....	
Means and extremes.....				36.9	+10.5	65	3	7	10†	38	0.34	-1.09	0.46	T.	3	14	6	8	s.	
State means and extremes.....				35.4	+12.8	65	2†	-4	10	44	0.25	-0.96	0.80	0.9	2	16	5	7	sw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

Keokuk. The average number of days with the minimum temperature zero or lower, was zero, ranging from 2 days at Decorah, to none at 95 stations. The greatest daily range in temperature at any station was 44° at Washta on the 24th.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records

of 119 stations, was 0.25 inch, or 0.96 below normal. The greatest district deficiency was in the east-central district, 1.45 inches, and the north-central district had the least deficiency, 0.65 inch. All of the stations were deficient in precipitation. The greatest precipitation deficiency for any one station was at Muscatine, 1.80 inches. The greatest amount at a single station was 1.13 at Keokuk No. 2, and the least was a trace at 14 stations. The greatest amount occurring in 24 consecutive hours was 0.80 inch at Bedford on the 22d and 23d. The average number of days with 0.01 inch





Daily Maximum and Minimum Temperature for the month of February, 1931

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.

## MISCELLANEOUS PHENOMENA

*Birds* (migration of): Boone, bluebirds on 22d. Earlham, bluebirds on 20th.

*Cold Winds*: 13th, 28th.

*Corona*, lunar: 8th, 11th, 24th.

*Fog*, dense: 2d, 3d, 7th, 12th, 17th, 18th, 19th, 20th, 22d, 23d, 24th, 25th.

*Fog*, light: 2d, 3d, 6th, 7th, 12th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 24th, 25th.

*Gales*: 3d, 6th, 9th, 13th, 15th, 27th, 28th.

*Glaze*: 6th, 10th, 26th, 28th.

*Græpel*: 10th.

*Halo*, lunar: 4th, 5th, 22d, 24th, 27th.

*Halo*, solar: 4th, 8th, 11th, 12th, 16th, 21st, 22d, 24th, 25th, 27th, 28th.

*Haze*: 2d, 10th, 11th, 17th, 21st, 22d, 23d, 26th.

*Hoar Frost*: 19th, 20th.

*Meteors*: 8th, 24th.

*Parhelia*: 11th.

*Sleet*: 6th, 11th, 12th, 27th, 28th.

*Smog*, dense (mixture of smoke and fog): 2d, 19th, 20th, 24th.

*Snow*: 6th, 9th, 10th, 12th, 13th, 17th, 18th, 19th, 26th, 28th.

*Thunderstorm*: 6th.

## THE WINTER OF 1930-1931

The mean temperature for the three winter months was 30.3°, which is 8.5° above the normal for the State, and 6.7° above the mean of 1929-1930. The winter was characterized by a nearly normal December, an abnormally warm January, and next to the warmest February of record. Out of 58 winters for which State-wide average temperatures are available, only one has been warmer. The warmest winter of record was 1877-78, with a mean of 32.2°, and the coldest, 1874-75, with a mean of 11.8°. The highest temperature during the winter was 65° at Albia on December 9; Alton, February 16; Lenox, February 2; and Keokuk No. 2, February 3. The lowest temperature was -15° at Decorah, January 21.

The average monthly precipitation for the State was 0.44 inch, and the average total was 1.32 inches, or 2.10 inches less than the normal, and the least of record in 59 winters. December precipitation averaged 0.57 inch, which was 0.57 inch below normal, January was 0.50 inch, or 0.57 inch below normal, and February 0.25 inch, or 0.96 inch below normal.

The average snowfall for the winter was 9.0 inches, which is

12.9 inches below normal, and 12.3 inches less than the winter of 1929-30. Snowfall averaged below normal for all three winter months. The northeastern portion of the State received the most. Comparing the average snowfall for Iowa for the winter 1930-31, it is interesting to note that it is the least of record since State-wide snowfall records began in the winter of 1892-93.

The lack of precipitation had no effect upon the principal streams. In fact, these streams showed an increased discharge due to less evaporation, but the effects on the water supply in wells and ponds became more serious daily.

The average number of days with 0.01 inch or more of precipitation was 8, or 10 days less than last winter, which establishes a new record. The average number of clear days was 46, partly cloudy, 17, and cloudy, 27, as compared with 37 clear days, 24 partly cloudy, and 29 cloudy days, during the winter of 1929-1930.

## BRILLIANT METEORS

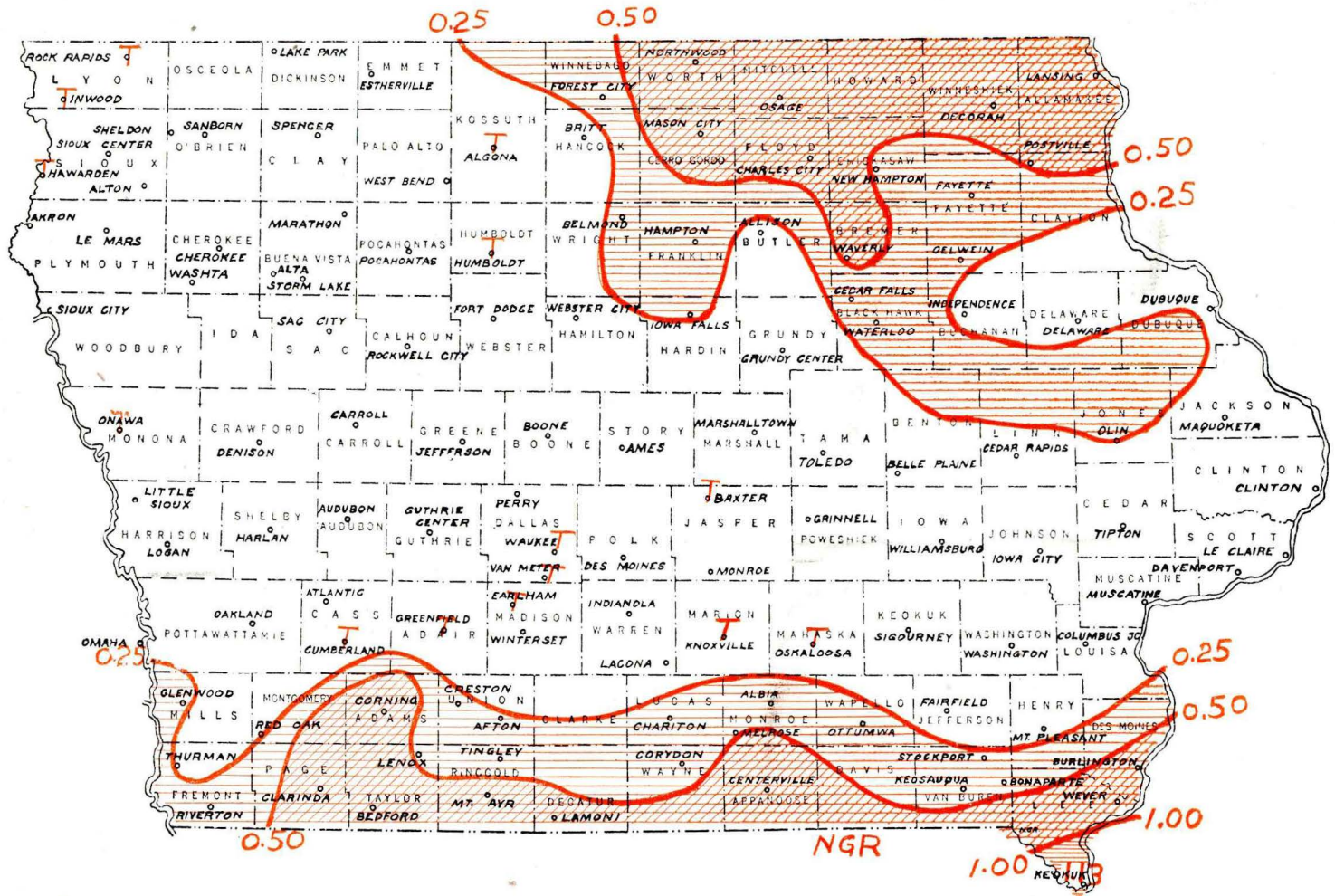
A very brilliant meteor was observed from Des Moines at 9:05 P. M., February 8, by Norbert G. Ribble of the United States Weather Bureau. The meteor was first observed high in the north, about 8° west of Polaris. Figuratively speaking, the meteor appeared to be about two-thirds of the size of the moon. As it approached the earth it left a beautiful after-glow of colors, merging from a fiery red to a deep purple. The after-glow lasted for about five seconds. It moved in a north-northwesterly direction, and appeared to explode about 10° above the horizon. No detonation was heard. From reports received by Professor C. C. Wylie of the State University of Iowa, it is evident the same meteor was observed in the northwest by Don W. Faulkner at Hudson, Iowa, and also by L. A. Schneider at Sleepy Eye, Minnesota, and Sam Brandvold of Thief Falls, Minnesota. From these reports it is possible that if any of the meteorite struck the earth, fragments may be found approximately one hundred miles west of St. Paul, Minnesota.

About 7:35 P. M. on February 24, Mr. George C. Rader of Riverton, Iowa, reports that he observed a meteor fall. It was first observed in the constellation of Ursa Major (Big Dipper), and as it approached the earth it took a northeast direction. It dissipated near the horizon. When first observed it gave off a whitish light, but as it fell and the velocity seemed to increase, the color changed from the white light to an orange color, and then to a fiery red. Figuratively speaking, it appeared about the size of a large orange. No detonation was heard.

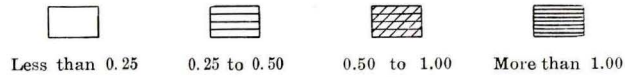
N. G. R.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, FEBRUARY, 1931



SCALE OF SHADE IN INCHES





# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, MARCH, 1931 No. 3

## COMPARATIVE DATA FOR THE STATE—MARCH

### GENERAL SUMMARY

March weather was characterized by nearly normal temperature and precipitation, no temperature extremes, and heavy snowfall.

The mean temperature for the State was 34.9°, or 0.3° above normal, and 0.5° colder than February, 1931. It was above normal in the northern half and below normal in the southern half. At no station did the thermometer reach the zero mark. The absolute range in temperature for the State was 59°, and is the lowest range of record. The only cold weather of any consequence was recorded on the 30th in the northeastern portion of the State.

Precipitation averaged approximately 95% of normal, and was above normal in the southern one-third of the State. The southern half of the State received nearly twice as much precipitation as did the northern half.

Snowfall averaged nearly 77% above the normal. The southern half of the State received nearly three times as much snow as the northern half. The monthly mean temperatures were below normal where the snowfall was the heaviest.

Two unusually heavy snowstorms occurred during the month; the first, 5th-7th, was caused by a barometric disturbance that originated over southern Colorado and moved eastward. After reaching the middle Mississippi Valley it moved very slowly, causing almost continuous snowfall at points in southern Iowa, for nearly 70 hours. The storm was accompanied by strong northwest winds, which drifted the snow badly, completely blocking all highways and temporarily stopping railroad traffic. The main highways were opened after about 24 hours, but a large number of secondary roads were closed for as much as ten days. Rural mail was delivered on horseback. The greatest total fall was 26.1 inches at Centerville, falling almost continuously for a period of 69 hours. From an agricultural standpoint, this snow was of variable benefit on account of the drifting. The snow blew off the higher cultivated land into the valleys, ravines and cuts, forming drifts as much as 10 to 15 feet deep.

The second storm which struck the southern and eastern portions of the State on the 27th-28th, was caused by a well defined and concentrated low barometric pressure area which originated in northern New Mexico, moved southeastward to the Gulf, then changed its course and ascended the Mississippi River Valley. The heavy snow halted railroad and highway traffic for at least 24 hours, and in some localities longer. It became impossible for the State Highway Commission to keep the roads open to the general traffic because of the high wind which replaced

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
1873.....	34.0	-0.6	72	-18	1.42	-0.35	3.70	0.33					
1874.....	31.7	-2.9	68	-4	1.43	0.34	2.80	0.17					
1875.....	26.9	-7.7	80	-10	1.62	0.15	3.80	0.45					
1876.....	27.2	-7.4	75	-6	3.24	+1.47	5.78	1.16					
1877.....	27.3	-7.3	72	-14	2.28	+0.51	6.54	0.20					
1878.....	45.6	+11.0	80	-20	3.36	+1.59	6.70	0.35					
1879.....	37.2	+2.6	80	-3	1.18	-0.59	4.50	0.20					
1880.....	33.6	-1.0	80	-21	1.26	-0.51	3.90	0.15					
1881.....	27.1	-7.5	56	0	1.91	+0.14	4.90	0.75					
1882.....	36.3	+1.7	78	4	1.82	-0.05	4.52	0.50					
1883.....	30.6	-4.0	72	-13	0.55	-1.22	1.40	0.00					
1884.....	32.0	-2.6	72	-16	2.57	+0.80	5.90	0.70					
1885.....	31.3	-3.3	65	-16	0.24	-1.53	1.25	0.00					
1886.....	30.6	-4.0	74	-9	1.72	-0.05	4.47	0.40					
1887.....	33.5	-1.1	76	-8	0.93	0.84	3.50	0.00					
1888.....	26.4	-8.2	78	-12	3.04	+1.27	6.20	0.29					
1889.....	39.7	+5.1	80	8	0.47	-1.30	2.40	0.00					
1890.....	28.1	-6.5	75	-24	1.49	-0.28	3.67	0.32					
1891.....	26.8	-7.8	66	-19	2.60	+0.83	4.58	1.33	10	6	8	17	
1892.....	31.9	-2.7	84	-6	2.22	-0.45	4.58	0.57	3.9	6	11	8	12
1893.....	31.8	-2.8	84	-8	2.14	-0.37	4.40	0.64	4.0	8	9	11	11
1894.....	41.0	+6.4	84	-5	2.03	+0.26	4.52	0.26	2.7	6	13	10	8
1895.....	34.4	-0.2	94	-11	0.83	-0.94	2.60	0.22	2.9	4	16	8	7
1896.....	30.9	-3.7	81	-12	1.10	-0.67	3.99	0.16	5.4	5	12	9	10
1897.....	32.0	-2.6	72	-22	2.39	+0.62	6.16	0.29	5.5	8	9	8	14
1898.....	37.5	+2.9	72	-2	1.94	+0.17	6.21	0.33	3.7	6	12	9	10
1899.....	23.0	-11.6	75	-16	1.62	-0.15	5.90	0.37	8.0	6	7	12	12
1900.....	30.7	-3.9	81	-13	2.06	+0.29	5.15	0.45	6.6	5	12	9	10
1901.....	34.2	-0.4	76	-8	2.64	+0.87	5.25	0.70	12.6	7	10	8	13
1902.....	39.1	+4.5	79	-12	1.45	-0.32	4.33	0.13	1.3	7	9	11	11
1903.....	38.8	+4.2	82	6	1.38	-0.39	3.90	0.15	3.9	7	11	7	13
1904.....	34.8	+0.2	78	3	2.18	+0.11	4.57	0.50	4.4	7	8	8	15
1905.....	41.5	+6.9	84	1	2.04	-0.27	3.70	0.89	4.1	7	8	8	15
1906.....	27.1	-7.5	65	-14	2.34	+0.57	4.55	0.58	8.9	10	8	7	16
1907.....	40.6	+6.0	92	-7	1.35	-0.42	5.05	0.23	4.1	6	14	7	10
1908.....	37.9	+3.3	85	-8	1.58	-0.19	3.74	0.45	1.1	6	13	7	11
1909.....	32.5	-2.1	71	-15	1.53	-0.24	5.00	0.28	9.8	6	12	10	9
1910.....	48.9	+14.3	92	-10	0.17	-1.60	1.37	0.00	T.	1	23	6	2
1911.....	39.4	+4.8	83	2	0.93	-0.84	4.84	T.	1.9	5	16	9	6
1912.....	24.9	-9.7	70	-19	2.01	+0.24	5.25	0.60	19.1	7	15	6	10
1913.....	31.9	-2.7	78	-23	2.48	-0.71	5.88	0.74	5.3	9	11	10	10
1914.....	34.7	+0.1	78	-5	1.69	-0.08	3.84	0.23	1.8	7	12	8	11
1915.....	29.3	-5.3	61	-5	0.96	-0.81	2.12	0.17	8.8	5	8	9	14
1916.....	35.2	+0.6	80	-18	1.57	-0.20	5.80	0.23	2.9	6	11	9	11
1917.....	34.6	-0.0	85	-12	1.84	+0.07	4.35	0.57	6.2	6	14	8	9
1918.....	42.9	+8.3	85	0	0.63	-1.14	2.12	0.03	2.6	3	10	7	5
1919.....	37.5	+2.9	78	-11	2.33	+0.56	5.40	0.81	1.1	6	15	8	8
1920.....	38.0	+3.4	80	-21	3.02	+1.25	5.70	0.47	2.4	7	15	7	9
1921.....	42.8	+8.2	86	4	1.57	-0.20	6.62	0.17	0.2	7	12	6	13
1922.....	38.3	+3.7	74	-5	1.97	+0.20	3.73	0.76	3.4	7	13	9	9
1923.....	29.4	-5.2	78	-22	2.87	+1.10	5.08	0.71	18.5	7	13	9	9
1924.....	31.9	-2.7	72	-3	2.65	+0.88	4.76	1.26	10.5	8	8	8	15
1925.....	40.1	+5.5	82	-6	0.93	-0.84	2.34	0.10	2.9	4	17	9	5
1926.....	32.1	-2.5	78	-4	1.06	-0.71	2.62	0.20	8.1	6	12	9	10
1927.....	39.6	+5.0	75	0	1.92	+0.15	3.64	0.62	2.9	9	11	7	13
1928.....	38.9	+4.3	88	1	1.44	-0.33	2.75	0.36	3.0	5	15	8	8
1929.....	39.1	+4.5	83	-5	1.44	-0.33	4.92	0.30	3.5	5	12	8	11
1930.....	37.3	+2.7	80	-4	0.89	-0.88	2.42	0.04	1.3	5	14	8	9
1931.....	34.9	+0.3	64	5	1.68	-0.08	4.18	0.15	10.3	6	11	8	12
Normals.....	34.6		78	-9	1.77		4.30	0.39	5.4	6	12	8	11
Highest.....	48.9		94	8	3.36		6.70	1.33	19.1	10	23	12	17
Lowest.....	23.0		56	-24	0.17		1.25	0.00	T.	1	6	6	2

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

the drifts as fast as the powerful snow plows cleared the way. It was estimated that the damage caused by the storm in cities will be more than offset by the advantages gained in relief from the long drouth, to the agricultural districts.

The favorable weather during the first three weeks permitted much outdoor work. Farm work continued to progress above normal. Much oats and barley seeding had been completed by the close of the month. Spring plowing for corn made an unusual advance. Pastures, clover and winter wheat made considerable advancement and was



Climatological Data for March, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy
<i>Northwest District</i>																			
Akron.....	Plymouth	1,153	4																Orlan C. Moore D. E. Hadden W. S. Slagle J. E. Wirth A. O. Peterson
Alta.....	Buena Vista	1,513	41	34.2	+ 1.2	57	17†	13	4†	40	1.53	- 0.02	0.58	7.0	6	11	12	8	
Alton.....	Sioux	1,305	26	35.3	+ 3.3	58	12†	10	2†	43	0.15	- 0.95	0.05	0.5	5	9	12	10	
Cherokee.....	Cherokee	1,196	11	34.4	+ 2.5	55	12	10	16	40	0.61	- 0.67	0.38	4.2	6	9	11	11	
Estherville.....	Emmet	1,298	37	31.5	+ 2.9	55	11	9	16	41	1.29	+ 0.02	0.45	4.0	6	14	12	5	
<i>Hawarden</i>																			
Inwood (near).....	Sioux	1,181	5																Earl V. Slife A. C. Hanson P. M. Lawrence Henry Newell E. G. Smith
Lake Park (near).....	Lyon	1,474	28	33.0	+ 0.3	57	17†	6	4	39	0.41	- 0.79	0.13	1.5	6	12	7	12	
Lake Park (near).....	Dickinson	1,489	19	32.3	+ 0.7	55	11	9	16	42	0.91	- 0.38	0.28	1.0	6	6	10	15	
La Mars.....	Plymouth	1,224	40	35.8	+ 2.5	63	12	11	15†	41	0.67	- 0.58	0.33	1.0	6	15	6	10	
Marathon.....	Buena Vista	1,390	5																
<i>Pocahontas</i>																			
Pocahontas.....	Pocahontas	1,248	27	34.5	+ 2.2	56	13	14	4†	34	1.18	- 0.19	0.40	3.8	6	11	11	9	F. E. Hronek Nellie F. Medberry J. W. Dow Ross E. Forward F. C. Aue
Rock Rapids.....	Lyon	1,349	34	34.3	+ 2.8	60	22	9	2†	43	0.49	- 0.83	0.12	3.0	6	22	4	5	
Sanborn.....	O'Brien	1,553	18	33.7	+ 2.1	57	22	10	9†	41	0.51	- 0.89	0.15	4.5	5	6	12	13	
Sheldon.....	O'Brien	1,418	25	31.0	+ 4.4	58	22	9	4†	43	0.50	- 0.80	0.17	4.0	6	9	13	9	
Sioux Center.....	Sioux	1,461	32	33.6	+ 2.1	57	12†	9	9	39	0.52	- 0.74	0.32	2.5	3	9	14	8	
<i>Spencer</i>																			
Spencer.....	Clay	1,319	23	34.6	+ 2.2	57	11†	10	16	40	0.97	- 0.35	0.46	3.0	6	11	9	11	E. W. Little Russel M. Edwards H. L. Felter Jos. Dorweiler
Storm Lake.....	Buena Vista	1,442	41	33.5	+ 0.9	54	17	11	4	35	1.18	- 0.12	0.46	3.3	6	8	13	10	
Washta.....	Cherokee	1,157	34	35.3	+ 2.0	59	12	7	2†	47	0.67	- 0.34	0.28	3.0	3	13	7	11	
West Bend.....	Palo Alto	1,197	44	33.8	+ 1.8	54	17†	9	16	37	0.87	- 0.69	0.52	1.5	6	12	10	9	
Means and extremes.....				34.3	+ 2.1	63	12	6	4	47	0.76	- 0.54	0.58	3.1	5	12	10	9	
<i>North Central District</i>																			
<i>Algona</i>																			
Algona.....	Kossuth	1,207	70	33.4	+ 1.9	55	11	12	16	35	1.02	- 0.40	0.52	3.0	4	14	6	11	Leon M. Merritt George H. Bell H. F. Luick E. P. Healy U. S. Weather Bureau
Allison (near).....	Butler	1,000	17	34.0	+ 1.9	53	11†	14	4†	32	0.86	- 0.77	0.60	8.5	3	7	12	12	
Belmond.....	Wright	1,181	22	33.4	+ 2.1	55	11	10	16	37	1.09	- 0.24	0.57	2.5	4	7	3	21	
Britt.....	Hancock	1,236	46	33.8	+ 2.3	54	11	12	16	33	1.47	+ 0.22	0.53	4.5	5	14	2	15	
Charles City.....	Floyd	1,015	56	33.8	+ 3.1	51	25	15	4	34	1.43	- 0.34	0.51	7.7	4	12	4	15	
<i>Forest City</i>																			
Forest City.....	Winnebago	1,226	41	32.4	+ 0.6	56	11	11	16	37	1.43	- 0.00	0.60	4.6	4	14	4	13	Dr. M. B. Neil Howard J. Haydon H. C. Snitkey American Beet Sugar Co Charles Dwellie
Hampton.....	Franklin	1,142	40	34.2		56	25	12	2	34	1.04	- 0.71	0.45	3.0	3	26	0	5	
Humboldt.....	Humboldt	1,095	47	34.2	+ 1.0	55	11†	9	16	37	0.68	- 0.76	0.51	1.0	4	6	10	15	
Mason City.....	Cerro Gordo	1,148	39	32.4	+ 1.5	53	11†	12	4†	37	1.51	+ 0.14	0.86	7.0	4	12	8	11	
Northwood.....	Worth	1,222	35	32.1	+ 2.9	53	11	14	4	34	1.63	- 0.22	0.50	7.0	5	12	8	11	
<i>Osage</i>																			
Osage.....	Mitchell	1,163	46	32.6	+ 2.7	52	11†	14	4	34	1.20	- 0.39	0.50	7.0	3	13	7	11	Dr. C. E. Juhl
Means and extremes.....				33.3	+ 2.1	56	11†	9	16	37	1.21	- 0.32	0.86	5.1	4	12	6	13	
<i>Northeast District</i>																			
<i>Cedar Falls</i>																			
Cedar Falls.....	Black Hawk	875	12																E. J. Cable M. D. Whitney E. J. Paris U. S. Weather Bureau W. C. Van Ness
Decorah.....	Winneshiek	872	48	31.6	+ 0.3	52	12	5	30	37	2.34	+ 0.54	1.65	13.0	5	9	7	15	
Delaware (near).....	Delaware	1,083	52	33.2		54	21	15	4	31	2.01		1.18	11.0	5	11	12	8	
Dubuque.....	Dubuque	700	80	34.4	+ 0.4	54	21	20	4	27	2.20	+ 0.17	1.58	18.1	9	7	7	17	
Fayette.....	Fayette	1,003	43	33.2	+ 1.9	56	21	8	30	35	1.38	- 0.73	0.50	9.0	6	11	7	13	
<i>Independence</i>																			
Independence.....	Buchanan	956	71	34.5	+ 0.4	53	25	16	4	29	0.80	- 0.92	0.35	4.9	4	11	7	13	Dr. Geo. Boody Mrs. Mary Spinner D. W. Dawson John T. Ridler F. L. Williams
Lansing.....	Allamakee	632	28								2.38	+ 0.34	0.94	12.3	8				
New Hampton.....	Chickasaw	1,169	34	33.2	+ 1.9	55	25	11	4	34	2.00	+ 0.08	0.75	6.0	4	12	4	15	
Oelwein.....	Fayette	1,036	8	33.8	+ 0.8	55	21	16	4†	31	1.45	- 0.37	0.60	10.0	4	7	6	18	
Postville (near).....	Clayton	1,192	40	30.8	+ 0.2	52	21	15	4	28	1.60	- 0.32	0.90	12.5	5	10	6	15	
<i>Waterloo</i>																			
Waterloo.....	Black Hawk	854	49	31.8	+ 0.4	55	21†	13	30	37	1.80	+ 0.13	0.85	13.0	4	15	6	10	R. B. Slippy D. H. Murphy
Waverly.....	Bremer	936	42	34.6	+ 1.7	55	21†	15	4	32	2.57	+ 0.79	0.96	9.5	4	19	5	7	
Means and extremes.....				33.4	+ 0.9	56	21	5	30	37	1.88	0.00	1.65	10.9	5	11	7	13	
<i>West Central District</i>																			
<i>Audubon</i>																			
Audubon (near).....	Audubon	1,297	38	35.2	+ 1.4	55	12†	15	2†	35	1.61	+ 0.16	0.35	7.5	8	7	16	8	George Kibby Mrs. J. J. Wolfe J. McMinimee Kenneth Hoyt Elmer Buss
Carroll.....	Carroll	1,265	45	34.4	- 1.6	56	17	12	16	40	0.92	- 0.77	0.31	2.5	5	16	7	8	
Denison.....	Crawford	1,200	47	35.8	+ 0.8	57	12†	9	16	42	1.00	- 0.53	0.26	1.0	6	9	11	11	
Guthrie Center.....	Guthrie	1,028	36								1.33	- 0.17	0.40	5.5	6				
Harlan.....	Shelby	1,210	39	35.0	- 0.3	56	13†	10	2	40	1.18	- 0.15	0.27	6.3	8	7	14	10	
<i>Jefferson</i>																			
Jefferson.....	Greene	1,052	39	35.3	- 0.5	60	13	9	16	39	0.95	- 0.51	0.41	2.0	6	13	5	13	W. I. Lyon H. W. Kerr Amy Ann Stern Mrs. H. E. Colby A. W. McIsaac
Little Sioux.....	Harrison	1,040	36	35.1	- 1.0	57	12	11	2†	38	1.21	- 0.11	0.38	6.0	8	10	13	8	
Logan.....	Harrison	1,120	65	35.9	- 1.3	56	25	13	4	38	0.99	- 0.67	0.38	5.5	7	9	17	5	
Onawa.....	Monona	1,051	46	35.8	+ 0.5	60	12	9	4	39	0.78	- 0.84	0.30	1.5	5	6	12	13	
Rockwell City.....	Calhoun	1,232	44	34.2	+ 0.4	58	17	9	16	42	1.51	- 0.10	0.60	10.0	4	20	4	7	
<i>Sac City</i>																			
Sac City.....	Sac	1,209	62	35.0	+ 1.9	57	17	10	16	40	1.35	- 0.08	0.45	1.0	5	16	6	9	F. P. Kessler U. S. Weather Bureau
Sioux City.....	Woodbury	1,135	56	35.2	+ 2.5	57	12	16	29	32	0.67	- 0.48	0.29	3.0	7	6	10	15	
Means and extremes.....				35.2	+ 0.3	60	12†	9	4†	42	1.12	- 0.36	0.60	4.3	6	11	10	10	
<i>Central District</i>																			
<i>Ames</i>																			
Ames.....	Story	926	55	35.8	+ 0.8	58	14	13	17	34	1.18	- 0.24	0.70	3.0	4	16	6	9	Iowa State College Geo. R. Geise Carl Fritz Henning U. S. Weather Bureau Mrs. Emma Sampson
Baxter.....	Jasper	993	32	36.6	+ 1.6	64	13	11	16	38	1.00	- 0.84	0.50	5.0	3	9	11	11	
Boone (near).....	Boone	894	47	34.9	- 1.1	60	13	7	16	40	1.82	+ 0.38	0.86	6.0	4	10	11	10	
Des Moines.....	Polk	861	54	36.0	+ 0.1	59	13	17	16	29	1.52	- 0.26	0.56	6.9	8	4	12	15	
Fort Dodge.....	Webster	1,114	43	35.0	+ 0.7	57	13	10	16	38	1.03	- 0.57	0.40	5.5	5	12	6	13	
<i>Grinnell</i>																			
Grinnell.....	Poweshiek	1,031	47	35.6	+ 0.3	57	13	14	4†	34	1.11	- 0.72	0.44	7.6	6	15	4	12	R. E. Bates M. G. Heiberger C. H. Gilbert C. C. Pigman J. A. Dibel
Grundy Center.....	Grundy	976	40	34.2	- 0.5	55	11†	13	16	37	1.95	+ 0.15	0.75	14.0	4	9	14		

Climatological Data for March, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit							Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine	Benton	866	55	35.6	+ 0.7	57	13†	13	4	31	2.52	+ 0.24	1.42	19.9	6	14	7	10	n.w.	O. C. Burrows
Cedar Rapids	Linn	737	49	36.0	+ 1.3	59	21	12	30	38	1.79	- 0.51	1.08	17.1	6	9	5	17	n.w.	J. T. Wurster
Clinton	Clinton	595	60	35.2	- 0.6	57	21†	16	11	33	1.52	+ 1.30	0.64	7.5	8	10	6	15	n.	Dr. A. P. Bryant
Davenport	Scott	580	60	36.2	+ 0.1	56	22	20	4	24	2.87	+ 0.56	1.45	10.6	11	8	5	18	n.w.	U. S. Weather Bureau
Iowa City	Johnson	733	74	35.8	+ 0.2	58	22	14	30	32	1.57	- 0.83	0.87	9.5	10	8	8	15	n.w.	Prof. J. F. Reilly
La Claire	Scott	576	54								2.50	+ 0.14	1.25	9.0	9					Margaret T. Disney
Maquoketa (near)	Jackson	692	38	34.1	+ 0.6	56	25	13	30	34	2.30	- 0.02	2.00	12.5	6	11	7	13	n.w.	John Strodthoff
Muscatine	Muscatine	546	85								2.51	+ 0.09	1.15	12.0	9					William Molis
Olin	Jones	750	33	34.8	+ 0.3	56	25	8	30	36	1.50	- 0.76	1.40	15.0	2	12	7	12	n.w.	Mrs. L. Stingley
Tipton (near)	Cedar	806	39	34.7	- 0.8	55	13†	15	4†	31	1.96	- 0.63	1.20	15.5	6	5	9	17	n.	John Kroepfen
Williamsburg	Iowa	805	15	36.0		57	21	16	4	33	2.35	+ 0.21	1.31	12.4	8	16	9	6	n.w.	Dr. F. C. Schadt
Means and extremes				35.4	+ 0.2	59	21	8	30	38	2.13	- 0.27	2.00	12.8	7	10	7	14	n.w.	
<i>Southwest District</i>																				
Atlantic	Cass	1,110	44	35.3	- 0.7	59	13	10	2	41	1.63	+ 0.04	0.65	12.4	9	10	11	10	n.w.	Roy L. Fancolly
Bedford	Taylor	1,200	27								1.92	+ 0.10	0.85	10.3	9	11	4	16	n.w.	Arthur L. Bishop
Clarinda	Page	1,009	59	36.0	- 2.1	56	13†	13	2	35	1.74	+ 0.02	0.80	13.0	8	13	13	5	se.	Dr. H. C. Hawley
Corning	Adams	1,287	43	35.1	- 0.8	58	13	15	4	33	2.74	+ 0.81	1.00	10.0	7	7	11	13	s.	W. S. Wagner
Cumberland (near)	Cass	1,225	32								1.55	+ 0.01	0.75	9.0	8	10	10	11	n.w.	Carl E. Pollock
Glenwood	Mills	1,100	41	35.8	- 2.1	58	22	14	2†	36	1.50	+ 0.16	0.60	12.0	8	12	9	10	se.	Dr. George Mogridge
Greenfield	Adair	1,368	35								1.51	- 0.10	0.70	12.0	5	8	14	9	n.w.	P. C. Cornell
Lenox	Taylor	1,250	36	35.8	- 0.8	60	13	14	2	35	1.68	+ 0.14	0.60	13.1	8	12	6	13	n.w.	W. L. Hurley
Oakland	Pottawattamie	1,139	18	36.1	- 0.1	57	5†	12	2	38	1.63	+ 0.16	0.60	15.0	6	7	8	16	n.w.	J. S. Matthews
Red Oak (near)	Montgomery	1,030	24								1.47	- 0.13	0.40	12.5	9	10	9	12	n.w.	B. R. Bridge
Riverton (near)	Fremont	920	5								1.60	0.00	1.35	14.0	6	9	3	19	n.w.	George C. Rader
Thurman	Fremont	960	44	36.1	- 1.6	57	13†	11	2†	38	1.35	- 0.13	0.50	10.0	7	12	3	16	n.	H. H. Askew
Omaha, Neb.		1,105	66	36.4	- 0.6	56	22	20	9	28	1.15	- 0.22	0.48	8.9	10	11	6	14	n.w.	U. S. Weather Bureau
Means and extremes				35.9	- 1.1	60	13	10	2	41	1.65	+ 0.07	1.35	11.7	8	10	8	13	n.w.	
<i>South Central District</i>																				
Afton	Union	1,212	50	35.6	- 0.9	59	13	15	16	31	2.51	+ 0.62	0.60	17.0	9	12	13	6	ne.	S. R. Brown
Albia	Monroe	949	40	35.5	- 0.7	60	13	14	4	31	3.68	+ 1.72	1.10	29.5	8	9	6	16	n.w.	J. M. Stevenson
Centerville	Appanoose	1,013	38	35.9	- 2.0	57	13	16	4	30	3.53	+ 1.60	1.30	34.4	8	13	7	11	se.	Thomas Wood, Jr.
Chariton (near)	Lucas	1,042	37	34.4	- 1.6	57	13	14	4	30	1.53	- 0.21	0.43	10.0	6	6	15	10	sw.	C. C. Burr
Corydon (near)	Wayne	1,050	47	34.7	- 1.9	56	13†	16	4†	29	2.15	+ 0.14	0.64	16.3	8	9	8	14	n.w.	J. C. Davis
Creston	Union	1,291	30	34.6	- 1.0	60	13	15	2†	33	1.45	- 0.01	0.37	10.6	10	12	7	12	n.	Mrs. N. Spangler
Earlham (near)	Madison	1,226	34	34.0	- 1.0	60	13	10	16	36	1.56	- 0.15	0.45	10.0	7	12	8	11	n.w.	George Phillips
Indianola	Warren	972	50	36.2	- 0.1	60	13	15	16	33	2.01	+ 0.38	0.45	14.3	7	7	11	13	se.	Seth F. Shenton
Knoxville	Marion	920	41	35.5	- 1.1	59	13	15	4	29	2.55	+ 0.75	0.90	21.0	7	13	6	12	ne.	W. J. Casey
Lacona	Warren	824	32								2.35	+ 0.05	0.80	23.5	8	8	13	10		J. B. Alter
Lamoni	Decatur	1,123	27	34.4	- 2.5	60	13	14	4	33	1.31	- 0.56	0.45	12.3	6	15	5	11	n.w.	F. S. Parks
Melrose	Monroe	871	1								2.51	- 0.10	0.70	25.1	6	12	9	10	se.	J. M. Carr
Mt. Ayr	Ringgold	1,220	39	35.4	- 1.6	60	13	15	2†	31	2.37	+ 0.47	0.80	15.3	7	15	6	10	ne.	E. O. Gleason
Tingley	Ringgold	1,275	7	35.2	- 1.1	58	13	15	4†	33	2.98	+ 1.18	0.78	18.7	8	14	6	11	se.	James A. Verploegh
Winterset	Madison	1,118	40	35.8	- 0.4	62	13	14	16	34	1.84	+ 0.09	0.32	19.0	7	15	8	8	se.	H. S. Ely
Means and extremes				35.2	- 1.2	62	13	10	16	36	2.29	+ 0.47	1.30	18.5	7	11	9	11	se.	
<i>Southeast District</i>																				
Bonaparte (near)	Van Buren	563	44	35.0	- 2.4	57	22	16	4	28	1.53	- 0.72	0.47	9.7	7	17	1	13	n.w.	B. R. Vale
Burlington	Des Moines	541	41	37.0	- 1.9	58	13	20	4	26	2.41	- 0.10	0.67	13.0	10	11	6	14	ne.	John W. Donnelly
Columbus Junction	Louisa	595	40	35.7	- 1.3	57	13	18	4	28	2.18	+ 0.14	1.00	18.8	11	11	11	9	se.	Miss Musa Todd
Fairfield	Jefferson	780	51	34.5	- 2.2	55	23	15	10	27	4.18	+ 1.85	2.00	26.5	8	11	3	17	n.	R. M. McKenzie
Keokuk	Lee	614	60	36.7	- 2.2	58	22	21	4	26	2.18	- 0.20	0.62	15.9	9	8	7	16	n.w.	U. S. Weather Bureau
Keokuk No. 2	Lee	651	2	36.8		59	13	18	4	29	2.52		0.70	19.5	7					J. N. D. Dickinson
Keosauqua	Van Buren	639	44	36.2	- 1.7	56	13†	14	10	33	2.28	+ 0.01	0.56	17.0	6	9	9	13	n.w.	Dr. J. W. Rinabarger
Mt. Pleasant	Henry	730	55	36.2	- 1.4	57	13†	18	4	28	2.37	+ 0.17	0.58	16.0	10	12	6	13	ne.	J. H. Jericho
Oskaloosa	Mahaska	835	55	35.9	+ 0.1	59	13	16	4	29	3.61	+ 1.70	1.20	34.9	9	7	10	14	ne.	R. R. Robinson
Ottumwa	Wapello	649	44	36.1	- 2.7	58	13	16	4†	32	3.51	+ 1.54	1.68	18.3	9	8	7	16	n.w.	C. L. Mikesch
Sigourney	Keokuk	785	36	36.0	- 0.1	59	13	15	4	29	1.91	- 0.10	0.97	15.5	6	14	8	9	e.	John B. Slate
Stockport (near)	Van Buren	747	30	34.4	- 2.0	58	22	13	10	33	2.57	+ 0.40	0.60	20.0	8	12	5	14	n.	C. L. Beswick
Washington	Washington	757	56	36.0	- 0.5	58	22	17	4	30	3.23	+ 1.04	1.12	20.0	9	13	5	13	n.w.	D. D. Sherman
Wever	Lee	552	3																	H. D. Liddle
Means and extremes				35.8	- 1.5	59	13	13	10	33	2.65	+ 0.46	2.00	18.9	8	11	7	13	n.w.	
State means and extremes				34.9	+ 0.3	64	13	5	30	47	1.88	- 0.08	2.00	10.3	6	11	8	12	n.w.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

much benefited by the snows. Considerable garden and flower planting had been done. Fruits, shrubs and early flowers were somewhat retarded by the snow and cool weather which occurred during the closing week.

Building operations were carried on with very little interruption because of weather conditions.

The water supply in general continued seriously defi-

cient, and the subsoil dry to a depth of 8 to 10 feet in much of southern and western Iowa.

N. G. R.

TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 104 stations, was 34.9°, or 0.3° above normal. The greatest district excess, 2.1°, was in the northwest and north-central districts; and the

Daily Precipitation for March, 1931

Stations	Drainage Basin	Day of Month																															Totals			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
<i>Northwest District</i>																																				
Akron.....	Big Sioux.....			T.		T.															.07			.07	.15		.17	.16	T.				0.62			
Alta.....	Raccoon.....					T.															.18	.02		.41	.58		.02	.29				1.53				
Alton.....	Floyd.....					T.															.04			.02	.05		.02	.02				0.15				
Cherokee.....	Little Sioux.....		T.			T.															.08	.07		.02	.38		T.	.01	.02			0.61				
Estherville.....	Des Moines.....																				.12	.10		.15	.40			.15	.07			1.29				
Hawarden.....	Big Sioux.....					T.							T.								.03			.11	.26		.17	.03	.02			0.62				
Inwood (near).....	Big Sioux.....																				.06	T.		.09	.04		.10	.07	.05			0.41				
Lake Park (near).....	Little Sioux.....																																			
Le Mars.....	Floyd.....					.01																.10			.03	.33		.07	.13	T.			0.67			
Marathon.....	Raccoon.....																					.07	T.		.30	.27		.13	.08				0.85			
Pocahontas.....	Des Moines.....													.02								.09	T.		.40	.20		T.	.32	.15			1.18			
Rock Rapids.....	Big Sioux.....																				.10			.03	.12		.10	.12	.02				0.49			
Sanborn.....	Floyd.....																				.15	.03		.06	.12			.15					0.51			
Sheldon.....	Floyd.....		T.						T.												.07	T.		.08	.17		.01	.13	.04				0.50			
Sioux Center.....	Floyd.....					.05																		.32				.15					0.52			
Spencer.....	Little Sioux.....																					.10	.03	.26	.46			.07	.05				0.97			
Storm Lake.....	Raccoon.....					T.															.09	T.		.42	.46		.02	.15	.04			T.	1.18			
Washta.....	Little Sioux.....					T.															.15			T.	.24		T.	T.	.28				0.67			
West Bend.....	Des Moines.....														T.							.08	.01		.52	.12		T.	.12	.02				0.87		
<i>North Central District</i>																																				
Algona.....	Des Moines.....																					.08			.52	.18			.24	T.			1.02			
Allison (near).....	Cedar.....																							.01				.25	.60					0.86		
Belmond.....	Iowa.....																							T.	.57	.30		T.	.09	.13				1.09		
Britt.....	Iowa.....																							.08	.53	.42			.20	.24				1.47		
Charles City***.....	Cedar.....														T.	T.									.38	.22			.54	.29				1.43		
Forest City.....	Cedar.....														T.									.08				.35						1.43		
Hampton.....	Cedar.....																								.43	.16								1.01		
Humboldt.....	Des Moines.....														T.	T.								.23	.28			.14						0.68		
Mason City.....	Cedar.....														T.	T.	T.								.32	.54			.36	.29				1.51		
Northwood.....	Cedar.....														T.	T.									.32	.54			.40	.30	T.			1.63		
Osage.....	Cedar.....																									.50			.40	.30				1.20		
<i>Northeast District</i>																																				
Cedar Falls.....	Cedar.....				T.																				.10	.46		.49		.98				2.04		
Decorah.....	Mississippi.....													.06	T.										.35	.02			.26	1.65				2.34		
Delaware (near).....	Maquoketa.....																								.09	.21			.28	1.18				2.01		
Dubuque***.....	Mississippi.....							.04	T.						T.	T.	.01		.02	.06					.04	.11		.03	.85	1.04				2.20		
Fayette.....	Mississippi.....																								.12	.33			.40	.50				1.38		
Independence.....	Wapsipicon.....																									.18	.13			.14	.35				0.80	
Lansing  .....	Mississippi.....					T.											.09	.06								.67	.25		.33	.94	T.			2.38		
New Hampton.....	Wapsipicon.....																									.10	.40			.75	.75				2.00	
Oelwein.....	Wapsipicon.....																								.10	.35			.40	.60				1.45		
Postville (near).....	Mississippi.....																								.15	.20			.30	.90				1.60		
Waterloo.....	Cedar.....																									.15	.35			.45	.85				1.80	
Waverly.....	Cedar.....																									.16	.53			.92	.96				2.57	
<i>West Central District</i>																																				
Audubon (near).....	Nishnabotna.....				.35	.20																				.17		.22	.25		.02	.20	.20	T.		1.61
Carroll.....	Raccoon.....				T.	T.																			.08	T.		.25	.23		.31	.05			0.92	
Denison.....	Missouri.....				T.	T.																			.16	T.		.23	.26		.03	.20	.12			1.00
Guthrie Center.....	Raccoon.....					.15	.05																		.10		.12	.29		.02	.40	.20				1.33
Harlan.....	Nishnabotna.....					.19	.10																		.10	T.		.27	.21		.01	.13	.11			1.18
Jefferson.....	Raccoon.....				T.	T.																				.01	.02		.28	.23		T.	.31	.10		0.95
Little Sioux.....	Little Sioux.....				.38																				.17	.01		.21	.12		.03	.21		.08		1.21
Logan.....	Missouri.....				.20	.18																			.15		.08	.15		T.	.16	.07				0.99
Onawa.....	Missouri.....				.08																					.05	T.		T.	.30	.05			T.	0.78	
Rockwell City.....	Raccoon.....																									.30	.21			.40	.60				1.51	
Sac City.....	Raccoon.....																								.12	T.		.45	.43		T.	.25	.10			1.35
Sioux City***.....	Missouri.....			T.		.01			T.																.06	T.	T.	.13	.08		.09	.29	.01			0.67
<i>Central District</i>																																				
Ames.....	Skunk.....																										.70	.20			.19	.09			1.18	
Baxter.....	Skunk.....																										.35	.15	.50						1.00	
Boone (near).....	Des Moines.....				T.	T.	.03	.04																		.37	.32			.86	.27				1.82	
Des Moines***.....	Des Moines.....				T.	T.																					.38	.27		.10	.51	.08				1.52
Fort Dodge.....	Des Moines.....																									.40	.21			.18	.21				1.03	
Grinnell.....	Iowa.....				.02				.02																		.12	.32			.29	.34				1.11
Grundy Center.....	Cedar.....																									.15	.30			.75	.75				1.95	
Iowa Falls.....	Iowa.....																									.48	.45			.48	.32				1.73	
Marshalltown.....	Iowa.....																									.10	.21			.24	1.29				1.84	
Monroe.....	Des Moines.....				.11	.07																				.08	.24			.26	.75				1.51	
Perry.....	Raccoon.....					.01	T.																				.26	.08			.21	.30				0.86
Toledo.....	Iowa.....					T.			T.																											

Daily Precipitation for March, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Southwest District</i>																																			
Atlantic	Nishnabotna				.65	.31	.15														.08	.01		.10	.13		.17	.03					T.	1.63	
Bedford	102				.08	.15	.85	T.													.04	T.		.25	.04		.36	.05					.10	1.92	
Clarinda	Nodaway					.50	.80														.03			.33	.02		.03	.02					.01	1.74	
Corning	Nodaway				.25	.25	1.00														T.			.21	.19		T.	.67	.11				.06	2.74	
Cumberl'nd (near)	Nodaway				.75	.15	1.00														.08			.09	.10		T.	.25	.12				.01	1.55	
Glenwood	Missouri				.10	.30	.60														.05			.16			T.	.20	.05				.04	1.50	
Greenfield	Nodaway				.70	.20															.04			.27	T.		.30							1.51	
Lenox	Missouri				.15	.60	.30														T.	.02		.25	.05		.25						.06	1.68	
Oakland	Nishnabotna				.60	.10	.30														.10			.22	.08		T.	.33						1.63	
Red Oak (near)	Nishnabotna		T.		.08	.24	.40														.12	.03		.14			T.	.30	.14				.02	1.47	
Riverton (near)	Nishnabotna					.46	.89														.05			.10			T.	.08	T.				.02	1.60	
Thurman	Missouri					.40	.50														.06			.10			T.	.22	.10				.03	1.35	
Omaha, Neb.***	Missouri		T.	T.	.44	.08	.06														.03	T.	T.	.14			.09	.23	.02		.04	.02		1.15	
<i>South Central District</i>																																			
Afton	Grand				.60	.50	.22																.02		.28	.14		.53	.16	.06				2.51	
Albia	Des Moines	.38			.35	.82	.30	.10																	.13			.50	1.10					3.68	
Centerville	Chariton	T.			.60	.50	1.30	.12																.10	.05		T.	.27	.59					3.53	
Chariton (near)	Chariton	T.			.43	.20	.10																	T.	.24			.38	.18					1.53	
Corydon (near)	Chariton	T.			.24	.12	.64	.10																T.	.08	.09		.30	.58				T.	2.15	
Creston	Missouri				.12	.13	.13																.03	.01		.37	.20		.24	.16			.06	1.45	
Earlham (near)	Des Moines				.20	.30	.10																T.	T.	.45	.11		.20	.20					1.56	
Indianola	Des Moines				.23	.35	.25																	T.	.25	.18		.45	.30					2.01	
Knoxville	Des Moines				.40	.30	.20																		T.	.07	.18		T.	.90	.50			2.55	
Lacona	Des Moines				.40	.40	.40						.05												.10	.20		.40	.40					2.35	
Lamoni	Grand				.15	.35	.25																	T.		.09	T.		.45	T.			.02	1.31	
Melrose	Des Moines				.40	.60	.50																		T.	.01		.30	.70					2.51	
Mt. Ayr	Grand				.35	.80																			.26	.08		.50	.31	.07				2.37	
Tingley	Platte				.57	.42	.78																	T.	.23	.13		T.	.72	.09			.04	2.98	
Winterset	Des Moines				.32	.24	.24																		.29	.24		.27	.24					1.84	
<i>Southeast District</i>																																			
Bonaparte (near)	Des Moines	T.			.19	.25	.21	.02																				.47	.33					1.53	
Burlington	Mississippi	.02			.37	.31	.21	.06						.02													T.	.14						2.41	
Columbus Junction	Iowa				.28	.04	.23	.10						.03												.02	.22	.01		.18	1.00			2.18	
Fairfield	Skunk				.30	.60	.70																			.05	.13	.02		.38	2.00			4.18	
Keokuk***	Mississippi	T.			.30	.14	.53	.08																		T.	.06		.20	.60	.26			2.18	
Keokuk No. 2	Mississippi	T.			.27	.40	.31	.11																			T.	.08		.70	.65			2.52	
Keosauqua	Des Moines				.30	.40	.50																				.02		.50	.50				2.28	
Mt. Pleasant	Skunk				.26	.31	.30	.08																		.03	.14		.01	.14				2.37	
Oskaloosa	Des Moines	.02			.24	.74	.30	.20																		T.	.23	.26		.42	1.20			3.61	
Ottumwa	Des Moines				.11	.99	.29	.01																			T.	.06	.09		.26	1.68			3.51
Sigourney	Skunk	T.			.19		.13																					.12	.15					1.91	
Stockport (near)	Skunk				.50	.60	.40	.15																			.03	.08		.33	.48			2.57	
Washington	Skunk				.28	.45	.70	.05																				.04	.15		.42	1.12			3.23
Wever	Mississippi																																		1.91

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

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

\*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.

\*Interpolated.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind				Sunshine				
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum						
					7 A. M.	12 Noon†	7 P. M.	Lowest			Date	Miles		From	Date		
																% possible	Departure from normal
Chas. City	30.09	30.46	15	29.37	24	81	53	61	27	10†	4,962	6.7	24	nw.	8	52	- 5
Davenport	30.03	30.36	16	29.40	24	80	59	61	24	11	7,519	10.2	36	ne.	7	43	-12
Des Moines	30.06	30.48	15	29.41	24	79	55	53	23	15	7,420	10.0	33	n.	7	51	- 6
Dubuque	30.05	30.40	15	29.37	21	83	60	65	27	9	5,005	6.7	25	ne.	7	38	-14
Keokuk	30.04	30.40	15	29.44	7	80	60	61	26	3	5,681	7.6	27	nw.	21	54	- 5
Sioux City	30.09	30.58	15	29.42	23	76	53	53	21	15	8,875	11.9	38	nw.	24	49	- 9
Omaha, Nb	30.08	30.55	15	29.49	23	73	55	55	24	15†	6,742	9.1	32	nw.	21	58	0
Means and extremes	30.06					79	57	58				8.9				49	- 8
Normals and records	30.04	30.58	15	29.37	24				21	15			38	nw.	24		
		\$30.82	1921	*28.79	1924				80	67			18th			16th	57
									*5	1918			\$53	w.	1920		

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

|||January 1, 1928, 3-cup anemometers replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

southeast district had the greatest district deficiency, 1.5°. The highest monthly mean temperature was 37.0° at Burlington, and the least was 30.4° at Decorah. The absolute range for the State was 59°, from 64° at Baxter on the 13th, to 5° at Decorah on the 30th. The average number of days with the maximum temperature 32° or lower, was 1, ranging from 8 days at Postville (near), to none at 52 stations. The average number of days with the minimum

temperature 32° or lower, was 27, ranging from 31 days at Forest City, to 19 days at Keokuk. Zero temperatures were not recorded by any of the cooperative stations in the State. The greatest daily range in temperature at any station was 47° at Washta on the 16th.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 120 stations, was 1.68 inches, or 0.08 inch below normal. The greatest district deficiency was in the northwest district, 0.54 inch, and the south-central district had the greatest district excess, 0.47 inch. The northeast district averaged exactly normal in precipitation. The greatest precipitation deficiency for any one station was at Clinton, 1.30 inches, and the greatest excess was at Fairfield, 1.85 inches. The greatest amount at a single station was 4.18 inches at Fairfield, and the least was 0.15 inch at Alton. The greatest amount occurring in 24 consecutive hours was 2.00 inches at Maquoketa (near), and Fairfield, on the 28th. The average number of days with 0.01 inch or more of precipitation for the State was 6, ranging from 8 days in the southwest and southeast districts, to 4 days in the north-central district. For individual stations the range was from 11 days at Davenport and Columbus Junction, to 2 days at Olin.

SNOWFALL

The average snowfall for the State was 10.3 inches, or 4.9 inches above normal. The greatest total snowfall at any one station for March was 34.9 inches at Oskaloosa, and the least, 0.5 inch at Alton. The greatest snowfall in 24 consecutive hours was 14.5 inches at Belle Plaine on the 28th. The greatest number of days with 0.1 inch or more of snow on the ground was 14 days at Lacona. The greatest depth of snow on the ground at any time was 16.5 inches at Belle Plaine on the 28th.

Daily Maximum and Minimum Temperature for the Month of March, 1931

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Mean	
<b>Northern Division</b>																																	
Algona.....	(Maximum.....)	33	41	34	38	31	40	36	38	44	49	55	50	49	40	38	47	51	44	50	39	40	46	43	43	53	45	40	32	39	42	46	42.5
	(Minimum.....)	16	18	20	15	23	22	23	19	17	26	25	32	34	31	13	12	28	26	31	29	33	30	30	31	26	24	26	21	20	22	22	24.4
Alta.....	(Maximum.....)	35	45	35	40	33	41	37	38	48	51	55	52	49	42	41	53	57	44	52	37	40	57	45	37	55	42	38	35	41	46	49	41.2
	(Minimum.....)	16	15	20	13	23	24	24	20	13	28	24	33	31	23	13	13	29	28	31	30	33	31	37	30	23	34	23	19	18	23	30	24.3
Alton.....	(Maximum.....)	40	46	39	38	34	40	38	39	46	53	55	58	54	48	46	53	54	50	52	44	43	58	52	44	55	48	41	38	46	48	52	46.8
	(Minimum.....)	17	10	20	10	23	24	25	20	13	27	21	31	28	21	15	10	33	26	22	32	36	33	38	31	21	37	23	19	18	21	29	23.8
Belmond.....	(Maximum.....)	36	41	35	39	35	41	35	39	45	48	55	51	52	43	40	46	48	44	48	41	45	43	44	43	51	48	40	32	38	41	41	43.0
	(Minimum.....)	16	15	20	12	22	25	24	19	18	24	18	29	34	24	17	10	25	25	32	28	33	30	31	32	26	33	26	22	20	20	28	23.8
Charles City*.....	(Maximum.....)	31	39	32	37	35	40	31	40	43	46	53	50	47	36	36	45	46	40	44	44	50	43	48	43	51	46	34	28	39	43	45	41.6
	(Minimum.....)	17	20	20	15	24	25	25	21	22	25	19	29	36	28	22	26	31	30	32	35	30	33	29	31	25	23	21	21	30	25	25.9	
Decorah.....	(Maximum.....)	32	38	32	33	35	40	30	39	40	44	48	52	44	36	33	42	42	42	42	45	51	45	48	42	51	47	45	32	35	42	47	41.1
	(Minimum.....)	12	17	20	12	20	22	21	22	19	18	11	17	32	29	19	20	22	30	25	28	30	31	34	32	27	28	25	21	18	5	15	22.0
Dubuque*.....	(Maximum.....)	34	40	36	33	37	39	31	38	41	42	46	52	42	36	34	39	44	41	40	41	51	51	44	53	42	34	33	38	40	42	41.0	
	(Minimum.....)	20	23	24	20	26	28	24	24	26	26	21	25	36	34	25	25	26	35	33	29	36	37	34	38	34	31	27	26	25	21	22	27.8
Forest City.....	(Maximum.....)	33	43	34	39	31	41	35	38	44	47	56	50	47	45	38	45	46	45	47	47	47	42	42	43	45	52	47	41	32	38	42	42.6
	(Minimum.....)	23	18	17	12	19	20	20	16	14	23	19	27	32	29	15	11	24	24	30	27	31	17	27	30	24	32	25	20	18	18	28	22.3
Independence.....	(Maximum.....)	34	39	34	37	37	40	37	40	44	45	49	51	50	44	35	44	45	46	45	41	51	51	52	43	53	50	41	34	35	37	40	42.8
	(Minimum.....)	19	30	22	16	25	28	25	24	22	24	20	24	35	33	24	22	23	33	29	31	30	31	33	33	30	31	29	23	20	19	25	26.2
Inwood (near).....	(Maximum.....)	37	45	38	35	33	41	39	39	43	48	53	56	51	47	41	50	57	45	45	48	41	57	48	44	54	44	31	32	37	42	46	44.7
	(Minimum.....)	13	10	20	6	23	21	22	20	7	24	20	33	24	19	11	11	28	24	19	32	34	31	33	30	19	31	21	16	15	17	28	21.4
Lake Park (near).....	(Maximum.....)	34	40	34	34	31	40	37	31	44	49	55	49	45	38	38	51	54	46	47	40	39	52	45	40	51	42	44	30	37	45	46	42.2
	(Minimum.....)	12	12	18	12	20	12	21	18	13	29	24	31	32	25	10	9	14	26	31	30	33	29	39	23	27	34	24	17	16	24	29	22.4
Mason City.....	(Maximum.....)	33	37	34	37	34	40	32	40	44	47	53	49	50	40	37	43	45	43	46	41	43	41	45	41	53	46	39	30	37	42	44	41.5
	(Minimum.....)	15	18	19	12	21	22	21	22	17	23	16	26	33	32	19	12	24	25	29	27	31	30	26	32	26	30	27	21	19	17	27	23.2
New Hampton.....	(Maximum.....)	34	41	35	35	35	42	34	43	45	48	52	49	45	38	36	44	45	43	43	42	54	41	48	44	55	48	40	34	40	42	41	42.5
	(Minimum.....)	15	18	19	11	22	23	23	23	19	21	18	24	34	30	22	20	21	30	27	30	30	32	28	32	26	29	27	22	20	19	25	23.9
Northwood.....	(Maximum.....)	33	37	33	37	33	40	33	38	42	48	53	49	48	34	36	45	46	41	45	38	45	39	41	41	52	45	37	34	38	43	46	41.1
	(Minimum.....)	15	18	18	14	19	20	21	19	17	22	19	23	34	30	17	16	23	27	28	25	28	28	31	32	25	32	25	20	20	20	29	23.1
Pocahontas.....	(Maximum.....)	36	43	34	39	34	42	37	38	47	49	55	50	56	40	40	50	55	46	51	38	41	51	45	41	53	46	39	31	40	45	47	44.0
	(Minimum.....)	16	15	20	14	25	25	25	20	17	23	21	28	33	26	14	19	27	27	32	32	33	31	39	30	29	34	26	20	24	22	29	25.0
Postville (near).....	(Maximum.....)	31	31	33	31	32	31	29	36	38	40	44	50	41	35	31	40	40	40	36	40	52	47	40	37	48	43	35	28	33	38	41	37.8
	(Minimum.....)	16	17	20	15	22	24	23	23	21	19	16	24	34	31	22	22	23	31	27	30	26	27	31	35	28	28	26	23	18	16	18	23.7
Rock Rapids.....	(Maximum.....)	41	44	36	41	43	40	37	39	45	50	55	56	55	43	42	52	56	55	51	49	55	60	52	42	55	50	32	32	41	46	50	46.6
	(Minimum.....)	14	9	18	9	22	22	22	20	11	25	20	30	25	20	12	9	33	25	21	32	35	32	35	30	20	32	20	17	16	19	27	22.0
<b>Central Division</b>																																	
Ames.....	(Maximum.....)	39	44	42	39	38	42	36	41	47	46	48	54	50	58	52	43	47	51	49	50	54	50	47	45	53	47	42	32	40	41	43	45.5
	(Minimum.....)	20	19	22	17	29	28	26	22	21	28	25	21	29	35	32	18	13	25	27	31	29	33	30	33	28	35	29	24	22	25	30	26.0
Belle Plaine.....	(Maximum.....)	38	42	39	42	37	40	34	42	49	48	54	52	57	46	52	47	46	51	48	48	56	51	53	47	57	47	40	39	40	43	45.6	
	(Minimum.....)	23	19	19	13	27	30	25	24	23	23	19	25	35	34	23	16	26	32	34	31	29	29	30	34	28	33	30	23	18	16	23	25.6
Carroll.....	(Maximum.....)	38	43	39	37	35	39	36	38	46	47	53	55	55	41	43	47	56	50	48	42	42	53	50	40	52	46	40	33	39	45	44	44.4
	(Minimum.....)	20	16	22	14	15	25	25	21	16	24	24	33	31	26	15	12	16	27	32	29	33	32	39	30	25	31	26	20	19	25	29	24.4
Cedar Rapids.....	(Maximum.....)	40	44	39	41	39	44	34	43	48	50	55	52	51	44	40	48	47	49	47	47	59	53	53	45	57	47	39	34	38	44	45	45.8
	(Minimum.....)	19	18	21	17	28	30	27	23	24	26	17	21	36	35	26	19	23	35	34	29	30	33	31	36	30	32	31	25	20	12	23	26.2
Davenport*.....	(Maximum.....)	39	43	41	38	35	37	31	38	41	46	50	52	55	41	36	42	48	43	40	45	53	56	54	46	55	40	36	33	36	42	43	43.2
	(Minimum.....)	25	23	21	20	29	31	26	24	26	25	26	29	33	33	29	25	28	37	35	32	36	33	37	38	34	32	33	26	23	24	28	29.2
Des Moines*.....	(Maximum.....)	40	45	40	40	34	39	34	41	48	44	52	51	59	42	41	46	52	48	44	47	54	50	48	40	54	48	33	33	39	41	42	44.3
	(Minimum.....)	26	20	23	20	30	28	26	24	22	28	21	32	35	30	21	17	28	30	35	32	31	32	36	34	30	33	28	24	23	26	31	27.7
Ft. Dodge.....	(Maximum.....)	35	43	36	40	35	41	37	39	46	49	55	49	57	50	41	48	54	54	50	44	41	49	44	41	54	46	41	34	42	43	45	41.1
	(Minimum.....)	17	15	20	15	25	21	26	19	17	29	23	33	35	28	16	10	28	21	33	29	34	36	40	32	25	35	26	21</				

## RIVERS

Record low stages prevailed on nearly all the interior streams, with little fluctuation. At Des Moines the extreme stages were 1.1 feet and 0.6 foot, and averaged 0.9 foot, or 3.6 feet below normal.

The Missouri River averaged more than 1 foot below normal along the Iowa boundary, with little fluctuation.

Extremely low stages prevailed on the Mississippi River along the Iowa boundary. At Dubuque the average stage was 1.9 feet. A lower average in March has been recorded only once in the history of the station, that being in 1896. At Davenport the extreme stages were 2.0 feet and 1.4 feet, and averaged 1.5 feet, or 4.0 feet below normal. The river readings at Keokuk averaged slightly below the zero of the gage. On the 7th the gage reading was -2.3 feet, which was a remarkably low stage.

## MISCELLANEOUS PHENOMENA

*Birds* (migration of): Boone; wild ducks on 16th, meadow larks on 21st, crow blackbirds on 30th. Webster City; bluebirds on 11th. Earlham; meadow larks on 18th, wild ducks on 19th, blackbirds on 21st. Oskaloosa; meadow larks on 9th.

*Corona*, lunar: 1st.

*Dust storm*: 3d, 4th, 5th, 6th, 7th, 8th, 12th.

*Fog*, dense: 14th, 18th, 21st.

*Fog*, light: 11th, 14th, 18th, 21st.

*Frost*, heavy: 1st, 2d, 3d, 4th, 9th, 11th, 18th, 19th, 25th, 29th, 30th, 31st.

*Frost*, killing: 25th, 30th, 31st.

*Gales*: 3d, 7th, 8th, 12th, 15th, 24th, 27th, 28th.

*Hoar Frost*: 2d.

*Halo*, lunar: 1st, 2d, 3d, 4th, 8th, 25th, 29th, 30th, 31st.

*Halo*, solar: 4th, 10th, 12th, 16th, 17th, 25th, 29th, 31st.

*Haze*: 3d, 8th, 11th, 13th, 15th, 17th, 18th, 21st.

*Parhelia*: 9th, 22d, 30th, 31st.

*Rainbow*: 25th.

*Sleet*: 5th, 27th, 28th.

*Smog*, dense (mixture of smoke and fog): 11th.

*Snow*: 1st, 2d, 5th, 6th, 7th, 8th, 13th, 20th, 21st, 23d, 24th, 26th, 27th, 28th.

## ERRATA

Report for March, 1930. Page 18, Sioux City; monthly mean temperature published 36.2°, should be 36.4°. Temperature departure from normal published +3.5°, should be +3.7°. Page 22, Sioux City; maximum temperature on 31st published 38°, should be 46°. Monthly mean maximum temperature published 46.9°, should be 47.2°.

Report for January, 1931. Page 2, Humboldt; date of minimum temperature published 18th, should be 14th. Page 3, Earlham; maximum temperature and date published 57° on 29th, should be 58° on 28th. Page 3, Columbus Junction; prevailing wind direction published NW, should be SW.

Report for February, 1931. Page 11, Stockport; monthly mean temperature published 35.8°, should be 35.6°. Temperature departure from normal published +10.1°, should be +9.9°. Greatest daily range in temperature published 33°, should be 36°.

## SNOWSTORM OF MARCH 26th-28th, 1931

BY L. WALTER DICK

(Weather Bureau Office, Dubuque, Iowa)

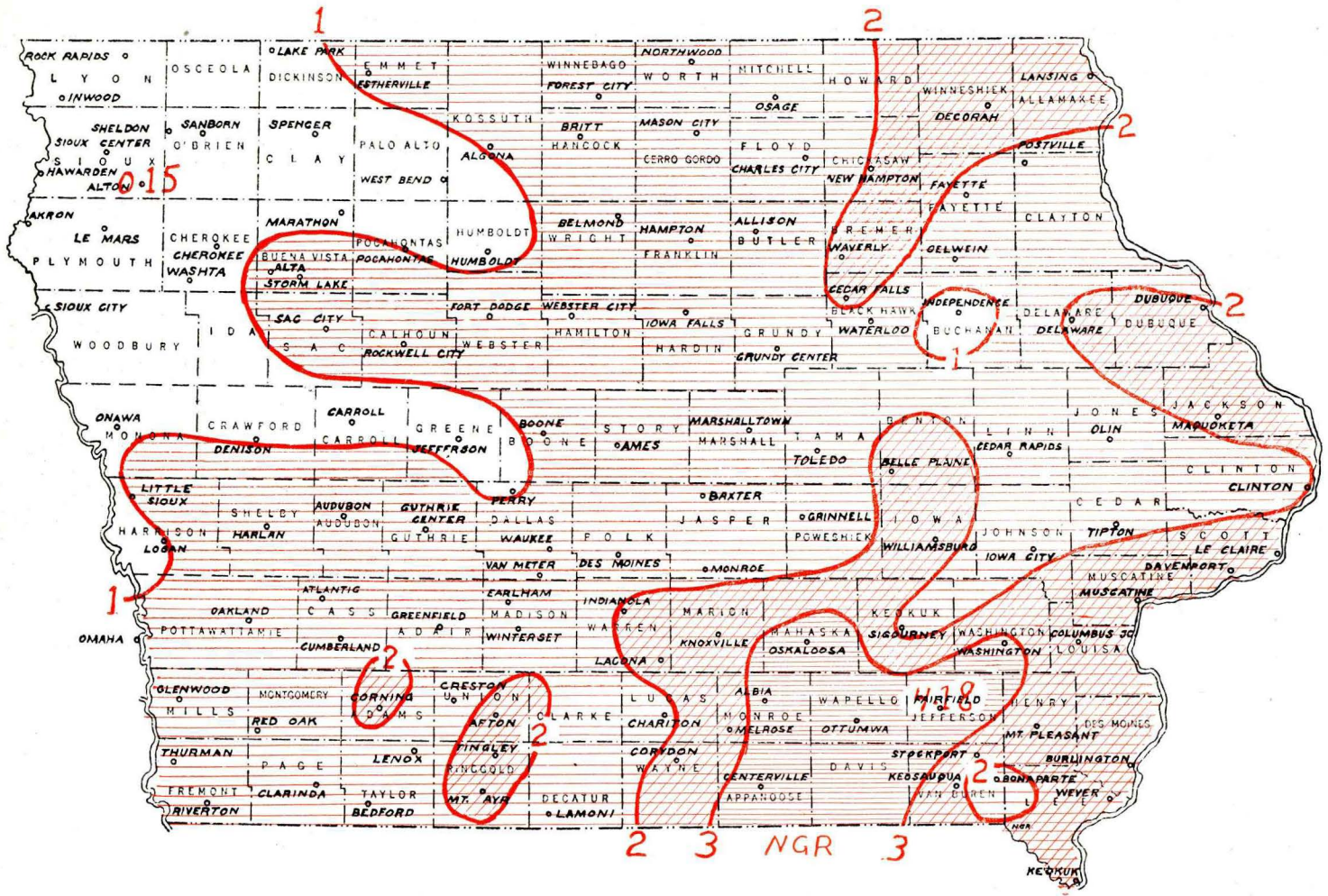
The snowstorm which occurred in and around Dubuque on March 26th-28th, 1931, was of considerable importance. Moist snow began falling at 10:50 p. m. on March 26th, and fell continuously, but in varying intensity, until 11:10 a. m. of the 28th. Another snow flurry occurred between 1:12 p. m. and 2:02 p. m. of the 28th. By 7:00 a. m. on the 27th there was a depth of 2.7 inches of snow on the ground. All of this, together with that which fell in the meanwhile, melted down so that by 2:00 p. m. (27th), only 0.2 inch of snow remained on the ground. After that time the snow again began to accumulate, and by 7:00 p. m. the fresh fall amounted to 0.4 inch, and the depth on the ground to 0.6. During the evening of the 27th the snow became very heavy, and 13.2 inches more fell between 7:00 p. m. and 7:00 a. m. the following morning, the 28th, bringing the depth on the ground at that time to 13.8 inches. A further fall of 1.2 inches of snow occurred by 11:10 a. m. when the main storm ended, and 0.1 inch more in the afternoon flurry. Between 2:00 p. m. on the 27th and 2:00 p. m. on the 28th, the new 24-hour snowfall record discussed above was established. The greatest depth of snow on the ground at any one time was 13.8 inches, at 7:00 a. m. on the 29th, the snow which fell thereafter not increasing the depth because the earlier fall or accumulation packed down or melted down very quickly. By 7:00 p. m. of the 28th, only 10.8 inches of snow remained on the ground. Altogether 17.6 inches of snow fell in less than 40 hours in this one storm period.

The snow drifted badly, seriously hampering all traffic in the city. All highways into the city were blocked. Railroads had most of their trains running, but not on schedule. Telegraph and telephone companies had very little trouble as a result of the storm, in the area served by the local offices. The telephone company reported toll lines unaffected, and only two local lines out of order. The trouble was practically all cleared by afternoon of the 28th.

Traffic difficulties due to the snow drifts were largely eliminated within two days, the warm temperatures materially helping in reducing the snow depth.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, MARCH, 1931



SCALE OF SHADE IN INCHES





# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, APRIL, 1931 No. 4

## COMPARATIVE DATA FOR THE STATE—APRIL

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
1873.....	43.2	- 5.7	83	24	3.13	+ 0.17	5.65	1.24					
1874.....	41.9	- 7.0	76	16	1.90	- 1.06	3.15	0.65					
1875.....	43.0	- 5.9	77	10	2.20	- 0.76	4.00	0.89					
1876.....	48.1	- 0.7	78	21	3.06	+ 0.10	6.80	0.85					
1877.....	47.5	- 1.4	91	14	3.33	+ 0.37	8.61	1.10					
1878.....	52.4	+ 3.5	82	26	3.14	+ 0.18	5.87	1.32					
1879.....	50.3	+ 1.4	88	12	1.13	- 1.83	3.70	0.00					
1880.....	47.9	- 1.0	92	15	2.08	- 0.88	5.65	0.35					
1881.....	42.5	- 6.4	81	10	2.26	- 0.70	5.40	0.45					
1882.....	48.8	- 0.1	91	20	3.73	+ 0.77	8.08	1.60					
1883.....	49.9	+ 1.0	90	21	2.25	- 0.71	5.00	0.58					
1884.....	46.8	- 2.1	86	18	2.54	- 0.42	5.40	0.83					
1885.....	47.5	- 1.4	80	16	2.94	- 0.02	7.82	0.73					
1886.....	50.3	+ 1.4	88	4	2.70	- 0.26	6.90	0.70					
1887.....	51.1	+ 2.2	94	9	1.38	- 1.58	2.65	0.10					
1888.....	48.8	- 0.1	90	20	2.65	- 0.31	7.80	0.40					
1889.....	50.3	+ 1.4	86	10	2.35	- 0.61	6.03	0.25					
1890.....	51.2	+ 2.3	88	2	1.73	- 0.23	5.15	0.25					
1891.....	50.6	+ 1.7	93	13	2.15	- 0.81	5.06	0.59		8	14	7	9
1892.....	45.4	- 3.5	88	14	4.75	+ 1.79	8.38	2.13	5.7	9	8	9	13
1893.....	45.5	- 3.4	96	15	4.21	+ 1.25	8.51	1.24	6.0	10	8	9	13
1894.....	51.7	+ 2.8	93	12	3.07	+ 0.11	6.91	0.55	0.2	9	11	11	8
1895.....	54.2	+ 5.3	98	8	2.62	- 0.31	5.88	0.28	2.1	5	14	8	8
1896.....	54.5	+ 5.6	94	10	5.02	+ 2.06	9.67	2.35	4.5	11	11	10	9
1897.....	47.9	- 1.0	89	19	5.35	+ 2.39	9.86	2.22	T.	11	9	9	12
1898.....	48.1	- 0.8	91	14	2.56	- 0.40	4.82	0.27	T.	8	13	9	8
1899.....	48.9	- 0.0	89	1	2.40	- 0.56	5.76	0.56	2.0	7	12	11	7
1900.....	52.2	+ 3.3	89	19	2.67	- 0.29	6.62	0.43	0.9	6	12	9	9
1901.....	40.9	- 1.0	92	15	1.79	- 1.17	3.47	0.66	2.0	5	14	8	8
1902.....	48.2	- 0.7	96	9	1.71	- 1.25	4.15	0.40	T.	5	14	11	5
1903.....	49.8	+ 0.9	86	17	2.98	+ 0.02	6.00	0.74	0.8	9	11	9	10
1904.....	41.1	- 4.8	86	13	3.63	+ 0.67	8.97	1.52	1.4	7	15	6	9
1905.....	47.5	- 1.4	90	10	3.03	+ 0.07	5.49	0.63	1.2	8	12	8	10
1906.....	52.5	+ 3.6	94	22	2.42	- 0.54	5.55	0.53	0.6	8	14	9	7
1907.....	41.5	- 7.4	80	10	1.32	- 1.64	3.22	0.24	2.7	6	12	8	10
1908.....	50.5	+ 1.6	91	8	2.24	- 0.72	4.59	0.67	0.3	8	14	8	8
1909.....	43.8	- 5.1	86	14	4.58	+ 1.62	9.43	0.83	3.1	12	9	9	12
1910.....	52.5	+ 3.6	99	15	1.48	- 1.48	4.86	0.10	3.0	7	14	7	9
1911.....	46.7	- 2.2	86	3	3.09	+ 0.13	6.04	1.33	3.6	9	11	8	11
1912.....	49.9	+ 1.0	84	20	2.66	- 0.30	5.66	0.78	1.1	8	13	8	9
1913.....	50.2	+ 1.3	88	16	3.28	- 0.32	7.43	1.12	2.7	9	15	5	10
1914.....	48.6	- 0.3	88	11	2.52	- 0.44	5.63	0.37	0.3	8	10	8	12
1915.....	57.2	+ 8.3	95	18	1.41	- 1.55	1.02	0.05	T.	7	15	10	5
1916.....	47.1	- 1.8	90	11	2.62	- 0.34	5.92	1.13	1.1	10	10	9	11
1917.....	45.5	- 3.4	88	17	4.55	+ 1.59	7.81	2.05	3.8	11	9	7	14
1918.....	44.8	- 4.1	79	12	2.32	- 0.64	4.20	1.01	3.5	9	12	8	10
1919.....	48.4	- 0.5	81	20	4.78	+ 1.82	9.00	1.94	0.7	14	8	8	11
1920.....	42.4	- 6.5	78	22	4.59	+ 1.63	7.13	1.93	2.0	12	8	9	13
1921.....	52.4	+ 3.5	88	14	3.34	+ 0.38	6.69	0.99	3.6	10	13	7	10
1922.....	49.9	+ 1.0	87	21	3.06	+ 0.10	6.70	1.04	1.0	9	11	9	10
1923.....	48.4	- 0.5	85	11	2.09	- 0.87	4.26	0.47	0.8	8	15	7	8
1924.....	50.5	+ 1.6	90	8	1.38	- 1.58	4.53	0.38	1.4	7	16	8	6
1925.....	56.5	+ 7.6	95	21	2.20	- 0.76	5.34	0.71	T.	8	14	9	7
1926.....	46.1	- 2.8	95	9	0.91	- 2.05	2.29	0.06	1.5	4	16	7	7
1927.....	49.2	+ 0.3	91	15	4.84	+ 1.88	9.06	2.09	2.6	11	9	7	14
1928.....	41.3	- 4.6	88	6	2.24	- 0.72	4.37	0.22	4.9	8	12	9	9
1929.....	51.2	+ 2.3	93	9	1.62	+ 1.66	7.97	1.81	1.1	11	12	8	10
1930.....	52.1	+ 3.2	96	5	2.67	- 0.29	4.59	1.05	0.3	9	14	7	9
1931.....	50.9	+ 2.0	92	17	2.29	- 0.67	5.04	0.82	0.1	8	16	6	8
Normals.....	48.9		88	14	2.96		6.02	0.86	1.9	9	12	8	10
Highest.....	57.2		99	26	5.35		9.86	2.13	6.0	11	16	11	14
Lowest.....	41.5		76	8	0.91		2.29	0.00	T.	4	8	5	5

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

### GENERAL SUMMARY

Nearly normal weather prevailed in April. Temperature fluctuations were quite frequent with no outstanding extremes. The maximum temperature, 92° at Estherville, was recorded by one of the most northerly stations of the State, which was very unusual.

Excepting the southeastern portion, the entire State was deficient in precipitation. Moisture was still needed throughout April. The subsoil continued very dry. Snowfall was very light and averaged approximately 5% of normal.

The cool weather during the third week of April, and the killing frosts which occurred, did much damage to vegetation. Fruit and truck were damaged and grapes on lowlands were badly injured. Fruits were not sufficiently advanced to be seriously affected. The temperature during the third week averaged the most unseasonable of record during the growing season.

There were fewer thunderstorms than usual and an almost complete absence of local storm damage. The most severe storm of the month occurred in the northern half of Adair County, where the wind damage was approximately \$10,000.00 to buildings. Later and more complete reports may indicate tornado action.

Several dust storms occurred during April. The one on the 8th was the most marked and troublesome in years. Homes, stores and office buildings were invaded by the fine particles of dirt. No place was immune, and housewives who had previously finished their spring cleaning, faced the necessity of repeating the work as the floating dust penetrated into nooks and corners, rugs, drapes and furniture. Much of the dust settled about in the streets and gutters. The ditches along the roadside were the receptacle of large drifts of dirt; and in a few cases dirt drifted along fences to a depth of four feet. Clouds of dust slowed down automobiles and in some cases stopped field work.

Farm work progressed normally. The soil was in excellent condition for the preparation of seed beds. Plowing for corn made good progress and there was some planting. Pastures, clover and small grain made considerable advancement and were much benefited by the rains. The water supply in general continued seriously deficient.

N. G. R.

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 106 stations, was 50.9°, or 2.0° above normal. The greatest district

excess, 3.4°, was in the northwest district; and the south-central district had the least district excess, 1.0°. The highest monthly mean temperature was 53.2° at Clarinda and Keokuk, and the least was 47.6° at Postville (near). The absolute range for the State was 75°, from 92° at Estherville on the 8th, to 17° at Washta on the 1st. The average number of days with the maximum temperature 90° or above, was zero, although 8 stations in the northwest, 1 in the north-central, and 4 in the west-central districts, had one day with the maximum temperature 90° or above. At no station was the maximum temperature as low as 32°. The average number of days with the minimum temperature 32° or lower, was 10, ranging from 16 days at Decorah, to 1 day at Keokuk. The greatest daily range in temperature at any station was 56° at Washta on the 8th.

Climatological Data for April, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days					OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>Northwest District</i>																				
Akron.....	Plymouth	1,153	4																Orlan C. Moore	
Alta.....	Buena Vista	1,513	11	50.8	+ 3.7	90	8	23	26	13	1.49	- 1.14	0.83	0	7	15	10	3	D. E. Hadden	
Alton.....	Sioux	1,305	26	50.8	+ 3.8	89	8	20	27	50	1.36	- 1.13	0.57	T.	4	15	12	3	W. S. Slagle	
Cherokee.....	Cherokee	1,196	11	50.5	+ 4.1	89	8	23	17	43	1.56	- 1.43	0.73	T.	6	16	11	3	J. E. Wirth	
Estherville.....	Emmet	1,298	37	50.6	+ 5.7	92	8	22	57	55	1.80	- 0.83	1.21	1.0	5	15	10	5	A. O. Peterson	
Hawarden.....	Sioux	1,181	5								1.72	- 1.05	1.13	T.	6	11	7	12	Earl V. Shife	
Inwood (near).....	Lyon	1,474	28	49.6	+ 2.9	90	8	19	5	50	1.27	- 1.26	0.82	T.	5	24	3	3	A. C. Hanson	
Lake Park (near).....	Dickinson	1,489	19	43.0	+ 3.4	90	8	20	26	50	0.82	- 1.56	0.68	0	5	14	8	8	P. M. Lawrence	
Le Mars.....	Plymouth	1,224	40	51.4	+ 3.6	89	8	21	5	47	1.48	- 1.34	0.62	0	6	21	5	4	Henry Newell	
Marathon.....	Buena Vista	1,390	5								1.18		0.72	T.	6	19	4	7	E. G. Smith	
Pocahontas.....	Pocahontas	1,248	27	50.5	+ 3.4	90	8	22	1	51	2.03	- 0.69	0.86	1.5	8	19	4	7	F. E. Hronek	
Rock Rapids.....	Lyon	1,319	34	49.6	+ 3.3	89	8	19	5	52	1.31	- 1.49	0.93	0	6	25	1	4	Nellie F. Medberry	
Sanborn.....	O'Brien	1,553	18	49.6	+ 3.1	88	8	22	26	47	1.07	- 1.93	0.58	T.	5	11	14	5	J. W. Dow	
Sheldon.....	O'Brien	1,418	25	50.0	+ 3.0	90	8	19	5	47	1.10	- 1.85	0.63	0.2	7	14	10	6	Ross E. Forward	
Sioux Center.....	Sioux	1,461	32	49.6	+ 3.1	89	8	21	26	45	0.87	- 1.95	0.55	0	2	17	8	5	F. C. Aue	
Spencer.....	Clay	1,319	23	51.1	+ 4.1	90	8	23	57	50	1.56	- 1.34	1.07	0.5	9	17	10	3	E. W. Little	
Storm Lake.....	Buena Vista	1,442	11	49.6	+ 2.2	85	8	23	267	42	1.71	- 1.22	0.93	T.	6	17	7	6	Russel M. Edwards	
Washta.....	Cherokee	1,157	34	50.6	+ 3.1	91	8	17	1	56	1.45	- 1.17	0.63	T.	5	14	12	4	H. L. Felter	
West Bend.....	Palo Alto	1,197	41	50.4	+ 3.0	89	8	22	5	46	1.54	- 1.33	0.78	0	7	20	5	5	Jos. Dorweiler	
Means and extremes.....				50.2	+ 3.4	92	8	17	1	56	1.41	- 1.36	1.13	0.2	6	17	8	5	nw.	
<i>North Central District</i>																				
Algona.....	Kossuth	1,207	70	50.8	+ 3.2	89	8	25	17	45	1.71	- 0.91	0.87	1.0	7	19	4	7	Leon M. Merritt	
Allison (near).....	Butler	1,000	17	50.2	+ 2.9	87	8	23	27	45	1.41	- 1.14	0.75	0	5	14	9	7	George H. Bell	
Belmond.....	Wright	1,181	22	49.8	+ 3.1	88	8	23	1	50	1.64	- 1.62	0.55	T.	7	7	5	18	H. F. Luick	
Britt.....	Hancock	1,236	46	49.6	+ 3.4	87	8	25	17	46	1.57	- 1.00	0.77	T.	8	19	2	9	E. P. Healy	
Charles City.....	Floyd	1,015	56	50.0	+ 3.6	86	8	25	1	45	1.88	- 0.64	0.76	0	8	16	9	5	U. S. Weather Bureau	
Forest City.....	Winnebago	1,226	41	49.3	+ 3.0	88	8	23	17	43	1.78	- 0.70	0.85	T.	6	16	5	9	Dr. M. B. Neil	
Hampton.....	Franklin	1,112	40	50.5		87	8	25	17	16	1.96	- 1.23	0.53	T.	8	24	0	6	Howard J. Haydon	
Humboldt.....	Humboldt	1,095	47	50.6	+ 2.5	90	8	20	1	51	1.00	- 1.68	0.53	T.	4	15	5	10	H. C. Snitkey	
Mason City.....	Cerro Gordo	1,118	39	48.7	+ 2.2	85	8	22	1	48	1.73	- 0.82	1.07	T.	6	16	9	5	American Beet Sugar Co	
Northwood.....	Worth	1,222	35	49.4	+ 4.3	86	8	25	27	46	1.64	- 1.10	0.70	0.5	7	17	4	9	Charles Dwelle	
Osage.....	Mitchell	1,163	46	49.5	+ 3.6	84	8	21	27	43	1.65	- 0.81	0.40	0	5	12	13	5	Dr. C. E. Juhl	
Means and extremes.....				49.9	+ 3.3	90	8	20	1	51	1.64	- 1.06	1.07	0.1	6	16	6	8	nw.	
<i>Northeast District</i>																				
Cedar Falls.....	Black Hawk	875	12								2.14		0.73	T.	7	14	8	8	E. J. Cable	
Decorah.....	Winneshiek	872	48	47.8	+ 0.5	81	8	18	1	50	1.53	- 1.02	0.52	T.	7	18	5	7	M. D. Whitney	
Delaware (near).....	Delaware	1,083	52	49.2		81	8	23	1	41	2.88		1.33	0	6	19	7	4	E. J. Paris	
Dubuque.....	Dubuque	700	80	51.0	+ 2.4	81	8	27	2	36	1.43	- 1.12	0.58	T.	8	12	5	13	U. S. Weather Bureau	
Fayette.....	Fayette	1,003	43	49.8	+ 2.9	87	8	21	1	49	2.41	- 0.66	0.72	0	7	19	6	5	W. C. Van Ness	
Independence.....	Buchanan	956	71	49.8	+ 1.1	83	8	25	1	42	2.16	- 0.35	0.82	T.	6	17	5	8	Dr. Geo. Boody	
Lansing.....	Allamakee	632	28								1.36	- 1.20	0.60	0	7				Mrs. Mary Spinner	
New Hampton.....	Chickasaw	1,169	34	49.4	+ 2.4	84	8	22	1	45	2.33	- 0.27	0.50	0	7	17	1	12	D. W. Dawson	
Oelwein.....	Fayette	1,036	8	50.1	+ 2.5	85	8	25	1	45	2.30	- 0.48	0.65	0	6	17	3	10	John T. Ridler	
Postville (near).....	Clayton	1,192	40	47.6	+ 1.3	81	8	24	1	39	1.10	- 1.61	0.52	0	6	19	7	4	F. L. Williams	
Waterloo.....	Black Hawk	854	49	51.3	+ 2.5	87	8	20	1	48	2.01	- 0.52	0.60	0	7	18	7	5	R. B. Slippy	
Waverly.....	Bremer	936	42	50.7	+ 3.1	86	8	24	1	46	2.86	- 0.14	1.05	0	7	22	3	5	D. H. Murphy	
Means and extremes.....				49.7	+ 2.1	87	8	18	1	50	2.06	- 0.69	1.33	T.	7	18	5	7	nw.	
<i>West Central District</i>																				
Audubon (near).....	Audubon	1,297	38	51.6	+ 4.0	88	8	26	17	44	1.84	- 1.28	0.66	T.	8	15	11	4	George Kibby	
Carroll.....	Carroll	1,265	45	51.2	+ 2.7	88	8	24	1	43	2.01	- 0.94	0.90	T.	9	18	6	6	Mrs. J. J. Wolfe	
Denison.....	Crawford	1,200	47	51.8	+ 2.6	89	8	21	1	48	2.18	- 0.65	0.61	0	6	12	10	8	J. McMinnee	
Guthrie Center.....	Guthrie	1,028	36	52.5	+ 3.1	90	8	21	1	43	2.58	- 0.55	0.60	T.	10	17	5	8	Kenneth Hoyt	
Harlan.....	Shelby	1,210	39	50.7	+ 1.7	90	8	21	1	50	1.96	- 0.92	0.66	T.	7	14	8	8	Elmer Buss	
Jefferson.....	Greene	1,052	39	52.8	+ 4.3	89	8	21	1	48	2.36	- 0.49	1.19	T.	8	15	4	11	W. I. Lyon	
Little Sioux.....	Harrison	1,040	30	52.7	+ 2.2	90	8	23	57	42	2.86	+ 0.19	0.70	0	7	12	11	7	H. W. Kerr	
Logan.....	Harrison	1,120	65	52.4	+ 1.6	89	8	23	1	46	1.77	- 1.02	0.53	T.	6	14	13	3	Amy Ann Stern	
Onawa.....	Monona	1,051	46	50.6	+ 0.5	89	8	21	1	46	2.35	- 0.32	0.75	T.	6	12	10	8	Mrs. H. E. Colby	
Rockwell City.....	Calhoun	1,232	44	50.0	+ 1.8	90	8	21	5	46	1.27	- 1.78	0.29	T.	7	21	3	6	A. W. McIsaac	
Sac City.....	Sac.	1,209	62	50.4	+ 2.6	89	8	21	1	50	1.32	- 1.62	0.39	0	6	17	4	9	F. P. Kessler	
Sioux City.....	Woodbury	1,135	56	51.8	+ 4.0	89	8	26	26	41	1.34	- 1.36	0.50	T.	5	10	9	11	U. S. Weather Bureau	
Means and extremes.....				51.5	+ 2.5	90	8	21	17	50	1.99	- 0.89	1.19	T.	7	15	8	7	nw.	
<i>Central District</i>																				
Ames.....	Story	926	55	51.6	+ 2.8	88	8	24	1	41	3.38	+ 0.40	1.35	1.0	9	14	6	10	Iowa State College	
Baxter.....	Jasper	903	32	51.6	+ 2.6	87	8	25	17	45	2.55	- 0.51	1.47	0	6	15	8	7	Geo. R. Geise	
Boone (near).....	Boone	894	47	51.0	+ 2.0	89	8	18	1	52	2.92	+ 0.04	0.91	2.0	11	13	6	11	Carl Fritz Henning	
Des Moines.....	Polk	861	54	52.2	+ 2.1	87	8	27	1	41	1.55	- 1.36	0.67	0.4	9	12	4	14	U. S. Weather Bureau	
Fort Dodge.....	Webster	1,114	43	50.8	+ 3.2	89	8	23	1	48	1.83	- 0.91	0.75	0.5	10	17	2	11	Mrs. Emma Sampson	
Grinnell.....	Poweshiek	1,031	47	51.3	+ 1.9	87	8	25	1	43	2.37	- 1.31	1.22	T.	8	18	4	8	R. E. Bates	
Grundy Center.....	Grundy	978	40	49.9	+ 0.8	86	8	20	1	45	1.99	- 1.31	1.05	T.	6	14	8	8	M. G. Heiberger	
Iowa Falls.....	Hardin	1,127	49	50.1	+ 2.3	88	8	24	17	47	2.29	- 0.83	1.12	0	8	18	3	9	C. H. Gilbert	
Marshalltown.....	Marshall	947	53																	

Climatological Data for April, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, 0.1 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	51.4	+ 2.0	88	8	22	1	45	3.04	- 1.37	1.72	T.	8	17	3	10	nw.	O. C. Burrows
Cedar Rapids.....	Linn	737	49	50.9	+ 1.7	86	8	23	1	47	2.22	- 1.03	0.57	0	10	15	1	14	nw.	J. T. Wurster
Clinton.....	Clinton	595	60	50.8	+ 1.0	86	8	23	6	43	2.12	- 0.92	0.78	T.	9	17	3	10	w.	Dr. A. P. Bryant
Davenport.....	Scott	580	60	52.3	+ 2.4	86	8	30	1	34	2.71	+ 0.02	1.03	T.	9	13	1	13	w.	U. S. Weather Bureau
Iowa City.....	Johnson	733	71	51.0	+ 1.1	85	8	21	1	41	2.93	- 0.25	0.77	T.	10	17	1	12	nw.	Prof. J. F. Reilly
L <sup>a</sup> Claire.....	Scott	576	54								2.81	- 0.07	1.05	T.	11					Margaret T. Disney
Maquoketa (near).....	Jackson	692	38	49.2	+ 1.9	85	8	22	2	45	2.48	- 0.34	1.20	0	8	14	5	11	nw.	John Strodtfoff
Muscatine.....	Muscatine	546	85								4.90	+ 1.62	1.40	0	10					William Molis
Olin.....	Jones	750	33	49.6	+ 0.4	84	8	23	2	47	1.49	- 1.32	0.60	0	6	16	4	10	nw.	Mrs. L. Stingley
Tipton (near).....	Cedar	806	39	50.3	+ 0.3	85	8	23	6	43	2.45	- 0.79	0.61	0	7	4	17	9	s.	John Kroepfen
Williamsburg.....	Iowa	805	15	51.0		86	8	24	1	40	3.08	- 0.27	0.92	0	7	18	7	5	se.	Dr. F. C. Schadt
Means and extremes.....				50.7	+ 1.3	88	8	22	1	47	2.75	- 0.33	1.72	T.	8	15	5	10	nw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	51.8	+ 2.0	89	8	19	1	48	1.89	- 1.25	0.76	T.	10	11	10	9	nw.	Roy L. Fancolly
Bedford.....	Taylor	1,200	27								1.67	- 1.19	0.60	T.	8	14	6	10	nw.	Arthur L. Bishop
Clarinda.....	Page	1,009	59	53.2	+ 2.1	86	8	25	4	43	1.85	- 1.06	0.56	0	7	12	13	5	nw.	Dr. H. C. Hawley
Corning.....	Adams	1,287	43	51.9	+ 2.6	88	8	24	4	43	3.45	+ 0.32	0.80	0	10	16	5	9	s.	W. J. Wagner
Cumberland (near).....	Cass	1,227	32								1.49	- 1.25	0.80	0	9	14	6	10	nw.	Carl E. Pollock
Greenwood.....	Mills	1,100	41	51.9	+ 0.6	86	8	22	1	42	1.71	- 1.18	0.56	T.	8	16	4	10	sw.	Dr. George Mogridge
Greenfield.....	Adair	1,368	35								3.00		1.40	0.7	9	15	5	10	nw.	P. C. Cornell
Lenox.....	Taylor	1,250	36	52.7	+ 2.5	89	8	24	1	41	2.14	- 1.10	0.54	0.7	9	15	7	8	nw.	J. L. Hurley
Oakland.....	Pottawattamie	1,139	18	51.8	+ 1.7	89	8	23	1	49	1.88	- 0.98	0.78	0.7	9	15	7	8	nw.	W. S. Matthews
Red Oak (near).....	Montgomery	1,030	21								2.22	- 0.81	1.08	0	7	13	12	5	s.	B. R. Bridge
Riverton (near).....	Fremont	920	5								1.08	- 1.90	0.53	T.	8	11	4	15	s.	George C. Rader
Thurman.....	Fremont	960	44	52.4	+ 0.4	88	8	22	1	44	1.88	- 1.27	0.75	T.	8	15	4	11	s.	H. H. Askew
Omaha, Neb.....		1,105	66	53.2	+ 2.0	88	8	27	4	39	1.22	- 1.29	0.32	T.	11	14	6	10	s.	U. S. Weather Bureau
Means and extremes.....				52.4	+ 1.8	89	8	19	1	49	1.96	- 1.00	1.40	0.2	8	14	7	9	nw.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	51.9	+ 1.7	87	8	25	1	43	3.67	+ 0.17	1.12	0	11	16	3	11	ne.	S. R. Brown
Albia.....	Monroe	949	10	51.6	+ 0.9	85	8	22	1	38	3.40	+ 0.32	0.93	0	9	14	3	13	sw.	J. M. Stevenson
Centerville.....	Appanoose	1,013	38	51.7	- 0.3	83	8	24	1	36	1.25	+ 0.75	1.55	0.1	12	15	2	13	nw.	Thomas Wood, Jr.
Chariton (near).....	Lucas	1,042	37	50.2	+ 0.7	85	8	23	1	42	2.58	- 0.72	0.88	T.	7	15	3	12	sw.	C. C. Burr
Corydon (near).....	Wayne	1,050	47	50.8	+ 0.3	85	8	24	1	45	3.77	+ 0.36	1.13	T.	9	15	2	13	nw.	J. C. Davis
Creston.....	Union	1,291	30	50.4	+ 0.9	86	8	23	1	43	3.71	+ 0.28	1.32	T.	10	13	6	11	sw.	Mrs. N. Spangler
Earlham (near).....	Madison	1,226	34	50.4	+ 1.7	87	8	19	1	43	1.35	- 2.00	0.45	T.	6	17	2	11	nw.	George Phillips
Indianola.....	Warren	977	50	52.3	+ 1.8	88	8	25	1	41	2.20	- 0.96	1.21	T.	9	15	4	11	se.	Seth F. Shenton
Knoxville.....	Marion	920	41	51.7	+ 1.1	87	8	23	1	45	2.73	- 0.67	0.95	T.	8	15	3	12	nw.	W. J. Casey
Lacona.....	Warren	821	32								4.30	+ 1.23	2.37	0	10	16	5	9		J. B. Alter
Lamoni.....	Decatur	1,123	27	50.8	+ 0.3	85	8	23	1	40	2.29	- 1.13	0.65	0	12	14	4	12	nw.	F. S. Parks
Melrose.....	Monroe	871	1								2.88		0.95	T.	8	15	4	11	sw.	J. M. Carr
Mt. Ayr.....	Ringold	1,220	39	51.2	+ 1.0	85	8	23	1	42	2.57	- 0.79	0.70	0	8	19	4	7	s.	E. O. Gleason
Tingley.....	Ringold	1,277	7	51.2	+ 1.5	86	8	24	1	41	2.43	- 0.95	0.82	T.	9	16	2	12	sw.	James A. Verploegh
Winterset.....	Madison	1,118	10	52.0	+ 1.7	87	8	25	1	40	2.23	- 1.35	0.52	0	9	18	3	9	sw.	H. S. Ely
Means and extremes.....				51.2	+ 1.0	88	8	19	1	45	2.96	- 0.38	1.55	T.	9	16	3	11	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	4	50.3	- 0.5	81	8	27	1	42	5.04	+ 1.84	2.00	T.	8	17	2	11	nw.	B. R. Vale
Burlington.....	Des Moines	541	41	52.6	+ 0.5	84	8	30	1	34	3.44	+ 0.34	1.32	T.	12	17	2	11	sw.	John W. Donnelly
Columbus Junction.....	Louisa	595	10	51.3	+ 0.1	86	8	27	2	3	3.08	+ 0.10	1.14	0	9	16	6	8	sw.	Miss Musa Todd
Fairfield.....	Jefferson	780	51	50.7	+ 0.6	85	8	26	1	44	4.07	+ 0.41	1.22	T.	11	15	2	13	n.	R. M. McKenzie
Keokuk.....	Lee	614	60	53.2	+ 0.9	81	8	31	1	32	3.27	+ 0.28	1.61	T.	11	12	5	13	n.	U. S. Weather Bureau
Keokuk No. 2.....	Lee	651	2	52.6		81	8	29	1	35	1.26		1.63	T.	13					J. N. D. Dickinson
Keosauqua.....	Van Buren	639	44	50.8	- 0.3	86	12	25	6	50	1.95	+ 1.56	2.00	0	9	16	4	10	sw.	Dr. J. W. Rinabarger
Mt. Pleasant.....	Henry	730	55	51.9	+ 0.4	84	8	29	1	35	4.19	+ 1.52	1.65	T.	9	15	4	11	nw.	J. H. Jericho
Oskalooza.....	Mahaska	835	55	51.2	+ 1.1	87	8	26	1	41	2.80	- 0.05	1.28	0.4	10	15	4	11	se.	R. R. Robinson
Ottumwa.....	Wapello	619	44	50.7	- 1.5	89	8	24	1	53	3.92	+ 1.01	1.44	T.	12	16	3	11	se.	C. L. Mikesch
Sigourney.....	Keokuk	785	36	51.3	+ 1.3	88	8	25	1	41	2.49	- 0.79	0.95	0	7	16	4	10	e.	John B. Slate
Stockport (near).....	Van Buren	747	30	50.4	+ 0.6	83	8	26	1	44	3.82	+ 0.70	1.13	T.	10	17	1	12	s.	C. L. Beswick
Washington.....	Washington	757	56	52.4	+ 1.7	88	8	25	1	42	4.47	+ 1.72	1.15	T.	10	14	5	11	sw.	D. D. Sherman
Wever.....	Lee	552	3																	H. D. Liddle
Means and extremes.....				51.5	+ 0.5	89	8	24	1	50	3.85	+ 0.75	2.00	T.	10	16	3	11	sw.	
State means and extremes.....				50.9	+ 2.0	92	8	17	1	56	2.29	- 0.67	2.00	0.1	8	16	6	8	nw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 121 stations, was 2.29 inches, or 0.67 inch below normal. The greatest district deficiency was in the northwest district, 1.36 inches, and the southeast district had the only district excess, 0.75 inch. The greatest precipitation deficiency for any one station was at Waukee, 2.10 inches, and the greatest excess was at Bonaparte

(near), 1.84 inches. The greatest amount at a single station was 5.04 inches at Bonaparte (near), and the least was 0.82 inch at Lake Park (near). The greatest amount occurring in 24 consecutive hours was 2.00 inches at Bonaparte (near), and Keosauqua, on the 20th. The average number of days with 0.01 inch or more of precipitation for the State was 8, ranging from 10 days in the southeast district, to 6 days in the northwest and north-central districts. For individual stations the range was from 13 days at Keokuk No. 2, to 2 days at Sioux Center.

Daily Precipitation for April, 1931

Stations	Drainage Basin	Day of Month																															Totals			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
<i>Northwest District</i>																																				
Akron.....	Big Sioux.....	.25	.04												.36			T.	.83	.01															1.49	
Alta	Raccoon.....	.18	.02					.18						.46	.02				.13	.50	T.														1.49	
Alton.....	Floyd.....	.15	T.					T.						T.	.47				.17	.57	T.														1.36	
Cherokee.....	Little Sioux.....	.15						.12						.07	.39				.10	.73	T.														1.55	
Estherville	Des Moines.....		.03					.05							.35						T.														1.80	
Hawarden.....	Big Sioux.....	.17	.10					.05							.26				.01	1.13															1.72	
Inwood (near)	Big Sioux.....	.06	.03	T.				.05							.31						.82	T.													1.27	
Lake Park (near)	Little Sioux.....	.02						*.05							.07						.67	.01													0.82	
Le Mars.....	Floyd.....	.31	.03												.37					.15	.61	.01	T.												1.48	
Marathon.....	Raccoon.....	.02	.02						T.						.15					.23	.72	.04	T.												1.18	
Pocahontas.....	Des Moines.....	.01						.23							.05	.27			.45	.83	.03	.13													2.03	
Rock Rapids.....	Big Sioux.....	.10	.03					.03							.02	.20				.93															1.31	
Sanborn.....	Floyd.....	.04	T.					.05							.40	T.				.53	.05														1.07	
Sheldon.....	Floyd.....	.05	.01						T.						.33	.01			.05	.63	.01	.02													1.10	
Sioux Center.....	Floyd.....	T.													.32					.55															0.87	
Spencer.....	Little Sioux.....	.03	.01					.05							.04	.20			.10	1.07	.03	.03													1.56	
Storm Lake.....	Raccoon.....	.11	T.					.17							.34				.14	.93	.02	T.													1.71	
Washita.....	Little Sioux.....	.20						.10							.35				.17	.63	T.	T.													1.45	
West Bend.....	Des Moines.....	T.	.04					.18							.03				.49	.34	.44	.02			T.										1.54	
<i>North Central District</i>																																				
Algona.....	Des Moines.....	.03	.47					.15							T.	.75			.09	.67	.20	.10													1.71	
Allison (near).....	Cedar.....							.13							T.	.75	.01			.30	.25	T.													1.41	
Belmond.....	Iowa.....	T.						.09							.22	.33			.30	.30	.30	.10													1.61	
Britt.....	Iowa.....		.02	.01				.20							.05	.29			.48	.29	.43	.09													1.57	
Charles City***	Cedar.....		T.	T.				.09							.04	.75	.01		.34	.61	.03	.01													1.88	
Forest City	Cedar.....							.15							.32				.28	.85	.08	.10													1.78	
Hampton.....	Cedar.....	T.						.06							.13	.31	.53		.35	.14	.40	.01													1.96	
Humboldt.....	Des Moines.....	T.	.13					.06							T.	.53	.21		.53	.21	.13														1.00	
Mason City.....	Cedar.....	T.	T.					.03							.29	.78			.22	.11	.30	T.	T.												1.73	
Northwood.....	Cedar.....							.04							.35	.15			.20	.70	.14	.06	T.												1.64	
Osage.....	Cedar.....							T.							.32	.34			.23	.40	.36														1.65	
<i>Northeast District</i>																																				
Cedar Falls.....	Cedar.....		T.					.18							.33	.27	.28		.73	.32	.03														2.14	
Decorah	Mississippi.....							.13							.32	.26			.11	.09	.52	.10													1.53	
Delaware (near).....	Maquoketa.....							.05							1.33	.35			.47	.49	.19														2.88	
Dubuque**	Mississippi.....		T.					.12							.01	.03	.10		.14	.36	.45	.22													1.43	
Fayette.....	Mississippi.....		T.					.11							.08	.48	.72		.57	.42	.06														2.41	
Independence.....	Wapsipicon.....		T.					.01							T.	.82	.38		.41	.45	.06	T.													2.16	
Iansing	Mississippi.....							.03							.60	.18			.03	.34	.17	.01													1.36	
New Hampton.....	Wapsipicon.....							.17							.20	.38	.38		.41	.29	.50														2.33	
Oelwein.....	Wapsipicon.....							.30							.60	.20			.65	.35	.20														2.30	
Postville (near).....	Mississippi.....							.08							T.	.24	.52		.10	.16	.30														1.40	
Waterloo	Cedar.....							.10							.40	.60			.55	.22	.12	.02													2.01	
Waverly.....	Cedar.....							.25							T.	.13	1.05		.50	.60	.30	.03													2.86	
<i>West Central District</i>																																				
Audubon (near).....	Nishnabotna.....	.50	T.	.02				.17							.01	.08			.04	.66	.36														1.84	
Carroll	Raccoon.....	.15	.20	.02				.21							.02	.16			.90	.15	.20														2.01	
Denison.....	Missouri.....	.61						.24							.23				.61	.28	.21	T.													2.18	
Guthrie Center.....	Raccoon.....	.41	.03					.20							.17	.10	.50		.10	.45	.60	T.													2.58	
Harlan.....	Nishnabotna.....	.30	T.	T.				.33							T.	.10			.66	.35	.20														1.96	
Jefferson.....	Raccoon.....	.24	.03	T.				.08							.08	.17	T.		1.19		.37	.20													2.36	
Little Sioux.....	Little Sioux.....	.53						.53							.01	.69			.49	.58	.03														2.86	
Logan.....	Missouri.....	.30						.28							.43				.05	.53	.18														1.77	
Onawa.....	Missouri.....	.65	T.					.40							T.	.75			.15	.35	.05														2.35	
Rockwell City.....	Raccoon.....	.10						.20							.11				.26	.29	.21	.10													1.27	
Sac City.....	Raccoon.....	.10						.22							.39				.18	.36	.07	T.													1.32	
Sioux City***	Missouri.....	.13	.22	T.				T.							T.	.46			.03	.50															1.34	
<i>Central District</i>																																				
Ames.....	Skunk.....	.30	.10					.10							.18	.05	.80		1.35	.47	.03														3.38	
Baxter.....	Skunk.....	T.						.23							.20	.22			1.47	.39	.04														2.57	
Boone (near)	Des Moines.....	.03	.10	.01				.01	.12						.05	.78			.91	.50	.35	.06													2.92	
Des Moines**	Des Moines.....	.06	.02					.14							.20	.19			.58	.22	.11	.03													1.55	
Fort Dodge	Des Moines.....		.07	.10	.10			.11							.08	.25			.75	.14	.13	.10													1.83	
Grinnell.....	Iowa.....	.02	.07					.07							.15	.35	.17		1.22	.32	T.															2.37
Grundy Center.....	Cedar.....							.27							.10	.34			1.05	.12	.04														1.92	
Iowa Falls	Iowa.....		.04												.41	.37			.54	.58	.12	.05													2.29	
Marshalltown	Iowa.....	T.	.05	.03																																

Daily Precipitation for April, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31				
<i>Southwest District</i>																																				
Atlantic	Nishnabotna	.27	T.	.01					.09	.10						.42	T.		.20	.51	.25		T.	.01	.03									1.89		
Bedford	102	.05							.19						.15			T.	.14	.60				.06	.20	.28								1.67		
Clarinda	Nodaway																T.	.30	.56	.31				.08	.23	.27	.10							1.85		
Corning	Nodaway	.80							.20						.25	.56		.05	.49	.78				.05	.15	.12								3.45		
Cumberl'nd (near)	Nodaway	.25	T.	T.					.15						T.	.06	T.	.10	.02	.80				.01	.05	.05								1.49		
Glenwood	Missouri	.19							.32						.22					.28	.28			.11	.18	.13								1.71		
Greenfield	Nodaway	.35							.16						T.	.32		1.40	.55	.10	T.		.03	.04	.05									3.00		
Lenox	Missouri	.40							.23						.02	.28		T.	.16	.54				.09	.22	.20								2.14		
Oakland	Nishnabotna	.18							.40						.14				.20	.55	.23			.05	.08	.05								1.88		
Red Oak (near)	Nishnabotna	T.							.33						T.	.19		T.	.28	.80				.14	.34	.14								2.22		
Riverton (near)	Nishnabotna	T.	T.	T.					.13						T.	.03			.01	.01	.26			.09	.32	.23								1.08		
Thurman	Missouri	.02	T.						.22						.18			T.	.18	.75				.11	.26	.16								1.88		
Omaha, Neb.***	Missouri	.08	.04	T.					.26						.01	.02			.26	.20	.12			.10	.12	.01								1.22		
<i>South Central District</i>																																				
Afton	Grand	.30	.02						.24						.46	1.42	.03		.51	.34				.03	.15	.14									3.67	
Albia	Des Moines	T.	.10	T.					.32						T.	.11	.62	T.	.78	.28	.93	T.		.03	.13	.13									3.40	
Centerville	Chariton	.15	.12						.30						.02	.20	.80		.70	1.55	.02	.02			.14	.23									4.25	
Chariton (near)	Chariton	T.							.18						.10	.21	.48		.55	.88	T.	T.		.11	.25										2.58	
Corydon (near)	Chariton	.26							.18						.50	.14	1.13		.28	.85				.10	.33										3.77	
Creston	Missouri	.24	.01	T.					.19						1.32	T.	.80	.37	.46	T.	T.		.01	.14	.14	.03									3.71	
Earlham (near)	Des Moines	.11							.11						T.	.12	.17	T.	.45	.39	T.		T.	T.											1.35	
Indianola	Des Moines	.10	T.						.20						.14	.19	.25		.93	.28	.01		T.	T.	.07										2.20	
Knoxville	Des Moines	.10							.07						T.	.95	.15		.68	.66	.04		T.	T.	.08										2.73	
Lacona	Des Moines	.05	.02						.20						.18	.32	2.05		.60	.73	.10			.05											4.30	
Lamoni	Grand	.17	.01						.11						T.	.14	.11	.18	.34	.11	.65			.13	.21	.13									2.29	
Meirose	Des Moines	.15	T.						.20						.42	.22		.59	.95	T.			T.	.10	.25										2.88	
Mt. Ayr	Grand								.14						.12	.55	.08		.55	.70				.14	.29										2.57	
Tingley	Platte	.16	T.						.15						.26	.82			.19	.45				.02	.18	.20									2.43	
Winterset	Des Moines	.29	.02						.20						.34	.07	.29		.52	.42	T.			T.	.08										2.23	
<i>South East District</i>																																				
Bonaparte (near)	Des Moines	T.	.39						.37						T.	.96	.34		.57	2.00	.14	T.	T.	T.	.27										5.04	
Burlington	Mississippi	.49	.01						.31						.24	.04		.24	.52	1.32	.01			.01	.11	.14									3.44	
Columbus Junction	Iowa	.08	.34												.55	.10		.47	1.14	.23	.03			.14											3.08	
Fairfield	Skunk	.08	.37						.30						.50	.65		.63	1.22	.07			.02	.03	.20										4.07	
Keokuk***	Mississippi	.39	.08						.38						.02	T.	.27		.18	1.53	.02		.02	.12	.26										3.27	
Keokuk No. 2	Mississippi	.05	.11	.02	T.				.50						.03	.51	.02		.15	1.63	.35	.01	T.	.16	.39										4.26	
Keosauqua	Des Moines	T.	.39						.35						.50	.55		.80	2.00	.03			T.	.10	.23										4.95	
Mt. Pleasant	Skunk		.11						.29						.83	.19		.65	1.65	.23	.01		T.	.23											4.49	
Oskaloosa	Des Moines	.07	.04						.14						T.	.34	.26		.91	.92	T.	.03	T.	.01	.05										2.80	
Ottumwa	Des Moines	.05	.10						.24						.01	.10	.95		.73	1.44	.05	.02	T.	.03	.20										3.92	
Sigourney	Skunk		.06						.12						T.	.32	.47		.49	.95		T.	T.	T.	.08											2.49
Stockport (near)	Skunk	.06	.37						.30						.47	.48		.64	1.13	.07				.03	.27										3.82	
Washington	Skunk	.02	.35						.82						.78	.50		.58	1.15	.15	.02				.10										4.47	
Wever	Mississippi																																			

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.

||| Precipitation measured in the morning; amount then recorded is for preceding 24 hours, except amount measured on April 1, is for preceding 12 hours.

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

\*\*Interpolated.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)					Relative Humidity, %				Wind				Sunshine			
	Mean	Highest	Date	Lowest	Date	Mean		Lowest	Date	Total movement	Average hourly velocity	Maximum			% possible Departure from normal		
						7 A. M. 12 Noon†	7 P. M.					Miles	From			Date	
Chas. City	30.06	30.46	5	29.67	2	70	38	15	28	4,437	6.2	28	sw.	12	71	+12	
Davenport	30.06	30.40	22	29.66	1	71	46	18	28	5,924	8.2	34	sw.	12	60	+3	
Des Moines	30.06	30.17	22	29.58	2	78	48	16	28	6,243	8.7	35	s.	12	57	+2	
Dubuque	30.05	30.45	5	29.67	2	73	43	21	10†	3,776	5.2	23	n.w.	10	65	+8	
Keokuk	30.08	30.44	22	29.60	2	72	52	23	10†	4,345	6.0	22	sw.	23	59	+2	
Sioux City	30.04	30.47	23	29.50	2	68	41	15	28	7,984	11.1	41	n.w.	8	71	+15	
Omaha, Nb	30.07	30.48	5	29.48	2	71	44	15	29	5,074	7.0	29	n.	8	68	+9	
Means and extremes	30.06					72	45	15	28†		7.5				61	+7	
Normals and records	29.98		9th		20th	76	57		25†						57		
		\$30.78	1918		*28	90	1898		†10	1902					60	n.	1902

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

††January 1, 1928, 3-cup anemometers replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

SNOWFALL

The average snowfall for the State was 0.1 inch, or 1.8 inches below normal. The greatest total snowfall at any one station for April was 2.0 inches at Boone (near), 41 stations received none, and 63 stations only a trace. The greatest snowfall in 24 consecutive hours for April was 2.0 inches at Boone (near) on the

21st. The greatest number of days with 0.1 inch or more of snow on the ground was 3 days at Belle Plaine, Delaware, Iowa City and Iowa Falls. The greatest depth of snow on the ground at any time was 6.0 inches at Waterloo on the 1st, which remained on the ground from March storms.

RIVERS

Record low stages prevailed on nearly all the interior streams, with little fluctuation at Des Moines, where the extreme stages were 2.0 feet and 1.0 foot, and averaged 1.3 feet, or 3.3 feet below normal. The low stage, 1.0 foot recorded on the 1st and 16th, broke the previous April low, 1.3 feet recorded April 20, 1914.

The Missouri River averaged very low. At Sioux City the stages ranged from 4.5 feet on the 7th, to 8.1 feet on the 11th. The average stage was 5.9 feet, or 2.9 feet below normal. The Missouri River at Sioux City on May 1 was at a stage of 5.0 feet, which equalled the record low stage for that date of May 1, 1889. The river record dates back to 1878, or 53 years. At Omaha the extreme stages were 9.2 feet and 5.9 feet, and averaged 7.2 feet, or 1.2 feet below normal.

Extremely low stages prevailed on the Mississippi River along the Iowa boundary. At Dubuque the extreme stages were 2.4 feet and 3.4 feet, and averaged 3.2 feet. The water did not rise above the 3.4 foot mark during the month, and was the first time of record that such has been the case in April. At Davenport the average stage for the month was 2.6 feet, or 5.2 feet below normal. This is the second lowest average stage of record for April. The lowest, 1.7 feet was recorded in 1895. At Keokuk the river readings averaged near the zero of the gauge.

Daily Maximum and Minimum Temperature for the Month of April, 1931

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.

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted.

\*For 24 hours, midnight to midnight.

IOWA STORMS, APRIL, 1931

Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path Miles	Length of Path Miles	Area of Sq. Miles	Size of Hailstones Inches	Damage	Persons Killed	Persons Injured
15	Iowa	Pilot	Hail	12:00 Noon	NW to SE	1	3	3	Cherries	Slight		
15	Taylor	Polk	Hail	5:00 p.m.	SW to NE	1	6	6	Hazelnuts	Slight		
18	Union	Spaulding, Lincoln, Douglas, Highland	Hail	p.m.					Hickory nuts	Slight		
18	Dallas	Union	Wind and hail	5:30 p.m.	SW to NE	1	3	3	Peas	Wind to bldgs. \$5,000 Wind to crops and trees \$1,000		
18	Adair	Prussia, Grove, Jefferson, Lincoln	Wind Hail and Tornado (?)	4:30 p.m. to 5:30 p.m.	SW to NE				Hickory nuts	Wind and tornado \$10,000 Hail, slight		

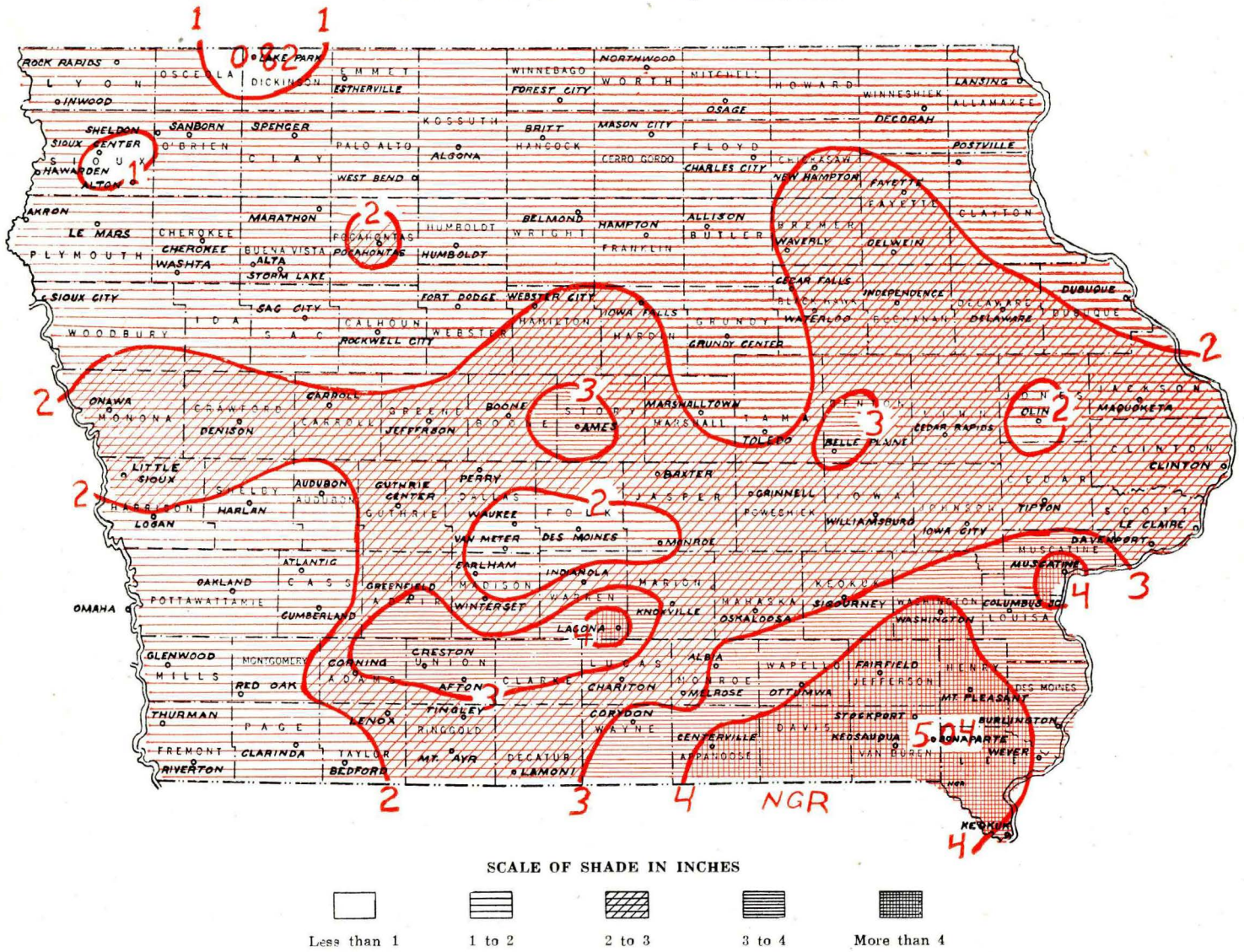
MISCELLANEOUS PHENOMENA

*Birds* (migration of): Oskaloosa, yellow hammers, blackbirds on the 7th, brown thrush and mourning doves on 17th.  
*Dew*, heavy: 16th, 17th.  
*Dust storm*: 6th, 8th, 9th, 10th, 11th, 12th, 13th, 18th, 28th, 29th.  
*Fog*, dense: 1st, 2d, 3d, 25th.  
*Fog*, light: 25th.  
*Frost*, heavy: 1st, 4th, 5th, 6th, 10th, 22d, 23d, 24th, 25th, 26th, 27th.  
*Frost*, killing: 1st, 4th, 5th, 6th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th.  
*Frost*, light: 5th, 10th, 22d, 23d, 24th, 25th, 27th, 28th, 30th.  
*Gales*: 6th, 10th, 11th, 12th, 18th, 29th.

*Hail*, light: 14th, 15th, 18th, 20th.  
*Hail*, moderate: Creston on 18th.  
*Halo*, lunar: 1st, 24th, 25th.  
*Halo*, solar: 9th, 11th, 13th, 14th, 15th, 24th, 27th.  
*Haze*: 7th, 8th, 9th, 11th, 12th, 13th, 17th, 30th.  
*Meteors*: 10th, 29th.  
*Parhelia*: 11th, 24th.  
*Rainbow*: 18th.  
*Sleet*: 20th.  
*Snow*: 2d, 3d, 20th, 21st, 22d, 23d, 24th, 26th.  
*Thunderstorms*: 9th, 14th, 15th, 16th, 18th, 19th, 20th.  
*Tornado*: Adair County, on 18th.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, APRIL, 1931





# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII

DES MOINES, IOWA, MAY, 1931

No. 5

## COMPARATIVE DATA FOR THE STATE—MAY

YEAR	Temperature				Precipitation				Number of Days				
	Mean	Departure	Highest	Lowest	Total	Departure	Greatest	Least	Snowfall	With pre. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	56.5	- 3.6	86	38	5.99	+ 1.41	9.10	3.42					
1874	64.1	+ 4.0	94	41	1.88	- 2.70	4.49	0.50					
1875	60.5	+ 0.4	91	26	2.94	- 1.64	6.70	1.63					
1876	61.1	+ 1.0	90	32	2.84	- 1.74	7.38	1.09					
1877	60.3	+ 0.2	92	29	4.30	- 0.28	11.00	1.60					
1878	55.7	- 4.4	88	32	5.01	+ 0.43	11.95	2.14					
1879	62.9	+ 2.8	93	26	4.38	- 0.20	8.70	1.40					
1880	66.3	+ 6.2	96	37	4.06	- 0.52	8.45	1.47					
1881	66.7	+ 6.6	95	35	3.73	- 0.85	9.30	0.40					
1882	51.3	- 5.8	83	21	5.42	+ 0.81	12.55	1.50					
1883	54.6	- 5.5	90	31	6.25	+ 1.67	11.68	1.30					
1884	59.6	- 0.5	88	33	3.15	- 1.43	6.36	1.00					
1885	57.4	- 2.7	86	27	3.44	- 1.14	9.33	1.05					
1886	62.5	+ 2.4	96	30	3.38	- 1.20	7.63	1.30					
1887	61.6	+ 4.5	96	34	1.55	- 3.03	5.84	0.00					
1888	53.8	- 6.3	88	22	6.58	+ 2.00	10.85	2.00					
1889	59.2	- 0.9	92	22	4.06	- 0.52	8.54	1.40					
1890	56.5	- 3.6	96	26	3.64	- 0.94	6.44	1.60					
1891	58.3	- 1.8	94	21	3.18	- 1.40	7.10	1.46					
1892	54.0	- 6.1	88	29	8.77	+ 4.19	12.64	4.87	T.	16	5	9	17
1893	56.6	- 3.5	96	26	3.45	- 1.13	5.82	1.65	0	9	13	9	9
1894	61.1	+ 1.0	96	22	1.87	- 2.71	4.77	0.33	0	6	17	10	4
1895	61.7	+ 1.6	104	24	3.19	- 1.39	5.79	0.84	0	9	11	12	8
1896	65.5	+ 5.4	100	34	6.60	+ 2.11	11.79	3.40	0	12	11	12	8
1897	58.5	- 1.6	96	20	1.92	- 2.66	3.59	0.21	0	5	16	10	5
1898	59.6	- 0.5	92	26	4.67	+ 0.09	7.82	2.22	0	12	9	10	12
1899	60.2	+ 0.1	98	27	6.23	+ 1.65	11.47	3.09	0	13	9	12	10
1900	63.2	+ 3.1	98	22	3.31	- 1.27	6.98	0.96	0	8	11	10	7
1901	60.7	- 0.6	95	28	2.35	- 2.23	4.57	0.72	0	7	16	9	6
1902	63.8	+ 3.7	97	25	5.39	+ 0.81	18.04	0.87	0	13	10	12	9
1903	61.6	+ 1.5	91	24	8.55	+ 3.97	15.45	2.88	0	16	9	12	10
1904	59.6	- 0.5	93	27	3.78	- 0.80	8.15	1.50	0	8	13	10	8
1905	58.3	- 1.8	88	28	5.95	+ 1.37	10.83	2.57	0	14	12	11	8
1906	60.8	+ 0.7	95	24	3.54	- 1.04	10.72	0.89	0	11	13	10	8
1907	53.5	- 6.6	96	14	3.48	- 1.10	7.68	0.71	1.0	10	11	10	10
1908	59.1	- 0.7	93	13	8.34	+ 3.76	14.33	1.33	0	15	9	11	11
1909	57.9	- 2.2	97	18	4.34	- 0.24	7.85	1.86	0.1	9	12	12	7
1910	55.1	- 4.7	89	18	3.41	- 1.17	6.91	1.29	T.	10	15	7	9
1911	64.9	+ 4.8	98	23	3.76	- 0.82	8.73	0.42	0.7	9	16	9	6
1912	62.7	+ 2.6	97	29	3.33	- 1.25	6.41	0.72	0	10	14	11	6
1913	59.4	- 0.7	102	30	6.24	+ 1.66	10.25	3.14	0	13	11	8	12
1914	62.2	+ 2.1	98	25	3.31	- 1.27	6.90	0.30	T.	10	14	11	6
1915	56.1	- 4.0	99	25	7.34	+ 2.76	13.21	3.82	T.	14	9	9	13
1916	59.9	- 0.2	94	27	4.93	+ 0.35	10.44	2.14	T.	12	13	10	8
1917	55.1	- 5.0	95	18	3.87	- 0.71	7.33	1.69	0.6	10	15	8	8
1918	64.9	+ 4.8	98	25	6.87	+ 2.29	11.98	2.72	T.	13	13	11	7
1919	58.2	- 1.9	93	30	3.11	- 1.47	7.14	0.73	0	9	13	11	7
1920	59.1	- 0.7	89	29	3.26	- 1.32	5.73	0.62	0	8	14	9	8
1921	63.3	+ 3.2	99	25	4.23	- 0.35	9.41	1.32	0	10	14	10	7
1922	63.4	+ 3.3	91	34	3.53	- 1.05	8.36	0.47	0	12	13	10	8
1923	59.6	- 0.5	90	20	2.84	- 1.74	6.55	1.07	T.	10	14	10	7
1924	51.1	- 6.0	94	26	1.71	- 2.87	3.28	0.78	0.1	9	13	9	9
1925	57.8	- 2.3	102	20	1.16	- 3.42	2.62	0.30	T.	6	19	8	4
1926	64.5	+ 4.4	97	25	2.76	- 1.82	6.83	0.52	0	9	15	11	5
1927	58.4	- 1.7	91	30	4.69	+ 0.11	9.07	0.86	T.	11	10	10	11
1928	62.6	+ 2.5	93	26	2.47	- 2.11	6.19	0.61	0	8	17	8	6
1929	57.7	- 2.4	91	24	2.47	- 2.11	5.79	0.82	T.	8	11	12	8
1930	60.2	+ 0.1	91	26	3.72	- 0.86	7.20	1.61	T.	11	14	7	10
1931	57.5	- 2.6	98	21	2.96	- 1.62	5.65	1.11	T.	9	15	7	9
Normals.....	60.1		94	26	4.58		8.48	1.43	0.1	10	13	10	8
Highest.....	66.7		104	41	8.77		18.04	4.87	1.0	16	17	12	17
Lowest.....	53.5		83	13	1.16		2.62	0.00	0	5	5	7	4

N. G. R.

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

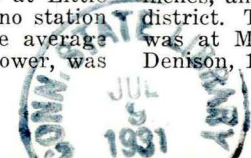
### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 103 stations, was 57.5°, or 2.6° below normal. The greatest district deficiency, 3.6°, was in the east-central district, and the least deficiency, 1.3°, was in the northwest district. The highest monthly mean temperature was 60.2° at Lenox, and the least was 53.4° at Postville (near). The absolute range for the State was 77°, from 98° at Inwood (near) on the 26th, to 21° at Webster City and Boone (near) on the 7th. The average number of days with the maximum temperature 90° or higher was 1, ranging from 5 days at Little Sioux, Glenwood and Lenox, to none at 40 stations. At no station did the maximum temperature get as low as 32°. The average number of days with the minimum temperature 32° or lower, was

3, ranging from 7 days at Inwood (near), Rock Rapids and Sioux Center, to none at Dubuque, Clinton and Davenport. The greatest daily range in temperature at any station was 51° at Washta on the 3d.

### PRECIPITATION

The average precipitation for the State, derived from the average of 9 districts of nearly equal area, and based on the records of 118 stations, was 2.96 inches, or 1.62 inches below normal. The greatest district deficiency was in the south-central district, 2.21 inches, and the least deficiency, 0.48 inch, was in the west-central district. The greatest precipitation deficiency for any one station was at Mount Ayr, 3.95 inches, and the greatest excess was at Denison, 1.37 inches. The greatest amount at a single station was



Climatological Data for May, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days					OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>Northwest District</i>																				
Akron.....	Plymouth	1,153	41	57.0	-1.6	92	27	28	7	36	2.13	-1.62	1.10	0	8	20	5	6	n.w.	Orlan C. Moore
Alta.....	Buena Vista	1,513	26	58.0	-0.6	92	24	28	7	44	1.90	-2.01	1.52	0	11	13	12	6	s.	D. E. Hadden
Alton.....	Sioux	1,305	11	56.7	-1.3	91	24	27	21	36	2.68	-1.99	1.31	T.	9	13	13	5	n.w.	W. S. Slagle
Cherokee.....	Cherokee	1,196	11	56.7	-1.3	91	24	27	21	36	2.68	-1.99	1.31	T.	9	13	13	5	s.	J. E. Wirth
Estherville.....	Emmet	1,298	37	56.5	-0.5	91	27	25	7	45	2.54	-1.93	1.25	0	10	18	9	4	n.w.	A. O. Peterson
Hawarden.....	Sioux	1,181	5								2.19	-1.56	0.91	0	9	15	6	10	n.w.	Earl V. Slife
Inwood (near).....	Lyon	1,474	28	57.0	-0.7	98	26	24	21	48	1.57	-2.63	0.78	0	9	21	5	5	n.w.	A. C. Hanson
Lake Park (near).....	Dickinson	1,489	19	55.4	-2.1	94	24	23	7	42	2.36	-1.67	0.97	0	7	11	10	10	n.w.	P. M. Lawrence
Lo Mars.....	Plymouth	1,224	40	58.2	-0.8	91	24	28	7	41	2.73	-1.80	1.11	0	10	20	4	7	n.	Henry Newell
Marathon.....	Buena Vista	1,390	5								3.70	-1.71		T.	10	13	6	12	n.w.	E. G. Smith
Pocahontas.....	Pocahontas	1,248	27	57.5	-1.3	92	26	27	7	39	3.63	-0.80	1.32	0	9	16	8	7	n.w.	F. E. Hronek
Rock Rapids.....	Lyon	1,314	34	57.2	-0.8	92	26	25	7	45	1.11	-2.41	0.30	0	5	24	1	6	n.	Nellie F. Medberry
Sanborn.....	O'Brien	1,555	18	56.5	-1.6	91	26	25	21	39	2.02	-2.77	1.05	T.	9	13	10	8	s.w.	J. W. Dow
Sheldon.....	O'Brien	1,418	25	57.0	-1.2	92	24	25	21	42	1.82	-2.93	0.68	0	10	13	10	8	n.w.	Ross E. Forward
Sioux Center.....	Sioux	1,161	32	56.6	-1.6	90	24	25	21	38	2.31	-2.37	0.62	T.	8	16	8	7	n.w.	F. C. Aug
Spencer.....	Clay	1,319	23	57.4	-1.1	92	26	26	7	41	2.47	-1.73	1.42	0	9	12	12	7	n.w.	E. W. Little
Storm Lake.....	Buena Vista	1,442	41	56.4	-2.7	89	24	26	21	37	3.23	-1.26	1.58	T.	11	13	11	7	n.	Russel M. Edwards
Washta.....	Cherokee	1,157	34	57.4	-0.9	94	26	25	3	51	3.35	-1.27	1.50	0	10	19	3	9	n.	H. L. Felter
West Bend.....	Palo Alto	1,197	44	56.3	-3.0	91	27	27	7	45	3.72	-0.47	1.22	0	9	14	10	7	n.w.	Jos. Dorweiler
Means and extremes.....				57.0	-1.3	98	26	24	21	51	2.56	-1.82	1.71	T.	9	16	8	7	n.w.	
<i>North Central District</i>																				
Algona.....	Kossuth	1,207	70	56.8	-2.4	91	27	28	7	37	2.80	-1.48	1.11	0	10	13	9	9	n.w.	Leon M. Merritt
Allison (near).....	Butler	1,000	17	56.2	-2.5	91	27	27	7	39	3.23	-1.25	1.00	0	7	10	9	12	n.w.	George H. Bell
Belmond.....	Wright	1,181	22	56.0	-2.6	91	26	26	7	39	1.79	-3.42	0.68	T.	8	9	8	14	n.w.	H. F. Luick
Britt.....	Hancock	1,236	46	57.0	-1.0	92	26	28	7	37	2.59	-2.31	0.85	0	7	16	0	15	s.w.	E. P. Healy
Charles City.....	Floyd	1,015	56	55.4	-2.4	90	27	31	6	39	2.73	-1.60	1.39	0	10	13	7	11	n.w.	U. S. Weather Bureau
Forest City.....	Winnebago	1,226	41	55.4	-2.7	90	27	25	7	41	2.87	-1.77	1.12	0	8	12	9	10	n.w.	Dr. M. B. Neil
Hampton.....	Franklin	1,112	40	55.7		90	27	22	7	39	2.81	-2.19	1.13	0	8	22	3	6	n.w.	Howard J. Haydon
Humboldt.....	Humboldt	1,095	47	56.8	-3.2	93	26	24	7	39	3.51	-0.81	1.51	0	8	13	11	7	n.	H. C. Snitkey
Mason City.....	Cerro Gordo	1,118	39	54.6	-3.4	89	27	27	7	39	2.41	-2.28	0.69	T.	7	15	4	12	n.e.	American Beet Sugar Co
Northwood.....	Worth	1,222	35	55.2	-2.1	88	27	27	7	40	2.25	-2.84	0.65	T.	8	12	8	11	n.w.	Charles Dwelle
Osage.....	Mitchell	1,163	46	55.0	-2.8	89	27	29	6	38	1.96	-2.72	0.56	0	6	14	4	13	n.w.	Dr. C. E. Juhl
Means and extremes.....				55.8	-2.6	92	26	22	7	41	2.63	-2.06	1.51	T.	8	14	6	11	n.w.	
<i>Northeast District</i>																				
Cedar Falls.....	Black Hawk	875	12								3.02		1.82	0	7	13	6	12	n.w.	E. J. Cable
Decorah.....	Winneshiek	872	48	54.2	-4.2	87	27	25	23	44	3.79	-0.89	1.86	0	11	13	9	9	n.w.	M. D. Whitney
Delaware (near).....	Delaware	1,083	52	55.9		87	27	32	6	35	1.22		0.48	0	9	14	9	8	n.w.	E. J. Paris
Dubuque.....	Dubuque	700	80	56.8	-3.5	87	27	31	23	37	2.00	-2.22	0.60	0	9	10	6	15	s.	U. S. Weather Bureau
Fayette.....	Fayette	1,003	43	55.6	-2.4	88	27	28	23	43	1.84	-3.02	0.82	0	6	14	8	9	n.w.	W. C. Van Ness
Independence.....	Buchanan	956	71	55.9	-3.7	87	27	30	7	35	1.18	-3.65	0.58	0	6	15	8	8	n.e.	Dr. Geo. Boody
Lansing.....	Allamakee	632	28								2.65	-2.35	0.87	0	10					Mrs. Mary Spinner
New Hampton.....	Chickasaw	1,167	31	55.0	-3.3	87	27	29	6	40	3.21	-1.62	1.25	0	6	11	9	11	n.w.	D. W. Dawson
Oelwein.....	Fayette	1,036	8	55.6	-3.1	89	27	31	7	39	2.95	-1.47	0.95	0	7	13	7	11	n.w.	John T. Ridler
Postville (near).....	Clayton	1,192	40	53.4	-4.0	83	27	29	23	36	2.17	-2.89	0.75	T.	6	8	11	12	n.w.	F. L. Williams
Waterloo.....	Black Hawk	851	49	57.5	-2.7	91	27	29	7	42	2.10	-1.69	1.10	0	8	17	4	10	se.	R. B. Shippy
Waverly.....	Bremer	936	42	56.6	-2.2	89	27	31	6	40	2.16	-2.28	0.72	0	7	20	4	7	n.	D. H. Murphy
Means and extremes.....				55.6	-3.3	91	27	25	23	44	2.38	-2.20	1.86	T.	8	14	7	10	n.w.	
<i>West Central District</i>																				
Audubon (near).....	Audubon	1,297	38	58.6	-0.7	91	26	28	7	37	4.15	-0.23	1.58	0	8	18	7	6	n.w.	George Kibby
Carroll.....	Carroll	1,267	45	58.0	-1.9	89	27	28	7	33	3.35	-1.21	0.96	0	11	20	1	10	n.w.	Mrs. J. J. Wolfe
Denison.....	Crawford	1,200	47	58.6	-1.5	91	21	29	7	38	5.65	+1.37	1.85	0	8	10	15	6	n.w.	J. McMinimee
Guthrie Center.....	Guthrie	1,028	36	59.4	-0.1	92	27	25	7	42	4.21	-0.49	1.85	0	9	18	7	6	n.w.	Kenneth Hoyt
Harlan.....	Shelby	1,210	39	58.4	-1.7	94	27	28	7	42	3.85	-0.71	1.38	0	9	14	9	8	n.w.	Elmer Buss
Jefferson.....	Greene	1,052	39	58.0	-1.8	90	27	25	7	37	3.16	-1.39	1.92	0	7	14	7	10	sw.	W. I. Lyon
Little Sioux.....	Harrison	1,040	30	59.6	-1.5	92	24	30	7	41	1.33	-0.11	1.38	0	7	13	11	7	n.	H. W. Kerr
Logan.....	Harrison	1,120	65	59.0	-2.3	91	27	30	22	40	4.57	+0.33	1.86	0	7	11	16	4	sw.	Amy Ann Stern
Onawa.....	Monona	1,051	46	57.1	-3.8	86	26	29	21	39	3.89	-0.94	1.50	0	8	17	5	9	n.w.	Mrs. H. E. Colby
Rockwell City.....	Calhoun	1,232	41	57.2	-1.6	91	26	27	7	46	3.50	-1.43	1.14	0	9	21	3	7	n.w.	A. W. McIsaac
Sac City.....	Sac	1,207	62	57.5	-1.2	90	24	27	7	42	4.05	-0.11	1.53	0	8	13	8	10	s.	F. P. Kessler
Sioux City.....	Woodbury	1,135	56	58.4	-2.0	91	24	30	6	34	2.71	-1.34	1.31	T.	10	11	8	12	n.w.	U. S. Weather Bureau
Means and extremes.....				58.4	-1.6	91	27	25	7	42	3.99	-0.48	1.92	T.	8	14	9	8	n.w.	
<i>Central District</i>																				
Ames.....	Story	926	55	58.2	-2.6	91	27	25	7	36	2.68	-1.83	1.36	0	7	18	3	10	n.	Iowa State College
Baxter.....	Jasper	993	32	56.7	-3.8	89	27	21	7	41	1.71	-3.62	0.72	0	7	17	5	9	se.	Geo. R. Geiss
Boone (near).....	Boone	897	47	57.2	-2.7	90	27	21	7	43	3.10	-1.93	1.52	0	11	14	7	10	n.e.	Carl Fritz Henning
Des Moines.....	Polk	861	54	59.2	-2.1	90	27	28	7	34	2.68	-1.88	1.65	0	8	10	9	12	n.w.	U. S. Weather Bureau
Fort Dodge.....	Webster	1,114	43	57.2	-2.0	92	26	25	7	38	2.04	-2.54	0.66	0	13	20	3	8	sw.	Mrs. Emma Sampson
Grinnell.....	Poweshiek	1,031	47	57.1	-3.4	90	27	23	7	36	1.67	-3.30	0.76	0	8	18				

Climatological Data for May, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, 0.1 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	57.4	- 3.0	91	27	25	7	41	1.56	- 3.25	0.57	0	8	15	11	5	nw.	O. C. Burrows
Cedar Rapids.....	Jinn	735	49	57.3	- 3.4	90	16†	30	7	41	1.74	- 2.96	0.51	0	9	14	1	16	nw.	J. T. Wurster
Clinton.....	Clinton	595	60	57.0	- 4.1	88	27	33	21	39	3.07	- 1.53	1.45	0	12	16	2	13	nw.	Dr. A. P. Bryant
Davenport.....	Scott	580	60	58.4	- 2.9	88	27	35	7	37	3.21	- 0.73	1.21	0	12	11	7	13	nw.	U. S. Weather Bureau
Iowa City.....	Johnson	733	74	57.5	- 2.8	88	27	27	7	40	2.45	- 2.08	0.85	0	9	17	4	10	nw.	Prof. J. F. Reilly
La Claire.....	Scott	576	54								3.74	- 0.67	1.01	0	12					Margaret T. Disney
Maquoketa (near).....	Jackson	692	38	55.5	- 3.5	88	27	29	23	39	2.52	- 1.98	0.75	0	10	11	2	15	nw.	John Strodthoff
Muscatine.....	Muscatine	546	85								3.80	- 0.62	1.65	0	8					William Molis
Olin.....	Jones	750	33	56.4	- 3.9	87	27	30	3†	42	2.32	- 2.37	0.50	0	7	16	3	12	nw.	Mrs. L. Stingley
Tipton (near).....	Cedar	806	39	56.4	- 1.4	86	27	31	23	37	2.48	- 2.41	0.52	0	8	4	18	9	ne.	John Kroepfen
Williamsburg.....	owa	805	15	57.2	- 2.6	89	27	26	7	35	2.59	- 2.01	1.40	0	7	17	9	5	sw.	Dr. F. C. Schadt
Means and extremes.....				57.0	- 3.6	91	27	25	7	42	2.68	- 1.84	1.65	0	9	14	6	11	nw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	58.8	- 1.9	91	27	24	7	46	4.74	+ 0.51	2.14	0	11	15	8	8	n.	Roy L. Fancolly
Bodford.....	Taylor	1,201	27								1.59	- 3.00	0.75	0	7	13	8	10	nw.	Arthur L. Bishop
C'arinda.....	Page	1,001	59	59.6	- 3.3	92	25†	30	7	47	2.41	- 2.54	1.32	0	10	16	7	8	n.	Dr. H. C. Hawley
Corning.....	Adams	1,287	43	58.8	- 1.7	90	24	27	7	42	3.49	- 1.55	1.80	0	8	19	3	9	nw.	W. J. Wagner
Cumberland (near).....	Cass	1,225	32								4.56	+ 0.38	2.05	0	7	18	5	8	nw.	Carl E. Pollock
Glenwood.....	Mills	1,100	41	59.4	- 1.9	92	17	30	7	40	4.28	- 0.33	1.28	0	8	17	6	8	nw.	Dr. George Mogridge
Greenfield.....	Adair	1,368	35								3.61		1.40	0	8	13	9	9	nw.	P. C. Cornell
Lenox.....	Taylor	1,250	36	60.2	- 1.7	97	24	28	7	44	2.08	- 2.60	0.90	0	5	19	4	8	nw.	J. L. Hurley
Oakland.....	Pottawattamie	1,139	18	59.0	- 2.2	91	17	29	7	38	4.31	0.00	1.64	0	9	19	3	9	nw.	W. S. Matthews
Red Oak (near).....	Montgomery	1,036	24								1.89	+ 0.14	1.87	0	7	15	9	7	nw.	B. R. Bridge
Riverton (near).....	Fremont	920	5								4.30	- 0.50	1.73	0	7	13	7	11	s.	George C. Rader
Thurman.....	Fremont	960	44	59.7	- 3.0	92	17	31	7	37	5.22	+ 0.27	1.85	0	7	19	4	8	n.	H. H. Askew
Omaha, Neb.....		1,105	66	59.8	- 2.6	92	17	33	6	31	3.26	- 0.51	1.51	0	10	16	7	8	nw.	U. S. Weather Bureau
Means and extremes.....				59.4	- 2.3	97	24	24	7	47	3.75	- 0.82	2.14	0	8	16	6	9	nw.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	59.2	- 2.2	91	27	28	7	37	1.71	- 3.06	0.67	0	6	15	8	8	nw.	S. R. Brown
Albia.....	Wronoe	949	40	58.4	- 2.9	92	16	26	7	39	2.15	- 2.84	0.85	0	6	17	4	10	nw.	J. M. Stevenson
Centerville.....	Appanose	1,013	38	59.2	- 2.2	87	16†	28	7	36	5.02	+ 0.43	1.95	0	10	15	7	9	nw.	Thomas Wood, Jr.
Chariton (near).....	Cucas	1,042	37	57.1	- 2.7	85	24	25	7	33	1.83	- 2.69	1.39	0	5	14	8	9	nw.	C. C. Burr
Corrydon (near).....	Wayne	1,050	47	58.0	- 3.3	86	16†	28	7	35	2.06	- 2.61	0.74	0	9	16	5	10	nw.	J. C. Davis
Creston.....	Union	1,291	30	57.9	- 2.8	89	24	26	7	38	2.53	- 2.01	1.78	0	9	14	8	9	nw.	Mrs. N. Spangler
Indianola.....	Warren	972	50	59.5	- 2.0	91	27	26	7	36	3.13	- 1.32	1.32	0	7	14	8	9	sw.	Seth F. Shenton
Knoxville.....	Warion	920	41	58.4	- 3.1	89	27	26	7	37	2.22	- 2.03	0.85	0	8	17	8	6	nw.	W. J. Casey
Lacona.....	Warren	824	32								2.75	- 2.08	1.50	0	10	12	12	7	nw.	J. B. Alter
Lamoni.....	Decatur	1,123	27	58.4	- 2.8	87	25†	32	6	36	2.03	- 2.92	0.92	0	7	17	7	7	nw.	F. S. Parks
Melrose.....	Monroe	871	1								2.41		0.65	0	8	14	6	11	nw.	J. M. Carr
Mt. Ayr.....	Ringgold	1,220	39	58.2	- 3.1	88	27	29	7	38	1.52	- 3.95	0.58	0	6	22	2	7	s.	E. O. Gleason
Tingley.....	Ringgold	1,275	7	58.5	- 1.9	91	24	30	7	36	1.71	- 3.26	0.72	0	7	21	1	9	nw.	James A. Verploegh
Winterset.....	Madison	1,118	40	59.1	- 2.5	90	27	29	7	38	3.61	- 0.91	2.07	0	7	19	5	7	nw.	H. S. Ely
Means and extremes.....				58.5	- 2.6	92	16	25	7	39	2.48	- 2.21	1.95	0	8	16	6	9	nw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	57.2	- 4.1	87	16	27	7	32	4.19	- 0.44	1.29	0	10	17	4	10	nw.	B. R. Vale
Burlington.....	Des Moines	544	41	59.2	- 3.7	89	27	30	7	35	4.80	+ 0.27	1.39	0	12	12	8	11	sw.	John W. Donnelly
Columbus Junction.....	Louisa	595	40	57.6	- 4.6	87	27	28	7	40	2.96	- 1.35	0.83	0	10	13	13	5	nw.	Miss Musa Todd
Fairfield.....	Jefferson	780	51	57.2	- 3.9	88	27	26	7	38	3.21	- 2.23	1.13	0	9	14	2	15	n.	R. M. McKenzie
Keokuk.....	Lee	614	60	59.4	- 4.4	88	16	32	7	32	4.27	+ 0.31	1.64	0	12	11	9	11	sw.	U. S. Weather Bureau
Keokuk No. 2.....	Lee	651	2	59.2		88	16	29	7	34	5.06		1.63	0	13					J. N. D. Dickinson
Keosauqua.....	Van Buren	639	44	58.0	- 3.3	90	16	27	7	38	3.85	- 1.03	1.50	0	10	10	11	10	nw.	Dr. J. W. Rinabarger
Mt. Pleasant.....	Henry	730	55	58.4	- 4.1	87	16†	29	7	36	3.27	- 1.35	1.10	0	12	8	12	11	nw.	J. H. Jericho
Oskalosa.....	Mahaska	835	55	57.6	- 3.6	90	16	25	7	34	2.32	- 1.93	0.85	T.	10	13	7	11	n.	R. R. Robinson
Ottumwa.....	Wapello	619	44	58.5	- 4.5	91	16	26	7	46	3.52	- 1.13	1.12	0	9	16	3	12	nw.	C. L. Mikesch
Sigourney.....	Keokuk	785	36	57.7	- 3.1	91	27	26	7	37	2.51	- 1.76	0.80	0	9	14	9	8	n.	John B. Slate
Stockport (near).....	Van Buren	747	30	57.0	- 3.5	86	27	25	7	38	3.53	- 1.13	1.06	0	10	19	0	12	n.	C. L. Beswick
Washington.....	Washington	757	56	58.6	- 2.9	89	16†	26	7	37	3.53	- 0.61	1.10	0	9	11	9	11	se.	D. D. Sherman
Wever.....	Lee	552	3																	H. D. Liddle
Means and extremes.....				58.1	- 3.7	91	16†	25	7	46	3.62	- 0.91	1.64	T.	10	13	7	11	nw.	
State means and extremes.....				57.5	- 2.6	98	26	21	7	51	2.96	- 1.62	2.72	T.	9	15	7	9	nw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

‡Received too late to be included in means and summaries.

5.65 inches at Denison, and the least was 1.11 inches at Rock Rapids. The greatest amount occurring in 24 consecutive hours was 2.72 inches at Grundy Center on the 29th.

The average number of days with 0.01 inch or more of precipitation for the State was 9, ranging from 10 days in the southeast district, to 8 days in the south-central, north-central, northeast, west-central and southwest districts. For individual stations the range was from 13 days at Fort Dodge and Keokuk No. 2, to 5 days at Lenox and Rock Rapids.

SNOWFALL

The only snow reported was a trace at 11 stations. The snow melted as it fell, except at Sanborn it remained on the ground a few hours on the 20th. The normal May snowfall for the State is 0.1 inch.

RIVERS

Record low stages continued on nearly all the interior streams, with little fluctuation. At Des Moines, the extreme stages were



Daily Precipitation for May, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<b>Southwest District</b>																																	
Atlantic	Nishnabotna				.11	.01			.30	.20	.35	.05	T.			T.		.25	.66									.61	.21	.06		4.74	
Bedford	Nishnabotna				.08				.16	.10	.12							.05										.75	.33			1.59	
Clarinda	Nodaway				.24				.12	.20	.05	.07						.05	.07									.19	.32	.10		2.41	
Corning	Nodaway				.08				.25	.10	.20							.27										.77	.80			3.49	
Cumberland (near)	Nodaway				.08				.45	.12	.25							T.										.90	.20			4.56	
Glenwood	Missouri				.70			.02	.37	.02	.08							.71										1.10	1.28			4.28	
Greenfield	Nodaway				.05				.18	.22	.13	.02						.36										1.25	1.40			3.61	
Lenox	Missouri								.20	.10	.18							T.										.70	.90			2.08	
Oakland	Nishnabotna				.27	.49			.45	.05	.11							.62										1.64	.66			4.31	
Red Oak (near)	Nishnabotna				.33				.18	.13	.1							.57										1.87	1.67			4.89	
Riverton (near)	Nishnabotna				T.	.40			T.	.37	.01	.03						1.73										1.22	.51			4.30	
Thurman	Missouri				.45				.26	.05	.11							1.43										1.85	1.07			5.22	
Omaha, Neb.***	Missouri				.68	.57			.02	.22	.01	.04	T.				T.	.13							T.			.02	1.49	.08	T.	3.26	
<b>South Central District</b>																																	
Afton	Grand				.07					.15	.21							.03										.58	.67			1.71	
Albia	Des Moines			T.					.15	.19	.12	T.							.68									.85	.13			2.15	
Centerville	Chariton				.08				.28	.07	.04	.06							.80	.43								.56	.75	1.95		5.02	
Chariton (near)	Chariton								.10	T.	T.								.19	.15								1.14	.25			1.83	
Corydon (near)	Chariton							.13	.01	.05	.07	.02							.50									.61	.21	.40		2.06	
Creston	Missouri					T.	.04		T.	.09	.14	.13	.05					T.	.12									.16	1.78	.02		2.53	
Indianola	Des Moines	T.	T.			.07			.24	.80	.12	T.					T.	.17										.41	1.32			3.13	
Knoxville	Des Moines					.08			.41	.22	.08								.05	.13								.40	.85			2.22	
Lacona	Des Moines			.04		.06			.28	.40	.10								.28	.07								.50	1.00	.02		2.75	
Lamoni	Grand					.02			.03	.05	.17								T.	.42									.92	.42			2.03
Melrose	Des Moines					T.			.24	.10	.15	.07							.55									.65	.60	.05		2.41	
Mt. Ayr	Grand								.09	.14	.17								.17									.58	.37	T.		1.52	
Tingley	Platte					T.			T.	.14	.17	.10							.03	.07								.48	.72			1.71	
Winterset	Des Moines					.06			.17	.37	.04	T.							.27									.63	2.07			3.61	
<b>Southeast District</b>																																	
Bonaparte (near)	Des Moines				.06		T.		.41	.12	.31	.47							.22	1.07								.58	.35	.60		4.19	
Burlington	Mississippi				.27			.09	.20	.07	.03	.11	.02						1.27	.37								.90	1.39	.08		4.80	
Columbus Junction	Iowa				.04			T.	.38	.12	.21	.22							.18	.83								.13	.28	.57		2.96	
Fairfield	Skunk				.01	.05	T.	.17		.25	.25	T.							.41	.48								.76	.37	.65		3.21	
Keokuk***	Mississippi				.27		T.	.56	.10	.23	.23	.03							T.	1.29	.54	.03	.03					T.	.40	.56		4.27	
Keokuk No. 2	Mississippi				.20	.15	T.	.39	.30	.41	.40	.07	.01						.25	1.63	T.	.12						.32	.81			5.06	
Keosauqua	Des Moines				T.			.02	.03	.23	.32								1.40	.10						1.15	.35	.15	.10			3.85	
Mt. Pleasant	Skunk				.06		.14	.01	.33	.05	.06	.19							.25	1.10								.33	.52	.23		3.27	
Oskaloosa	Des Moines	.06	.02		.09	T.			.19	.28	.28	T.							T.	.34	.11							.38	.83	.02		2.32	
Ottumwa	Des Moines				.08				.20	.11	.05								.45	.40								.58	.54	1.11		3.52	
Sigourney	Skunk	T.			.10				.21	.31	.03	T.							.20	.30								.38	.80	.15		2.51	
Stockport (near)	Skunk				.07				.29	.09	.21	.14							.21	1.06								.48	.59	.39		3.53	
Washington	Skunk				.08				T.	.28	.08	.18							.45	.85								.12	.41	1.10		3.55	
Wever	Mississippi																											.94	.75	.88		**	

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

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

\*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.

\*\*Incomplete.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind				Sunshine					
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum			% possible Departure from normal				
					Date	7 A. M.	12 Noon	7 P. M.			Lowest	Date	Miles		From	Date		
Chas. City	29.92	30.36	22	29.40	9	71	50	51	21	24	4,396	5.9	22	s.	26	58	-	4
Davenport	29.91	30.36	23	29.36	9	69	51	55	21	1	6,223	8.4	30	sw.	5	59	-	3
Des Moines	29.91	30.36	22	29.48	10	72	17	48	18	25	6,811	9.2	34	s.	24	66	+	4
Dubuque	29.90	30.38	23	29.35	9	76	52	54	28	1	3,889	5.2	20	sw.	24	55	-	3
Keokuk	29.93	30.37	23	29.48	9	70	51	57	27	25	4,363	5.9	20	nw.	28	64	+	2
Sioux City	29.91	30.36	22	29.37	17	70	43	46	18	24	8,809	11.8	36	s.	23	69	+	11
Omaha, Nb	29.93	30.37	22	29.46	17	72	47	46	20	25	5,916	8.0	29	nw.	27	69	+	6
Means and extremes	29.92					71	49	51				7.8				63	+	1
Normals and records	29.95	30.38	23	29.35	9				18	24			36	s.	23			
			4th		17	77	59		3d						1st	62		
		*30.58	1910	\$29.02	1875	\$10								167	nw.	1894		

\*Dubuque §Omaha ||Also Sioux City, 9th, 1927 ¶Sioux City †Local mean time ‡And other dates.

‡January 1, 1929, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

1.4 feet and 0.9 foot, and averaged 1.1 feet, or 3.3 feet below normal. The reading, 0.9 foot, recorded on the 27th and 28th, established a new record low May reading at Des Moines.

The Missouri River averaged more than 3.0 feet below normal along the Iowa boundary.

The Mississippi River was at very low stages throughout the month. At Dubuque the average stage, 2.6 feet, was 6.7 feet be-

low the past average for May, and 0.9 foot lower than the lowest previous mean. The minimum stage, 1.8 feet, recorded on the last three days of the month, was 0.2 foot lower than had ever before been recorded in May. At Davenport the mean stage was 2.2 feet, the lowest May average of record, while the next lowest average stage for May was 2.7 feet in 1925. At Keokuk the average stage was 1.0 foot, which is 7.5 feet below normal, and is the lowest average on record since 1868.

MISCELLANEOUS PHENOMENA

Aurora: 7th.

Clouds, mammato cumulus: 17th, 28th.

Corona, lunar: 21st, 22d, 23d, 24th, 25th, 26th.

Dew, heavy: 6th, 11th, 13th, 30th, 31st.

Dust storm: 1st, 4th, 15th, 17th, 18th, 23d, 26th.

Fog, light: 10th.

Frost, light: 2d, 3d, 6th, 7th, 8th, 13th, 20th, 21st, 22d, 23d.

Frost, heavy: 2d, 6th, 7th, 8th, 13th, 20th, 21st, 22d, 23d.

Frost, killing: 2d, 6th, 7th, 8th, 20th, 21st, 22d.

Gales: 4th, 5th, 15th, 17th, 23d, 24th, 26th, 27th, 28th, 30th.

Halo, lunar: 24th, 26th.

Halo, solar: 3d, 16th, 19th, 21st, 26th, 27th, 30th.

Hail, light: 7th, 8th, 10th, 17th, 18th, 27th, 28th, 31st.

Hail, moderate: 17th, 28th.

Haze: 14th, 16th, 17th, 19th.

Irridescence: 23d.

Meteor: 17th.

Snow: 6th, 20th.

Thunderstorm: 1st, 4th, 5th, 8th, 9th, 10th, 17th, 18th, 23d, 24th, 26th, 27th, 28th, 29th, 31st.

Tornado: 17th, 28th.

Daily Maximum and Minimum Temperature for the Month of May, 1931

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.

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight.

IOWA STORMS, MAY, 1931

Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path Miles	Length of Path Miles	Area of Sq. Miles	Size of Hailstones Inches	Damage	Persons Killed	Persons Injured
5	Jefferson	Center	Wind	9:30 a. m. to 10:30 a. m.						Wind to trees and high lines, \$4,000		
5	Page	Washington, Colfax	Wind	9:30 a. m. to 10:30 a. m.						Wind to bldgs., \$6,000		
8	Lee	Keokuk, Jackson	Hail	Midnight to 12:15 a. m.					Marbles	Slight to trees and small plants		
17	Osceola	Ocheyedan	Tornado	5:30 p. m.	W to E		3			To trees and bldgs., \$5,000		
17	Dickinson	Silver Lake	Tornado and Hail	5:00 p. m.	W to E		2		Walnuts	Livestock, \$500		1
17	Plymouth	Fredonia	Wind	..... p. m.						Hail, slight		
28	Des Moines	Flint River	Tornado and Hail	3:00 p. m.	SW to NE		4		Marbles	Tornado, \$8,000		
28	Des Moines	Burlington, Tama	Hail and Wind	3:00 p. m.	SW to NE				Walnuts	Wind damage to trees and buildings, \$300		
28	Scott	Liberty	Tornado and Wind	2:30 p. m.	SW to NE	30 rods	2			Hail to crops, \$50		
										Tornado, \$800		
										Hail to greenhouses, \$200		
										Wind to trees, \$100		
										Tornado, \$2,000		
										Wind, \$500		

THE SPRING OF 1931

The mean temperature for the three spring months was 47.8°, which is 0.1° below the normal for the State, and 2.1° below the mean of 1930. March was nearly normal; April, 2.0° above normal; and May, 2.6° below normal. Out of 59 springs for which Statewide average temperatures are available, 30 average as cool or cooler, 27 have been warmer, and one exactly the same. The coolest spring of record was 1888, with a mean of 43°, and the warmest was 1921, with a mean of 52.8°. The highest temperature during the spring of 1931 was 98° at Inwood (near) on the 26th of May, and the lowest was 5° at Decorah on March 30.

The average monthly precipitation for the State was 2.31 inches, and the average total was 6.93 inches, or 2.37 inches less than the normal. March precipitation averaged 1.68 inches, which was 0.08 inch below normal, April was 2.29 inches, or 0.67 inch below normal, and May, 2.96 inches, or 1.62 inches below normal. Out of 59 springs for which Statewide average precipitation are available, only 14 have had less, 43 have had more, and one had the same. The spring having the least amount of average total precipitation was 1925, with 4.29 inches, and 1892 had the greatest, 15.74 inches.

The average total snowfall for the spring was 10.4 inches, which is 3.0 inches above normal, and 5.8 inches more than the spring of 1930. March snowfall averaged 10.3 inches, April 0.1 inch, and May, only a trace.

The deficient spring precipitation, coupled with general de-

ciency of the preceding 8 months, had a serious effect upon the streams and rivers, all failing to get the usual spring rise. In fact, most all of the streams showed nearly a continuous fall in their stages. Low water supply in wells and ponds became more serious daily, until the moderate rains which fell during the latter half of May gave temporary relief.

Rainy days were only two less than the spring normal, though the total precipitation was only 75% of the normal. The average number of days with 0.01 in or more of precipitation was 23, or 2 days less than last spring. The average number of clear days was 42, partly cloudy, 21, and cloudy, 29, as compared with 42 clear days, 22 partly cloudy days, and 28 cloudy days, during the spring of 1930.

N. G. R.

ERRATA

Report for March, 1931. Page 18, Guthrie Center; number of days with 0.01 in. or more of precipitation, published 6, should be 8. Page 18, Waukee; date of lowest temperature, published 15th, should be 16th. Page 19, Corning; number of days with 0.01 inch or more of precipitation, published 7, should be 8.

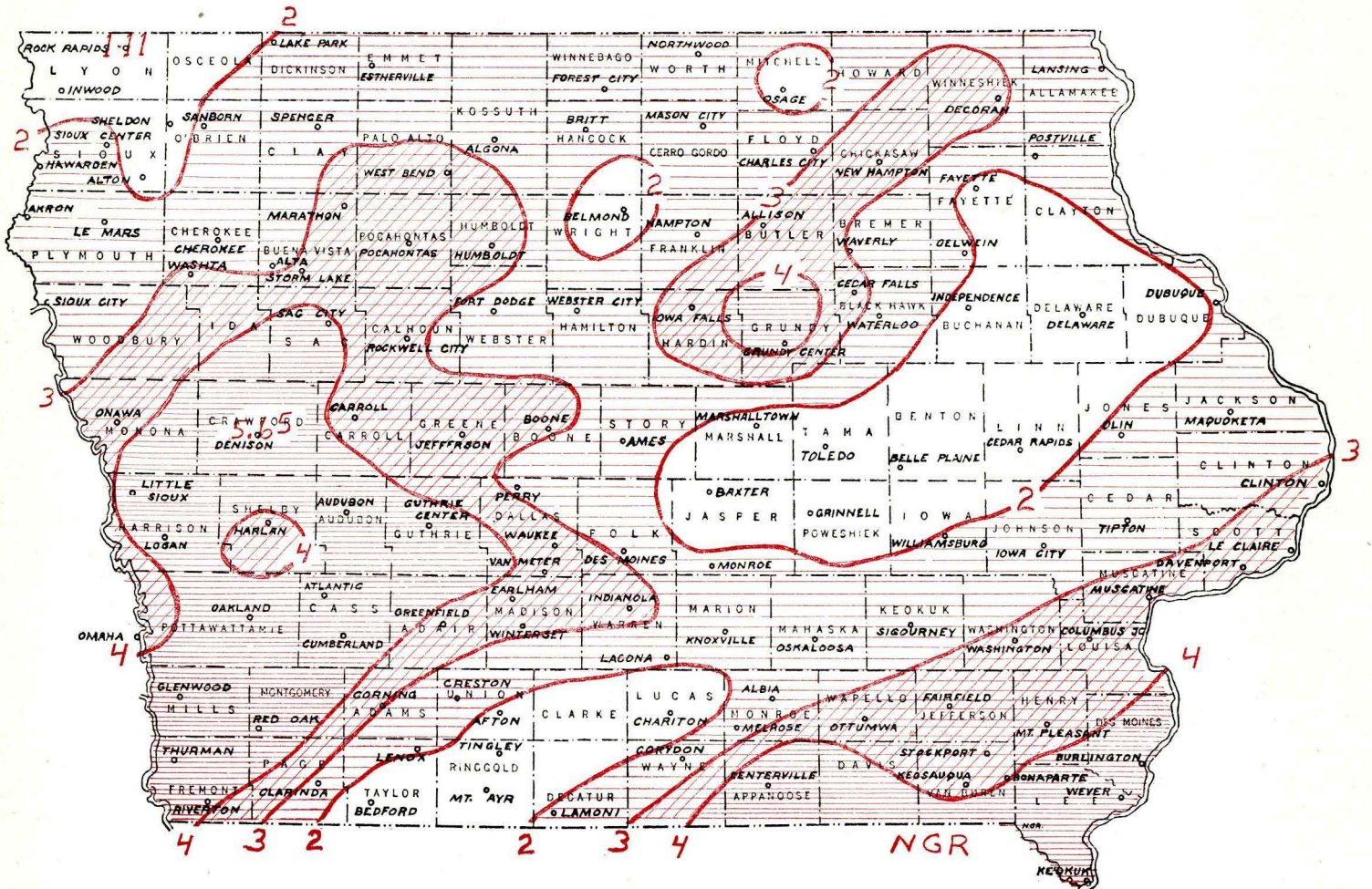
Report for April, 1931. Page 29, Des Moines; monthly sunshine percentage, published 57, should be 61. Monthly sunshine departure from normal, published -2 should be +2. Sioux City; monthly mean sea level barometric pressure, published 30.04 inches, should be 30.05 inches.

CLIMATOLOGICAL DATA: IOWA SECTION

Wheat

rt, June 18, 188  
at mail.

TOTAL PRECIPITATION, MAY, 1931



SCALE OF SHADE IN INCHES





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

# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU  
CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, JUNE, 1931 No. 6

## COMPARATIVE DATA FOR THE STATE—JUNE

### GENERAL SUMMARY

Record breaking high temperatures in northern Iowa, damaging local downpours of rain in the southwestern portion, and the continuation of the drouth over the north half of the State, were the outstanding features of the weather of June, 1931.

The mean temperature for the State was 75.0°, or 5.7° above normal, and 6.0° warmer than June, 1930, making it next to the warmest June of record, exceeded only by June, 1911, with a mean of 75.7°. The temperature was above normal at all stations. Excepting a few scattered stations, the monthly maximum temperatures broke all previous high records in the northern half of Iowa. Out of 107 temperature recording stations, 51 broke all previous high records, and 17 equaled their record. The mean temperature this month was the first June mean since 1925 to be above normal. Most of the excess heat occurred during the last week of the month. Hundreds and possibly thousands of horses at work in the fields died from the effects of the succession of 100-degree days in most of the State. Scores of persons died or were prostrated by the heat.

The local downpour of rain which occurred in the western and southwestern districts on the 12th, 15th and 20th, caused local floods in the rivers and arroyos, inundating the farm land and doing considerable damage to crops by flooding and erosion in the southwestern portion of the State. Washouts of railways and highways occurred in a few localities in Cass, Fremont and Pottawattamie counties.

Wind squalls, tornadoes and hailstorms were not especially numerous nor destructive, probably less so than usual.

The drouth continued throughout the northern half of Iowa, being most serious in the northwest district. The water supply continued seriously deficient, and wells and the subsoil showed very little influence from the rains during the month. Pastures were short and badly burned in several of the northern and a few eastern counties.

During intervals between the showery periods, farm work progressed normally. With favorable growing weather, corn grew so rapidly very little could be cultivated, except in the south-eastern district, at the close of the month. Fields were generally clean except in some southeast counties.

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
1873.....	74.5	+ 5.2	96	56	4.68	+ 0.18	8.40	1.20					
1874.....	71.4	+ 2.1	98	47	5.83	+ 1.33	8.55	2.60					
1875.....	67.5	- 1.8	92	45	7.81	+ 3.31	10.80	1.63					
1876.....	67.6	- 1.7	92	41	4.09	+ 0.41	10.34	0.25					
1877.....	66.9	- 2.4	92	40	6.80	+ 2.30	13.12	3.21					
1878.....	66.7	- 2.6	94	44	6.34	+ 1.84	11.60	2.78					
1879.....	69.4	+ 0.1	92	40	5.12	+ 0.62	10.60	1.47					
1880.....	71.0	+ 1.7	96	42	4.40	+ 0.10	11.12	1.03					
1881.....	70.4	+ 1.1	100	40	7.37	+ 2.87	17.37	2.75					
1882.....	68.1	- 1.2	98	33	7.48	+ 2.98	15.41	2.93					
1883.....	67.6	- 1.7	96	38	6.69	+ 2.19	14.20	1.30					
1884.....	70.2	+ 0.9	95	36	3.65	+ 0.85	8.80	0.70					
1885.....	67.9	- 1.4	89	42	5.08	+ 0.58	11.04	1.31					
1886.....	69.3	0.0	98	34	1.73	+ 2.77	3.42	0.10					
1887.....	72.1	+ 2.8	103	40	2.93	+ 1.57	7.92	0.96					
1888.....	69.4	+ 0.1	102	34	2.93	+ 1.57	6.01	0.96					
1889.....	66.7	- 2.6	98	33	4.75	+ 0.25	9.87	1.69					
1890.....	72.2	+ 2.9	106	39	6.67	+ 2.17	16.53	1.57	11	12	10	8	
1891.....	69.1	- 0.2	99	37	5.39	+ 0.89	19.88	1.68	11	8	10	12	
1892.....	69.2	- 0.1	102	42	5.19	+ 0.69	14.16	0.67	10	12	11	7	
1893.....	71.2	+ 1.9	100	40	3.91	+ 0.59	7.56	1.36	8	15	11	4	
1894.....	73.2	+ 3.9	104	34	2.67	+ 1.83	6.20	0.57	7	16	10	4	
1895.....	69.7	+ 0.4	102	34	4.32	+ 0.18	9.26	0.98	10	11	11	8	
1896.....	69.1	- 0.2	100	40	3.11	+ 1.39	7.89	0.81	9	12	13	5	
1897.....	69.1	- 0.2	103	29	3.81	+ 0.69	9.38	1.03	10	10	12	8	
1898.....	71.4	+ 2.1	99	42	4.72	+ 0.22	12.48	1.90	9	13	10	7	
1899.....	70.7	+ 1.4	100	42	5.04	+ 0.54	11.99	1.10	10	12	13	5	
1900.....	69.7	+ 0.4	102	38	3.98	+ 0.52	12.35	0.67	5	17	10	3	
1901.....	72.3	+ 3.0	106	30	3.71	+ 0.79	7.84	1.05	9	15	11	4	
1902.....	65.2	- 4.1	97	32	7.16	+ 2.66	16.04	1.46	14	8	11	11	
1903.....	64.6	- 4.7	96	30	2.86	+ 1.64	6.04	0.75	10	13	10	7	
1904.....	67.1	- 2.2	94	35	3.45	+ 1.05	8.35	0.44	7	13	10	7	
1905.....	69.9	+ 0.6	100	36	5.53	+ 1.03	14.89	1.80	10	12	11	7	
1906.....	67.9	- 1.4	99	37	3.92	+ 0.58	8.27	1.48	8	15	10	5	
1907.....	66.5	- 2.8	98	36	5.35	+ 0.85	9.33	2.07	11	14	9	7	
1908.....	67.1	- 2.2	94	35	5.66	+ 1.16	11.88	1.77	13	12	10	8	
1909.....	69.1	- 0.2	96	40	6.41	+ 1.91	13.30	2.80	13	12	10	8	
1910.....	69.5	+ 0.2	105	33	1.99	+ 2.51	5.51	0.05	7	18	7	5	
1911.....	75.7	+ 6.4	108	36	1.82	+ 2.68	6.28	0.06	5	20	8	2	
1912.....	66.2	- 3.1	101	34	2.74	+ 1.76	5.71	0.78	7	15	9	6	
1913.....	71.5	+ 2.2	102	33	3.31	+ 1.19	8.95	0.74	7	19	8	3	
1914.....	72.2	+ 2.9	101	40	5.57	+ 1.07	13.21	1.17	13	12	14	4	
1915.....	65.1	- 4.2	91	31	4.16	+ 0.34	9.99	1.72	11	12	12	6	
1916.....	64.5	- 4.8	96	38	3.71	+ 0.79	7.96	1.41	10	13	11	6	
1917.....	66.0	- 3.3	100	32	6.65	+ 2.15	13.82	3.04	12	13	10	7	
1918.....	71.8	+ 1.5	104	38	5.29	+ 0.79	10.19	1.55	11	16	10	4	
1919.....	71.9	+ 2.6	98	41	6.13	+ 1.63	12.25	1.82	13	12	12	6	
1920.....	70.7	+ 1.4	99	40	3.56	+ 0.94	8.48	1.25	9	16	10	4	
1921.....	74.7	+ 5.4	100	40	3.76	+ 0.74	8.85	0.56	9	16	10	4	
1922.....	72.2	+ 2.9	104	38	1.82	+ 2.68	7.19	0.28	6	19	8	3	
1923.....	70.9	+ 1.6	100	40	4.93	+ 0.43	7.69	2.43	12	14	10	6	
1924.....	66.8	- 2.5	96	35	8.10	+ 3.60	14.92	4.00	14	11	14	5	
1925.....	70.4	+ 1.1	98	38	6.64	+ 2.14	13.30	2.99	12	15	9	6	
1926.....	66.2	- 3.1	105	32	4.52	+ 0.02	12.09	1.05	8	16	9	5	
1927.....	66.4	- 2.9	101	35	2.42	+ 2.08	7.05	0.55	9	16	7	7	
1928.....	64.5	- 4.8	88	31	5.38	+ 0.88	10.31	2.31	12	10	10	10	
1929.....	67.6	- 1.7	99	38	3.08	+ 1.42	8.47	0.82	9	14	9	7	
1930.....	69.0	- 0.3	101	37	5.83	+ 1.33	13.49	2.48	10	16	10	4	
1931.....	75.0	+ 5.7	106	36	3.73	+ 0.77	8.11	1.31	9	18	8	4	
Normals.....	69.3		99	37	4.50		10.48	1.45	10	14	10	6	
Highest.....	75.7		108	56	7.81		19.88	4.00	14	20	14	12	
Lowest.....	64.5		88	29	1.73		3.42	0.05	5	8	7	3	

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

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 107 stations, was 75.0°, or 5.7° above normal. The greatest district excess, 7.0°, was in the northwest district, and the least excess, 4.1°, was in the southeast district. The highest monthly mean temperature was 78.0° at Little Sioux, and the least was 70.6° at Postville (near). The absolute range in temperature for the State was 70°, from 106° at Inwood (near) and Waterloo on the 28th, to 36° at Estherville on the 8th. The average number of days with the maximum temperature 100° or higher was 3, ranging from 8 days at Waterloo, Waverly, Toledo and Cedar Rapids, to none at



Climatological Data for June, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	
<i>Northwest District</i>																		
Akron	Plymouth	1,153	4															Orlan C. Moore
Alta	Buena Vista	1,513	41	75.2	+ 7.4	102	28	44	7	37	2.91	- 2.25	1.26	0	10	19	8	D. E. Hadden
Alton	Sioux	1,305	26	75.6	+ 7.2	102	28	43	8	40	3.69	- 0.27	2.04	0	11	11	14	W. S. Slagle
Cherokee	Cherokee	1,196	11	74.8	+ 7.3	100	28	42	8	39	2.25	- 2.19	1.25	0	10	15	12	J. E. Wirth
Estherville	Emmet	1,298	37	74.1	+ 7.2	102	28	36	8	44	1.10	- 0.24	1.20	0	9	20	10	A. O. Peterson
<i>Hawarden</i>																		
Hawarden	Sioux	1,181	5															Earl V. Slife
Inwood (near)	Lyon	1,474	28	75.6	+ 7.9	106	28	41	7	42	2.85	- 2.46	1.00	0	14	21	6	A. C. Hanson
Lake Park (near)††	Dickinson	1,489	19	73.2	+ 5.9	102	28	42	8	38	2.24	- 1.66	0.75	0	7	17	6	P. M. Lawrence
La Mars	Plymouth	1,224	40	76.6	+ 8.0	104	28	44	8	40	3.01	- 1.37	1.06	0	10	23	3	Henry Newell
Marathon	Buena Vista	1,390	5															E. G. Smith
<i>Pocahontas</i>																		
Pocahontas	Pocahontas	1,248	27	74.8	+ 6.5	101	28†	42	8	36	2.81	- 1.83	0.81	0	8	18	8	F. E. Hronek
Rock Rapids	Lyon	1,349	34	75.4	+ 7.5	104	28	42	6†	43	2.05	- 2.57	0.64	0	9	26	1	Nellie F. Medberry
Sanborn	O'Brien	1,553	18	74.6	+ 6.9	102	28	43	7†	40	2.62	- 2.11	0.72	0	13	9	17	J. W. Dow
Sheldon	O'Brien	1,418	25	75.2	+ 7.7	102	28	42	7†	42	2.45	- 1.95	1.13	0	10	13	13	Ross E. Forward
Sioux Center	Sioux	1,461	32	74.2	+ 6.7	101	28	42	7	37	3.34	- 0.72	2.35	0	7	18	8	F. C. Aue
<i>Spencer</i>																		
Spencer	Clay	1,319	23	75.2	+ 6.7	102	28	42	8	39	3.38	- 0.82	1.40	0	12	15	12	E. W. Little
Storm Lake	Buena Vista	1,442	41	73.7	+ 5.2	98	28	44	7†	33	2.57	- 2.43	1.19	0	8	17	8	Russel M. Edwards
Washta	Cherokee	1,157	34	75.8	+ 7.7	105	28	40	8	45	2.83	- 1.75	1.09	0	8	16	10	H. L. Felter
West Bend	Palo Alto	1,197	44	74.2	+ 5.8	99	28	44	8	32	3.05	- 1.24	1.19	0	8	19	9	Jos. Dorweiler
Means and extremes				74.9	+ 7.0	106	28	36	8	45	2.87	- 1.61	2.35	0	10	17	9	4 s.
<i>North Central District</i>																		
<i>Algona</i>																		
Algona	Kossuth	1,207	70	74.7	+ 6.1	101	28	44	8	31	3.53	- 0.98	1.70	0	10	18	8	4 se.
Allison (near)	Butler	1,000	17	74.6	+ 6.5	101	28	41	8	31	2.17	- 1.58	0.60	0	8	15	10	5 sw.
Belmond	Wright	1,181	22	75.2	+ 6.7	103	28	39	8	37	3.52	- 1.24	1.50	0	11	16	7	7 sw.
Britt	Hancock	1,236	46	74.6	+ 7.2	103	28	41	8	32	3.85	- 0.68	1.03	0	12	23	2	5 sw.
Charles City	Floyd	1,015	56	74.5	+ 8.0	102	28	42	8	33	2.41	- 2.22	1.31	0	9	14	10	6 se.
<i>Forest City</i>																		
Forest City	Winnebago	1,226	41	73.4	+ 5.6	101	28	40	8	36	3.61	- 0.94	1.72	0	10	13	12	5 sw.
Hampton	Franklin	1,142	40	74.7		102	26	41	8	34	2.23	- 2.71	0.80	0	5	25	2	3 sw.
Humboldt	Humboldt	1,095	47	74.7	+ 5.4	100	28†	40	8	35	4.40	+ 0.02	2.77	0	10	18	8	4 sw.
Mason City	Cerro Gordo	1,148	39	73.2	+ 5.6	102	28	37	8	38	2.58	- 2.56	1.43	0	8	19	9	2 sw.
Northwood	Worth	1,222	35	73.0	+ 6.3	99	28	43	8	32	3.24	- 1.62	2.05	0	8	14	10	6 sw.
Osage	Mitchell	1,163	46	73.8	+ 6.6	103	28	43	8	35	2.18	- 2.57	1.32	0	7	12	13	5 sw.
Means and extremes				74.2	+ 6.4	103	28	37	8	38	3.07	- 1.55	2.77	0	9	17	8	5 sw.
<i>Northeast District</i>																		
<i>Cedar Falls</i>																		
Cedar Falls	Black Hawk	875	12															E. J. Cable
Decorah	Winneshiek	872	48	72.8	+ 4.8	102	28	37	8	35	2.72	- 1.80	0.77	0	13	14	11	5 se.
Delaware (near)	Delaware	1,083	52	74.0		103	28†	41	8	34	1.34		0.76	0	7	18	10	2 sw.
Dubuque	Dubuque	700	80	75.1	+ 5.7	103	28	45	8	31	2.31	- 2.00	0.67	0	9	12	6	12 s.
Fayette	Fayette	1,003	43	74.4	+ 7.1	104	28	38	8	34	2.65	- 2.19	1.28	0	10	17	9	4 s.
<i>Independence</i>																		
Independence	Buchanan	956	71	73.6	+ 5.3	100	28†	44	8	30	1.52	- 3.10	0.46	0	7	20	3	7 sw.
Lansing	Allamakee	632	28															Dr. Geo. Boody
New Hampton	Chickasaw	1,169	34	72.7	+ 5.0	101	28	37	8	36	3.10	- 1.47	0.76	0	10	13	12	5 s.
Oelwein	Fayette	1,036	8	75.2	+ 7.4	104	28	30	8	32	2.25	- 2.21	0.55	0	6	17	4	9 s.
Postville (near)	Clayton	1,192	40	70.6	+ 4.9	96	28	41	8	27	1.99	- 2.67	0.73	0	8	15	12	3 sw.
Waterloo	Black Hawk	854	49	76.0	+ 6.6	106	28	40	8	34	1.50	- 2.63	0.47	0	10	21	6	3 sw.
Waverly	Bremer	936	42	74.8	+ 6.6	103	28	39	7	35	1.71	- 2.56	0.40	0	9	26	2	2 se.
Means and extremes				73.9	+ 5.9	106	28	37	8	36	2.15	- 2.34	1.28	0	9	17	8	5 sw.
<i>West Central District</i>																		
<i>Audubon (near)</i>																		
Audubon (near)	Audubon	1,297	38	76.0	+ 7.7	100	28	47	7	35	5.95	+ 1.93	1.83	0	9	18	10	2 s.
Carroll	Carroll	1,265	45	75.0	+ 6.6	98	28†	46	7†	31	4.55	+ 0.23	1.25	0	10	24	2	4 se.
Denison	Crawford	1,200	47	75.5	+ 6.4	98	28	45	8	35	5.18	+ 1.09	1.70	0	10	10	18	2 sw.
Guthrie Center	Guthrie	1,028	36	77.0	+ 8.0	101	28	44	8	37	5.95	+ 1.49	2.94	0	9	21	7	2 s.
Harlan	Shelby	1,210	39	75.8	+ 6.7	100	28	43	7	36	4.95	+ 0.32	2.71	0	11	15	11	4 sw.
<i>Jefferson</i>																		
Jefferson	Greene	1,052	39	75.0	+ 5.8	98	28	43	8	33	3.18	- 1.02	1.50	0	6	18	7	5 sw.
Little Sioux	Harrison	1,040	30	78.0	+ 7.9	101	28	45	7	32	3.30	- 0.96	1.49	0	9	14	14	2 s.
Logan	Harrison	1,120	65	76.0	+ 6.2	101	28	47	7	34	5.15	- 0.03	2.30	0	8	13	14	3 s.
Onawa	Monona	1,051	46	75.7	+ 5.7	100	28	45	7	35	3.20	- 1.48	1.38	0	10	17	7	6 sw.
Rockwell City††	Calhoun	1,232	44	75.2	+ 5.8	103	28	40	8	49	3.47	- 1.26	1.20	0	7	22	2	6 sw.
<i>Sac City</i>																		
Sac City	Sac	1,209	62	74.9	+ 5.6	99	28	41	8	39	7.88	+ 3.13	6.10	0	6	16	9	5 s.
Sioux City	Woodbury	1,135	56	77.2	+ 7.7	102	28	46	7	31	2.90	- 1.09	1.00	0	11	11	9	10 s.
Means and extremes				75.9	+ 6.6	103	28	40	8	49	4.64	+ 0.16	6.10	0	9	17	9	4 s.
<i>Central District</i>																		
<i>Ames</i>																		
Ames	Story	926	55	75.7	+ 5.8	101	28†	43	8	30	4.06	- 0.31	0.92	0	9	22	3	5 s.
Baxter	Jasper	993	32	74.1	+ 4.5	100	28†	42	8	30	1.05	- 0.54	1.31	0	10	11	13	6 sw.
Roone (near)	Boone	894	47	74.4	+ 5.4	100	28†	39	8	36	3.88	- 0.65	0.88	0	9	16	9	5 s.
Des Moines	Polk	861	51	76.4	+ 5.8	99	28	46	8	30	6.14	+ 1.38	2.69	0	10	15	9	6 s.
Fort Dodge	Webster	1,114	43	75.3	+ 6.3	102	28	41	8	34	2.58	- 1.84	0.61	0	12	22	5	3 sw.
<i>Grinnell</i>																		
Grinnell	Poweshiek	1,031	47	75.0	+ 5.4	101	25†	41	8	29	4.26	- 0.29	1.14	0	9	22	2	6 sw.
Grundy Center	Grundy	976	40	74.0	+ 4.3	102	28	42	8	31	1.76	- 3.32	0.65	0	7	20	4	6 s.
Iowa Falls	Hardin	1,127	49	74.8	+ 6.9	103	28	41	8	32	1.47	- 3.99	0.84	0	8	18	10	2 sw.
Marshalltown	Marshall	947	53	76.5	+ 6.2	103	28	44	8	29	2.25	- 2.32	0.76	0	9	18	7	5 sw.
Monroe	Jasper	922	20	75.6	+ 5.8	99	28†	45	8	30	3.78	- 0.72	1.57	0	9	23	4	3 s.
<i>Newton</i>																		
Newton	Jasper	943		74.8	+ 5.2	100	28	43	8	31	2.98	- 1.59	0					

Climatological Data for June, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	74.9	+ 5.7	102	26†	39	8	34	1.92	- 2.43	0.80	0	8	19	7	4	s.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly
Cedar Rapids.....	Linn	737	49	75.1	+ 6.0	103	26†	41	8	36	1.81	- 2.54	1.33	0	7	17	3	10	sw.	
Clinton.....	Clinton	595	60	74.8	+ 4.4	104	29†	41	8	33	3.26	- 1.13	1.26	0	9	20	5	5	s.	
Davenport.....	Scott	580	60	76.5	+ 6.0	104	30	46	8	26	2.21	- 1.90	1.58	0	6	12	10	8	sw.	
Iowa City.....	Johnson	733	71	74.6	+ 5.5	102	28	42	8	30	3.06	- 1.43	1.60	0	8	14	9	7	s.	
La Claire.....	Scott	576	54								3.05	- 1.11	1.71	0	6					Margaret T. Disney John Strothoff William Molis Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	73.3	+ 5.7	104	28†	39	8	39	2.38	- 2.42	0.63	0	7	17	5	8	sw.	
Muscatine.....	Muscatine	546	85								2.36	- 2.07	1.52	0	6					
Olin.....	Jones	750	33	73.8	+ 4.3	103	28	39	8	38	1.95	- 2.23	1.20	0	4	22	4	4	sw.	
Tipton (near).....	Cedar	806	39	73.2	+ 2.5	101	30	40	8	32	1.65	- 2.45	0.95	0	5	4	22	4	s.	
Williamsburg.....	Iowa	805	15	75.4		104	28†	45	8	32	2.78	- 1.72	0.95	0	7	22	5	3	se.	Dr. F. C. Schadt
Means and extremes.....				74.6	+ 5.1	104	28†	39	8	39	2.40	- 1.94	1.71	0	7	16	8	6	s.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	75.6	+ 6.2	98	28†	45	8	37	7.07	+ 2.01	2.78	0	9	16	11	3	s.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock
Bedford.....	Taylor	1,200	27								3.62	- 0.47	0.88	0	9	21	4	5	sw.	
Clarinda.....	Page	1,009	59	76.4	+ 5.0	102	28	50	7†	33	5.30	+ 0.59	1.93	0	9	20	7	3	s.	
Corning.....	Adams	1,287	43	74.8	+ 5.5	99	29	48	7†	29	4.28	+ 0.15	2.15	0	8	19	10	1	s.	
Cumberland (near).....	Cass	1,225	32								5.79	+ 1.47	2.62	0	11	18	9	3	s.	
Glenwood.....	Mills	1,100	41	76.8	+ 6.4	102	28	50	8	32	6.04	+ 1.17	2.20	0	8	20	9	1	se.	Dr. George Mogridge P. C. Cornell J. L. Hurley W. S. Matthews B. R. Bridge
Greenfield.....	Adair	1,368	35								5.62	- 2.70	0	10	14	14	2	2	s.	
Lenox.....	Taylor	1,250	36	76.8	+ 6.0	102	28†	49	7†	32	3.08	- 1.09	1.65	0	7	23	5	2	s.	
Oakland.....	Pottawattamie	1,139	18	76.2	+ 6.0	98	28	48	7†	37	4.33	- 0.47	2.44	0	7	21	6	3	sw.	
Red Oak (near).....	Montgomery	1,030	21								3.98	- 0.67	1.96	0	9	14	14	2	s.	
Riverton (near).....	Fremont	920	5								6.25	+ 1.39	2.62	0	8	15	8	7	s.	George C. Rader H. H. Askew U. S. Weather Bureau
Thurman.....	Fremont	960	44	76.8	+ 4.7	99	28	50	7	34	7.58	+ 2.38	2.35	0	9	22	4	4	s.	
Omaha, Neb.....	Fremont	1,105	66	79.0	+ 7.4	102	28	51	7	30	4.96	+ 0.40	2.68	0	8	18	6	6	s.	
Means and extremes.....				76.6	+ 5.9	102	28†	45	8	37	5.22	+ 0.60	2.78	0	9	19	8	3	s.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	76.7	+ 7.3	101	28	49	7†	31	4.94	+ 0.01	2.80	0	8	19	6	5	sw.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis
Albia.....	Monroe	949	10	74.8	+ 4.4	98	28	42	8	32	5.44	+ 1.12	1.54	0	8	17	6	7	sw.	
Centerville.....	Appanoose	1,013	38	75.0	+ 4.5	98	29†	44	8	32	4.18	- 0.22	1.20	0	9	19	7	4	sw.	
Chariton (near).....	Lucas	1,042	37	73.4	+ 4.6	100	28	44	7	32	4.04	- 0.34	1.95	0	6	17	9	4	sw.	
Corydon (near).....	Wayne	1,050	47	73.8	+ 3.6	95	28†	47	8	27	6.16	+ 1.52	1.79	0	9	17	6	7	s.	
Creston.....	Union	1,291	30	74.4	+ 5.7	97	28	47	8	30	5.17	+ 0.22	2.50	0	8	14	13	3	sw.	Mrs. N. Spangler Seth F. Shenton W. J. Casey J. B. Alter F. S. Parks
Indianola.....	Warren	972	50	76.0	+ 6.0	99	28	46	8	31	5.83	+ 1.39	2.11	0	11	16	10	4	s.	
Knoxville.....	Marion	920	41	75.2	+ 4.7	99	28†	43	8	29	3.72	- 0.38	1.66	0	7	18	7	5	se.	
Lacona.....	Warren	824	32								6.35	+ 1.78	3.04	0	11	12	16	2	se.	
Lamoni.....	Decatur	1,123	27	75.2	+ 5.6	102	25†	47	8	32	2.96	- 1.89	0.96	0	8	20	6	4	se.	
Melrose.....	Monroe	871	1								5.33	- 2.03	0	6	20	7	3	sw.	J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely	
Mt. Ayr.....	Ringgold	1,220	39	74.7	+ 4.7	100	27	46	8	31	3.70	- 1.04	1.01	0	6	23	4	3		sw.
Tingley.....	Ringgold	1,275	7	75.3	+ 5.5	101	28	48	8	30	3.50	- 1.17	0.82	0	8	24	3	3		sw.
Winterset.....	Madison	1,118	40	75.8	+ 5.4	100	28	50	7†	29	5.58	+ 0.71	1.63	0	10	21	7	2		sw.
Means and extremes.....				75.0	+ 5.2	102	25†	42	8	27	4.78	+ 0.23	3.04	0	8	18	8	4	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	73.6	+ 3.5	97	28†	45	8	25	4.72	+ 0.36	1.42	0	8	20	7	3	sw.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau
Burlington.....	Des Moines	544	41	76.4	+ 4.7	102	27†	47	8	28	3.81	- 0.48	2.12	0	8	20	8	2	sw.	
Columbus Junction.....	Louisa	595	40	73.2	+ 2.5	99	30	44	8	30	2.53	- 1.77	0.71	0	8	17	12	1	sw.	
Fairfield.....	Jefferson	780	51	73.5	+ 3.7	100	28†	44	8	30	4.30	- 0.53	2.13	0	10	13	10	7	s.	
Keokuk.....	Lee	614	60	76.5	+ 4.0	102	30	48	8	24	6.56	+ 2.43	2.22	0	10	13	8	9	sw.	
Keokuk No. 2.....	Lee	651	2	75.8		102	29†	45	8	27	7.45	- 2.16	0	9						J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesh
Keosauqua.....	Van Buren	639	44	74.4	+ 2.2	99	28	44	8	39	6.48	+ 2.01	2.00	0	8	16	14	0	se.	
Mt. Pleasant.....	Henry	730	55	74.8	+ 3.2	102	30	45	8	30	3.80	- 1.23	1.17	0	7	6	21	3	sw.	
Oskaloosa.....	Mahaska	835	55	74.5	+ 5.9	99	28†	44	8	27	3.87	- 0.11	1.51	0	11	16	7	7	sw.	
Ottumwa.....	Wapello	649	44	74.8	+ 3.1	100	30	44	8	36	6.95	+ 2.94	3.20	0	10	19	6	5	sw.	
Sigourney.....	Keokuk	785	36	74.8	+ 5.1	101	28	42	8	32	2.91	- 1.35	0.73	0	9	20	6	4	sw.	John B. Slate C. L. Beswick D. D. Sherman H. D. Liddle
Stockport (near).....	Van Buren	747	30	74.4	+ 4.7	100	28†	44	8	29	4.72	+ 0.23	1.33	0	11	19	5	6	s.	
Washington.....	Washington	757	56	74.4	+ 4.2	99	28†	45	8	27	3.50	- 0.41	1.02	0	5	13	12	5	se.	
Wever.....	Lee	552	3	73.8		102	30	46	8	30	4.37	- 1.50	0	8	15	9	6	s.		
Means and extremes.....				74.7	+ 4.1	102	27†	42	8	39	4.71	+ 0.37	3.20	0	9	16	10	4	sw.	
State means and extremes.....				75.0	+ 5.7	106	28	36	8	49	3.73	- 0.77	6.10	0	9	18	8	4	sw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

‡Received too late to be included in means and summaries.

25 stations, mainly in the south-central, southwest and west-central counties. The average number of days with the maximum temperature 90° or higher was 12, ranging from 16 days at Lenox, to 6 days at Postville (near). The greatest daily range in temperature at any station was 49° at Rockwell City on the 8th.

PRECIPITATION

The average precipitation for the State, derived from the aver-

age of 9 districts of nearly equal area, and based on the records of 122 stations, was 3.73 inches, or 0.77 inch below normal. The greatest district deficiency was in the northeast district, 2.34 inches, and the greatest district excess, 0.60 inch, was in the southwest district. The greatest precipitation deficiency for any one station was at Iowa Falls, 3.99 inches, and the greatest excess was at Waukee, 4.02 inches. The greatest amount at a single station was 8.11 inches at Waukee, and the least was 1.31 inches at Cedar Falls. The greatest amount occurring in 24 consecutive hours was

Daily Precipitation for June, 1931

Stations	Drainage Basin	Day of Month																															Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Northwest District</i>																																			
Akron	Big Sioux			.30	.08	.36	.13			.09	.65	.13	.01	T.								.47												2.32	
Alta	Raccoon	.15		T.	.02	.25		.16				.05	.44	.22								1.26	.18	.18									2.91		
Alton	Floyd			.18	.07	.17	.13					T.	.34	.03								T.											3.69		
Cherokee	Little Sioux	T.		.05	.01	.17	.12	T.			.01	.09	T.	.33	T.																		2.25		
Estherville	Des Moines		T.		.90	.10	T.	.45				.05	.60	.35								.40											4.10		
Hawarden	Big Sioux			.03	.05		.17			.01	1.01	.08	.04	.10								1.13		.36									2.98		
Inwood (near)	Big Sioux		.04	.15	.06	.08	T.	.37		.02		.60	.07	.30						.02	.01												2.85		
Lake Park (near)	Little Sioux			T.			.55	.20				.09	.45									.35	.55		.05								2.24		
Le Mars	Floyd	T.		.10	.06	.30	.14	T.			.36	1.06	.02	.15	.02							.80		T.									3.01		
Marathon	Raccoon			.21		.30	.11			.03				1.15								.76	T.	.46										3.02	
Pocahontas	Des Moines				T.	.28	.25	.07		T.	T.		.80									T.	.81	.08	.48									2.81	
Rock Rapids	Big Sioux					.22	.10			.08	.12	.24	.22									.17	.64	.26										2.65	
Sanborn	Floyd	.04	.04		.31	.10	.29	.18		.01		.12	.56									.04	.72	.20	.01									2.02	
Sheldon	Floyd	.04	.03	.07		.09	.25			T.	.29	.27	.16		T.							T.	1.13	.12										2.45	
Sioux Center	Floyd			.55	.02	T.		T.			.02	.35		.03	T.							T.	2.35	.02										3.34	
Spencer	Little Sioux				.01	.14	.35	.05		.03	.03		1.40								.08		.35	.43	.01	.50								3.38	
Storm Lake	Raccoon			T.	T.	.30	.17			T.	T.	.25	.47									1.19	.05	.13										2.57	
Washta	Little Sioux			.12	.02	.23	.13			T.	.28		1.09	T.								.03	.93											2.83	
West Bend	Des Moines				.41	.24	.38	.04			.45		.04									1.19													3.05
<i>North Central District</i>																																			
Algona	Des Moines		T.		.10	.25	.13	.06				.48		.25							.17		.01	.38	1.70									3.53	
Allison (near)	Cedar	T.	.02		.20	.35	.25	.05	T.			T.	.25								T.		.45	.60										2.17	
Belmond	Iowa		.25		.25	.15	.05	T.				.19	.40	.01							.05		.65	.02	1.50									3.52	
Britt	Iowa	.30			.28	.30	.18	.19				.14	.15	.19								.06	.05	.98	1.03									3.85	
Charles City***	Cedar		T.	.04	T.	.20	.04		T.			.04	.30									.03	.19	.26	1.31									2.41	
Forest City	Cedar			.05	T.	.25	.12			T.	T.	.28	.18	.62							.02		.07	1.72	.30									3.61	
Hampton	Cedar	T.		T.	.53	.12						.03											.75	.80										2.23	
Humboldt	Des Moines			.05	.05	.25	.20	.22				.28	T.	.12							.08		.30	.13	2.77									4.40	
Mason City	Cedar	T.	T.		T.	.11	.10	.27	T.		T.	T.	.18	T.								.07	.30	1.13	.42									2.58	
Northwood	Cedar				T.	.06	.14	.15	T.			T.	.14									.10	.02	2.05	.58									3.24	
Osage	Cedar				.13	.13	.03	T.					.09										.13	1.32	.35									2.18	
<i>Northeast District</i>																																			
Cedar Falls	Cedar		.06		.06	.38	.26	.06	T.			.10	.01									T.		.25	.13									1.31	
Decorah	Mississippi			.12	.05	.12	.45		.01			.50	.12								.01	.05	.08	.44	.58	.19								2.72	
Delaware (near)	Maquoketa		.01		T.	.06	.76	.22				.05	.15											.09	.09										1.34
Dubuque***	Mississippi	T.	.08		.03	.18	.40	.33	T.			.65	.05	T.								.03		T.	.56									2.31	
Fayette	Mississippi		.03		.10	.12	.26	.12				1.28	.21										.04	.12	.37										2.65
Independence	Wapsipicon		.06		T.	.43	.26	.05				.03	.46										T.	.23											1.52
Lansing	Mississippi		.01	.02	.22		.19	.99				.18	.31								.05		.52	.02	.92									3.43	
New Hampton	Wapsipicon		.20		.33	.60	.20	.06				.06	.10										.26	.53	.76									3.10	
Oelwein	Wapsipicon		.10		.20		.55					.10											.55	.45											2.25
Postville (near)	Mississippi	T.		.47	.04	.14	.26					T.	.08									.18		T.	.09	.73								1.99	
Waterloo	Cedar		.05	.04	.05	.05	.47	.17		T.			.05	.29										.20	.13	T.								1.50	
Waverly	Cedar		.08		.40	.27	.23	.02				.01	.03											.28	.36										1.71
<i>West Central District</i>																																			
Audubon (near)	Nishnabotna		.12		T.	1.31	.10	.11				T.	.50										.22	1.83										5.95	
Carroll	Raccoon		.02		.82	.60	.20					1.25	.22										.72	.45	.20	.07								4.55	
Denison	Missouri		.06		.70	1.61	.05	.14				.13	.50	T.									1.70	.25	.04	T.								5.18	
Guthrie Center	Raccoon		.02		.03	2.10	.15					.10	.20	.41									.98	1.96		T.								5.95	
Harlan	Nishnabotna		.02	T.	.03	1.25	.09	.14				T.	.03	.37	T.								2.71	.24	.05	.02									4.95
Jefferson	Raccoon	T.			1.50	.38						.24	T.	.17									.62	.27	T.									3.18	
Little Sioux	Little Sioux				.01	1.49	.14				.01	.01	T.	.18	.02								1.35	.09											3.30
Logan	Missouri				T.	1.80	.06	.17				.03	T.	.36	T.								2.30	.24	.19										5.15
Onawa	Missouri	T.		.10	.06	1.10	.12	.16				.08	.04	.16	T.								1.00	.38											3.20
Rockwell City	Raccoon				.76	.16						T.	.05	1.10									1.20	.10	.10										3.47
Sac City	Raccoon					.56	.12					T.	.01	.88										6.10	.18										7.88
Sioux City***	Missouri	T.	.24	.19	.12	.18	.21				.07	.99	.01	.29	T.								.39	.21	T.									2.90	
<i>Central District</i>																																			
Ames	Skunk		.05		.35	.90	.50	.10				.10	.70										.92	.44										4.06	
Baxter	Skunk		.12		.25	1.31	.25	.52				.05	.07										.66	.75											4.05
Boone (near)	Des Moines		.03		.57	.83	.41					.69	.03										.88	.43	.01	T.									3.88
Des Moines***	Des Moines		.01	.14	.01	2.13	.28					T.	.39	.46									2.69	.02	.01										6.14
Fort Dodge	Des Moines		.33	.02	.03	.14	.48	.25					.16	.01								.06	.49	.36	.25										2.58
Grinnell	Iowa		.12		.03	1.14	.91	.55				.25	.68										.54	.04											4.26
Grundy Center	Cedar		.10		.25	.65			T.			.28	.08										.20	.20											1.76
Iowa Falls	Iowa	T.		.21	.05	.79	.09					.03																							

Daily Precipitation for June, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Southwest District</i>																																			
Atlantic	Nishnabotna	.18	T.		1.30	1.35	.12					.98	.12								.02	2.78	T.	.22											7.07
Bedford	Nishnabotna	.03	.19	.65	.68	.32	.04				.17	.66										.88													3.62
Clarinda	Nodaway	.14			2.15	.01	.27					1.93	.14	.04	.51							.65													5.30
Corning	Nodaway	.04	.09		.53	.01					T.	.04	.45								.70	.80											4.28		
Cumberl'nd (near)	Nodaway	.09	.03	.01	2.22	.05	.01				T.	.40	.28		T.	T.					.78	1.84		.08											5.79
Glenwood	Missouri	.46			2.20	.01					.18	.92			1.51					.56	.17													6.01	
Greenfield	Nodaway	.13	.23	.02	2.70	.02					.05	.05		.05						2.17		.20												5.62	
Lenox	Missouri	.20			.90	.17					.11	.05								.92	.73													3.08	
Oakland	Nishnabotna				2.44	.17					.28	.33			.37					.58	.06		.27											4.33	
Red Oak (near)	Nishnabotna	.27			1.96	.02					.17	.19			.25					.65	.46													3.98	
Riverton (near)	Nishnabotna	T.			.30	.49					.02	.21	1.47		2.62					.95	.19													6.25	
Thurman	Missouri	.55			.75	.14	.09				.23	.25	2.05		.51	2.35					.91													7.58	
Omaha, Neb.***	Missouri	T.	.16		2.68	T.					.08	.21	.03	T.	1.36					.43	T.	.01											4.96		
<i>South Central District</i>																																			
Afton	Grand	.23	.30		2.80	.05						.23								.58	.60		.15											4.94	
Albia	Des Moines	.15			1.02	.50	.23				T.	.60	.22							1.18	1.54													5.44	
Centerville	Chariton	.26			1.61	.20	.32				.01	.26								.91	.50													4.18	
Chariton (near)	Chariton	.29			1.20	.16					T.	.44								1.60	.35													4.04	
Corydon (near)	Chariton	.28			.77	1.79	.32				.02	.41	.92							1.37	.28													6.16	
Creston	Missouri	.51			2.50	.77	.01					.01	.01	T.						1.20		.07											5.17		
Indianola	Des Moines	.23			.06	1.15	.63	.10				.02	.30							2.11	1.16	.03	.04											5.83	
Knoxville	Des Moines	.10			T.	.96	.28	.25				T.	.30							1.66	.17	T.											3.72		
Lacona	Des Moines		.25	.02	1.85	.08	.03				.02	.03	.30							3.04	.68	T.	.05											6.35	
Lamoni	Grand	.50			.68	.19	.28				T.	.20	.15							.43	.53													2.96	
Melrose	Des Moines				2.03	.48					T.	T.	1.20		.23					1.05	.34													5.33	
Mt. Ayr	Grand	.46			1.01	.86	.44					.23									.70													3.70	
Tingley	Platte	.08	.53		T.	.61	.36	.02				T.	T.	.32		T.					.82	.76												3.50	
Winterset	Des Moines	.02	.18	.01	1.18	.82	.10				T.	T.	.55							1.63	1.05		.04											5.58	
<i>Southeast District</i>																																			
Bonaparte (near)	Des Moines	T.			T.	1.14	.45	.29				T.	.40	.03	1.42					.14	.85													4.72	
Burlington	Mississippi				.41	2.12	.35					.01	.76	.04						.07	T.	.05											3.81		
Columbus Junction	Iowa	.03			.06	.69	.71	.40				.01								.19		T.												2.53	
Fairfield	Skunk	.08			.81	1.32	.28	.37				.21	.03	.68						.47	.65													4.30	
Keokuk***	Mississippi	.08			.07	2.11	.29	.02				.62	1.74	.27						.04	1.32													6.56	
Keokuk No. 2	Mississippi	.15			*	*	*	3.05				.65	T.	2.16					.10	1.34		T.											7.45		
Keosauqua	Des Moines	.01	T.		.35	1.80	.30	.30				.80	1.10							.12	2.00													6.48	
Mt. Pleasant	Skunk				T.	.98	.92	.37				.10								.18	.08													3.80	
Oskaloosa	Des Moines	.16			.07	1.14	.37	.22				.02	.13	.49						1.14	.09	T.	.04											3.87	
Ottumwa	Des Moines	.10			.22	1.29	.96	.45				.20	T.	.42						3.20	.09	T.												6.95	
Sigourney	Skunk	.05			.10	.73	.30	.31				.17	.06	.48						.71	T.													2.91	
Stockport (near)	Skunk	.01			.17	1.33	.90	.27				.17	.15	1.02	.06					.19	.42													4.72	
Washington	Skunk	T.			.85	.90	.35					1.02								.38		T.												3.50	
Wever	Mississippi				.15	1.50	1.38	.34				.04	.03	.78						.15														4.37	

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

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

\*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.

\*\*Incomplete.

\*Precipitation included in next following measurement.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

RIVERS

Stations	Barometric Pressure, Inches (Sea Level)					Relative Humidity, %				Wind					Sunshine		
	Mean	Highest	Date	Lowest	Date	Mean		Lowest	Date	Total movement	Average hourly velocity	Maximum		% possible	Departure from normal		
						7 A. M.	12 Noon†					Miles	From			Date	
Chas. City	29.91	30.18	15	29.66	9	79	53	57	26	14	4,315	6.0	24	nw.	19	72	+ 5
Davenport	29.94	30.23	5	29.60	7	71	51	52	32	27†	5,745	8.0	34	sw.	11†	73	+ 4
Des Moines	29.90	30.19	5	29.64	9	78	53	57	36	13	6,010	8.3	36	nw.	19	78	+ 7
Dubuque	29.93	30.21	5	29.59	7	78	53	57	30	30	3,648	5.1	21	n.	22	71	+ 7
Keokuk	29.96	30.17	5	29.65	7	74	51	60	40	16†	3,911	5.4	21	nw.	7	79	+ 7
Sioux City	29.84	30.20	5	29.50	9	74	51	50	27	28	7,892	11.0	41	nw.	19	74	+ 11
Omaha, Nb	29.88	30.13	5	29.55	9	70	49	52	30	30	4,565	6.3	38	nw.	20	77	+ 8
Means and extremes	29.91					75	52	55				7.2				75	+ 8
Normals and records		30.23	5	29.50	9			26	14				44	nw.	19		
	29.93		10th		5th	79		60		7th					22d	67	
		*30.61	1913	‡29.04	1880					†13	1926			¶68	w.	1917	

\*Dubuque †Omaha ‡Sioux City ‡Local mean time †And other dates.  
 ‡‡January 1, 1929, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

6.10 inches at Sac City on the 20th.

The average number of days with 0.01 inch or more of precipitation for the State was 9, ranging from 10 days in the northwest district to 7 days in the east-central district. For individual stations the range was from 14 days at Inwood (near), to 4 days at Olin.

Considerable fluctuation occurred on several of the interior streams, and flood stages were reached at several places, caused by heavy rains on the 12th, 15th and 20th of the month, which inundated the farm land and did considerable damage to crops in southwest Iowa. The maximum stage on the Nishnabotna River recorded at Riverton (near), was 17.1 feet on the 15th. The Raccoon River had a considerable rise in the southern part of Dallas County caused by heavy rains in that locality on the 19th and 20th. At Des Moines the extreme stages were 2.7 feet and 0.7 foot, and averaged 1.2 feet, or 3.5 feet below normal.

The Missouri river stages averaged more than 3 feet below normal at both Sioux City and Omaha, with little fluctuation.

Unusually low stages were recorded on the Mississippi River, with moderate fluctuation. At Dubuque the average stage was 2.4 feet. Only once before has a lower average been recorded in June, that being 2.3 feet in 1900. At Davenport low stages prevailed during the first half of the month, but a steady rise began on the 22d and continued during the remainder of the month. The crest stage of 3.9 feet was recorded on the 30th. This was the highest river stage recorded at Davenport since July, 1930. At Keokuk the stages were lower than usual. On two days the readings were below the zero of the gage, which is unusual for June.

ERRATA

Report for April, 1931. Page 26, Rockwell City; total monthly snowfall published a trace, should be 1.0 inch.

Daily Maximum and Minimum Temperature for the Month of June, 1931

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

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted.

\*For 24 hours, midnight to midnight.

MISCELLANEOUS PHENOMENA

Clouds, mammato cumulus: 4th, 20th.  
 Corona, lunar: 24th.  
 Dew: 8th, 13th, 27th.  
 Dust Storm: 1st, 9th, 27th, 28th.  
 Fog, dense: 13th, 23d, 24th.  
 Fog, light: 15th.  
 Gales: 1st, 2d, 3d, 4th, 5th, 7th, 10th, 11th, 16th, 17th, 19th, 20th, 21st.  
 Hail, heavy: 5th, 6th, 19th, 22d.

Hail, light: 3d, 4th, 5th, 6th, 14th, 15th, 19th, 20th, 22d.  
 Hail, moderate: 4th, 5th, 6th, 14th, 19th, 20th, 22d.  
 Halo, lunar: 1st, 11th, 23d, 25th, 27th.  
 Halo, solar: 1st, 2d, 3d, 9th, 11th, 14th, 15th, 16th, 24th.  
 Meteor: 12th, Carson, Creston, Estherville, Keokuk, Oskaloosa, Pocahontas; 28th, Corydon, Des Moines, about 9:00 p. m.  
 Parhelia: 20th.  
 Rainbow: 7th, 14th.  
 Thunderstorms: 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 14th, 15th, 19th, 20th, 21st, 22d.  
 Tornadoes: 4th, 19th, 20th.

IOWA STORMS, JUNE, 1931

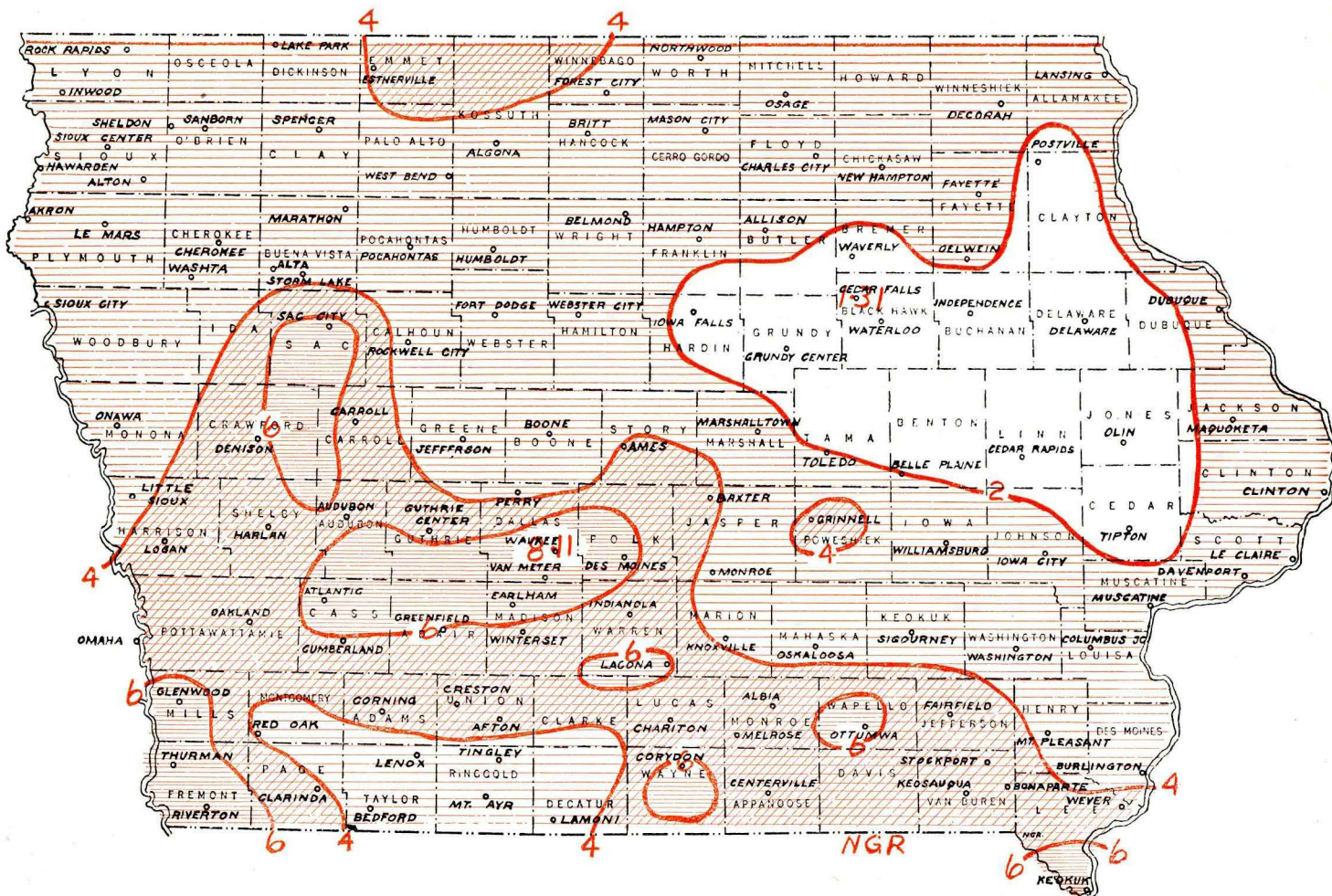
Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path Miles	Length of Path Miles	Size of Hailstones Inches	Persons Killed	Persons Injured	Damage
4	Henry	Scott	Wind and Hail	5:30 p. m.	SW to NE		2	3/8 in.			Hail to corn \$500; wind to buildings, telephone and high lines, \$1,000.
4	Louisa	Elm Grove	Wind and Hail	6:00 p. m.	SW to NE		4	3/8 in.			Hail \$500; Wind \$500.
4	Pottawattamie	Layton	Electrical	..... p. m.					1		Horses killed \$150.
4	Pottawattamie	Kane	Electrical	1:00-2:00 a. m.							Lightning struck several bldgs.
4	Jefferson	Fairfield	Rain and Hail								Slight
4	Decatur	Fayette	Wind, Rain, Electr.	3:30 p. m.							Struck 1 house, about \$100
4	Page	Washington	Tornado and Hail	1:30 p. m.	SW to NE		7	1 in.			Tornado struck southwest of Northboro; damaged bldgs. \$800; killed chickens valued at \$75.
5	Cass	Union	Electrical	4:30 a. m.							Car and garage burned, \$800
5	Union	Douglas, Highland	Rain, Hail, Erosion	3:00-7:00 a. m.							Hail damaging truck gardens \$2,000 considerable erosion to soil
5	Decatur	Long Creek	Wind, Rain, Flood	5:00 a. m.	W to E	3	6				Wind to buildings and crops \$2,200; Flood to crops \$2,000
6	Clarke	Doyle, Knox	Wind and Hail	2:00-7:00 p. m.	NW to SE		12	Marbles			Hail to greenhouses and crops \$3,500
6	Union	Douglas	Hail	4:00 a. m.	W to E	2	6	1/2 in.			Fruit trees and crops by hail \$1,000
8	Chickasaw	Bradford	Hail	2:00 a. m.	W to E	1	4	1/4 in.			Hail damaged crops \$2,000
10	Woodbury	Sioux City	Rain and Flood	..... p. m.							Flood damage to streets and sewers \$20,000
12	Kossuth	Union	Wind	10:00 p. m.	W to E	4	6				Wind to buildings and windmills \$4,000
12	Winnebago	Forest	Wind	11:00 p. m.	SW to NE						Damage to buildings \$500
14	Fremont	Riverside	Wind, Hail, Flood	12:10 p. m.		2	4	1/2 in.			Hail to crops \$1,000; Flood to crops \$1,200; wind, slight
14	Mills	Oak, Plattville, Glenwood, Lyons, Rawles, Center	Rain and Flood	..... p. m.							Flooded farm land, highway grades and railroad bed, \$10,000
18	Butler	Ripley	Wind	11:30 p. m.	SW to NE						Buildings \$500
18	Clay	Riverton	Wind	11:00 p. m.	NW to SE						Buildings blown down \$16,000
18	Chickasaw	Utica, Stapleton	Wind	11:30 p. m. to 12:00 mdt.	W to E						Buildings demolished \$6,000; Livestock killed \$155
19	Black Hawk	Waterloo, East Waterloo	Tornado	11:40 p. m.	W to E	800 ft.	2				Tornado passed through east side of Waterloo doing \$8,000 damage
19	Butler	Pittsford, Cold Water	Wind	11:00 p. m.	NW to SE						Wind damage to buildings, silos, fruit trees, windmills and crops \$4,550
19	Benton	Iowa	Wind	12:10 a. m.	W to E						Buildings and trees \$3,000
19	Buena Vista	Lee, Poland	Wind, Tornado, Flood	10:00 p. m.	SW to NE	200 ft.	5				Tornado struck 5 farms southeast of Sioux Rapids, doing \$10,000 damage; wind damaged trees \$1,200; floods \$300
19	Carroll	Kniest	Wind, Hail, Floods	4:30 p. m.	NW to SE						Hail damaged small grain about \$2.00 per acre and wind did approximately \$2,000; floods and washing out of road bed, \$2,000
19	Cherokee	Diamond, Spring	Wind and Hail	9:00-9:30 p. m.	NW to SE			Peas			Wind to crops \$2,000; hail to crops \$500
19	Chickasaw	Washington, Deerfield	Tornado and Wind	11:00-11:30 p. m.	SW to NE	200 ft.	6				Tornado passed from near Deerfield to Alta Vista, doing about \$56,000 to buildings, crops and livestock; wind damage estimated \$15,000 in other parts of 2 twps.
19	Cerro Gordo	Grand, Clear Lake	Wind	10:00 p. m.	NW to SE						Wind to crops, considerable
19	Fayette	Jefferson	Wind	12:20 a. m.	SW to NE						Trees badly damaged
19	Fayette	Dover	Wind	11:00 p. m.							\$25 to buildings
19	Floyd	Rock Grove	Wind	12:20 p. m.							Wind did considerable damage to trees and in some localities some to buildings
19	Franklin	Ingham	Wind	11:00 p. m.							Wind to buildings \$500
19	Grundy	Grant, Melrose	Wind	11:00 p. m. to 12:00 mdt.							Roof of creamery, poultry house, garage and trees, \$4,000
19	Hancock	Madison, Erin, Boone, Orthel, Madison, Britt, Crystal, Ellington, Garfield	Tornado and Wind	10:30 p. m.	W to E		6		1	4	Tornado struck south of Hayfield killing 1 man and injuring 2 and destroyed about \$20,000 property consisting of trees, buildings and telephone equipment
19	Hamilton	Marion	Wind	11:00 p. m.	NW to SE						Wind to trees about \$4,000
19	Hardin	Clay, Providence	Wind	11:00-11:30 p. m.	SW to NE						Oats blown down
19	Humboldt	Grove, Beaver, Rutland	Wind	10:00 p. m.	NW to SE						3 windmills and several trees blown down, building slightly damaged, \$3,000; wind to crops \$1,000
19	Jefferson	Buchanan	Wind and Hail	6:00 p. m.	NW to SE			1/2 in.			Trees badly mutilated and several buildings wrecked, \$6,000
19	Kossuth	Ramsey	Wind	9:30 p. m.	NW to SE	3	7				Wind to buildings and trees \$200; hail to crops \$500
19	Kossuth	Grant	Tornado	10:00 p. m.	SW to NE		2				Squall wind blew down barn and moved numerous others, damage about \$5,000
19	Marshall	LeGrand, Linn, Marshalltown	Wind	12:00 p. m.	NW to SE						Damage to buildings \$500
19	Mitchell	Liberty, Ontranto, Stacyville	Wind	10:30-11:00 p. m.	NW to SE						Squall wind damaged trees, buildings and high lines, \$4,000
19	O'Brien	Baker	Hail	2:00 a. m.	NW to SE			Peas			Wind damage to silos, trees and small bldgs, \$2,300; wind to crops, \$1,000
19	Palo Alto	Rush Lake	Tornado	10:00 p. m.	W to E		1				Slight to crops
											Tornado struck west of Mallard, damaged farm buildings and property \$7,300

## IOWA STORMS, JUNE, 1931—Continued

Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path	Length of Path	Size of Hailstones Inches	Persons Killed	Persons Injured	Damage
19	Palo Alto	Emmetsburg, Freedom	Wind	10:00 p. m.	SW to NE						Buildings, trees, telephone and electric wires damaged \$2,000
19	Tama	Clark, Perry	Wind	12:00 p. m.	W to E						Windmills and trees, \$2,000
19	Tama	Carlton, Howard	Tornado	11:45 p. m.	W to E		6				Tornado struck south of Garwin, damaged bldgs. and trees \$1,200
19	Wayne	Walnut	Wind	3:30 a. m.	NW to SE						Wind damaged buildings \$3,000; crops \$6,000
19	Winneshiek	Madison	Wind	1:00 a. m.							Squall wind damaged bldgs \$2,500
19	Worth	Brookfield, Lincoln, Danville	Wind	10:00-11:00 p. m.	NE to SW						Squall wind damaged building \$8,800; slight to crops
19	Wright	Belmond, Pleasant, Woolstock	Wind	11:00-11:30 p. m.	SW to NE						Wind damaged bldgs \$7,500; killed livestock valued at \$3,000
20	Audubon	Douglas	Wind, Rain, Flood	5:00 p. m.	N to S						Wind damaged buildings \$500
20	Benton	Eden	Wind	3:00 a. m.	NW to SE						flood to crops and livestock \$8,400
20	Black Hawk	Payner	Wind	12:20 p. m.	W to E						Damage to roof of barn and trees \$800
20	Carroll	Warren	Rain and Flood	4:00-6:00 p. m.							Destroyed small bldg, trees and killed many poultry, \$500
20	Cass	Grove, Pymose, Washington, Brighton, Bear Grove	Wind, Hail, Flood	4:15-6:00 p. m.	SW to NE						Flood damaged railways and road beds, fences, corn and small grain, and livestock drowned, \$15,000
20	Crawford	Nishnabotny	Wind, Rain, Flood	6:30 p. m.	NE to SW						Wind damage mostly to crops \$124,000; hail \$5,000; flood \$57,000
20	Dallas	Union	Flood								Wind damage slight; flood \$4,400
20	Fremont	Benton, Scott	Wind, Rain, Flood	8:00 p. m.	W to E						Flood damage to crops \$2,000
20	Greene	Cedar	Hail	12:00 noon	SW to NE	1½	4	Walnuts			Considerable wind damage to trees flood to crops \$10,000
20	Guthrie	Stuart, Penn	Wind	8:00 p. m.	W to E						Damage to crops \$1,000
20	Harrison	Lincoln, Taylor, Bayer, Harrison	Wind, Rain, Flood	4:00-5:00 p. m.	NW to SE						Damage to crops \$5,000
20	Hancock	Magor	Wind	4:00 a. m.	SW to NE						Wind damage to buildings \$1,000; Flood to crops \$8,000
20	Howard	Paris	Tornado and Wind	12:15 p. m.	S to N		7				Wind damage to buildings and crops \$6,000
20	Ida	Maple, Garfield	Flood	10:00 p. m.							Tornado struck north of Jerico, damaging building and crops \$6,000; wind damage \$7,000 in same vicinity
20	Linn	Cedar	Wind	12:30 a. m.	SW to NE						Water damage approximately \$2,000
20	Mills	Anderson	Hail, Rain, Flood	5:30 p. m.	NW to SE						Property damage \$5,000
20	Pottawattamie	Knox, Lewis, Valley, Pleasant, Garner, Norwalk, Carson	Wind, Hail, Flood	5:00-6:00 p. m.	NW to SE						Flood damage to crops \$20,000; hail slight
20	Shelby	Douglas, Monroe, Center, Polk, Westphalia	Wind, Hail, Flood	4:00-6:00 p. m.	SW to NE						Wind damage to buildings and trees, \$3,000; flood damage to crops \$130,000; hail to crops \$20,000
20	Sac	Jackson	Hail and Flood	12 noon to 1:00 p. m.	SW to NE			½ in.			Wind damage to property \$11,000; hail to crops \$40,000; flood damage to crops \$57,000
20	Warren	White Breast	Wind and Hail	4:00 a. m.	W to E			Peas			Hail damage \$5,000; flood to crops \$25,000
20	Winneshiek	Jackson, Sumner	Wind	11:30 p. m. to 12:15 a. m.	NW to SE						Crops badly blown down; hail damage slight
21	Hamilton	Marion	Wind	2:30 a. m.	N to S						Wind damage to buildings and crops \$7,000
21	Humboldt	Avery	Wind and Hail	2:00 a. m.	NW to SE						Oats and alfalfa badly blown down
22	Dubuque	Dubuque, Julien	Wind and Rain	2:00-2:30 p. m.	NW to SE					1	Wind damage slight to crops and trees; hail to crops \$5,000
22	Fayette	Fremont	Wind, Electrical	2:00-2:30 p. m.	NW to SE						Wind to roofs \$600; water damage to store stock \$2,500
22	Hancock	Magor	Flood	12:00 noon to 1:00 p. m.	NW to SE				1		Wind to trees was considerable
22	Pottawattamie	Norwalk	Wind	12:00 p. m.	NW to SE						Crops flooded and damaged \$4,000
22	Pocahontas	Garfield	Wind and Hail	1:30-2:00 p. m.	W to E						Considerable damage to crops
22	Marshall	Bangor	Wind	9:00 p. m.	NW to SE						Considerable damage to crops by wind; hail to crops \$25,000
											Wind damage to buildings, fruit trees and crops \$14,000



# TOTAL PRECIPITATION, JUNE, 1931



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII

DES MOINES, IOWA, JULY, 1931

No. 7

## COMPARATIVE DATA FOR THE STATE—JULY

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
1873.....	74.0	+ 0.3	96	54	2.78	- 1.05	7.73	0.85					
1874.....	77.8	+ 4.1	101	56	3.04	- 0.79	6.15	0.55					
1875.....	72.8	- 0.9	97	56	6.05	+ 2.22	9.70	1.60					
1876.....	74.2	+ 0.5	95	54	6.15	+ 2.32	11.92	1.84					
1877.....	74.0	+ 0.3	97	54	2.35	- 1.48	7.58	0.38					
1878.....	76.5	+ 2.8	101	52	5.13	+ 1.30	13.20	0.90					
1879.....	76.0	+ 2.3	102	55	2.20	- 1.63	8.66	0.00					
1880.....	73.8	+ 0.1	98	48	4.16	+ 0.33	10.40	1.30					
1881.....	75.9	+ 2.2	100	50	5.33	+ 1.50	16.31	0.28					
1882.....	69.1	- 4.6	94	46	3.66	- 0.17	7.30	0.85					
1883.....	72.9	- 0.8	100	46	5.14	+ 1.31	13.99	1.26					
1884.....	71.0	- 2.7	96	50	5.41	+ 1.58	11.51	0.70					
1885.....	74.6	+ 0.9	102	48	4.73	+ 0.90	11.45	0.68					
1886.....	76.2	+ 2.5	104	48	0.50	- 3.33	2.20	0.00					
1887.....	77.0	+ 3.3	105	45	2.85	- 0.98	8.43	0.87					
1888.....	75.9	+ 2.2	103	38	4.31	+ 0.48	8.45	1.17					
1889.....	72.6	- 1.1	102	40	4.00	+ 0.17	8.25	1.15					
1890.....	75.2	+ 1.5	110	45	2.04	- 1.79	6.16	0.06					
1891.....	68.5	- 5.2	99	41	4.22	+ 0.39	8.20	1.67		8	13	13	5
1892.....	73.0	- 0.7	104	38	5.29	+ 1.46	12.86	1.71		9	16	10	5
1893.....	75.0	+ 1.3	102	47	3.33	- 0.50	8.84	1.49		7	19	10	2
1894.....	76.4	+ 2.7	109	39	0.63	- 3.20	3.50	T.		3	22	8	1
1895.....	72.1	- 1.6	104	35	3.40	- 0.43	10.10	0.45		7	15	12	4
1896.....	73.6	- 0.1	104	42	6.90	+ 3.07	12.67	1.61		9	14	11	6
1897.....	75.6	+ 1.9	106	42	3.26	- 0.57	7.60	1.01		6	18	10	3
1898.....	73.4	- 0.3	102	42	2.98	- 0.85	12.88	0.55		7	19	9	3
1899.....	73.1	- 0.6	101	38	3.07	- 0.76	8.66	0.42		7	16	10	5
1900.....	73.4	- 0.3	102	37	6.15	+ 2.32	18.45	1.80		9	16	10	5
1901.....	82.4	+ 8.7	113	46	2.34	- 1.49	5.97	0.27		5	21	9	1
1902.....	72.9	- 0.6	99	41	8.67	+ 4.84	13.57	4.82		13	14	10	7
1903.....	72.9	- 0.8	100	40	4.83	+ 1.00	12.72	0.94		9	17	9	5
1904.....	70.6	- 3.1	100	38	4.41	+ 0.58	11.97	1.28		10	16	9	6
1905.....	70.6	- 3.1	102	40	2.91	- 0.92	7.08	0.69		9	14	10	7
1906.....	70.9	- 2.8	102	42	3.04	- 0.79	7.05	0.26		8	18	10	3
1907.....	73.7	- 0.0	102	41	7.27	+ 3.44	13.66	3.97		13	16	11	4
1908.....	73.0	- 0.7	100	42	3.66	- 0.17	9.21	0.70		8	16	10	5
1909.....	72.3	- 1.4	102	46	4.77	+ 0.94	12.20	1.20		10	15	8	8
1910.....	74.5	+ 0.8	108	43	1.86	- 1.97	5.69	0.12		7	19	8	4
1911.....	75.5	+ 1.8	111	38	2.27	- 1.56	6.62	0.08		7	18	10	3
1912.....	74.6	+ 0.9	103	38	3.71	- 0.12	7.56	1.17		10	17	10	4
1913.....	76.1	+ 2.4	108	45	1.82	- 2.01	6.23	T.		5	21	8	2
1914.....	76.6	+ 2.9	109	43	2.27	- 1.56	6.50	0.44		5	20	8	3
1915.....	69.5	- 4.2	92	40	8.32	+ 4.49	15.83	3.68		14	10	12	9
1916.....	79.7	+ 6.0	105	48	1.78	- 2.05	6.87	0.10		5	23	7	1
1917.....	74.3	+ 0.6	106	38	2.27	- 1.56	6.06	0.23		7	21	8	2
1918.....	73.1	- 0.6	105	40	3.17	- 0.66	8.05	0.26		8	19	8	4
1919.....	72.4	+ 3.7	101	41	2.86	- 0.97	7.82	0.39		6	22	8	1
1920.....	77.3	+ 1.4	102	45	4.22	+ 0.39	7.49	1.11		9	19	9	3
1921.....	77.9	+ 4.2	104	41	2.53	- 1.30	7.45	0.42		7	19	9	3
1922.....	71.5	- 2.2	98	40	6.31	+ 2.48	11.72	3.13		11	14	12	5
1923.....	76.5	+ 2.8	102	47	1.75	- 2.08	5.51	0.29		5	19	9	3
1924.....	70.2	- 3.5	99	41	3.67	- 0.16	8.90	0.57		9	16	11	4
1925.....	74.1	+ 0.4	105	40	2.66	- 1.17	7.93	0.80		8	19	10	2
1926.....	74.8	+ 1.1	109	38	3.72	- 0.11	9.08	0.82		10	15	10	6
1927.....	72.9	- 0.8	102	45	1.96	- 1.87	4.80	0.09		7	18	10	3
1928.....	73.9	+ 0.2	98	43	4.43	+ 0.60	9.32	0.65		8	18	10	3
1929.....	74.1	+ 0.4	98	43	4.31	+ 0.48	12.30	1.47		9	16	10	5
1930.....	77.9	+ 4.2	112	40	1.49	- 2.34	5.58	T.		4	21	8	2
1931.....	77.2	+ 3.5	109	42	2.72	- 1.11	7.87	0.58		6	20	8	3
Normals.....	73.7	.....	102	44	3.83	.....	9.21	0.95	.....	8	17	10	4
Highest.....	80.1	.....	113	56	8.32	.....	18.45	4.82	.....	14	23	13	9
Lowest.....	68.5	.....	92	35	0.50	.....	2.20	T.	.....	3	10	7	1

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

## GENERAL SUMMARY

Extremely high temperatures during the latter half of the month, localized heavy rains, and the absence of destructive winds, except in a few localities, were the outstanding features of the weather for July, 1931.

The mean temperature for the State was 77.2°, or 3.5° above normal, and 0.6° cooler than July, 1930. The temperature was above normal at all stations. Temperatures were considerable above normal the last two weeks of July. The average temperature for several nights during the last week was greater than the normal temperature for those days. Hundreds of horses at work in the fields died from the effects of the intense heat. Scores of persons died or were prostrated. Fatality was so great among horses that much work where horses were used was done at night to evade the heat.

The heavy local downpour of rain which occurred in the southeastern and central portions of the State, and in O'Brien and Cherokee counties, on scattered dates, did some damage by erosion and floods. Wind squalls and hailstorms were not especially numerous nor destructive, and no tornadoes were reported. Corn reached its best condition about the middle of July but a general deterioration of approximately fifty million bushels occurred during the latter half of the month in large areas over the northern one-third of the State, except Cherokee County and bordering localities. Deficiency in precipitation continued in most of the northern half of Iowa, being extremely serious in the northwest district. Pastures were short and badly burned. The water supply continued seriously deficient.

The weather conditions were exceptionally good for threshing, and very good progress was made. Some fall plowing was done by the close of the month.

N. G. R.

## TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 105 stations, was 77.2°, or 3.5° above normal. The greatest district excess, 4.1°, was in the east-central district, and the least excess, 2.7°, was in the central district. The highest monthly mean temperature was 80.5° at Keokuk, and the least was 73.1° at Lake Park (near). The absolute range in temperature for the State was 67°, from 109° at Lenox on the 28th, to 42° at Fayette on the 10th. The average number of days with the maximum temperature 100° or higher was 3, ranging from 9 days at Inwood (near) and Lenox, to none at 9 stations. The average number of days with the maximum temperature 90° or higher was 17, ranging from 22 days at Lenox, to 11 days at Columbus Junction. The greatest daily range in temperature at any station was 46° at Pocahontas on the 25th.

## PRECIPITATION

The average precipitation for the State, derived from the average of 9 districts of nearly equal area, and based on the records of 120 stations, was 2.72 inches, or 1.11 inches below normal. The greatest district deficiency was in the northeast district, 1.94 inches, and the greatest excess, 0.32 inch, was in the southeast district. The greatest precipitation deficiency for any one station was at Lansing, 3.45 inches, and the greatest excess was at Columbus Junction, 4.30 inches. The greatest amount at a single station was 7.87 inches at Columbus Junction, and the least was 0.58 inch at Lansing. The greatest amount occurring in 24 consecutive hours was 6.02 inches at Stockport (near) on the 2d and 3d. The average number of days with 0.01 inch or more of precipi-



Climatological Data for July, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days			Prevailing direction of wind	OBSERVERS			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy	
<i>Northwest District</i>																					
Akron	Plymouth	1,153	4									0.95	-2.86	0.38	0	4	20	9	2	n.w.	Orlan C. Moore
Alta	Buena Vista	1,513	41	76.4	+ 4.0	102	30†	52	7	39	3.15	-1.10	1.46	0	5	21	9	1	s.	D. E. Hadden	
Alton	Sioux	1,305	26	76.2	+ 2.7	101	31	49	9	36	2.07	-1.47	0.56	0	7	15	15	1	s.	W. S. Slagle	
Cherokee	Cherokee	1,196	11	75.0	+ 3.9	99	30	54	5†	35	6.16	+ 2.34	3.09	0	5	20	9	2	s.	J. E. Wirth	
Estherville	Emmet	1,298	37	76.0	+ 4.1	104	27†	50	8†	44	1.61	-2.55	1.01	0	5	27	4	0	n.w.	A. O. Peterson	
Hawarden	Sioux	1,181	5									1.21	-2.42	0.54	0	8	16	5	10	n.w.	Earl V. Slife
Inwood (near)	Lyon	1,474	28	77.1	+ 4.5	105	26†	49	5†	39	1.27	-2.10	0.43	0	6	25	4	2	n.e.	A. C. Hanson	
Lake Park (near)	Dickinson	1,489	19	73.1	+ 1.1	99	31	48	7†	36	2.62	-0.18	0.90	0	5	23	2	6	s.	P. M. Lawrence	
Le Mars	Plymouth	1,224	40	77.2	+ 3.9	102	31	50	9	40	1.32	-2.76	0.64	0	4	27	1	3	s.	Henry Newell	
Marathon	Buena Vista	1,390	5									2.66		1.15	0	3	24	4	3	sw.	E. G. Smith
Pocahontas	Pocahontas	1,248	27	77.0	+ 4.3	104	31	50	8	46	1.49	-1.96	0.90	0	5	23	6	2	s.	F. E. Hronek	
Rock Rapids	Lyon	1,349	34	75.0	+ 2.4	102	27†	46	8	43	1.69	-1.68	0.52	0	6	27	2	2	n.	Nellie F. Medberry	
Sanborn	O'Brien	1,553	18	74.4	+ 1.6	101	31	50	8	36	1.14	+ 0.64	1.75	0	8	17	9	5	se.	J. W. Dow	
Sheldon	O'Brien	1,418	25	75.6	+ 2.6	101	27†	49	7†	39	2.71	-1.39	1.18	0	5	21	6	4	s.	Ross E. Forward	
Sioux Center	Sioux	1,461	32	76.2	+ 3.2	103	31	50	5	37	1.30	-2.53	0.48	0	4	19	10	2	se.	F. C. Auo	
Spencer	Clay	1,319	23	76.2	+ 2.8	104	31	49	8†	43	2.00	-1.50	0.80	0	6	19	10	2	n.w.	E. W. Little	
Storm Lake	Buena Vista	1,442	41	76.0	+ 2.5	98	27	53	5	36	2.70	-1.37	1.36	0	5	21	7	3	sw.	Russel M. Edwards	
Washita	Cherokee	1,157	34	75.2	+ 2.9	101	30	47	8†	45	2.34	-1.89	0.97	0	4	24	5	2	s.	H. L. Felter	
West Bend	Palo Alto	1,197	44	75.6	+ 2.4	100	30†	51	7†	41	2.33	-1.14	1.17	0	5	22	8	1	s.	Jos. Dorweiler	
Means and extremes				75.8	+ 3.1	105	26†	46	8	46	2.30	-1.42	1.75	0	5	22	6	3	s.		
<i>North Central District</i>																					
Algona	Kossuth	1,207	70	75.8	+ 2.8	101	27	52	9†	39	2.51	-0.55	1.67	0	3	19	8	4	sw.	Leon M. Merritt	
Allison (near)	Butler	1,000	17	77.0	+ 4.2	102	30	51	10†	41	1.09	-2.53	0.40	0	6	20	9	2	sw.	George H. Bell	
Belmond	Wright	1,181	22	75.7	+ 2.1	101	30	48	10†	42	3.30	-0.32	2.05	0	6	20	6	5	sw.	H. F. Luick	
Britt	Hancock	1,236	46	75.8	+ 4.6	100	27†	50	8†	38	1.89	-2.09	0.75	0	5	22	3	6	sw.	E. P. Healy	
Charles City	Floyd	1,015	56	76.8	+ 4.5	99	31	51	10	39	1.15	-2.62	0.52	0	7	19	9	3	se.	U. S. Weather Bureau	
Forest City	Winnebago	1,226	41	75.0	+ 2.8	101	27	47	8	39	2.17	-1.40	0.96	0	4	15	9	7	sw.	Dr. M. B. Neil	
Hampton	Franklin	1,142	40	77.3	+ 4.2	101	30	48	10	44	1.63	-2.02	0.96	0	4	26	4	1	se.	Howard J. Haydon	
Humboldt	Humboldt	1,095	17	76.4	+ 2.3	103	31	48	8†	42	1.71	-2.03	0.92	0	4	21	5	5	sw.	H. C. Snitkey	
Mason City	Cerro Gordo	1,148	39	74.8	+ 2.4	100	27	45	8†	45	1.10	-2.42	0.48	0	6	24	5	2	sw.	American Beet Sugar Co	
Northwood	Worth	1,222	35	75.8	+ 4.6	100	27	51	10	40	1.05	-2.78	0.41	0	6	23	5	3	n.w.	Charles Dwelle	
Osage	Mitchell	1,163	46	76.1	+ 4.2	100	27	50	10	39	1.17	-2.10	0.51	0	6	16	9	6	sw.	Dr. C. E. Juhl	
Means and extremes				76.0	+ 3.5	103	31	45	8†	45	1.68	-1.92	2.05	0	5	20	7	4	sw.		
<i>Northeast District</i>																					
Cedar Falls	Black Hawk	875	12									3.47		1.80	0	6	18	12	1	sw.	E. J. Cable
Decorah	Winnesiek	872	48	75.5	+ 3.3	101	15	45	8†	43	1.58	-2.47	0.60	0	5	19	12	0	n.w.	M. D. Whitney	
Delaware (near)	Delaware	1,083	52	76.6	+ 4.0	101	1	51	9	34	2.22		0.84	0	9	21	10	0	sw.	E. J. Paris	
Dubuque	Dubuque	700	80	78.1	+ 4.0	100	1	53	10	32	2.57	-1.37	1.34	0	9	18	9	4	s.	U. S. Weather Bureau	
Fayette	Fayette	1,003	43	75.8	+ 3.9	100	1†	42	10	44	1.47	-2.36	0.54	0	6	23	8	0	s.	W. C. Van Ness	
Independence	Buchanan	956	71	76.7	+ 3.7	98	30	51	8	33	1.60	-2.54	0.41	0	7	21	7	3	sw.	Dr. Geo. Boody	
Lansing	Allamakee	632	28									0.58	-3.45	0.37	0	4					Mrs. Mary Spinner
New Hampton	Chickasaw	1,169	34	76.0	+ 3.6	99	1	50	8†	38	1.73	-2.01	0.64	0	6	16	11	4	n.w.	D. W. Dawson	
Oelwein	Fayette	1,036	8	77.0	+ 4.8	100	1	50	8†	34	2.75	-1.17	0.75	0	7	21	5	5	s.	John T. Ridler	
Postville (near)	Clayton	1,192	40	73.6	+ 3.6	96	16	46	11	35	1.41	-2.98	0.41	0	6	21	10	0	sw.	F. L. Williams	
Waterloo	Black Hawk	854	49	77.6	+ 3.9	102	1	50	8†	42	2.21	-1.77	0.90	0	5	24	7	0	se.	R. B. Slippy	
Waverly	Bremer	936	42	77.1	+ 4.6	101	1	51	8†	39	3.11	-0.64	1.05	0	7	29	2	0	se.	D. H. Murphy	
Means and extremes				76.4	+ 4.0	102	1	42	10	44	2.04	-1.94	1.80	0	6	21	8	2	sw.		
<i>West Central District</i>																					
Audubon (near)	Audubon	1,297	38	77.4	+ 4.7	102	28	54	7	33	2.15	-1.52	0.88	0	8	20	10	1	sw.	George Kibby	
Carroll	Carroll	1,265	45	76.5	+ 3.3	101	30	53	7	38	2.88	-0.70	0.90	0	6	26	2	3	se.	Mrs. J. J. Wolfe	
Denison	Crawford	1,200	47	76.4	+ 3.0	101	30	51	7†	42	2.08	-1.67	0.68	0	6	16	11	1	se.	J. McMinnee	
Guthrie Center	Guthrie	1,028	36	77.4	+ 3.8	103	30	49	8	39	3.57	-0.65	0.93	0	6	20	10	1	n.w.	Kenneth Hoyt	
Harlan	Shelby	1,210	39	76.8	+ 3.7	106	28	50	8	41	1.53	-2.35	0.60	0	7	18	10	3	n.e.	Elmer Buss	
Jefferson	Greene	1,052	39	76.0	+ 2.7	101	28	52	8†	35	2.27	-1.41	0.80	0	5	23	4	4	sw.	W. I. Lyon	
Little Sioux	Harrison	1,040	30	78.6	+ 4.2	107	28	50	7	38	2.14	-2.06	0.63	0	6	17	13	1	n.e.	H. W. Kerr	
Logan	Harrison	1,120	65	76.8	+ 2.6	102	30	52	7	35	3.37	-1.04	1.70	0	5	15	14	2	se.	Amy Ann Stern	
Onawa	Monona	1,051	46	75.7	+ 1.4	100	28	51	7	36	3.74	-0.41	1.55	0	4	20	9	2	se.	Mrs. H. E. Colby	
Rockwell City	Calhoun	1,232	44	76.2	+ 3.1	104	30	50	7†	44	2.23	-1.56	0.83	0	3	24	3	4	n.w.	A. W. McIsaac	
Sac City	Sac	1,209	62	76.5	+ 3.6	103	30	50	24	44	1.69	-1.98	1.00	0	4	22	3	6	s.	F. P. Kessler	
Sioux City	Woodbury	1,135	56	78.4	+ 4.1	99	30	53	9	31	1.71	-1.80	0.66	0	5	16	9	6	s.	U. S. Weather Bureau	
Means and extremes				76.9	+ 3.4	107	28	49	8	44	2.45	-1.43	1.70	0	5	20	8	3	se.		
<i>Central District</i>																					
Ames	Story	926	55	76.5	+ 2.5	99	28†	51	8	35	3.43	-0.43	1.20	0	9	20	7	4	se.	Iowa State College	
Baxter	Jasper	993	32																		Geo. R. Geise
Boone (near)	Boone	894	47	75.6	+ 2.1	103	30	47	8	42	3.72	0.00	1.65	0	5	17	11	3	s.	Carl Fritz Henning	
Des Moines	Polk	861	54	78.6	+ 3.2	107	28	56	8	29	3.60	+ 0.10	1.81	0	8	15	9	7	s.	U. S. Weather Bureau	
Fort Dodge	Webster	1,114	43	76.8	+ 2.8	101	30	50	10	41	2.55	-1.36	0.89	0	6	22	5	4	sw.	Mrs. Emma Sampson	
Grinnell	Poweshiek	1,031	47	77.6	+ 3.3	102	1	51	8	32	5.49	+ 1.12	2.28	0	9	23	5	3	s.	R. E. Bates	
Grundy Center	Grundy	976	40	76.4	+ 2.3	101	30	48	10												

Climatological Data for July, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	78.2	+ 4.7	103	28†	49	8	38	2.82	- 1.13	0.84	0	9	18	10	3	s.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly
Cedar Rapids.....	Linn	737	49	77.6	+ 3.6	103	28	49	8	36	4.49	+ 0.59	1.45	0	6	16	7	8	sw.	
Clinton.....	Clinton	595	60	78.5	+ 3.7	104	1	50	8	38	1.48	- 2.41	0.70	0	7	18	8	5	s.	
Davenport.....	Scott	580	60	80.2	+ 4.9	102	30	59	10	33	2.05	- 1.28	0.87	0	6	14	14	3	sw.	
Iowa City.....	Johnson	733	74	77.8	+ 4.0	102	30	51	8	34	3.00	- 1.12	1.10	0	9	15	11	5	sw.	
La Claire.....	Scott	576	54								2.02	- 1.51	0.81	0	5					Margaret T. Disney John Strodthoff William Molis Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	76.9	+ 5.7	103	1	45	8†	44	2.47	- 1.32	0.81	0	8	18	8	5	sw.	
Muscataine.....	Muscataine	546	85								2.51	- 1.20	0.95	0	4					
Olin.....	Jones	750	33	77.6	+ 3.6	104	1	44	8	42	2.22	- 1.63	0.85	0	4	21	7	3	sw.	
Tipton (near).....	Cedar	806	39	77.3	+ 2.8	102	1†	45	8	40	1.17	- 2.66	0.68	0	4	8	17	6	s.	
Williamsburg.....	Iowa	805	15	78.8		105	28†	50	8†	40	2.20	- 1.75	1.03	0	4	19	12	0	sw.	Dr. F. C. Schadt
Means and extremes.....				78.1	+ 4.1	105	28†	44	8	44	2.40	- 1.39	1.45	0	6	16	11	4	sw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	77.2	+ 3.0	104	28	50	7†	39	2.54	- 1.00	1.16	0	6	17	11	3	sw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock
Bedford.....	Taylor	1,200	27								2.88	- 1.07	1.67	0	7	20	6	5	sw.	
Clarinda.....	Page	1,00†	59	79.0	+ 3.5	107	28	52	8	40	2.81	- 1.52	1.34	0	8	21	6	1	se.	
Corning.....	Adams	1,287	43	76.2	+ 2.1	100	28	51	8	37	2.50	- 1.63	0.73	0	8	24	5	2	s.	
Cumberland (near).....	Cass	1,22†	32								2.61	- 1.07	1.80	0	6	19	7	5	sw.	
Glenwood.....	Mills	1,100	41	78.3	+ 3.0	106	28	52	5†	38	3.88	+ 0.28	1.43	0	4	18	11	2	se.	Dr. George Mogridge P. C. Cornell J. L. Hurlley W. S. Matthews B. R. Bridge
Greenfield.....	Adair	1,368	35								2.67		1.42	0	10	15	15	1	s.	
Lenox.....	Taylor	1,250	36	80.4	+ 5.3	109	28	54	7	38	1.77	- 2.44	0.63	0	8	25	5	1	se.	
Oakland.....	Pottawattamie	1,139	18	77.6	+ 3.3	106	28	52	24	39	2.89	- 0.95	1.15	0	5	21	5	5	sw.	
Red Oak (near).....	Montgomery	1,030	24								2.58	- 1.47	1.16	0	4	19	9	3	s.	
Riverton (near).....	Fremont	920	5								1.61	- 2.33	0.70	0	6	19	4	8	s.	George C. Rader H. H. Askew U. S. Weather Bureau
Thurman.....	Fremont	960	44	78.2	+ 2.6	105	28	50	7	42	2.80	- 1.37	1.72	0	5	18	9	4	s.	
Omaha, Neb.....		1,105	66	80.4	+ 3.7	105	28	57	5	27	2.10	- 1.44	1.50	0	6	20	7	4	s.	
Means and extremes.....				78.4	+ 3.3	109	28	50	7†	42	2.59	- 1.33	1.80	0	6	20	8	3	s.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	79.6	+ 5.8	108	28	56	8	36	0.91	- 3.06	0.45	0	9	21	6	4	sw.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis
Albia.....	Monroe	949	40	78.0	+ 3.5	103	28†	51	8†	40	1.42	- 2.72	0.57	0	6	16	7	8	sw.	
Centerville.....	Appanoose	1,013	38	78.6	+ 3.7	101	28	52	8	34	1.87	- 2.06	0.67	0	10	23	3	5	sw.	
Chariton (near).....	Lucas	1,042	37	76.8	+ 3.5	103	28	54	8†	35	4.59	+ 0.28	1.40	0	8	14	11	6	sw.	
Corydon (near).....	Wayne	1,050	47	76.4	+ 1.8	100	28	55	6†	30	2.98	- 0.83	0.83	0	11	16	9	6	s.	
Creston.....	Union	1,291	30	77.8	+ 4.4	106	28	52	8	35	1.28	- 2.72	0.39	0	8	16	13	2	s.	Mrs. N. Spangler Seth F. Shenton W. J. Casey J. B. Alter F. S. Parks
Indianola.....	Warren	972	50	78.2	+ 3.4	104	28	54	8	34	3.34	- 0.45	1.33	0	12	20	8	3	sw.	
Knoxville.....	Marion	920	41	77.6	+ 3.1	104	28	53	8†	31	4.73	+ 0.76	1.45	0	8	19	9	3	se.	
Lacona.....	Warren	824	32								3.10	- 0.68	1.02	0	9	20	11	0	.....	
Lamoni.....	Decatur	1,123	27	77.4	+ 3.5	102	28†	54	8†	34	3.83	- 0.11	1.24	0	7	17	10	4	sw.	
Melrose.....	Monroe	871	1								3.12		1.08	0	8	17	9	5	ne.	J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely
Mt. Ayr.....	Ringgold	1,220	39	77.0	+ 2.7	102	28	52	8	35	4.54	+ 0.12	0.91	0	11	24	4	3	s.	
Tingley.....	Ringgold	1,275	7	77.8	+ 4.4	104	28	56	6†	33	4.19	+ 0.05	1.44	0	4	22	4	5	sw.	
Winterset.....	Madison	1,118	40	77.9	+ 3.0	107	28	54	8	37	1.46	- 2.94	0.55	0	9	22	8	1	sw.	
Means and extremes.....				77.8	+ 3.7	108	28	51	8†	40	2.95	- 1.02	1.45	0	9	19	8	4	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	77.0	+ 2.6	100	30	55	8	31	6.43	+ 2.57	5.39	0	6	24	5	2	se.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau
Burlington.....	Des Moines	544	41	80.4	+ 4.4	104	30	58	10	30	3.20	- 0.21	2.56	0	7	20	9	2	sw.	
Columbus Junction.....	Louisa	595	40	75.9	+ 0.9	100	1	53	8	32	7.87	+ 4.30	5.80	0	6	16	15	0	sw.	
Fairfield.....	Jefferson	780	51	77.4	+ 3.0	103	30	50	8†	35	2.07	- 1.75	0.79	0	7	10	18	3	s.	
Keokuk.....	Lee	614	60	80.5	+ 3.6	104	29	59	10	28	1.71	- 1.70	0.91	0	8	17	8	6	sw.	
Keokuk No. 2.....	Lee	651	2																	J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesh
Keosauqua.....	Van Buren	639	44	78.4	+ 3.7	102	30	53	8	35	6.73	+ 2.74	5.50	0	7	19	9	3	se.	
Mt. Pleasant.....	Henry	730	55	78.1	+ 2.4	100	1	55	10	30	5.54	+ 1.88	3.69	0	8	12	18	1	sw.	
Oskaloosa.....	Mahaska	835	55	77.8	+ 4.1	103	28	50	10†	33	2.52	- 1.20	0.80	0	10	17	10	4	sw.	
Ottumwa.....	Wapello	649	44	78.8	+ 2.5	104	30	51	8	37	1.36	- 2.20	0.48	0	7	15	13	3	sw.	
Sigourney.....	Keokuk	785	36	78.0	+ 3.9	103	28	51	10	36	2.11	- 1.74	0.92	0	7	19	11	1	sw.	John B. Slate C. L. Beswick D. D. Sherman H. D. Liddle
Stockport (near).....	Van Buren	747	30	77.1	+ 3.3	101	30	54	6†	33	7.77	+ 3.18	6.02	0	8	21	6	4	s.	
Washington.....	Washington	757	56	78.0	+ 3.5	101	28†	54	10	30	2.62	- 0.72	0.85	0	7	18	10	3	s.	
Wever.....	Lee	552	3	79.2		106	30	53	6†	39	2.75		1.47	0	8	15	10	6	w.	
Means and extremes.....				78.1	+ 3.1	106	30	50	8†	39	4.05	+ 0.32	6.02	0	7	17	11	3	sw.	
State means and extremes.....				77.2	+ 3.5	109	28	42	10	46	2.72	- 1.11	6.02	0	6	20	8	3	sw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

‡Received too late to be included in means and summaries.

tation for the State was 6, ranging from 9 days in the south-central district to 5 days in the northwest, north-central and west-central districts. For individual stations the range was from 12 days at Indianola, to 3 days at Rockwell City, Marathon and Algona.

RIVERS

Unusually low stages prevailed on the interior streams, with little fluctuation. At Des Moines the extreme stages were 2.7 feet

and 0.3 foot, and averaged 1.0 foot, or 2.5 feet below normal. The lowest stage for July, 0.3 foot at Des Moines, recorded on the 31st, broke the July low record of 0.4 foot recorded on July 26, 1926.

The Missouri River stages averaged more than 3.6 feet below normal along the Iowa boundary, with little fluctuation. At Sioux City a stage of 4.0 feet on the 30th and 31st, was 1.3 foot lower than ever before recorded in July in 53 years. The mean stage of the Missouri at Omaha was 8.2 feet and was the lowest July mean of record.

Daily Precipitation for July, 1931

Stations	Drainage Basin	Day of Month																															Totals		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Northwest District</i>																																			
Akron	Big Sioux	.25		.38						.03	.29																							0.95	
Alta	Raccoon		.50		1.46					.07		.18			T.		.94																	3.15	
Alton	Floyd	.55		.39	.05			.05		.02	.45						.56	T.	T.															2.07	
Cherokee	Little Sioux	1.22		1.05				T.	.21	T.	.59	T.					3.09												T.					6.16	
Estherville	Des Moines	.20			1.01						.10	.27																			.03		1.61		
Hawarden	Big Sioux	.46		.52	.02			.02	.01	.01	.08				T.					.09													1.21		
Inwood (near)	Big Sioux		.43		.34				.07	T.	.33	.05																			.05		1.27		
Lake Park (near)	Little Sioux	.33		.64							.69							.90												.06			2.62		
Le Mars	Floyd	.64						T.	.04		.03	T.			T.																		1.32		
Marathon	Raccoon	1.08			1.15						.43	T.			T.			T.										T.					2.66		
Pocahontas	Des Moines	.12		.73	.17			.02			.45						T.																1.49		
Rock Rapids	Big Sioux	.46		.52						.10	.33							.18													T.		1.69		
Sanborn	Floyd	.51		.92	.08			.14	.03		.69	.02						1.75															4.14		
Sheldon	Floyd	.34		.80					.07		.32							1.18		T.													2.71		
Sioux Center	Floyd	.40		.48				.12			.30								T.														1.30		
Spencer	Little Sioux	.23		.80				T.	.40		.40							.16												.01			2.00		
Storm Lake	Raccoon	.35		1.36					.06		.21	T.			T.			.72															2.70		
Washta	Little Sioux	.73		.97				T.	.02		.62																							2.34	
West Bend	Des Moines	1.17		.58	.02			T.			.52																					.04		2.33	
<i>North Central District</i>																																			
Algona	Des Moines	1.67		.63	T.			T.			.21							T.														T.	2.51		
Allison (near)	Cedar	.22	T.	.05	.40			.09	.18		T.	.15	T.							T.													1.09		
Belmond	Iowa	2.05		.22	.48	T.				.03	.02																							3.30	
Britt	Iowa	.75		.23	.64			.09	.18																									1.89	
Charles City***	Cedar	.27	T.	.38	.14			T.	.15		.15									.02														1.15	
Forest City	Cedar		.96		.90					T.	.25		.06																					2.17	
Hampton	Cedar	.27		.20	.96			T.			.20																							1.63	
Humboldt	Des Moines	.47		.42	.50			T.			.32																							1.71	
Mason City	Cedar	.33	.06	.16	.32			T.	.21				.02																					1.10	
Northwood	Cedar	.41		.16	.23			.03	.05			.17																						1.05	
Osage	Cedar	.35		.07	.41			.07	.13			.11																						1.17	
<i>Northeast District</i>																																			
Cedar Falls	Cedar	1.80		T.	.85			.18	T.		.01	.43	.20							T.														3.47	
Decorah	Mississippi		.30		.43				T.	.05		.20								.60														1.58	
Delaware (near)	Maquoketa	.05	.01		.47			.17	.02			.84	.62		.01					.03														2.22	
Dubuque***	Mississippi		.02	T.	.11				.41			1.28	.06	.02	.07					.48														2.57	
Fayette	Mississippi	.15			.44			T.	.20			.51	.05							.09														1.47	
Independence	Wapsipinicon	T.	.29		.41			.01	.06		T.	.40	.41							.02														1.60	
Lansing	Mississippi		.07		.37				.02			.12			T.																			0.58	
New Hampton	Wapsipinicon		.18		.40			.36	.28									.11		.40														1.73	
Oelwein	Wapsipinicon		.55		.60				.05	.25		.35	.20							.75														2.75	
Postville (near)	Mississippi	.24			.41			.28	.12			.08								.28														1.41	
Waterloo	Cedar		.90		.56				.10	T.		.35	.30																					2.21	
Waverly	Cedar	1.05	.01		.87			.13	.15			.82	.08																					3.11	
<i>West Central District</i>																																			
Audubon (near)	Nishnabotna	.62		.88	.10					.01	.11	.18						.01		.24														2.15	
Carroll	Raccoon	.05	.54		.63							.69							.07		.90													2.88	
Denison	Missouri	.53		.68					.08	.17	.33							.29		T.														2.08	
Guthrie Center	Raccoon	.53		.15	.32			T.		T.	.87	.93								.77														3.57	
Harlan	Nishnabotna	.60		.34	T.				.01	.40	.06							.06		.06														1.53	
Jefferson	Raccoon	.68		.80						T.	.27									.32														2.27	
Little Sioux	Little Sioux	.56		.57							.26	.11						.63		.01														2.14	
Logan	Missouri	.96		.48				T.			.18	T.						1.70		.05														3.37	
Onawa	Missouri	.90		1.12							.17							1.55																3.74	
Rockwell City	Raccoon	.80		.60				T.			.83									T.														2.23	
Sac City	Raccoon	.17		1.00							.51								.01															1.69	
Sioux City***	Missouri	.50		.51				T.	.02	T.	.66	T.						.05		T.														1.74	
<i>Central District</i>																																			
Ames	Skunk	.91		.38	.31				.03		.05	1.20	.32	.02						.18														3.43	
Baxter	Skunk																																		
Boone (near)	Des Moines	1.65			.55							.45	.51	T.						.56														3.72	
Des Moines***	Des Moines	.29	.16	.98	.01				.16		.24	1.61		T.						.15														3.60	
Fort Dodge	Des Moines		.38		.78				.17		.20									.89															2.55
Grinnell	Iowa	.22	.10	.54		.51			T.	T.		.11	1.21	2.28						.35	.17													5.49	
Grundy Center	Cedar	.42		T.	1.02				T.	T.		.63	.25							T.														2.32	
Iowa Falls	Iowa		.26		.92				.21		.05	.35	.06																					1.85	
Marshalltown	Iowa		.14	.72		.90			T.	.06		1.00	1.47																					4.43	
Monroe	Des Moines	.13	1.36		.89				.05	.05	.05								.84	.12														4.91	
Newton	Skunk	.35	.49		.92						.05	2.12	.63							1.30	.12													5.98	
Perry	Raccoon	.86		.09	.13				.11		.08	1.16	.09							.22															

Daily Precipitation for July, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31					
<i>Southwest District</i>																																					
Atlantic	Nishnabotna	1.16				.32					.02		.21	.62							.21														2.54		
Bedford	102	.11	.07		T.	.50						.48	1.67	.03								.02												2.88			
Clarinda	Nodaway	.27	.07			.34		.03					.65	1.34							.03	.08												2.81			
Corning	Nodaway	.73	.09			.12					T.	.64	.60	.09							.18	.05												2.50			
Cumberl'nd (near)	Nodaway	.40	T.			.15				T.	T.	T.	.16	1.77	.03						.10													2.61			
Glenwood	Missouri	1.42				.17				T.			1.43	.86																				3.88			
Greenfield	Nodaway	.48	.07	.02		.12					T.	.02	.05	1.42							.45				.03									2.67			
Lenox	Missouri	.22	.03			.20	.08							.63							.40	.19			.02									1.77			
Oakland	Nishnabotna	1.15				.36						.01	.64	.73							T.													2.89			
Red Oak (near)	Nishnabotna	1.15				.14							.13	1.16							T.													2.58			
Riverton (near)	Nishnabotna	.32	.02	.30								T.	.23									.70												.04	1.61		
Thurman	Missouri	1.72				.20						T.	.52																					.33	2.80		
Omaha, Neb.***	Missouri	1.50				.22				T.	T.	.02	T.	.13						.07	T.	.16												T.	2.10		
<i>South Central District</i>																																					
Afton	Grand	T.	.02	.05	.23						.01	.03	.06	.45							.05				.01										0.91		
Albia	Des Moines			.23		.19						.29	.28	.23							.20														1.42		
Centerville	Chariton	.01	T.	.05		.14					.01	.05	.02	.17	.67						.17	.58												T.	1.87		
Chariton (near)	Chariton	1.40	.22			.80						.20	.35	.18								1.20												.24	4.59		
Corydon (near)	Chariton	.21	.08	.23	.10	.62					T.	.05	.21	.38								.83	.10											T.	1.4	2.98	
Creston	Missouri		.03	.05		.25						.03	.18	.21	.39																				T.	1.28	
Indianola	Des Moines	.15	.32	.05	.01	1.33						.02	.10	.45	.26							.57	.01												.07	3.34	
Knoxville	Des Moines	.75	.25			T. 1.45						.50	.05	.30	.20	T.																				4.73	
Lacona	Des Moines	.60	.07			1.02						.05	.06	.50	.02							.38	.40												3.10		
Lamoni	Grand	.23	.07	T.		.62						T.		.17	.35							T. 1.15	1.24												3.83		
Melrose	Des Moines	T.	.48	.60		.64					.10		.10	.25	.22																				T.	3.12	
Mt. Ayr	Grand		.21		.33	.58						.04	.41	.25	.75							.91	.40	.56										.10	4.54		
Tingley	Platte	T.	.75	1.30									T.	.70																						4.19	
Winterset	Des Moines		.10	.05	.02	.30						T.		.55	.20	.18																			T.	1.46	
<i>Southeast District</i>																																					
Bonaparte (near)	Des Moines		T.	5.39		T.						.39	.10	.11	.24																					6.43	
Burlington	Mississippi		T.	2.51	.05							.10		.19	.12							.02	.21													3.20	
Columbus Junction	Iowa		.05	5.80								.25		T.	1.21	.18							.38												T.	7.87	
Fairfield	Skunk		.14	.65								.03	.09	.28	.53																					2.07	
Keokuk***	Mississippi		.59	.33		T.						.04	.02	.14	.11																				T.	1.71	
Keokuk No. 2	Mississippi																																				
Keosauqua	Des Moines		.12	5.50								.12	.28	.32																						T.	6.73
Mt. Pleasant	Skunk		.09	3.69								.04	.02	.41	.15																					5.54	
Oskaloosa	Des Moines	T.	.03	.05		.33						.09	.06	.80	.51																					2.52	
Ottumwa	Des Moines			.11		.04						.09	T.	.18	.31	.48																				T.	1.36
Sigourney	Skunk		T.			.05						T.	.05	.92	.57																						2.11
Stockport (near)	Skunk		.10	5.92		T.						.03	.15	.21	.21																					7.77	
Washington	Skunk		.08	.75								.18	.08	T.	.85	.38																				2.62	
Wever	Mississippi		.45	1.47								.07		.03	.17	.10																					2.75

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

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

\*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.

\*\*Incomplete.

\*Precipitation included in next following measurement.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)					Relative Humidity, %				Wind				Sunshine			
	Mean	Highest	Date	Lowest	Date	Mean		Lowest	Date	Total movement	Average hourly velocity	Maximum			% possible Departure from normal		
						7 A. M.	12 Noon					7 P. M.	Miles	From		Date	
Chas. City	29.91	30.26	9	29.62	5	68	37	42	22	24	3,791	5.1	20	w.	1	83	+ 8
Davenport	29.91	30.18	9	29.57	5	68	41	43	21	7	5,033	6.8	28	sw.	1	81	+ 8
Des Moines	29.90	30.19	9	29.63	22	72	46	51	29	21	5,292	7.1	32	w.	1	76	+ 3
Dubuque	29.90	30.24	9	29.54	5	72	42	44	23	7	3,430	4.6	17	nw.	19	82	+ 13
Keokuk	29.93	30.20	9	29.64	5	70	47	50	29	29	3,586	4.8	17	nw.	19	83	+ 6
Sioux City	29.86	30.17	9	29.57	28	66	42	41	18	21	7,626	10.2	36	n.	11	81	+ 9
Omaha, Nb	29.89	30.19	9	29.58	22	62	45	45	19	28	4,134	5.6	22	nw.	8	82	+ 7
Means and extremes	29.90					68	43	45				6.3				81	+ 8
Normals		30.26	9	29.54	5				18	21					11		
and records.	29.97		7th		9th	79		57		25th					13th	73	
		*30.47	1892		*29.29	1926									113	1894	
																152	ne. 1905

\*Davenport †Sioux City ‡Des Moines ||Omaha ‡Local mean time †And other dates. ‡‡January 1, 1928, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

MISCELLANEOUS PHENOMENA

- Clouds, mammato cumulus: 1st.
- Dew, heavy: 8th, 9th, 10th, 13th, 19th, 20th, 21st, 22d, 23d, 24th.
- Dust Storm: 18th.
- Fog, dense: 6th, 10th, 13th.
- Fog, light: 6th, 10th, 13th, 22d.
- Gales: 1st, 5th, 9th, 11th, 12th, 19th, 28th.
- Hail, light: 1st, 5th, 8th, 9th, 11th, 12th, 17th, 19th, 20th, 31st.
- Hail, moderate: 1st, 8th, 9th, 11th, 12th, 17th, 19th, 20th.
- Hail, heavy: 1st, 8th, 9th, 11th, 12th, 17th.
- Halo, solar: 1st, 12th, 17th, 20th.
- Haze: 31st.
- Hot Winds: 14th, 15th, 16th, 18th, 19th, 27th, 28th, 29th, 30th.
- Meteor: 22d, 23d.
- Parhelia: 1st, 6th, 7th.
- Rainbow: 1st, 8th, 9th, 10th, 11th, 12th, 31st.
- Thunderstorms: 1st, 2d, 4th, 5th, 8th, 9th, 11th, 12th, 13th, 14th, 15th, 17th, 19th, 20th, 22d, 23d, 29th, 31st.

ERRATA

Report for June, 1931. Page 45, State extreme highest sea-level barometric pressure published 30.23 inches, should be 30.24 inches. Charles City; highest monthly sea-level barometric pressure published 30.18 inches, should be 30.24 inches. Date of highest sea-level barometric pressure published 15th, should be 5th. Page 46, Sioux City; minimum temperature on the 20th, published 67°, should be 66°.

Unusually low stages were recorded on the Mississippi River, with little fluctuation. At Dubuque the extreme stages were 6.1 feet and 1.1 feet, and averaged 4.2 feet for the month. At Davenport the extreme stages were 4.6 feet and 1.2 feet and averaged 3.3 feet or 2.3 feet below normal. At Keokuk the stages continued near or below the zero mark.

Daily Maximum and Minimum Temperature for the Month of July, 1931

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

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight.

IOWA STORMS, JULY, 1931

Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path Miles	Length of Path Miles	Size of Hailstones Inches	Persons Killed	Persons Injured	Damage and Remarks
1	Audubon	Cameron, Sharon	Wind	2:00 p. m.	NW to SE						Considerable corn blown down, several trees and small buildings blown over, damaged about \$1500
1	Black Hawk	Bennington	Wind	2:30 p. m.	SW to NE						Wind damage to buildings \$1000; crops \$1000
1	Boone	Yell, Worth	Wind and Hail	1:00-2:30 p. m.	SW to NE			1/4			Wind damage to corn considerable; hail slight
1	Bremer	Maxfield	Wind	11:30 a. m.	SW to NE	2	8				Wind \$2500; demolished 3 silos, small buildings, several electric power poles
1	Carroll	Glidden	Wind	2:00 p. m.	W to E						Corn badly blown down
1	Cerro Gordo	Lime Creek, Falls	Wind	1:00 p. m.	W to E	4	6	Small			Wind \$4000; squall wind damaged a barn, wind mill, hog house, chicken house; considerable damage to crops
1	Clay	Douglas	Wind	12:30 p. m.	N to S						Corn badly blown down
1	Greene	Willow	Wind	4:00 p. m.	NW to SE						Corn and oats prostrated
1	Grundy	Grant, Washington, Clay, Lincoln, Black Hawk	Wind and Hail	6:00 p. m.	W to E			3/4			Wind damage to buildings and crops \$7000; hail to crops \$10,000
1	Guthrie	Dodge, Highland	Wind	2:00-3:00 p. m.	W to E						Corn and oats prostrated
1	Hamilton	Liberty, Marion	Wind	3:00 p. m.	SW to NE						Wind damage to crops and trees \$1600
1	Hancock	Magor	Wind	2:30 p. m.	SW to NE						Wind damage to crops \$10,000
1	Harrison	Cincinnati	Wind	12:00 mt. to 2:00 a. m.	NW to SE						Wind damage to trees and crops considerable
1	Humboldt	Delana, Humboldt, Grove	Wind	2:00-3:30 p. m.	SW to NE						Wind damage to buildings, silos, trees and crops \$9000
1	Ida	Corwin	Wind	1:00 p. m.							Wind damage to trees and buildings \$500
1	Kossuth	Union, Plum Creek, Cresco, Irvington	Wind	2:30-3:30 p. m.	NW to SE						Corn prostrated by wind
1	Lucas	Pleasant	Wind	4:00 p. m.	W to E				1		Wind damage to crops about \$1.00 per acre; buildings \$500
1	Mahaska	Garfield	Wind	5:00 p. m.	W to E						Wind damaged several trees and crops
1	Marion	Knoxville	Wind	4:45 p. m.							Wind prostrated corn
1	Marshall	Le Grand	Hail	3:30 p. m.	W to E	1	2	1/2			Hail to crops \$10,000
1	Montgomery	Sherman	Wind	1:00-2:00 p. m.	SW to NE		4				Wind damage to buildings \$300; crops considerable
1	Page	Washington	Wind	2:30 p. m.	SW to NE						Several broken tree limbs
1	Pocahontas	Des Moines, Garfield	Hail	12:30 a. m.	W to E	1	8	1/2			Hail damage to crops \$45,000
1	Tama	Grant	Wind and Hail	4:00 p. m.	W to E			Small			Wind damage to building \$500; hail slight
1	Wright	Pleasant	Wind	2:40 p. m.	SW to NE						Corn prostrated
2	Henry	Salem	Rain and Flood	Night	SW to NE						Flood damaged crops in bottom land about \$5.00 per acre
2	Tama	Toledo, Tama	Wind	3:00 p. m.	SW to NE						Wind damage to barns, small buildings and trees \$3000
2	Wapello	Center, Wapello	Rain and Flood	Midnight							Considerable damage to streets and sewers
3	Henry	Canaan	Wind	2:30 a. m.	NE to SW						Corn and small grain blown flat
3	Van Buren	Village	Wind	4:00 a. m.	NE to SW						Corn, and small grain blown down flat
8	Dubuque	New Wine	Wind and Hail	11:00 a. m.	NW to SE	3	7	1/2			Wind prostrated crops; hail damaged 1/2 oat crop in township
8	Hamilton	Fremont, Cass, Blairsburg, Williams	Wind and Hail	2:30-3:00 p. m.	W to E	3	20	1/2			Wind to buildings and crops \$3000; hail to crops \$35,000
8	Lyon	Riverside, Liberal, Cleveland, Midland, Allison	Hail	7:30 p. m.	NW to SE			1/2			Hail to crops \$40,000
8	Story	Washington	Hail	4:00 p. m.	NW to SE			3/8			Crops moderately damaged
8	Webster	Colfax	Wind and Hail	3:00 p. m.	W to E	1	6	1/2			Wind to crops \$5000; hail to crops \$5000
9	Benton	Taylor, Jackson, Benton	Hail	1:30 p. m.	NW to SE	7	12	1/2			Hail damaged crops \$50,000
9	Boone	Pilot Mound	Hail	1:00 p. m.	W to E	1	6	1/4			Hail slight to crops
9	Buchanan	Hazelton, Byron, Washington	Hail	10:00 a. m.	NW to SE			1/2			Hail to crops \$30,000
9	Delaware	Bremer, Milo, Prairie, Hazel Green, Adams	Hail	10:30-11:00 a. m.	NW to SE			1			Hail damage to crops \$35,000
9	Dubuque	Dubuque, New Wine	Hail	11:00 a. m.	NW to SE			1/2			Hail damage to crops \$10,000
9	Franklin	Geneva	Hail			3	4	1/2			Hail damaged from 5% to 50% of crops
9	Johnson	Monroe, Jefferson	Hail	1:00-1:30 p. m.	NW to SE	6		1			Crops entirely hailed out in localities, others not totally destroyed; many chickens killed
9	Linn	Fairfax	Hail	1:00-1:30 p. m.	NW to SE	4		1			To crops \$20,000; some places occurred a complete hail out
9	Mitchell	East Lincoln, West Lincoln, Douglas	Hail	6:00 a. m.	NW to SE	2	8	1/2			Crops moderately damaged
9	Polk	Allen	Hail	3:00-3:30 p. m.	N to S	2	3	1/2			To melons \$1000; corn slight
9	Tama	Clark, Buckingham, Geneseo	Hail	11:30 a. m. to 12 noon	NW to SE	1	8	1/2			Corn, soybeans, oats, \$10,000
10	Story	Franklin, Milford, Warren, Lincoln	Hail	p. m.	SW to NE	1		1			Considerable damage to late oats
11	Hamilton	Independence	Hail	5:30 p. m.	W to E	1	3	3/4			Considerable damage to corn
11	Jasper	Malaka	Hail	11:00 p. m.	NW to SE	2	6	3/4			Considerable damage to corn
11	Pottawattamie	Lewis	Hail	7:00 p. m.	SW to NE			1/2			Damaged approximately 25% crops in path of storm
11	Harrison	Little Sioux, Morgan	Hail	a. m.	W to E						Completely hailed out 10 farms, damage about \$20,000
11	Mills	Plattville, Glenwood, Center, Oak	Hail	6:00 a. m.	NW to SE			1			17 farms had partial or total loss to crops, damage about \$35,000
12	Fremont	Prairie	Wind and Hail	5:00 p. m.	W to E			Small			Wind damage to buildings \$1500; hail slight to crops
12	Tama	Indian Village, Highland	Wind and Hail	4:30 p. m.	NW to SE	3	10	1/2			Wind damage to crops \$4000; hail \$10,000
12	Taylor	Grant	Wind and Hail		NW to SE			Small			Wind damage \$500; hail to crops slight
12	Marshall	LeGrand	Wind, Hail, Flood	4:00-6:00 p. m.	W to E	4	10	1			Wind blew corn down; hail to crops \$30,000; flood to livestock \$1000
12	Page	Nodaway, East River	Wind and Hail	4:00-5:30 p. m.	W to E			1/4		1	Corn blown down badly; hail slight; wind damage to buildings and cars \$6000
12	Wayne	Monroe, Walnut	Wind	8:00 p. m.	SW to NE						Wind damage to buildings \$2200 crops \$27,000
17	Jackson	Iowa	Hail	2:00 p. m.	NW to SE			1			Hail to bldg. \$25; crops \$2000
17	O'Brien	Carroll	Wind and Hail	2:30 a. m.	NW to SE	2	5	1/2			Hail to crops \$5000; wind slight
17	Cherokee	Pilot	Flood	a. m.		1	4				Considerable damage by erosion and flooding of farm land





# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, AUGUST, 1931 No. 8

## COMPARATIVE DATA FOR THE STATE—AUGUST

### GENERAL SUMMARY

Remarkably heavy rainfall over several local areas and a continuation of the drouth in the north half of the State, with further deterioration of the corn crop, were the August abnormalities.

The heavy rainfall which occurred on scattered dates in several local areas did some damage by erosion, but was quite beneficial to crops, pastures and water supply. Wind squalls, hailstorms and tornadoes, were not especially numerous, but were quite destructive in a few local areas. The precipitation was unevenly distributed within the districts, yet the district averages were nearly normal except the east-central district, where the deficiency was considerable.

Rains were insufficient to break the drouth in the northern half of Iowa, being most serious in the north-central and northwest districts. The water supply continued seriously deficient, and wells and the subsoil showed very little influence from the rains. Pastures were short and badly burned in most of the northern and eastern counties.

In most localities where the precipitation continued deficient, there was further deterioration of corn. The condition of the corn crop is even worse than in 1930 over several areas, due to the deficiency in subsoil moisture as well as the shortage in rainfall during the current season.

N. G. R.

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 district of nearly equal area, and based on the records of 100 stations, was 72.6° or 0.9° above normal. The greatest district excess, 2.4°, was in the northwest district, and the greatest deficiency, 0.2°, was in the central and southeast districts. The south-central district averaged exactly normal. The highest monthly mean temperature was 75.4°, in western Pottawattomie County, in the vicinity of Omaha, and the least was 68.5° at Postville (near). The absolute range in temperature for the State was 6.9° from 102° at Inwood (near) on the 4th, and at Wever on the 8th, to 95.3° at Decorah on the 30th. The average number of days with the maximum temperature 100° or higher was only a small fraction of a day, although Inwood (near), Decorah, Olin, Sac City, Clinton, Keokuk and Wever, each had one day with maximum temperature 100° or higher. The average number of days with the maximum temperature 90° or higher was 9, ranging from 15 days at Sioux Center, Humboldt, and Little Sioux, to 3 days at Postville (near). The greatest daily range in temperature at any station was 46° at 4 stations.

### PRECIPITATION

The average precipitation for the State, derived from the average of 9 districts of nearly equal area, and based on the records of 117 stations, was 3.30 inches, or 0.14 inch below normal.

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
1873.....	75.7	+ 4.0	102	54	4.17	+ 0.73	8.40	0.00					
1874.....	74.3	+ 2.6	99	55	3.12	- 0.32	9.16	0.85					
1875.....	68.9	- 2.8	92	41	4.04	+ 0.60	7.60	1.07					
1876.....	73.2	+ 1.5	96	46	5.15	+ 1.71	10.01	1.50					
1877.....	71.9	+ 0.2	100	53	4.36	+ 0.92	12.65	0.10					
1878.....	74.4	+ 2.7	100	50	3.22	- 0.22	9.15	0.43					
1879.....	72.0	+ 0.3	100	42	2.70	- 0.74	7.50	0.45					
1880.....	72.5	+ 0.8	104	41	4.77	+ 1.33	9.88	0.77					
1881.....	76.5	+ 4.8	104	48	2.71	- 0.73	6.85	0.32					
1882.....	71.5	+ 0.2	96	43	1.61	- 1.83	6.90	0.07					
1883.....	69.2	- 2.5	88	42	2.58	- 0.86	8.95	0.22					
1884.....	68.5	- 3.2	93	44	4.09	+ 0.65	8.34	1.98					
1885.....	66.9	- 4.8	88	40	5.90	+ 2.46	12.68	2.79					
1886.....	74.2	+ 2.5	103	34	2.02	- 1.42	7.13	0.30					
1887.....	70.8	- 0.9	103	34	2.75	- 0.69	8.85	0.51					
1888.....	70.4	- 1.3	110	40	4.37	+ 0.92	8.40	0.95					
1889.....	71.3	- 0.4	104	37	1.87	- 1.57	9.95	0.12					
1890.....	68.1	- 3.6	102	34	3.25	- 0.19	6.44	1.03					
1891.....	69.1	- 2.6	106	34	4.24	+ 0.80	13.02	1.23	8	13	12	6	
1892.....	71.4	- 0.3	102	40	2.24	- 1.20	4.69	0.65	5	18	9	4	
1893.....	69.4	- 2.3	101	30	2.32	- 1.12	6.22	0.40	5	19	9	3	
1894.....	74.6	+ 2.9	108	38	1.58	- 1.86	4.53	T.	4	21	8	2	
1895.....	71.9	+ 0.2	103	37	4.43	+ 0.99	10.63	0.67	7	17	9	5	
1896.....	71.7	- 0.0	104	34	3.52	+ 0.08	12.25	0.86	8	15	11	5	
1897.....	68.9	- 2.8	104	35	1.86	- 1.58	4.98	0.47	6	15	11	5	
1898.....	71.2	- 0.5	103	40	3.44	- 0.00	10.55	0.58	6	17	9	5	
1899.....	74.1	+ 2.7	100	41	3.68	+ 0.24	10.45	1.12	7	17	10	4	
1900.....	77.4	+ 5.7	103	44	4.65	+ 1.21	10.43	1.26	6	18	10	3	
1901.....	73.8	+ 2.1	105	40	1.29	- 2.15	4.16	T.	5	20	9	2	
1902.....	69.1	- 2.6	98	37	6.58	+ 3.14	15.47	1.57	11	11	11	9	
1903.....	69.1	- 2.6	101	41	6.64	+ 3.20	17.74	2.55	11	12	10	9	
1904.....	69.1	- 2.6	97	35	3.43	- 0.01	6.75	0.66	7	17	8	6	
1905.....	74.3	+ 2.6	104	44	4.05	+ 0.61	8.47	1.04	5	16	9	6	
1906.....	74.1	+ 2.4	101	33	3.95	+ 0.51	10.51	0.92	9	17	9	5	
1907.....	71.1	- 0.6	99	37	4.33	+ 0.89	9.67	1.05	9	17	9	5	
1908.....	70.0	- 1.7	101	38	4.77	+ 1.33	10.55	1.35	9	17	9	5	
1909.....	76.1	+ 4.4	103	33	1.81	- 1.63	8.21	T.	5	21	8	2	
1910.....	71.9	+ 0.2	104	36	3.88	+ 0.44	11.22	0.37	8	15	10	6	
1911.....	71.7	- 0.0	107	34	3.32	- 0.12	9.47	0.41	9	16	10	5	
1912.....	71.0	- 0.7	101	40	3.78	+ 0.34	7.90	0.89	10	15	10	6	
1913.....	76.6	+ 4.9	108	40	2.68	- 0.76	7.13	0.08	6	17	10	4	
1914.....	73.7	+ 2.0	103	40	2.19	- 1.25	4.90	0.42	7	17	10	4	
1915.....	65.9	- 5.8	91	30	2.81	- 0.63	9.14	0.27	8	16	8	7	
1916.....	74.0	+ 2.3	106	35	2.58	- 0.86	6.23	0.49	7	18	9	4	
1917.....	69.4	- 2.3	102	31	2.29	- 1.15	6.31	0.70	7	19	8	4	
1918.....	76.0	+ 4.3	113	38	3.61	+ 0.17	8.38	0.54	8	16	10	5	
1919.....	71.5	- 0.2	103	38	2.59	- 0.85	5.72	0.97	7	19	9	3	
1920.....	69.3	- 2.4	98	39	3.35	- 0.09	8.52	0.44	7	18	8	5	
1921.....	72.1	+ 0.4	102	37	5.04	+ 1.60	9.04	2.20	8	16	11	1	
1922.....	73.8	+ 2.1	102	42	3.06	- 0.38	9.80	0.33	8	19	8	1	
1923.....	70.6	- 1.1	102	38	5.42	+ 1.98	13.14	1.46	12	15	9	7	
1924.....	71.7	- 0.0	100	40	5.35	+ 1.91	12.38	1.90	10	16	10	5	
1925.....	72.4	+ 0.7	99	39	3.47	+ 0.03	8.36	0.31	8	18	9	4	
1926.....	73.5	+ 1.8	103	47	3.80	+ 0.36	7.33	1.64	10	16	10	5	
1927.....	67.9	- 3.8	99	35	2.36	- 1.08	5.68	0.67	8	15	10	6	
1928.....	72.7	+ 1.0	100	37	6.42	+ 2.98	12.80	2.16	9	19	8	4	
1929.....	71.9	+ 0.2	102	37	2.41	- 1.00	9.27	0.78	6	18	9	4	
1930.....	74.4	+ 2.7	113	41	2.42	- 1.02	6.71	0.48	8	15	11	5	
1931.....	72.6	+ 0.9	102	37	3.30	- 0.14	7.18	1.09	8	16	10	5	
Normals.....	71.7	.....	102	39	3.44	.....	8.93	0.82	8	17	9	5	
Highest.....	77.4	.....	113	55	6.61	.....	17.74	2.79	12	21	12	9	
Lowest.....	66.9	.....	91	30	1.29	.....	4.16	0.00	4	11	8	2	

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

The greatest district deficiency was in the east-central district, 1.47 inches, and the greatest excess, 0.98 inch, was in the southwest district. The greatest precipitation deficiency for any one station was at Iowa Falls, 2.27 inches, and the greatest excess was at Waverly, 3.84 inches. The greatest amount at a single station was 7.18 inches at Lenox, and the least was 1.09 inches at Sioux Center. The greatest amount occurring in 24 consecutive hours was 3.80 inches at Waverly on the 1st and 2d.

The average number of days with 0.01 inch or more of precipitation for the State was 8, ranging from 9 days in the west-central, central and southeast districts, to 6 days in the north-central, north-east and east-central districts. For individual stations the range was from 13 days at Des Moines to 3 days at Olin and Lake Park (near).



Climatological Data for August, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days			Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy
<i>Northwest District</i>																			
Akron.....	Plymouth.....	1,153	4															Orlan C. Moore	
Alta.....	Buena Vista.....	1,513	41	73.3	+ 3.0	98	16	45	29	38	1.94	- 1.64	0.67	0	7	14	15	D. E. Hadden	
Alton.....	Sioux.....	1,305	26	73.1	+ 2.2	95	16	44	29	40	5.22	+ 2.12	3.12	0	6	11	17	W. S. Slagle	
Cherokee.....	Cherokee.....	1,196	11	72.8	+ 2.8	95	16	46	11	36	2.37	- 0.83	0.90	0	7	19	12	J. E. Wirth	
Estherville.....	Emmet.....	1,298	37	72.4	+ 3.6	98	4†	40	30	40	2.90	- 0.29	1.15	0	9	25	5	A. O. Peterson	
Hawarden.....	Sioux.....	1,181	5								2.05	- 0.73	0.86	0	7	19	5	Earl V. Slife	
Inwood (near).....	Lyon.....	1,474	28	73.6	+ 3.1	102	4	44	11	44	1.88	- 0.71	1.44	0	4	26	5	A. C. Hanson	
Lake Park (near).....	Dickinson.....	1,489	19	71.8	+ 2.3	96	4	44	30	38	2.19	- 1.31	1.56	0	3	16	11	P. M. Lawrence	
Le Mars.....	Plymouth.....	1,224	30	74.4	+ 3.4	95	4†	45	11	38	1.92	- 0.76	1.03	0	5	24	4	Henry Newell	
Marathon.....	Buena Vista.....	1,390	5								3.93		1.53	0	8	20	7	E. G. Smith	
Pocahontas.....	Pocahontas.....	1,248	27	73.3	+ 2.7	97	16†	45	30	39	3.32	- 0.05	1.62	0	8	20	9	F. E. Hronek	
Rock Rapids.....	Lyon.....	1,349	34	72.1	+ 2.4	98	4	43	30	43	3.60	+ 1.25	3.00	0	6	28	1	Nellie F. Medberry	
Sanborn.....	O'Brien.....	1,553	18	71.6	+ 1.1	96	5†	42	30	39	2.91	- 0.30	1.91	0	7	12	13	J. W. Dow	
Sheldon.....	O'Brien.....	1,418	25	72.4	+ 1.9	96	4†	42	29	42	3.75	+ 0.75	2.36	0	7	19	9	Ross E. Forward	
Sioux Center.....	Sioux.....	1,461	32	73.3	+ 2.8	97	5†	45	30	38	1.09	- 1.73	0.60	0	4	15	10	F. C. Au	
Spencer.....	Clay.....	1,319	23	73.4	+ 2.8	99	4	45	11†	40	4.38	+ 0.98	2.10	0	7	17	13	E. W. Little	
Storm Lake.....	Buena Vista.....	1,442	41	72.4	+ 1.0	93	16	44	29	44	2.35	- 0.79	0.69	0	8	17	10	Russel M. Edwards	
Washta.....	Cherokee.....	1,157	34	72.6	+ 2.0	98	15†	40	12	46	1.98	- 0.96	0.80	0	7	20	9	H. L. Felter	
West Bend.....	Palo Alto.....	1,197	44	72.6	+ 2.0	95	5†	46	11†	31	2.42	- 1.27	0.78	0	8	21	8	Jos. Dorweiler	
Means and extremes.....				72.8	+ 2.4	102	4	40	12†	46	2.73	- 0.35	3.12	0	7	19	9	3	s.
<i>North Central District</i>																			
Algona.....	Kossuth.....	1,207	70	72.4	+ 2.1	95	5	45	30	33	3.32	- 0.23	1.45	0	7	15	10	6	Leon M. Merritt
Rock Rapids (near).....	Butler.....	1,000	17	72.0	+ 1.5	95	6†	46	30	37	3.56	+ 0.18	1.95	0	4	11	14	6	George H. Bell
Belmond.....	Wright.....	1,181	22	71.4	+ 1.6	97	6	43	30	40	3.91	+ 0.83	1.95	0	7	14	11	6	H. F. Luick
Britt.....	Hancock.....	1,236	46	71.3	+ 1.4	96	19	44	30	34	7.11	+ 3.34	3.60	0	9	16	2	13	E. P. Healy
Charles City.....	Floyd.....	1,015	56	72.0	+ 2.9	96	16	41	30	37	3.55	+ 0.07	2.50	0	6	14	10	7	U. S. Weather Bureau
Forest City.....	Winnebago.....	1,226	41	70.4	+ 0.2	95	4†	40	30	39	3.46	+ 0.09	1.44	0	6	11	8	12	Dr. M. B. Neil
Hampton.....	Franklin.....	1,142	40	72.0		95	4†	43	30	38	2.29	- 1.16	1.20	0	4	27	2	2	Howard J. Haydon
Humboldt.....	Humboldt.....	1,095	47	72.4	+ 0.6	97	16	43	30	40	2.19	- 1.11	0.76	0	6	18	6	7	H. C. Snitkey
Mason City.....	Cerro Gordo.....	1,118	39	70.2	+ 0.6	95	4†	38	30	41	2.86	- 0.88	1.42	0	5	17	10	4	American Beet Sugar Co.
Northwood††.....	Worth.....	1,222	35	71.7	+ 3.2	95	4†	39	30	35	2.09	- 1.87	0.95	0	5	15	12	4	Charles Dwelle
Osage.....	Mitchell.....	1,163	46	71.8	+ 3.1	97	4	40	30	37	2.37	- 0.76	1.20	0	6	14	10	7	Dr. C. E. Juhl
Means and extremes.....				71.7	+ 1.9	97	4†	38	30	41	3.16	- 0.01	3.60	0	6	16	8	7	se.
<i>Northeast District</i>																			
Cedar Falls.....	Black Hawk.....	875	12								4.04		2.21	0	7	11	11	9	E. J. Cable
Decorah.....	Winneshiek.....	872	48	71.4	+ 2.9	101	6	37	30	45	1.89	- 1.41	1.34	0	5	18	8	5	M. D. Whitney
Delaware (near).....	Delaware.....	1,083	52	72.0		95	17	47	11	38	2.54		1.70	0	5	18	12	1	E. J. Paris
Dubuque.....	Dubuque.....	700	80	73.1	+ 1.4	94	4	51	12	31	2.02	- 1.22	1.24	0	5	9	7	15	U. S. Weather Bureau
Fayette.....	Fayette.....	1,003	43	71.2	+ 1.8	95	4†	43	12†	46	4.94	+ 1.40	2.83	0	9	18	8	5	W. C. Van Ness
Independence.....	Buchanan.....	956	71	71.8	+ 0.5	92	4	49	12†	35	2.52	- 0.69	0.91	0	7	16	6	9	Dr. Geo. Boody
Lansing.....	Allamakee.....	632	28								3.20	+ 0.25	1.65	0	8				Mrs. Mary Spinner
New Hampton.....	Chickasaw.....	1,160	34	72.2	+ 2.1	96	16	49	30	40	5.55	+ 2.05	3.22	0	5	15	9	7	D. W. Dawson
Oelwein.....	Fayette.....	1,036	8	72.0	+ 1.8	94	17	46	30	36	3.65	+ 0.33	1.55	0	5	9	9	13	John T. Ridler
Postville (near).....	Clayton.....	1,192	40	68.5	+ 0.7	91	1†	41	30	39	2.70	- 0.75	1.75	0	5	18	11	2	F. L. Williams
Waterloo.....	Black Hawk.....	854	49	72.8	+ 1.3	96	17	45	30	38	2.88	- 0.43	1.00	0	6	21	6	4	R. B. Slippy
Waverly.....	Bremer.....	936	42	71.2	+ 0.6	94	4	45	30	38	7.08	+ 3.84	3.80	0	7	26	5	0	D. H. Murphy
Means and extremes.....				71.6	+ 1.5	101	6	37	30	46	3.58	+ 0.27	3.80	0	6	16	9	6	sw.
<i>West Central District</i>																			
Audubon (near).....	Audubon.....	1,297	38	73.0	+ 2.2	95	4	46	29	37	4.26	+ 0.63	2.18	0	11	18	13	0	George Kibby
Carroll.....	Carroll.....	1,265	45	72.3	+ 1.2	94	16	48	12†	39	1.79	- 2.06	1.07	0	6	25	5	1	Mrs. J. J. Wolfe
Denison.....	Crawford.....	1,200	47	72.9	+ 1.4	94	5	43	12	43	2.87	- 0.94	1.20	0	9	14	17	0	J. McMinimee
Guthrie Center.....	Guthrie.....	1,028	36	73.2	+ 1.5	96	2	43	12	41	3.06	- 0.80	1.03	0	8	20	10	1	Kenneth Hoyt
Harlan.....	Shelby.....	1,210	39	73.0	+ 2.0	94	5	43	12	43	3.83	+ 0.17	1.52	0	11	14	11	6	Elmer Buss
Jefferson.....	Greene.....	1,052	39	71.2	+ 0.5	92	4	46	12	36	3.21	+ 0.03	1.27	0	8	17	9	5	W. I. Lyon
Little Sioux.....	Harrison.....	1,040	30	74.7	+ 2.1	95	5	44	29	45	3.32	- 0.42	1.39	0	11	12	19	0	H. W. Kerr
Logan.....	Harrison.....	1,120	65	73.5	+ 0.8	94	4†	46	12†	42	2.16	- 1.53	0.64	0	9	10	20	1	Amy Ann Stern
Onawa.....	Monona.....	1,051	46	72.0	+ 0.1	92	15	41	29	41	2.77	- 1.29	1.70	0	8	18	10	3	Mrs. H. E. Colby
Rockwell City††.....	Calhoun.....	1,232	44	72.5	+ 1.4	96	5	43	20	39	5.20	+ 1.58	1.70	0	7	22	5	4	A. W. McIsaac
Sac City.....	Sac.....	1,209	62	72.2	+ 0.6	101	5†	44	12	41	4.44	+ 1.05	1.62	0	8	18	11	2	F. P. Kessler
Sioux City.....	Woodbury.....	1,135	56	74.8	+ 2.8	95	3	52	29	35	3.90	+ 0.77	1.20	0	7	14	7	10	U. S. Weather Bureau
Means and extremes.....				73.0	+ 1.4	101	5†	41	29	45	3.24	- 0.40	2.18	0	9	16	12	3	s.
<i>Central District</i>																			
Ames.....	Story.....	926	55	71.0	- 0.8	92	17	45	12	39	2.59	- 0.85	1.59	0	9	12	10	9	Iowa State College
Baxter.....	Jasper.....	993	32	71.0	- 1.2	94	17	46	29†	36	5.49	+ 2.26	2.20	0	10	10	18	3	Geo. R. Geise
Boone (near).....	Boone.....	894	47	71.7	+ 0.8	94	6†	41	29	44	3.22	- 0.34	1.05	0	10	8	16	7	Carl Fritz Henning
Des Moines.....	Polk.....	861	54	72.6	+ 0.5	92	6	50	29	34	3.66	+ 0.14	1.96	0	13	11	11	9	U. S. Weather Bureau
Fort Dodge.....	Webster.....	1,114	43	72.2	+ 1.4	96	4†	46	29†	38	1.78	- 1.82	0.64	0	7	24	2	5	Mrs. Emma Sampson
Grinnell.....	Poweshiek.....	1,031	47																R. E. Bates
Grundy Center.....	Grundy.....	976	40	71.4	- 0.5	93	17	45	29	43	2.27	- 1.03	1.34	0	5	20	9	2	M. G. Heiberger
Iowa Falls.....	Hardin.....	1,127	49	72.0	+ 0.9	96	1†	41	30	41	1.14	- 2.27	0.46	0	5	16	10	5	C. H. Gilbert
Marshalltown.....	Marshall.....	947	53	73.1	+ 0.3	95	6	49	29	34	3.86	+ 0.86	1.05	0	9	17	9	5	

Climatological Data for August, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit							Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind	
<i>East Central District</i>																					
Belle Plaine.....	Benton	866	55	72.5	+ 1.0	95	4†	44	29	40	1.63	- 1.60	0.90	0	8	18	11	2	s.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly	
Cedar Rapids.....	Linn	737	49	72.3	+ 0.5	95	4†	43	12	40	1.53	- 1.97	0.96	0	6	10	7	14	sw.		
Clinton.....	Clinton	595	60	73.6	+ 0.9	100	8	47	12†	39	2.80	- 0.83	2.65	0	5	15	5	11	s.		
Davenport.....	Scott	580	60	74.6	+ 1.5	97	8	54	12	28	3.16	- 0.33	1.64	0	8	10	11	10	ne.		
Iowa City.....	Johnson	733	74	72.6	+ 0.6	95	4†	46	12†	37	1.86	- 2.24	1.13	0	8	13	11	7	se.		
La Claire.....	Scott	576	54								1.63	- 1.40	0.93	0	8						Margaret T. Disney John Strothoff William Mohs Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	71.4	+ 1.8	97	6†	41	12	46	2.65	- 0.49	1.58	0	8	14	6	11	w.		
Muscatine.....	Muscatine	546	85								1.92	- 2.22	0.90	0	5						
Olin.....	Jones	750	33	72.1	+ 0.5	100	8	40	12	40	1.58	- 2.02	0.95	0	3	21	5	5	se.		
Tipton (near).....	Cedar	806	39	72.3	+ 0.1	95	7†	45	13	40	2.63	- 1.19	1.25	0	4	3	16	12	s.		
Williamsburg.....	Iowa	805	15	73.8		98	4	44	12	40	1.93	- 1.57	0.67	0	5	22	8	1	sw.	Dr. F. C. Schadt	
Means and extremes.....				72.7	+ 0.9	100	8	40	12	46	2.12	- 1.47	2.65	0	6	14	9	8	s.		
<i>Southwest District</i>																					
Atlantic.....	Cass	1,110	44	73.9	+ 1.2	97	18	42	29	45	3.01	- 0.46	0.95	0	10	13	16	2	sw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock	
Bedford.....	Taylor	1,200	27								5.73	+ 2.17	2.50	0	7	21	3	7	se.		
Clarinda.....	Page	1,009	59	73.8	- 0.8	95	1	47	12†	42	6.12	+ 2.59	1.92	0	8	22	7	2	s.		
Corning.....	Adams	1,287	43			92	4	45	29	40	2.84	- 0.94	1.45	0	7	18	9	4	sw.		
Cumberland (near).....	Cass	1,225	32								3.42	- 0.03	0.95	0	10	19	8	4	sw.		
Glenwood.....	Mills	1,100	41	73.4	- 0.6	92	4†	44	12	40	2.97	- 0.39	0.98	0	9	15	14	2	se.	Dr. George Mogridge P. C. Cornell J. L. Hurley W. S. Matthews B. R. Bridgess	
Greenfield.....	Adair	1,368	35								3.91		1.45	0	9	17	13	1	sw.		
Lenox.....	Taylor	1,250	36	74.6	+ 0.9	96	6	47	29	41	7.18	+ 3.82	2.88	0	8	17	14	0	se.		
Oakland.....	Pottawattamie	1,139	18	72.6	- 0.3	92	5†	45	12	35	5.68	+ 2.21	2.17	0	8	18	6	7	sw.		
Red Oak (near).....	Montgomery	1,030	24								2.90	- 0.74	1.58	0	6	14	17	0	s.		
Riverton (near).....	Fremont	920	5								5.62	+ 1.94	1.97	0	9	10	12	9	s.	George C. Rader H. H. Askew U. S. Weather Bureau	
Thurman.....	Fremont	960	44	73.0	+ 1.4	92	7†	42	29	46	4.97	+ 0.90	2.15	0	8	16	8	7	s.		
Omaha, Neb.....		1,105	66	75.4	+ 1.0	92	23	53	11	33	4.43	+ 1.38	2.12	0	9	17	9	5	s.		
Means and extremes.....				73.8	+ 0.2	97	18	42	29	46	4.52	+ 0.98	2.88	0	8	17	10	4	s.		
<i>South Central District</i>																					
Afton.....	Union	1,212	50	73.8	+ 1.2	94	4†	49	12	35	3.10	- 0.28	1.50	0	7	18	6	7	se.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis	
Albia.....	Monroe	949	40	73.2	+ 0.6	97	8	44	29	43	1.32	- 2.01	0.70	0	4	16	3	12	sw.		
Appanville.....	Appanose	1,013	38	73.8	+ 0.6	96	7	48	29	37	1.97	- 1.51	1.08	0	8	19	3	9	sw.		
Chariton (near).....	Lucas	1,042	37	71.6	- 0.3	94	8	45	29	38	2.47	- 1.22	1.05	0	4	17	9	5	sw.		
Corydon (near).....	Wayne	1,050	47	72.0	- 1.2	94	7	47	29	37	2.93	- 0.31	1.05	0	10	14	8	9	se.		
Creston.....	Union	1,291	30	71.8	- 0.2	91	6†	45	29	39	5.74	+ 2.48	2.46	0	8	12	15	4	se.	Mrs. N. Spangler Seth F. Shenton W. J. Casey J. B. Alter F. S. Parks	
Indianola.....	Warren	972	50	72.7	- 0.4	92	4†	46	29	39	4.88	+ 1.04	2.11	0	12	16	10	5	se.		
Knoxville.....	Marion	920	41	72.2	- 0.2	93	4	48	29	36	4.91	+ 1.00	1.40	0	9	16	8	7	se.		
Lacona.....	Warren	824	32								4.05	+ 0.60	1.15	0	8	12	12	7	sw.		
Lamoni.....	Decatur	1,123	27	72.2	- 0.2	93	8	47	29	40	3.18	- 0.60	1.37	0	9	18	9	4	se.		
Melrose.....	Monroe	871	1								4.13		1.50	0	8	12	13	6	nw.	J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely	
Mt. Ayr.....	Ringgold	1,220	39	72.0	- 1.0	92	17	45	29	40	4.03	+ 0.63	1.63	0	6	22	8	1	s.		
Tingley.....	Ringgold	1,275	7	73.0	+ 0.8	92	4	48	28	38	2.63	- 0.85	1.12	0	7	20	10	1	se.		
Winterset.....	Madison	1,118	40	73.0	- 0.2	93	6	46	30	36	3.49	0.00	1.55	0	7	25	5	1	sw.		
Means and extremes.....				72.6	0.0	97	8	44	29	43	3.38	- 0.14	2.46	0	8	17	8	6	se.		
<i>Southeast District</i>																					
Bonaparte (near).....	Van Buren	563	44	73.4	+ 0.6	96	8	49	29	36	2.67	- 0.82	0.92	0	8	16	9	6	e.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau	
Burlington.....	Des Moines	544	41	74.4	0.0	99	8	53	12†	31	3.84	+ 0.11	1.60	0	8	17	12	2	sw.		
Columbus Junction.....	Louisa	595	40			93	8	48	12	29	3.72	- 0.62	1.50	0	11	16	14	1	sw.		
Fairfield.....	Jefferson	780	51	72.3	- 0.5	98	8	42	12	40	2.74	- 0.73	1.03	0	11	10	8	13	s.		
Keokuk.....	Lee	614	60	74.6	- 0.4	100	8	54	12	30	2.40	- 0.80	1.29	0	9	12	9	10	sw.		
Keokuk No. 2.....	Lee	651	2																	J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesch	
Keosauqua.....	Van Buren	639	44	72.7	- 0.5	97	8	47	12	37	3.53	+ 0.26	1.60	0	6	14	12	5	sw.		
Mt. Pleasant.....	Henry	730	55	72.5	- 1.1	97	8	49	12	31	3.68	+ 0.41	1.39	0	10	11	15	5	sw.		
Oskaloosa.....	Mahaska	835	55	72.4	+ 0.3	94	4	47	29	35	3.14	+ 0.05	0.82	0	8	14	6	11	sw.		
Ottumwa.....	Wapello	649	44	73.5	- 0.5	98	8	45	12	40	1.88	- 1.57	0.56	0	10	15	5	11	se.		
Sigourney.....	Keokuk	785	36	72.2	- 0.4	95	4	46	29	38	6.08	+ 2.98	1.58	0	8	19	6	6	sw.	John B. Slate C. L. Beswick D. D. Sherman H. G. Liddle	
Stockport (near).....	Van Buren	747	30	72.0	- 0.2	97	7†	47	12†	36	4.37	+ 1.27	1.38	0	9	17	10	4	s.		
Washington.....	Washington	757	56	73.0	+ 0.6	95	4†	49	29	33	3.15	- 0.50	0.97	0	8	17	9	5	e.		
Wever.....	Lee	552	3	72.8		102	8	45	12†	39	4.78		2.60	0	8	15	13	3	w.		
Means and extremes.....				73.0	- 0.2	102	8	42	12	40	3.54	+ 0.11	2.60	0	9	15	10	6	sw.		
State means and extremes.....				72.6	+ 0.9	102	4†	37	30	46	3.30	- 0.14	3.80	0	8	16	10	5	s.		

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

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

RIVERS

Unusually low stages prevailed on the interior streams, with little fluctuation. At Des Moines the extreme stages were 1.4 feet and 0.2 foot, and averaged 0.4 foot, or 2.2 feet below normal. The lowest stage for August, 0.16 foot at Des Moines, recorded on the 23d, broke the August low record of 0.4 foot recorded August 31, 1930. The Racoon River at Van Meter, the Iowa River at Wapello, and the Cedar River at Cedar Rapids, recorded unusually low stages for the month of August.

The Missouri River continued at record low stages along the Iowa boundary with little fluctuation. At Sioux City the average stage was 3.8 feet, or 3.7 feet below the normal August stage, and the lowest of record. The lowest stage, 3.1 feet on the 18th, was 0.8 foot lower than ever before recorded during August since the river station was established 53 years ago. The mean stage of the Missouri River at Omaha was 5.8 feet, or 3.3 feet below the 50-year mean, and the lowest August mean of record. The previous low was 6.1 feet recorded in 1905. The lowest stage for August

Daily Precipitation for August, 1931

Stations	Drainage Basin	Day of Month																															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Northwest District</i>																																	
Akron	Big Sioux	.19	.08					.33												.20						.23		.06			.66	1.75	
Alta	Raccoon		.45					.12	.42											.20	.08							.22	.45			1.94	
Alton	Floyd	1.07	.37					.03			T.									.40					T.		T.	.23			3.12	5.22	
Cherokee	Little Sioux	.41	.07					.23			T.									.55	.04			T.			.17			.90	2.37		
Estherville	Des Moines	.03	.35						1.15	.10	.01									.50	.10						.03	.60			2.90		
Hawarden	Big Sioux	.80	.06					.27												.69				.10		.08		.03			2.05		
Inwood (near)	Big Sioux		.09					1.44							T.				.29						T.		.06				1.88		
Lake Park (near)	Little Sioux		.04					1.56											.59							T.		.07			2.19		
La Mars	Floyd	1.03	.02					.04																				.07			1.92		
Marathon	Raccoon	1.21	.32	.05				.41											.06	.32	T.						.58			.98	3.93		
Pocahontas	Des Moines	1.30	.32					.48											.03	.05							.40			.70	3.32		
Rock Rapids	Big Sioux	.12	.15					3.00			T.	T.							.24	.02							.07			3.60	3.60		
Sanborn	Floyd	.04	.30					1.91												.33	.03						.12			.18	2.91		
Sheldon	Floyd	.32	.01					2.36			T.									.86	.01						.12			.07	3.75		
Sioux Center	Floyd	.12						.60												.25							.12			T.	1.09		
Spencer	Little Sioux	.05	.19					1.46			T.									.25	.05						.28			2.10	4.38		
Storm Lake	Raccoon	.51	.07					.38											.24	.11	.10			T.		.25			.69	2.35			
Washta	Little Sioux	.58						.02	.18										.20	.08							.12			.80	1.98		
West Bend	Des Moines	.41	.34					.19			.01								.04	.05	T.						.78			.60	2.42		
<i>North Central District</i>																																	
Algona	Des Moines	.72	.02					T.	.30		T.							.03	.30								1.45			T.	.50	3.32	
Allison (near)	Cedar	1.95	.22					.04			T.																1.35			T.	.50	3.56	
Belmond	Iowa	.18	.45					T.	.25		.03									.55							1.95			T.	.50	3.91	
Britt	Iowa	.14	2.55					.27			.31									.07	.03	.05					3.60			.09	7.11		
Charles City***	Cedar	.63	.02					T.	.13										.01							T.	2.50			.26	3.55		
Forest City	Cedar		1.44					.45	.08		.11									T.	.10						1.28				3.46		
Hampton	Cedar	.30						T.	.14											T.							.65			1.20	2.29		
Humboldt	Des Moines	.32	.44					.43												.08							.28			T.	.64	2.19	
Mason City	Cedar	.10	.82					.16												T.							1.42				.36	2.86	
Northwood	Cedar	.02	.95					.48			T.									T.							1.45			T.	.19	2.09	
Osage	Cedar	.23	.32					.18											.03	T.							1.20				.41	2.37	
<i>Northeast District</i>																																	
Cedar Falls	Cedar	2.21	.75					.07			.02									.19							.78				.02	4.04	
Decorah	Mississippi	.25	.17					.03	.10										T.	T.							1.34			T.	.02	1.89	
Delaware (near)	Maquoketa	.03	.76	.03																.02							1.70				.25	2.54	
Dubuque***	Mississippi	.35	.12	.08				T.	T.						T.					T.							1.24			T.	.23	2.02	
Fayette	Mississippi	.75	.72	.29				.14			.01									.01	.13						2.83				.06	4.94	
Independence	Wapsipinicon	.91	.65					.08	.08											.03							.75	.02			.02	2.52	
Lansing	Mississippi	1.65	.32		.01			.05	.02		.11									.49							3.22	.55			.02	3.20	
New Hampton	Wapsipinicon	.47	.20					.08												1.58							3.22				.02	5.55	
Oelwein	Wapsipinicon	1.35	.55	.10				.10												.10							1.55				.02	3.65	
Postville (near)	Mississippi	.17	.40					.08											.30	T.						1.75			T.	.02	2.70		
Waterloo	Cedar	.40	.56	.04				.08												T.	.80							1.00			.02	2.88	
Waverly	Cedar	3.18	.62					.15		.04										.19							1.48			1.42	.02	7.08	
<i>West Central District</i>																																	
Audubon (near)	Nishnabotna	.93	.24			.06	.10	T.											2.18	.07					.18	.47	.01		.01	.01	4.26		
Carroll	Raccoon	1.07	.29					.40	.08											.20	.03					.62	.09			.06	.02	1.79	
Denison	Missouri	.19	.27					.05	.36											.20	.03						.43	T.		.22	.02	2.87	
Guthrie Center	Raccoon	1.03	.50					.05	.10	T.										.60	.10				T.	.43	T.			.25	.02	3.06	
Harlan	Nishnabotna	.73	.15					.07	.04	.02	T.									1.47	.05	.10				.36	.32	.10		.52	.02	3.83	
Jefferson	Raccoon	T.	1.27					.05	.17											.91	.02					.35	T.	.13		.31	.02	3.21	
Little Sioux	Little Sioux	1.36	.03	.01				1.01	.02											.01	.03				.04	.31	.08			.42	.02	3.32	
Logan	Missouri	.22	.25					.64	.04	T.										T.	.13				.29	.22	.05	T.		.32	.02	2.16	
Onawa	Missouri	1.70	.10					.25	.37											.05						.20	.05			.05	.02	2.77	
Rockwell City	Raccoon	1.02	.35					.30	.01											1.70	.05	.42					T.			1.40	.02	5.20	
Sac City	Raccoon	1.36	.18					.25	.06											1.62		.14					.39			.44	.02	4.41	
Sioux City***	Missouri	.93				T.		.01	1.20											.82						T.	.01	.12	T.	.81	.02	3.90	
<i>Central District</i>																																	
Ames	Skunk	.64	.95					.11	.05											.08	T.	.03				.68		.03		.02	.02	2.59	
Baxter	Skunk	.08	1.15					.10	.12											2.20	.25					.76		.65		.15	.03	5.49	
Boone (near)	Des Moines	.11	1.05					.30	.05											.57	.16					.90	.03	.02		.03	.02	3.22	
Des Moines***	Des Moines	1.22	.74					.06	.19	.03	.01									.11	.39					T.	.18	.01		.02	.02	3.66	
Fort Dodge	Des Moines		.64					.51	.10											.12	.28							.03	.10		.02	1.78	
Grinnell	Iowa							.06	.05	T.	0									.35	.42					.41		.24		.12	.03	2.50	
Grundy Center	Cedar	.58	1.34					T.	.10											.10								.15			T.	2.27	
Iowa Falls	Iowa	T.	.45					.09	.05											T.	.09							.46			.02	1.14	
Marshalltown	Iowa	T.	.98	.07				.08	.07		.06										1.03	T.					.48		.66		.43	3.86	
Monroe	Des Moines	1.44	1.33					T.	.04	T.										.93	.05					.44		.56		1.28	.02	6.07	
Newton	Skunk	.15	.67					.06	.05	T.	0									.35	.42					.41		.24		.03	.02	2.50	
Perry	Raccoon	.90	.94					.03	.05											.03													

Daily Precipitation for August, 1931—Continued

Stations	Drainage Basin	Day of Month																														Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
<i>Southwest District</i>																																
Atlantic	Nishnabotna	.51	.95						.12	.02	.16									.56				.35	T.	.16		.01			.17	3.01
Bedford	102	.70	1.06						.15	2.50									.08						.11						1.13	5.73
Clarinda	Nodaway	.09	1.92						.08	.50	1.25									.43						.12					1.73	6.12
Corning	Nodaway	.38	1.45						T.	.55										.09					.26					.03	2.81	
Cumberl'nd (near)	Nodaway	.95	.36	T.					.01	.02	.22									.75	.13				.16	.11				.71	3.42	
Glenwood	Missouri	.60	.13						.06	.54										.24	.10			T.	.04	.98				.28	2.97	
Greenfield	Nodaway	1.45	.55						T.	.03	.10									.31	T.			.05	.07	.01				1.31	3.91	
Lenox	Missouri	1.20	1.40						T.	.02	2.88									.46	.02				.05	T.				1.15	7.18	
Oakland	Nishnabotna	1.05							.07	.13	.19									2.17				.13		.30				1.64	5.68	
Red Oak (near)	Nishnabotna	1.54	.04						T.											.45	.33			T.	.14	T.			.40	2.90		
Riverton (near)	Nishnabotna	.74	.41						.04	1.97										.47	.24			.32		.02				1.41	5.62	
Thurman	Missouri	.85	.09							2.15										T.	.35	.23			.14	.01				1.12	4.97	
Omaha, Neb.***	Missouri	.30							.02	1.02	.03									T.	.20			.09	.09	.56	T.			2.12	4.43	
<i>South Central District</i>																																
Afton	Grand	.30	1.02						.02	1.50	.02									.17					.07					T.	3.10	
Albia	Des Moines	.30	T.						.70	.16										T.	T.			.16	T.			T.		1.32		
Centerville	Chariton	.09			T.				.15	T.	1.08										.01	.06			.06				T.	.40	1.97	
Chariton (near)	Chariton	T.	1.05			T.			T.	.22										T.	T.			1.00	T.		.20			T.	2.47	
Corydon (near)	Chariton	.26	.37							.31	T.									.22	.03	1.02			.24		.04		.02	.42	2.93	
Creston	Missouri	2.43	.03						T.	.01	1.15										T.	2.03	T.		.03	.04	.02	T.		5.74		
Indianola	Des Moines	.62	.73		.68				.02	.01	.21									2.09	.02			.01	T.	.18		.27	.04	4.88		
Knoxville	Des Moines	.75	.65		T.				.67	.14	.17									.40	1.40			.67	.06	T.		T.	.41	4.91		
Lacona	Des Moines	.60	1.15							1.00											1.04				.10		.42		.02	4.05		
Lamoni	Grand	.36	.87	.13						.04	1.33									.09	.01	T.		.11				.24	3.18			
Melrose	Des Moines	.26	.25		1.50				.05	.14											T.	.70			1.03			T.	.20	4.13		
Mt. Ayr	Grand	.50	1.63							1.08															.18	.02			.62	4.03		
Tingley	Platte	.32	1.12						.02	T.	.80									.31	.03				.03	T.			T.	2.63		
Winterset	Des Moines	.36	1.45						.02	T.	.03										1.55	.03							.05	3.49		
<i>Southeast District</i>																																
Bonaparts (near)	Des Moines	.18	T.						T.	.28	.92										T.	.40	.08		.20			T.	.56	.05	T.	2.67
Burlington	Mississippi	.20	.03							T.	1.06	.30									T.	1.60	.09		.09	.04			T.	.31	3.81	
Columbus Junction	Iowa	.46	.10						.02	.26	.07	.01								1.50		.05			T.		1.12		.04	3.72		
Fairfield	Skunk	.02	.01						.02	.14											.99	.34	.07		.25		.75		.04	.11	2.74	
Keokuk***	Mississippi	T.	.03						T.	T.	.51									T.	.01	.11	.02		.06		1.29	T.	.17	.20	2.40	
Keokuk No. 2	Mississippi									1.25	.35	.65										1.15	T.		.03		.10			3.53		
Keosauqua	Des Moines									.30	1.03									.03	.07	.43	.12		.19		1.39		.04	3.68		
Mt. Pleasant	Skunk	.08	T.							.39	T.	.08									.66	.82			.45		.07		T.	3.14		
Oskaloosa	Des Moines	.37	.30						.02	T.	.18										.10	.12			.56		.04	.34	T.	.38	1.88	
Ottumwa	Des Moines	.07	.07						.02	T.	.18										.10	.12			.56		.04	.34	T.	.38	1.88	
Sigourney	Skunk	.54	.32	T.					.61	.48	T.										1.58	1.32			.20		1.03		T.	6.08		
Stockport (near)	Skunk	.11	T.							1.32	1.38									.16	.22	.08		.18		.88		.04	4.37			
Washington	Skunk	.18	.23						.02	T.	.22									.65	.58	.08		.30		.97			3.15			
Wever	Mississippi	.08							.23	.95											2.60	.08			.03		.75		.06	4.78		

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

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

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

\*Incomplete.

\*Precipitation included in next following measurement.

T. Precipitation is less than .01 inch rain or melted snow.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind					Sunshine			
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum		% possible departure from normal				
					7 A. M.	12 Noon	7 P. M.	Lowest			Miles	From			Data		
Chas. City	30.02	30.26	16	29.65	27	74	44	48	24	22	3,662	4.9	20	n.w.	27	67	-4
Davenport	30.03	30.31	16	29.70	27	74	45	49	26	11	4,785	6.4	48	n.w.	27	70	0
Des Moines	30.02	30.28	16	29.57	31	81	50	52	26	29	4,873	6.5	29	w.	28	69	-1
Dubuque	30.02	30.28	15	29.65	27	76	43	45	24	21	3,184	4.3	25	n.w.	27	62	-2
Keokuk	30.05	30.31	15	29.70	27	75	50	56	21	29	3,485	4.7	22	w.	26	80	+7
Sioux City	29.98	30.31	11	29.59	31	74	44	46	16	28	6,987	9.4	34	n.w.	28	78	+8
Omaha, Nb	30.01	30.30	11	29.63	31	74	49	52	18	28	3,913	5.3	32	n.w.	31	77	+9
Means and extremes	30.02					75	46	50				5.7				72	+2
Normals and records.	29.97	*30.31	11	29.57	31			16	28				48	n.w.	27		
			24th		10th	82		61		5th					6th	70	
			[30.43	1919	[29.40	1874				[19	1918			[57	sw.	1916	

||Sioux City \$Omaha †Des Moines ‡Local meantime †And other dates \*Also at Davenport on 16th, and Keokuk on 15th.  
 ††January 1, 1928, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

was 5.2 feet recorded on the 20th and 25th, but lacked 1.0 foot of breaking the record of 4.2 feet established in 1905.  
 Record low stages prevailed on the Mississippi River along the Iowa boundary. At Dubuque the low stage for the month, -0.3 foot, recorded on the 27th, establishes a new August record. The mean stage of 0.3 foot was lower than had previously been recorded

in August, by 0.2 foot. At Keokuk the river established a new low water record for the month of August, reaching a stage of -1.9 feet on the 25th. The previous low record for August was -0.7 foot recorded in 1894.

MISCELLANEOUS PHENOMENA

- Corona, lunar: 21st, 22d, 24th, 30th.
- Dew, heavy: 12th, 13th, 23d, 26th.
- Dust Storm: 19th, 30th.
- Fog, light: 6th, 12th, 13th, 17th, 19th, 22d, 23d, 26th.
- Gales: 1st, 27th, 28th, 30th, 31st.
- Hail, light: 5th, 18th, 19th, 27th, 30th, 31st.
- Hail, moderate: 18th, 19th, 27th.
- Hail, heavy: 18th, 19th, 27th.
- Halo, lunar: 24th.
- Halo, solar: 17th, 23d, 30th.
- Haze: 12th, 16th, 19th, 20th, 27th.
- Meteor: 3d, 4th, 5th, 6th, 7th.
- Meteorfall, perseids: 10th, 11th, 12th, 13th, 14th, 15th.
- Parhelia: 1st, 17th, 21st.
- Squall Wind: 1st, 7th, 19th, 31st.
- Thunderstorms: 1st, 2d, 5th, 7th, 8th, 17th, 18th, 19th, 20th, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.
- Tornadoes: 1st, 27th.

ERRATA

Report for June, 1931. Page 42, Akron; greatest 24 hour precipitation published 0.88 inch, should be 0.78 inch. Page 43, Columbus Junction; lowest temperature and date published 44° on the 8th, should be 43° on the 1st. Page 42, Hampton; number of days clear and partly cloudy published 25 and 2, should be 26 and 1.

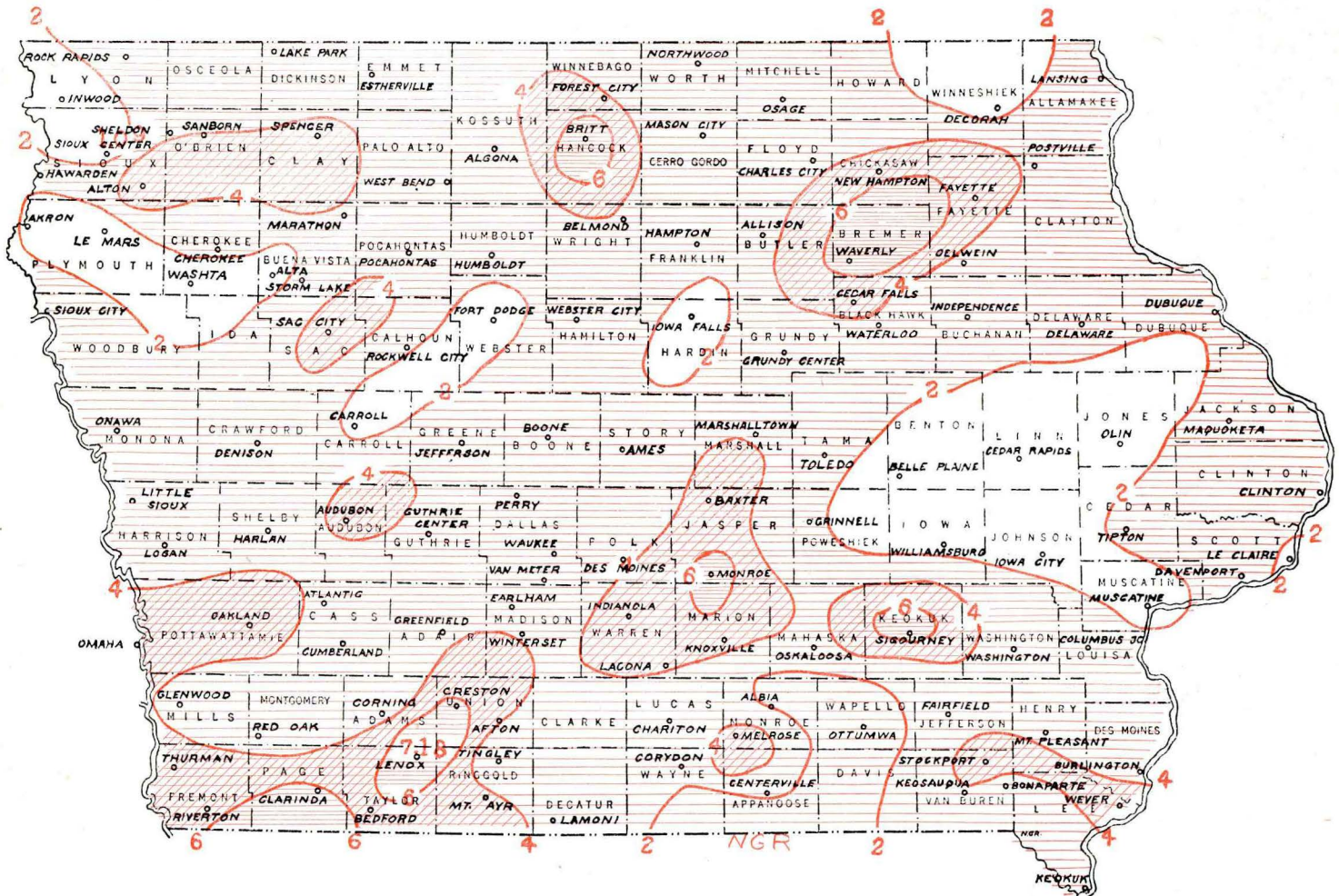
CLIMATOLOGICAL DATA: IOWA SECTION

time in 60 years, and water had to be hauled many miles for livestock. Many streams entirely dried up, and the larger rivers had the lowest stages of record. Crops, truck gardens, pastures, and fruit also, were seriously affected by the drouth, and in some localities vegetation almost completely failed.

The average number of days with 0.01 inch or more of precipitation was 23, or 1 day more than last summer. The average number of clear days was 54, partly cloudy, 26, and cloudy, 12, as compared with 52 clear days, 29 partly cloudy, and 11 cloudy days, during the summer of 1930.

N. G. R.

TOTAL PRECIPITATION, AUGUST, 1931



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU  
CHARLES D. REED, Senior Meteorologist

## COMPARATIVE DATA FOR THE STATE—SEPTEMBER

VOL. XLII DES MOINES, IOWA, SEPTEMBER, 1931 No. 9

### GENERAL SUMMARY

The weather for September, 1931, was noteworthy because of record breaking maximum and mean temperatures and excess rainfall over much of Iowa.

The mean temperature for the State, 71.0° or 6.7° above normal, broke the previous record, 70.9° established in 1897. The first half of the month was abnormally hot for September and the latter half was moderately cool. Record high monthly mean temperatures occurred at most of the stations in the northern half, east central, and southwestern portions of the State. Also the maximum temperatures recorded at several stations in the northwest district and a few scattered stations throughout the State exceeded the previous record. Several scattered stations equalled their previous record in both the maximum and monthly mean temperatures.

State wide precipitation averaged 6.69 inches or 3.02 inches above normal and was the heaviest since September, 1926. This was the first monthly rainfall in excess of normal since November, 1930. Excessive local downpours of rain on scattered dates did some damage by flooding storm sewers and cellars and by erosion. The greatest 24-hour rainfall, 6.30 inches, occurred at Fort Dodge on the 19th. This was the first month since November, 1930, that both the mean temperature and precipitation averaged in excess of normal. The rains were very beneficial to grasses, pastures and surface water supply, though wells showed very little effect.

Light frosts occurred in favorable locations in the extreme north part of the State on the 24th and 27th, but did very little damage, if any. By the close of the month about 95% of the corn had sufficiently matured to be out of the way of frost.

Wind squalls, hailstorms and tornadoes were not especially numerous, but were quite destructive in a few localities. The tornadoes and hailstorms causing the greatest damage are treated in detail elsewhere in this issue.

A very brilliant meteor was observed in the northeast, from Sanborn, about 7:30 p. m. on the 10th, by the local cooperative weather observer. It started just east of the constellation of the Great Dipper (Ursa Major). The direction of fall was from northeast to southwest.

N. G. R.

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 105 stations, was 71.0°, or 6.7° above normal. The greatest district excess, 7.2°, was in the west central and south central districts, and the least district excess, 6.0°, was in the northeast district. The

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
1873.....	59.1	- 5.2	89	33	2.18	- 1.49	5.40	0.81					
1874.....	62.8	- 1.5	90	40	6.04	+ 2.37	9.50	4.50					
1875.....	60.6	- 3.7	92	37	5.02	+ 1.35	9.38	1.33					
1876.....	60.4	- 3.9	86	38	6.42	+ 2.75	12.60	3.42					
1877.....	65.4	+ 1.1	96	40	1.95	- 1.72	5.20	0.65					
1878.....	62.9	- 1.4	92	38	3.13	- 0.54	10.85	0.70					
1879.....	59.3	- 5.0	90	24	2.70	- 0.97	9.45	0.57					
1880.....	61.1	- 3.2	90	30	4.18	+ 0.51	11.64	0.10					
1881.....	64.5	+ 0.2	103	37	7.14	+ 3.47	13.35	2.64					
1882.....	63.4	- 0.9	97	31	0.87	- 2.80	3.71	0.00					
1883.....	58.5	- 5.8	93	30	2.04	- 1.63	6.20	0.06					
1884.....	66.5	+ 2.2	95	30	5.20	+ 1.53	11.00	2.20					
1885.....	61.7	- 2.6	92	32	3.04	- 0.63	5.59	0.65					
1886.....	63.0	- 1.3	97	30	4.68	+ 1.01	7.93	0.39					
1887.....	62.1	- 2.2	98	30	6.17	+ 2.50	12.87	1.40					
1888.....	59.9	- 4.4	96	26	1.07	- 2.60	3.44	0.10					
1889.....	60.7	- 3.6	96	23	2.80	- 0.87	7.19	0.70					
1890.....	59.5	- 4.8	96	23	2.71	- 0.96	4.85	0.30					
1891.....	67.3	+ 3.0	104	28	1.33	- 2.34	3.60	0.13		4	20	7	3
1892.....	64.7	+ 0.4	99	29	1.53	- 2.14	4.15	0.16	0	4	16	8	6
1893.....	64.7	+ 0.4	102	18	2.34	- 1.33	5.49	0.74	0	4	20	6	4
1894.....	65.1	+ 0.8	100	26	3.57	- 0.10	7.43	0.67	0	8	15	10	5
1895.....	66.8	+ 2.5	103	22	3.03	- 0.64	7.43	0.85	T.	5	18	8	4
1896.....	58.5	- 5.8	95	22	4.09	+ 0.42	9.96	1.82	0	10	11	9	10
1897.....	70.9	+ 6.6	106	26	2.04	- 1.63	5.88	0.00	0	4	23	5	2
1898.....	65.3	+ 1.0	99	29	2.60	- 0.98	8.45	0.41	0	7	16	9	5
1899.....	62.5	- 1.8	104	15	0.93	- 2.74	4.32	T.	0	4	16	9	5
1900.....	64.4	+ 0.1	99	26	4.98	+ 1.31	8.82	2.48	T.	9	15	8	7
1901.....	63.3	- 1.0	102	26	4.77	+ 1.10	13.62	1.71	0	9	13	9	8
1902.....	59.1	- 5.2	88	23	4.35	+ 0.68	10.41	1.65	0	9	15	6	9
1903.....	60.8	- 3.5	94	28	3.81	+ 0.14	8.79	1.42	0	10	14	6	10
1904.....	64.0	+ 0.3	94	30	2.78	- 0.89	8.33	0.99	0	7	13	8	9
1905.....	65.8	+ 1.5	96	36	3.81	+ 0.14	13.18	0.50	0	8	14	8	8
1906.....	67.2	+ 2.9	100	27	4.16	+ 0.49	11.10	0.64	0	8	16	8	6
1907.....	62.8	- 1.5	98	25	2.75	- 0.92	6.06	1.38	0	8	15	9	6
1908.....	67.9	+ 3.6	98	20	1.20	- 2.45	3.46	0.25	T.	3	21	6	3
1909.....	62.4	- 1.9	94	30	3.58	- 0.09	7.34	1.39	0	9	14	8	8
1910.....	63.2	- 1.1	99	30	3.59	- 0.08	7.43	1.18	0	9	14	7	9
1911.....	65.8	+ 1.5	103	32	5.12	- 1.45	13.73	1.19	T.	10	11	9	10
1912.....	62.1	- 2.2	104	24	3.98	+ 0.31	10.12	0.28	T.	11	12	8	10
1913.....	64.5	+ 0.2	107	19	3.31	- 0.36	7.44	0.45	0	9	15	8	7
1914.....	61.5	+ 0.2	99	30	7.88	+ 4.21	16.24	2.48	0	10	16	7	7
1915.....	63.7	- 0.6	91	30	6.03	+ 2.36	12.45	2.88	0	11	11	8	11
1916.....	62.5	- 1.8	98	21	3.89	+ 0.22	9.71	1.45	T.	7	17	8	5
1917.....	62.6	- 1.7	97	28	2.90	- 0.77	8.68	0.30	0	7	15	7	8
1918.....	58.6	- 5.7	93	20	1.87	- 1.80	4.62	0.48	T.	6	16	8	6
1919.....	67.5	+ 3.2	99	33	5.94	+ 1.67	11.82	1.49	0	8	16	6	8
1920.....	66.5	+ 2.2	98	24	3.30	- 0.37	7.21	0.69	0	8	17	8	5
1921.....	67.3	+ 3.0	99	31	6.72	+ 3.05	11.95	1.72	0	11	14	8	8
1922.....	67.1	+ 2.8	103	31	2.03	- 1.64	4.34	0.31	0	6	20	6	4
1923.....	64.2	- 1.1	92	28	5.79	+ 2.12	12.14	1.88	0	11	14	8	8
1924.....	59.1	- 5.2	91	25	3.13	- 0.54	5.68	1.01	0	8	16	7	7
1925.....	69.0	+ 4.7	105	32	5.04	+ 1.37	9.13	1.54	0	9	14	10	6
1926.....	63.0	- 1.3	92	18	9.76	+ 6.09	18.57	4.75	T.	14	8	7	15
1927.....	67.4	+ 3.1	101	29	4.56	+ 0.89	11.94	2.02	T.	10	15	8	7
1928.....	60.5	- 3.8	93	24	3.08	- 0.59	9.98	1.04	0	6	19	7	4
1929.....	62.4	- 1.9	98	25	3.74	+ 0.07	7.36	1.55	T.	9	14	7	9
1930.....	66.3	+ 2.0	101	25	2.31	- 1.36	6.39	0.17	0	5	19	7	4
1931.....	71.0	+ 6.7	105	35	6.69	+ 3.02	12.68	2.68	0	12	15	8	7
Normals.....	64.3	.....	97	28	3.67	.....	8.71	1.15	T.	8	15	8	7
Highest.....	71.0	.....	107	40	9.76	.....	18.57	4.75	T.	14	23	10	15
Lowest.....	58.5	.....	86	15	0.93	.....	3.44	T.	0.0	3	8	5	2

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

highest monthly mean was 74.0° at Keokuk, and the lowest 66.0° at Postville (near). The absolute range in temperature for the State was 70°, from 105° at Washta on the 7th, to 35° at Forest City on the 24th and also at Spencer, Washta and Webster City on the 27th. The average number of days with the maximum temperature 100° or above was only a fraction of a day. Nearly one-fourth of the stations had such temperatures. The average number of days with the maximum temperature 90° or higher was 11, ranging from 13 days in the southwest district, to 8 days in the northeast district. For individual stations with the maximum temperature 90° or higher, Le Mars had the greatest, 15 days and Postville (near) the least, only 2 days. The greatest daily range in temperature at any one station was 48° at Washta on the 7th.





Climatological Data for September, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy
<i>Northwest District</i>																			
Akron.....	Plymouth	1,153	4																Orlan C. Moore
Alta.....	Buena Vista	1,513	41	70.4	+ 7.7	100	7	42	24†	38	6.23	+ 2.95	2.20	0	12	14	10	6	D. E. Hadden
Alton.....	Sioux	1,305	26	70.2	+ 7.4	100	7	41	27	40	3.74	+ 0.78	1.35	0	12	7	16	7	W. S. Slagle
Cherokee.....	Cherokee	1,196	11	69.9	+ 7.7	99	7	40	24†	34	4.71	+ 1.44	1.32	0	12	12	14	4	J. E. Wirth
Estherville.....	Emmet	1,298	37	69.0	+ 7.3	101	10	36	24	40	5.18	+ 1.85	1.50	0	11	22	5	3	A. O. Peterson
Hawarden.....	Sioux	1,181	5																Earl V. Slife
Inwood (near).....	Lyon	1,474	28	70.3	+ 7.2	103	7	40	26	45	4.24	+ 1.45	2.84	0	8	20	5	5	A. C. Hanson
Lake Park (near).....	Dickinson	1,489	19	69.2	+ 7.7	99	10	38	25	37	3.58	+ 0.03	1.14	0	8	17	7	6	P. M. Lawrence
Le Mars.....	Plymouth	1,224	40	71.6	+ 7.9	102	7	38	27	42	2.87	+ 0.36	1.15	0	7	20	2	8	Henry Newell
Marathon.....	Buena Vista	1,390	5																E. G. Smith
Pocahontas.....	Pocahontas	1,248	27	71.0	+ 7.5	101	7	38	27	38	6.97	+ 3.38	3.40	0	12	18	7	5	F. E. Hronek
Rock Rapids.....	Lyon	1,349	34	69.4	+ 7.7	101	7	37	27	44	4.46	+ 1.87	2.75	0	10	21	3	6	Nellie F. Medberry
Sanborn.....	O'Brien	1,553	18	69.1	+ 6.3	101	7	38	24	40	4.32	+ 1.12	1.54	0	13	12	10	8	J. W. Dow
Sheldon.....	O'Brien	1,418	25	70.0	+ 6.6	102	7	40	24†	44	4.13	+ 0.87	1.86	0	11	14	10	6	Ross E. Forward
Sioux Center.....	Sioux	1,461	32	70.0	+ 7.0	101	7	40	26†	39	4.06	+ 1.11	2.45	0	5	12	11	7	F. C. Aue
Spencer.....	Clay	1,319	23	69.9	+ 6.4	99	10	35	27	38	5.83	+ 2.51	1.97	0	14	14	9	7	E. W. Little
Storm Lake.....	Buena Vista	1,442	41	70.0	+ 6.0	97	7	42	27	34	7.35	+ 3.25	2.87	0	9	18	6	6	Russel M. Edwards
Washta.....	Cherokee	1,157	34	70.6	+ 7.1	105	7	35	27	48	4.76	+ 1.37	1.32	0	12	16	7	7	H. L. Felter
West Bend.....	Palo Alto	1,197	44	69.8	+ 6.5	99	7	38	24†	36	5.53	+ 2.39	2.38	0	14	16	8	6	Jos. Dorweiler
Means and extremes.....				70.0	+ 7.1	105	7	35	27	48	4.77	+ 1.61	3.40	0	11	16	7	7	
<i>North Central District</i>																			
Algona.....	Kossuth	1,207	70	69.7	+ 6.4	99	7†	39	24	36	4.97	+ 1.65	1.85	0	12	12	11	7	Leon M. Merritt
Allison (near).....	Butler	1,000	17	69.8	+ 6.7	96	10	41	27	37	7.87	+ 3.09	2.80	0	12	12	12	6	George H. Bell
Belmond.....	Wright	1,181	22	69.4	+ 5.8	98	7†	37	24†	37	9.03	+ 4.83	3.70	0	15	12	9	9	H. F. Luick
Britt.....	Hancock	1,236	46	68.7	+ 6.3	98	10	37	24	35	5.99	+ 2.53	1.28	0	17	18	1	11	E. P. Healy
Charles City.....	Floyd	1,015	56	69.0	+ 8.0	98	10	40	24	35	7.40	+ 3.72	2.86	0	11	12	12	6	U. S. Weather Bureau
Forest City.....	Winnebago	1,226	41	68.2	+ 5.5	99	10	35	24	36	6.13	+ 2.80	1.68	0	12	14	6	10	Dr. M. B. Neil
Hampton.....	Franklin	1,142	40	70.1		98	10	39	21	36	8.07	+ 4.64	2.85	0	9	22	1	7	Howard J. Haydon
Humboldt.....	Humboldt	1,095	47	70.4	+ 6.2	102	7	38	24†	41	7.27	+ 4.00	4.12	0	11	20	4	6	H. C. Snitkey
Mason City.....	Cerro Gordo	1,148	39	68.0	+ 6.3	98	10	36	24	38	5.81	+ 3.00	1.61	0	13	14	9	7	American Beet Sugar Co.
Northwood.....	Worth	1,222	35	68.5	+ 7.5	98	8†	37	24	39	5.38	+ 1.85	1.12	0	14	16	7	7	Charles Dwelle
Osage.....	Mitchell	1,163	46	68.6	+ 7.4	99	8†	38	24	36	6.35	+ 2.84	1.50	0	14	13	8	9	Dr. C. E. Juhl
Means and extremes.....				69.1	+ 6.7	102	7	35	24	41	6.75	+ 3.18	4.12	0	13	15	7	8	
<i>Northeast District</i>																			
Cedar Falls.....	Black Hawk	875	12								8.45		2.43	0	14	11	9	10	E. J. Cable
Decorah.....	Winneshiek	872	48	69.4	+ 7.8	98	16	38	24†	39	8.61	+ 4.50	2.40	0	13	18	5	7	M. D. Whitney
Delaware (near).....	Delaware	1,083	52	68.9		98	10	40	24	38	9.14		2.73	0	15	16	9	5	E. J. Paris
Dubuque.....	Dubuque	700	80	70.0	+ 6.0	96	16	44	27	32	6.67	+ 2.66	2.36	0	13	12	8	10	U. S. Weather Bureau
Fayette.....	Fayette	1,003	43	68.5	+ 6.2	97	10	38	27	36	9.67	+ 6.00	2.46	0	17	13	10	7	W. C. Van Ness
Independence.....	Buchanan	956	71	69.4	+ 5.5	95	10†	41	24	35	7.68	+ 3.73	2.17	0	12	16	7	7	Dr. Geo. Boody
Lansing.....	Allamakee	632	28								7.01	+ 3.32	2.11	0	11				Mrs. Mary Spinner
New Hampton.....	Chickasaw	1,169	34	68.2	+ 5.8	95	10	36	24	35	7.86	+ 4.27	2.47	0	18	10	11	9	D. W. Dawson
Oelwein.....	Fayette	1,036	8	70.0	+ 7.2	97	10	39	21	36	9.73	+ 5.94	3.05	0	12	7	6	17	John T. Ridler
Postville (near).....	Clayton	1,192	40	66.0	+ 5.2	92	10†	39	24	34	8.82	+ 4.98	2.83	0	15	14	10	6	F. L. Williams
Waterloo††.....	Black Hawk	854	49	70.3	+ 6.2	98	10	40	24†	35	9.09	+ 0.05	2.50	0	12	18	5	7	R. B. Slippy
Waverly.....	Bremer	936	42	69.0	+ 5.6	95	16	39	24	34	7.69	+ 4.19	2.41	0	15	20	3	7	D. H. Murphy
Means and extremes.....				68.8	+ 6.0	98	10†	36	24	39	8.30	+ 4.48	3.05	0	14	14	8	8	
<i>West Central District</i>																			
Audubon (near).....	Audubon	1,297	38	71.4	+ 7.7	96	6†	45	27	34	5.37	+ 1.61	1.20	0	12	17	7	6	George Kibby
Carroll.....	Carroll	1,265	45	71.1	+ 7.4	98	7†	43	27	36	5.42	+ 1.95	2.07	0	14	23	1	6	Mrs. J. J. Wolfe
Denison.....	Crawford	1,200	47	71.6	+ 7.6	100	7	38	27	35	7.04	+ 3.92	2.22	0	11	13	11	6	J. McMinimee
Guthrie Center.....	Guthrie	1,028	36	72.4	+ 7.8	101	7	37	27	37	4.77	+ 1.00	2.07	0	14	18	6	6	Kenneth Hoyt
Harlan.....	Shelby	1,210	39	71.8	+ 8.0	99	7	39	27	35	5.44	+ 1.67	1.86	0	12	14	9	7	Elmer Buss
Jefferson.....	Greene	1,052	39	70.9	+ 7.3	97	7†	38	27	33	7.69	+ 3.70	3.68	0	10	18	5	7	W. I. Lyon
Little Sioux.....	Harrison	1,040	30	72.2	+ 6.9	100	7	39	27	35	5.79	+ 2.62	1.24	0	13	8	16	6	H. W. Kerr
Logan.....	Harrison	1,120	65	72.4	+ 6.7	101	7†	40	27	35	4.87	+ 1.71	1.17	0	9	12	13	5	Amy Ann Stern
Onawa.....	Monona	1,051	46	70.6	+ 6.0	100	7	40	27	37	7.73	+ 4.22	2.15	0	9	17	4	9	Mrs. H. E. Colby
Rockwell City.....	Calhoun	1,232	44	70.5	+ 6.7	99	7	40	27	35	5.90	+ 1.85	2.65	0	8	18	3	9	A. W. McIsaac
Sac City.....	Sac	1,200	62	70.4	+ 6.7	98	7†	37	27	40	7.27	+ 3.91	2.96	0	10	16	8	6	F. P. Kessler
Sioux City.....	Woodbury	1,135	56	71.8	+ 8.4	101	7	42	27	36	3.34	+ 0.31	1.54	0	7	12	7	11	U. S. Weather Bureau
Means and extremes.....				71.4	+ 7.2	101	7†	37	27	40	5.89	+ 2.38	3.68	0	11	16	7	7	
<i>Central District</i>																			
Ames.....	Story	926	55	70.8	+ 6.4	99	16	40	27	35	7.18	+ 3.51	2.39	0	14	10	12	8	Chas. N. Brown
Baxter.....	Jasper	993	32	70.3	+ 5.7	95	16	40	24	33	6.70	+ 2.73	2.28	0	12	11	12	7	Geo. R. Geise
Boone (near).....	Boone	894	47	71.2	+ 7.4	100	7†	36	27	39	7.48	+ 3.43	2.47	0	15	15	8	7	Carl Fritz Henning
Des Moines.....	Polk	861	54	72.4	+ 6.8	98	7	43	27	33	4.44	+ 0.77	2.68	0	11	12	9	9	U. S. Weather Bureau
Fort Dodge.....	Webster	1,114	43	70.6	+ 6.6	98	7†	40	24†	37	12.68	+ 8.30	6.30	0	10	20	2	8	Mrs. Emma Sampson
Grinnell.....	Poweshiek	1,031	47	71.4	+ 6.5	97	16	39	27	34	7.99	+ 4.34	2.73	0	13	14	10	6	R. E. Bates
Grundy Center.....	Grundy	976	40	69.6	+ 5.0	97	16	40	24†	38	10.28	+ 6.51	3.16	0	13	18	3	9	M. G. Helberger
Iowa Falls.....	Hardin	1,127	49	70.4	+ 7.8	99	7†	39	24	38	8.52	+ 4.72	2.52	0	13	15	7	8	C. H. Gilbert
Marshalltown.....	Marshall	947	53	71.5															

Climatological Data for September, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	71.0	+ 6.6	98	10†	39	27	35	8.09	+ 4.52	2.29	0	16	15	10	5	s.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. P. Reilly
Cedar Rapids.....	Linn	737	49	71.0	+ 6.4	98	10†	39	28	38	8.05	+ 4.45	3.40	0	11	14	1	15	sw.	
Clinton.....	Clinton	595	60	71.1	+ 5.9	96	10	40	27†	38	5.00	+ 1.51	1.66	0	13	17	2	11	s.	
Davenport.....	Scott	580	60	72.4	+ 6.8	95	9	46	27	29	3.78	+ 0.20	1.05	0	10	12	7	11	s.	
Iowa City.....	Johnson	733	74	71.6	+ 6.8	98	10	42	27	37	6.48	+ 2.60	1.99	0	13	15	2	2	se.	
Le Claire.....	Scott	576	51								4.68	+ 1.27	1.53	0	10					Margaret T. Disney John Strodthoff William Molis Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	69.4	+ 6.2	96	16	37	28	39	5.40	+ 1.12	2.10	0	9	14	3	13	sw.	
Muscatine.....	Muscatine	546	85								6.18	+ 2.58	3.10	0	10					
Olin.....	Jones	750	33	70.4	+ 6.7	102	16	39	24†	40	5.60	+ 1.93	2.06	0	6	15	7	8	sw.	
Tipton (near).....	Cedar	806	39	70.5	+ 5.7	95	16	41	28	40	5.94	+ 2.01	1.75	0	7	8	15	7	s.	
Williamsburg.....	Iowa	805	15	71.4		99	10	43	27	35	7.81	+ 4.16	2.10	0	11	17	9	4	se.	Dr. F. C. Schadt
Means and extremes.....				71.0	+ 6.4	102	16	37	28	40	6.09	+ 2.40	3.40	0	11	14	8	8	s.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	71.8	+ 6.8	96	7	37	27	37	8.07	+ 4.66	2.48	0	15	12	12	6	sw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock
Bedford.....	Taylor	1,200	27								7.40	+ 3.31	2.35	0	8	21	1	8	sw.	
Clarinda.....	Page	1,009	59	72.3	+ 6.0	101	6	42	27†	37	7.21	+ 3.74	2.03	0	12	16	11	3	s.	
Corning.....	Adams	1,287	43	73.3	+ 8.4	97	5†	45	27	33	6.22	+ 2.30	1.74	0	12	11	15	4	s.	
Cumberland (near).....	Cass	1,225	32								6.37	+ 2.99	1.65	0	14	18	5	7	s.	
Glenwood.....	Mills	1,100	41	73.4	+ 6.7	100	5†	40	27	34	4.76	+ 2.08	1.81	0	9	12	13	5	se.	Dr. George Mogridge P. C. Cornell J. L. Hurley W. S. Matthews B. R. Bridge
Greenfield.....	Adair	1,368	35								5.42		2.08	0	10	11	16	3	s.	
Lenox.....	Taylor	1,250	36	73.5	+ 7.8	100	6	43	27	33	7.72	+ 3.51	1.90	0	10	15	13	2	se.	
Oakland.....	Pottawattamie	1,139	18	72.0	+ 6.9	97	7	40	27	33	3.99	+ 0.73	1.63	0	8	13	8	9	se.	
Red Oak (near).....	Montgomery	1,030	24								6.13	+ 2.59	2.12	0	10	13	14	3	s.	
Riverton (near).....	Fremont	920	5								4.96	+ 1.16	2.39	0	9	13	5	12	s.	George C. Rader H. H. Askew U. S. Weather Bureau
Thurman.....	Fremont	960	44	73.8	+ 6.2	102	13	41	27	36	3.31	- 0.95	1.18	0	10	13	7	10	s.	
Omaha, Neb.....		1,105	66	73.7	+ 6.9	102	6	46	27	33	3.74	+ 0.53	1.43	0	10	17	8	5	s.	
Means and extremes.....				73.0	+ 7.0	102	6†	37	27	37	5.79	+ 2.19	2.48	0	11	14	10	6	s.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	73.0	+ 7.9	101	6	44	27	33	6.86	+ 2.48	1.53	0	12	13	11	6	sw.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis
Albia.....	Monroe	949	40	72.8	+ 7.4	96	7	38	27	34	11.08	+ 7.02	4.35	0	10	15	3	12	se.	
Centerville.....	Appanoose	1,013	38	73.2	+ 7.6	99	6	42	27	29	7.60	+ 3.50	2.08	0	11	16	4	10	sw.	
Chariton (near).....	Lucas	1,042	37	72.0	+ 7.2	97	6	42	27	32	10.47	+ 6.53	2.72	0	8	13	8	9	sw.	
Corydon (near).....	Wayne	1,050	47	71.5	+ 5.8	95	6	43	27	28	8.89	+ 4.80	2.46	0	12	16	5	9	s.	
Creston.....	Union	1,291	30	71.2	+ 7.1	96	6†	42	27	30	6.88	+ 2.88	1.64	0	14	13	12	5	s.	Mrs. N. Spangler Seth F. Shenton W. J. Casey J. B. Alter F. S. Parks
Indianola.....	Warren	972	50	73.0	+ 7.4	99	6	42	27	32	5.80	+ 2.07	2.35	0	11	14	11	5	sw.	
Knoxville.....	Marion	920	41	72.2	+ 6.4	99	16	41	27	31	6.65	+ 2.51	1.53	0	12	16	7	7	se.	
Lacona.....	Warren	824	32								8.60	+ 4.24	2.25	0	15	15	9	6	se.	
Lamoni.....	Decatur	1,123	27	72.1	+ 7.4	98	6	42	27	31	8.38	+ 4.37	2.47	0	10	19	6	5	se.	
Melrose.....	Monroe	871	1								10.30		2.58	0	12	15	9	6	sw.	J. M. Carr E. O. Gleason James A. Verploegh H. S. Ely
Mt. Ayr.....	Ringgold	1,220	39	72.2	+ 6.8	98	9	41	27	31	7.26	+ 3.31	2.05	0	9	21	3	6	s.	
Tingley.....	Ringgold	1,275	7	72.2	+ 7.4	98	5†	43	27	32	6.80	+ 2.66	2.10	0	10	19	5	6	sw.	
Winterset.....	Madison	1,118	40	72.9	+ 7.4	99	6	43	27	32	6.46	+ 2.71	1.94	0	12	16	9	5	se.	
Means and extremes.....				72.4	+ 7.2	101	6	38	27	34	8.00	+ 3.97	4.35	0	11	16	7	7	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	72.5	+ 6.6	94	7†	44	27	31	7.97	+ 3.84	2.65	0	10	21	3	6	se.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau
Burlington.....	Des Moines	544	41	73.5	+ 6.3	94	7†	42	27	30	5.43	+ 1.51	2.65	0	9	18	5	7	sw.	
Columbus Junction.....	Louisa	595	40	70.8	+ 4.7	92	13†	41	28	31	5.78	+ 2.12	2.92	0	11	14	15	1	sw.	
Fairfield.....	Jefferson	780	51	71.4	+ 5.8	94	7†	42	27	34	7.95	+ 4.32	3.29	0	10	13	6	11	sw.	
Keokuk.....	Lee	614	60	74.0	+ 6.5	95	7	46	27	28	6.73	+ 2.89	2.76	0	12	15	9	6	s.	
Keokuk No. 2.....	Lee	651	2																	J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikesch
Keosauqua.....	Van Buren	639	44	72.6	+ 6.8	96	8	43	28	36	6.10	+ 1.90	2.45	0	7	10	16	4	sw.	
Mt. Pleasant.....	Henry	730	55	72.3	+ 6.2	94	16	44	27	30	6.47	+ 2.94	1.95	0	11	11	14	5	sw.	
Oskaloosa.....	Mahaska	835	55	71.8	+ 6.9	95	7†	42	27	32	8.35	+ 4.95	2.99	0	13	13	8	9	se.	
Ottumwa.....	Wapello	619	44	72.8	+ 6.5	97	8	41	27	37	9.48	+ 5.63	3.70	0	10	15	6	9	se.	
Sigourney.....	Keokuk	785	36	70.8	+ 5.7	96	5†	40	27	36	6.81	+ 3.12	2.55	0	9	19	5	6	sw.	John B. Slate C. L. Beswick D. D. Sherman H. G. Liddle
Stockport (near).....	Van Buren	747	30	72.0	+ 7.0	95	7†	44	27†	34	7.10	+ 3.01	2.80	0	11	17	8	5	s.	
Washington.....	Washington	757	56	72.4	+ 7.2	96	16	44	27	34	7.07	+ 3.69	2.48	0	9	18	5	7	s.	
Wever.....	Lee	552	3	73.3		98	7	40	28	39	5.36		2.32	0	10	15	1	14	w.	
Means and extremes.....				72.3	+ 6.4	98	7	40	27†	39	6.97	+ 3.19	3.70	0	10	15	8	7	sw.	
State means and extremes.....				71.0	+ 6.7	105	7	35	24†	48	6.69	+ 3.02	6.30	0	12	15	8	7	s.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

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

†Also other dates.

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

‡‡Received too late to be included in means and summaries.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 120 stations, was 6.69 inches, or 3.02 inches above normal. The greatest district excess was in the northeast district, 4.48 inches, and the least district excess, 1.61 inches, was in the northwest district. The greatest precipitation deficiency at any one station was 0.95 inch at Thurman, and the greatest excess was at Fort Dodge, 8.30 inches. The greatest amount at a single station was 12.68

inches at Fort Dodge, and the least was 2.68 inches at Akron. The greatest amount occurring in 24 consecutive hours was 6.30 inches at Fort Dodge on the 19th.

The average number of days with 0.01 inches or more of precipitation for the State was 12, ranging from 10 days in the southeast district, to 14 days in the northeast district. For individual stations, the range was from 5 days at Sioux Center to 18 days at New Hampton.

Daily Precipitation for September, 1931

Stations	Drainage Basin	Day of Month																															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
<i>Northwest District</i>																																	
Akron	Big Sioux			.14										.03		.06		.02	.47	1.23		T.			.62	.01						.07	2.68
Alta	Raccoon	.70	.02	T.					.10					T.		.08		T.	.50	2.20	.35	.20	.72			1.30	.02				.04	6.23	
Alton	Floyd	.02	.02						.03					.02		.08	.04	T.	.34	1.35		.77			.78	.10					.19	3.74	
Cherokee	Little Sioux	.36		.02					.23				T.	T.		.06	T.	T.	.58	1.32	.01	.76	.02		.97	.23	T.			.15	4.71		
Estherville	Des Moines	1.50	.05						.03							.10			.15	1.10	.20	.30	.60			1.05				.10	5.18		
Hawarden	Big Sioux							.03	.01					.03		.01	T.	.06	.16	2.02		.06			1.10	.03				.11	3.62		
Inwood (near)	Big Sioux	T.		.07				.25		T.			T.			.05			.11	2.84			T.			.84	.01			.07	4.24		
Laka Park (near)	Little Sioux								.26							.04			.14	1.14		.25			.63	.96			.16	3.58			
Le Mars	Floyd			.05					T.							.13	T.	T.	.48	1.15		.14			.78	.14				2.87			
Marathon	Raccoon	.13	T.						T.				T.	T.		.09	.02		.86	1.92	.81	.77			.02	.98	.31		.41	6.32			
Pocahontas	Des Moines	.21							.02				.02			.06	.06		1.02	3.40	.25	.17			.90	.56			.30	6.97			
Rock Rapids	Big Sioux						.20	.04				.10				.07	.03		.03	2.75		T.			1.02	.10			.12	4.46			
Sanborn	Floyd	.12	.02						.03				.07			.10	.12		.37	1.54		.47	.17		.83	.12			.36	4.32			
Sheldon	Floyd		.01				.05		T.				T.	.03		.06	.02	T.	.35	1.86		.65			.76	.07			.27	4.13			
Sioux Center	Floyd								T.				T.			T.		T.	.45	2.45		.38			.75	.03			T.	4.06			
Spencer	Little Sioux	.03	.02						.07				.01			.10	.06		.39	1.56	.38	.50	.10		1.97	.31			.33	5.83			
Storm Lake	Raccoon	.02	T.						T.				T.	T.		.10	T.	T.	1.19	2.87	.25	1.29			1.29	.07			.27	7.35			
Washta	Little Sioux		.04	.08					.41				T.	T.		.09		T.	.90	1.32	.02	.56	.08		.80	.25			.18	4.76			
West Bend	Des Moines	.12	.02						.05				T.			.07	.03		.80	1.58	.55	.11	.07		.87	.68	.02		.56	5.53			
<i>North Central District</i>																																	
Algona	Des Moines	.09							.02				T.			.21	.03	T.	.59	1.65	.20	.22	.02		.80	.59			.55	4.97			
Allison (near)	Cedar	.80	T.						.07				.07	T.		.25	.19		.45	2.80	.12	.46	T.		.10	.32	2.06	T.	.25	7.87			
Belmond	Iowa	.16		.01					.07				.08	T.		.15			1.10	3.70	.05	.90	.08		.43	.78	1.05	.04	.43	9.03			
Britt	Iowa	.21	.04	.05									.04	.02	.20	.03			.47	1.28	.90	.61	.02		.18	.53	.99	.04	.32	5.99			
Charles City	Cedar		T.	T.					T.				.24	.04	.18				.59	2.72	.02	.51			.30	1.61	.87		.32	7.40			
Forest City	Cedar	.82							.02							.02	.45		.08	1.36	1.00	.18	.18				1.68	.10	.24	6.13			
Hampton	Cedar			.11												.25			.66	2.85	.49	.96				2.30	.05		.40	8.07			
Humboldt	Des Moines	.19	T.						T.				.04			.05			.92	3.20	.25	.32			.12	.90	.97	T.	.31	7.27			
Mason City	Cedar	.21	T.	T.					T.				.09	T.		.21	.08		.30	1.36	.50	.56	.10		.50	.46	1.15	T.	.29	5.81			
Northwood	Cedar	.12							T.				.03	.01	.37	.12			.06	1.04	.83	.66	T.		.04	.44	1.12	.06	.48	5.38			
Osage	Cedar		.02		.33								.06	T.		.25	.02		.21	1.12	.52	.45	.60		.42	.49	1.50		.36	6.35			
<i>Northeast District</i>																																	
Cedar Falls	Cedar	1.86	.01	.31					T.				.11	.20		.21			.31	2.33	T.	.54	.25		.27	.57	1.28	T.	.20	8.45			
Decorah	Mississippi	1.41			.28								.14	T.		.42	.03		.08	1.05	2.40	.15	.24		.05		2.28	.08		8.61			
Delaware (near)	Maquoketa	.40		.19	.21								.16		.08	.01	.40		.22	2.16	1.39	.96	.18			.16	2.57		.05	9.14			
Dubuque	Mississippi	.03	T.	.45	.01								.04		.14	.32	.04		.07	1.48	.52	1.21			T.	.70	1.66	T.	T.	6.67			
Fayette	Mississippi	2.24	.01	.09	.06								.07		.79	.54			.14	2.25	.05	.34	.41		.06	.15	2.31	.01	.15	9.67			
Independence	Wapsipicon	1.40											.15		.12	.02	.42		.34	2.01		.91	.08			.25	1.92		.06	7.68			
Lansing	Mississippi	1.24											.14		.75	.65	.12	.38	1.10	.11	.23		.18				2.11			7.01			
New Hampton	Wapsipicon	.70	.02	.07	.09							.12	.02	.22	.06			.35	2.33	.33	.28	.08			.16	.10	2.37	.37	.19	7.86			
Oelwein	Wapsipicon	1.80	.10									.10		.40	.50				.10	3.05	.40	.15	.55			.55	2.40		.18	9.73			
Postville (near)	Mississippi	1.29		.12	.43								.08	T.	.30	.43			.20	1.82	.03	.12	.65		.37	.08	2.75		.15	8.82			
Waterloo	Cedar	2.50	T.		T.								.05		.15	.60			.12	1.82	.58	.50	.20		.22		2.30		.05	9.09			
Waverly	Cedar	.58	.02	.02									.16		.49	.52			.83	2.35	.06	.40	.09		.26	.39	1.42		.10	7.69			
<i>West Central District</i>																																	
Audubon (near)	Nishnabotna	.88		.04									.02	T.	.02				.50	1.20	.18	.31			.09	.88	1.10		.15	5.37			
Carroll	Raccoon	1.23		.02	.04									T.	.11	.06			.61	.66	.22	.26	.04		.02	.88	2.07	.02	.03	5.42			
Denison	Missouri	.51		.19									.05		.08				.77	1.74		.37			T.	.74	2.22		.34	7.04			
Guthrie Center	Raccoon	.52		.05					.02				.02	T.	.08	.08			.90	2.28	.05	.55			.03	.95	1.12		.12	4.77			
Harlan	Nishnabotna	1.22	T.	.14					T.				.05		.02	.02			.76	.76	T.	.35			.06	.90	.96	.02	.20	5.44			
Jefferson	Raccoon	.31		.17									T.	T.	T.				.61	1.45	.07	.31			.02	.95	3.68	T.	.12	7.69			
Little Sioux	Little Sioux	.28		.01					.06				.01	.01	.16				1.12	1.08		.33			.01	1.23	.89		.60	5.79			
Logan	Missouri	1.00											T.	T.	T.				1.17	.38	.28	.18	T.			.89	.52	.02	.43	4.87			
Onawa	Missouri	.25		.06					.11				T.	T.	T.				1.25	1.96		1.70				.75	1.40	T.	.25	7.73			
Rockwell City	Raccoon	.20											.88	T.	.10				1.50	2.65		.05					.30		.22	5.90			
Sac City	Raccoon			.06					.09						.03				2.14	2.96	.05	.10				.83	.80		.21	7.27			
Sioux City	Missouri	T.	T.						T.					T.		.08	T.	.09	1.31	.55		.10				1.00	T.		.21	3.34			
<i>Central District</i>																																	
Ames	Skunk	.49		.11										.02		.07	.14		.96	1.74	.18	.80	.01		.17	.98	1.41		.10	7.18			
Baxter	Skunk	1.02		.08										.02	.05				.30	.90	.10	.78				.82	2.28	.05	.30	6.70			
Boone (near)	Des Moines	.59		.01	.03									.05		.05	.57	.29	1.94	.43	.44	.44	.27		.26		2.47	.05	.03	7.48			
Des Moines	Des Moines	.01		.15										T.	T.	T.	.01	.01	.22	1.16	.55	.57	T.		T.	2.12	.56		.08	4.44			
Fort Dodge	Des Moines	2.20											.02		.07				.37	6.30	.58	.38					2.60	.04	T.	12.68			
Grinnell	Iowa	1.86	.07	.07										.02					.15	.15	.90	1.45	.12		.02	.55	2.18		.45	7.99			
Grundy Center	Cedar	3.16		T.									.06		.15				.42	.50	2.25	.26	.55	.22	.18	.25	2.06	T.	.22	10.28			
Iowa Falls	Iowa	1.60	T.	T.	.06									T.		.23	.06	.33	1.70	1.10	.30	.21			.20		2.52	.13	.08	8.52			
Marshalltown	Iowa	1.27		.01	.02								.03		.14	.33			.18	1.96</													

Daily Precipitation for September, 1931—Continued

Stations	Drainage Basin	Day of Month																														Totals			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		31		
<i>Southwest District</i>																																			
Atlantic	Nishnabotna	2.11	.01	T.	.68					.05					.01	.25	.01	.06	1.13	.27	T.	.59	.16	.22		2.48	.04					T.		8.07	
Bedford	Nishnabotna	2.35													.50					.30	T.	1.92	.71	.46	1.03						.13		7.40		
Clarinda	Nodaway	2.03			.06								.10		.30	.03	.10	.10			.80	.60	1.10	.03	1.96								7.21		
Corning	Nodaway	1.45		T.	.01		T.								.35	.01			.68	.12	.02	1.09	.15	.35	1.74						.25		6.22		
Cumberland (near)	Nodaway	1.09			.15	.23					T.				.16	T.	.05		.85	.15	.22	.58		.02	.95	1.65	.01				.26		6.37		
Glenwood	Missouri	1.81												T.	.16		.02		.17	.50		.53		.50	.72						.35		4.76		
Greenfield	Nodaway			.15										T.	.24	.04	.06		.91	.12	.24	1.38		T.	2.08	T.					.20		5.42		
Lenox	Missouri	1.65													.55		.06		.18	.14	.10	1.74		1.20	.45	1.45					.26		7.72		
Oakland	Nishnabotna														.15	.03			1.15	.25		.42			1.63	.02					.34		3.99		
Red Oak (near)	Nishnabotna	1.84									T.				.26		.08		.10		.14	1.18		.08	.56	1.56					.33		6.13		
Riverton (near)	Nishnabotna										T.				.15	.03	.04		.05			.65	T.	1.30	.28	2.11					.35		4.96		
Thurman	Missouri														.10		.17		.12	.18	.05	.50		.16	.45	1.18					.40		3.31		
Omaha, Neb.***	Missouri		T.								T.				.12	T.	.81		.62	.51	.07	.21	T.	.02	.98	.01					.39		3.74		
<i>South Central District</i>																																			
Afton	Grand	1.53		.25									.53						.61	.05	.31	1.23	.02	.22	.58	1.35					.18		6.86		
Albia	Des Moines	4.35	.67	.21											.26	.68	T.		.26	.16		1.53	.87	.45	T.	1.90	T.						11.08		
Centerville	Chariton	2.08		.15											.24	.06			1.09		.04	1.84	.28	.62	.24	.96							7.60		
Chariton (near)	Chariton	2.72	T.	.15											.52	T.	T.		.75	T.		2.62	T.	1.00	1.08	1.63					T.		10.47		
Corydon (near)	Chariton	1.90		.17											.45	.01			.83	.50	.31	2.15		.67	.39	1.45						.06		8.89	
Creston	Missouri	1.30	.03	.04												.65		.03	.64	.13	.06	1.11	.49	.12	.39	1.64	T.			.25		6.88			
Indianola	Des Moines	.74		.28											.18	T.	T.		.22	.10	.10	1.32	.03		.65	1.70					.48		5.80		
Knoxville	Des Moines	1.53		.18										T.	.08	T.			.05	.49	.65	1.50	.10	.15	.44	1.30					.18		6.65		
Lacona	Des Moines	1.70		.48	.27									.04	.19	.08		.01	.48	.35	.48	1.77		.25	.98	1.27				.25		8.60			
Lamoni	Grand	.98	.01												.20	.15			.19		.49	2.18	.41	1.77	.02	2.47	T.						8.38		
Melrose	Des Moines	2.58		.12											.60	.10			.72	.50	.10	2.13		.90	.45	2.00					.10		10.30		
Mt. Ayr	Grand	1.03													.38				.12		.32	2.05		.90	.44	1.90					.12		7.26		
Tingley	Platte	.87		T.											.68	T.					.23	1.60	.02	.95	.45	1.65					.09		6.80		
Winterset	Des Moines	.69		.15											T.	.27	.03		.15	.95	.20	.10	1.26		.56	1.94					.16		6.46		
<i>Southeast District</i>																																			
Bonaparte (near)	Des Moines	2.65		T.											.49	.31			T.	.90	.20	T.	.95	.66	.81	.03	.97	T.					7.97		
Burlington	Mississippi	2.65	.09													.67	T.	.01	T.	.24		T.	.38	.13	.05	1.21								5.43	
Columbus Junction	Iowa	2.92	.01												.14	.06			.05	.02		.82	.50	.04	.08	1.14								5.78	
Fairfield	Skunk	3.29		.04											.33	.07			.09			2.70	.03	.34	.10	.96								7.95	
Keokuk***	Mississippi	2.58	.20	.01											2.03	.02			.12	.05	T.	.01	.55	T.	.22	.06	.88	T.			T.		6.73		
Keokuk No. 2	Mississippi																																		
Keosauqua	Des Moines	2.45													.32	.25			T.			1.68		.30	.30	.80								6.10	
Mt. Pleasant	Skunk	1.65		.02											.23	.07			.14	.06		.99	.89	.40	.07	1.95								6.47	
Oskaloosa	Des Moines	2.99		.15											T.	.14	.03		T.	.07		.06	1.79	.22	.19	.59	2.07	.02			.03		8.35		
Ottumwa	Des Moines	3.70		.15											.30	.03			.14	T.		.14	T.	.81	.18	1.29								9.48	
Sigourney	Skunk	2.55		T.											T.	.12	.05			.05	.08	T.	1.76	.33		.35	1.52					T.		6.81	
Stockport (near)	Skunk	2.80		.05											.29	.26			.01	.03		T.	1.04	.64	.57	.14	1.37							7.10	
Washington	Skunk	2.10													.22	.12				.18			T.	2.48	.50	.12	.15	2.20						7.07	
Wever	Mississippi	2.32													.62	.25				.03	.12		.15	.38	.26	.09	1.14							5.36	

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
 |||Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
 \*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.  
 \*\*Incomplete.  
 \*Precipitation included in next following measurement.  
 T. Precipitation is less than .01 inch rain or melted snow.  
 i Interpolated.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind				Sunshine						
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum			% possible departure from normal					
					7 A. M.	12 Noon	7 P. M.	Lowest			Date	Miles			From	Date			
																	Date	Date	
Chas. City	29.95	30.36	30	29.57	25	82	53	65	29	11	4,360	6.1	19	s.	11	61	-	2	
Davenport	29.98	30.34	30	29.58	25	82	54	60	32	4	5,707	5.9	27	s.	13	64	+	1	
Des Moines	29.93	30.35	30	29.54	20	80	53	60	28	17	6,102	8.5	30	sw.	16	60	+	2	
Dubuque	29.96	30.32	30	29.57	25	85	55	61	34	4	3,442	4.8	16	nw.	25	58	+	0	
Keokuk	29.99	30.35	30	29.64	25	81	53	63	32	4	4,139	5.7	30	sw.	14	76	+	12	
Sioux City	29.88	30.35	30	29.45	19	69	48	49	20	7	8,172	11.3	35	s.	11	69	+	6	
Omaha, Nb	29.91	30.37	30	29.50	19	73	47	54	17	13	4,561	6.3	21	n.	17	70	+	6	
Means and extremes	29.94																		
Normals and records	30.02		25th		29th	83		64		13th		6.9							
			*30.67 1926		*29.20 1927														

\*Sioux City †Des Moines §Omaha ||Davenport ‡Local mean time.  
 ††January 1, 1928, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

RIVERS

Low stages prevailed on the interior streams, with moderate fluctuation. At Des Moines the extreme stages were 0.2 foot and 3.5 feet and averaged 1.2 feet, or 1.4 feet below normal. The Raccoon River at Van Meter, the Iowa River at Wapello, the Cedar River at Cedar Rapids and the Des Moines River at Ottumwa, showed mod-

erate fluctuation in stages the last ten days of the month, because of heavy rains which fell throughout Iowa during that period.

The Missouri River had a falling tendency throughout September, and averaged two feet below normal along the Iowa boundary. Fluctuations were small and unimportant.

The Mississippi River stages remained very low throughout the month. At Dubuque the average stage was 1.1 feet. The lowest stage, -0.4 foot recorded on the 14-15th, surpassed all previous low records for September. At Davenport the average stage was 1.2 feet and nearly two feet below normal. The low stage, -0.1 foot on the 17th, also established a new low record for September. At Keokuk the river remained unusually low. The lowest, -1.3 feet recorded on the 18th, broke all previous low records for September by 0.6 foot.

MISCELLANEOUS PHENOMENA

- Aurora: 3d, 16th.
- Clouds, mammato cumulus: 14th.
- Corona, lunar: 5th.
- Dew, heavy: 2d, 3d, 4th, 6th, 17th, 27th.
- Fog, light: 4th, 7th, 15th, 16th, 21st, 22d, 24th, 25th, 26th, 27th, 28th, 30th.
- Fog, dense: 4th, 15th, 16th, 25th, 26th, 27th, 28th.
- Frost, light: 24th, 27th.
- Gales: 1st, 9th, 10th, 11th, 12th, 13th, 14th, 16th, 17th, 19th, 21st, 25th, 28th, 29th.
- Hail, light: 3d, 16th, 20th, 21st.
- Hail, moderate: 3d, 20th, 21st.
- Hail, heavy: 3d, 20th, 21st.
- Halo, lunar: 24th, 29th.
- Halo, solar: 7th, 8th, 9th, 19th, 23d.
- Meteor: 10th.
- Rainbow: 19th, 20th, 21st, 30th.

Daily Maximum and Minimum Temperature for the Month of September, 1931

Table with columns for Stations, 31 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.

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight.

IOWA STORMS, SEPTEMBER, 1931

Date	County	Township	Nature of Storm	Time	Storm Moved From	Width of Path Miles	Length of Path Miles	Size of Hailstones Inches	Persons Killed	Persons Injured	Damage and Remarks
3	Crawford	Nishnabotna, Paradise	Hail	4:00 p. m.	NW to SE	1	4	1			Hail damaged corn considerable.
13	Emmet	Estherville	Wind	6:00 a. m.	SW to NE						Squall wind blew down numerous trees in Estherville
19	Clay	Webb, Herdland	Wind and rain	p. m.							Squall wind damaged trees, small buildings, garages, windmills and some damage to electric light wires. Damage about \$5,000.
19	Crawford	Nishnabotna	Wind	5:00 p. m.	SW to NE	1/2	1				Unroofed buildings and porch and blew down chimneys, damage \$1,000, by squall wind.
19	Humboldt	Avery, Weaver, Rutland	Wind	6:00-7:00 p. m.	SW to NE	4	10				Wind damage to buildings slight; corn down badly.
19	Linn	Cedar	Rain and flood	2:00 a. m.							Heavy downpour of rain flooded storm sewers doing considerable damage.
19	Palo Alto	Silver Lake	Wind and rain	5:30 p. m.							Squall wind uprooted trees, leveled small buildings and broke a number of large glass in stores at Ayrshire. Damage about \$7,000.
19	Sioux	Logan, Buncombe	Flood								Heavy rains caused washout on railroad; a train derailed but no injuries.
19	Worth	Danville	Tornado	7:30 p. m.	SW to NE		5				Tornado struck northeast of Hanlontown, damaging buildings about \$3,000 and killed livestock valued at \$200.
20	Buena Vista	Nokomis	Hail	4:00-4:10 p. m.	SW to NE	1		2 3/4			Heavy hail damage to auto tops, windows and corn; damage estimated about \$7,000.
20	Cass	Grove, Bear Grove, Cass, Washington, Pymosa, Franklin, Benton	Wind and hail	3:00 p. m.	SW to NE						Wind to crops \$500; hail damage slight.
20	Monona	St. Clair, Soldier	Wind and hail	p. m.	SW to NE			1 1/2			Wind damage to trees, window glass and electric wires, damage about \$1,500. Heavy hail damage, \$10,000, confined mostly to destruction of auto tops, window panes and roofs; corn damaged some.
20	Tama	Toledo, Tama	Wind	p. m.							Wind damaged several awnings on store fronts, demolished several small buildings, trees blown down on residences, and about 20 electric light poles blown down.
21	Davis	Cleveland, Wyacondah, Lick Creek, Union, Prairie	Wind, hail, tornado	3:15-3:30 p. m.	SW to NE	300 ft.	11	2 1/2		20	Tornado struck at Bloomfield and proceeded one mile east, then divided into two distinct tornadoes, one proceeded northeast and struck Floris; and the other southeast and struck Pulaski; mutilated hundreds of trees, numerous houses, barns and windmills wrecked; damage about \$100,000. Extremely heavy hail driven by wind broke more than 15,000 glass window panes in Bloomfield, nearly every roof needed repair and at least 600 homes must be reroofed; hail damage to windows, roofs, highlines, telephone wires about \$300,000.
21	Poweshiek	Grant, Washington, Malcom, Pleasant, Sugar Creek	Wind	5:00 p. m.	NW to SE						Squall wind damaged corn cribs, windmills, wrecked an airplane, and damaged trees, damage about \$8,000.
21	Scott	Liberty, Cleona	Wind and hail	5:30 p. m.	SW to NE			2			Heavy hail damage to composition paper roofs and numerous window glass broken; corn stripped; damage about \$5,000.
21	Van Buren	Lick Creek	Hail	3:30 p. m.	SW to NE			1			Heavy hail damaged crops about \$3.00 per acre, along path.
21	Van Buren, Jefferson, Henry, Washington, Louisa	Van Buren Co., Lick Creek Twp.; Jefferson Co., Liberty, Center, Cedar, Buchanan, Lockridge, Walnut Twps.; Washington Co., Marion, Crawford, Oregon Twps.; Louisa Co., Columbus Twp.	Tornado	3:30-4:30 p. m.	SW to NE	100 to 300 feet	50		2	8	Tornado struck west of Birmingham and moved northeastward and dissipated southeast of Cotter; damage estimated about \$125,000. Damage confined to rural districts, mutilated trees, farm buildings and farm property, telephone, telegraph and high lines; killed livestock.
23	Butler	Pittsford	Wind	4:30 p. m.	W to E					2	Squall wind damaged several small buildings, roofs, and uprooted numerous trees, several hay stacks blown down, also auto tops torn; damage about \$4,000.

Record high temperatures: 7th, 13th, 16th, 19th, 20th.

Squall Wind: 19th, 21st, 23d.

Thunderstorms: 1st, 2d, 3d, 4th, 6th, 7th, 9th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 30th.

Tornadoes: 19th, 21st.

ERRATA

Report for August, 1931. Page 62, Charles City; precipitation on 18th published zero, should be trace. Page 63, Charles City; monthly mean sea-level barometric pressure published 30.02 inches, should be 30.03 inches; monthly sunshine percentage of possible and departure from normal published 67 and -4, should be 68 and -3.

TORNADOES IN SOUTHEAST IOWA, SEPTEMBER 21, 1931

By NORBERT G. RIBBLE

(Weather Bureau Office, Des Moines, Iowa)

A well defined and concentrated low barometric pressure center which extended from Sioux City, Iowa, to Omaha and Lincoln, Nebraska, at 7:00 a. m., on September 21, advanced nearly due north and by 7:00 p. m. it was located at Moorhead, Minnesota. Precipitation accompanied by thunderstorms and local wind squalls occurred over a belt about 250 miles wide, extending from the Texas Panhandle to the Lake region. The most severe storms struck in the southeastern portion of Iowa. Preceding their development, strong convective air currents probably occurred as a result of a steep maximum temperature gradient in the southeastern part of the State and the destructive squalls, hail and tornadoes appear to have resulted from this sharp temperature difference. Two principal areas of tornadic destruction were reported.

The first of these occurred in Cleveland, Wyacondah, Lick Creek, Union and Prairie Townships of Davis County. The tornado struck

Bloomfield and proceeded about one mile east, then divided into two distinct funnels, one proceeding northeast and striking near Floris and the other moving southeast and striking Pulaski. The path of destruction was well defined and the damage was estimated at \$100,000. The damage consisted of hundreds of mutilated trees and numerous houses, barns and windmills wrecked. The time of duration was from 3:15 p. m. to 3:30 p. m. The storm was concentrated along a path approximately 300 feet wide and 11 miles long before it dissipated. Twenty people were reported injured from flying debris. A severe hailstorm accompanied the tornado which did probably \$300,000 damage to property in Bloomfield. The large hailstones, some more than 2 1/2 inches in diameter, driven by the wind, broke more than 15,000 glass window panes. Nearly every roof along the path needed repair, and at least 600 homes must be re-roofed. The hail damage was confined mostly to trees, windows, roofs, highlines and telephone wires.

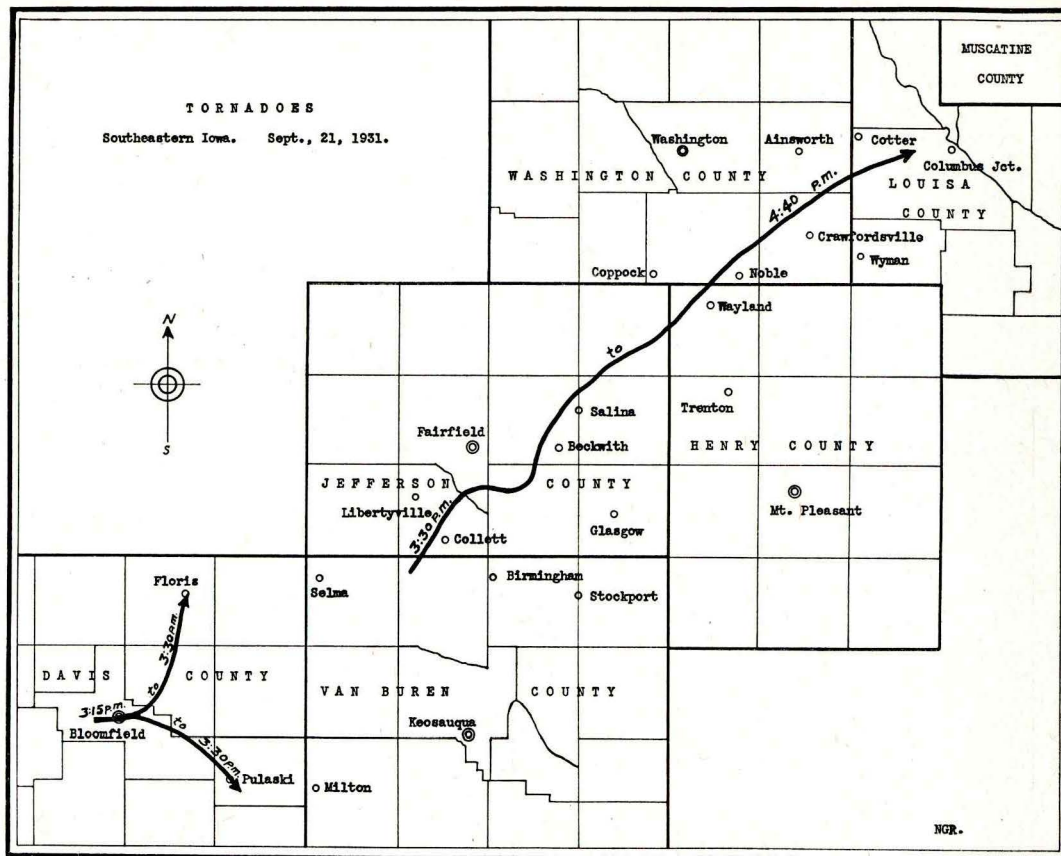
Approximately the same time as the first tornado dissipated, a second tornado developed in the northern part of Lick Creek Township, Van Buren County, some 15 miles east of the first, and moved in nearly a straight line to the northeast. The second tornado left a well marked path, 100 to 300 feet wide and about 50 miles long, and did approximately \$125,000 damage. The damage was confined to rural districts where it mutilated hundreds of trees and wrecked numerous farm buildings, fences and telephone, telegraph and high lines; also many head of livestock were killed. The tornado first struck west of Birmingham about 3:30 p. m. and dissipated southeast of Cotter about 4:30 p. m.; crossing Lick Creek Township of Van Buren County; Liberty, Center, Cedar, Buchanan, Lockridge and Walnut Townships of Jefferson County; Jefferson Township of Henry County; Marion, Crawford and Oregon Townships of Washington County and Columbus Township of Louisa County. Two

CLIMATOLOGICAL DATA: IOWA SECTION

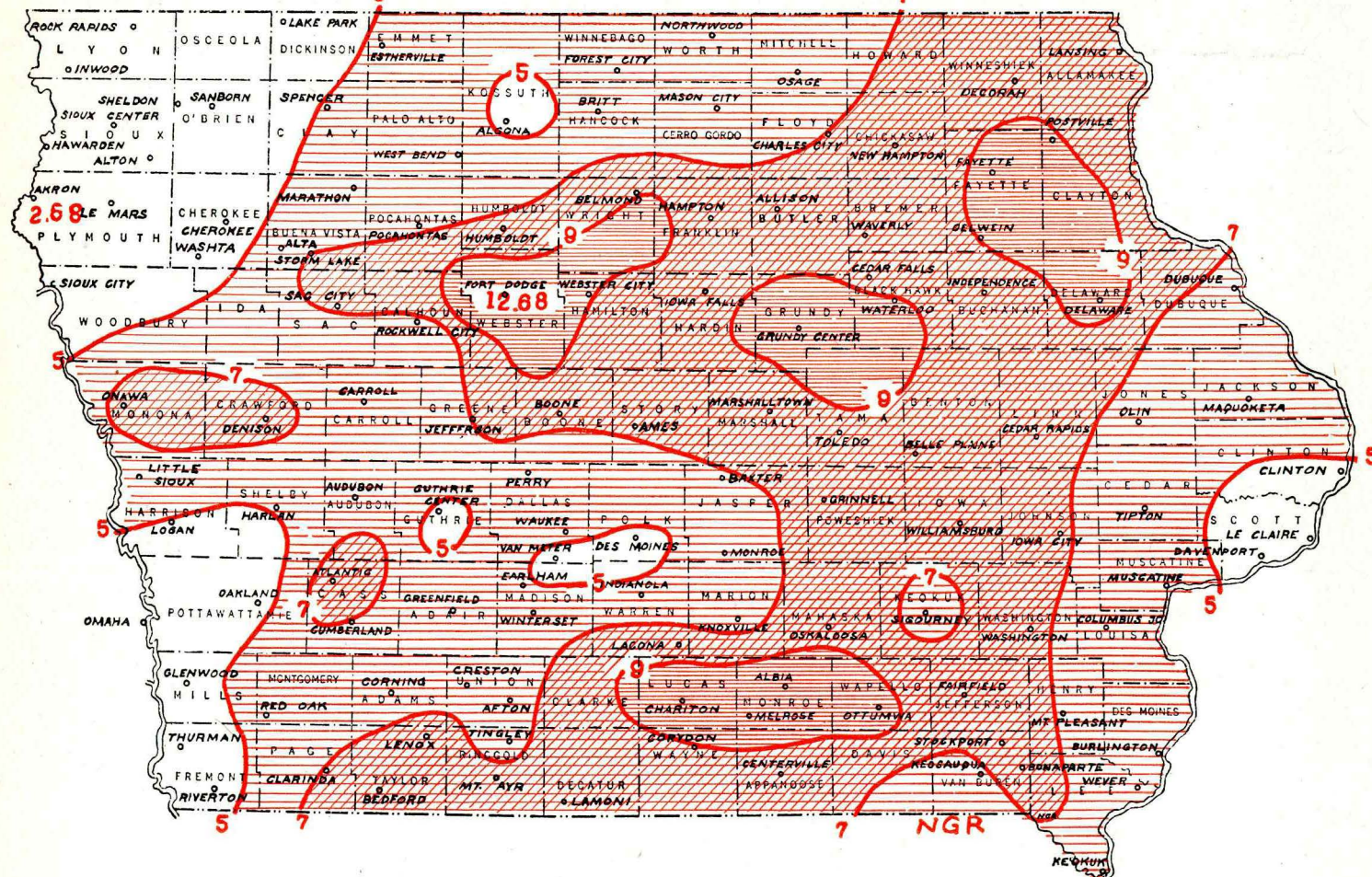
people, Mrs. Rickey Inghram, 68 years old, and Valentine Schaad, 70 years old, were killed by flying debris and eight were injured. The heaviest farm damage done by the tornado probably was the H. D. Cherryholmes place near Crawfordville in southeastern Washington County, where every building, including the residence, barns and sheds were leveled to the ground and the contents scattered over a wide area. It was there that Mrs. Inghram sustained the injuries that caused her death. Three horses were killed at the Cherryholmes farm, dead hogs and chickens were scattered about and two cows were so badly crippled that they had to be killed. Household goods were a total loss. Numerous other farms had almost total losses but probably not as great as occurred on the Cherryholmes farm. A school bus was overturned and the horses ran away, but none of the children were injured.

Reports of people who have resided in that locality for many years agree that the storm was by far the most severe ever experienced in that section of the State.

The approximate paths of the two tornadoes are shown by the accompanying map.



TOTAL PRECIPITATION, SEPTEMBER, 1931



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU  
CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, OCTOBER, 1931 No. 10

## COMPARATIVE DATA FOR THE STATE—OCTOBER

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
1873.....	46.0	-5.8	76	15	2.64	+0.21	4.80	1.25					
1874.....	51.2	-0.6	84	25	1.52	-0.91	2.70	0.65					
1875.....	47.8	-4.0	77	22	1.36	-1.07	2.71	0.28					
1876.....	47.0	-4.8	78	18	1.16	-1.27	3.31	0.18					
1877.....	49.6	-2.2	93	28	4.45	+2.02	8.08	1.90					
1878.....	48.9	-2.9	85	10	2.73	+0.30	5.52	0.40					
1879.....	58.3	+6.5	90	11	2.19	-0.24	6.28	0.28					
1880.....	47.6	-4.2	83	13	1.90	-0.53	6.90	0.25					
1881.....	52.1	+0.3	86	26	6.42	+3.99	14.03	3.10					
1882.....	54.4	+2.6	86	23	3.97	+1.54	6.50	0.55					
1883.....	47.2	-4.6	88	20	3.37	+0.94	6.95	0.40					
1884.....	54.2	+2.4	86	17	4.20	+1.77	9.00	2.00					
1885.....	46.7	-5.1	80	20	2.62	-0.19	4.30	0.92					
1886.....	55.0	+3.2	88	18	2.51	+0.98	8.15	0.43					
1887.....	46.4	-5.4	86	3	1.46	-0.97	3.41	0.05					
1888.....	47.7	-4.1	84	22	1.16	-1.27	2.81	0.10					
1889.....	47.5	-4.3	94	12	0.58	-1.85	2.88	0.00					
1890.....	49.2	-2.6	84	15	3.44	+1.01	6.43	1.59					
1891.....	50.0	-1.8	92	19	2.77	+0.34	6.53	0.85		6	18	7	6
1892.....	51.5	+2.7	96	14	1.55	-0.88	2.58	0.00	0.0	4	21	6	4
1893.....	52.4	+0.6	94	10	1.28	-1.15	4.56	0.02	0.0	4	16	9	6
1894.....	51.7	-0.1	90	20	2.67	+0.24	5.25	0.03	0.2	8	14	8	9
1895.....	46.0	-5.8	88	4	0.47	-1.96	1.38	0.00	T.	2	19	8	4
1896.....	47.8	-4.0	88	12	3.13	+0.70	5.05	1.51	T.	5	18	6	7
1897.....	56.8	+5.0	97	12	1.14	-1.29	3.30	0.03	0.0	4	17	8	6
1898.....	47.5	-4.3	88	17	3.56	+1.13	5.75	1.27	3.6	8	7	9	15
1899.....	56.7	+4.9	95	17	1.73	-0.70	4.64	0.15	0.0	5	17	8	6
1900.....	59.3	+7.5	90	21	3.91	+1.48	8.00	1.20	0.0	7	16	7	7
1901.....	54.2	+2.4	88	20	1.98	-0.45	4.23	0.45	T.	6	17	7	8
1902.....	53.5	+1.7	83	20	2.54	+0.11	6.66	0.28	T.	5	16	8	7
1903.....	52.2	-0.4	90	16	1.95	-0.48	4.50	0.32	0.0	5	19	6	6
1904.....	53.1	+1.3	96	16	1.67	-0.76	4.43	0.14	T.	6	15	8	8
1905.....	49.2	-2.6	95	16	3.40	+0.97	5.36	1.20	1.6	8	16	6	9
1906.....	50.5	-1.3	87	7	1.96	-0.47	4.25	0.50	0.1	6	14	7	10
1907.....	50.4	-1.4	85	10	1.50	-0.93	3.71	0.30	0.0	5	20	5	6
1908.....	51.1	-0.7	89	17	3.38	+0.95	8.83	0.58	2.6	8	16	6	9
1909.....	49.7	-2.1	97	10	2.22	-0.21	4.70	0.48	T.	6	16	6	9
1910.....	55.2	+3.4	93	10	0.77	-1.66	1.73	T.	0.1	4	21	4	6
1911.....	48.7	-3.1	87	14	3.34	+0.91	7.03	0.73	0.6	10	12	8	11
1912.....	52.2	+0.4	92	16	2.98	+0.55	5.77	1.03	T.	6	21	3	7
1913.....	49.2	-2.6	89	-2	3.03	+0.60	7.29	0.35	1.2	9	15	8	8
1914.....	55.9	+4.1	88	14	3.23	+0.80	6.64	0.74	T.	9	16	6	9
1915.....	54.4	+2.6	86	19	1.31	-1.12	4.33	0.20	2.0	8	16	7	8
1916.....	50.9	-0.9	92	6	2.00	-0.43	4.00	0.15	2.2	6	10	11	10
1917.....	42.9	-8.9	85	0	1.41	-1.02	7.56	1.36	0.8	7	13	7	11
1918.....	55.1	+3.3	93	21	3.64	+1.21	8.65	0.45	T.	10	11	8	12
1919.....	50.7	-1.1	89	8	3.02	+0.59	4.64	0.48	T.	6	19	6	6
1920.....	57.7	+5.9	90	11	2.13	-0.30	3.61	0.21	T.	6	17	8	6
1921.....	54.6	+2.8	90	21	1.96	-0.47	3.93	0.06	T.	5	21	4	6
1922.....	56.1	+4.3	96	14	1.81	-0.62	3.67	0.29	1.7	6	18	6	7
1923.....	48.5	-3.3	81	10	1.22	-1.21	2.58	0.03	0.0	4	22	5	4
1924.....	58.1	+6.3	89	21	0.87	-1.56	2.70	0.97	4.9	10	8	8	15
1925.....	40.2	-11.6	78	-15	2.91	+0.48	3.91	0.11	T.	7	13	9	9
1926.....	51.2	-0.6	91	14	1.53	-0.90	8.51	0.46	T.	7	19	5	7
1927.....	55.5	+3.7	91	24	3.25	+0.82	7.38	1.48	0.1	8	15	5	11
1928.....	54.2	+2.4	93	17	3.66	+1.23	6.55	1.10	0.7	9	15	5	11
1929.....	51.8	-0.0	84	23	3.10	+0.67	4.21	0.71	0.4	7	14	7	10
1930.....	50.7	-1.1	95	9	2.08	-0.35	6.67	0.62	T.	10	13	8	10
1931.....	56.8	+5.0	92	28	3.01	+0.58							
Normals.....	51.8	.....	88	15	2.43	.....	5.28	0.60	0.5	6	16	7	8
Highest.....	59.3	.....	97	28	6.42	.....	14.03	3.10	4.9	10	22	11	15
Lowest.....	40.2	.....	76	-15	0.47	.....	1.38	0.00	0.0	2	7	3	4

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

### TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 105 stations, was 56.8°, or 5.0° above normal. There was an excess in all of the districts of the State. The greatest district excess, 5.6°, was in the east-central and southwest districts, and the least district excess, 4.3°, was in the south-central district. The highest monthly mean was 60.4° at Keokuk, and the lowest, 53.0°, at Postville (near). The absolute range for the State was 64°, from 28° at Rock Rapids on the 17th and 25th and Sheldon on the 25th, to 92° at Lamoni and Thurman on the 10th. Only two stations, Lamoni and Thurman, had temperatures 90° or higher. At no station was the maximum temperature as low as 32° or below. The average

### GENERAL SUMMARY

October weather was very mild with an abundance of precipitation. The mean temperature for the State was 56.8° or 5.0° above normal, and the highest since 1924. The first half of the month was very mild and the last half was rather cool. The minimum temperature for the State, 28° recorded at Rock Rapids on the 17th and 25th and at Sheldon on the 25th, equals the State record for highest October minimum, established in 1877.

State-Wide precipitation averaged 3.01 inches, or 0.58 inch above normal, and 0.93 inch above the October 1930 average. Precipitation was below normal in the north half of the State, with the exception of a few scattered stations. The south half had precipitation in excess of the normal. Precipitation was fairly well distributed through the month.

Traces of snow occurred on the 29th and 30th at Inwood (near), Mason City, Cherokee, Alta, Sioux City, Webster City, Grundy Center, Onawa, Atlantic and Chariton.

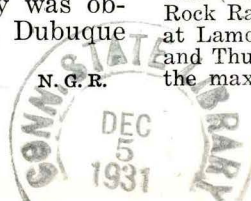
From the agricultural standpoint the month was abnormal for growing vegetation. Pastures, meadows, alfalfa and winter wheat grew vigorously. The luxurious pastures in some localities caused animals to bloat. Potatoes that were killed by the earlier heat and drouth produced an unusual late season development of tubers, mostly since the rains set in during the middle of September. Corn husking progressed rapidly in the drier northwest counties and for the State as a whole 48% of the husking was done.

Killing frost occurred at several stations in the north half of the State on the 17th and 25th, doing very little damage to crops which had advanced beyond the possibility of damage. Ninety-nine per cent of the corn escaped frost damage.

Wind squalls and hailstorms were not especially numerous, but did considerable damage in a few localities. Moderately heavy rains which occurred on the 6th and 7th caused the streams and rivers to flood the bottom land in south-central Jackson, north-central Clinton, central Wapello and south-central Fremont Counties. There was considerable damage to crops, road beds and bridges and to cellars by flooding.

A meteor of more than ordinary brilliancy was observed from Mt. Pleasant, Iowa City, Clinton, Dubuque and Keokuk about 9:45 p. m. on the 24th.

N. G. R.





Climatological Data for October, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy
<i>Northwest District</i>																			
Akron	Plymouth	1,153	4																Orlan C. Moore
Alta	Buena Vista	1,513	41	51.7	+ 4.6	83	10	33	29	32	2.94	+ 0.71	1.18	T.	12	11	11	9	D. E. Hadden
Alton	Sioux	1,305	26	55.2	+ 5.4	83	10	31	17	34	1.30	+ 0.46	0.73	0	12	10	11	9	W. S. Slagle
Cherokee	Cherokee	1,196	11	55.2	+ 5.7	82	10	33	17	31	2.42	+ 0.51	1.40	T.	9	15	8	8	J. E. Wirth
Estherville	Emmet	1,298	37	54.8	+ 5.7	83	2	30	17	37	1.89	+ 0.02	0.50	0	10	19	3	9	A. O. Peterson
<i>Hawarden</i>																			
Inwood (near)	Sioux	1,181	5								0.99	+ 0.86	0.34	0	12	14	4	13	Earl V. Slife
Lake Park (near)	Lyon	1,474	28	53.6	+ 3.8	81	6	29	25	34	1.17	+ 0.74	0.46	T.	11	16	8	7	A. C. Hanson
Le Mars	Dickinson	1,489	19																P. M. Lawrence
Marathon	Plymouth	1,224	40	56.1	+ 5.0	85	10	30	17	36	1.34	+ 0.72	0.55	0	9	16	5	10	Henry Newell
	Buena Vista	1,390	5								1.56	+ 0.91	0	6	13	7	11	11	E. G. Smith
<i>Pocahontas</i>																			
Rock Rapids	Pocahontas	1,248	27	55.4	+ 4.7	83	2	33	17	32	2.06	+ 0.67	0.67	0	8	18	3	10	F. E. Hronek
Sanborn	Lyon	1,349	34	54.0	+ 5.1	79	2	28	17	36	0.75	+ 1.04	0.21	0	7	20	1	10	Nellie F. Medberry
Sheldon	O'Brien	1,553	18	53.6	+ 4.2	81	6	31	25	32	1.54	+ 0.31	0.63	0	11	12	8	11	J. W. Dow
Sioux Center	O'Brien	1,418	25	54.2	+ 4.0	84	10	28	25	36	0.78	+ 1.22	0.29	0	10	14	7	10	Ross E. Forward
	Sioux	1,461	32	54.4	+ 4.6	84	10	30	31	33	0.80	+ 1.04	0.25	0	5	16	8	7	F. C. Aue
<i>Spencer</i>																			
Storm Lake	Clay	1,310	23	51.6	+ 4.4	82	6	31	25	32	3.35	+ 1.43	1.98	0	11	15	5	11	E. W. Little
Washta	Buena Vista	1,442	41	51.8	+ 3.6	83	10	33	29	32	2.43	+ 0.39	1.28	0	10	14	9	8	Russel M. Edwards
West Bend	Cherokee	1,157	34	55.5	+ 5.0	85	4	29	17	39	1.19	+ 0.92	0.50	0	6	17	6	8	H. L. Felter
	Palo Alto	1,197	44	55.3	+ 4.7	85	2	33	17	31	0.70	+ 1.33	0.42	0	9	18	8	5	Jos. Dorweiler
<i>Means and extremes</i>																			
				51.8	+ 4.8	85	2	28	17	39	1.58	+ 0.37	1.98	T.	9	15	7	9	nw.
<i>North Central District</i>																			
Algona	Kossuth	1,207	70	55.6	+ 5.1	81	2	34	17	31	1.61	+ 0.66	0.82	0	7	17	3	11	Leon M. Merritt
Allison (near)	Butler	1,000	17	55.8	+ 5.1	80	2	33	17	33	0.62	+ 1.65	0.13	0	7	12	8	11	George H. Bell
Belmond	Wright	1,181	22	54.9	+ 4.3	82	4	30	17	33	1.23	+ 1.49	0.48	0	8	10	3	18	H. F. Luick
Britt	Hancock	1,236	46	54.5	+ 4.8	81	2	33	25	33	3.81	+ 1.41	1.80	0	13	14	4	13	E. P. Healy
Charles City	Floyd	1,015	56	55.0	+ 6.4	81	2	33	17	30	1.07	+ 1.26	0.73	0	8	15	5	11	U. S. Weather Bureau
<i>Forest City</i>																			
Hampton	Winnebago	1,226	41	54.0	+ 4.9	81	2	31	29	34	3.90	+ 1.47	2.10	0	8	12	8	11	Dr. M. B. Neil
Humboldt	Franklin	1,142	40	55.8		83	4	32	17	37	1.93	+ 0.62	1.45	0	4	21	2	8	Howard J. Haydon
Mason City	Humboldt	1,095	47	54.8	+ 3.5	82	2	30	17	33	1.69	+ 0.53	0.62	0	6	11	14	6	H. C. Snitkey
Northwood	Cerro Gordo	1,118	39	53.4	+ 3.8	79	2	30	17	30	2.78	+ 0.42	1.20	T.	11	11	10	10	American Beet Sugar Co.
	Worth	1,222	35	54.1	+ 5.9	80	2	32	17	30	2.93	+ 0.29	1.61	0	9	14	5	12	Charles Dwelle
<i>Osage</i>																			
	Mitchell	1,163	46	54.1	+ 5.6	80	2	32	17	28	2.33	+ 0.11	1.94	0	7	11	8	12	Dr. C. E. Juhl
<i>Means and extremes</i>																			
				54.7	+ 5.0	83	4	30	17	37	2.08	+ 0.33	2.10	T.	8	14	6	11	se.
<i>Northeast District</i>																			
Cedar Falls	Black Hawk	875	12								2.11		0.52	0	11	10	9	12	E. J. Cable
Decorah	Winneshiek	872	48	55.3	+ 6.2	80	2	30	12	35	2.64	+ 0.18	1.07	0	11	16	3	12	M. D. Whitney
Delaware (near)	Delaware	1,083	52	55.1		81	4	34	17	26	2.13		0.96	0	10	13	9	9	E. J. Paris
Dubuque	Dubuque	700	80	56.8	+ 4.9	81	3	35	18	26	2.92	+ 0.44	1.12	0	11	12	3	16	U. S. Weather Bureau
Fayette	Fayette	1,003	43	55.0	+ 5.4	81	2	30	17	33	1.60	+ 0.93	0.37	0	11	17	6	8	W. C. Van Ness
<i>Independence</i>																			
Lansing	Buchanan	956	71	55.6	+ 3.5	79	2	36	17	25	1.46	+ 0.09	0.33	0	11	14	4	13	Dr. Geo. Boody
New Hampton	Allamakee	632	28								1.43	+ 1.47	0.40	0	9				Mrs. Mary Spinner
Oelwein	Chickasaw	1,169	34	51.6	+ 4.4	79	2	34	25	31	1.24	+ 1.33	0.60	0	9	9	10	12	D. W. Dawson
Postville (near)	Fayette	1,036	8	56.6	+ 5.4	83	3	35	17	32	1.18	+ 1.35	0.45	0	4	12	1	18	John T. Ridler
	Clayton	1,192	40	53.0	+ 3.7	77	4	35	12	27	1.59	+ 1.09	0.37	0	9	15	6	10	F. L. Williams
<i>Waterloo</i>																			
Waverly	Black Hawk	854	49	56.6	+ 4.7	87	4	31	17	31	1.72	+ 0.72	0.35	0	8	16	8	7	R. B. Slippy
	Bremer	936	42	55.3	+ 4.2	79	2	32	17	30	1.09	+ 1.51	0.41	0	7	18	5	8	D. H. Murphy
<i>Means and extremes</i>																			
				55.4	+ 4.7	87	4	30	12	35	1.76	+ 0.85	1.12	0	9	14	6	11	nw.
<i>West Central District</i>																			
Audubon (near)	Audubon	1,297	38	56.8	+ 6.0	81	2	34	29	28	1.96	+ 0.35	0.62	0	8	13	12	6	George Kibby
Carroll	Carroll	1,265	45	56.0	+ 4.4	83	10	34	29	33	1.95	+ 0.63	0.60	0	8	20	1	10	Mrs. J. J. Wolfe
Denison	Crawford	1,200	47	57.0	+ 5.3	86	10	32	17	32	2.36	+ 0.13	0.96	0	7	10	12	9	J. McMinnema
Guthrie Center	Guthrie	1,028	36	57.6	+ 5.1	86	4	34	17	32	1.63	+ 1.03	0.78	0	11	13	11	7	Kenneth Hoyt
Harlan	Sherburne	1,210	39	57.2	+ 6.0	88	4	32	17	35	2.58	+ 0.07	0.95	0	9	12	8	11	Elmer Buss
<i>Jefferson</i>																			
Little Sioux	Greene	1,052	39	56.4	+ 5.0	83	4	34	17	30	2.02	+ 0.52	0.88	0	7	12	8	11	W. I. Lyon
Logan	Harrison	1,040	30	58.0	+ 5.8	89	10	32	17	36	1.32	+ 0.73	0.95	0	6	12	12	7	H. W. Kerr
Onawa	Harrison	1,120	65	57.5	+ 4.3	88	4	36	25	34	1.81	+ 0.57	1.32	0	8	8	20	3	Amy Ann Stern
Rockwell City	Monona	1,051	46	55.8	+ 4.0	85	10	32	17	34	1.48	+ 0.70	0.80	T.	7	15	8	8	Mrs. H. E. Colby
	Calhoun	1,232	44	56.2	+ 4.4	85	4	34	17	31	1.76	+ 0.83	0.92	0	6	17	7	7	A. W. McIsaac
<i>Sac City</i>																			
Sioux City	Sac.	1,209	62	55.8	+ 4.3	85	4	33	17	34	3.76	+ 1.59	1.78	0	5	13	11	7	F. P. Kessler
	Woodbury	1,135	56	55.8	+ 4.9	85	10	31	17	32	1.13	+ 0.64	0.67	T.	6	12	8	11	U. S. Weather Bureau
<i>Means and extremes</i>																			
				56.7	+ 5.0	89	10	32	17	36	1.98	+ 0.36	1.78	T.	7	13	10	8	s.
<i>Central District</i>																			
Ames	Story	926	55	56.6	+ 4.9	82	2	36	17	29	2.18	+ 0.43	0.70	0	9	11	11	9	Chas. N. Brown
Baxter	Jasper	993	32	57.4	+ 5.0	85	4	34	29	38	2.31	+ 0.11	0.90	0	9	10	14	7	Geo. R. Geise
Boone (near)	Boone	894	47	56.9	+ 5.2	85	4	30	17	38	3.03	+ 0.24	0.74	0	8	10	10	11	Carl Fritz Henning
Des Moines	Polk	861	54	58.6	+ 5.2	84	10	37	29	26	3.54	+ 1.04	1.82	0	13	11	7	13	U. S. Weather Bureau
Fort Dodge	Webster	1,114	43	56.1	+ 4.8	82	2	32	17	32	1.62	+ 1.42	0.45	0	9	19	3	9	Mrs. Emma Sampson
<i>Grinnell</i>																			
Grundy Center	Poweshiek	1,031	47	57.8	+ 4.8	85	4	36	29	29	2.98	+ 0.47	0.78	0	11	17	10	4	R. E. Bates
Iowa Falls	Grundy	976	40	55.4	+ 4.3	82	4	32	17	34	2.89	+ 0.10	0.62	T.	10	13	5	13	M. G. Heiberger
Marshalltown	Hardin	1,127	49	55.5	+ 4.8	81	2	32	17</										

Climatological Data for October, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit							Precipitation, in inches				Number of Days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind	
<i>East Central District</i>																					
Belle Plaine.....	Benton	866	55	57.5	+ 5.6	85	2†	32	17	36	3.23	+ 0.74	0.72	0	14	13	5	13	nw.	O. C. Burrows J. T. Wurster Dr. A. P. Bryant U. S. Weather Bureau Prof. J. F. Reilly	
Cedar Rapids.....	Linn	737	49	57.9	+ 6.5	85	4	31	18	35	3.15	+ 0.70	1.30	0	12	12	3	16	sw.		
Clinton.....	Clinton	595	60	57.6	+ 5.0	81	2	32	18	32	5.02	+ 2.46	3.34	0	13	14	5	12	w.		
Davenport.....	Scott	580	60	59.0	+ 5.3	83	3	39	31	23	3.01	+ 0.62	1.06	0	15	10	7	14	s.		
Iowa City.....	Johnson	733	74	58.2	+ 5.8	86	4	34	17†	31	3.45	+ 0.71	0.88	0	14	13	8	10	se.		
La Claire.....	Scott	576	54								3.31	+ 0.86	1.31	0	8						Margaret T. Disney John Strodthoff William Molis Mrs. L. Stingley John Kroepfen
Maquoketa (near).....	Jackson	692	38	55.8	+ 5.6	84	3	29	18	35	6.49	+ 3.60	4.20	0	11	14	5	12	sw.		
Muscataine.....	Muscataine	546	85								3.11	+ 0.46	0.65	0	11						
Olin.....	Jones	750	33	56.8	+ 5.8	83	4	30	18	32	4.43	+ 1.94	1.45	0	9	17	4	10	sw.		
Tipton (near).....	Cedar	806	39	57.4	+ 5.0	84	3	33	18	30	3.81	+ 1.43	1.10	0	8	7	12	12	s.		
Williamsburg.....	Iowa	805	15	58.0		86	4	35	17†	32	2.32	- 0.13	0.57	0	11	15	9	7	sw.	Dr. F. C. Schadt	
Means and extremes.....				57.6	+ 5.6	86	3†	29	18	36	3.76	+ 1.22	4.20	0	11	13	6	12	sw.		
<i>Southwest District</i>																					
Atlantic.....	Cass	1,110	44	57.7	+ 5.5	87	4	31	17	33	5.16	+ 2.56	3.78	T.	9	11	11	9	nw.	Roy L. Fancolly Arthur L. Bishop Dr. H. C. Hawley W. J. Wagner Carl E. Pollock	
Bedford.....	Taylor	1,200	27								6.67	+ 3.86	3.20	0	9	13	9	9	sw.		
Clarinda.....	Page	1,009	59	59.2	+ 5.2	88	10	35	17†	36	3.95	+ 1.31	1.48	0	14	17	7	7	s.		
Corning.....	Adams	1,287	43	58.2	+ 5.8	85	10	35	29	33	3.84	+ 1.08	2.36	0	10	10	14	7	s.		
Cumberland (near).....	Cass	1,225	32								4.23	+ 1.52	2.76	0	8	15	8	8	s.		
Glenwood.....	Mills	1,100	41	58.8	+ 5.2	88	4†	32	17	32	1.49	- 1.19	0.90	0	5	10	12	9	nw.	Dr. George Mogridge P. C. Cornell J. L. Hurlay W. S. Matthews B. R. Bridge	
Greenfield.....	Adair	1,368	35								5.54		3.40	0	9	11	14	6	nw.		
Lenox.....	Taylor	1,250	36	59.6	+ 6.4	87	10	34	28	36	4.25	+ 1.53	1.85	0	9	13	12	6	nw.		
Oakland.....	Pottawattamie	1,139	18	58.2	+ 5.9	87	10	33	17	33	3.85	+ 1.30	2.68	0	5	14	3	14	sw.		
Red Oak (near).....	Montgomery	1,030	24								2.95	+ 0.20	2.08	0	5	13	13	5	s.		
Riverton (near).....	Fremont	920	5								2.56	- 0.16	1.15	0	10	10	5	16	s.	George C. Rader H. H. Askew U. S. Weather Bureau	
Thurman.....	Fremont	960	14	59.8	+ 6.5	92	10	31	17	34	1.51	- 1.43	0.58	0	8	13	5	13	s.		
Omaha, Neb.....		1,105	66	59.2	+ 4.9	89	10	36	30	33	2.61	+ 0.44	1.56	0	7	12	12	7	s.		
Means and extremes.....				58.8	+ 5.6	92	10	31	17	36	3.74	+ 1.07	3.78	T.	8	12	10	9	s.		
<i>South Central District</i>																					
Afton.....	Union	1,212	50	58.8	+ 5.5	87	4	35	30	34	5.34	+ 2.76	3.02	0	12	12	12	7	nw.	S. R. Brown J. M. Stevenson Thomas Wood, Jr. C. C. Burr J. C. Davis	
Albia.....	Monroe	949	40	59.0	+ 5.5	85	4†	34	17	31	6.42	+ 4.14	2.10	0	7	9	7	15	sw.		
Centerville.....	Appanoose	1,013	38	59.6	+ 5.6	86	10	36	17	33	5.33	+ 3.12	1.97	0	15	15	6	10	sw.		
Chariton (near).....	Lucas	1,042	37	57.9	+ 5.1	84	4	37	17†	30	4.46	+ 2.14	0.96	T.	9	10	13	8	sw.		
Corydon (near).....	Wayne	1,050	47	58.2	+ 4.4	85	10	37	29	29	5.54	+ 2.95	2.14	0	12	8	5	18	nw.		
Creston.....	Union	1,293	30	57.2	+ 4.7	84	10	35	17†	31	4.17	+ 1.39	2.56	0	11	10	12	9	n.	Mrs. N. Spangler Seth F. Shenton W. J. Casey J. B. Alter F. S. Parks	
Indianola.....	Warren	972	50	58.9	+ 5.7	85	4†	36	29	31	3.72	+ 1.36	1.87	0	12	12	9	10	w.		
Knoxville.....	Marion	920	41	58.8	+ 5.1	85	10	36	17	27	4.43	+ 2.12	1.15	0	12	11	10	10	sw.		
Lacona.....	Warren	824	32								5.50	+ 2.79	2.50	0	13	10	15	6	sw.		
Lamoni.....	Decatur	1,123	27	58.0	+ 4.5	92	10	35	28†	36	3.67	+ 0.74	1.70	0	11	16	7	8	sw.		
Melrose.....	Monroe	871	1								6.35		1.70	0	11	11	12	8	sw.		
Mt. Ayr.....	Ringgold	1,220	39	58.0	+ 4.4	86	10	34	17	32	4.07	+ 1.55	1.70	0	8	20	5	6	s.		
Tingley.....	Ringgold	1,275	7	58.2	+ 5.1	87	10	35	30	32	4.68	+ 1.99	1.60	0	12	17	7	7	se.		
Winterset.....	Madison	1,118	40	58.8	+ 5.2	85	4†	36	17†	29	5.96	+ 3.59	3.90	0	10	14	8	9	nw.		
Means and extremes.....				57.6	+ 4.3	92	10	34	17	36	4.97	+ 2.47	3.90	T.	11	13	9	9	sw.		
<i>Southeast District</i>																					
Bonaparte (near).....	Van Buren	563	44	59.2	+ 5.5	85	4†	37	17	27	4.19	+ 2.31	1.30	0	11	14	7	10	s.	B. R. Vale John W. Donnelly Miss Musa Todd R. M. McKenzie U. S. Weather Bureau	
Burlington.....	Des Moines	544	41	59.6	+ 4.7	86	6	39	18	26	3.24	+ 0.96	0.85	0	11	15	6	10	sw.		
Columbus Junction.....	Louisa	595	40	58.2	+ 3.9	83	10	35	18	27	3.60	+ 1.05	0.76	0	13	11	14	6	nw.		
Fairfield.....	Jefferson	780	51	57.6	+ 4.6	84	10	35	17	28	5.71	+ 2.95	1.71	0	14	14	8	9	sw.		
Keokuk.....	Lee	614	60	60.4	+ 5.0	87	5	40	31	28	4.05	+ 1.79	0.91	0	13	12	8	11	sw.		
Keokuk No. 2.....	Lee	651	2																	J. N. D. Dickinson Dr. J. W. Rinabarger J. H. Jericho R. R. Robinson C. L. Mikes	
Keosauqua.....	Van Buren	639	44	58.8	+ 5.6	77	1	35	17	29	4.82	+ 2.83	1.03	0	13	9	14	8	se.		
Mt. Pleasant.....	Henry	730	55	59.4	+ 5.4	84	10	36	17	27	4.53	+ 2.13	1.40	0	15	11	10	10	se.		
Oskaloosa.....	Mahaska	835	55	58.2	+ 5.4	84	4†	35	17	27	5.83	+ 3.58	1.41	0	16	11	3	17	se.		
Ottumwa.....	Wapello	649	41	59.8	+ 5.2	88	4	35	17†	34	6.10	+ 3.72	1.69	0	14	11	10	10	se.		
Sigourney.....	Keokuk	785	36	57.9	+ 4.9	85	10	34	17	30	4.96	+ 2.71	1.45	0	11	13	10	8	e.	John B. Slate C. L. Beswick D. D. Sherman H. G. Liddle	
Stockport (near).....	Van Buren	747	30	58.8	+ 6.4	85	4†	35	17	29	4.87	+ 2.81	1.25	0	15	13	7	11	s.		
Washington.....	Washington	757	56	58.6	+ 5.3	84	10	37	17†	28	5.39	+ 3.19	1.25	0	12	13	5	13	sw.		
Wever.....	Lee	552	3	58.8		87	3†	32	18	36	4.03		1.05	0	11	13	6	12	s.		
Means and extremes.....				58.9	+ 5.2	88	4	32	18	36	4.72	+ 2.45	1.71	0	13	12	8	11	se.		
State means and extremes.....				56.8	+ 5.0	92	10	28	17†	39	3.01	+ 0.58	4.20	T.	10	13	8	10	nw.		

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations. Reference letters a, b, c, etc., appearing in the table indicate the number of days missing; for example b represents two days, etc. †Also other dates. ‡Precipitation is less than 0.005 inch rain or melted snow. ††Received too late to be included in means and summaries.

number of days with the minimum temperature 32° or below was 1, ranging from 1 day in the northwest, north-central, northeast, central and east-central districts, to zero in the west-central, southwest, south-central and southeast districts. For individual stations the number of days with the minimum temperature 32° or below, ranged from 3 days at Inwood (near) and Le Mars, to none at 66 stations. The greatest daily range in temperature at any one station was 39° at Washta on the 4th.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 120 stations, was 3.01 inches, or 0.58 inch above normal. The greatest district deficiency was in the northeast district, 0.85 inch, and the south-central district had the greatest district excess, 2.47 inches. The greatest precipitation deficiency, at any one station, was 1.65 inches at Allison, and the greatest excess was at Albia, 4.14 inches. The greatest amount at a single station was 6.67

Daily Precipitation for October, 1931

Stations	Drainage Basin	Day of Month																															Totals	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
<i>Northwest District</i>																																		
Akron	Big Sioux						.73			.03		.07	.04									.01	.25					.02	T.	.07	.02		1.24	
Alta	Raccoon	.26	.05			.40	1.18			.08		.30	.42	.03																		.06	2.94	
Alton	Floyd						.73			.11		.10	.04	.01									.01	.02	.04			.13	.03	.07	.01	1.30		
Cherokee	Little Sioux					1.40				.10		.44	.26	.05	T.													.03	.02	.10	T.	2.42		
Estherville	Des Moines	.15	.02			.40						.05	.50	.06														.40	.23	.05	.03	1.89		
Hawarden	Big Sioux		.02			.21				.10		.21	.02										.04	.30				.02	.01	.04	.01	0.99		
Inwood (near)	Big Sioux	.03	.02			.46				.24		.08	.09	T.	T.								.03	.07				.06	.05	.04	1.17			
Lake Park (near)	Little Sioux																																	
Le Mars	Floyd					.55				.02		.16	.06	T.	T.								.08	.14				.22	T.	.09	.02	1.34		
Marathon	Raccoon		.06			.91				T.		.29	.23	T.									T.					T.	.03	T.	.04	1.56		
Pocahontas	Des Moines					.65	.67			.03		.25	.28	.06															.05	.07	T.	2.06		
Rock Rapids	Big Sioux		.03			.21						.12	.10										.05						.18	.06		0.75		
Sanborn	Floyd		.01			.63				.03		.15	.30		.05								T.	.14				.03	.11	.06		0.83		
Sheldon	Floyd					.29				.06		.11	.05	.03	T.								T.	.05	T.			.02	.08	.08	T.	0.78		
Sioux Center	Floyd					.25						T.	T.	.12									T.	.23				.10		T.	T.	0.80		
Spencer	Little Sioux					1.98				.05		.07	.75	.10	.01													.05	.20		.09	.02	3.35	
Storm Lake	Raccoon		.09			.11	1.28			.04		.44	.26	T.	.05													T.		T.	.10	2.43		
Washta	Little Sioux		.02			.50				.02		.30	.33	T.														T.	.04	T.	T.	1.19		
West Bend	Des Moines		.03			.02				.02			.42	.05														.08	T.	.03	.03	.02	0.70	
<i>North Central District</i>																																		
Algona	Des Moines					.02	.82			.03		T.	.43	T.									T.				.05	.05	.21	T.	T.	1.61		
Allison (near)	Cedar					T.	.05			.11			.11	.11													T.	.13	T.	.10	.01	T.	0.62	
Belmond	Iowa					.01	.48			.15	T.		.10										T.				.24	.08	.15	.02	T.	1.23		
Britt	Iowa	.12	.02	.03		1.80		.02		.22			.39	.14	.02													.37	.08	.24	.36		3.81	
Charles City***	Cedar					.04	.69			T.		.09	.03	.01									T.				T.	.10	.06	.05	T.	1.07		
Forest City	Cedar	.56				.20	1.90			.05			.32										T.				.29	.33	.25			3.90		
Hampton	Cedar					1.45				.05			.08	T.													.35	T.	T.			1.93		
Humboldt	Des Moines					.11	.32			T.			.48										T.	T.			.62	.04	.12	T.		1.69		
Mason City	Cedar					T.	1.20			.08	T.		.14	.02	.03								T.	T.			.09	.05	.06	.03	.04	1.78		
Northwood	Cedar	T.	T.	T.		1.61				.20			.46	T.	.04								T.	T.			.22	T.	.12	.22	.04	.02	2.93	
Osage	Cedar	T.				1.94				.04			.08															.12	.03	.09	.03		2.33	
<i>Northeast District</i>																																		
Cedar Falls	Cedar				.25	.10	.45			.14	.09		.14	.10	.01												.52		T.	.26	.05		2.11	
Decorah	Mississippi	.15				1.07				.37			.38	.04													.20	.12	.11	.07		2.64		
Delaware (near)	Maquoketa			.10		.05	.11			.60	.36		.12													.27	.40	.02	T.	.10		2.13		
Dubuque***	Mississippi	T.		.01	.16		.01			1.11	.01	.17	.25	T.	T.											.91	T.	.22	.03	T.	.04	T.	2.92	
Fayette	Mississippi					.08	.25			.20			.20	.01													.09	.27	.10	.06	.18	.16	1.61	
Independence	Wapsipicon			.04	T.	.21	.23			.26	.01		.15														.08	.33	.05		.08	T.	.02	1.46
Lansing	Mississippi	.22				.40				.12			.18	.03													.04	.08	.15	.12	.13		1.43	
New Hampton	Wapsipicon					.05	.60			.07			.15	.02														.09	.04	.18			1.21	
Oelwein	Wapsipicon					.15	.28			.30																		.45					1.18	
Postville (near)	Mississippi					.08	.18			.22			.22	.04													.15	.32	.05	T.	.33		1.59	
Waterloo	Cedar	.10				.13	.30			.22	.30		.20															T.		.12			1.72	
Waverly	Cedar					.01	.40			.15			.12		.04													.35			.02		1.09	
<i>West Central District</i>																																		
Audubon (near)	Nishnabotna					.62	.52		.20	.08	.15	.29		.14	.10													.02			.08	T.	1.96	
Carroll	Raccoon	.20				.33	.45			.07		.27	.60	T.															.02	.01	T.	1.95		
Denison	Missouri					.15	.96			.01	.01	.65	.50	T.															T.	.08	T.	T.	2.36	
Guthrie Center	Raccoon			.03		.28	.50			.10	.15	.05	.25	.03	T.												.10		.12	.02		1.63		
Harlan	Nishnabotna					.04	.25	.63		.57	.07	.19	.76	.01														T.		.06	T.		2.58	
Jefferson	Raccoon					T.	.38	.88		.21		T.	.42	.02														.04		T.	.07	T.	2.02	
Little Sioux	Little Sioux		.06			.21	.08					.69	.26																	T.	.02		1.32	
Logan	Missouri	.02				T.	.35			.02	.02	.70	.62																	.06	.02		1.81	
Onawa	Missouri		.07			.18	.23			T.		.60	.20															.15		.05	T.		1.48	
Rockwell City	Raccoon					.25	.67			T.			.75															T.	.04	.04	.01		1.76	
Sac City	Raccoon					1.08	1.78					.48	.35	T.															T.	.07	T.	T.	3.76	
Sioux City***	Missouri					.67				T.		.13	.05	T.															T.	.14	.01	T.	1.13	
<i>Central District</i>																																		
Ames	Skunk					.70	.42			.07	.31		.04	T.														.43		T.	.14	.02	.05	2.18
Baxter	Skunk			.20		.37	.90			.24			.10	.11														.13			.20	.06		2.31
Boone (near)	Des Moines	.05				.62	.74			.66			.26															.50		T.	.15	.05	T.	3.03
Des Moines**	Des Moines				.06	.74	1.10	.52		.32	.10	.06	.15	.02	T.													.28	.02	T.	.16	.01	T.	3.54
Fort Dodge	Des Moines					.11	.35			.07		.45	.20															.31	.01	.07	.05		1.62	
Grinnell	Iowa			.12		.77	.25			.42	.36		.12	.03														.05	.67		.14	.05		2.98
Grundy Center	Cedar			.10	.30	.42	.62			.10	.62		.15	.03	T.													T.	.40		T.	T.	2.89	
Iowa Falls	Iowa	.20			.05		.45			.50			.11	.09	.05													.16	.04	.17	.06		1.88	
Marshalltown	Iowa	.20		.26		.52	.33			.02	.43	.02	.08	T.	.01													.24	T.	.22	.05		2.38	
Monroe	Des Moines	.11				1.41	.40			.07	.28		.15		T.													.41		.23	.06	.04	3.16	
Newton																																		



Daily Maximum and Minimum Temperature for the Month of October, 1931

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Mean		
<b>Northern Division</b>																																		
Algona.....	(Maximum.....	74	81	76	81	75	81	72	59	69	80	68	59	52	56	64	59	64	71	73	70	73	67	74	69	62	62	65	51	43	41	45	65.7	
	(Minimum.....	50	54	59	55	46	58	50	48	43	56	41	36	44	49	45	42	31	40	47	46	52	49	43	44	36	47	46	38	35	37	38	45.4	
Alta.....	(Maximum.....	69	81	79	82	75	78	65	59	70	83	68	55	52	53	61	59	65	65	71	70	69	62	71	66	64	74	70	47	40	39	43	64.8	
	(Minimum.....	48	55	60	50	48	59	48	41	43	52	39	39	45	49	43	43	35	40	47	48	54	41	43	44	36	48	43	36	33	35	36	44.6	
Alton.....	(Maximum.....	74	81	80	75	75	78	71	58	68	83	63	53	53	54	68	63	63	67	72	71	70	65	71	70	65	79	74	53	41	41	45	65.9	
	(Minimum.....	46	56	64	49	45	60	43	43	44	57	40	39	46	49	44	41	31	41	46	45	55	46	40	39	31	51	43	37	33	35	34	44.5	
Belmond.....	(Maximum.....	75	81	78	82	72	80	72	60	68	78	68	59	52	55	63	59	63	66	72	70	76	66	73	68	64	59	65	49	44	41	47	65.3	
	(Minimum.....	42	53	60	55	46	57	52	45	41	56	40	36	45	46	44	41	30	36	47	43	52	51	44	45	32	47	46	37	34	36	39	44.5	
Charles City*.....	(Maximum.....	74	81	78	79	73	75	68	59	66	72	58	58	53	55	62	59	60	64	70	71	76	68	70	68	63	60	65	47	44	43	46	64.0	
	(Minimum.....	44	52	57	58	48	59	49	41	43	55	44	40	47	49	48	39	33	37	45	45	51	54	54	46	37	46	46	37	36	38	41	45.9	
Decorah.....	(Maximum.....	75	80	80	77	78	76	77	77	68	68	65	65	63	56	59	57	63	58	69	70	75	68	68	68	65	50	63	48	43	44	44	65.1	
	(Minimum.....	43	47	60	62	45	55	53	47	37	54	48	30	45	49	48	42	32	30	44	46	42	62	58	49	40	42	46	38	36	40	40	45.5	
Dubuque*.....	(Maximum.....	74	80	81	80	74	71	72	59	64	70	68	57	53	56	58	60	56	61	69	70	76	70	65	70	62	57	61	54	43	47	48	64.2	
	(Minimum.....	50	55	61	64	58	60	54	48	44	57	46	43	48	50	45	45	37	35	46	54	51	57	61	55	46	47	50	40	39	42	41	49.5	
Forest City.....	(Maximum.....	76	81	75	80	72	78	73	59	67	76	73	57	51	55	66	58	67	60	72	68	73	68	70	69	64	57	64	48	44	42	47	64.8	
	(Minimum.....	43	50	56	52	45	56	51	40	40	52	40	35	42	45	43	47	33	34	43	43	50	52	51	41	33	42	44	35	31	32	36	43.1	
Independence.....	(Maximum.....	72	79	79	78	72	73	71	60	64	72	70	55	55	56	58	57	56	62	67	68	74	70	66	66	62	55	65	53	48	44	47	63.7	
	(Minimum.....	49	55	55	62	53	59	55	47	42	55	49	49	45	47	45	43	36	37	42	47	50	58	58	51	40	41	48	41	36	39	39	47.6	
Inwood (near).....	(Maximum.....	77	80	77	72	76	81	62	58	68	79	57	51	58	53	65	63	62	68	73	70	67	62	67	66	63	78	71	49	40	39	40	61.3	
	(Minimum.....	44	50	60	47	45	58	45	41	43	56	35	39	46	47	43	37	30	41	45	45	55	43	42	36	29	49	41	35	32	34	33	42.8	
Lake Park (near).....	(Maximum.....																																	
	(Minimum.....																																	
Mason City.....	(Maximum.....	75	79	76	78	71	76	70	60	65	74	66	58	51	55	61	58	60	64	67	69	69	69	69	66	61	63	52	49	43	41	45	63.2	
	(Minimum.....	46	50	59	55	42	57	50	42	38	52	43	32	41	47	45	40	30	37	47	42	48	50	45	43	33	45	46	36	34	36	39	43.6	
New Hampton.....	(Maximum.....	74	79	77	78	73	76	69	63	65	70	68	56	53	56	59	59	59	62	70	71	75	67	66	68	64	55	64	50	44	44	45	63.8	
	(Minimum.....	43	52	57	59	48	57	55	46	41	50	45	35	45	46	46	40	35	35	43	44	50	59	55	49	34	45	47	38	35	38	38	45.4	
Northwood.....	(Maximum.....	77	80	77	78	74	77	70	60	66	74	66	58	51	53	62	57	61	64	71	70	75	67	70	66	63	54	61	49	43	41	45	63.9	
	(Minimum.....	50	50	55	57	45	57	50	43	41	52	43	36	44	47	46	41	32	36	44	43	49	55	43	44	35	45	45	36	34	36	39	44.3	
Pocahontas.....	(Maximum.....	73	83	80	82	74	81	70	60	70	82	68	57	55	54	65	52	57	68	75	69	73	66	75	71	65	69	71	50	47	40	45	66.0	
	(Minimum.....	47	56	64	52	45	58	49	43	43	56	41	37	45	50	43	44	38	38	46	45	52	48	43	47	39	45	41	35	34	35	36	44.8	
Postville (near).....	(Maximum.....	72	76	74	77	71	69	68	62	60	64	58	55	51	52	57	55	56	61	68	67	74	67	64	66	60	59	61	48	41	43	44	61.3	
	(Minimum.....	45	48	58	58	47	49	49	45	38	46	39	35	44	46	44	42	35	36	46	48	47	59	58	49	37	41	47	36	35	38	37	44.7	
Rock Rapids.....	(Maximum.....	75	79	76	74	75	79	74	59	77	77	61	53	56	54	65	61	62	65	72	70	68	62	67	64	61	76	73	51	42	40	45	65.1	
	(Minimum.....	56	56	61	53	40	56	46	40	41	55	37	36	46	48	39	37	28	40	44	44	54	45	40	35	28	47	44	35	33	35	35	43.0	
<b>Central Division</b>																																		
Ames.....	(Maximum.....	69	82	82	82	72	78	70	62	69	82	74	57	55	58	63	60	63	65	72	73	75	69	74	72	65	65	70	53	44	43	45	66.5	
	(Minimum.....	48	55	54	58	52	60	53	47	43	56	47	42	46	50	48	44	36	36	44	50	47	59	56	49	36	36	47	37	36	38	40	46.8	
Belle Plaine.....	(Maximum.....	79	85	82	85	76	78	74	62	70	73	71	56	65	62	63	62	61	65	72	76	78	74	68	74	65	58	65	56	44	45	52	67.7	
	(Minimum.....	52	49	57	61	54	60	47	49	44	55	49	43	47	52	41	41	32	37	44	48	51	58	64	51	34	45	45	40	37	37	38	47.3	
Carroll.....	(Maximum.....	66	80	79	82	70	76	73	61	68	83	75	60	55	55	63	59	63	65	71	71	72	66	73	70	65	75	73	53	41	42	45	66.1	
	(Minimum.....	49	56	63	55	50	59	51	43	45	57	42	40	45	41	45	43	35	38	50	51	53	50	48	43	38	47	45	38	34	35	36	46.0	
Cedar Rapids.....	(Maximum.....	79	84	83	85	78	77	73	65	69	82	71	59	57	63	61	65	64	66	72	77	79	75	67	74	68	56	66	57	44	47	54	68.3	
	(Minimum.....	53	57	57	62	57	59	55	50	39	55	50	43	46	51	45	44	32	31	39	49	45	56	60	53	38	42	51	40	36	40	38	47.5	
Davenport*.....	(Maximum.....	77	81	83	82	80	76	72	63	67	81	67	54	57	60	61	62	58	62	68	74	77	75	65	74	64	63	65	59	45	45	50	66.7	

IOWA STORMS, OCTOBER, 1931

Date	County	Township	Nature of storm	Time	Storm moved from	Width of path	Length of path miles	Size of hailstones inches	Persons killed	Persons injured	Damage and remarks
6	Franklin	Oakland	Wind and hail	8:00 p. m.	S to N			1/2			Wind damage to barn \$800. Hail damage light.
6	Madison	Madison, Douglas, Lincoln, Union, Scott, Crawford	Rain and flood	... night							The lowlands along North River, North Branch and Middle River were inundated, damage to corn crop and dirt roads considerable.
6	Monroe	Troy	Wind and hail	10:00 p. m.	W to E			3/4			Corn was blown down and will be hard to pick, some corn will rot. Hail damage light.
6	Fremont	Washington, Madison, Riverton	Rain and flood	9:45 a. m.	SW to NE						Heavy rains inundated the bottom land along the Nishnabotna, damage mostly to corn, and road grades.
6	Crawford	Goodrich, Milford, Stockholm	Rain and flood								Boyer River out of its banks. Boyer and Deliot had considerable sewer damage.
7	Monroe	Jackson	Flood	... a. m.							Flood damage to crops about \$200.
7	Marshall	Green Castle, Jefferson	Wind	12:15 a. m.	NW to SE						Wind damage to crops about \$2,000; to garage and windmill about \$300
7	Taylor	Benton, Bedford, Ross, Clayton	Rain and hail	6:00 p. m.							Hail damaged fruit on trees, leaves, corn fodder, etc.; damage about \$500.
7	Story	Washington	Electrical	... p. m.							Fire resulting from a lightning bolt which destroyed the cattle barn at the Iowa State College with a loss of \$52,505.
7	Jasper	Newton, Palo Alto	Wind	12:30-1:00 a. m.							Wind damage to signs and store windows approximately \$400.
10	Clinton	Bloomfield, Waterford, Deep Creek	Rain and flood	5:00 p. m. to during night	W to E						Heavy rains inundated the bottom land along Deep Creek, railroads had minor washouts in twelve or more places, ten small bridges were washed out, several basements were flooded.
10	Jackson	Van Buren, Union, Maquoketa, South Fork	Rain and flood	... p. m.							Lowlands along Deep Creek were flooded, damage considerable. Sewers badly damaged in Sabula. Considerable water damage in Maquoketa.
10	Shelby	Lincoln, Centre, Shelby, Fairview, Douglas	Rain, hail, wind	4:30-5:00 p. m.	SW to NE	3 Mi	10	1 1/2			Heavy hail struck near and in Harlan, damage between \$20,000 and \$25,000. Window glass in homes and greenhouses broken, and many chickens killed. Some wind damage to trees.
10	Cass	Pleasant, Cass	Wind and rain	... p. m.	SW to NE						Squall wind damaged farm property considerable. Several buildings moved on their foundations and trees mutilated.
10	Pottawattamie	Wright	Wind and rain	... p. m.	SW to NE					1	Squall winds damaged buildings, windmills, numerous trees, considerable. Frank Schofield was badly bruised by flying debris.
10	Marshall	Marshalltown, Linn, Taylor, Le Grand, Marietta, Liscomb	Rain, hail, wind, electrical	7:00-8:00 p. m.	SW to NE						Squall wind struck northwest of Marshalltown doing considerable damage to roofs on farm buildings, windows broken, windmills and trees damaged. About 80 chickens killed. Electric power lines crippled. Hail damage light. Telephone service interrupted in a few localities.
11	Fremont	Riverton	Wind	5:50-10:30 p. m.	SW to NE						Wind damaged trees, roofs on buildings, considerable.

ERRATA

Report for August, 1931. Page 60, New Hampton; minimum temperature for the month published 49°, should be 44°.

Report for September, 1931. Page 68, Britt; monthly mean temperature and departure from normal published 68.7° and +6.3°, should be 68.6° and +6.2°. Page 69, Olin; monthly mean temperature and departure from normal published 70.4° and +6.7°, should be 70.2° and +6.5°.

Report for September, 1931. Page 68, Allison; minimum temperature and date published 41° on 27th, should be 40° on the 24th. Waukee; maximum temperature and date published 96° on 7th, should be 97° on 16th. Page 69, Columbus Junction; maximum temperature and date published 92° on 13th, should be 93° on 20th.

MISCELLANEOUS PHENOMENA

Aurora: 5th.

Corona, lunar: 2d, 3d, 21st, 27th.

Dew, heavy: 1st, 2d, 8th, 9th, 10th, 16th, 18th, 24th, 25th.

Dust storm: 27th, 28th.

Fog, light: 1st, 2d, 4th, 8th, 9th, 12th, 13th, 14th, 15th, 17th, 21st, 23d.

Fog, dense: 1st, 2d, 4th, 12th, 13th, 14th, 15th, 17th, 21st, 23d.

Frost, light: 9th, 11th, 12th, 16th, 17th, 18th, 23d, 25th, 28th, 29th.

Frost, heavy: 12th, 16th, 17th, 18th, 23d, 25th.

Frost, killing: 17th, 25th.

Gales: 3d, 6th, 7th, 10th, 11th, 17th, 21st, 26th, 27th, 28th, 29th, 31st.

Hail, light: 5th, 6th, 9th, 10th, 11th, 27th, 31st.

Hail, moderate: 10th.

Hail, heavy: 10th.

Halo, lunar: 21st, 26th.

Halo, solar: 19th, 26th, 28th.

Haze: 13th, 19th, 20th, 27th.

High water damage: 6th, 7th, 10th.

Meteor: 24th.

Rainbow: 10th.

Sleet: 30th, 31st.

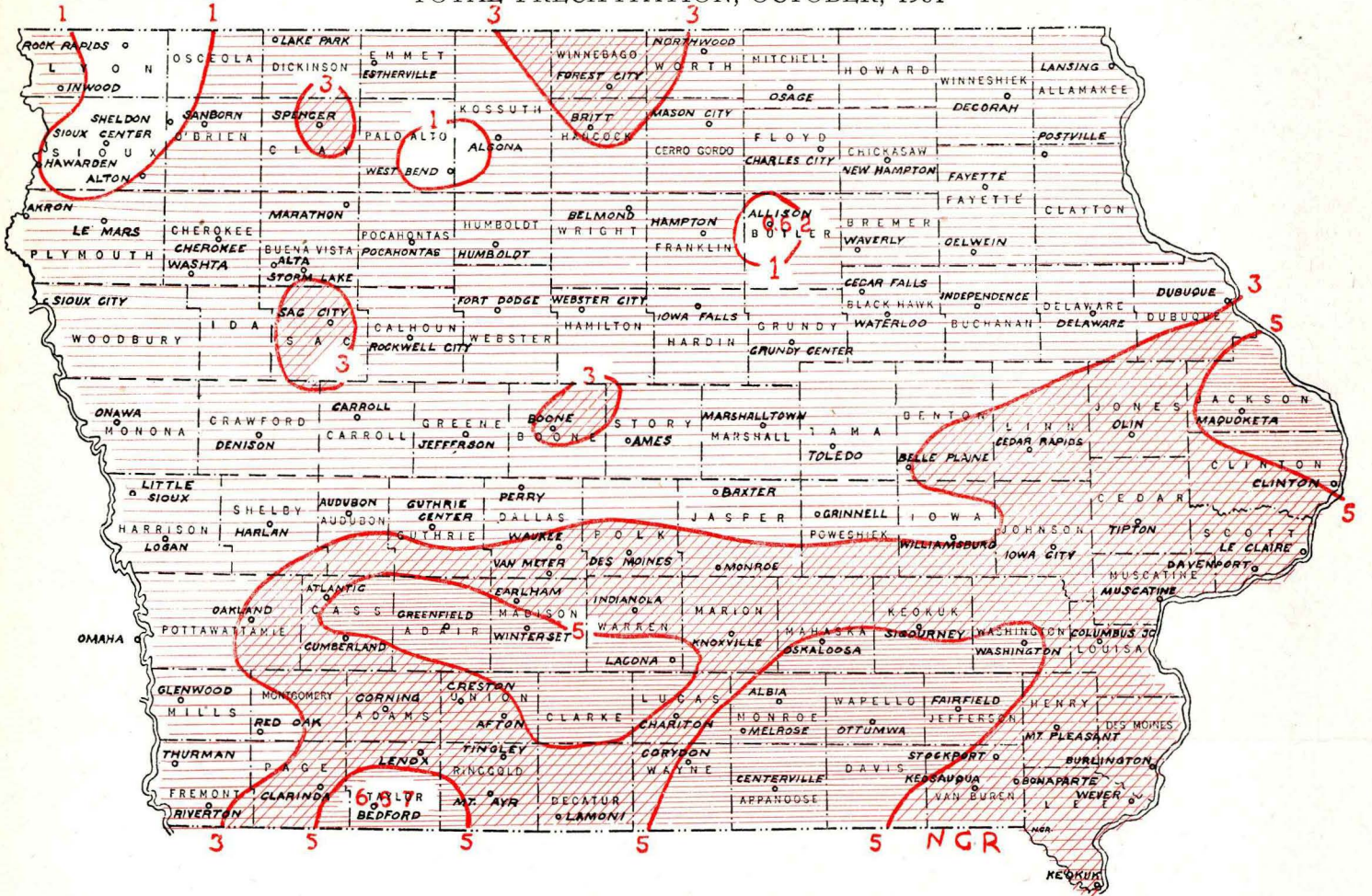
Snow: 29th, 30th.

Squall winds: 10th.

Thunderstorms: 3d, 4th, 5th, 6th, 7th, 10th, 12th, 13th, 14th, 21st, 26th, 27th.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, OCTOBER, 1931



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA.

## IOWA SECTION

11

In co-operation with  
IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, NOVEMBER, 1931 No. 11

## 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
1873.....	36.2	+ 0.4	64	- 4	0.72	- 0.83	2.78	0.00					
1874.....	32.9	- 3.7	74	- 6	2.21	+ 0.66	4.79	1.05					
1875.....	30.1	- 6.5	60	-16	0.19	- 1.36	0.63	0.00					
1876.....	31.3	- 5.3	68	- 6	1.70	+ 0.15	3.50	0.16					
1877.....	33.3	- 3.3	82	-10	1.86	+ 0.31	3.84	0.12					
1878.....	39.7	+ 3.1	72	-12	0.63	+ 0.92	2.69	0.00					
1879.....	36.3	- 0.3	75	- 4	4.08	+ 2.53	7.90	0.20					
1880.....	25.3	-11.3	68	-12	1.29	- 0.26	3.30	0.05					
1881.....	34.4	- 2.2	65	- 1	2.01	+ 0.46	3.97	0.60					
1882.....	37.5	+ 0.9	76	- 4	1.71	+ 0.16	7.15	0.30					
1883.....	36.8	+ 0.2	70	- 3	1.44	+ 0.11	4.17	0.00					
1884.....	35.6	- 1.0	68	-15	0.79	- 0.76	1.90	0.00					
1885.....	36.4	- 0.2	67	-14	0.69	- 0.86	2.60	0.10					
1886.....	32.1	- 4.5	75	- 4	1.49	- 0.06	5.18	0.30					
1887.....	35.1	- 1.5	78	-25	0.85	+ 0.70	4.10	0.10					
1888.....	37.1	+ 0.5	82	- 0	1.56	+ 0.01	6.00	0.00					
1889.....	33.0	- 3.6	68	- 9	1.44	+ 0.11	4.90	0.05					
1890.....	38.9	+ 2.3	78	- 2	1.31	+ 0.21	3.55	0.50					
1891.....	30.5	- 6.1	84	-24	1.70	+ 0.15	3.64	0.66		7	10	8	12
1892.....	33.3	- 3.3	70	- 3	1.10	+ 0.45	3.16	0.05	1.8	4	11	8	11
1893.....	34.0	- 2.6	86	-13	1.17	+ 0.38	2.56	0.05	4.6	4	16	8	6
1894.....	32.7	- 3.9	72	- 5	0.92	+ 0.63	2.42	T.	0.4	4	9	11	10
1895.....	31.3	- 2.3	86	-12	1.51	+ 0.04	3.01	0.45	4.9	6	9	8	13
1896.....	29.6	- 7.0	82	-15	1.83	+ 0.28	4.51	0.16	2.9	6	9	8	13
1897.....	31.3	- 2.3	81	-19	0.66	- 0.89	2.24	T.	1.2	5	12	8	10
1898.....	32.2	- 4.4	78	-17	1.50	+ 0.05	3.61	0.35	8.7	6	14	8	8
1899.....	43.9	+ 7.3	86	- 8	1.20	+ 0.35	2.97	0.13	0.5	5	12	8	10
1900.....	33.5	- 3.1	79	- 6	1.06	+ 0.19	3.35	T.	3.7	6	12	7	11
1901.....	35.8	- 0.8	77	- 2	0.86	+ 0.69	2.30	0.20	2.6	3	18	6	6
1902.....	41.2	+ 4.6	79	- 4	2.13	+ 0.58	4.19	0.16	1.8	7	9	7	14
1903.....	34.2	- 2.1	76	- 5	0.52	+ 1.03	1.74	T.	1.1	3	13	8	9
1904.....	41.0	+ 4.4	80	- 4	0.15	+ 1.40	0.59	0.00	0.5	1	20	6	4
1905.....	38.4	+ 1.8	70	-12	2.84	+ 1.29	5.30	0.90	0.6	5	16	7	7
1906.....	35.4	- 1.2	76	- 5	2.03	+ 0.48	3.86	0.35	4.4	8	9	7	14
1907.....	36.7	- 0.1	68	- 4	1.03	+ 0.52	2.27	0.05	0.9	4	17	6	7
1908.....	39.3	+ 2.7	80	- 5	1.56	+ 0.01	3.31	0.21	1.4	5	14	7	9
1909.....	42.4	+ 5.8	84	- 3	5.39	+ 3.84	11.48	2.07	6.8	10	10	7	13
1910.....	33.4	- 3.2	76	- 5	0.34	+ 1.21	1.03	T.	0.7	3	13	9	8
1911.....	29.9	- 6.7	79	- 8	1.42	+ 0.13	4.99	0.11	1.6	6	11	8	11
1912.....	40.1	+ 3.5	77	- 6	0.98	+ 0.57	2.38	0.00	T.	2	18	8	4
1913.....	44.1	+ 7.5	78	-10	1.18	+ 0.37	3.49	0.20	0.4	6	11	7	12
1914.....	41.0	+ 4.4	80	- 4	0.22	+ 1.33	0.95	0.00	T.	2	19	6	5
1915.....	40.2	+ 3.6	83	- 5	1.94	+ 0.39	4.86	0.30	1.2	6	11	10	9
1916.....	37.3	- 0.7	80	- 8	1.61	+ 0.06	3.65	0.05	3.6	5	16	6	8
1917.....	40.7	+ 4.1	77	- 3	0.28	+ 1.27	1.02	T.	1.4	3	14	6	10
1918.....	39.9	+ 3.3	76	- 0	2.11	+ 0.56	5.10	0.70	4.4	7	13	5	12
1919.....	33.6	- 3.0	68	-12	3.40	+ 1.85	6.22	1.97	6.3	8	11	7	12
1920.....	35.4	- 1.2	71	- 5	2.03	+ 0.48	4.45	0.73	1.2	8	10	5	15
1921.....	33.6	- 3.0	70	- 5	0.58	+ 0.97	1.61	T.	3.4	5	10	5	15
1922.....	42.2	+ 5.6	74	-11	3.54	+ 1.99	5.28	1.96	0.3	9	11	6	13
1923.....	40.1	+ 3.5	72	- 9	0.58	+ 0.97	1.84	0.00	1.2	3	16	6	8
1924.....	38.9	+ 2.3	82	- 0	0.58	+ 0.97	1.55	T.	0.4	4	15	7	8
1925.....	36.1	- 0.5	68	- 6	0.71	+ 0.84	2.30	0.10	4.0	4	15	6	9
1926.....	32.6	- 4.0	71	- 3	2.10	+ 0.55	3.88	0.68	4.2	7	8	7	15
1927.....	37.7	+ 1.1	81	- 0	0.87	+ 0.68	3.61	T.	0.6	5	7	6	17
1928.....	38.7	+ 2.1	70	- 8	3.83	+ 2.28	6.83	0.77	6.9	9	13	4	13
1929.....	32.3	- 4.3	66	-12	1.24	+ 0.31	2.58	0.08	2.7	6	13	8	9
1930.....	41.3	+ 4.7	79	-16	2.12	+ 0.57	4.57	0.79	1.1	5	17	6	7
1931.....	43.9	+ 7.3	81	- 1	5.76	+ 4.21	9.00	2.86	1.6	12	10	5	15
Normals.....	36.6	.....	75	- 4	1.55	.....	3.65	0.31	2.3	5	13	7	10
Highest.....	44.1	.....	86	-14	5.76	.....	11.48	2.86	8.7	12	20	11	17
Lowest.....	25.3	.....	60	-25	0.15	.....	0.50	0.00	T.	1	7	4	4

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

## TEMPERATURE

The mean temperature for the State, derived from the means of 9 districts of nearly equal area, and based on the records of 107 stations, was 43.9°, or 7.3° above normal. There was an excess at all of the stations of the State. The greatest district excess, 9.0°, was in the east-central and southeast districts, and the least district excess, 5.5°, was in the northwest district. The highest monthly mean was 51.0° at Keokuk and the lowest, 36.9°, at Inwood (near). The absolute range in temperature for the State was 80°, ranging from 81° at Algona, Belmond, Humboldt, Webster City and Thurman on the 8th, to 1° at Rock Rapids and Sheldon on the 29th. The average number of days with the maximum temperature 32° or below was 3, ranging from 5 days in the northwest district to 1

## GENERAL SUMMARY

Remarkably heavy rainfall over considerable areas, and very mild temperatures were the November abnormalities. The mean temperature for the State was 43.9°, 7.3° above normal, has been exceeded only by November, 1913, 44.1°, and equaled by November, 1899. The first half of the month was very mild but the latter half was moderately cool. The mean temperature was the highest of record at several scattered stations. Also the maximum temperature on the 8th was the highest temperature of record so late in the season for several stations.

State-wide precipitation averaged 5.76 inches, or 4.21 inches above normal, and is the greatest of record. The previous record was 5.39 inches in 1909. The north-central, west-central, central, southwest and south-central districts received the greatest total rainfall. It all fell during the period 9th to 29th. The average number of days with 0.01 inch or more of precipitation was 12, surpassing the old record of 10 days in 1909. The heavy downpours of rain on the 22d and 23d caused many arroyos, creeks and rivers to run bankfull and in some localities floods occurred. Flood damage was reported in Monroe, Audubon, Mahaska, Wapello, Fremont, Mills and Pottawattamie Counties. There was considerable damage to crops, mostly corn remaining unhusked, by inundating farm land and damage to fences and wooden bridges.

Snow fell on the 21st and 24-30th inclusive and averaged 70% of the normal. The western half of the State received nearly all of the snow. The northwest district had the longest period of snow cover.

Killing frosts occurred during the first week of the month at most of the stations in the southern half of the State and a few scattered stations in the northern half. This is unusually late for the first killing frost in the fall. At several scattered stations it was the latest of record.

Due to the abundance of rainfall, the water supply in wells and subsoil has apparently returned to the normal level for the first time in nearly two years. Corn husking was delayed by wet fields and considerable corn rotted, molded or started to germinate as a result of the warmth and moisture. Ears that blew off or dropped to the ground were a total loss. The reduction in yield per acre was considerable in the southern counties where considerable husking remained to be done at the close of the month.

JAN 1932





Climatological Data for November, 1931—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), Number of Days (Precipitation, Clear, Partly cloudy, Cloudy, Prevailing direction of wind), OBSERVERS.

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.

day in the southeast and southwest districts. The average number of days with the minimum temperature 32° or below was 13, ranging from 19 days in the northwest district to 9 days in the southeast district. For individual stations the number of days with the maximum temperature 32° or below ranged from 8 days at Inwood (near) and Lake Park (near) to none at Clarinda, Corning and Keokuk No. 2.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 123 stations, was 5.76 inches, or 4.21 inches above normal. The greatest district excess was in the south-central district, 4.98 inches, and the northwest district had the least district excess, 2.58 inches.



Daily Precipitation for November, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
		Content of the table body is summarized here for brevity, following the pattern of the input																															

Except as otherwise indicated, observations are generally made late in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
 || Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
 \*\*\*Regular Weather Bureau Station; precipitation is for 24-hour period midnight to midnight.  
 \*\*Incomplete.  
 \*Precipitation included in next following measurement.  
 T. Precipitation is less than 0.005 inch rain or melted snow.  
 i Interplated.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind				Sunshine				
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum		% possible	Departure from normal			
					7 A. M.	12 Noon	7 P. M.	Lowest			Miles	From			Date		
															From	To	
Chas. City	30.05	30.61	26	29.24	20	87	69	80	35	4	4,734	6.6	27	sw.			20
Davenport	30.07	30.60	26	29.40	20	83	68	69	32	17	7,473	10.4	37	sw.	20	39	-11
Des Moines	30.04	30.55	26	29.28	20	88	67	74	34	4	6,115	8.5	33	nw.	9	37	-17
Dubuque	30.05	30.64	26	29.38	20	85	67	72	34	3	3,935	5.5	22	nw.	17	31	-14
Keokuk	30.10	30.60	26	29.40	20	81	62	67	30	5	5,015	7.0	27	s.	20	44	-7
Sioux City	30.02	30.51	5	29.23	20	84	66	73	22	8	6,920	9.6	34	s.	16	42	-10
Omaha, Nb	30.04	30.47	5	29.26	20	79	62	70	21	3	4,303	6.0	23	n.	3	47	-9
Means and extremes	30.05	30.64	26	29.23	20	84	66	72	21	3	7.7		37	sw.	20		-11
Normals and records	30.07		2d	28th	81		72		6th						10th	51	
		*30.96	1896	29.03	1918				16	1916				51	sw.	1919	

\*Sioux City, §Davenport, ¶Omaha, ||Keokuk, also 51 nw. at Sioux City, November 25, 1930, †Local mean time, ‡And other dates  
 §§January 1, 1928, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

The greatest amount at a single station was 9.00 inches at Guthrie Center, and the least was 2.86 inches at Inwood (near). The greatest amount occurring in 24 consecutive hours was 4.35 at Guthrie Center on the 23d.

The average number of days with 0.01 inch or more of precipitation for the State was 12, ranging from 13 days in the northwest

district to 10 days in the northeast district. For individual stations, the range was from 7 days at Keosauqua to 16 days at Hawarden.

SNOWFALL

The average snowfall for the State was 1.6 inches, or 0.7 inch below normal. There were 103 stations that received measurable amounts of snowfall, 15 received only a trace, and 5 received none. The greatest total snowfall at any one station for November was 4.7 inches at Little Sioux and Omaha. The greatest snowfall in 24 consecutive hours was 4.0 inches at Onawa and Logan on the 26th, and also at Guthrie Center on the 27th. The greatest number of days with 0.1 inch or more of snow on the ground was 10 at Inwood (near). The greatest depth of snow on the ground at any time was 4.2 inches at Audubon on the 27th.

RIVERS

Moderate to flood stages were recorded on the interior streams, with considerable fluctuations in some localities. At Des Moines, the extreme stages were 0.9 foot and 10.7 feet, and averaged 3.5 feet or 0.7 foot above normal. At Ottumwa, the extreme Des Moines River stages were 1.7 feet and 12.2 feet. At Wapello, the extreme Iowa River stages were -0.9 foot and 8.3 feet. At Van Meter, the extreme Raccoon River stages were 2.3 feet and 14.2 feet. At Cedar Rapids, the extreme Cedar River stages were 2.9 feet and 8.1 feet.

The Missouri River averaged below normal with little fluctuation. At Sioux City, the extreme stages were 1.5 feet and 4.1 feet and averaged 3.4 feet or 1.7 feet below normal. At Omaha, the extreme stages were 4.4 feet and 7.4 feet and averaged 6.0 feet or 0.4 foot below normal.

The Mississippi River had no decided change in the stages during the first half of the month, but had a continuous rise during

Daily Maximum and Minimum Temperature for the month of November, 1931

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

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight.

IOWA STORMS, NOVEMBER, 1931

Date	County	Township	Nature of storm	Time	Storm moved from	Width of path	Length of path miles	Size of hailstones inches	Persons killed	Persons injured	Damage and remarks
11	Dubuque	Julien	Electrical	7:00 a. m.							Lightning blew out fuses on transformers, numerous radios put out of commission; damage considerable.
20-21	Grundy	Melrose	Wind and hail	9:00 p. m. to 5:00 a. m.	SW to NE			1			Wind damaged small buildings, telephone equipment and trees considerably.
20	Floyd	St. Charles	Wind	p. m.							Wind broke an anchored airplane loose and demolished the ship, damage about \$5,000.
20	Chickasaw	Bradford	Wind	p. m.							Wind damage about \$6,000 to buildings, trees, windmills, and telephone lines.
20	Bremer	Polk	Wind	p. m.							Wind damage of about \$8,000 to buildings, car tops, glass windows, power lines.
23	Monroe	Jackson	Flood	7:00 p. m.							Flood damage to crops about \$200.
23-25	Audubon	Viola, Leroy, Hamlin, Exira, Oakfield, Audubon	Flood								Excessive rain caused floods which washed out 16 wooden bridges and damaged many more; damage, \$6,088.37.
23-25	Mahaska	Scott, Jefferson, West Des Moines, East Des Moines	Flood								Bottom land along the Des Moines River inundated by flood waters; considerable damage to crops, fences and bridges.
23-25	Wapello	Columbia, Cass, Center, Keokuk, Agency, Ottumwa	Flood								Bottom land along the Des Moines River inundated by flood waters, considerable damage to crops, fences and bridges.
23-25	Fremont	Washington, Madison, Riverton, Walnut, Fisher, Riverside, Prairie	Flood								Bottom land along the Nishnabotna River inundated by flood waters; considerable damage to crops, fences and bridges.
-25	Mills	White Cloud, Indian Creek, Anderson	Flood								Low land along Nishnabotna River inundated by flood waters, some damage to crops, fences and bridges.
23-25	Pottawattamie	Macedonia, Carson, Belknap, James	Flood								Lowlands along Nishnabotna River inundated at local areas by flood waters; some damage to crops, fences and bridges.

the latter half. At Dubuque and Davenport the extreme stages were from a little over one foot to seven feet. At Keokuk a crest stage of 10.5 feet was recorded on the 29th.

MISCELLANEOUS PHENOMENA

- Auroras: 5th.
- Cold Wave: 25th, 29th.
- Corona, lunar: 18th, 25th, 30th.
- Clouds, mammato cumulus: 14th.
- Dew, heavy: 3d, 8th, 15th.
- Flood: 23d, 24th, 25th.
- Fog, light: 1st, 3d, 6th, 11th, 12th, 13th, 14th, 15th, 16th, 18th, 19th, 20th, 22d, 23d, 27th.
- Fog, dense: 6th, 11th, 13th, 14th, 15th, 16th, 18th, 19th, 20th, 22d, 23d, 27th.
- Frost, light: 1st, 2d, 3d, 4th, 5th, 6th, 13th, 18th, 26th.
- Frost, heavy: 1st, 2d, 3d, 4th, 5th, 6th, 13th, 18th, 26th.
- Frost, killing: 1st, 2d, 3d, 4th, 5th, 6th, 13th, 18th, 26th.
- Gales: 3d, 9th, 16th, 17th, 18th, 19th, 20th, 21st, 24th.
- Glaze: 23d.
- Hail, moderate to heavy: 20th, 21st.
- Halo, lunar: 1st, 18th, 21st, 25th, 26th, 29th.
- Halo, solar: 1st, 6th.
- Haze: 27th, 28th.
- Meteor, Leonids: 21st, 22d, 23d, 24th.
- Rainbow: 20th, 21st.
- Sleet: 21st, 22d, 23d.
- Snow: 21st, 24th, 25th, 26th, 27th, 30th.
- Thunderstorms: 10th, 11th, 12th, 14th, 15th, 16th, 17th, 20th, 22d, 23d.

ERRATA

Report for September, 1931. Page 69, Mount Ayr: monthly maximum temperature published 98° on 9th, should be 96° on 6th.

THE FALL OF 1931

The mean temperature for the three fall months, for the State, was 57.2° which is 6.3° above the normal; 4.4° above the mean of 1930; and the warmest of record. The previous high record was 55.1° in 1922. All three fall months were above normal; September, 6.7°, October, 5.0° and November 7.3°. The coldest fall of record was 1880 with a mean of 44.7°. The highest temperature during the fall of 1931 was 105° at Washta on September 7th, and the lowest was 1° at Rock Rapids and Sheldon on November 29th.

The average monthly precipitation for the State was 5.15 inches, and the average total was 15.46 inches, or 7.81 inches above normal. September precipitation averaged 6.69 inches, which was 3.02 inches above normal; October was 3.01 inches, or 0.58 inch above normal; and November was 5.76 inches, or 4.21 inches above normal. Out of 59 falls for which State-wide average precipitation is available, only 1 has had more. The fall having the least amount of average total precipitation was 1888 with 3.79 inches, and 1881 had the greatest, 15.57 inches.

The average total snowfall for the fall was 1.6 inches which is 5.8 inches below normal, and 0.1 inch more than the fall of 1930. There was no snow recorded during the month of September; October averaged only a "trace"; and November 1.6 inches. The western half of the State received nearly all of the snow.

The excess fall precipitation checked the drouth, which prevailed in Iowa most of the last two years; and the arroyos, creeks and rivers are having a normal flow. The water supply in wells and subsoil is rapidly being restored.

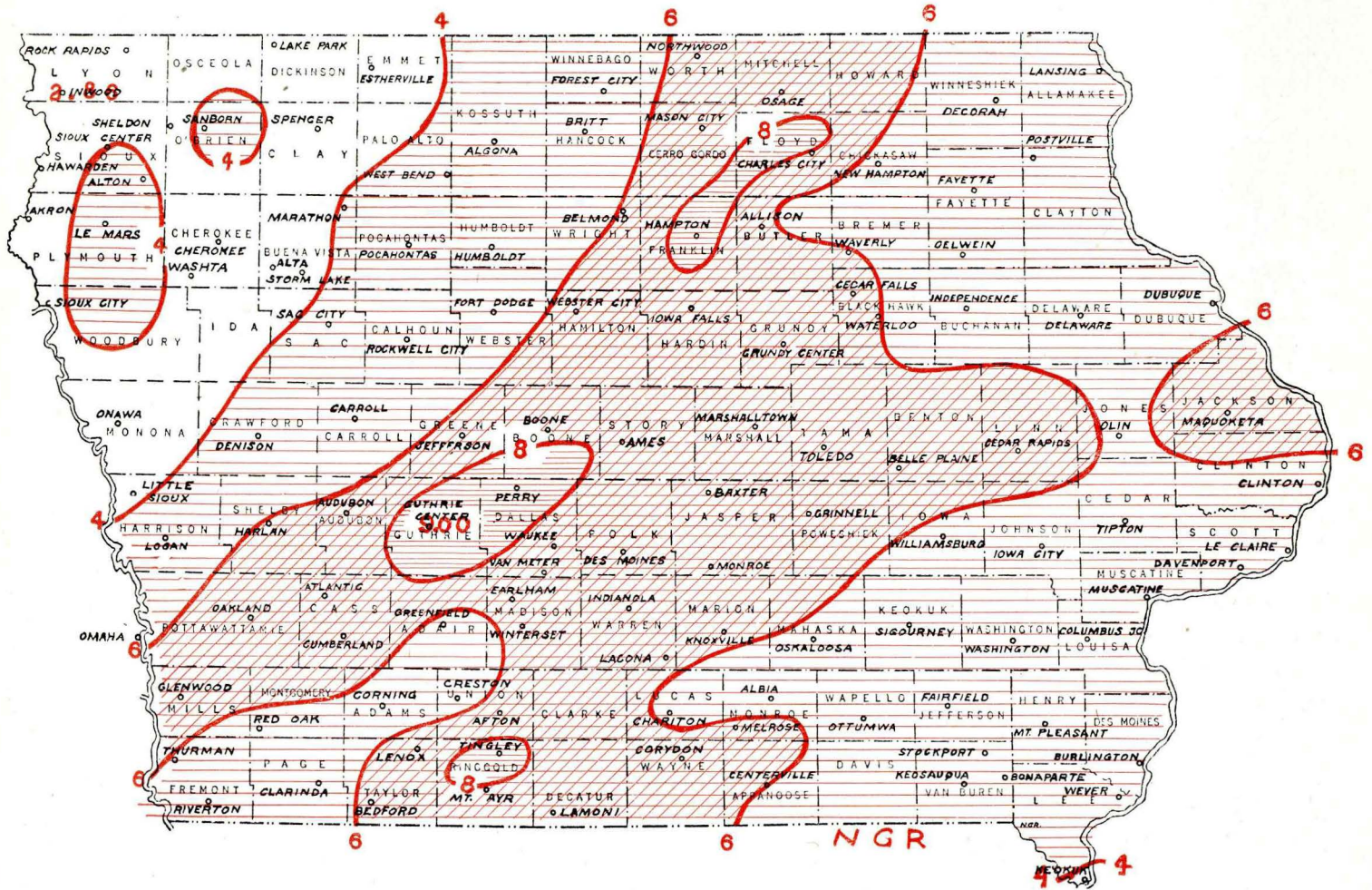
The average total number of days with 0.01 inch or more of precipitation was 34, or 17 days more than for the same season of last year, and establishes a new record, the previous record being 28 days in 1926. The falls having the least number of days with 0.01 inch or more of precipitation were in 1892 and 1893, each with 12 days.

The average number of clear days was 38, partly cloudy 21 and cloudy 32, as compared with 50 clear days, 20 partly cloudy and 21 cloudy days during the fall of 1930.

N. G. R.

CLIMATOLOGICAL DATA: IOWA SECTION

TOTAL PRECIPITATION, NOVEMBER, 1931



SCALE OF SHADES IN INCHES







Climatological Data for December, 1931

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit						Precipitation, in inches				Number of Days				Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy
<i>Northwest District</i>																				
Akron.....	Plymouth	1,153	4							1.14	+ 0.49	0.69	1.7	4	14	3	14	s.	Orlan C. Moore D. E. Hadden W. S. Slagle J. E. Wirth A. O. Peterson  Earl V. Slife A. C. Hanson P. M. Lawrence Henry Newell E. G. Smith  F. E. Hronek Nellie F. Medberry J. W. Dow Ross E. Forward Joe te Veltrup  E. W. Little Russel M. Edwards H. L. Felter Jos. Dorweiler  Leon M. Merritt George H. Bell H. F. Luick E. P. Healy U. S. Weather Bureau  Dr. M. B. Neil Howard J. Haydon H. C. Snitkey American Beet Sugar Co. Charles Dwelle  Dr. C. E. Juhl  E. J. Cable M. D. Whitney E. J. Paris U. S. Weather Bureau W. C. Van Ness  Dr. Geo. Boody Mrs. Mary Spinner D. W. Dawson John T. Ridler F. L. Williams  R. B. Slippy D. H. Murphy  George Kibby Mrs. J. J. Wolfe J. McMinimee Kenneth Hoyt Elmer Buss  W. I. Lyon H. W. Kerr Amy Ann Stern Mrs. H. E. Colby A. W. McIsaac  F. P. Kessler U. S. Weather Bureau  Chas. N. Brown Geo. R. Geise Carl Fritz Henning U. S. Weather Bureau Mrs. Emma Sampson  R. E. Bates M. G. Heiberger C. H. Gilbert C. C. Pigman J. A. Dibel  E. D. Finch Eugene N. Hastie H. P. Giger Calvin K. Smith O. D. Ellsworth Frank A. Bonebright	
Alta.....	Buena Vista	1,513	41	30.6	+ 9.2	50	18	8	7	27	3.21	+ 2.30	1.25	7.0	10	12	3	16		s.
Alton.....	Sioux	1,305	26	30.9	+10.1	50	19†	7	14	28	1.06	+ 0.26	0.73	1.7	6	12	3	16		sw.
Cherokee.....	Cherokee	1,196	11	30.9	+10.4	50	18†	6	14	24	2.17	+ 1.35	1.39	1.2	10	14	3	14		s.
Estherville.....	Emmet	1,298	37	31.2	+10.9	53	18	5	7	30	1.80	+ 1.09	1.10	3.5	5	14	1	16		s.
Hawarden.....	Sioux	1,181	5							1.32	+ 0.64	0.91	T.	4	14	2	15	s.		
Inwood (near).....	Lyon	1,474	28	28.3	+ 8.9	58	26	4	7	30	1.22	+ 0.56	1.03	1.1	4	11	6	11		nw.
Lake Park (near).....	Dickinson	1,489	19	29.0	+ 9.5	50	18	3	7	23	1.01	+ 0.38	0.75	3.1	4	13	1	17		sw.
Le Mars.....	Plymouth	1,224	40	31.2	+ 8.8	50	26	5	14	27	1.67	+ 0.80	0.61	2.3	8	14	3	14		sw.
Marathon.....	Buena Vista	1,390	5							3.00		1.45	5.4	12	10	0	21	se.		
Pocahontas.....	Pocahontas	1,248	27	32.0	+10.3	53	18	9	7	31	2.68	+ 1.76	1.15	6.2	10	12	3	16		se.
Rock Rapids.....	Lyon	1,349	34	28.6	+ 8.9	48	26	4	7	26	1.83	+ 1.20	1.57	1.7	4	15	4	12		s.
Sanborn.....	O'Brien	1,553	18	29.5	+10.1	57	18	4	7	29	2.24	+ 1.39	1.26	1.5	6	12	2	17		sw.
Sheldon.....	O'Brien	1,418	25	29.4	+ 9.0	50	26	4	14	27	2.19	+ 1.37	1.66	1.3	9	12	2	17		sw.
Sioux Center.....	Sioux	1,461	32	29.0	+ 8.2	48	18†	5	7†	29	1.35	+ 0.47	1.25	1.0	2	14	2	15		sw.
Spencer.....	Clay	1,319	23	30.5	+ 9.8	50	26	5	14	25	2.38	+ 1.53	1.25	1.3	10	12	3	16		sw.
Storm Lake.....	Buena Vista	1,442	41	31.2	+ 8.7	52	18	8	7	25	2.46	+ 1.64	1.45	4.0	7	11	4	16		se.
Washita.....	Cherokee	1,157	34	31.8	+ 9.7	55	18	4	14	30	1.67	+ 0.84	0.60	T.	6	12	2	17		s.
West Bend.....	Palo Alto	1,197	44	32.2	+11.1	55	18	7	7	29	2.92	+ 1.76	1.19	4.5	7	13	3	15		sw.
Means and extremes.....				30.4	+ 9.6	58	26	3	7	31	1.96	+ 1.15	1.66	2.6	7	13	2	16		sw.
<i>North Central District</i>																				
Algona.....	Kossuth	1,207	70	31.6	+10.1	50	18	7	7	25	2.49	+ 1.54	1.00	7.5	9	12	8	11	se.	
Allison (near).....	Butler	1,000	17	32.6	+11.2	49	18	10	7	21	1.54	+ 0.60	0.60	5.4	4	11	2	18	s.	
Belmond††.....	Wright	1,181	22	31.8	+10.9	50	18	7	14	25	1.93	+0.60	0.80	5.5	7	10	3	18	se.	
Britt.....	Hancock	1,236	46	31.6	+11.1	49	20	6	7	27	1.75	+ 0.95	0.69	2.2	5	11	2	18	se.	
Charles City.....	Floyd	1,015	56	32.0	+11.6	48	18	9	7	22	2.22	+ 0.92	0.74	4.4	12	10	3	18	se.	
Forest City.....	Winnebago	1,226	41	30.4	+ 9.1	50	18	4	7	28	1.98	+ 1.10	0.67	7.8	7	10	1	20	se.	
Hampton.....	Franklin	1,142	40	32.4		51	18	10	7	21	2.42	+ 1.17	1.00	3.0	6	19	0	12	nw.	
Humboldt.....	Humboldt	1,095	47	32.1	+ 9.5	50	18†	8	7	29	1.84	+ 0.98	0.89	3.0	4	11	2	18	sw.	
Mason City.....	Cerro Gordo	1,148	39	31.1	+10.2	46	18†	6	7	23	1.97	+ 1.09	0.54	7.7	11	11	3	17	nw.	
Northwood.....	Worth	1,222	35	30.5	+10.8	51	18	5	7	25	2.65	+ 1.42	0.92	9.0	9	12	3	16	se.	
Osage.....	Mitchell	1,163	46	30.6	+10.6	48	18	5	7	22	1.76	+ 0.54	0.67	7.0	9	11	2	18	sw.	
Means and extremes.....				31.5	+10.6	51	18	4	7	29	2.06	+ 1.00	1.00	5.7	8	12	3	16	se.	
<i>Northeast District</i>																				
Cedar Falls.....	Black Hawk	875	12							2.62		0.95	2.0	9	11	4	16	nw.		
Decorah.....	Winneshiek	872	48	31.9	+ 9.7	48	23	14	8†	23	2.10	+ 0.82	0.80	4.2	9	11	4	16	nw.	
Delaware (near).....	Delaware	1,083	52	32.8		50	18	10	7	24	1.26		0.45	4.1	6	11	5	15	se.	
Dubuque.....	Dubuque	700	80	35.2	+10.5	54	18	15	7	25	1.51	+ 0.07	0.62	5.7	11	7	4	20	se.	
Fayette.....	Fayette	1,003	43	32.9	+11.5	49	18	10	7	25	1.06	+ 0.35	0.45	4.4	7	11	1	19	se.	
Independence.....	Buchanan	956	71	33.3	+ 9.7	49	18	11	7	23	1.77	+ 0.46	0.61	5.2	10	11	2	18	se.	
Lansing.....	Allamakee	632	28																	
New Hampton††.....	Chickasaw	1,169	34	32.0	+11.2	47	18	8	7	26	1.83	+ 0.74	0.70	2.8	6	10	3	18	e.	
Oelwein.....	Fayette	1,036	8	33.3	+10.3	49	18	11	7	24	1.90	+ 0.62	1.15	4.0	4	11	2	18	s.	
Postville (near).....	Clayton	1,192	40	31.0	+10.1	49	18	8	7	28	2.43	+ 1.07	1.32	4.0	5	11	5	15	se.	
Waterloo.....	Black Hawk	854	49	33.5	+10.0	50	18	12	7	24	2.19	+ 0.99	1.00	7.5	9	13	3	15	se.	
Waverly.....	Bremer	936	42	32.6	+ 9.4	49	18	11	7	23	0.81	+ 0.37	0.44	3.4	5	15	2	14	se.	
Means and extremes.....				32.9	+10.3	51	18	8	7	28	1.76	+ 0.51	1.32	4.4	8	11	3	17	se.	
<i>West Central District</i>																				
Audubon (near).....	Audubon	1,297	38	33.4	+10.6	51	18	10	14	26	2.61	+ 1.62	0.75	6.0	7	11	4	16	sw.	
Carroll.....	Carroll	1,265	45	33.2	+ 9.4	51	18†	11	14	24	3.88	+ 2.90	1.57	5.0	11	13	1	17	se.	
Denison.....	Crawford	1,200	47	34.2	+10.4	54	18†	11	14	27	1.64	+ 0.77	0.93	4.5	5	12	3	16	sw.	
Guthrie Center.....	Guthrie	1,028	56	35.0	+10.5	55	18	10	14	25	4.27	+ 3.16	1.65	7.0	5	12	2	17	s.	
Harlan.....	Shelby	1,210	39	34.4	+10.8	52	18†	11	14	29	2.51	+ 1.51	1.13	3.6	9	12	3	16	sw.	
Jefferson.....	Greene	1,052	39	33.7	+10.1	53	18	5	14	32	4.39	+ 3.32	1.67	12.5	5	11	2	18	se.	
Little Sioux.....	Harrison	1,040	30	34.5	+10.5	54	18	11	14	30	2.32	+ 1.44	1.29	2.2	13	10	7	14	sw.	
Logan.....	Harrison	1,120	65	34.2	+ 8.8	52	18†	12	14	26	1.95	+ 0.82	1.19	2.7	6	7	12	12	sw.	
Onawa.....	Monona	1,051	46	32.4	+ 8.5	53	18	9	14	30	2.05	+ 0.95	0.85	0.5	4	12	3	16	se.	
Rockwell City.....	Calhoun	1,232	41	32.9	+10.1	53	18	10	14	29	3.68	+ 2.70	1.85	6.0	5	11	5	15	sw.	
Sac City.....	Sac	1,200	62	33.1	+10.6	55	18	11	7	27	3.00	+ 1.88	1.45	4.0	6	11	3	17	s.	
Sioux City.....	Woodbury	1,135	56	32.3	+ 9.2	53	18	10	14	25	1.83	+ 0.93	1.10	1.4	8	9	7	15	s.	
Means and extremes.....				33.6	+10.0	55	18	5	14	32	2.84	+ 1.83	1.85	4.6	7	11	4	16	s.	
<i>Central District</i>																				
Ames.....	Story	926	55	33.4	+ 9.6	50	18	8	14	24	3.37	+ 2.31	1.03	3.8	8	10	4	17	sw.	
Baxter.....	Jasper	903	32	34.2	+ 9.8	55	18	10	14	28	3.31	+ 2.36	1.04	6.0	8	10	4	17	se.	
Boone (near).....	Boone	894	47	33.9	+ 9.9	54	18	8	14	32	3.52	+ 2.63	1.35	6.5	6	13	3	15	s.	
Des Moines.....	Polk	861	54	35.8	+ 9.8	55	18	14	14	26	3.72	+ 2.60	1.49	5.7	14	8	2	21	se.	
Fort Dodge.....	Webster	1,114	43	32.4	+10.1	51	18	10	7	24	2.88	+ 2.05	0.97	5.5	9	12	2	17	sw.	
Grinnell.....	Poweshiek	1,031	47	34.7	+ 9.5	51	11†	6	14	29	3.03	+ 1.86	0.93	9.0	9	11	3	17	nw.	
Grundy Center.....	Grundy																			

Climatological Data for December, 1931—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperature, in Degrees Fahrenheit							Precipitation, in inches				Number of Days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Greatest daily range	Total	Departure from normal	Greatest in 24 hours	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>East Central District</i>																				
Belle Plaine.....	Benton	866	55	34.7	+10.5	52	18	13	15	26	2.52	+ 1.17	0.98	9.0	11	11	3	17	se.	O. C. Burrows J. T. Wurster
Cedar Rapids.....	Linn	737	49	34.7	+10.7	53	18	15	14	29	1.93	+ 0.62	0.72	6.2	8	11	0	20	n.w.	
Clinton.....	Clinton	595	60	34.8	+ 8.5	53	22	14	14	27	1.89	+ 0.11	0.75	9.0	9	12	3	16	s.	Dr. A. P. Bryant U. S. Weather Bureau
Davenport.....	Scott	580	60	37.1	+10.0	57	18	19	14	25	2.68	+ 1.20	0.74	6.7	12	6	7	18	sw.	
Iowa City.....	Johnson	733	74	35.6	+ 9.8	51	18	13	14	28	2.58	+ 0.97	0.86	6.0	13	9	5	17	se.	Prof. J. F. Reilly
La Claire.....	Scott	576	54								2.03	+ 0.59	0.65	7.5	10					Margaret T. Disney John Strodhoff
Maquoketa (near).....	Jackson	692	38	33.9	+ 9.9	52	22	12	8	27	1.82	+ 0.51	0.64	9.8	7	13	6	12	sw.	
Muscataine.....	Muscataine	546	85								2.41	+ 0.45	0.70	4.0	11					William Molis Mrs. L. Stingley
Olin.....	Jones	750	33	33.9	+ 9.0	52	18†	12	14	27	1.76	+ 0.41	0.68	7.0	6	11	2	18	sw.	
Tipton (near).....	Cedar	806	39	34.6	+ 9.0	51	22	10	14	25	1.67	+ 0.19	0.40	11.0	8	8	5	18	s.	John Kroepfen
Williamsburg.....	Iowa	805	15	34.6		52	18	9	14	27	2.77	+ 1.52	1.00	4.2	8	13	7	11	se.	Dr. F. C. Schadt
Means and extremes.....				34.9	+ 9.5	57	18	9	14	29	2.19	+ 0.70	1.00	7.3	9	11	4	16	sw.	
<i>Southwest District</i>																				
Atlantic.....	Cass	1,110	44	35.2	+ 9.5	52	18†	8	14	29	2.80	+ 1.68	1.04	3.8	7	11	4	16	sw.	Roy L. Fancolly Arthur L. Bishop
Bedford.....	Taylor	1,200	27								2.74	+ 1.76	1.00	5.5	7	10	4	17	n.w.	
Clarinda.....	Page	1,009	59	37.1	+10.2	58	18	10	14	30	2.28	+ 1.18	1.35	5.5	6	12	7	12	sw.	Dr. H. C. Hawley W. J. Wagner
Corning.....	Adams	1,294	43	36.0	+10.8	52	18†	11	14	26	1.75	+ 0.51	0.85	4.8	5	10	5	16	sw.	
Cumberland (near).....	Cass	1,225	32								2.22	+ 1.29	0.95	5.0	5	13	2	16	sw.	Carl E. Pollock
Glenwood.....	Mills	1,100	41	36.2	+ 9.4	54	18†	14	14	26	3.13	+ 2.46	2.20	4.0	6	11	3	17	se.	Dr. George Mogridge P. C. Cornell
Greenfield.....	Adair	1,368	35								3.28		1.53	6.5	8	10	6	15	sw.	
Lenox.....	Taylor	1,250	36	36.6	+11.0	57	18	10	14	29	3.31	+ 2.33	1.58	4.3	8	11	5	15	sw.	J. L. Hurley W. S. Matthews
Oakland.....	Pottawattamie	1,139	18	35.9	+10.7	54	17†	15	14	29	2.98	+ 2.02	1.32	3.5	5	14	1	16	sw.	
Red Oak (near).....	Montgomery	1,030	24								2.63	+ 1.58	1.15	8.0	6	9	10	12	sw.	B. R. Bridge
Riverton (near).....	Fremont	920	5								3.40	+ 2.32	2.38	4.5	6	11	1	19	s.	George C. Rader H. H. Askew
Thurman.....	Fremont	960	44	37.1	+ 9.7	57	18	13	14	30	2.61	+ 1.30	1.66	5.0	3	12	1	18	s.	
Omaha, Neb.....		1,105	66	37.0	+10.6	57	18	19	14	24	3.33	+ 2.40	2.07	3.8	9	12	3	16	sw.	U. S. Weather Bureau
Means and extremes.....				36.4	+10.2	58	18†	8	14	30	2.80	+ 1.77	2.38	4.9	6	11	4	16	sw.	
<i>South Central District</i>																				
Afton.....	Union	1,212	50	37.1	+10.9	57	26	13	14	26	3.53	+ 2.34	1.56	9.0	9	12	5	14	ne.	S. R. Brown J. M. Stevenson
Albia.....	Monroe	949	40	36.9	+10.7	57	19	8	14	28	2.77	+ 1.70	0.95	7.5	7	10	1	20	n.w.	
Centerville.....	Appanoose	1,013	38	37.4	+ 9.7	57	19	10	14	24	3.19	+ 2.09	1.08	11.2	7	12	4	15	sw.	Thomas Wood, Jr. C. C. Burr
Chariton (near).....	Lucas	1,042	37	35.7	+ 9.3	51	19†	6	14	26	3.11	+ 1.95	1.20	8.0	6	13	2	16	sw.	
Corydon (near).....	Wayne	1,050	47	36.2	+ 9.4	52	11†	10	14	22	2.86	+ 1.57	0.85	8.5	8	12	3	16	sw.	J. C. Davis
Creston.....	Union	1,293	30	35.3	+10.3	53	18†	8	14	29	2.85	+ 1.79	1.28	7.2	9	10	8	13	w.	Mrs. N. Spangler Seth F. Shenton
Indianola.....	Warren	972	50	36.0	+10.4	57	18	8	14	32	3.16	+ 1.81	1.19	8.2	8	10	6	15	se.	
Knoxville†.....	Marion	920	41	36.0	+10.1	55	18	8	14	32	3.16	+ 1.84	0.90	6.0	11	12	1	18	se.	W. J. Casey J. B. Alter
Jacona.....	Warren	824	32								4.40	+ 2.78	1.20	13.0	10	13	5	17	sw.	
Lamoni.....	Decatur	1,123	27	36.7	+10.7	57	19	10	14	26	3.28	+ 2.10	1.10	7.6	11	9	5	13	n.w.	F. S. Parks
Melrose.....	Monroe	871	1								2.53		0.63	9.5	8	11	7	13	sw.	J. M. Carr E. O. Gleason
Mt. Ayr.....	Ringgold	1,220	39	36.7	+10.2	56	19	10	14	28	2.83	+ 1.60	1.08	11.8	8	14	2	15	sw.	
Tingley.....	Ringgold	1,275	7	36.2	+10.2	54	18†	11	14	25	4.18	+ 3.04	1.66	9.3	8	14	1	16	sw.	James A. Verploegh D. M. Coleman
Tracy.....	Marion	725									2.15		0.70	9.5	7				sw.	
Winterset.....	Madison	1,118	40	36.2	+10.4	55	18	10	14	26	3.46	+ 2.27	1.55	8.6	6	12	3	16	sw.	H. S. Ely
Means and extremes.....				36.4	+10.4	57	18†	6	14	32	3.16	+ 1.96	1.66	9.2	8	12	4	15	sw.	
<i>Southeast District</i>																				
Bonaparte (near).....	Van Buren	563	44	37.8	+10.0	61	18	14	14	31	2.35	+ 1.09	0.88	4.6	7	13	3	15	e.	B. R. Vale John W. Donnelly
Burlington.....	Des Moines	544	41	38.1	+ 8.7	55	11†	21	14	22	2.65	+ 1.05	0.85	6.5	9	11	4	16	sw.	
Columbus Junction.....	Louisa	595	40	35.8	+ 8.0	54	18	13	14	28	1.90	+ 0.58	0.60	5.3	10	10	5	16	sw.	Miss Musa Todd R. M. McKenzie
Fairfield.....	Jefferson	780	51	35.7	+ 9.3	56	18	12	14	31	2.47	+ 0.85	0.90	8.7	9	9	4	18	n.	
Keokuk.....	Lee	614	60	39.6	+10.0	60	18	20	14	24	2.01	+ 0.56	0.63	3.5	12	9	3	19	sw.	U. S. Weather Bureau
Keokuk No. 2.....	Lee	651	2	38.5		61	18	17	14	30	2.82		0.66	4.5	11					J. N. D. Dickinson Dr. J. W. Rinabarger
Keosauqua.....	Van Buren	639	44	37.4	+ 9.7	62	18	14	14	38	2.30	+ 0.92	1.04	4.0	5	8	3	20	se.	
Mt. Pleasant.....	Henry	730	55	37.6	+ 9.5	57	18†	15	14	27	2.87	+ 1.50	0.98	3.5	10	10	5	16	sw.	J. H. Jericho R. R. Robinson
Oskaloosa.....	Mahaska	835	55	36.4	+10.4	54	11†	9	14	26	3.35	+ 2.18	0.89	10.8	12	10	4	17	se.	
Ottumwa.....	Wapello	619	44	37.2	+ 9.5	56	18†	11	14	33	2.97	+ 1.71	0.99	9.9	8	11	5	15	se.	C. L. Mikesh
Sigourney.....	Keokuk	785	36	35.4	+ 8.7	55	18	10	14	29	2.51	+ 1.28	1.00	7.5	7	10	9	12	e.	John B. Slate C. L. Beswick
Stockport (near).....	Van Buren	747	30	36.9	+10.1	59	18	14	14	33	2.68	+ 1.41	1.04	4.0	7	12	1	18	sw.	
Washington.....	Washington	757	56	35.6	+ 9.0	55	18†	11	14	27	2.99	+ 1.67	1.10	5.5	10	9	4	18	ne.	D. D. Sherman
Means and extremes.....				37.1	+ 9.5	61	18	9	14	38	2.61	+ 1.26	1.10	6.0	9	10	4	17	se.	
State means and extremes.....				34.1	+10.0	61	18	3	7	38	2.48	+ 1.34	2.38	5.7	8	11	4	16	sw.	

Temperature normals are based on the 46-year period July 3, 1875 to July 2, 1921; shorter records corrected to harmonize. Precipitation normals are based on the 50-year period ended December 31, 1927 at first order stations; upon all records of 10 years or more ending December 31, 1920 for most of the co-operative observing stations; and upon interpolations from normal maps for recently established stations.  
 Reference letters a, b, c, etc., appearing in the table indicate the number of days missing; for example b represents two days, etc.  
 †Also other dates.  
 ‡ Precipitation is less than 0.005 inch rain or melted snow.  
 ††Received too late to be included in means and summaries.

mean was 39.6° at Keokuk and the lowest, 28.3°, at Inwood (near). The absolute range in temperature for the State was 58°, ranging from 61° at Bonaparte (near) and Keokuk No. 2 on the 18th to 3° at Lake Park (near) on the 7th. The average number of days with the maximum temperature 32° or below was 3, ranging from 7 days in the northwest district, to none in the southeast district. The average number of days with the minimum temperature 32° or below was 24, ranging from 28 days in the northwest and north-central districts to 20 days in the southeast district. For individual stations the number of days with the maximum temperature 32°

or below ranged from 11 days at Inwood (near) to none at 15 stations. The number of days with the minimum temperature 32° or below ranged from 30 days at Spencer, Mason City and Osage, to 15 days at Keokuk. The greatest daily range in temperature at any one station was 38° at Keosauqua on the 18th.

PRECIPITATION

The average precipitation for the State, derived from the averages of 9 districts of nearly equal area, and based on the records of 119 stations, was 2.48 inches, or 1.34 inches above normal. The



Daily Precipitation for December, 1931—Continued

Stations	Drainage Basin	Day of Month																															Totals								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31									
<i>Southwest District</i>																																									
Atlantic	Nishnabotna					T.				T.	.38	.21	.80	T.	.13							.03	T.	T.	T.							T.	.21	1.04	2.80						
Bedford	102										.42	.08	.40		.07							.02	T.									T.	.75	1.00	2.74						
Clarinda	Nodaway										.15	.10	.55		.10							.03												1.35	2.28						
Corning	Nodaway										T.	.25	T.	.25		.10	T.					T.	T.	T.	T.								.30	.85	1.75						
Cumberland (near)	Nodaway							T.				.31	T.	.95		.18																	T.	.16	.62	2.22					
Glenwood	Missouri											.27	.10	.52	T.	.02																	T.	.02	2.20	3.13					
Greenfield	Nodaway											.30	.02	.63		.10	.04																T.	.65	1.53	3.28					
Lenox	Missouri											T.	.40	T.	.60		.08						.10	T.	.01							T.	.45	1.58	3.31						
Oakland	Nishnabotna							.16				.20		.95		T.																	T.	.35	1.32	2.98					
Red Oak (near)	Nishnabotna											.24	.14	.98		.08																		T.	.04	1.15	2.63				
Riverton (near)	Nishnabotna											.17	.26	.19	.32		.08	T.																T.	.28	3.40	3.40				
Thurman	Missouri											.35	T.	.60		T.																	T.	.16	2.61	2.61					
Omaha, Neb.***	Missouri					T.	.01					.20	.05	.45	.10	T.	.01																T.	.90	1.59	3.33					
<i>South Central District</i>																																									
Afton	Grand					.05	.02					T.	.51	.08	.54		.12																.02	.63	1.56	3.53					
Albia	Des Moines					.15	T.					.45	.40	.12		.38							T.										T.	.32	.95	2.77					
Centerville	Chariton					.11						.52		.31		.45	.02																		.70	1.08	3.19				
Chariton (near)	Chariton					.12	T.					.55	T.	.12		.22																			1.20	.90	3.11				
Corydon	Chariton					.11	.01					.53	.03	.25		.34																			.85	.74	2.86				
Creston	Missouri					T.	T.					.48	.08	.44		.11	.01						.02										T.	.42	1.28	2.85					
Indianola	Des Moines					.05	T.					.41	.02	.32		.17	T.																	.02	.98	1.19	3.16				
Knoxville	Des Moines					.16	.03					.20	.15	.55		T.	.30	.10					.03											T.	.70	.90	3.16				
Lacona	Des Moines					.32	.38					.10	.40	.12	.28		.60	.20																	1.20	.80	4.40				
Lamoni	Grand					.05	.12	.10				.15	.49	.06	.56		.25							.05	T.										.35	1.10	3.28				
Melrose	Des Moines					.10	.10					.50	.20			.45								.05											.50	.63	2.53				
Mt. Ayr	Grand					T.	.10					.50		.54		.03	.15						.06	.02										T.	.35	1.08	2.83				
Tingley	Platte					.12	.08					.59	.72	T.	.48	.07																			T.	.46	1.66	4.18			
Tracy	Des Moines					.14						.49	.25			.20																			.35	.70	2.15				
Winterset	Des Moines					T.	T.					.40	T.	.60		.10	.01						T.											T.	.80	1.55	3.46				
<i>Southeast District</i>																																									
Bonaparte (near)	Des Moines					T.	.10					T.	.47	T.	.39		.12	.02					T.												.37	.88	2.35				
Burlington	Mississippi					T.	.22					T.	.60	.02	.19		.12	.04					.03												.58	.85	2.65				
Columbus Junction	Iowa					.33	T.					.60	.01	.28		.02	.05						.01											.08	.13	.39	1.90				
Fairfield	Skunk					.13						T.	.52	.01	.11		.30	.01					T.												.44	.90	2.47				
Keokuk***	Mississippi					.18	.02					.32	.31	.09	.14		.01	.16	T.				T.	T.	T.	.06								.05	T.	T.	.28	.39	2.01		
Keokuk No. 2	Mississippi					.02	.19					.66	.24			.25	.20	T.					T.	.20	.10									.07	T.	.36	.53	2.82			
Keosauqua	Des Moines					T.						.60		.48		.30																			.03		.33	1.04	2.30		
Mt. Pleasant	Skunk					.10						.56	.02	.48		.10	.02						.02												.01		.58	.98	2.87		
Oskaloosa	Des Moines					.23	.05					.67	.31	.14		.23	.07							.04											T.	.02	.02	T.	.68	.89	3.35
Ottumwa	Des Moines					.11						.64	.02	.12		.46	.02																			T.		.61	.99	2.97	
Sigourney	Skunk					.21						.55	.12			.15																				.06		.42	1.00	2.51	
Stockport (near)	Skunk					T.	.12					.49		.55		T.	.12							T.											.03		.33	1.04	2.68		
Washington	Skunk					.22	T.					.42	.04	.14		.38								.02		.03										.02		.62	1.10	2.99	

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

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

\*\*\*Regular Weather Bureau Station: precipitation is for 24-hour period midnight to midnight.

\*\*Incomplete.

\*Precipitation included in next following measurement.

T. Precipitation is less than 0.005 inch rain or melted snow.

i Interolated.

PRESSURE, RELATIVE HUMIDITY, WIND AND SUNSHINE

Stations	Barometric Pressure, Inches (Sea Level)				Relative Humidity, %				Wind					Sunshine				
	Mean	Highest	Date	Lowest	Mean				Total movement	Average hourly velocity	Maximum				% possible Departure from normal			
					7 A. M.	12 Noon	7 P. M.	Lowest			Date	Miles	From			Date		
																	Direction	Direction
Chas. City..	30.09	30.63	7	29.39	11	88	76	82	45	7	4,762	6.4	24	ne.	30	37	- 6	
Davenport	30.10	30.63	2	29.40	11	84	72	76	48	3	7,005	9.4	38	ne.	31	37	- 6	
Des Moines	30.08	30.58	2	29.35	11	89	76	82	40	7	6,523	8.8	28	n.	31	41	- 9	
Dubuque	30.10	30.62	7	29.38	11	85	75	76	40	18	3,886	5.2	19	ne.	31	31	- 10	
Keokuk	30.11	30.66	2	29.45	11	85	72	78	42	7	4,737	6.4	21	e.	31	41	- 6	
Sioux City	30.05	30.55	1	29.45	10	86	74	80	46	7	7,353	9.9	30	s.	8	51	+ 2	
Omaha, Nb	30.07	30.56	1	29.42	10	85	71	76	35	18	4,510	6.1	21	ne.	31	46	- 6	
Means and extremes	30.09					86	74	79			7.5							- 5
Normals and records	30.14	30.66	2	29.35	11				55	18					38	ne.	31	
			29th		13th	84		77									24th	46
			*31.09 1917		†29.00 1920													†18 1922

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

|||January 1, 1928, 3-cup anemometer replaced 4-cup instruments. See Climatological Data, January, 1928, page 7.

greatest district excess was in the south-central district, 1.96 inches, and the northeast district had the least district excess, 0.51 inch. All of the Iowa stations had precipitation in excess of normal, except Fayette and Waverly. The greatest precipitation excess at any one station was 3.32 inches at Jefferson, and Waverly had the greatest deficiency, 0.37 inch. The greatest amount at a single station was 4.40 inches at Lacona, and the least was 0.81 inch at Wav-

erly. The greatest amount in 24 consecutive hours was 2.38 inches at Riverton (near) on the 31st.

The average number of days with 0.01 inch or more of precipitation for the State was 8, ranging from 9 days in the southeast and east-central districts, to 6 days in the southwest district. For individual stations, the range was from 14 days at Des Moines, to 2 days at Sioux Center.

SNOWFALL

The average snowfall for the State was 5.7 inches, or 0.3 inch below normal. There were 118 stations that received measurable amounts of snowfall, and one with only a trace. The greatest total snowfall at any one station for December was 13.0 inches at Lacona, and the least a trace at Washta. The greatest district average was in the south-central district, 9.2 inches, and the northwest district had the least district average, 2.6 inches. The greatest snowfall in 24 consecutive hours was 6.0 inches at Lacona on the 13th. The greatest number of days with 0.1 inch or more of snow on the ground was 18 days at Inwood (near). The greatest depth of snow on the ground at any time was 6.0 inches at Lacona on the 13th.

RIVERS

Moderate stages were recorded on the interior streams, with considerable fluctuations in some localities. At Des Moines, the extreme stages were 4.8 feet and 2.9 feet, and averaged 3.7 feet, or 1.3 feet above normal. The extreme Des Moines River stages at Ottumwa were 6.8 feet and 4.1 feet. The extreme Iowa River stages at Wapello were 8.8 feet and 3.6 feet. At Van Meter, the extreme Raccoon River stages were 3.5 feet and 9.0 feet. The extreme Cedar River stages at Cedar Rapids were 5.3 feet and 4.1 feet.

The Missouri River averaged below normal with little fluctua-

Daily Maximum and Minimum Temperature for the Month of December, 1931

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.

Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight.

tion. At Sioux City, the extreme stages were 3.6 feet and 1.4 feet and averaged 2.1 feet or 2.5 feet below normal. At Omaha, the extreme stages were 5.7 feet and 3.2 feet and averaged 4.1 feet, or 1.2 feet below normal.

The Mississippi River averaged over two feet above normal along the Iowa boundary. At Dubuque the extreme stages were 7.6 feet and 3.8 feet, and averaged 5.2 feet. The extreme stages at Davenport were 7.0 feet and 3.9 feet and averaged 5.3 feet, or 2.5 feet above normal. At Keokuk the river stages remained rather high during the month, being unusual for December.

#### MISCELLANEOUS PHENOMENA

*Aurora*: 25th.

*Corona*, lunar: 17th, 25th, 26th, 27th.

*Fog*, dense: 8th, 9th, 10th, 11th, 16th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 27th, 28th, 29th.

*Fog*, light: 8th, 9th, 10th, 11th, 16th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 27th, 28th, 29th.

*Gales*: 7th, 26th, 29th, 30th, 31st.

*Glaze*: 5th, 31st.

*Hail*, light: 3d, 31st.

*Halo*, lunar: 16th, 17th, 18th, 25th, 26th.

*Halo*, solar: 6th, 18th, 26th.

*Haze*: 4th, 5th, 22d, 30th.

*Sleet*: 4th, 5th, 8th, 9th, 12th, 30th, 31st.

*Snow*: 4th, 5th, 8th, 9th, 12th, 13th, 24th, 29th, 31st.

*Thunderstorms*: 10th, 30th.

#### ERRATA

Report for July, 1931. Page 54, Monroe; precipitation on the 1st published .13, should be .31 inch.

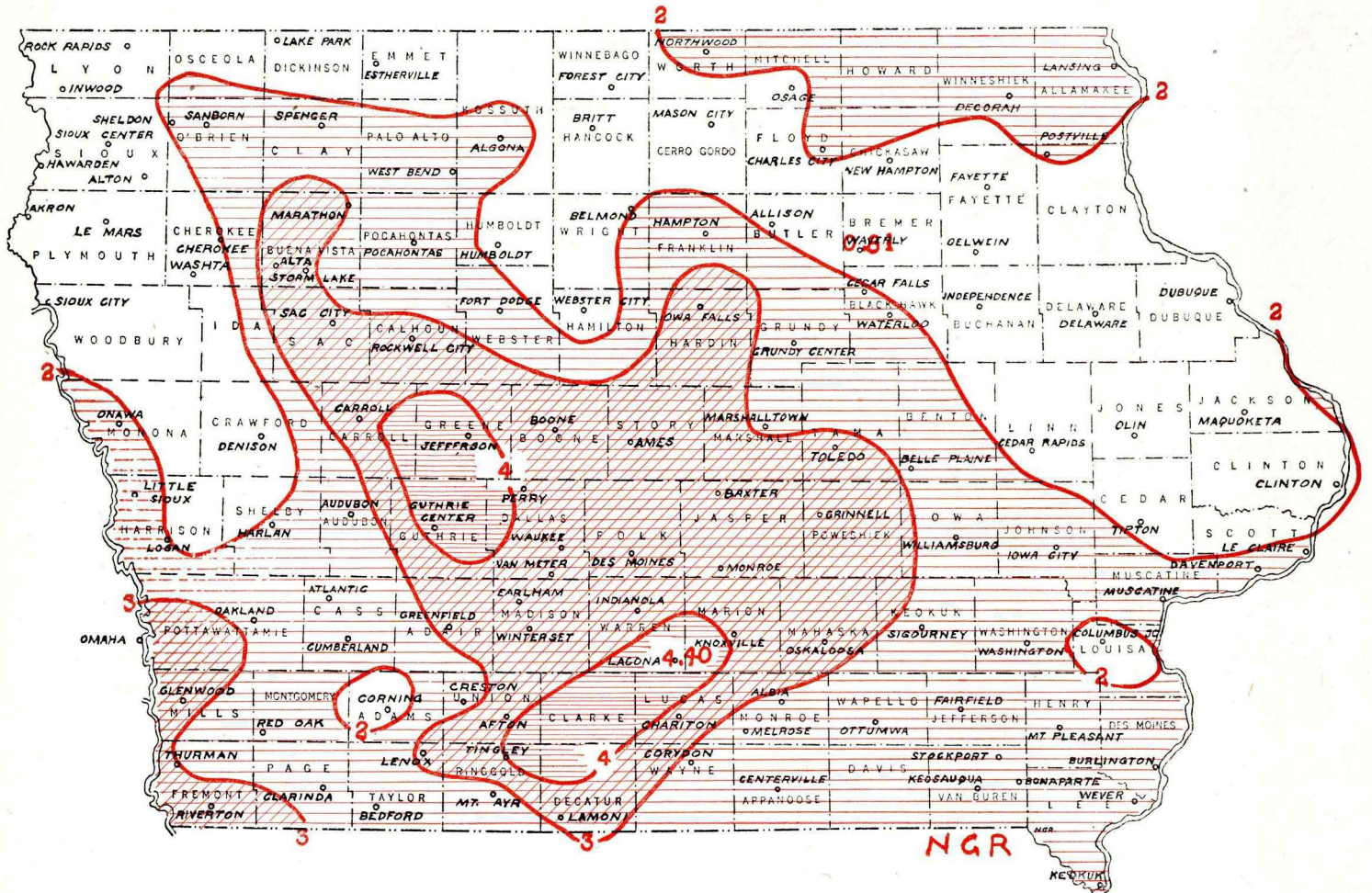
Report for August, 1931. Page 62, Tipton (near); precipitation on 2d published .22, should be .20 inch.

Report for September, 1931. Page 70, Fort Dodge; precipitation on the 29th and 30th published zero and trace, should be trace and .12 inch.

Report for October, 1931. Page 76, Audubon (near); maximum temperature and date published 81° on 2†, should be 85° on 4. Page 76, Ames; number of days partly cloudy and cloudy published 11 and 9, should be 12 and 8. Page 77, Clinton; number of days clear and partly cloudy published 14 and 5, should be 15 and 4.

Report for November, 1931. Page 84, Sioux City; total monthly snowfall published 3.2 inches, should be 3.0 inches.

TOTAL PRECIPITATION, DECEMBER, 1931



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA.

11

In co-operation with  
 IOWA SECTION

IOWA WEATHER AND CROP BUREAU

CHARLES D. REED, Senior Meteorologist

VOL. XLII DES MOINES, IOWA, ANNUAL, 1931 No. 13

## GENERAL SUMMARY

The year 1931 with an average temperature of 53.2°, 5.2° above normal, is the warmest of the 59 years of record and 1.0° warmer than 1921 which has heretofore held the record. Every month but May was warmer than normal. January, February and December were 10° or more above normal, September was the warmest of record and November next to the warmest. The average length of the growing season between the average date of last killing frost in spring, May 17, and the average date of first killing frost in autumn, October 29, was 165 days or 10 days longer than normal. Ninety-nine per cent of the corn escaped frost damage, but heat and drouth reduced the crop about 88,000,000 bushels after July 14.

The annual rainfall ranged from 18.20 inches at Akron, Plymouth County to 49.23 inches at Lacona, Warren County, while the State average was 35.37 inches which is 3.22 inches or 10% above normal. November was the wettest of record. Serious local drouth and heat in a good many northern and some other counties in July and August greatly deteriorated the corn crop. At Akron the rainfall of the two months was only 25% of a relatively small normal; Albia, 37%; and Iowa Falls, 41%. In contrast, Stockport and Monroe had 158%; Columbus Junction and Waverly, 146%; and Wauke, 124%. Days with appreciable rainfall ranged from 118 at Keokuk to 61 at Hampton.

## AVERAGE PRECIPITATION

State of Iowa, Year 1931

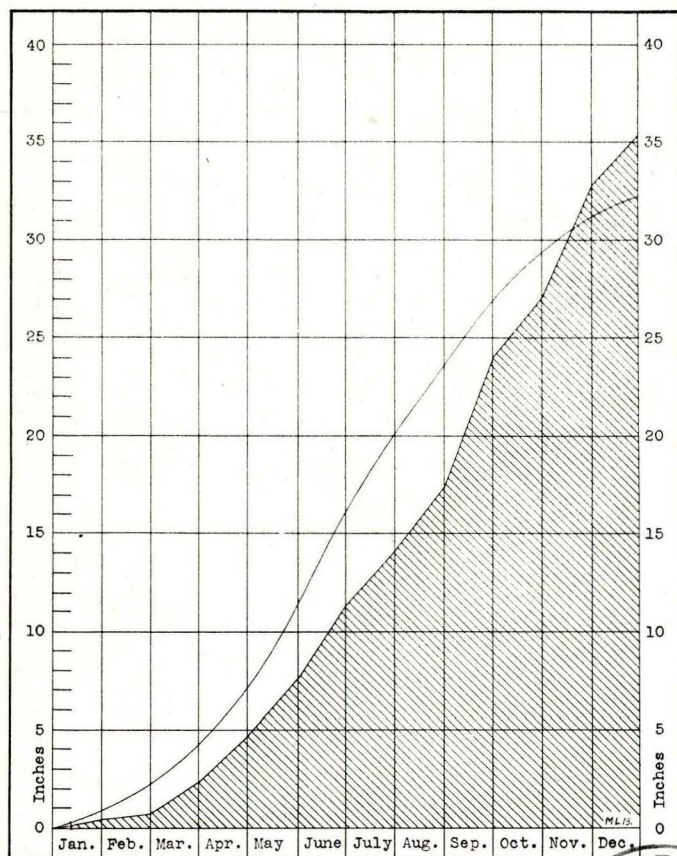


Figure 1.—Line bounding shaded areas shows accumulated depth of precipitation in inches. Smooth curve shows normal.

## AVERAGE TEMPERATURE DEPARTURE

State of Iowa, Year 1931

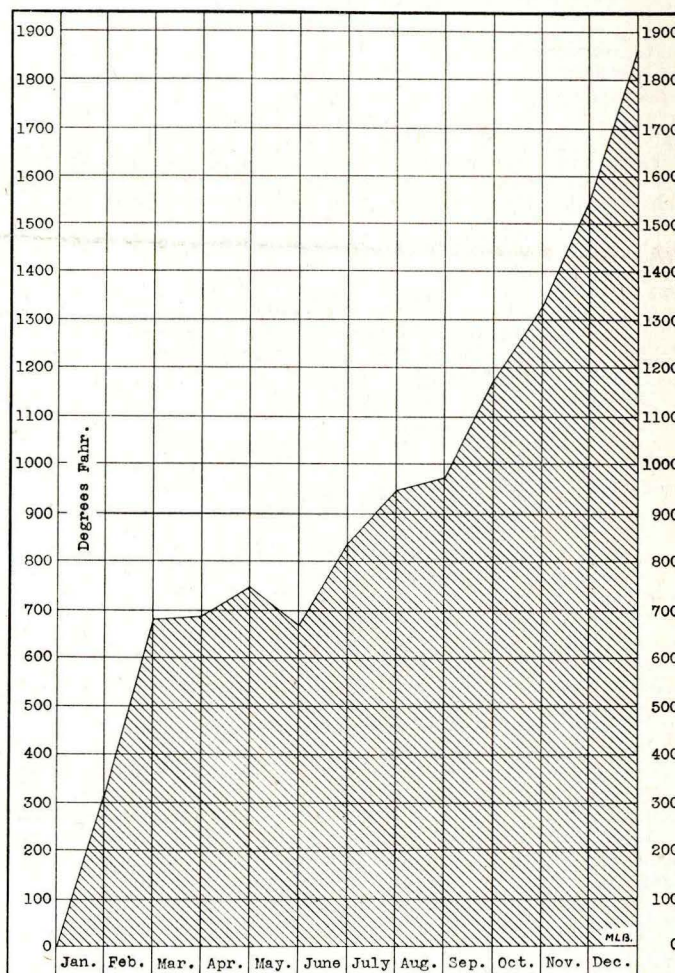


Figure 2.—Line bounding shaded area shows accumulated departure from normal. Upward slope means temperature above normal; downward, below. This is Iowa's warmest year.

## SYNOPSIS BY MONTHS

Mild, dry weather predominated in January which averaged 10.4° above normal and 18.4° warmer than the same month in 1930. Only a few days about the middle of the month were slightly below normal in temperature while several days toward the close of the month were twenty or more degrees above normal. Only one January, 1880, was warmer in 59 years. Several days toward the close of the month were the warmest of record for those dates and at Sioux City the highest temperature observed, 63°, is a record for January. At several stations in the southeast district the thermometer did not reach zero, however, cold waves occurred on the 14th and 21st. The first was most severe in the west central and northwest districts while the second was in the north central and east central districts. Ice harvested was mostly light and of poor quality. Some plowing and disking was done in the southern and western portions of the State and as far north as the northwest corner. The general water supply continued seriously deficient.

February was also abnormally mild and dry, averaging only 0.1° lower than the record warm February of the preceding year. Only a few stations reached the zero mark. Scarcely a day had temperatures below normal. The drouth continued to grow more acute, February precipitation being only 21 per cent of normal. Only one February, 1877, has been drier. The number of days with appreciable precipitation averaged only 2, the least of record. There was much outdoor work. More plowing and disking than usual occurred in the southern and western portions of the State. Some oat seeding was done in the extreme southern counties, the earliest known for such work. A little gardening was done, some fruit trees, shrubs and early flowers advanced abnormally, and young pigs and baby chicks were vigorous. Building was active and road paving was attempted in the southwest counties.





March averaged nearly normal in temperature and precipitation but there was a rather cool week at the close. Snowfall was heaviest in the southern half of the State and in the area of persistent snow cover, temperatures averaged slightly below normal. A heavy snow storm, 5th-6th, was accompanied by strong northwest winds which drifted the snow badly and completely blocked highways and temporarily stopped railway traffic. Drifts formed to the depth of 10 to 15 feet. The greatest total fall of snow was 26.1 inches at Centerville where the snow fell almost continuously for 69 hours. Another severe snow storm, 27th-28th, halted railway and highway traffic for about 24 hours. The snow drifted so fast that powerful snow plows could not keep the roads clear. These drifts were still visible in eastern Iowa as late as April 8th which was very warm with temperatures of 90° in the northern and western counties. Farm work progressed rapidly and much oat and barley seeding had been completed by the close of the month. Spring plowing for corn made an unusual advancement. Pastures, clover and winter wheat were much benefited by the snows. Considerable gardening was done. Fruit, shrubs and early flowers were beneficially retarded by the cool weather at the close of the month. The drouth continued serious and the subsoil was dry to a depth of 8 to 10 feet over much of the State.

April averaged warmer than normal but there were cool periods at the beginning and in the 3rd week. Precipitation was deficient except in the southeast counties. Killing frost during the 3rd week damaged fruit and truck crops, particularly grapes, on lowlands. Due to the long continued deficiency in precipitation, the soil was so dry that dust storms were frequent particularly on the 8th when homes, stores and office buildings were invaded by fine particles of dirt. Ditches along the roadside were filled with dirt and dirt drifts formed along fences to a depth of 4 feet. Clouds of dust retarded automobile traffic and in some cases stopped field work. The soil worked easily, small grain seeding was completed early and preparations for corn planting were far advanced.

May was generally cool and dry, being the first month in six with the average temperature below normal and the only month in the year 1931 below normal. Only a few stations had precipitation above normal. Farm work made good progress with practically no interruption from rain. Corn planting was about four days earlier than normal. Crops and grasses were in good condition at the close of the month, though somewhat retarded by the late frosts. Killing frosts on the 21st and 22d, being unusually late in an otherwise early season, caused considerable damage to commercial truck gardens. Millions of tomato plants were killed. These frosts were about 14 days later than normal. Four tornadoes were reported.

Record breaking high temperatures in northern Iowa, damaging local downpours of rain in the southwest portion, and the continuation of the drouth over the northern half of the State, were the outstanding features of the weather of June 1931. The last ten days of the month were exceptionally warm with afternoon temperatures from high in the 90's to about 100°, the highest being generally on the 28th and 29th. Out of 107 temperature recording stations, 51 broke all previous high records and 17 equalled their record. Thousands of horses at work in the fields died from cumulative effects of several 100° days in succession. Scores of persons died or were prostrated. Local downpours of rain in the west and southwest districts on the 12th, 15th and 20th caused local floods and considerable damage by overflow and erosion with wash-outs on highways and railroads. Drouth continued throughout the northern half of the State being most serious in the northwest district. Water supply continued deficient and pastures were short and badly burned in several of the northern and a few eastern counties. Corn grew rapidly so that very little could be cultivated after the close of the month except in the southeast district.

Hot weather continued into the opening days of July after which, for a period of about 10 days, temperatures averaged below normal and precipitation was normal or above in frequency and amount. Then followed a hot dry period which made the average temperature for July above normal at all stations. Horses at work in the fields died in great numbers and scores of persons died or were prostrated. Much field work was done at night to avoid the extreme heat. Many stations in northern Iowa had numerous days with temperatures of 100° or higher and most of the State was without rain for 10 to 21 days. Corn reached its highest condition just before the middle of the month after which it deteriorated very rapidly to the extent of at least 50,000,000 bushels. Water shortage continued serious. Grain harvest proceeded with practically no weather damage or delay and threshing made a good start toward the close of the month. The yield of oats was considerably reduced by the heat of the latter part of June and early July.

General and locally heavy rains on the first 2 days of August afforded temporary relief to the parched crops and pastures but in many localities, particularly in the north central and northwest portions of the State, the amount was insufficient, and the drouth again became serious in a few days over most of northern Iowa. Pastures were short and badly burned and there was a further deterioration of corn so that in the north central counties and in localities throughout the northern half of the State, particularly along the Big Sioux River, the corn crop was almost a failure.

## SUPPLEMENTAL PRECIPITATION TABLE, YEAR 1931

STATIONS	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	<i>Northern Division</i>												
Cedar Falls.....	0.91	0.37	2.04	2.14	3.02	1.31	3.47	4.04	8.45	2.11	6.83	2.62	37.31
Delaware (near)...	0.81	0.12	2.01	2.88	1.22	1.34	2.22	2.54	9.14	2.13	5.65	1.26	31.30
Hampton.....	0.40	0.34	1.04	1.96	2.81	2.23	1.63	2.29	8.07	1.93	8.62	2.42	33.74
Lake Park (near) T.	0.22	0.91		0.82	2.36	2.24	2.62	2.19	5.58	*2.00	3.87	1.01	21.82
Lansing.....	*0.65	*0.60	2.38	1.36	2.65	3.43	0.58	3.20	7.01	1.43	5.37	*2.00	30.66
Marathon.....	0.32	0.13	0.85	1.18	3.70	3.02	2.66	3.93	6.32	1.56	4.07	3.00	30.74
Stoux Center.....	0.22	*0.05	0.52	0.87	2.34	3.34	1.30	1.09	4.06	0.80	4.21	1.35	20.15
<i>Central Division</i>													
Baxter.....	0.51	T.	1.00	2.55	1.74	4.05	*5.10	5.49	6.70	2.31	7.64	3.31	40.40
Grinnell.....	0.45	0.12	1.11	2.37	1.67	4.26	5.49	*3.60	7.99	2.98	7.56	3.03	40.63
Le Claire.....	0.52	0.18	2.50	2.81	3.74	3.05	2.02	1.63	4.68	3.31	4.49	2.03	30.96
Newton.....	*0.60	*0.05	*1.25	*2.00	*2.00	2.98	5.98	2.50	6.98	2.22	7.39	3.32	37.27
Rockwell City.....	0.80	0.10	1.51	1.27	3.50	3.47	2.23	5.20	5.90	1.76	5.70	3.68	35.12
Van Meter.....	0.35	T.	1.21	0.96	3.41	6.19	3.78	5.46	4.69	2.72	6.17	2.31	37.25
Muscatine.....	0.84	0.12	2.51	4.90	3.80	2.36	2.51	1.92	6.18	3.11	5.97	2.41	36.63
<i>Southern Division</i>													
Earlham (near)....	0.52	T.	1.56	1.35					5.42	5.54	5.33	3.28	40.16
Greenfield.....	0.27	T.	1.51	3.00	3.61	5.62	2.67	3.91	5.42	*4.05	4.69	2.82	43.77
Keokuk No. 2.....	0.89	1.13	2.52	4.26	5.06	7.45	*1.75	*2.45	*6.70	*4.05	4.69	2.53	48.77
Melrose.....	0.29	0.51	2.51	2.88	2.41	5.33	3.12	4.13	10.30	6.35	5.97	2.53	48.33
Red Oak (near)....	0.44	0.43	1.47	2.22	4.89	3.98	2.58	2.90	6.13	2.95	7.99	2.63	36.61
Wever.....	*0.70	*0.75	*2.40	*4.00	*4.80	4.37	2.75	4.78	5.36	4.03	4.34	*2.75	41.03

\*Interpolated.

## COMPARATIVE DATA FOR THE STATE—Annual

Year	Temperature				Precipitation in Inches			
	Mean annual	Highest	Date		Annual	Greatest annual	Least annual	Average snowfall
			Lowest	Date				
1873	46.1	102	August 31.....	−38	33.92	41.04	23.34	.....
1874	47.7	101	July 5.....	−24	30.76	39.76	25.43	.....
1875	43.3	97	July 16.....	−31	35.83	48.42	28.55	.....
1876	45.9	96	August 24.....	−28	36.65	53.57	19.92	.....
1877	48.4	100	.....	−31	35.16	49.82	22.52	.....
1878	50.0	104	.....	−13	34.53	42.08	20.92	.....
1879	48.0	102	.....	−35	28.23	46.71	16.49	.....
1880	47.9	104	.....	−25	30.95	51.10	14.90	.....
1881	47.5	104	.....	−40	44.16	56.81	34.02	.....
1882	48.4	98	.....	−23	33.40	50.30	17.71	.....
1883	44.8	100	.....	−38	34.54	46.15	18.00	.....
1884	46.0	96	.....	−38	35.50	46.60	23.35	.....
1885	44.7	102	July 30.....	−12	32.23	44.89	17.91	.....
1886	46.4	103	July 13.....	−34	24.71	35.48	15.55	.....
1887	46.6	105	July 29.....	−34	26.31	38.61	12.30	.....
1888	45.3	110	August 2.....	−43	31.44	41.17	20.60	.....
1889	48.0	104	August 30.....	−28	24.95	37.61	13.66	.....
1890	47.5	110	July* 13.....	−27	29.48	45.45	16.54	.....
1891	47.3	106	August 9.....	−31	32.90	49.05	23.48	.....
1892	46.6	104	July 11.....	−38	36.58	48.77	24.78	34.2
1893	45.7	102	July* 13.....	−36	27.59	33.27	19.19	37.2
1894	49.7	109	July 26.....	−37	21.94	29.81	15.65	19.2
1895	47.2	104	May 28.....	−33	26.77	35.25	18.57	26.0
1896	48.6	104	July 3.....	−20	37.23	51.60	28.68	22.6
1897	47.8	106	July* 23.....	−30	26.98	36.18	20.21	38.8
1898	47.7	103	August 20.....	−25	31.34	55.47	19.51	40.3
1899	47.3	104	Sept. 6.....	−40	28.68	42.06	21.79	23.4
1900	49.3	103	August 3.....	−27	35.05	47.33	25.05	25.8
1901	49.0	113	July 22.....	−31	24.41	37.69	16.35	38.5
1902	47.7	98	July 30.....	−31	43.82	58.80	20.14	28.0
1903	47.2	101	August 24.....	−27	35.39	50.53	26.41	19.4
1904	46.3	100	July 17.....	−32	28.51	38.93	19.34	29.2
1905	47.2	101	August 11.....	−11	36.56	52.26	24.66	38.3
1906	48.4	102	July 21.....	−32	31.60	44.34	20.63	32.8
1907	47.4	102	July 5.....	−31	31.61	43.90	19.93	24.0
1908	49.4	101	August 3.....	−18	35.09	49.98	21.11	22.7
1909	47.4	103	August* 15.....	−26	40.01	53.48	37.20	49.0
1910	48.6	108	July 16.....	−35	19.87	27.99	12.11	23.4
1911	49.5	111	July* 3.....	−35	31.37	46.77	19.74	35.3
1912	46.3	104	Sept. 8.....	−47	28.65	33.13	15.25	39.5
1913	49.7	108	July* 16.....	−25	29.95	45.18	20.31	25.4
1914	49.1	109	July 12.....	−31	31.93	44.11	23.30	27.5
1915	47.8	99	May 14.....	−32	39.53	51.15	27.29	31.3
1916	47.2	106	August 4.....	−34	28.90	46.34	22.48	29.5
1917	44.8	106	July 30.....	−40	27.81	36.00	20.78	32.4
1918	49.2	113	August 4.....	−36	32.78	47.53	25.03	33.4
1919	48.6	104	July* 30.....	−36	36.76	48.16	26.88	26.6
1920	48.2	102	July 23.....	−26	31.75	44.00	20.95	21.7
1921	52.2	104	July* 11.....	−22	32.03	46.47	20.44	30.7
1922	50.2	104	June 23.....	−29	29.98	41.20	19.08	13.5
1923	49.0	102	July* 22.....	−23	29.50	37.47	21.36	36.3
1924	46.4	100	August* 21.....	−36	31.39	43.85	19.41	37.2
1925	48.8	105	July* 1.....	−25	28.24	45.53	13.77	29.2
1926	48.3	109	July* 19.....	−22	33.07	48.36	22.35	27.8
1927	48.8	102	July 11.....	−27	29.35	47.54	18.75	17.9
1928	49.4	100	August 1.....	−20	35.96	47.81	24.67	22.5
1929	46.4	102	August 22.....	−35	30.20	44.24	20.57	11.8
1930	50.2	113	August* 3.....	−37	26.10	35.65	16.15	23.6
1931	53.2	109	July 28.....	−15	35.37	49.23	18.20	23.7
Nm.	48.0	104	.....	−31	32.15	41.58	21.00	29.9
Hst.	53.2	113	July* 22, 1901.....	−13	44.16	58.80	34.02	49.0
Lst.	43.3	96	Aug.* 24, 1878.....	−47	19.87	27.99	12.11	13.5

\*And other dates.

(Continued on page 106)

CLIMATOLOGICAL DATA FOR THE YEAR 1931

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperature (Mean, Highest, Date, Lowest, Date), Precipitation (Total, Greatest Monthly, Month, Least Monthly, Month, Total snowfall), Number of Days (Precipitation .01 in. or more, Clear, Partly cloudy, Cloudy), and Prevailing direction of wind. The table is divided into Northern and Central Divisions.

CLIMATOLOGICAL DATA FOR THE YEAR 1931—Continued

Main climatology table with columns for Stations, Counties, Elevation, Length of record, Temperature (Mean, Highest, Date, Lowest, Date), Precipitation (Total, Greatest Monthly, Month, Least Monthly, Month, Total snowfall), Number of Days (Precipitation .01 in. or more, Clear, Partly cloudy, Cloudy), and Prevailing direction of wind.

\*Interpolated.
†Also on other dates.

MONTHLY STATE DATA FOR 1931

Monthly state data table with columns for Month, Barometric Pressure (Mean, Highest, Date, Lowest, Date), Temperature (Mean, Departure from Normal, Highest, Lowest, 7 a. m., 12 noon, 7 p. m.), Relative Humidity (Average, Departure from Normal, Lowest), Precipitation (Average, Departure from Normal, Greatest, Least, Snowfall), No. of Days (With .01 inch or More Precipitation, Clear, Partly Cloudy, Cloudy), Sunshine (Pct. of Possible Amt., Departure from Normal), and Wind (Average Hourly Velocity, Prevailing Direction).

‡Local mean time.
\*Normal central time.
†And other dates.
‡7 A. M. and 7 P. M. observations only.

MEAN MONTHLY AND ANNUAL TEMPERATURES, WITH DEPARTURES FROM THE NORMAL, FOR 1931

Table with columns for months (January to December) and Annual, and rows for various stations (Northern, Central, Southern Divisions). Each cell contains temperature values and departures from normal.

\*Interpolated.

MEAN MONTHLY AND ANNUAL PRECIPITATIONS, WITH DEPARTURES FROM THE NORMAL, FOR 1931

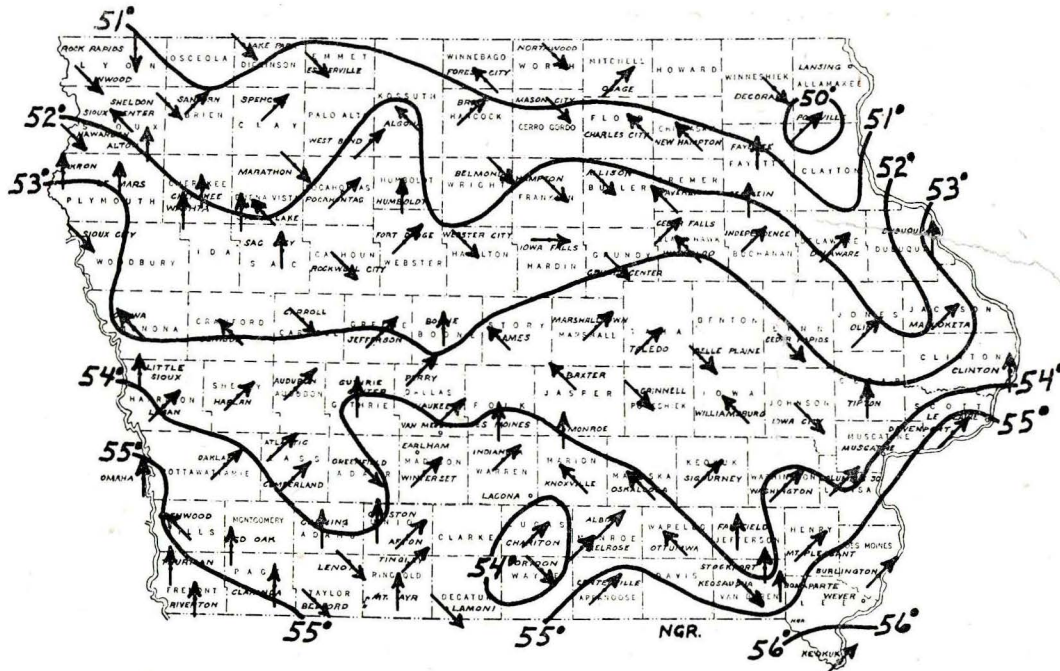
Table with columns for STATIONS, months (January-December), and Annual. Rows are categorized into Northern Division, Central Division, and Southern Division, listing various Iowa cities and their precipitation data for 1931.

DATES OF KILLING FROST, 1931

Charles City, Davenport, Des Moines, Dubuque, Keokuk, Sioux City, Omaha and Marshalltown, excluded from averages because of city influences.

STATIONS	Last in Spring	First in Autumn	Days in Growing Season	STATIONS	Last in Spring	First in Autumn	Days in Growing Season	STATIONS	Last in Spring	First in Autumn	Days in Growing Season
<i>Northwest District</i>				<i>North Central District</i>				<i>Northeast District</i>			
Alta	May 21	Nov. 2	165	Algona	May 22†	Nov. 1†	163	Decorah	May 23†	Oct. 12†	142
Alton	May 22	Oct. 17	148	Allison (near)	May 21	Nov. 4	167	Delaware (near)	May 21†	Nov. 2†	165
Cherokee	May 22†	Nov. 1	163	Belmond	May 22	Oct. 17	148	Dubuque	April 24	Nov. 6	196
Estherville	May 22	Oct. 17†	148	Britt	May 22†	Nov. 1†	163	Fayette	May 23	Oct. 17†	147
Inwood (near)	May 22†	Oct. 17	148	Charles City	April 27	Nov. 2	193	Independence	May 21	Nov. 2†	165
Lake Park (near)	May 22†	Oct. 17†	148	Forest City	May 22†	Nov. 4	166	New Hampton	May 23†	Nov. 2†	163
Le Mars	May 22†	Oct. 17†	148	Hampton	May 23†	Oct. 17†	147	Oelwein	May 23†	Nov. 2†	163
Pocahontas	May 22†	Nov. 2†	164	Humboldt	May 22†	Oct. 17†	148	Postville (near)	May 23†	Nov. 2†	163
Rock Rapids	May 22	Oct. 17	148	Mason City	May 23	Oct. 12	142	Waterloo	May 23†	Oct. 17†	147
Sanborn	May 22	Oct. 25†	156	Northwood	May 7	Oct. 17†	163	Waverly	May 23†	Nov. 2	163
Sheldon	May 22	Oct. 17	148	Ossage	May 7†	Oct. 17†	163	Rural Average	May 22	Oct. 27	158
Sioux Center	May 22	Oct. 29†	160	Rural Average	May 19	Oct. 23	157	<i>East Central District</i>			
Spencer	May 22	Oct. 25	156	<i>Central District</i>				Belle Plaine	May 23	Nov. 2†	163
Storm Lake	May 22†	Nov. 1†	163	Ames	May 8†	Nov. 2†	178	Cedar Rapids	May 23†	Oct. 17†	147
Washita	May 22	Oct. 17†	148	Baxter	May 21†	Nov. 2†	165	Clinton	April 30	Nov. 4	188
West Bend	May 22	Nov. 4†	166	Boone (near)	May 21	Oct. 17	149	Davenport	April 27	Nov. 4	191
Rural Average	May 22	Oct. 24	155	Des Moines	May 7	Nov. 4	181	Iowa City	May 7	Nov. 6	183
<i>West Central District</i>				Fort Dodge	May 22†	Oct. 17†	148	Maquoketa (near)	May 23†	Oct. 17†	147
Audubon (near)	May 7†	Nov. 1	178	Grinnell	May 21	Nov. 4†	167	Olin	May 23†	Oct. 17†	147
Carroll	May 21	Nov. 4†	167	Grundy Center	May 22	Oct. 17†	148	Tipton (near)	May 23†	Nov. 2†	163
Denison	May 22†	Oct. 17†	148	Iowa Falls	May 22	Nov. 2	165	Williamsburg	May 7†	Nov. 2†	179
Guthrie Center	May 21†	Nov. 6	169	Marshalltown	May 22	Nov. 2	165	Rural Average	May 16	Oct. 28	165
Harlan	May 22†	Nov. 1	163	Monroe	May 7	Nov. 4	181	<i>Southeast District</i>			
Jefferson	May 22†	Nov. 4†	166	Newton	May 7	Nov. 4	181	Bonaparte (near)	May 7†	Nov. 4†	181
Little Sioux	May 22†	Nov. 1	163	Perry	May 7	Nov. 4	181	Burlington	May 7	Nov. 6†	183
Logan	May 22†	Nov. 1†	163	Toledo	May 21	Nov. 6	169	Columbus Junction	May 7†	Nov. 2†	179
Onawa	May 22†	Nov. 1	163	Waukee	May 21†	Nov. 4†	167	Fairfield	May 7	Nov. 4	181
Rockwell City	May 22†	Nov. 1†	163	Webster City	May 22†	Oct. 17†	148	Keokuk	May 7	Nov. 6	183
Sac City	May 22†	Nov. 2†	164	Rural Average	May 18	Oct. 29	164	Keosauqua	May 7†	Nov. 4†	181
Sioux City	May 21	Oct. 17	149	<i>South Central District</i>				Mt. Pleasant	May 7	Nov. 6	183
Rural Average	May 21	Nov. 1	164	Afton	May 7	Nov. 6†	183	Oskaloosa	May 21	Nov. 4	167
<i>Southwest District</i>				Albia	May 21	Nov. 1†	164	Ottumwa	May 7†	Nov. 1	178
Atlantic	May 7	Nov. 1	178	Centerville	May 7	Nov. 1†	178	Sigourney	May 21†	Nov. 2†	165
Clarinda	May 7†	Nov. 1†	178	Chariton (near)	May 21	Nov. 1	164	Stockport (near)	May 7†	Nov. 4†	181
Corning	May 7	Nov. 1	178	Corydon (near)	May 7	Nov. 24	201	Washington	May 7†	Nov. 4†	181
Cumberland (near)	May 7	Nov. 1	178	Creston	May 7	Nov. 4†	181	Wever	May 7†	Oct. 18†	164
Glenwood	May 22	Oct. 17	148	Indianola	May 21	Nov. 6†	169	Rural Average	May 9	Nov. 2	177
Lenox	May 7†	Nov. 1†	178	Knoxville	May 7†	Nov. 4†	181	State Average, 1931	May 17	Oct. 29	165
Oakland	May 22	Nov. 1†	163	Lamoni	May 6†	Nov. 1†	179	State Normal	May 3	Oct. 5	155
Red Oak (near)	May 22	Oct. 17	148	Mount Ayr	May 7†	Nov. 1†	178	† Date of last temperature of 32° or lower in the Spring, or first temperature of 32° in the Autumn (as the case may be) when frost was not reported.			
Riverton (near)	May 21	Oct. 29	161	Tingley	May 7†	Nov. 1†	178				
Thurman	May 7	Oct. 17†	163	Winterset	May 7	Nov. 4	181				
Omaha, Nebr.	April 26	Nov. 1	189	Rural Average	May 10	Nov. 4	178				
Rural Average	May 14	Oct. 27	166								

MEAN ISOOTHERMS AND PREVAILING WINDS, YEAR 1931



Good rains occurred in the early days of September except in the northwest and north central districts but these were followed by a dry week and it was not until the 18th that the rains became heavy and continuous enough to materially relieve the drouth. This was the first month in nine with the average rainfall of the State above normal. Every station reported an excess except a few in the northwest district but the thirsty soil and vegetation absorbed it so the moisture did not penetrate deeply and wells showed practically no effect. This was the warmest September of record in 59 years. Many stations reported temperatures about 100° at sometime during the month. By the close of the month, 95 per cent of the corn was safe from frost. Outstanding tornadoes occurred from Davis to Washington and Louisa Counties on the 21st accompanied by a severe hailstorm causing about \$300,000 damage in the vicinity of Bloomfield, Davis County. Damaging hail is very unusual in that county. Two people were killed and eight injured along the path of the storm.

October was warm with frequent, well distributed rains. Vegetation grew vigorously. Potatoes made an unusual late season development of tubers. Killing frost occurred at several stations in the northern half of the State on the 17th and 25th but many stations in the central and southern portions did not have their first killing frost until early November so that the State average date of first killing frost was October 29th which is 24 days later than normal, making the average growing season between killing frosts 165 days, or 10 days longer than normal. Ninety-nine per cent of the corn escaped frost and husking made excellent progress, nearly half being done by the close of the month.

Following the first dry week, frequent rains culminating in heavy downpours on the 23d, made November the wettest of record in 59 years. The rains were heaviest over a belt extending from southwest to northeast in which many stations reported from 6 to 8 inches, the greatest amount being 9 inches at Guthrie Center. The soil became saturated to considerable depths so that the heavy rains of the 23d caused many streams to overflow in the southern part of the State and there was considerable damage to bridges, fences and unhusked corn in the fields. Water supply and subsoil moisture ap-

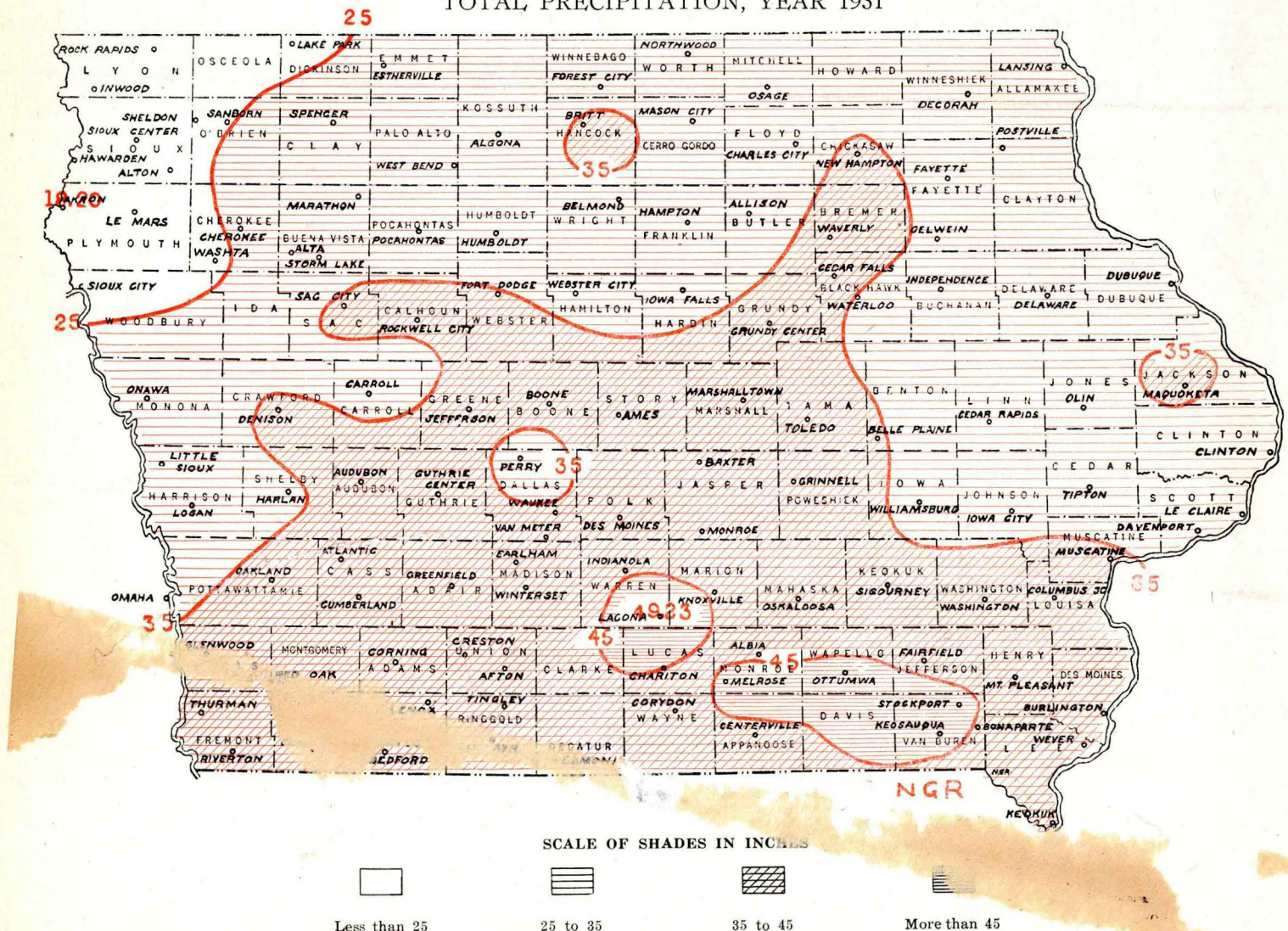
parently returned to approximately normal for the first time in nearly two years. Corn husking was delayed by wet fields and considerable corn rotted, molded or started to germinate as a result of the warmth and moisture. This caused an appreciable reduction in the yield per acre in the southern counties where considerable husking remained to be done at the close of the month. November was also next to the warmest of record, the mean temperature, 43.9°, being exceeded only by 0.2° in November, 1913, and equalled by November 1899. At many stations in central and southern Iowa, the first killing frost was delayed until the early days of the month. In a good many localities in eastern Iowa, garden vegetables such as lettuce, radishes, spinach, onions, tomatoes and new potatoes grew luxuriantly and dahlias and roses were blooming till the general freeze of November 6th. Pastures also continued luxuriant which helped the feed shortage in the more drouthy areas. The ground was generally too wet to plow.

December was the mildest in 42 years and the third wettest of record. Precipitation was fairly well distributed but the south central and central districts received the heaviest amounts threatening floods at the last of the month. A glaze storm on the last day of the month caused great destruction to overhead wires and poles in localities in the central portion of the State. The warmth and moisture caused meadows, grasses and winter wheat to grow vigorously. There was little or no frost in the ground during much of the month, considerable plowing was done, pocket gophers worked on meadows, dandelions were blooming and frogs were croaking toward the close of the month.

ERRATA

Report for May, 1931. Page 34, Independence; precipitation departure from normal published -3.65 inches, should be -3.09 inches. Page 34, Monroe; precipitation departure from normal published -1.61 inches, should be -2.61 inches.  
 Report for June, 1931. Page 43, Keosauqua; temperature departure from normal published +2.2°, should be +4.2°. Page 43, Oskaloosa; temperature departure from normal published +5.9°, should be +4.9°.  
 Report for September, 1931. Page 68, Storm Lake; precipitation departure from normal published +3.25 inches, should be +4.10 inches.  
 Report for October, 1931. Page 76, Independence; precipitation departure from normal published -0.09 inch, should be -1.09 inches.

TOTAL PRECIPITATION, YEAR 1931



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