

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, JANUARY, 1943 No. 1

GENERAL SUMMARY

January, 1943, was a relatively cold and dry month. Although temperature averaged below normal for the State as a whole, it was slightly above normal in the southern third, while the greatest deficiency occurred in the north central district.

On the other hand, precipitation exceeded the all-time mean in the northern third and was deficient in the remaining sections. The least reported from any station was a trace at Cumberland (near), in the southwest portion. From this section the amounts increased to the north and east with relatively heavy falls in the northeast portion.

Most of the precipitation was in the form of snow and in consequence the average total of 9.2 inches was 2 inches more than the all-time January average. Distribution of snowfall was similar to that of precipitation generally, ranging from a trace at Cumberland (near) to amounts in excess of 25 inches at several stations in the extreme northeast portion. At Dubuque the total fall of 25.7 inches has been exceeded in only two other months since records have been kept. One of these occurrences was a total of 32.0 inches in December, 1887, and the other was 34.3 inches in January, 1929. At the close of the month the ground was covered with snow to a depth of 3 inches or more in areas north of a line extending from Sioux to northern Louisa County. South of this line the relatively light cover diminished to scattered patches on protected slopes and old drifts with much bare ground in the southern third of the State. In the northeast district the snow cover still ranged from 12 to 20 inches at the close of the month.

The air masses during the month were mostly of Continental Arctic or Continental Polar origin. The warm weather that prevailed at the end of 1942 continued on the first two days of January but on the 3d a mass of Arctic air moved southward and brought a brief spell of subnormal temperatures. The change to cooler was attended by general light precipitation. Light freezing mist or drizzle occurred over much of the western and southern portions of the State, making streets, sidewalks and highways dangerously slippery on the 4th and for some time thereafter. Numerous accidents were blamed on the glaze and traffic was impeded. On the 6th a low pressure center moved eastward and brought a return to mild temperature but precipitation was mostly confined to the eastern portion of the State. After a slight reaction to cooler on the 7th, unseasonable warmth prevailed from the 8th to the 11th. More or less general light snow was recorded from the 7th to the 9th. The general synoptic picture showed a trough-like area of low pressure over the northern plains with high pressure to the eastward and also over the plateau and a succession of frontal areas between air masses of slightly different properties passing over Iowa. Another short period of relatively cool weather occurred,

COMPARATIVE DATA FOR JANUARY, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	12.0	55	-38	2.53					
1874.....	10.6	64	-24	1.67					
1875.....	4.9	48	-30	0.82					
1876.....	23.5	62	-16	1.49					
1877.....	13.7	58	-31	1.09					
1878.....	25.4	55	-13	0.48					
1879.....	16.1	54	-30	0.48					
1880.....	32.0	68	-6	1.36					
1881.....	9.6	48	-40	0.94					
1882.....	23.4	60	-17	0.65					
1883.....	8.0	46	-38	1.31					
1884.....	13.3	52	-38	0.52					
1885.....	9.4	51	-42	1.28					
1886.....	8.1	52	-33	2.59					
1887.....	8.8	55	-34	1.13					
1888.....	5.4	58	-43	1.30					
1889.....	21.6	62	-25	1.22					
1890.....	18.0	64	-27	1.79					
1891.....	26.0	58	-4	1.75		4	13	7	11
1892.....	15.3	76	-38	1.09	6.9	5	16	9	6
1893.....	9.3	54	-34	0.74	6.9	6	11	9	11
1894.....	19.3	69	-37	1.09	6.0	5	14	9	8
1895.....	13.6	68	-31	0.85	8.7	4	15	7	9
1896.....	23.4	68	-20	0.48	2.8	3	10	10	11
1897.....	17.2	66	-30	2.01	8.2	7	12	7	12
1898.....	23.4	52	-11	1.60	12.6	5	15	6	10
1899.....	19.8	68	-34	0.28	1.5	3	15	10	6
1900.....	25.6	66	-20	0.53	2.3	3	16	7	8
1901.....	23.7	60	-21	0.74	6.2	4	14	9	8
1902.....	22.4	63	-31	0.88	9.4	4	17	8	6
1903.....	23.0	60	-12	0.28	2.0	4	13	7	11
1904.....	14.0	57	-32	1.18	6.1	6	12	8	11
1905.....	11.2	56	-30	0.91	11.1	7	14	7	10
1906.....	24.6	69	-19	1.52	11.3	5	14	6	11
1907.....	18.8	68	-22	1.52	6.0	7	8	7	16
1908.....	24.9	60	-18	0.44	4.6	2	17	8	6
1909.....	21.2	72	-25	1.66	7.8	6	9	6	16
1910.....	18.1	56	-35	1.57	12.6	6	13	7	11
1911.....	20.2	66	-35	0.97	7.3	5	9	8	14
1912.....	4.2	49	-47	0.53	5.5	5	14	7	10
1913.....	20.9	62	-25	0.77	7.2	5	14	9	8
1914.....	27.8	64	-10	0.88	5.1	5	11	8	12
1915.....	17.5	59	-32	1.63	7.3	8	13	8	10
1916.....	17.8	63	-34	2.62	7.2	10	12	6	13
1917.....	17.0	60	-28	0.83	7.2	4	17	8	6
1918.....	8.6	53	-35	1.02	11.2	7	13	8	10
1919.....	26.8	64	-32	0.24	2.8	2	20	5	6
1920.....	16.7	58	-26	0.42	4.6	4	12	8	11
1921.....	38.4	67	-9	0.51	4.1	4	11	7	13
1922.....	19.8	57	-29	0.89	5.3	4	17	6	8
1923.....	26.7	58	-10	0.85	6.5	6	10	7	14
1924.....	13.9	59	-36	0.89	5.5	5	17	7	7
1925.....	19.4	55	-24	0.40	4.2	3	17	7	7
1926.....	22.7	58	-22	1.09	5.0	7	11	8	12
1927.....	21.7	59	-27	0.29	3.0	4	14	8	9
1928.....	25.2	70	-20	0.17	0.9	3	15	8	8
1929.....	10.2	47	-29	2.06	17.5	9	11	6	14
1930.....	10.5	58	-37	1.33	14.7	8	14	8	9
1931.....	28.9	64	-15	0.50	5.1	2	18	6	7
1932.....	22.5	61	-22	1.81	13.6	8	9	6	16
1933.....	32.5	62	-10	0.95	1.4	5	13	8	10
1934.....	26.9	67	-14	0.83	4.4	5	10	7	14
1935.....	20.6	58	-30	1.16	2.9	6	12	5	14
1936.....	9.5	56	-33	1.68	19.4	10	11	7	13
1937.....	12.8	46	-30	2.25	10.5	7	15	7	9
1938.....	21.0	59	-25	1.14	6.8	7	11	8	12
1939.....	28.7	69	-12	0.86	6.0	7	10	9	12
1940.....	8.4	45	-26	0.83	9.9	4	16	6	9
1941.....	23.8	59	-8	1.73	10.2	10	10	5	16
1942.....	21.6	64	-36	0.76	8.1	2	18	7	6
1943.....	16.7	54	-31	0.79	9.2	8	12	7	12
Period.....	18.6	76	-47	1.09	7.2	5	13	7	11

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

as a ridge of high pressure built up east of the Rocky Mountains and drifted eastward. This was followed by relatively high temperatures, the maximum readings for the month occurring at many northwestern stations on the 14th and at some southwestern stations on the 15th. Precipitation occurred in

CLIMATOLOGICAL DATA FOR JANUARY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches					Number of days			Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54	12.2	-2.6	38	28	-22	19	0.86	+0.12	0.25	31	9.6	8	14	7	10	n.	D. E. Hadden
Alton	Sioux	1,305	39	12.7	-2.2	40	14	-25	19	0.93	+0.25	0.30	16	9.7	7	7	14	10	nw.	W. S. Slagle
Cherokee	Cherokee	1,858	24	12.6	-2.8	38	14	-22	19	0.50	+0.06	0.14	3†	6.5	7	12	3	16	nw.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	9.2	-3.8	38	14	-24	19	1.15	+0.53	0.28	4†	14.2	10	8	6	17	nw.	Mrs. Mayme P. Orvill
Hawarden	Sioux	1,191	17	13.8	-1.7	42	14	-24	19	0.43	-0.17	0.13	3	5.0	8	13	7	11	nw.	Earl V. Slife
Inwood (near)	Lyon	1,474	41	10.0	-3.1	40	10	-27	19	0.82	+0.26	0.30	3-4	10.3	8	9	9	13	nw.	A. C. Hanson
Lake Park	Dickinson	1,479	41	9.7	-2.8	37	14	-25	19	1.17	+0.59	0.38	15	14.4	6	9	8	14	nw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	14.1	-1.9	41	14	-24	19	0.41	-0.17	0.18	3	4.5	5	13	9	9	nw.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	11.4	-3.7	38	14	-24	19	0.56	-0.14	0.20	15	6.0	7	5	10	16	nw.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17	11.8	-1.8	37	14	-25	19	0.92	+0.24	0.40	19	9.2	6	13	3	15	se.	Scott King
Rock Rapids	Lyon	1,341	47	10.3	-3.2	38	14	-31	19	0.86	+0.19	0.28	3	13.2	6	10	6	15	nw.	George Raveling
Sanborn	O'Brien	1,552	31	10.2	-2.8	36	14†	-26	19	1.11	+0.43	0.54	16	12.0	6	10	9	12	sw.	Susie O. Dow
Sheldon	O'Brien	1,418	38	10.4	-2.9	38	14	-27	19	0.58	-0.07	0.18	3	9.5	9	10	7	14	nw.	Ross E. Forward
Sibley	Osceola	1,494	9	8.8	-3.7	38	14	-30	19	0.62	-0.02	0.32	3	10.2	5	8	6	17	nw.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		11.8		40	14	-23	19	0.75		0.23	3	12.0	13	8	10	n.	Walter A. Simonsen	
Spencer	Clay	1,319	36	10.9	-2.7	38	14	-25	19	0.94	+0.20	0.27	15	11.0	6	14	6	11	ne.	E. W. Little
Storm Lake	Buena Vista	1,455	54	12.6	-2.9	38	14	-21	19	1.20	+0.53	0.35	3	7.0	6	11	7	13	nw.	Paul B. Vance
West Bend	Palo Alto	1,197	57	10.6	-3.8	38	14	-26	19	0.72	-0.01	0.35	15	9.0	3	9	10	12	nw.	Jos. Dorweiler
Means and extremes				11.3	-2.8	42	14	-31	19	0.81	+0.17	0.54	16	9.6	7	10	8	13	nw.	
<b>North Central Dist</b>																				
Algona	Kossuth	1,200	83	10.8	-4.1	39	14	-22	19	0.72	-0.06	0.21	3	7.9	7	10	9	12	nw.	Harry B. Nolte
Allison	Butler	1,060	30	12.4	-2.6	42	22	-24	19	1.50	+0.54	0.30	15	15.0	8	14	5	12	nw.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	9.6	-3.2	37	14	-27	19	0.86	+0.08	0.20	15	12.0	6	16	4	11	nw.	Wilbur Fox
Belmond	Wright	1,175	35	12.6	-1.6	42	22	-26	19	0.76	-0.25	0.28	3	8.2	8	10	10	11	nw.	W. H. Dempsey
Britt	Hancock	1,240	59	10.6	-4.0	38	14†	-25	19	0.67	-0.01	0.20	15	8.6	6	4	11	16	nw.	L. M. Naaser
Charles City	Floyd	1,013	69	11.8	-1.9	40	22	-24	19	1.14	+0.09	0.25	15	18.6	9	8	6	17	nw.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	12.8	-2.5	41	22	-21	19	0.60	-0.21	0.19	15-16	6.8	7	13	5	13	nw.	H. S. Brandsgard
Forest City	Winnebago	1,289	54	10.4	-3.8	40	22	-25	19	0.97	+0.03	0.30	9	11.5	8	10	7	14	nw.	Dr. M. B. Neil
Hampton	Franklin	1,142	53	12.4	-2.5	44	22	-24	19	1.22	+0.23	0.30	18	19.0	9	15	0	16	nw.	E. A. Saxton
Mason City	Cerro Gordo	1,148	52	10.6	-2.9	41	22	-26	19	0.74	-0.12	0.26	3	11.5	9	10	7	14	nw.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	9.2	-3.9	39	22	-26	19	1.02	-0.03	0.25	3†	13.9	9	11	10	10	nw.	Charles H. Dwelle
Osage	Mitchell	1,163	59	12.2	-1.2	43	22	-25	19	1.04	+0.10	0.36	3	14.5	6	7	7	17	nw.	Harry D. Hedrick
Means and extremes				11.3	-2.8	44	22	-27	19	0.94	+0.04	0.36	3	12.3	8	11	7	13	nw.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							1.27	+0.17	0.32	15	19.2	8	13	3	15	nw.	E. J. Cable
Cresco	Howard	1,260	7	11.0	-2.2	42	22	-27	19	1.05	+0.07	0.20	18	15.1	9	11	5	15	ne.	William Hebig
Decorah	Winneshiek	881	61	11.0	-3.6	45	22	-27	19	0.77	-0.39	0.22	4†	11.6	7	10	11	10	ne.	Mrs. Fleta M. Rose
Delaware (near)	Delaware	1,083	65	13.4	-3.6	40	22	-22	19	1.03	+0.21	0.21	3	13.5	7	12	9	10	nw.	E. J. Paris
Dubuque	Dubuque	642	93	16.8	-2.3	45	22	-16	20	1.07	+0.37	0.40	17-18	25.7	13	7	12	12	nw.	U. S. Weather Bureau
Elkader	Clayton	772	52	13.6	-3.5	44	22	-23	20†	1.54	+0.61	0.49	18	29.5	9	13	4	14	n.	W. H. O'Brien
Fayette	Fayette	1,009	56	12.2	-3.8	41	22	-24	19†	1.18	+0.04	0.33	15	16.4	7	4	13	14	nw.	F. B. Claxton, Jr.
Guttenburg	Clayton			16.2	-1.1	43	22	-21	20	0.91	-0.14	0.27	16	11.0	10	12	3	16		U. S. Engineers
Independence	Buchanan	956	84	14.4	-3.3	41	22	-23	19	1.50	+0.56	0.30	18	22.3	8	10	8	13	nw.	August Bracht
New Hampton	Chickasaw	1,161	47	12.0	-2.2	42	22	-26	19	1.15	+0.18	0.27	18	13.5	7	3	13	15	nw.	C. Maas
Oelwein	Fayette	1,036	21	12.8	-3.7	37	14	-24	19	1.90	+0.92	0.40	3	19.0	8	11	3	17	nw.	John T. Ridler
Postville (near)	Clayton	1,130	53	12.0	-2.7	42	22	-23	19	1.61	+0.53	0.31	18	16.8	10	12	7	12	nw.	V. H. Williams
Waterloo	Black Hawk	848	62	15.4	-1.8	43	22	-22	19	1.14	+0.14	0.40	4	11.6	9	15	5	11	nw.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	12.1	-3.5	42	22	-24	19	2.54	+1.49	0.78	9	23.5	9	13	7	11	w.	Mrs. Albert S. Tousiev
Waverly	Bremer	935	55	13.6	-2.0	40	22	-24	19	0.75	-0.40	0.16	15	10.4	11	8	12	11	nw.	Charles W. Wile
Means and extremes				13.4	-2.7	45	22	-27	19	1.34	+0.30	0.78	9	16.8	9	10	8	13	nw.	
<b>West Central Dist.</b>																				
Audubon (near)	Audubon	1,297	51	17.1	-1.0	46	22	-21	19	0.37	-0.54	0.10	3	3.7	7	8	10	13	n.	Geo. Kibby
Carroll	Carroll	1,280	58	16.5	-1.0	45	22	-18	19	0.23	-0.49	0.07	3	4.3	6	11	9	11	nw.	Ben H. Schenkelberg
Cushing (near)	Ida	1,350	10	13.6	-3.2	38	14	-20	19	0.36	-0.24	0.11	3	4.4	9	15	5	11	nw.	H. P. Lasher
Denison	Crawford	1,307	60	16.4	-1.1	43	22	-20	19	0.11	-0.59	0.07	31	1.0	2	12	8	11	ne.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	18.4	-0.5	49	22	-18	19	0.23	-0.69	0.09	18	2.1	5	16	4	11	sw.	Wilbert Shaw
Harlan	Shelby	1,210	52	18.5	+0.4	45	22	-21	19	0.14	-0.65	0.05	30	2.0	5	14	6	11	nw.	Elmer Buss
Jefferson	Greene	1,055	52	17.5	-0.2	46	22	-18	19	1.00	+0.09	0.30	18	10.0	7	11	7	13	nw.	Will I. Lyon
Lake City	Calhoun	1,238	8	15.0	-2.0	44	22	-19	19	0.37	-0.52	0.12	3	6.3	8	9	9	13	n.	Frank A. Taylor
Little Sioux	Harrison	1,040	43	17.7	-1.5	44	14	-22	19	0.17	-0.54	0.04	16	1.6	8	15	9	7	nw.	H. W. Kerr
Logan	Harrison	1,120	78	17.6	-2.2	43	14	-24	19	0.29	-0.45	0.06	16†	1.9	6	11	15	5	nw.	Miss Amy Ann Stern
Mapleton (near)	Woodbury	1,225	5	15.0	-2.1	42	15	-23	19	0.12	-0.58	0.07	18	1.5	3	14	9	8	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069																		C. B. Crouch
Onawa	Monona	1,050	59	17.2	-1.4	44	14	-21	19	0.21	-0.53	0.08	18	2.8	8	14	6	11	nw.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	13.8	-2.4	41	22	-20	19	0.55	-0.51	0.13	18	9.5	10	12	7	12	nw.	F. C. Beitelspacher
Sac City	Sac	1,274	75	13.4	-2.6	39	14	-21	19	0.36	-0.48	0.10	3	4.8	7	8	12	11	n	

CLIMATOLOGICAL DATA FOR JANUARY, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit					Precipitation, in inches				Number of days				OBSERVERS			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear		Partly cloudy	Cloudy	Prevailing direction of wind
<i>Central District (Continued)</i>																				
Perry	Dallas	975	44	18.7	+ 0.3	48	22	-19	19	0.53	- 0.37	0.21	18	5.5	9	12	6	13	nw.	Eugene N. Hastie H. M. Meads H. P. Giger Barto Speer Leo Holtkamp
State Center	Marshall	1,068	7	16.6	- 1.6	43	22	-20	19	0.82	- 0.10	0.26	15	10.5	10	12	8	11	nw.	
Toledo	Tama	929	50	17.0	- 1.2	46	22	-20	19	1.15	+ 0.07	0.23	18	17.0	11	13	7	11	ne.	
Waukegan	Dallas	1,042	46																	
Webster City	Hamilton	1,042	60	13.5	- 2.3	41	22	-24	19	0.51	- 0.31	0.15	15	6.5	6	10	15	6	w.	
Means and extremes				16.2	- 1.9	49	22	-24	19	0.84	- 0.14	0.45	9	10.6	9	11	8	12	nw.	
<i>East Central Dist.</i>																				
Anamosa	Jones	873	15	16.1	- 2.2	39	22	-20	19	0.71	- 0.54	0.16	3†	10.0	7	15	6	10	nw.	State Reformatory R. O. Burrows U. S. Engineers John T. Wurster H. J. Klatt
Belle Plaine	Benton	895	68	16.8	- 2.3	42	22	-19	19	0.94	- 0.46	0.30	18	11.7	8	9	10	12	nw.	
Bellevue	Jackson	603		18.4	- 1.2	42	22	-20	20	1.80	+ 0.66	0.35	16	20.0	13	15	5	11	n.	
Cedar Rapids	Linn	813	62	17.3	- 1.7	45	22	-19	19	1.42	+ 0.43	0.28	19	14.0	11	11	7	13	e.	
Clarence	Cedar	850	10	16.9	- 2.3	41	22	-20	19	0.87	- 0.53	0.26	15	7.5	10	15	4	12	nw.	
Clinton	Clinton	640	73	20.7	- 0.4	45	22	-17	20	1.83	+ 0.37	0.41	18	15.2	10	12	8	11	ne.	Samuel W. Williams U. S. Weather Bureau Inst. Hydraulic Research
Davenport	Scott	579	73	20.4	- 1.4	47	22	-15	19	1.62	+ 0.20	0.37	17-18	16.3	13	9	6	16	ne.	
Iowa City	Johnson	780	87	18.9	- 1.3	43	22	-16	19	1.16	- 0.11	0.27	15	11.6	13	15	4	12	nw.	
Maquoketa	Jackson	700	51																	
Monmouth	Jones	870	3	17.6		40	14†	-19	19	1.25	+ 0.05	0.24	15	12.3	10	6	12	13	nw.	
Muscatine	Muscatine	620	98	20.2	- 1.2	48	22	-16	19	1.40	- 0.15	0.27	15	13.8	10	17	3	11	w.	G. Krieger H. J. Adams Dr. F. C. Schadt
Vinton	Benton	815	1	16.6	- 3.1	42	22	-20	19	1.07	- 0.08	0.20	18	21.0	8	12	10	9	nw.	
Williamsburg	Iowa	805	28	18.0	- 2.0	41	22	-17	19	0.73	- 0.25	0.22	15	7.3	9	14	5	12	nw.	
Means and extremes				18.2	- 1.7	48	22	-20	19†	1.23	- 0.04	0.41	18	13.4	10	12	7	12	nw.	
<i>Southwest District</i>																				
Atlantic	Cass	1,110	57	19.4	+ 0.4	49	23	-21	19	0.17	- 0.73	0.07	4	2.5	3	11	10	10	n.	Roy L. Fancolly H. J. Chambers Forrest E. Allison Soil Conservation Serv. S. W. Morris
Bedford	Taylor	1,215	40	22.3	+ 0.7	53	15	-21	19	0.13	- 0.80	0.13	18	2.0	1	16	6	9	nw.	
Clarinda	Page	1,004	72	21.8	+ 0.0	52	15	-21	19	0.12	- 0.75	0.04	3	1.0	4	11	4	16	nw.	
Clarinda Erosion	Page	1,132	5	21.4	- 0.2	52	15	-20	19	0.12	- 0.71	0.06	18	1.3	5	15	6	10	nw.	
Corning	Adams	1,285	56	20.8	+ 0.6	47	15	-21	19	0.17	- 0.77	0.10	18	2.5	3	16	5	10	nw.	
Glenwood	Mills	1,100	54	21.2	- 0.3	49	15	-19	19	0.17	- 0.48	0.10	3	2.5	5	8	15	8	nw.	Dr. Thos. B. Lacey Wallace Grounds M. E. Gray Arthur E. J. Johnson B. R. Bridge
Greenfield	Adair	1,368	48	19.2	+ 0.1	48	22	-20	19	0.11	- 0.79	0.04	3	0.8	5	11	5	15	nw.	
Oakland	Pottawattamie	1,100	31	19.8	- 0.1	48	22	-23	19	0.18	- 0.62	0.08	19	1.8	4	12	8	11	nw.	
Red Oak	Montgomery	1,077	5	21.3	+ 0.5	49	22	-23	19	0.09	- 0.67	0.07	18	2.1	2	8	6	17	nw.	
Red Oak (near)	Montgomery	1,030	37							0.38	- 0.38	0.28	18	5.0	3	15	7	9	s.	
Riverton (near)	Fremont	920	18							0.23	- 0.57	0.14	18	2.5	4	10	5	16	n.	Geo. C. Rader Earl E. May Seed Co. Bernard Porter U. S. Weather Bureau
Shenandoah	Page	974	9	22.4	+ 0.9	53	15	-18	19	0.12	- 0.68	0.08	18	2.2	4	13	7	11	nw.	
Thurman	Fremont	973	57	22.2	+ 0.9	54	15	-21	19	0.10	- 0.64	0.10	18	1.5	1	19	3	9	nw.	
Omaha, Nebr.	Fremont	1,035	79	19.9	- 1.0	46	15	-16	19	0.05	- 0.65	0.03	18	1.3	2	8	9	14	n.	
Means and extremes				21.0	+ 0.2	54	15	-23	19	0.15	- 0.66	0.28	18	2.1	3	12	7	12	nw.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	20.5	- 0.3	48	22	-19	19	0.28	- 0.61	0.07	3†	1.2	6	16	3	12	sw.	S. R. Brown Arthur L. Freed E. Grant Everman Ellis Shaw Mrs. Nellie Spangler
Albia	Monroe	949	53	21.7	0.0	52	22	-17	19	0.58	- 0.49	0.10	16†	4.6	12	11	6	14	nw.	
Centerville	Appanoose	1,013	51	23.0	- 1.3	52	22†	-19	19	0.73	- 0.39	0.55	4	1.7	6	8	9	14	nw.	
Chariton	Lucas	940	50	21.5	+ 0.4	51	22	-20	19	0.25	- 0.66	0.18	17-18	3.8	2	15	3	13	nw.	
Creston	Union	1,293	43	19.8	0.0	49	22	-21	19	0.31	- 0.58	0.10	19	6.3	8	15	5	11	nw.	
Indianola	Warren	972	63																	Seth F. Shenton Mrs. Ella Mae Brobst Dr. Gustav A. Platz J. C. Davis Mrs. Irene Hood
Knoxville	Marion	920	54	20.4	- 0.1	50	22	-17	19	0.53	- 0.64	0.17	15	7.0	5	13	7	11	nw.	
Lamoni	Decatur	1,138	40	21.3	+ 0.2	50	22	-20	19	0.34	- 0.61	0.12	18	3.8	8	12	5	14	nw.	
Millerton	Wayne	1,070	60	20.6	- 1.0	51	22	-23	10	0.41	- 0.70	0.09	25	3.7	9	11	7	13	nw.	
Mount Ayr	Ringgold	1,209	52	21.3	- 0.1	51	22	-21	19	0.11	- 0.90	0.09	24	1.0	2	9	15	7	nw.	
Osceola	Clarke	1,088	23	21.0	0.0	50	22	-19	19	0.26	- 0.64	0.10	3	3.7	5	12	3	16	nw.	Mrs. Irene Davison Jas. A. Verploegh H. S. Ely
Tingley	Ringgold	1,275	20	20.6	- 0.4	48	10	-19	19	0.22	- 0.68	0.10	18	2.0	3	18	6	7	nw.	
Winterset	Madison	1,120	53	20.8	+ 0.4	48	22†	-18	19	0.43	- 0.44	0.18	18	6.0	3	15	2	14	nw.	
Means and extremes				21.0	0.0	52	22	-23	19	0.37	- 0.62	0.55	4	3.7	6	13	6	12	nw.	
<i>Southeast District</i>																				
Bloomfield	Davis	825	29	22.2	- 0.3	47	22	-16	19											Mrs. Leo Foster U. S. Weather Bureau Miss Musa Todd Prof. R. M. McKenzie U. S. Weather Bureau
Burlington	Des Moines	697	54	22.0	- 1.9	48	22	-15	19	1.25	- 0.46	0.30	17-18	13.5	11	10	8	13	nw.	
Columbus Jct.	Louisa	595	53	20.5	- 1.5	45	22	-17	19	0.93	- 0.33	0.25	15	14.8	11	14	4	13	nw.	
Fairfield	Jefferson	780	64	22.0	+ 0.8	53	22	-18	19	1.51	+ 0.27	0.27	15	14.1	13	11	5	15	nw.	
Keokuk	Lee	574	73	25.0	+ 0.1	51	22	-13	19	1.04	- 0.52	0.26	17	8.5	10	13	1	17	nw.	
Keosauqua	Van Buren	712	57	23.6	+ 1.6	52	22	-15	19	1.04	- 0.28	0.23	15	7.3	10	14	5	12	nw.	Harry J. Schlotfeldt Raymond A. Hughes Perry Lytle C. L. Mikesch Chas. S. Chandler
Mt. Pleasant	Henry	722	68	23.7	+ 0.9	52	22	-16	19	1.06	- 0.28	0.25	9	7.5	6	15	6	10	w.	
Oskaloosa	Mahaska	813	68	19.8	- 0.8	48	22	-19	19	0.89	- 0.21	0.20	15	7.5	8	11	6	14	nw.	
Ottumwa	Wapello	649	49	23.8	+ 1.8	54	22	-17	19	0.97	- 0.16	0.28	15	5.6	10	13	8	10	nw.	
Sigourney	Keokuk	780	49	20.8	+ 0.5	49	22	-16	19	1.47	+ 0.28	0.51	6	12.7	7	16	8	7	sw.	
Stockport	Van Buren	747	43	22.4	+ 1.0	50	22	-15	19	0.65	- 0.69	0.23	15	6.4	8	15	2	14	nw.	C. L. Beswick Clarence M. Logan
Washington	Washington	762	69	20.8	- 0.4	45	22	-17	19	1.32	+ 0.03	0.40	15	16.3	9	9	10	12	nw.	
Means and extremes				22.2	+ 0.1	54	22	-19	19	1.10	- 0.19	0.51	6	10.4	9	13	5	13	nw.	
State means and extremes				16.7	- 1.9	54	15†	-31	19	0.79	- 0.30	0.78	9	9.2	8	12	7	12	nw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.  
 Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year period. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departures are based on the averages for the entire 70 years of record and must necessarily differ slightly from average station departures based on established normals.  
 † Precipitation is less than 0.005 inch rain or melted snow. ‡ Also other dates. †Received too late to be used in means and summaries.

## DAILY PRECIPITATION FOR JANUARY, 1943

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			.31				.03							.02	.04	T.	T.														T.	T.	.05	0.45						
Alta <sup>2</sup>	Raccoon		T.	.18	T.			.07		.03					.08	.10	.12																.03	.25	0.86						
Alton	Floyd			.20			.10	T.	T.						.10	.30	.03	.05														T.		.15	0.93						
Cherokee	Little Sioux	T.	T.	.14			T.	.07		.01					T.	.14	.04	.02	T.						T.							T.	T.	.08	0.50						
Emmetsburg	Des Moines																																								
Estherville <sup>2</sup>	Des Moines		T.	.28				T.	T.	.20					.06	T.	.28	.10	.08	.05					T.	.01							.01	.08	1.15						
Hawarden	Big Sioux			.13				T.	.03	T.	.01		T.		.04	.07	.02	.05														T.	T.	.08	0.43						
Inwood (near) <sup>2</sup>	Big Sioux			.21	.09					T.					.01	.01	.13	.17	.02						T.								T.	.18	0.82						
Lake Park	Little Sioux			.30						.14					.38	.20										.04							T.	.11	1.17						
Le Mars	Floyd		T.	.18				T.	.06	T.					T.	.05	.03																T.	T.	.09	0.41					
Marcus SCS	Little Sioux																																								
Milford <sup>2</sup>	Okoboji			.14						T.					.05	.03	.03																	.10	0.35						
Peterson SCS <sup>2</sup>	Little Sioux																																								
Pocahontas	Des Moines			.10				T.	.02	T.	.02	T.			T.	.20	.02	T.	.10															.10	0.56						
Pringhar	Little Sioux			.11					.03							.20			.09	.40														.09	0.92						
Rock Rapids	Big Sioux		T.	.28				T.		T.	.05				T.	.20	.16	T.	.05						T.								T.	T.	.12	0.86					
Sanborn	Floyd			.27				T.		T.					.02	.12	.54	.08																.08	1.11						
Sheldon	Floyd		T.	.18				.01	T.	T.	.04	T.			T.	.01	.13	.09	.01	.07					T.	T.							T.	T.	.04	0.58					
Sibley	Big Sioux			.32						.03					T.	.10	.10																		.07	0.62					
Sioux Rapids	Little Sioux			.23					.03						.15	.20	.08	T.																T.	.04	0.75					
Spencer	Little Sioux			.25						.05						.27	.15		.10															T.	.12	0.94					
Spirit Lake SCS <sup>2</sup>	Okoboji		T.	.26						.12					.20	.26		.09																T.	.10	1.03					
Storm Lake	Raccoon			.35				.22						T.	T.	.22	.22	T.	.15															T.	.04	1.20					
Terril SCS	Little Sioux			.30						.12					T.	.20	.30	.30	.30																						
West Bend	Des Moines		T.	.25				T.		T.	T.				.35	T.	T.																	T.	.12	0.72					
<i>North Central District</i>																																									
Algona	Des Moines			.21	T.					.08					.04	.15	.08	T.	.09														T.	.07	0.72						
Allison	Cedar		T.	.20	.10		.10	.20	T.	.20					.20	.30		T.																T.	.20	1.50					
Bancroft	Des Moines			.18						.15					T.	.20		.10	.08																T.	.15	0.86				
Belmond	Iowa			.28					.03	.02	.04					.26	T.		.05																.02	0.76					
Britt	Iowa			.16	T.			T.	T.	T.	.16		T.		.04	.20	T.		.01	T.					T.	T.									.10	0.67					
Charles City <sup>1</sup> †	Cedar		T.	.24			.01	.03	.07	.11		T.		.14	T.	.25	T.	T.	.19	T.					T.									T.	T.	.10	1.14				
Dakota City	Des Moines			.18				T.	.06	T.	T.	T.			T.	.17	.02	T.	.13																T.	.02	0.60				
Dumont (near)	Cedar			.13	T.				.09	.13					.03	.19			.04																T.	.04	0.65				
Forest City <sup>2</sup>	Cedar			.05	.03	.24				T.	.30				.10		.15	T.	.05																T.	.05	0.97				
Hampton	Cedar			.25				.03	.12	.16					.08	.15	.05	.30																		.08	1.22				
Kanawha	Boone			.20						.23					T.	.16	T.																			.07	0.66				
Mason City	Cedar		T.	.26	T.			.02	.07	.06	T.				T.	.07	.14	.06		T.															.03	0.74					
Mason City Apt. <sup>1</sup>	Cedar		T.	.09				T.	.01	.10	T.				.09																										
Northwood	Cedar		T.	.25				.03	.20	.20	T.				.10	.25	.05	.05																		.01	1.02				
Osage	Cedar		T.	.30	.04			.18	T.	.14					T.	.25	T.																			.07	1.04				
<i>Northeast District</i>																																									
Cascade	Maquoketa			.16	.03			.13	.09						.20	.22		.25	.15																.04	.05					
Cedar Falls	Cedar			.17				T.	.19	.18		T.			.10	.32		.13	.08						T.												.10	1.27			
Creaco	Turkey			.18					.04	T.	.10				.11	.19	T.	.20																	.07	T.	.12	1.05			
Decorah <sup>2</sup>	Mississippi			.22					.03	.09						.22		.09	.06																	.06	0.77				
Delaware (near)	Maquoketa			.21				T.	.06	.10					.18	.18		.20																		.10	1.03				
Dubuque <sup>1</sup> †	Mississippi		.04	T.	.31	T.		.03	.09	T.	.07				.10	.09	.36	.07	.38	T.																.01	.04	.08	1.67		
Dubuque LD 11 <sup>2</sup>	Mississippi		.02	T.	.07	.27			.10	.04	.05	.03			.21		.34		.19	.16																.01	.01	T.	T.	.04	1.53
Elkader	Turkey		T.	.22	T.				.12	.06					.11	.28		.49	.09																		.07	.10	1.54		
Fayette	Mississippi			.25					.12	.09					.10	.33		.16	T.																		T.	T.	.13	1.18	
Guttenburg LD 10 <sup>2</sup>	Mississippi		T.	T.	.22			.05	.02	.03	.01			T.	.09		.27		.05	.11																	.06	T.	.01	0.91	
Independence	Wapsipicon			.17				.10	.25						.25	.25		.30	.10																		.08	1.50			
Lansing <sup>2</sup>	Mississippi		T.	.41				T.	.06	.15	.21				.27		.32		.11	.42	.03															.16	.08	2.14			
New Hampton	Wapsipicon			.16					T.	.26					.08	.26	.03	.27																				.09	1.15		
Oelwein	Wapsipicon			.40			.10	.20	.20	.20					.30	.30	.20	.30																			.20	1.90			
Postville (near)	Mississippi			.27				.06	.23						.15	.29	T.	.31	.05																	.11	.05	.09	1.61		
Waterloo <sup>2</sup>	Cedar			.40				.11	.02	.10	.03				.08		.20		.10	.10																			1.14		
Waukon	Mississippi			.28						.78					.42	.34		.55																		.09	.08	2.54			
Waverly	Cedar			.14			.02	.08	.02	.19	T.	T.			.09	.16	T.	*	.09																			.05	0.75		
Genoa, Wis. LD 8 <sup>2</sup>	Mississippi		.02		.23			T.	T.	.07	.05				.22		.18		.01	.05																	.10	T.	.03	0.93	
Lynxville, W. LD 9 <sup>2</sup>	Mississippi		T.	T.	.17			.01	T.	.02	.08				.10		.09		.02	.08																	.08		0.65		
<i>West Central District</i>																																									
Anthron (nr.) SCS	Little Sioux</																																								

DAILY PRECIPITATION FOR JANUARY, 1943—Continued

Stations	Basin Drainage	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>West Central District (Continued)</i>																																										
Rockwell City †	Raccoon			.11			.02	.08	T.	.04	T.				.02	.08	.01	T.	.13	.01						T.	T.					T.	.05	0.55								
Sac City	Raccoon			.10			T.	.05		.02					T.	.08	.01		.06												.01	T.	.05	0.36								
Sioux City †	Missouri	T.	T.	.05			.04	T.	T.	.01				T.	T.	.08	.02	.06			T.	T.				T.							.02	0.32								
Sloan	Missouri		T.								T.										T.	.30										.20	.02	0.02								
Woodbine	Missouri																																.28	0.78								
<i>Central District</i>																																										
Ames †	Skunk			.05	T.		.02	.10	T.	.02	T.					.03	.15	T.		.13	T.											T.	.04	0.54								
Boone	Des Moines			.06			.05	.05	.01	.09						.01	.16	T.		.19	.01						T.					T.	.03	.04	0.70							
Des Moines †	Des Moines		.01	.03			.08	.05	.01	.10				T.	T.	.14	T.	.04	.15							T.						T.	.02	.02	0.63							
Des Moines Apt. †	Des Moines		.01	.05			.04	.01	T.	.09						T.	.12	T.	.04	.13														.09	.02	0.51						
Dunbar (near)	Iowa			.09			.15	.11		.15						.02	.21	.01	T.	.33	.03												.03	.05	1.19							
Fort Dodge †	Des Moines			.10	.10			.11	T.	.08	T.					.01	T.	.28	.11	.07	.10												.02	.02	1.04							
Grinnell †	Iowa			.10	T.		T.	.12	T.	.13							.16			.09	T.												.05	.02	0.62							
Grundy Center	Cedar			.12				.15	.20	.45							.20			.28												T.	.02	.05	1.45							
Iowa Falls †	Iowa					.10		.12		.08	.05									.10	T.													.02	.02	0.71						
Marshalltown †	Iowa			.07	.11			.19	.03	.10	T.						.02	.16		.02	.03							T.						.08	.07	0.73						
Monroe	Des Moines	T.		T.			.03	.11	.01	T.							.22			.06	.03												T.	.11	.02	0.46						
Newton	Skunk			.13	T.		T.	.31	.03	.41	T.						.03	.32		T.	.44	.03					T.	T.					.02	.02	1.81							
Perry	Raccoon			.04				.04		.08	.01						.01	.10			.21	.02												.02	.02	0.53						
State Center	Iowa		T.	.04			.02	.17	.04	.15	T.						.06	.26	T.	T.	.04	.02												.08	.08	0.82						
Toledo	Iowa			.16	T.		.04	.15	.18	.03							.02	.20			.23	.06												.08	.08	1.15						
Van Meter †	Raccoon			T.	.06		T.	.04		.08	T.						T.	T.	.08	.08														T.	.02	.02	0.36					
Wauke	Raccoon																																			.03	.03	0.51				
Webster City †	Boone					.14			.06	T.	.10						.03	.15																		.04	.04	0.11				
Webster City (rv.) †	Boone					.02			.03	T.	.02																															
<i>East Central District</i>																																										
Anamosa	Wapsipinicon			.18			.03	.12		.02							.06	.16			.16															T.	.05	0.71				
Belle Plaine	Iowa			.10	T.		.04	.12	T.	.12	T.						.03	.18			.30	T.														.10	.05	0.94				
Bellevue LD 12 †	Mississippi	.05	T.	.06	.22		T.	.13	.05	.07	.04						.24		.35		.13	.22															.14	.05	1.80			
Cedar Rapids †	Cedar		T.	.12	.09		T.	.11	.04	.14	.02						.19		.22		.16	.28															.02	.02	1.42			
Ced. Rap. (rvr.) †	Cedar			.08	.07		T.	.14	.06	.12	T.						.03		.23		.24	.30																.02	.02	1.35		
Clarence	Wapsipinicon			.04	.09		.03	.09	T.	.05							.14	.26		T.	.10	T.															.03	.03	0.87			
Clinton	Mississippi		T.	.18	T.		.09	.12	T.	.11							.30	.33	T.	T.	.41	.10																.07	.07	1.83		
Clinton (rvr.) †	Mississippi			.02	.07		.02	.05	.14	.02	T.						.29		.12		.08	.24																.02	.02	1.09		
Davenport †	Mississippi	.01		.18	T.		.13	.12	.01	.07	T.						.29	.27		.09	.32	.01																.01	.01	1.62		
Davenport LD 15 †	Mississippi		T.	.14	.06		.08	.10	.06	.10	.03						.31	.25		.16	.31																	.02	.02	1.63		
Iowa City †	Iowa			.16	T.		.10	.08	.01	.09							.12	.27		.01	.13	.03																.01	.01	1.16		
Le Claire †	Mississippi			.03	.08		.03	.12	.04	.04	.02						.19	.25		.20	.21																	.01	.01	1.27		
Le Claire LD 14 †	Mississippi			.09	.08		.05	.09	.04	.05	.01						.30	.18		.14	.31																		.05	.05	1.40	
Maquoketa	Maquoketa			.14	T.		T.	.11	.10	.13	T.																													.12	.12	1.25
Monmouth	Maquoketa																																									
Muscatine	Mississippi			.16	T.		.20	.11	.02	.13							.20	.27		T.	.19	.04																				
Muscatine (rvr.) †	Mississippi			T.	.12		T.	.20	.02	.05	T.						.13		.12		.12	.14																				
Muscatine LD 16 †	Mississippi			.14	.06		.11	.16	.07	.12	.01						.16		.32		.11	.13																				
Vinton	Cedar			.15			.10	.10		.17							.10	.18		.20																						
Williamsburg	Iowa			.14		.05	.01	.06		.08							.06	.22		.02	.09																					
<i>Southwest District</i>																																										
Atlantic †	Nishnabotna			T.	.07					T.	T.																															
Bedford	102			T.																																						
Bedford SCS †	102																																									
Blockton SCS	Platte			.06				.10																																		
Clarinda †	Nodaway			.04	T.					T.	T.																															
Clarinda Eros. †	Tarkio			.01	.02					T.	T.																															
Corning	Nodaway																																									
Cumberland (near)	Nodaway			T.	T.					T.	T.																															
Emerson SCS †	Nishnabotna			T.	.03			.02		T.	T.																															
Glenwood	Missouri			T.	.10					T.	T.																															
Greenfield	Nodaway			.04						T.	T.																															
Oakland	Nishnabotna			.03						T.	T.																															
Red Oak	Nishnabotna			T.						T.	T.																															
Red Oak (near)	Nishnabotna																																									
Riverton (near)	Nishnabotna																																									



to death at West Bend on the 17th, and Mrs. Alex Dickerson likewise froze to death at Ottumwa the night of the 18th.

Warmer air again overspread the State from the north Pacific region on the 21st and 22d and at most stations the maximum temperatures of the month occurred on the latter date. The break in the cold spell was of brief duration as a new outbreak of cold Arctic air occurred on the 23d and brought subnormal temperatures that persisted through the 26th. There was no precipitation of consequence from the 20th to the 30th with only light scattered snow on the 24th-25th. The cold weather from the 16th to the 26th, broken only by the unusually high temperatures of the 22d, wiped out the temperature excess that had been built up during the first half of the month and resulted in the monthly average temperature being below the all-time mean. The cold air was replaced by warmer masses on the 26th and mild temperatures that prevailed until the close of the month. Light precipitation again occurred on the 31st.

At the seven first order stations, the average number of degree days was 1,450, compared to the Iowa January normal of 1,347. In other words, fuel requirements for heating purposes were about 8% greater than the all-time average.

Sunshine, relative humidity and the number of days with clear, partly cloudy or cloudy skies were all close to the respective normals. However, the number of days with measurable precipitation was 8, or 3 more than normal.

A meteor of unusual brilliance was observed on January 26 at 7:45 p.m., C.W.T. On that date, Mr. Charles H. Dwelle, cooperative weather observer at Northwood, observed the phenomenon as he was preparing to read his instruments. The meteor was bluish-green and the light shone on the ground in a manner similar to flares, but lasted only 2 or 3 seconds. The path was in the form of an arc that started to the north-northeast of the observer and faded to the south-southeast. The middle of the arc was about 45° above the horizon. The meteor was also observed by Mr. C. H. Gilbert, cooperative observer at Iowa Falls, and by a man living near Wellman but no further details or descriptions have been received.

Most of the streams were frozen over during the entire month. The U. S. Geological Survey reports that stream flow in Iowa continued above normal during January. S.E.D.

#### TEMPERATURE

The Statewide average temperature, derived from the averages of nine districts of approximately equal area which in turn were computed from the averages of 121 temperature observing stations, was 16.7°. This was 1.9° lower than the average of all Januarys during the 71 years of record. There have been 46 warmer, 23 colder and one equally cold January during the preceding 70 years. The temperature averaged normal or slightly above in the southern third of the State but was below normal in the northern and central districts. The highest district mean was 22.2°, in the southeast, while the lowest was 11.3°, in the northwest and north central districts. The highest station average was 25.0°, at Keokuk, and the lowest was 8.8°, at Sibley. The highest observed was 54°, on the 15th, at Thurman, and on the 22d, at Ottumwa. The absolute low was -31°, at Rock Rapids on the 19th. The average number of days with zero or lower was 10, and except at 2 stations in the extreme southeast, the temperature fell below the freezing point at all stations on every night during the month. The average number of days on which the temperature failed to rise above the melting point was 20.

#### PRECIPITATION

The average precipitation in Iowa during January was 0.79 inch, or 0.30 inch less than the 71-year mean. Except that measured totals at 123 stations were used as the base, the precipitation and snowfall averages were computed in the same way as the temperature data. There have been 49 wetter and

21 drier Januarys prior to 1943. It was driest in the southwest, south central and west central districts and wettest in the northeast. Amounts averaged above normal in the northern third but were below in the central and southern districts. The greatest station total was 2.54 inches at Waukon, while the least was a trace, or an amount too small to measure, at Cumberland (near). The greatest 24-hour fall was 0.78 inch at Waukon, on the 9th. Measurable precipitation fell on an average of 8 days, or 3 more than the usual number.

#### SNOWFALL

The average snowfall was 9.2 inches, or 2.0 inches more than the average of the past 52 years. There have been only 13 years with more snow in January, while in 38 years there was less than in 1943. Distribution of the snow was similar to that of the precipitation generally, and ranged from only a trace at Cumberland (near), to 29.5 inches at Elkader. At the close of the month snow cover was confined to scattered patches and old drifts in much of the southern and western sections of the State, but a deep blanket covered the north central and northeast districts, ranging up to 20 inches in parts of the extreme northeast.

#### MISCELLANEOUS PHENOMENA

*Aurora*: 17th.

*Corona*, lunar: 21st, 22d, 23d, 25th, 28th.

*Fog*, light: 1st, 2d, 3d, 5th, 6th, 7th, 9th, 15th, 16th, 21st, 22d, 23d, 24th, 26th, 29th, 30th, 31st.

*Fog*, heavy: 1st, 2d, 6th, 7th, 22d, 23d, 24th, 28th, 29th, 30th.

*Glaze*: 2d, 3d, 4th, 6th, 7th, 9th, 13th, 14th, 21st, 22d.

*Hail*: 29th.

*Halo*, lunar: 12th, 17th, 20th, 22d, 25th, 27th, 28th.

*Halo*, solar: 1st, 5th, 18th, 25th, 27th, 28th, 29th.

*Parhelia*: 4th, 20th, 24th, 25th, 28th, 31st.

*Paraselene*: 25th.

*Sleet*: 3d, 6th, 7th, 8th, 9th, 10th, 13th, 14th, 15th, 16th, 18th, 19th, 20th, 21st, 23d, 29th, 31st.

#### ERRATA

Report for August, 1942. Page 71, Indianola, monthly mean temperature published 73.5, should be 73.6; departure published +0.5, should be +0.6. Page 77, Indianola, maximum temperature on 27th published 83, should be 88; monthly mean maximum temperature published 85.2, should be 85.4.

Report for December, 1942. Page 118, Waterloo, total precipitation published 1.26, should be 1.06; departure published +0.11, should be -0.09; days with .01 inch or more precipitation published 7, should be 6. Page 119, Vinton, monthly mean temperature published 19.6, should be 19.8; departure published -4.6, should be -4.4. Page 120, Waterloo, precipitation on 27th published .20, should be .06, monthly total published 1.26, should be 1.06. Page 125, Davenport, maximum temperature on 17th published 41, should be 43, monthly mean maximum temperature published 29.3, should be 29.4; Vinton minimum temperature on 15th published 5, should be 15; monthly mean minimum temperature published 11.7, should be 12.0.

Annual Report for 1942. Page 132, Waterloo, total precipitation published 40.52, should be 40.32; days with .01 inch or more precipitation published 106, should be 105. Page 135, Vinton, December mean temperature published 19.6, should be 19.8; departure published -4.6, should be -4.4; Indianola, August mean temperature published 73.5, should be 73.6; departure published +0.5, should be +0.6. Page 136, Waterloo, December total precipitation published 1.26, should be 1.06; departure published +0.11, should be -0.09; annual total published 40.52, should be 40.32; departure published +8.78, should be +8.58.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JANUARY, 1943

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>Northwest District</i>																																	
Alta.....	30	30	22	10	31	27	12	17	31	33	29	16	24	37	30	18	-6	-9	5	5	21	30	20	-2	0	27	33	38	36	31	18	21.0	
Alton.....	31	30	20	15	30	27	18	17	33	38	32	22	28	40	34	23	3	-9	6	5	20	25	17	2	7	28	33	36	34	32	21	22.5	
Cherokee.....	30	30	20	10	31	27	15	17	32	34	28	21	30	38	30	18	1	-10	5	2	19	28	12	7	3	28	34	37	34	31	19	21.3	
Estherville.....	27	27	20	12	28	20	10	19	33	34	28	16	27	38	20	15	-3	-9	2	-3	15	17	6	0	5	15	33	35	31	29	22	18.4	
Hawarden.....	32	31	14	16	30	29	16	19	34	40	33	24	30	42	34	21	1	-5	8	8	17	22	16	6	9	31	35	36	35	21	23.3		
Lake Park.....	29	27	19	8	27	21	11	18	32	33	32	19	22	37	27	17	0	-10	5	4	14	12	7	4	1	19	31	34	33	30	20	18.8	
Le Mars.....	31	31	20	16	30	25	15	21	33	38	35	25	28	41	39	28	-2	-12	6	4	20	26	16	4	9	29	34	38	36	34	27	23.5	
Pocahontas.....	29	30	22	7	29	26	12	18	33	32	28	18	27	38	30	18	0	-10	0	0	19	35	12	10	0	25	33	34	33	30	19	20.5	
Rock Rapids.....	29	28	18	8	22	23	14	18	33	36	32	19	29	38	29	18	6	-12	2	1	13	17	9	5	5	26	32	34	33	31	18	19.8	
Sioux Rapids.....	31	30	32	13	34	27	16	20	34	32	31	23	25	40	26	18	4	-8	1	8	20	30	18	8	7	27	35	36	36	34	22	21.6	
Spencer.....	30	27	20	10	28	22	14	16	34	32	30	22	25	38	28	19	-2	-10	0	-3	17	21	11	5	5	22	34	36	35	30	20	19.9	
<i>North Central District</i>																																	
Algona.....	29	30	22	10	22	25	12	17	35	29	28	16	25	39	19	15	0	-11	-2	-2	20	36	9	10	2	17	33	32	30	30	22	19.3	
Bancroft.....	29	28	21	12	17	26	11	15	33	29	25	15	22	37	17	15	0	-11	-3	-3	20	35	11	12	6	14	31	32	31	29	23	18.7	
Belmond.....	29	29	23	15	24	28	19	18	33	29	24	17	22	38	20	19	4	-12	-3	6	26	42	19	14	-2	20	33	32	33	29	23	21.0	
Britt.....	31	29	23	11	23	25	18	19	33	26	24	13	23	38	16	16	1	-12	-3	2	23	38	11	13	0	18	32	34	31	30	22	19.7	
Charles City*.....	32	31	25	8	19	24	20	20	35	29	25	14	29	37	16	21	2	-2	-6	7	22	40	18	22	1	14	28	31	30	26	23	20.7	
Dakota City.....	29	30	24	17	27	20	15	18	34	31	27	18	26	38	23	17	4	-7	1	1	23	41	14	12	2	22	34	34	30	31	20	21.5	
Mason City.....	29	29	24	15	24	20	18	17	34	28	25	15	21	37	15	20	5	-6	-7	2	21	41	15	5	-1	15	30	29	30	27	24	19.4	
Northwood.....	29	30	21	13	25	17	20	17	34	31	26	13	18	37	14	14	5	-6	-8	-7	19	30	15	15	-3	12	28	28	27	20	18.4		
Osage.....	32	31	24	18	19	20	19	22	35	37	26	17	13	36	16	20	14	-3	19	3	21	43	33	20	1	15	30	32	28	26	24	22.3	
<i>Northeast District</i>																																	
Decorah.....	34	30	25	19	16	19	19	19	36	34	25	18	12	38	15	21	15	2	-5	1	21	45	27	24	0	16	30	34	28	28	24	21.6	
Delaware (near).....	31	31	30	15	21	31	19	20	34	33	23	17	13	37	16	21	17	3	0	10	24	40	34	28	0	15	27	29	27	29	24	22.5	
Dubuque*.....	35	34	27	19	22	26	22	28	36	33	29	15	26	41	20	26	19	15	-1	10	29	45	32	31	3	10	31	34	32	38	26	25.8	
Elkader.....	32	33	31	21	20	22	22	23	36	36	28	20	15	38	15	23	18	5	-3	10	27	44	32	25	-1	11	32	35	30	26	23.7		
Fayette.....	30	32	28	16	19	24	22	23	35	34	25	19	16	38	15	22	18	3	-3	-8	30	41	29	24	-2	14	28	31	30	26	24	22.5	
Independence.....	33	33	32	19	23	33	22	26	35	34	28	22	17	38	22	23	14	3	-2	9	26	41	33	26	-2	15	31	31	31	28	25	24.2	
New Hampton.....	31	30	26	17	19	23	19	23	34	33	25	16	10	36	16	20	14	-3	-5	6	22	42	33	22	-2	14	27	29	27	27	23	21.1	
Waterloo.....	32	32	31	19	27	34	22	25	36	35	25	22	19	40	20	23	17	-6	2	12	27	43	34	25	14	19	30	31	34	28	25	25.1	
Waverly.....	30	31	28	17	21	29	20	22	35	32	24	17	19	38	18	21	15	-1	-1	11	26	40	28	23	-2	15	28	30	32	31	25	22.6	
<i>West Central District</i>																																	
Carroll.....	32	31	26	15	36	33	18	20	34	35	33	25	27	40	35	31	5	-8	8	8	27	45	32	13	6	32	37	41	39	35	23	26.3	
Denison.....	30	31	23	16	34	33	17	24	33	35	33	25	28	39	39	25	5	-10	8	10	29	43	29	15	7	31	35	41	36	34	21	25.8	
Guthrie Center.....	31	32	29	18	37	35	20	21	34	35	33	28	29	41	40	34	6	-8	7	18	32	49	33	15	10	31	38	41	40	35	22	27.9	
Harlan.....	33	30	25	16	35	34	19	21	35	35	33	28	28	42	40	39	7	-6	8	17	30	45	36	17	8	31	37	43	39	36	25	27.9	
Jefferson.....	31	31	29	15	36	34	21	22	37	34	32	25	27	42	34	28	7	-9	-11	-21	0	2	19	1	-3	-8	-2	13	22	26	10	12	9.1
Little Sioux.....	31	31	20	22	35	34	16	22	36	36	34	27	31	44	41	40	7	-7	11	11	24	33	23	12	12	33	37	43	38	36	26	27.1	
Logan.....	33	32	22	15	35	34	17	21	38	36	34	28	31	43	41	41	6	-6	9	9	30	42	31	18	7	31	37	42	38	35	23	27.5	
Mapleton.....	31	31	18	14	35	31	14	21	34	38	35	22	31	41	42	25	4	-9	9	5	24	35	21	11	7	31	37	40	36	31	22	24.7	
Rockwell City.....	30	30	24	11	31	30	15	18	35	31	30	21	25	39	32	21	3	-8	-3	-4	23	41	32	12	3	28	34	33	35	32	20	22.8	
Sac City.....	31	30	23	15	32	30	14	19	33	34	29	22	25	39	32	25	2	-11	9	4	21	37	25	10	11	28	35	37	32	33	26	23.6	
Sioux City*.....	32	31	17	20	33	26	14	30	34	40	32	21	41	42	45	21	-6	-9	11	5	20	23	14	10	10	33	37	39	36	27	20	24.2	
<i>Central District</i>																																	
Ames.....	30	30	30	13	32	33	22	22	34	31	29	23	26	39	32	21	9	-5	3	15	28	43	34	16	5	37	35	32	35	32	22	25.1	
Boone.....	30	30	28	11	33	40	21	20	32	32	30	23	28	38	33	23	7	-7	4	10	29	45	32	16	4	27	35	33	33	34	25	25.1	
Des Moines*.....	32	32	31	17	35	36	22	24	35	33	34	22	34	42	32	23	4	-3	5	19	32	49	21	19	7	28	38	37	38	34	25	27.0	
Fort Dodge.....	29	30	26	11	29	30	16	20	34	32	29	20	25	39	30	19	3	-8	5	6	24	43	21										

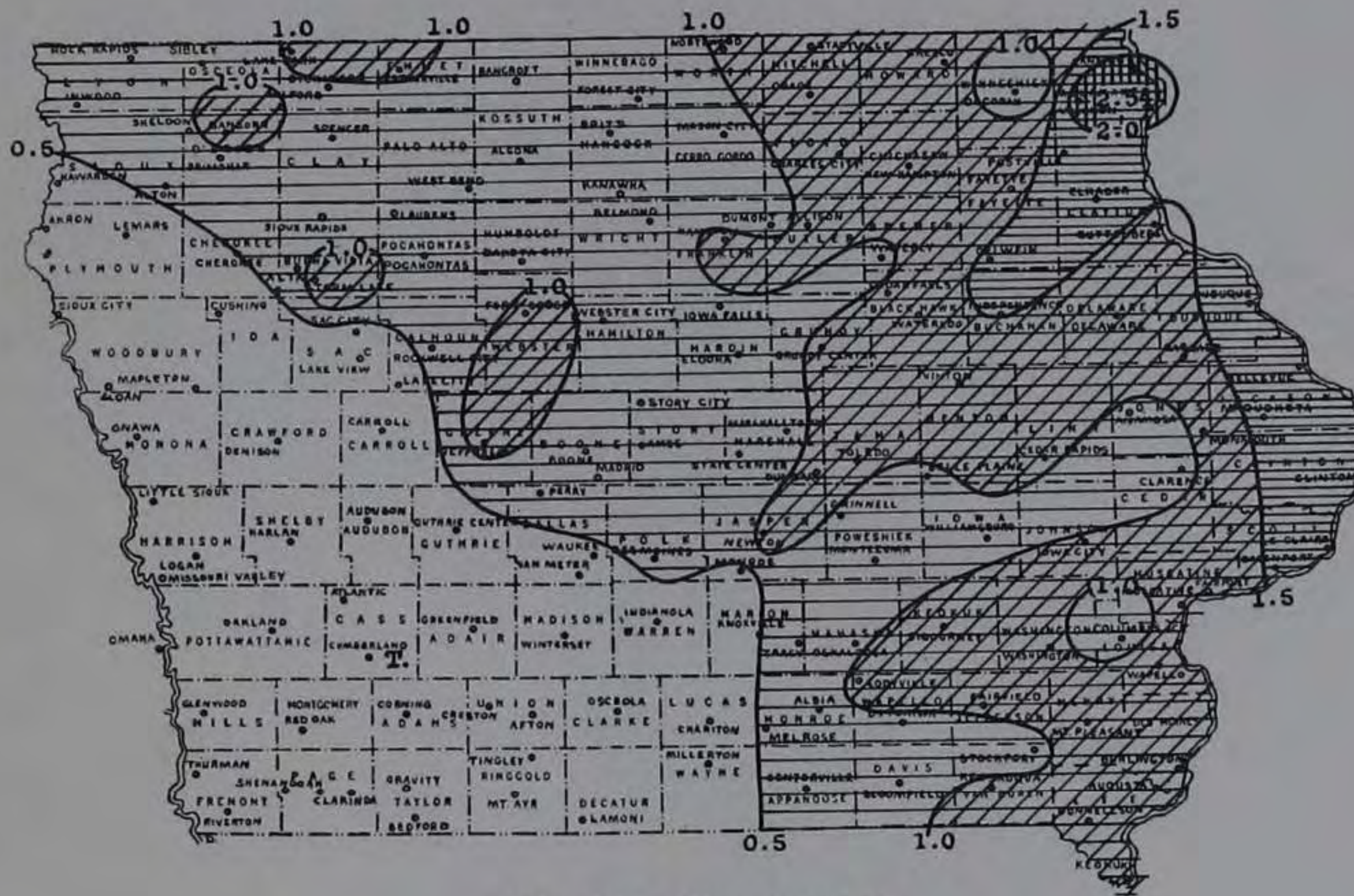


DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JANUARY, 1943—Continued

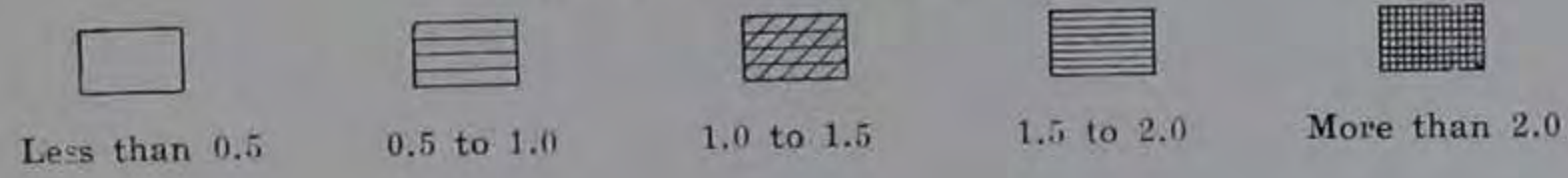
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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. †Interpolated.

TOTAL PRECIPITATION, JANUARY, 1943



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

11

IOWA SECTION  
In co-operation with  
IOWA DEPARTMENT OF AGRICULTURE  
C. D. REED

VOL. LIV DES MOINES, IOWA, FEBRUARY, 1943 No. 2

## GENERAL SUMMARY

February, 1943, was warm and dry. In contrast to the two preceding months the temperature averaged 5.1° above normal, and except for the week, 10th-16th, and again on the 26th, mild weather prevailed. The average total precipitation of 0.77 inch was 0.31 inch less than the all-time February average. Furthermore, a good part of the monthly total fell the night of the 2d-3d, and at many western stations no further measurable precipitation occurred during the remainder of the month. The number of clear days was 25% greater than usual, while cloudy skies prevailed less than half the normal amount of the time. Sunshine averaged 74% of the possible amount, or 18% more than normal. Heating requirements, based on degree days at seven first order stations, averaged 91% of the February normal.

Despite the mild temperature the snow that covered most of the northern third of the State and the Cedar River Valley, at the end of January, melted slowly and in the northeast district some of it remained until the end of February. In most of the southern, central and western sections the ground was bare most of the month except for relatively short periods after fresh falls of snow.

The warm weather and rain of the 2d-3d caused the ice to break up in the Nishnabotna River and resulted in local floods in southwest Iowa. Train service between Riverton, Red Oak and Hamburg was interrupted on two days.

Ice began breaking up in the Des Moines River and the tributaries emptying into it from just above Des Moines to below Ottumwa on the night of the 2d. Ice gorges formed below Tracy and Eddyville, causing serious overflow at those points. Highway 137 was overflowed between Eddyville and Albia. The Eddyville gorge dammed sufficient water to have caused a serious flood at Ottumwa if the jam had broken suddenly, but the ice held and colder weather lessened the danger by reducing runoff on the 10th. A breakup of ice above Des Moines on the 23d brought new floods due to gorges to Tracy and Eddyville and once more threatened Ottumwa. However, the Eddyville gorge weakened sufficiently to permit some of the water to run through and a new cold wave in March ended the danger of a flood at Ottumwa.

Similar conditions prevailed on other interior streams. The U. S. Geological Survey reports index streams in Iowa had exceptionally high February discharges. The maximum daily discharge of the Iowa River at Marshalltown was 4,060 cubic feet per second, compared with the maximum of record of 4,790 in February, 1922. The maximum daily discharge of the Big Sioux River at Akron was 6,870 cubic feet per second, compared with the previous maximum of 2,640 in February, 1930. The monthly totals at these stations exceeded all previous February records.

## COMPARATIVE DATA FOR FEBRUARY, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	19.2	49	-25	1.17					
1874.....	21.2	59	-20	1.28					
1875.....	6.4	48	-31	1.72					
1876.....	25.5	68	-16	1.11					
1877.....	34.0	63	-5	0.21					
1878.....	34.4	60	-8	0.59					
1879.....	21.6	57	-20	0.68					
1880.....	27.4	68	-12	0.64					
1881.....	17.0	57	-24	3.10					
1882.....	33.5	72	-12	0.91					
1883.....	17.7	62	-33	1.89					
1884.....	18.3	56	-23	1.32					
1885.....	12.5	54	-32	0.82					
1886.....	21.2	56	-34	0.59					
1887.....	17.1	60	-25	2.14					
1888.....	20.2	64	-34	1.01					
1889.....	17.8	62	-28	0.47					
1890.....	25.1	68	-24	0.83					
1891.....	19.4	70	-31	1.16		3	13	7	8
1892.....	28.1	68	-20	1.20	5.0	6	6	7	16
1893.....	16.0	60	-28	1.39	8.1	6	10	8	10
1894.....	19.7	60	-19	0.89	8.4	3	16	8	4
1895.....	16.4	73	-33	0.49	3.3	4	13	9	6
1896.....	27.4	78	-13	0.71	5.4	4	12	9	8
1897.....	24.7	61	-24	0.89	8.0	5	6	10	12
1898.....	24.2	62	-18	1.20	7.8	5	10	9	9
1899.....	12.2	75	-40	0.89	7.1	5	11	10	7
1900.....	14.8	60	-27	1.30	9.9	6	10	8	10
1901.....	17.5	49	-21	1.01	9.7	4	15	7	6
1902.....	17.6	62	-21	0.73	2.6	4	13	8	7
1903.....	19.8	56	-21	1.18	7.9	4	13	7	8
1904.....	14.8	70	-26	0.41	4.5	4	10	9	10
1905.....	12.8	69	-41	1.57	15.5	7	14	6	8
1906.....	23.6	66	-32	1.29	6.1	5	14	7	7
1907.....	25.0	65	-31	0.71	4.6	4	14	6	8
1908.....	24.3	59	-16	1.69	8.9	6	12	6	11
1909.....	26.2	62	-26	1.54	7.7	5	11	6	11
1910.....	17.8	58	-21	0.46	4.0	3	14	8	6
1911.....	27.3	71	-13	2.76	7.0	6	12	6	10
1912.....	18.1	57	-30	1.21	11.2	5	10	9	10
1913.....	20.2	70	-24	0.82	7.3	4	14	7	7
1914.....	16.8	59	-29	0.87	9.2	6	10	9	9
1915.....	29.1	62	-8	2.93	9.4	9	9	5	14
1916.....	19.0	62	-32	0.55	6.0	4	14	8	7
1917.....	15.2	68	-37	0.36	3.5	3	14	8	6
1918.....	23.0	70	-36	0.95	6.0	5	14	7	7
1919.....	24.9	65	-16	2.42	9.9	8	11	5	12
1920.....	24.0	59	-22	0.56	4.1	5	9	6	14
1921.....	31.0	76	-5	0.77	6.5	5	13	7	8
1922.....	23.7	70	-20	1.59	1.3	4	14	7	7
1923.....	20.1	61	-23	0.40	3.2	3	13	8	7
1924.....	25.8	70	-15	1.27	11.2	7	15	5	9
1925.....	28.4	66	-16	0.82	2.6	4	11	7	10
1926.....	31.2	67	-2	0.76	3.3	4	10	7	11
1927.....	30.6	65	-17	1.15	4.4	5	13	6	9
1928.....	28.6	65	-14	1.95	4.4	7	15	5	9
1929.....	14.0	52	-35	1.31	12.5	8	10	7	11
1930.....	35.5	80	-34	0.67	2.8	5	11	10	7
1931.....	35.4	65	-4	0.25	0.9	2	16	5	7
1932.....	28.9	74	-16	0.83	5.1	5	12	8	9
1933.....	22.3	69	-31	0.32	3.6	3	17	6	5
1934.....	25.0	71	-25	0.47	4.1	3	14	8	6
1935.....	29.1	64	-19	1.13	5.5	6	9	7	12
1936.....	6.0	71	-35	1.33	15.9	9	9	10	10
1937.....	19.6	60	-24	1.04	6.7	6	12	7	9
1938.....	29.0	71	-22	0.94	4.6	7	7	7	14
1939.....	20.3	60	-23	1.75	14.9	5	14	6	8
1940.....	24.2	56	-27	1.18	11.1	9	8	6	17
1941.....	22.3	59	-18	0.50	2.2	4	10	9	9
1942.....	23.4	52	-21	1.15	9.4	6	6	9	13
1943.....	27.5	71	-20	0.77	2.9	4	16	8	4
Period.....	22.4	80	-41	1.08	6.7	5	12	7	9

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

Damage caused by the high water was relatively small, although there was some loss of livestock, and fences, roads, etc., suffered some damage.

Farm activity was mostly confined to repair of machinery and buildings during most of the month, but during the last

CLIMATOLOGICAL DATA FOR FEBRUARY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit					Precipitation, in inches				Number of days			Prevailing direction of wind	OBSERVERS			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more			Clear	Partly cloudy	Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54	26.1	+ 7.6	60	21	-11	14	0.70	- 0.32	0.45	3	4.2	6	15	10	3	nw.	D. E. Hadden
Alton	Sioux	1,305	39	27.6	+ 9.7	65	21	- 9	14	0.76	- 0.05	0.41	3	4.5	4	11	13	4	w.	W. S. Slagle
Cherokee	Cherokee	1,358	24	26.6	+ 8.0	60	21	-11	14	0.61	+ 0.02	0.45	3	2.0	5	13	11	4	nw.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	22.4	+ 5.8	55	21	-16	14	0.52	- 0.35	0.31	3	7.1	8	10	3	9	nw.	Mrs. Mayme P. Orvit
<b>Hawarden</b>																				
Inwood (near)	Sioux	1,191	17	28.6	+ 9.6	67	21	- 7	14	0.57	- 0.23	0.49	3	T.	5	16	7	5	s.	Earl V. Slife
Lake Park	Lyon	1,474	41	26.0	+ 9.4	63	21	-11	14	0.51	- 0.19	0.40	3	0.8	3	16	8	4	nw.	A. C. Hanson
Le Mars	Dickinson	1,479	41	23.0	+ 6.6	52	21	-16	14	0.56	- 0.26	0.22	3	7.2	4	16	3	9	nw.	Frank O. Rood
Pocahontas	Plymouth	1,230	57	28.6	+ 8.9	66	21	- 7	14	0.66	- 0.15	0.55	3	1.5	4	16	8	4	nw.	D. N. Zeig
	Pocahontas	1,228	40	24.4	+ 5.9	56	21	-11	14	0.71	- 0.23	0.46	3	2.5	4	9	13	6	nw.	Wilbern L. Boyd
<b>Primghar</b>																				
Rock Rapids	O'Brien	1,517	17	26.8	+ 9.7	60	21	-12	14	0.73	- 0.15	0.46	3		5	20	1	7	nw.	Scott King
Sanborn	Lyon	1,341	47	25.4	+ 8.7	62	21	-10	14	0.49	- 0.23	0.33	3	1.8	3	12	10	6	nw.	George Raveling
Sheldon	O'Brien	1,552	31	24.2	+ 7.6	55	21	-15	14	0.83	- 0.09	0.63	3	2.7	5	15	3	10	nw.	Susie O. Dow
Sibley	O'Brien	1,418	38	24.8	+ 7.9	59	21	-11	14	0.48	- 0.33	0.39	3	2.7	5	16	10	2	nw.	Ross E. Forward
	Osceola	1,494	9	23.2	+ 7.2	56	21	-15	14	0.49	- 0.31	0.43	3	3.9	2	17	5	6	sw.	R. D. Stewart
<b>Sioux Rapids</b>																				
Spencer	Buena Vista	1,275		25.6		59	22	-12	14	0.49		0.35	3	1.7	4	15	6	7	nw.	Walter A. Simonsen
Storm Lake	Clay	1,319	36	24.4	+ 7.0	58	21	-15	14	0.62	- 0.34	0.37	3	4.3	5	13	10	5	nw.	E. W. Little
West Bend	Buena Vista	1,455	54	25.8	+ 6.2	55	27	-10	14	0.56	- 0.32	0.41	3	1.5	3	20	5	3	s.	Paul B. Vance
	Palo Alto	1,197	57	23.8	+ 5.7	55	22	-17	14	0.75	- 0.11	0.55	3	4.5	4	13	13	2	nw.	Jos. Dorweiler
<b>Means and extremes</b>																				
				24.5	+ 7.7	67	21	-17	14	0.61	- 0.22	0.63	3	3.1	4	15	8	5	nw.	
<b>North Central Dist</b>																				
Algona	Kossuth	1,200	83	23.4	+ 5.2	55	27	-15	14	0.80	- 0.21	0.59	3	5.1	4	14	9	5	nw.	Harry B. Nolte
Allison	Butler	1,060	30	22.5	+ 4.1	54	27	-15	14	0.98	- 0.14	0.48	3	9.0	4	17	9	2	nw.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	21.8	+ 4.9	51	27	-18	14	1.08	+ 0.12	0.70	3	6.7	5	15	8	5	nw.	Wilbur Fox
Belmond	Wright	1,175	35	22.0	+ 4.4	52	27	-14	14	0.72	- 0.46	0.53	3	1.9	4	15	10	3	nw.	W. H. Dempsey
Britt	Hancock	1,240	59	22.0	+ 4.4	53	27	-17	14	0.72	- 0.06	0.45	3	9.1	5	14	7	7	nw.	L. M. Naser
<b>Charles City</b>																				
Dakota City	Floyd	1,013	69	20.5	+ 3.4	51	27	-15	14	0.70	- 0.40	0.40	3	7.1	7	16	3	9	nw.	U. S. Weather Bureau
Forest City	Humboldt	1,133	60	24.3	+ 5.4	56	21	-13	14	0.66	- 0.32	0.52	3	2.7	4	15	8	5	s.	H. S. Brandsgard
Hampton	Winnebago	1,289	54	21.4	+ 4.4	50	27	-19	14	0.85	- 0.19	0.37	3-4	6.5	8	14	8	6	nw.	Dr. M. B. Neil
Mason City	Franklin	1,142	53																	E. A. Saxton
	Cerro Gordo	1,148	52	20.2	+ 3.3	50	27	-19	14	0.37	- 0.61	0.22	3	8.1	5	15	8	5	nw.	Amer. Crystal Sugar Co.
<b>Northwood</b>																				
Osage	Worth	1,222	48	19.1	+ 2.8	47	19	-20	14	0.42	- 0.85	0.15	15	7.5	6	16	6	6	nw.	Charles H. Dwelle
	Mitchell	1,163	59	21.2	+ 4.5	50	27	-18	14	0.76	- 0.36	0.60	3	3.3	3	13	6	9	sw.	Harry D. Hedrick
<b>Means and extremes</b>																				
				21.7	+ 4.2	56	21	-20	14	0.73	- 0.33	0.70	3	6.1	5	15	7	6	nw.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							0.74	- 0.31	0.55	3	6.2	5	17	3	8	sw.	E. J. Cable
Cresco	Howard	1,260	7	19.6	+ 3.1	47	27	-16	14	0.37	- 0.78	0.28	3	4.0	4	17	4	7	nw.	William Hebig
Decorah	Winneshiek	886	61	20.4	+ 2.8	50	22	-15	14	0.53	- 0.59	0.28	3	5.4	5	12	13	3	nw.	Mrs. Fleta M. Rose
Delaware (near)	Delaware	1,083	65	22.0	+ 1.2	52	27	-13	14	0.45	- 0.41	0.30	3	3.5	4	18	9	1	nw.	E. J. Paris
Dubuque	Dubuque	642	93	24.8	+ 2.6	56	22	- 7	14	0.71	- 0.67	0.45	3	3.9	10	14	7	7	nw.	U. S. Weather Bureau
<b>Elkader</b>																				
Fayette	Clayton	772	52	22.1	+ 1.3	53	22	-13	14	0.56	- 0.54	0.36	3	4.5	5	15	4	9	w.	W. H. O'Brien
Guttenberg	Fayette	1,009	56	21.6	+ 2.5	50	27	-13	14	0.69	- 0.70	0.45	3	2.0	4	12	9	7	nw.	John P. Clyde
Independence	Clayton			24.5	+ 3.5	54	22	- 9	14	0.46	- 0.74	0.22	3-4	1.5	8	16	2	10		U. S. Engineers
New Hampton	Buchanan	956	84	23.0	+ 1.5	53	22	-13	14	0.80	- 0.11	0.60	3	5.3	4	15	8	5	nw.	August Bracht
	Chickasaw	1,161	47	21.2	+ 3.5	50	27	-15	14	0.49	- 0.58	0.41	3	1.4	3	10	11	7	nw.	C. Maas
<b>Oelwein</b>																				
Postville (near)	Fayette	1,036	21	21.2	+ 1.2	52	22	-15	14	0.86	- 0.05	0.46	3	4.0	3	16	0	12	nw.	John T. Ridler
Waterloo	Clayton	1,130	53	21.0	+ 2.9	49	22	-15	14	0.41	- 0.77	0.30	3	2.9	5	14	11	3	nw.	V. H. Williams
Waukon	Black Hawk	848	62	24.2	+ 3.5	55	22	-14	14	0.69	- 0.48	0.48	3	2.6	7	17	8	3	nw.	Ralph B. Slippy
Waverly	Allamakee	1,287	9	20.0	+ 1.5	47	22	-17	14	0.66	- 0.49	0.49	3	5.6	4	14	5	9	w.	Mrs. Albert S. Tousey
	Bremer	935	55	21.8	+ 2.9	52	27	-15	14	0.56	- 0.52	0.38	3	6.2	6	14	10	4	nw.	Charles W. Wile
<b>Means and extremes</b>																				
				22.0	+ 2.6	56	22	-17	14	0.60	- 0.51	0.60	3	3.9	5	15	7	6	nw.	
<b>West Central Dist.</b>																				
Audubon (near)	Audubon	1,297	51	29.6	+ 7.7	60	21	- 7	14	0.75	- 0.38	0.72	3	0.6	3	13	10	5	nw.	Geo. Kibby
Carroll	Carroll	1,280	58	29.2	+ 8.0	62	22	- 7	14	0.67	- 0.32	0.56	3	0.6	3	15	7	6	nw.	Ben H. Schenkelberg
Cushing (near)	Ida	1,350	10	28.6	+ 9.0	61	21	- 8	14	0.59	- 0.26	0.45	3	1.7	5	15	6	7	nw.	H. P. Lasher
Denison	Crawford	1,307	60	28.8	+ 7.1	60	21	- 7	14	0.57	- 0.27	0.57	3	T.	1	17	6	5	nw.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	29.5	+ 6.6	60	22	- 7	14	0.72	- 0.41	0.65	3	0.8	3	17	8	3	nw.	Wilbert Shaw
<b>Harlan</b>																				
Jefferson	Shelby	1,210	52	30.7	+ 8.3	62	21	- 3	14	0.60	- 0.37	0.58	3	T.	2	18	5	5	nw.	Elmer Buss
Lake City	Greene	1,055	52	29.0	+ 7.9	60	21	- 7	14	1.05	- 0.08	0.95	3	1.0	2	17	6	5	sw.	Will I. Lyon
Little Sioux	Calhoun	1,238	8																	Frank A. Taylor
Logan	Harrison	1,040	43	32.0	+ 8.6	64	21	- 1	14	0.58	- 0.44	0.56	3	0.2	3	14	13	1	nw.	H. W. Kerr
	Harrison	1,120	78	31.8	+ 7.5	64	21	- 3	14	0.54	- 0.38	0.51	3	T.	2	13	15	0	nw.	Miss Amy Ann Stern
<b>Mapleton (near)</b>																				
Missouri Valley	Woodbury	1,225	5	28.6	+ 7.6	62	21	- 6	14	0.58	- 0.27	0.54	3	T.	2	20	4	4	nw.	LeRoy Wasmund
Onawa	Harrison	1,069																		C. B. Crouch
Rockwell City	Monona	1,050	59	32.0	+ 9.7	65	19	- 3	14	0.63	- 0.46	0.62	3	0.2	2	16	8	4	nw.	W. J. Oliver
Sac City	Calhoun	1,226	57	27.3	+ 7.4	60	21	- 9	14	0.59	- 0.69	0.45	3	3.7	3	18	7	3	nw.	F. C. Beitelspacher
	Sac	1,274	75	27																

CLIMATOLOGICAL DATA FOR FEBRUARY, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit					Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry	Dallas	975	44	29.2	+ 7.1	60	21†	- 7	14	0.79	- 0.37	0.71	3	0.8	3	17	9	2	nw.	Eugene N. Hastie H. M. Meads H. P. Giger Barto Speer Leo Holtkamp
State Center	Marshall	1,068	7	26.8	+ 4.8	57	21	- 9	14	1.12	+ 0.12	0.96	3	4.7	4	9	13	6	sw.	
Toledo	Tama	929	50	27.2	+ 5.1	59	22	- 9	14†	0.92	- 0.21	0.72	3	4.5	6	16	9	3	sw.	
Waukee	Dallas	1,042	46	28.9	+ 5.9	61	22	- 7	14	0.73	- 0.41	0.66	3	2.4	3	20	2	6	nw.	
Webster City	Hamilton	1,042	60	23.4	+ 4.1	57	21	- 13	16	1.05	+ 0.03	0.95	3	1.8	3	15	10	3	se.	
Means and extremes				27.0	+ 5.2	61	22	- 16	16	0.86	- 0.23	0.96	3	4.0	4	15	9	4	nw.	
<i>East Central Dist.</i>																				
Anamosa	Jones	873	15	24.5	+ 2.2	57	22	- 11	14	0.82	- 0.47	0.62	3	2.0	4	19	7	2	nw.	State Reformatory R. O. Burrows U. S. Engineers John T. Wurster H. J. Klatt
Belle Plaine	Benton	895	68	26.6	+ 3.7	56	27	- 9	14†	0.73	- 0.76	0.56	3	5.2	5	15	9	4	nw.	
Bellevue	Jackson	603		25.5	+ 2.9	59	22	- 6	14	0.72	- 0.47	0.36	3-4	4.5	10	19	7	2	nw.	
Cedar Rapids	Linn	813	62	26.2	+ 3.6	58	22	- 9	14	1.02	- 0.13	0.57	3	4.0	11	15	8	5	s.	
Clarence	Cedar	850	10	25.2	+ 2.4	56	22†	- 9	14	0.90	- 0.45	0.68	3	2.0	4	17	8	3	nw.	
Clinton	Clinton	640	73	27.0	+ 2.6	60	22	- 5	14	1.54	+ 0.02	0.43	3	2.5	7	16	10	2	nw.	
Davenport	Scott	579	73	28.4	+ 3.5	58	22	- 5	14	1.12	- 0.46	0.45	3	3.3	7	10	12	6	nw.	Samuel W. Williams U. S. Weather Bureau Inst. Hydraulic Research
Iowa City	Johnson	780	87	27.6	+ 3.9	59	22	- 9	16	0.85	- 0.52	0.60	3	2.8	8	10	6	3	nw.	
Maquoketa	Jackson	700	51																	Otto J. Bisinger
Monmouth	Jones	870	3	25.3		55	22†	- 10	14	1.18	- 0.07	0.51	3	8.0	7	18	3	nw.		
Muscatine	Muscatine	620	98	28.4	+ 3.6	61	22	- 7	14†	1.20	- 0.38	0.62	3	3.9	7	17	9	2	w.	G. Krieger H. J. Adams Dr. F. C. Schadt
Vinton	Benton	815	1	25.6	+ 3.1	56	22	- 10	16	0.88	- 0.37	0.58	3	2.5	4	15	10	3	nw.	
Williamsburg	Iowa	805	28	27.4	+ 3.9	59	22	- 9	16	0.92	- 0.30	0.60	6	1.0	5	24	2	2	nw.	
Means and extremes				26.5	+ 3.2	61	22	- 11	14	0.99	- 0.36	0.68	3	3.5	6	16	9	3	nw.	
<i>Southwest District</i>																				
Atlantic	Cass	1,110	57	30.6	+ 7.0	63	22	- 5	14	0.69	- 0.45	0.62	3	1.0	2	13	12	3	sw.	Roy L. Fancolly H. J. Chambers Forrest E. Allison Soil Conservation Ser. S. W. Morris
Bedford	Taylor	1,215	40	34.0	+ 8.1	65	19	1	14	0.75	- 0.51	0.68	3	2.5	3	20	5	3	sw.	
Clarinda	Page	1,004	72	32.4	+ 6.4	65	19†	0	14	0.57	- 0.61	0.55	3	0.7	2	16	8	4	nw.	
Clarinda Erosion	Page	1,132	5	32.6	+ 6.5	65	19†	- 1	14	0.65	- 0.54	0.61	2-3	0.2	3	19	5	4	nw.	
Corning	Adams	1,285	56	32.3	+ 8.0	63	19†	- 3	14	0.72	- 0.44	0.65	3	1.3	3	19	5	4	nw.	
Glenwood	Mills	1,100	54	34.0	+ 8.5	67	22	1	14	0.69	- 0.41	0.69	3	T.	1	9	16	3	sw.	
Greenfield	Adair	1,368	48	31.0	+ 7.5	61	22	- 6	14	0.71	- 0.36	0.69	3	0.1	2	14	7	7	nw.	Dr. Thos. B. Lacey Wallace Grounds M. E. Gray Arthur E. J. Johnson B. R. Bridge
Oakland	Pottawattamie	1,100	31	31.5	+ 7.1	64	22	- 2	14	0.67	- 0.21	0.67	3	T.	1	20	4	4	n.	
Red Oak	Montgomery	1,077	5	32.4	+ 7.4	64	22	0	14	0.73	- 0.47	0.73	3	0.3	1	15	6	7	sw.	
Red Oak (near)	Montgomery	1,030	37							0.62	- 0.60	0.60	3	T.	2	14	11	3	s.	
Riverton (near)	Fremont	920	18																	Geo. C. Rader Earl E. May Seed Co. Bernard Porter U. S. Weather Bureau
Shenandoah	Page	974	9	33.8	+ 7.6	66	19†	0	14	0.64	- 0.56	0.60	3	0.2	2	14	11	3	sw.	
Thurman	Fremont	973	57	34.0	+ 8.1	67	22	3	14	0.68	- 0.55	0.68	3	T.	1	19	6	3	nw.	
Omaha, Nebr.	Fremont	1,035	79	32.4	+ 8.1	66	22	2	14	0.50	- 0.39	0.50	2-3	0.1	2	11	8	9	n.	
Means and extremes				32.6	+ 7.5	67	22	- 6	14	0.66	- 0.48	0.73	3	0.5	2	16	8	4	nw.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	31.6	+ 6.7	62	19	- 5	14	0.65	- 0.54	0.55	3	1.2	3	19	6	3	sw.	S. R. Brown Arthur L. Freed E. Grant Everman Ellis Shaw Mrs. Nellie Spangler
Albia	Monroe	949	53	31.4	+ 6.0	60	22	- 3	14	0.97	- 0.33	0.73	3	2.8	6	12	11	5	nw.	
Centerville	Appanoose	1,013	51	32.9	+ 6.9	66	10	- 4	14	0.99	- 0.26	0.70	3	0.5	5	11	12	5	nw.	
Chariton	Lucas	940	50	31.2	+ 6.4	62	9†	- 8	16	0.51	- 0.61	0.51	3	T.	1	15	8	5	nw.	
Creston	Union	1,293	43	30.2	+ 6.3	62	19	- 5	14	0.74	- 0.30	0.59	3	2.3	7	21	2	5	sw.	
Indianola	Warren	972	63	28.9	+ 4.8	60	22	- 7	14	0.54	- 0.70	0.45	3	0.9	3	7	9	12	s.	
Knoxville	Marion	920	54	30.9	+ 6.6	61	9†	- 5	14	0.72	- 0.57	0.54	3	2.5	5	20	6	2	nw.	Seth F. Shenton Mrs. Ella Mae Brobst Dr. Gustav A. Platz J. C. Davis Mrs. Irene Hood
Lamoni	Decatur	1,138	40	31.9	+ 6.7	62	19	- 4	14	0.82	- 0.43	0.54	3	1.5	6	14	9	5	nw.	
Millerton	Wayne	1,070	60	32.0	+ 6.7	64	9	- 4	14	0.71	- 0.59	0.46	3	1.6	6	15	11	2	nw.	
Mount Ayr	Ringgold	1,209	52	32.4	+ 7.3	64	19	- 2	14	0.73	- 0.52	0.70	3	T.	3	8	20	0	nw.	
Osceola	Clarke	1,088	23	31.3	+ 6.5	62	19	- 5	14	0.59	- 0.61	0.50	3	2.1	4	21	1	6	nw.	Mrs. Irene Davison Jas. A. Verploegh H. S. Ely
Tingley	Ringgold	1,275	20	31.4	+ 6.7	62	19	- 4	14	0.72	- 0.48	0.67	3	0.5	2	19	2	7	sw.	
Winterset	Madison	1,120	53	31.5	+ 7.1	64	7	- 5	14	0.60	- 0.50	0.53	3	1.0	2	15	5	8	sw.	
Means and extremes				31.6	+ 6.8	66	10	- 8	16	0.73	- 0.48	0.73	3	1.3	4	16	8	4	nw.	
<i>Southeast District</i>																				
Bloomfield	Davis	825	29	31.6	+ 5.7	64	9	- 4	14	1.14		0.68	3	2.0	6	20	3	5	nw.	Mrs. Leo Foster U. S. Weather Bureau Miss Musa Todd Prof. R. M. McKenzie U. S. Weather Bureau
Burlington	Des Moines	697	54	29.7	+ 2.1	65	9	- 6	16	1.09	- 0.63	0.60	3	3.8	6	15	7	6	nw.	
Columbus Jct.	Louisa	595	53	29.5	+ 3.9	63	9	- 9	16	1.08	- 0.34	0.65	3	3.3	6	17	8	3	nw.	
Fairfield	Jefferson	780	64	31.4	+ 6.9	69	9	- 6	16	1.35	- 0.21	0.72	3	5.5	6	18	6	4	nw.	
Keokuk	Lee	574	73	33.4	+ 5.1	71	9	- 3	16	0.77	+ 0.22	0.58	2-3	4.9	5	18	2	8	sw.	
Keosauqua	Van Buren	712	57	33.2	+ 7.3	70	9	- 3	16	1.09	- 0.27	0.62	3	5.0	4	12	12	4	nw.	
Mt. Pleasant	Henry	722	68	32.0	+ 5.4	67	9†	- 6	16	1.45	+ 0.18	0.82	3	2.7	4	20	4	4	s.	
Oskaloosa	Mahaska	813	68	29.8	+ 5.6	63	9	- 9	16	1.13	- 0.11	0.80	3	7.0	5	12	12	4	nw.	
Ottumwa	Wapello	649	49	32.8	+ 7.8	68	9†	- 12	16	1.24	- 0.23	0.88	3	5.0	5	17	8	3	nw.	
Sigourney	Keokuk	780	49	29.8	+ 5.5	64	9	- 7	14	0.95	- 0.41	0.73	3	3.3	4	18	6	4	w.	
Stockport	Van Buren	747	43	31.3	+ 6.0	66	9	- 9	16	1.29	- 0.10	0.70	3	3.0	4	19	5	4	nw.	C. L. Beswick Clarence M. Logan
Washington	Washington	762	60	30.0	+ 4.6	64	9	- 11	16	1.01	- 0.45	0.60	3	1.0	5	18	6	4	nw.	
Means and extremes				31.2	+ 5.5	71	9	- 12	16	1.13	- 0.29	0.88	3	3.4	5	17	7	4	nw.	
State means and extremes				27.5	+ 5.1	71	9	- 20	14	0.77	- 0.31	0.96	3	2.9	4	16	8	4	nw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.  
Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year period. For stations having less than 15 years of record, normals have been interpolated from normals constructed from the 35-year and adjusted means. However, State departures are based on the averages for the entire 71 years of record and must necessarily differ slightly from average station departures based on established normals.  
T. Precipitation is less than 0.005 inch rain or melted snow. † Also other dates. ‡ Received too late to be used in means and summaries.





DAILY PRECIPITATION FOR FEBRUARY, 1943—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>Southeast District (Continued)</i>																																			
Donnellson <sup>2</sup>	Des Moines			.70			.10				.14														.02	T									1.07
Eddyville <sup>2</sup>	Des Moines	T		.82			T				.05		T			.12	.08								T										1.07
Fairfield	Skunk			.72		.10	.14									.17	.14								T	.02									1.35
Keokuk <sup>1</sup> †	Mississippi		.03	.55		.02	T				.05	T		T		.12								T		T	T							0.77	
Keokuk LD 19 <sup>2</sup>	Mississippi		.14	.50	T		.10					.02		T		.04	.04																	0.84	
Keosauqua	Des Moines			.62		T	.19				.14		T	T		.14								T										1.09	
Keosauqua (rvr.) <sup>2</sup>	Des Moines		.06	.60	T		.04				T					T	.20																	0.90	
Mt. Pleasant	Skunk			.82			.35				.23		T			.05																		1.45	
Oskaloosa	Des Moines			.80		T	.04				.13		T			.12								.04	T		T						1.13		
Ottumwa †	Des Moines			.88			.04				.14		T			.14									.04									1.24	
Ottumwa (river) <sup>2</sup>	Des Moines		.02	.82	T		.04				.12		T			.07	.06									.03							1.16		
Sigourney	Skunk			.73			T				.10	T		T		.09									.03								0.95		
Stockport	Skunk			.70		T	.13				.37		T			.09									T	T		T					1.29		
Wapello <sup>2</sup>	Iowa		.02	.60	T		.29	T			.23		T	T		.02	.08				.03				.02								1.29		
Washington †	Skunk			.60			.18				.11	T				.10									.02		T						1.01		

Except as otherwise indicated, observations are generally made in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.  
<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
T. Precipitation is less than 0.005 inch rain or melted snow.  
† Interpolated  
‡ Station is equipped with recording gage.  
\* Precipitation included in next following measurement.

SUPPLEMENTAL TABLE, FEBRUARY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	17	0.52	-0.28	0.47	3	0.7	3	16	8	4	s.
Cmbrld. (nr.)	Cass	1,225	45	0.77	-0.17	0.77	3	T	1	17	6	5	sw.
Dumont (nr.)	Butler	998	9	0.66	-0.44	0.48	3	8.7	4	14	7	7	nw.
Dunbar (nr.)	Marshall	1,010	9	0.87	-0.23	0.67	3	6.2	6	18	8	2	nw.
Kanawha	Hancock	1,183		1.03		0.54	3	5.5	4	10	3	15	nw.
Lake View	Sac	1,239	5	0.32		0.23	3	1.5	3	14	6	8	sw.
Melrose	Monroe	871	15	1.49	+0.29	0.99	3	1.6	5	17	11	0	se.
Sloan	Woodbury	1,071		0.60		0.60	2	T	1				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

PRESSURE, WIND, HUMIDITY AND SUNSHINE, FEBRUARY, 1943

Stations	Sea-level pressure, extremes—inches		Wind†			Relative Humidity				Degree Days				
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.		6:30 A. M.	12:30 P. M.	6:30 P. M.	Percentage of sunshine
Burlington	30.66	15	29.31	9	11.3	31	nw.	26	80	61	67	78	987	
Charles City	30.75	14	29.40	9	7.8	25	w.	3					1243	
Davenport	30.66	14	29.36	9	11.3	29	w.	10	81	86	71	77	69	1025
Des Moines	30.72	14	29.34	9	11.3	30	nw.	10	79	80	63	66	83	998
Dubuque	30.65	14	29.34	19	7.3	24	nw.	27	74	80	56	67	69	1122
Sioux City	30.77	14	29.41	3	12.1	40	nw.	10	78	83	63	66	70	1010
Omaha, Nebr.	30.76	14	29.45	9	12.4	37	n.	12	77	81	57	59	72	909
State	30.77	14	29.31	9	10.5	40	nw.	10	78	82	62	67	74	1042
Normals and Records	31.07	20	28.60	28	9.2	54	nw.	4	83	67	74	56	56	1148

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.  
§ Sioux City \*Davenport †and other dates.

SOIL TEMPERATURES AT AMES, IOWA, FEBRUARY, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	19.4	24.3	28.8	29.2	32.2		
Average 12 noon	28.5	29.2	28.6	29.5	32.3		
Average 7 p. m.	29.4	29.8	30.0	29.5	32.2	36.9	41.6
Highest	57	43	33	32*	33	38	43
Date	21†	22	4†	22†	3†	1†	1†
Lowest	-8	4	17	24*	32	36	41
Date	14†	14	14	14†	1†	14†	13†
Number of days with temperature							
0° or lower	4	0	0	0	0	0	0
24° or lower	18	14	5	2	0	0	0
32° or lower	26	28	27	28	24	0	0
40° or higher	14	3	0	0	0	0	28
50° or higher	6	0	0	0	0	0	0
60° or higher	0	0	0	0	0	0	0
90° or higher	0	0	0	0	0	0	0

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

week there was some manure spreading; and soybeans and corn that had remained in the fields all winter were harvested in the southern portions. Pigs were being farrowed, lambs dropped, and chicks hatched in increasing numbers towards the close of the month.

During most of the month the weather was dominated by Continental Arctic warm or by Continental Polar air masses. On the night of the 2d, warm, moist Maritime air overrunning the cold surface air resulted in a general rain over Iowa, giving most of the State the heaviest precipitation of the month. Distribution of the rain was unusually uniform, with the average amounting to slightly over one-half inch, or slightly more than two-thirds of the average monthly total. From the 2d through the 9th unseasonably warm weather was the rule. During this period the synoptic weather charts usually showed relatively high barometric pressure over the Pacific, Gulf and southeastern States, and relatively low pressure over the Great Central



valleys. A mild outbreak of fresh Polar air brought slightly lower temperatures on the 6th, and its movement into the State caused scattered light precipitation in the extreme east portion. At some southeastern stations the highest temperature of the month occurred on the 9th, just to the south of a warm front where Superior air, overlying Maritime Polar air, was pushing northward in the northeast part of a low pressure trough.

On the 9th the southern edge of a mass of cold air moved into Iowa and was followed by successive outbreaks of Arctic air that brought the lowest temperatures of the month during the next few days. As a general rule the monthly minimum readings occurred on the 14th, except that in the southeast corner and at scattered stations elsewhere, the temperatures on the 16th were the lowest.

Scattered snow occurred in connection with the fronts that developed as the waves of cold air moved southward. However, the amounts were mostly light and in much of the southwest only scattered flurries were reported.

On the 15th a small center of low pressure was pushed from northern South Dakota southeastward to northeastern Missouri, passing over Iowa from northwest to southeast. This was attended by a general fall of extremely fine, dry snow. The moisture content was almost unbelievably low. Many stations reported from 4 to 5 inches of snow with less than 0.10 inch of moisture. A good many of the observers were apparently concerned lest an error had been made and entered notes about the lack of moisture. While it is possible that a slight part of the moisture was lost by evaporation, there is no doubt that most of the measurements were made as accurately as possible, and that this was one of the driest snows ever to fall in Iowa. Sufficient data are not at hand to make a complete analysis of the storm at this time, but it seems significant that there was an increase in the mixing ratio with elevation at the 1 a. m. radiosonde observations in this area. At Bismarck, North Dakota, the inversion occurred at 6,000 feet, at St. Paul at about 9,000 feet, and at Omaha between 6,000 and 9,000 feet.

The temperature again went above normal on the 17th and continued unseasonably high for the following week. At most stations, except those in the southeast district, the maximum temperatures for the month were recorded on the 21st or 22d. A brief cool spell on the 25th-26th was followed by unseasonable warmth on the 27th, and moderate but falling temperatures on the 28th. Scattered precipitation attending these changes was light and mostly inconsequential.

S. E. D.

#### TEMPERATURE

The average temperature for the State, obtained from the averages of nine districts of about equal area, which in turn were computed from the averages of 119 temperature observing stations, was 27.5°, or 5.1° higher than the all-time February average. It was the 16th warmest February in the 71 years of record, and the warmest since 1938. The averages were above the adopted normals at all stations, with departures ranging from more than 9° above normal in the far western portions to less than 2° above in parts of the northeast. The district averages ranged from 32.6° in the southwest to 21.7° in the north central, and 22.0° in the northeast. The highest station average was 34.0° at Glenwood, Thurman and Bedford; the lowest was 19.1° at Northwood. The absolute maximum reading was 71° at Keokuk on the 9th; the lowest was -20° at Northwood on the 14th. The average number of days on which the maximum temperature did not rise above 32° was 8, with minima of 32° or lower was 25, and days with 0° or lower was 4.

#### PRECIPITATION

The average total precipitation was 0.77 inch, 0.31 inch less than the 71-year February average. As usual, the State average

was derived from the averages of nine districts of nearly equal area, and was based on the measured totals of 120 stations. There have been 22 drier and one other equally dry February in the 70 years preceding 1943. District averages were below normal and ranged from 0.60 inch in the northeast to 1.13 inches in the southeast. Only a few scattered stations, most of them in the southeast quarter, received more than the station normals. The greatest amounts were 1.82 inches at the Le Claire river station, 1.54 at Clinton, and 1.49 at Melrose. The least was 0.37 inch at Cresco and Mason City. The greatest 24-hour fall was 0.96 at State Center on the 3d. The average number of days with measurable amounts was 4, which is 1 less than normal.

#### SNOWFALL

The average total snowfall at the precipitation measuring stations was 2.9 inches. This was 3.8 inches less than the average of the 52 years for which snowfall records are available, and only 5 Februarys in the period of record have had less. In general, the amounts were heaviest along the northern border and in a belt extending from Worth County towards the southeast corner of the State. The greatest totals were 9.1 inches at Britt, and 9.0 at Allison, while numerous stations in the southwest and west central portions reported only traces. At the close of the month the ground was bare of snow in most sections of the State.

#### MISCELLANEOUS PHENOMENA

*Aurora*: 25th.  
*Corona, solar*: 26th.  
*Corona, lunar*: 12th, 13th.  
*Eclipse, moon*: 20th.  
*Fog, light*: 1st, 2d, 3d, 4th, 5th, 8th, 9th, 10th, 18th, 19th, 20th, 21st.  
*Fog, heavy*: 9th, 19th, 20th.  
*Glaze*: 9th.  
*Halo, lunar*: 7th, 10th, 11th, 14th.  
*Halo, solar*: 4th, 5th, 11th, 12th, 14th, 16th, 26th.  
*Parhelia*: 10th, 11th, 15th, 16th, 26th, 28th.  
*Parsalena*: 12th, 13th.  
*Sleet*: 1st, 3d, 5th, 10th, 15th, 20th, 23d, 28th.  
*Thunderstorms*: 9th, 10th.

#### ERRATA

Annual Climatological Data, 1942. Page 129, precipitation, amount above normal published 1.12; should be 1.09.

Report for January, 1943. Page 2, Sioux Rapids, number of days with .01 inch or more of precipitation published 7, should be 8; Carroll, total snowfall published 3.1, should be 2.9. Page 6, Dubuque, 12:30 a.m. humidity published 83, should be 82. Page 9, Newton, mean minimum temperature published 9.7, should be 9.6.

#### THE WINTER OF 1942-43

Like the autumn of 1942, the winter of 1942-43 averaged rather close to normal but there were wide variations between unseasonable warmth and severe cold.

The average temperature for the three winter months was 21.5° or 0.2° lower than the all-time average. However, December was 3.9° colder than normal, and January 1.9° colder than normal, while February temperature averaged 5.1° above normal. The cold weather that began at Thanksgiving continued during the first three weeks of December, but the last 10 days of the month were comparatively mild and warmer than normal. The lowest temperature occurred at most stations on the 13th and the highest on the 23d. Although there were several short

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF FEBRUARY, 1943

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes Maximum and Minimum temperature values for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF FEBRUARY, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

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. †Interpolated.

spells of cold weather during the first half of January, the period as a whole was relatively mild. On January 16th a severe cold wave overspread the State with temperatures falling far below zero and with the lowest readings of the winter generally occurring on the 19th. Blizzard conditions prevailed, highway traffic was halted in places, trains and busses were late, and many schools closed because of the cold and the lack of fuel. Two persons are known to have frozen to death. The cold persisted through the 26th except for a short warm wave on the 21st-22d. The month closed with above normal temperatures that continued for the first third of February. This was followed by a week of cool weather from the 10th to the 16th, a warm spell from the 17th to the 24th, and lower but still moderate temperatures at the close of February. During the three months the average number of days on which the temperature did not rise above freezing was 50, the number of days with minima of 32° or lower was 87, and days with zero or lower was 19.

The average total precipitation was 3.15 inches, or 0.21 inch less than the all-time average. Precipitation was above normal during December but was deficient in January and February. Unusually heavy downpours for the season occurred at east central stations on January 27. There were no unusual

features about other falls of rain or snow during the winter except for unusually heavy amounts of snow in the northeast portion during January, and the remarkably dry snow of February 15 discussed in this issue. The average number of days with measurable precipitation was 19.

Snowfall averaged 18.6 inches, or 1.2 inches less than normal for the winter. There was somewhat more than normal in the first two months, but the February fall was light. The snow blanket remained on the ground for an unusually long unbroken period, especially in the north central and northeast portions. At some places the ground was covered with snow without interruption from Thanksgiving until the latter part of February.

The average number of clear days was 36, partly cloudy 22, and cloudy 32. Sunshine was deficient in the first two winter months but was far above normal in February so that the entire winter average was 2% more than normal.

The long periods of low temperature and snow covered ground made heavy feeding of livestock necessary in most sections. There was little outdoor farm activity until towards the close of February, when some corn and soybeans in the south portion that were caught in the fields by the Thanksgiving snowstorm, were harvested.

S. E. D.



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, MARCH, 1943 No. 3

## GENERAL SUMMARY

March, 1943, was the coldest since 1932 and the 18th coldest on record. There were two periods of unseasonable cold during which the temperature fell to near record low readings for so late in the season, but these were followed by two other shorter periods of unseasonable warmth that brought the monthly average somewhat nearer normal and partially obscured the true picture of the severity of the wintry conditions. The monthly mean of 31.0° was 3.6° below the all-time average, and 3.5° higher than the average for February of this year. Yet the average heating requirements expressed in degree-days amounted to 1050 for March, against 1042 for February. The March requirements were 120% of normal. There were 10 days on which the temperature failed to rise above the freezing point during March, and only 8 such days in February. The number of days with readings of zero or lower was 4 in both months, while the number of days with minima of 32° or lower was 24 in March, and 25 in February. Of course the fact that March has 31 days to 28 for February, makes comparison of the months less effective, but since the last three days of March were unseasonably warm, the relative coldness of the month would be emphasized if averages of only the first four weeks could be used.

The average total snowfall of 9.8 inches equalled the eighth greatest March fall of record since 1891 when observation of these data began. This was 4.4 inches above the March normal and 6.7 inches more than the average for February of this year. Heavy snow was general on the 18th-19th and in the northern third of the State on the 9th. Despite the heavy snow the average total precipitation was 0.21 inch less than normal. Excessively heavy rain fell in some sections during thunderstorms on the 15th, on which date damaging wind and hailstorms, as well as tornadoes, also occurred.

There was somewhat more wind and sunshine than usual, while humidity was slightly below normal.

The month was mostly unfavorable for agricultural operations. Much less than the usual amount of field work was possible, but the last 3 days turned abnormally warm and dried the soil so a little corn husking was done, cornstalks were cleared, and some manure spread. Some oats were seeded in the extreme southern counties, and the grass greened rapidly during the last week of the month. Livestock had wintered well but had consumed much feed; and during March rough feed became scarce. The severe wintry weather from the 1st to the 10th, and from the 16th to the 22d, caused considerable loss of baby pigs, lambs and chicks.

A severe cold wave that overspread the State on February 28 brought unseasonably low temperatures that persisted through March 8. Readings below zero were experienced in all sections, and in many cases were close to the record low values

## COMPARATIVE DATA FOR MARCH, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	34.0	72	-18	1.42					
1874.....	31.7	68	-4	1.43					
1875.....	26.9	80	-10	1.62					
1876.....	27.2	75	-6	3.24					
1877.....	27.3	72	-14	2.28					
1878.....	45.6	80	-20	3.36					
1879.....	37.2	80	-3	1.18					
1880.....	33.6	80	-21	1.26					
1881.....	27.1	56	0	1.91					
1882.....	36.3	78	4	1.82					
1883.....	30.6	72	-13	0.55					
1884.....	32.0	72	-16	2.57					
1885.....	31.3	65	-16	0.24					
1886.....	30.6	74	-9	1.72					
1887.....	33.5	76	-8	0.93					
1888.....	26.4	78	-12	3.04					
1889.....	39.7	80	8	0.47					
1890.....	28.1	75	-24	1.49					
1891.....	26.8	66	-19	2.60		10	6	8	17
1892.....	31.9	84	-6	2.22	3.9	6	11	8	12
1893.....	31.8	84	-8	2.14	4.0	8	9	11	11
1894.....	41.0	84	-5	2.03	2.7	6	13	10	8
1895.....	34.4	94	-11	0.83	2.9	4	16	8	7
1896.....	30.9	81	-12	1.10	5.4	5	12	9	10
1897.....	32.0	72	-22	2.30	5.5	8	9	8	14
1898.....	37.5	72	-2	1.94	3.7	6	12	9	10
1899.....	23.0	75	-16	1.62	8.0	6	7	12	12
1900.....	30.7	81	-13	2.06	6.6	5	12	9	10
1901.....	34.2	76	-8	2.64	12.6	7	10	8	13
1902.....	39.1	79	-12	1.45	1.3	7	9	11	11
1903.....	38.8	82	6	1.38	3.9	7	11	7	13
1904.....	34.8	78	3	2.18	4.4	7	8	8	15
1905.....	41.5	84	1	2.04	4.1	7	8	8	15
1906.....	27.1	65	-14	2.34	8.9	10	8	7	16
1907.....	40.6	92	-7	1.35	4.1	6	14	7	10
1908.....	37.9	85	-8	1.58	1.1	6	13	7	11
1909.....	32.5	71	-15	1.53	9.8	6	12	10	9
1910.....	48.9	92	-10	0.17	T.	1	23	6	2
1911.....	39.4	83	2	0.93	1.9	5	16	9	6
1912.....	24.9	70	-19	2.01	19.1	7	15	6	10
1913.....	31.9	78	-23	2.48	5.3	9	11	10	10
1914.....	34.7	78	-5	1.69	1.8	7	12	8	11
1915.....	29.3	61	-5	0.96	8.8	5	8	9	14
1916.....	35.2	80	-18	1.57	2.9	6	11	9	11
1917.....	34.6	85	-12	1.84	6.2	6	14	8	9
1918.....	42.9	85	0	0.63	2.6	3	19	7	5
1919.....	37.5	78	-11	2.33	1.1	6	15	8	8
1920.....	38.0	80	-21	3.02	2.4	7	15	7	9
1921.....	42.8	86	4	1.57	0.2	7	14	8	9
1922.....	38.3	74	-5	1.97	3.4	7	12	6	13
1923.....	29.4	78	-22	2.87	18.5	7	13	9	9
1924.....	31.9	72	3	2.65	10.5	8	8	8	15
1925.....	40.1	82	-6	0.93	2.9	4	17	9	5
1926.....	32.1	78	-4	1.06	8.1	6	12	9	10
1927.....	39.6	75	0	1.92	2.9	9	11	7	13
1928.....	38.9	88	1	1.44	3.0	5	15	8	8
1929.....	39.1	83	-5	1.44	3.5	5	12	8	11
1930.....	37.3	80	-4	0.89	1.3	5	14	8	9
1931.....	34.9	64	5	1.68	10.3	6	11	8	12
1932.....	28.4	77	-8	1.46	10.2	7	11	11	9
1933.....	36.0	77	-3	3.09	9.2	8	11	9	11
1934.....	34.4	81	-13	1.09	6.0	6	12	10	9
1935.....	40.7	85	-2	1.47	5.5	8	12	9	10
1936.....	39.2	80	-1	1.02	2.3	5	13	11	7
1937.....	32.9	76	-2	1.63	4.4	7	11	9	11
1938.....	43.7	89	0	2.35	1.2	9	13	8	10
1939.....	36.4	86	-9	1.79	7.1	6	15	8	8
1940.....	31.6	79	-2	1.72	10.1	10	8	8	15
1941.....	33.5	71	-10	0.99	6.8	6	10	10	11
1942.....	38.3	77	5	1.96	2.5	9	8	8	15
1943.....	31.0	90	-19	1.51	9.8	6	14	9	8
Period.....	34.6	94	-24	1.72	5.4	7	12	8	11

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

for so late in the winter. During most of this time Continental Arctic air covered the State, but there was a slight temporary reaction from the extremely low temperatures during the night of the 3d-4th, when Continental Polar air temporarily displaced the Arctic mass. Light snow fell on the 5th-6th as a low pres-

CLIMATOLOGICAL DATA FOR MARCH, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>Northwest District</i>																				
Alta	Buena Vista	1,513	54	29.2	-1.7	82	30†	-11	2	1.41	+0.02	0.65	19-20	12.8	12	11	13	7	s.	D. E. Hadden
Alton	Sioux	1,305	39	29.2	-1.7	87	30	-10	7	1.23	+0.04	0.40	19	14.0	7	10	12	9	s.	W. S. Slagle
Cherokee	Cherokee	1,358	24	28.5	-2.5	83	30	-13	2	1.43	+0.51	0.52	19	13.0	8	12	8	11	nw.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	27.2	-2.0	80	30	-10	2	1.43	+0.19	0.67	19-20	9.8	10	9	10	12	nw.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	30.4	-1.0	90	30	-8	7	0.94	-0.26	0.27	19	11.0	8	13	8	10	nw.	Earl V. Slife
Inwood (near)	Lyon	1,474	41	27.9	-2.6	88	30	-14	7	1.08	-0.11	0.52	19-20	8.1	8	15	9	7	nw.	A. C. Hanson
Lake Park	Dickinson	1,479	41	27.3	-1.7	79	30	-9	7	1.32	+0.11	0.55	19	10.5	7	11	6	14	nw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	30.6	-1.4	89	30	-10	7	0.84	-0.32	0.37	9-10	13.0	6	18	6	7	s.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	2.76	-3.8	80	30	-8	2†	1.25	-0.21	0.46	18-19	11.0	7	7	10	14	sw.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17	29.2	-0.7	85	30	-11	7	1.51	+0.29	0.49	15	11.5	7	16	5	10	nw.	Scott King
Rock Rapids	Lyon	1,341	47	28.0	-2.4	86	30	-10	7	1.05	-0.20	0.35	12	10.0	6	10	9	12	nw.	George Raveling
Sanborn	O'Brien	1,552	31	27.2	-2.6	82	30	-12	7	1.37	+0.13	0.52	19	10.0	7	10	12	9	sw.	Susie O. Dow
Sheldon	O'Brien	1,418	38	27.2	-2.8	85	30	-10	7	1.02	-0.20	0.38	19	12.2	9	13	12	6	nw.	Ross E. Forward
Sibley	Osceola	1,494	9	27.3	-2.7	84	30	-11	7	0.94	-0.31	0.44	19	8.9	6	15	10	6	sw.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		29.2	-2.6	82	30	-9	2†	0.94	-0.36	0.39	18-19	9.7	7	15	7	9	s.	Walter A. Simonsen
Spencer	Clay	1,319	36	28.4	-2.5	82	30	-10	7	1.56	+0.39	0.49	9	15.0	7	11	13	7	nw.	E. W. Little
Storm Lake	Buena Vista	1,455	54	27.4	-4.0	75	30	-10	2	2.25	+1.00	0.79	15	13.0	7	12	9	10	nw.	Paul B. Vance
West Bend	Palo Alto	1,197	57	27.5	-3.7	80	30	-10	2	1.07	-0.12	0.46	19	12.0	7	16	8	7	sw.	Jos. Dorweiler
Means and extremes				28.3	-2.4	90	30	-14	7	1.26	+0.03	0.67	19-20	11.4	8	13	9	9	nw.	
<i>North Central Dist.</i>																				
Algona	Kossuth	1,200	83	27.9	-3.5	81	30	-7	2	1.24	-0.13	0.49	19	12.9	7	14	9	8	nw.	Harry B. Nolte
Allison	Butler	1,060	30	27.6	-3.9	70	30	-10	2	2.02	+0.45	0.70	16	12.0	6	14	12	5	s.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	27.3	-2.7	79	30	-8	2	1.28	-0.04	0.42	19	9.5	7	17	6	8	nw.	Wilbur Fox
Belmond	Wright	1,175	35	20.5	-4.8	78	30	-16	11	2.19	+0.71	1.13	15	12.0	4	14	10	7	s.	W. H. Dempsey
Britt	Hancock	1,240	59	27.0	-4.3	80	30	-9	2	1.30	+0.09	0.53	9-10	11.0	5	13	6	12	nw.	L. M. Naser
Charles City	Floyd	1,013	69	25.4	-5.3	79	30	-9	2	2.32	+0.55	0.83	9	16.5	8	12	8	11	se.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	28.4	-3.8	80	30	-8	2	1.29	-0.12	0.62	18-19	16.5	7	12	8	11	s.	H. S. Brandgard
Forest City	Winnebago	1,289	54	26.8	-4.1	79	30	-10	2	1.74	+0.33	0.55	10	13.2	9	8	6	17	sw.	Dr. M. B. Neil
Hampton	Franklin	1,142	53	27.8	-3.9	78	30	-8	2											E. A. Saxton
Mason City	Cerro Gordo	1,148	52	25.6	-4.8	77	30	-15	11	2.15	+0.75	0.86	15	15.2	8	14	9	8	nw.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	24.7	-5.1	76	30	-13	2	1.87	+0.07	0.85	15	12.4	11	14	9	8	nw.	Charles H. Dwelle
Osage	Mitchell	1,163	59	26.7	-3.4	79	30	-12	2	1.93	+0.35	0.85	15	14.9	4	11	9	11	nw.	Harry D. Hedrick
Means and extremes				26.8	-4.1	81	30	-16	11	1.76	+0.25	1.13	15	13.3	7	13	9	9	nw.	
<i>Northeast District</i>																				
Cedar Falls	Black Hawk	875	23							1.30	-0.50	0.57	15	8.2	5	12	6	13	nw.	E. J. Cable
Cresco	Howard	1,260	7	24.6	-5.2	77	30	-15	8	1.89	+0.09	0.60	15	12.9	9	10	11	10	s.	William Hebig
Decorah	Winneshek	880	61	25.6	-5.1	78	30	-19	11	2.14	+0.26	0.83	10	17.8	7	13	15	3	ne.	Mrs. Fleta M. Rose
Delaware (near)	Delaware	1,083	65	28.4	-4.4	78	30	-9	2†	2.45	+0.71	1.91	15-16	8.0	7	16	9	6	nw.	E. J. Paris
Dubuque	Dubuque	642	93	30.6	-3.4	81	30	-6	8	2.75	+0.72	2.15	15	5.6	7	11	8	12	nw.	U. S. Weather Bureau
Elkader	Clayton	772	52	28.6	-4.0	80	30	-11	8	2.05	+0.09	1.02	15	13.0	7	13	6	12	n.	W. H. O'Brien
Fayette	Fayette	1,009	56	27.6	-4.1	77	30	-11	11	1.90	-0.22	0.65	15	9.3	6	16	10	5	s.	John P. Clyde
Guttenberg	Clayton			30.4	-1.8	80	30	-6	2	2.07	+0.09	1.17	16	11.6	9	13	6	11		U. S. Engineers
Independence	Buchanan	956	84	29.8	-3.7	80	30	-8	2†	1.81	+0.28	1.16	15-16	7.1	7	11	9	11	nw.	August Bracht
New Hampton	Chickasaw	1,161	47	26.5	-4.6	78	30	-12	2	2.84	+1.05	1.40	9	13.3	6	12	7	12	nw.	C. Maas
Oelwein	Fayette	1,036	21	27.6	-4.5	78	30	-12	2	1.83	+0.04	0.85	15	11.0	5	12	1	18	nw.	John T. Ridler
Postville (near)	Clayton	1,130	53	26.6	-3.9	78	30	-12	2	2.12	+0.31	0.88	9-10	15.2	9	10	16	5	sw.	V. H. Williams
Waterloo	Black Hawk	848	62	30.6	-3.0	82	30	-9	2	1.56	-0.29	0.56	16	6.5	7	18	7	6	se.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	26.4	-4.5	77	30	-13	2	2.52		0.67	9	15.9	8	17	3	11	nw.	Mrs. Albert S. Tousley
Waverly	Bremer	935	55	28.0	-4.4	79	30	-9	2	1.75	-0.05	0.97	15	9.6	8	10	16	5	nw.	Charles W. Wile
Means and extremes				27.8	-4.2	82	30	-19	11	2.06	+0.22	2.15	15	11.0	7	13	9	9	nw.	
<i>West Central Dist.</i>																				
Audubon (near)	Audubon	1,297	51	30.7	-3.3	82	30	-10	2	0.96	-0.46	0.30	18	9.2	6	8	15	8	nw.	Geo. Kibby
Carroll	Carroll	1,280	58	31.2	-2.1	82	30	-9	7	0.62	-0.79	0.21	18	9.0	5	13	6	12	nw.	Ben H. Schenkelberg
Cushing (near)	Ida	1,350	10	30.3	-1.6	83	30	-8	7	0.79	-0.31	0.40	18-19	8.5	7	12	11	8	sw.	H. P. Lasher
Denison	Crawford	1,307	60	30.7	-2.6	82	29†	-9	2	0.63	-0.53	0.43	18	7.5	4	19	7	5	nw.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	31.2	-3.7	82	30	-6	2†	1.41	-0.07	0.85	15	6.7	7	16	7	8	sw.	Wilbert Shaw
Harlan	Shelby	1,210	52	32.4	-1.7	82	29†	-8	7	0.51	-0.75	0.43	18-19	8.0	3	17	6	8	nw.	Elmer Buss
Jefferson	Greene	1,055	52	31.8	-1.6	83	30	-6	7	1.12	-0.43	0.60	18-19	7.5	5	16	9	6	sw.	Will I. Lyon
Lake City	Calhoun	1,238	8																	Frank A. Taylor
Little Sioux	Harrison	1,040	43	33.4	-2.0	86	30	-10	7	0.90	-0.38	0.61	18-19	9.0	5	18	9	4	nw.	H. W. Kerr
Logan	Harrison	1,120	78	33.4	-2.4	86	30	-9	7	0.67	-0.61	0.44	18-19	10.0	4	13	17	1	nw.	Miss Amy Ann Stern
Mapleton (near)	Woodbury	1,225	5	30.4	-2.5	86	30	-15	7	0.79	-0.41	0.43	18-19	5.0	7	20	4	7	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069		33.6		85	29†	-7	7							10	19	2	se.	C. B. Crouch
Onawa	Monona	1,050	59	33.0	-1.0	86	30†	-13	7	0.70	-0.66	0.51	18-19	9.0	4	18	6	7	s.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	29.8	-2.5	82	30	-8	7	1.07	-0.49	0.45	18-19	11.2	7	18	7	6	nw.	F. C. Beitelspacher
Sac City	Sac	1,274	75	29.4	-2.6	82	30	-9	7	0.68	-0.56	0.35	15	5.0	3	17	4	10	n.	James L. Leonard
Sioux City	Woodbury	1,111	69	30.0	-2.1	89	30	-9												

CLIMATOLOGICAL DATA FOR MARCH, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit					Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry	Dallas	975	44	31.6	-2.7	82	30	-7	7	1.46	-0.08	0.72	18-19	8.7	6	19	5	7	nw.	Eugene N. Hastie
State Center	Marshall	1,068	7	31.0	-2.5	81	30	-8	12	1.72	+0.07	1.02	15	7.8	5	9	16	6	sw.	H. O. Meads
Toledo	Tama	929	50	32.0	-1.8	83	30	-7	22	2.50	+0.58	1.65	15	10.5	6	13	12	6	sw.	H. P. Giger
Waukeet†	Dallas	1,042	46	32.0	-1.9	83	30	-6	24	1.54	-0.16	0.75	16	8.2	4	24	3	4	sw.	Ivan B. Speer
Webster City	Hamilton	1,042	60	30.0	-2.5	81	30	-5	6	1.30	-0.10	0.72	15	8.8	6	8	14	9	e.	Leo Holtkamp
Means and extremes				31.0	-3.3	84	30	-10	2†	1.76	+0.07	1.65	15	10.0	6	13	10	8	sw.	
<i>East Central Dist.</i>																				
Anamosa	Jones	873	15	30.0	-4.1	79	30	-12	8	2.86	+0.86	1.59	15	4.5	6	18	6	7	sw.	State Reformatory
Belle Plaine	Benton	895	68	31.5	-3.1	80	30	-7	12	2.23	-0.04	1.58	15	10.2	6	13	10	8	s.	R. O. Burrows
Bellevue	Jackson	603	31.0	-3.7	80	30	-12	8	8	2.84	+0.76	1.92	15-16	7.1	8	13	7	11	s.	U. S. Engineers
Cedar Rapids	Linn	813	62	31.6	-2.8	82	30	-10	8	2.17	+0.50	1.29	16	6.7	10	8	11	12	s.	John T. Wurster
Clarence	Cedar	850	10	30.4	-4.1	79	30	-9	8	2.14	-0.06	0.94	15	11.0	7	18	4	9	sw.	H. J. Klatt
Clinton	Clinton	640	73	33.0	-3.1	80	30	-5	8	2.20	-0.32	1.08	15	4.3	7	5	23	3	nw.	Samuel W. Williams
Davenport	Scott	579	73	33.6	-2.5	80	30	-1	2	1.97	-0.34	0.70	18-19	6.3	7	8	12	11	sw.	U. S. Weather Bureau
Iowa City	Johnson	780	87	32.4	-3.2	80	30	-7	8	2.26	-0.01	1.19	15	8.4	6	15	9	7	s.	Inst. Hydraulic Research
Maquoketa	Jackson	700	51	30.9	-3.9	80	30	-14	8	1.83	-0.32	1.08	15	4.3	7	5	23	3	nw.	Otto J. Bisinger
Monmouth	Jones	870	3	30.9	-3.9	80	30	-14	8	1.83	-0.32	1.08	15	4.3	7	5	23	3	nw.	
Muscatine	Muscatine	620	98	33.5	-3.0	82	30	-12	8	2.06	-0.24	0.82	15-16	10.6	6	17	10	4	s.	G. Krieger
Vinton	Benton	815	1	31.2	-3.5	82	30	-9	8	2.23	+0.33	1.74	15	8.0	5	16	8	7	nw.	H. J. Adams
Williamsburg	Iowa	805	28	32.2	-3.2	82	30	-9	8	0.72	-1.28	0.50	18-19	6.5	5	21	4	6	nw.	Dr. F. C. Schadt
Means and extremes				31.8	-3.3	82	30	-14	8	2.13	-0.02	1.92	15-16	7.7	7	14	9	8	s.	
<i>Southwest District</i>																				
Atlantic	Cass	1,110	57	32.2	-3.1	83	30	-10	7	1.54	+0.05	0.74	19	10.7	6	11	12	8	nw.	Roy L. Fancolly
Bedford	Taylor	1,215	40	35.2	-2.3	84	30	-5	7	0.61	-1.14	0.41	18-19	6.5	4	18	7	6	sw.	H. J. Chambers
Clarinda	Page	1,004	72	34.5	-3.5	85	30	-7	7	1.34	-0.28	0.88	19	9.8	4	7	11	13	sw.	Forrest E. Allison
Clarinda Erosion	Page	1,132	5	34.1	-4.0	85	30	-6	7	0.74	-0.84	0.45	18	11.2	5	18	4	9	nw.	Soil Conservation Service
Corning	Adams	1,285	56	33.6	-2.3	83	30	-7	7	0.68	-1.01	0.30	15	3.8	5	17	6	8	sw.	S. W. Morris
Glenwood	Mills	1,100	54	34.8	-2.8	85	30	-8	7	0.91	-0.36	0.64	18	12.0	4	7	23	1	sw.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	32.0	-3.2	81	30	-7	7	2.21	+0.62	1.45	15	10.0	5	12	8	11	sw.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	32.3	-3.7	84	30	-13	7	1.20	-0.08	0.73	18-19	11.5	5	19	4	8	n.	M. E. Gray
Red Oak	Montgomery	1,077	5	33.7	-3.1	85	30	-15	7	0.55	-0.95	0.43	18-19	10.2	4	12	7	12	sw.	Arthur E. J. Johnson
Red Oak (near)	Montgomery	1,030	37						7	1.26	-0.26	0.98	18-19	13.0	4	16	6	9	s.	B. R. Bridge
Riverton (near)	Fremont	920	18						7	0.80	-0.75	0.61	18-19	9.6	5	13	8	10	sw.	F. E. Cowden
Shenandoah	Page	974	9	35.2	-2.9	86	30	-7	7	0.67	-0.82	0.57	18-19	9.0	3	21	7	3	s.	Earl E. May Seed Co.
Thurman	Fremont	973	57	34.6	-3.2	85	30	-14	7	0.98	-0.39	0.90	18-19	10.5	4	9	11	11	s.	Bernard Porter
Omaha, Nebr.		1,085	79	33.5	-2.6	85	30	-6	7	0.98	-0.39	0.90	18-19	10.5	4	9	11	11	s.	U. S. Weather Bureau
Means and extremes				33.8	-3.1	86	30	-15	7	1.04	-0.48	1.45	15	9.8	4	14	9	8	sw.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	33.2	-3.3	83	30	-7	7	1.50	-0.34	0.89	15	10.8	5	14	11	6	sw.	S. R. Brown
Albia	Monroe	949	53	34.4	-3.0	80	30	-4	7	1.53	-0.46	0.62	16	7.7	6	11	11	9	nw.	Arthur L. Freed
Centerville	Appanoose	1,013	51	35.4	-1.9	80	30	-7	7	0.87	-1.16	0.53	18-19	9.3	6	10	11	10	s.	E. Grant Everman
Chariton	Lucas	940	50	33.8	-2.8	82	30	-11	7	1.59	-0.14	0.98	15	8.0	4	14	9	8	nw.	Ellis Shaw
Creston	Union	1,293	43	32.0	-3.5	82	30	-9	7	1.28	-0.22	0.78	19-20	11.3	6	17	5	9	sw.	Mrs. Nellie Spangler
Indianola	Warren	972	63	31.8	-4.5	80	30	-5	2	1.03	-0.59	0.45	18	7.5	4	9	10	12	s.	Seth F. Shenton
Knoxville	Marion	920	54	34.1	-2.5	81	30	-5	7	1.85	-0.09	1.06	15	8.4	5	17	10	4	s.	Mrs. Ella Mae Brobst
Lamoni	Decatur	1,138	40	33.6	-3.1	81	30	-7	7	1.39	-0.43	0.78	15	6.8	5	11	6	14	nw.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	34.2	-2.8	80	30	-8	7	1.31	-0.68	0.72	15	6.8	6	12	16	3	sw.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	33.6	-3.1	80	30	-7	7	1.14	-0.78	0.54	19	11.1	4	9	15	7	n.	Mrs. Irene Hood
Osceola	Clarke	1,098	23	33.8	-2.7	82	30	-6	7	0.81	-1.09	0.45	18-19	7.0	5	15	6	10	nw.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	33.7	-2.7	82	30	-9	7	0.70	-1.15	0.44	18-19	6.4	5	15	7	9	nw.	Jas. A. Verploegh
Winterset	Madison	1,120	53	34.0	-2.3	83	30	-6	7	1.60	-0.09	0.65	15	12.0	5	14	9	8	sw.	H. S. Ely
Means and extremes				33.7	-2.9	86	30	-11	7	1.28	-0.55	1.06	15	8.7	5	13	10	8	nw.	
<i>Southeast District</i>																				
Bloomfield	Davis	825	29	34.0	-3.5	78	29	-6	7	1.32	-0.88	0.55	16	8.8	6	12	11	8	sw.	Mrs. Leo Foster
Burlington	Des Moines	697	54	33.2	-5.4	82	30	-5	7	1.34	-1.40	0.49	15	6.4	7	8	11	12	sw.	U. S. Weather Bureau
Columbus Jct.	Louisa	595	53	33.9	-3.2	82	30	-16	8	1.61	-0.59	0.51	18-19	10.1	6	15	14	2	nw.	Miss Musa Todd
Fairfield	Jefferson	780	64	34.6	-1.9	82	30	-12	8	1.41	-0.75	0.75	18-19	11.5	5	12	11	8	s.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	36.4	-2.5	81	30	-2	7	1.46	-0.92	0.61	15	3.8	7	14	7	10	sw.	U. S. Weather Bureau
Keosauqua	Van Buren	712	57	36.8	-0.6	84	30	-7	8	1.24	-1.00	0.50	18-19	12.5	6	15	8	8	nw.	Harry J. Schlotfeldt
Mt. Pleasant	Henry	722	68	34.8	-3.1	82	30†	-9	8	2.43	+0.10	1.20	15	5.6	5	20	7	4	s.	Raymond A. Hughes
Oskaloosa	Mahaska	813	68	33.1	-3.0	81	30	-6	7	2.10	+0.07	1.01	15	8.4	5	11	14	6	s.	Perry Lytle
Ottumwa	Wapello	649	49	36.4	-0.9	81	30	-7	8	1.38	-0.78	0.75	18-19	11.7	6	14	8	9	nw.	C. L. Mikesch
Sigourney†	Keokuk	780	49	34.2	-1.9	82	30	-8	8	1.26	-0.93	0.65	18-19	9.0	5	18	4	9	nw.	Mrs. Christie E. Chandler
Stockport	Van Buren	747	43	34.2	-2.7	81	30	-14	8	0.80	-1.48	0.29	18-19	5.0	6	17	7	7	s.	C. L. Beswick
Washington	Washington	762	69	34.3	-2.7	81	30	-8	8	1.82	-0.53	0.75	18-19	11.0	6	14	13	4	nw.	Clarence M. Logan
Means and extremes				34.8	-2.5	84	30	-16	8	1.54	-0.72	1.20	15	8.6	6	14	10	7	s.	
State means and extremes				31.0	-3.6	90	30	-19	11	1.51	-0.21	2.15	15	9.8	6	14	9	8	nw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921. Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year record. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departures are based on the averages for the entire 71 years of record and must necessarily differ slightly from average station departures based on established normals. † Also other dates. ‡ Received too late to be used in means and summaries.</









in momentum the cold front was pushed south and eastward and on the morning of the 15th it had reached eastern Nebraska. As the cold front moved eastward across Iowa, general precipitation occurred, with thundershowers over most sections south of the east-west warm front, and with scattered reports of hail and tornadoes. At some points the rain fell at an excessively rapid rate and at Des Moines the accumulated amounts falling in 15 and 30 minutes were the greatest of record for March. Damage by sleet and glaze in the extreme northwest counties marked the southern edge of an extensive ice storm over the Dakotas and Minnesota. A more detailed discussion of the storms appears in a separate paragraph.

The cold air dominated weather conditions during the following week, and temperatures again fell below zero in all sections. During this period Continental Arctic or Continental Polar air prevailed at the surface, but on the 18th-19th over-running Maritime Tropic air aloft resulted in a general fall of rather heavy snow.

The temperature rose above normal on the 23d, and continued relatively mild until the 29th when it became unseasonably warm. Except for light precipitation over the northern third on the 27th, fair weather was the rule after the snowstorm of the 19th. Superior air on the 30th caused maximum temperatures far above normal, with a reading of 90° at Hawarden. The monthly maximum occurred on the 30th at practically all stations, while minimum readings were mostly recorded on the 7th, 8th or 11th.

S. E. D.

#### TEMPERATURE

The average Iowa temperature for March, derived from the averages of nine districts of almost equal area, was 31.0°, or 3.6° lower than the average of the entire 71 years of March record. It was the coldest March since 1932 and the 18th coldest of record. Reports of 119 stations were used in computing district means from which the State average was obtained. At all of these stations the monthly means were below the adopted normals. The district averages ranged from 34.8° in the southeast to 26.8° in the north central section, but the greatest deficiency was in the northeast, while the least was in the northwest. The highest station average was 36.8° at Keosauqua, while the lowest was 24.6° at Cresco. The highest recorded was 90° at Hawarden on the 30th, while the lowest was -19° at Decorah on the 11th, making the monthly range 109°. The average number of days on which readings failed to rise above freezing was 10, with a minima of 32°, or lower 24, and with zero or lower 4.

#### PRECIPITATION

The average total precipitation during March was 1.51 inches, or 0.21 inch less than the average of the 71 years of record. Measured totals at 120 stations were used to compute the averages of nine districts of nearly equal area from which the State values were derived. There have been 42 wetter Marches in the preceding 70 years. The averages were above normal in the three northern and the central districts, but were below normal in the remaining sections, with the greatest deficiency in the southeast. The greatest total was 2.86 inches at Anamosa, while the least was 0.30 inch at Sloan. The greatest 24-hour fall was 2.15 inches at Dubuque on the 15th. The average number of days with 0.01 inch or more of precipitation was 6.

#### SNOWFALL

The average total snowfall was 9.8 inches. This is 4.4 inches more than the average of the entire 52 years during which snow records have been kept, and equaled the eighth greatest March fall. However, it was only slightly more than one-half of the record March snow of 19.1 inches in 1912. Following the trend of the general precipitation figures, the amounts were heaviest in the central and three northern dis-

tricts, with an average of 13.3 inches in the north central section. The greatest total was 17.8 inches at Decorah, while the least was 3.8 inches at Keokuk and Corning.

#### MISCELLANEOUS PHENOMENA

*Corona*, solar: 23d, 24th, 25th.

*Corona*, lunar: 13th.

*Fog*, light: 8th, 9th, 11th, 12th, 15th, 18th, 19th, 23d, 24th, 25th.

*Fog*, heavy: 11th, 12th, 13th, 14th, 15th, 24th, 25th.

*Halo*, lunar: 11th.

*Halo*, solar: 1st, 4th, 5th, 8th, 23d, 25th, 26th.

*Parhelia*: 6th.

*Sleet*: 10th, 15th, 18th, 19th.

*Thunderstorms*: 13th, 15th, 30th, 31st.

*Blizzard*: 16th, 18th.

*Freezing rain*: 15th, 16th, 17th.

*Hail*: 14th, 15th.

#### ERRATA

Report for January, 1943, Page 6, Dubuque, relative humidity at 12:30 a.m. published 83, should be 82.

Report for February, 1942, Page 14, Belmond, maximum temperature published 52 on 27, should be 53 on 22; Waverly, minimum temperature published -14 on 14 should be -15 on 16; Grundy Center minimum temperature published -14 on 13<sup>+</sup> should be -16 on 16. Page 15, Monmouth, number of days with 0.01 or more published 5 should be 6.

#### THE STORMS OF MARCH 15, 1943

(By S. E. Decker, Assistant Meteorologist, Des Moines, Iowa)

A series of thunderstorms and small tornadoes were responsible for the destruction of property valued at nearly \$300,000 and injury to 7 persons on the 15th. In addition, sleet and glaze caused some inconvenience and property loss in the extreme northwest.

The glaze was part of a more general storm and blizzard that hampered traffic and disrupted communications in Minnesota and the Dakotas. The Iowa damage occurred mostly in Lyon and parts of adjacent counties. Many rural telephone circuits were out of order, some communities were without electric service, and numerous minor traffic accidents were blamed on the icy pavement. Some schools were closed.

Near Des Moines lightning set fire to a large dairy barn during an early morning thunderstorm, with resultant loss amounting to several thousand dollars.

Another thunderstorm was responsible for the burning of a large barn about 5 miles north of Marshalltown. The building and machinery destroyed were valued at \$7,500 or more.

Hail fell in several localities but except for a few chicks being killed in Milford Township in Crawford County, there were no reports of loss. Most of the storm damage was caused by six separate and distinct tornadoes that are listed below in chronological order.

The first tornado occurred near Hancock in Pottawattamie County at about 3:00 p.m. Following a thunderstorm and a heavy fall of hail, a dark black cloud developed into a tornado funnel. The cloud rose and fell but remained aloft most of the time. Damage was mostly confined to telephone wires. No further details are available except that it became much colder shortly after the tornado passed.

The second tornado probably developed in the extreme northern part of Madison County shortly after 4:00 p.m. Traveling northeastward it passed west of Waukee in Dallas County, and thence into Polk County, where it curved sharply to the east and disappeared east of Grimes. It traveled through a rural area and lifted frequently. The path of the storm was about 30 miles long and from 500 to 1,000 feet wide. Ellen Walker was injured but details are not available. The total loss was reported at about \$10,000.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MARCH, 1943

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>Northwest District</i>																																
Alta.....	26	10	33	32	18	10	18	34	29	32	42	43	43	56	47	30	27	20	23	35	37	42	49	64	66	53	43	57	79	82	82	40.7
Alton.....	29	13	38	34	21	15	20	36	32	28	40	45	37	56	51	29	26	23	27	37	40	43	55	66	71	64	42	57	83	87	81	42.8
Cherokee.....	27	9	33	32	16	12	15	35	30	28	39	43	39	59	48	28	25	22	24	33	37	42	51	63	66	50	38	56	81	83	74	39.9
Estherville.....	29	10	34	31	14	14	15	29	27	35	45	40	34	53	43	35	22	22	25	34	33	38	48	62	66	55	36	44	76	80	70	38.7
Hawarden.....	29	13	38	38	17	13	18	39	37	29	43	46	46	58	49	24	28	25	27	38	40	46	58	68	75	59	40	60	84	90	84	43.8
Lake Park.....	29	9	30	30	16	10	12	31	30	31	42	40	34	50	48	33	20	22	21	29	28	38	49	60	64	63	38	47	70	70	70	38.2
Le Mars.....	28	12	38	30	15	24	19	38	32	32	43	44	36	61	50	21	28	29	26	39	42	45	57	68	71	66	54	60	84	89	73	43.9
Pocahontas.....	28	10	32	33	18	14	14	28	26	29	37	43	37	55	49	34	26	22	22	34	31	38	48	60	63	50	37	51	78	80	71	38.6
Rock Rapids.....	30	9	34	31	14	11	17	34	31	33	44	40	39	56	38	25	22	22	25	33	35	43	55	65	70	56	37	56	81	86	69	40.0
Sioux Rapids.....	29	11	34	36	21	17	17	32	33	33	41	42	38	56	55	45	27	26	25	36	37	41	51	64	67	63	44	52	80	82	80	42.4
Spencer.....	24	12	34	31	16	13	18	32	31	33	42	40	37	56	52	38	24	24	28	35	34	40	49	63	67	62	40	49	79	82	78	40.7
<i>North Central District</i>																																
Algona.....	28	10	34	31	17	16	13	26	28	34	40	42	36	52	45	41	24	23	26	33	32	39	45	60	64	51	37	49	77	81	70	38.8
Bancroft.....	29	8	31	30	17	14	12	26	28	34	40	42	36	52	41	30	22	23	23	32	30	37	45	60	64	59	39	46	74	79	74	38.3
Belmond.....	28	6	31	33	20	17	10	21	30	27	37	43	42	53	47	44	25	25	29	29	28	37	46	57	56	50	39	47	75	78	73	38.2
Britt.....	27	9	32	33	19	14	12	24	30	30	40	42	37	52	44	37	25	24	24	32	29	40	47	60	62	47	34	49	76	80	66	38.0
Charles City*.....	17	6	29	34	20	13	10	18	28	29	39	43	43	50	42	24	24	24	31	29	36	48	58	62	46	32	43	71	79	60	35.7	
Dakota City.....	28	8	33	35	21	16	14	26	29	32	38	41	40	56	53	40	27	24	24	31	31	38	47	60	60	49	38	50	77	80	70	39.2
Mason City.....	29	8	28	34	18	15	11	18	31	30	36	39	37	49	42	37	22	23	26	29	29	37	46	55	59	46	33	43	70	77	68	36.5
Northwood.....	27	5	27	28	16	15	12	18	29	31	38	37	35	44	41	35	20	23	19	32	27	35	45	58	61	48	35	42	69	76	68	35.4
Osage.....	30	9	27	35	20	17	12	18	31	29	40	44	40	45	45	36	21	24	27	33	31	39	49	59	59	50	39	42	71	79	76	38.0
<i>Northeast District</i>																																
Decorah.....	30	5	26	34	22	17	9	15	29	28	38	47	45	48	42	40	21	24	24	31	30	37	46	53	53	45	38	41	66	78	72	36.6
Delaware (near).....	29	4	28	39	24	20	10	15	33	29	40	45	54	59	54	51	29	25	28	30	31	37	47	53	46	50	40	43	65	78	69	38.8
Dubuque*.....	27	7	28	43	25	19	12	21	34	32	40	48	55	61	52	39	31	28	30	34	36	42	57	49	53	41	43	66	81	66	40.4	
Elkader.....	32	5	28	38	25	22	9	18	34	30	40	48	52	58	48	50	28	27	27	33	32	40	51	55	54	50	39	45	68	80	74	40.0
Fayette.....	32	7	27	42	25	21	10	17	36	31	39	47	53	56	48	48	22	26	25	32	32	35	49	54	47	55	39	44	68	77	70	39.2
Independence.....	32	8	30	39	26	22	10	18	35	33	42	49	56	62	56	51	30	29	25	31	30	40	50	54	49	50	41	47	71	80	74	41.0
New Hampton.....	32	6	27	34	24	16	9	16	28	29	41	44	43	48	48	36	24	23	25	33	29	35	48	56	49	47	33	45	67	78	72	36.9
Waterloo.....	35	5	32	42	26	23	13	19	35	30	44	50	57	61	55	53	31	30	26	32	32	37	50	57	48	50	38	46	75	82	73	41.5
Waverly.....	32	7	29	38	22	19	11	17	31	28	40	47	51	55	51	47	27	26	25	32	30	35	47	55	48	48	40	45	72	79	71	38.9
<i>West Central District</i>																																
Carroll.....	36	10	36	38	21	17	18	32	36	31	45	49	61	63	60	30	30	27	25	37	35	40	50	61	57	53	40	55	80	82	80	43.1
Denison.....	30	14	36	38	21	16	18	36	32	32	45	48	63	61	65	26	31	23	24	35	37	41	51	62	58	51	41	57	82	82	72	42.8
Guthrie Center.....	33	8	35	39	22	18	13	32	39	29	45	50	62	63	58	29	32	28	23	32	33	39	49	57	52	50	41	53	78	82	75	41.9
Harlan.....	40	12	38	38	26	18	10	38	37	34	48	52	65	65	30	33	32	25	36	39	41	50	62	58	55	47	56	82	82	81	45.3	
Jefferson.....	30	11	36	41	23	20	15	30	37	30	45	50	62	60	60	37	33	32	27	34	35	39	49	60	55	50	42	58	80	83	78	43.5
Littel Sioux.....	43	12	42	40	21	17	21	42	36	33	46	50	62	64	62	24	34	29	27	35	40	43	53	64	64	59	48	59	83	86	81	45.8
Logan.....	31	13	42	41	23	18	22	42	38	30	50	53	64	66	64	26	36	31	27	40	44	42	54	66	64	58	47	58	84	86	84	46.8
Mapleton.....	39	12	38	35	18	13	13	39	33	33	44	49	62	61	59	18	31	25	24	37	42	43	54	64	65	52	43	59	82	86	83	43.7
Rockwell City.....	33	10	33	37	20	16	16	30	29	31	43	47	49	58	55	33	29	26	25	35	34	39	50	62	61	54	42	53	79	82	76	41.5
Sac City.....	32	10	36	35	24	14	12	32	31	30	41	45	48	58	55	29	34	25	23	31	34	39	50	61	61	54	45	53	81	82	72	41.2
Sioux City*.....	17	12	39	34	16	12	18	40	28	30	41	48	54	63	38	17	30	22	25	38	44	46	58	67	72	51	45	60	84	89	75	42.4
<i>Central District</i>																																
Ames.....	34	9	35	40	23	22	14	26	38	30	45	50	60	63	57	46	32	29	25	32	32	37	48	55	52	49	42	51	77	80	74	42.2
Boone.....	35	9	35	41	23	20	14	24	38	28	45	50	63	61	58	36	31	29	24	33	34	41	50	59	54	49	38	54	79	83	75	42.4
Des Moines*.....	25	10	36	43	24	20	15	29	44	32	46	50	63	65	66	23	34	27	26	33	34	42	52	52	54	52	42	55	79	83	66	42.6
Fort Dodge.....	28	8	33																													

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MARCH, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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. †Interpolated.

About 5:30 p.m. a "twister" developed in Garden Grove Township in Decatur County, and traveled northeastward for about 12 miles into Lucas County. Like the Dallas-Polk County storm it occurred in a rural area lifting and dipping at times with great destruction where it traveled along the ground. The total loss was estimated at \$20,000.

The fourth tornado apparently developed near Marshalltown about 6:00 p.m. Hail fell at that city and a storm aloft was reported. The tornado dipped to the ground and wrecked buildings on one farm 5 miles south of Green Mountain. The monetary value of the property destroyed is not known. It would have been possible for this storm to have been a redevelopment of the Dallas-Polk County twister, but definite evidence to connect the two phenomena is lacking.

The fifth storm was the smallest and the most destructive of the series. Striking near the heart of Independence at 7:15 p.m. the tornado wrecked buildings in an area six city blocks long and two blocks wide. The area of destruction was crescent-shaped, curving from southeast to northwest, and then northeast. Six persons were injured, none very seriously. The total loss amounted to about \$250,000.

The sixth and last destructive windstorm of the day destroyed buildings on 2 farms near Andrew in Jackson County, at about 9:00 p.m. No details of this storm are available, but because the synoptic weather conditions favored development of tornadoes, and because of the prevalence of such storms on this date, it is being classified as one.

While these tornadoes are all listed as if each were separate and distinct from the others, all were effects of the same general cause. It is even possible that the one that caused damage near Waukee and Grimes redeveloped near Marshalltown, then lifted and traveled high in the air until it again struck with great violence at Independence. Thus what are listed as three separate tornadoes may have been only one. The time element for all of the storms is somewhat uncertain, but for one storm to have caused damage in the three localities, it would have been necessary for it to travel at about 30 to 40 miles per hour from Grimes to Marshalltown, and from 40 to 50 miles per hour from Marshalltown to Independence. Such a path would have been from southwest to northeast, and the progressive velocity would have been rather close to that observed under similar conditions. It has also been noted in the past that many Iowa tornadoes tend to accelerate their speed and to become more violent with time until their destructive energy reaches a climax. Reports from observers indicate that both the Decatur County and the Dallas-Polk County storms were quite violent and would have been much more destructive if they had struck in urban areas instead of in the open country.

The general weather conditions over this section on the 15th were of the type that have come to be recognized as being very favorable for the development of tornadoes. As early as March 12 cold air from the north had practically ceased to flow southward over Iowa, and a frontal area between cold air to the north and warm air to the south began to develop. From the 12th to the 15th some part of the front passed over Iowa or over southern Minnesota from west to east each day, and on the 15th it was almost stationary as a warm front across the third and fourth tiers of counties south of the Minnesota line. It is interesting to note that on the 14th when the front crossed southern Minnesota, the Continental Arctic air at the surface

north of the front was being overrun by Continental Polar air, which in turn was overrun by a Maritime Polar mass.

On the 15th cold Continental Arctic air pushed southward over the Great Plains States and upper Missouri Valley, under-running Maritime Polar air, and causing snow and freezing rain in those areas. As stated before, a warm front extended from west to east across northern Iowa. At the Missouri River the front changed to cold and extended southwest to a deep low pressure center over western Kansas. South of the front Superior air covered the southern Rocky Mountain section, changing to Maritime Tropic air over Texas. Superior air overlaid Continental Polar air in the Mississippi Valley south of the front. During the day the cold air pushed farther south and spread eastward, while the low pressure center moved northeastward along the front. At noon the low pressure center was over eastern Nebraska, and in the evening it was over north central Iowa. The evening weather map of observations taken at about the time the Independence storm occurred, showed the warm front passing almost due east from the low center over north central Iowa across southern Michigan, while the cold front extended from the low pressure center to the Ozarks and then southwest into northern Texas.

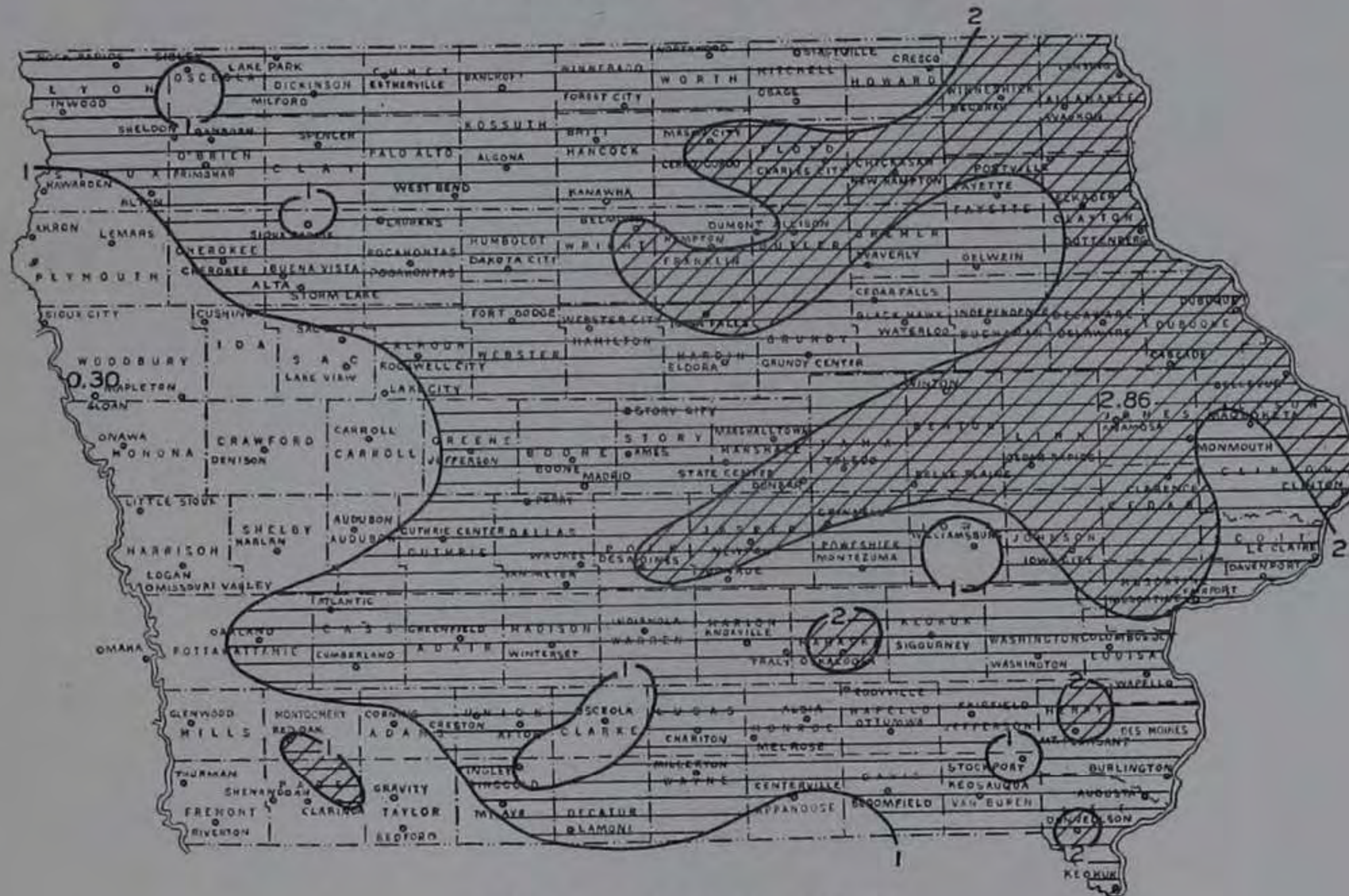
The tornadoes all occurred a short distance in advance of the surface cold front as it moved eastward. It became much colder after the Pottawattamie tornado occurred. The Waukee-Grimes storm occurred about a half hour before the center of the low pressure area reached Des Moines. Before the passage of the cold front the Des Moines temperature was 65° and the dew point 57°. As the front passed both fell sharply and then more slowly but steadily until the temperature reached 12° and the dew point 2° early on the morning of the 16th. Heavy rain fell during a thunderstorm at Des Moines, with the accumulated amounts for 15 and 30 minutes exceeding previous March records.

The radiosonde observation at Omaha, Nebraska, which was begun at about 11:00 a. m. wartime, showed a sharp change in the moisture content of the air above 2 kilometers, or between 6,600 and 7,800 feet. At the lower of these two levels there were 6.7 grams of moisture per kilogram of dry air and at the higher it was only 1.6 grams per kilogram, or less than a fourth as much. After this sharp change the moisture content was fairly constant to above 20,000 feet.

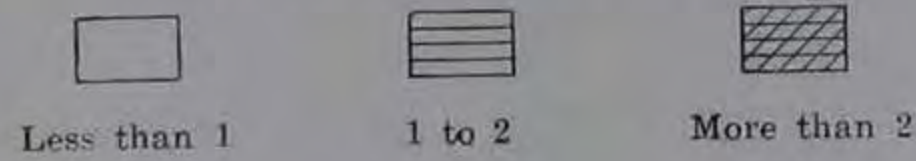
At 7:30 p. m. wartime dew point readings ranged from 17° at Sioux City and 19° at Omaha on the west, to 46° at Des Moines in the central section, and to 46° at Dubuque, and 56° at Davenport on the east. At La Crosse, Wisconsin, it was 31°.

It is probable that the cold front aloft extended somewhat in advance of the one at the surface, and that the tornadoes developed and moved along this front in agreement with the theory of Mr. J. R. Lloyd, proposed in the Monthly Weather Review of April, 1942. The Independence storm occurred almost on the east-west warm front, and its violence may be attributed to the fact that it developed very close to the junction of the east-west warm front and the cold front aloft. As stated previously, the synoptic maps were similar to those that have been followed by tornadoes in the past, and the storms give additional evidence that Mr. Lloyd's theory is substantially correct.

### TOTAL PRECIPITATION, MARCH, 1943



SCALE OF SHADES IN INCHES





# CLIMATOLOGICAL DATA

11

IOWA SECTION  
 In co-operation with  
 IOWA DEPARTMENT OF AGRICULTURE  
 C. D. REED

VOL. LIV DES MOINES, IOWA, APRIL, 1943 No. 4

## GENERAL SUMMARY

Iowa weather averaged close to normal during April, 1943. However, conditions varied greatly within the State, especially in the distribution of precipitation. In general, the temperature averages were above normal in the western half of the State and below normal in the eastern. The individual station averages ranged from 54.0° at Glenwood in the southwest to 44.3° at Postville (near) in the northeast. Precipitation was above normal in the east central, central and southeast districts, and was deficient in the remaining sections. Monthly totals amounted to less than one inch in most of the two northern tiers of counties, and ranged up to more than six inches in parts of the east central district. Rain was needed in most of the extreme western counties at the end of the month but it was too wet for farm operations in large areas in the central and eastern portions of the State.

The conditions during April, 1943, were in decided contrast to those of a year earlier. In 1942, April was the third warmest and second driest of record, and marked the 13th consecutive month with above normal temperature. This year air masses of Continental Polar origin predominated during the month, and in fact were present every day. Most of the precipitation occurred in connection with frontal passages. On some days air masses of varying properties merged so gradually that no true front could be discerned but only a wide transition zone appeared on weather charts.

There were only a few reports of measurable amounts of snow but most stations reported flurries or snow mixed with rain on one or more dates. The heaviest fall was 0.5 inch at Northwood.

Sunshine averaged 64% of the maximum amount possible, or 6% more than normal. There were two less cloudy days than usual but one more clear and partly cloudy days. The relative humidity was below the all-time average, while the total wind movement was considerably above. The average heating requirements at the first order stations were within 0.2 of 1 per cent of the all-time average.

Except for rather cool weather on the 2d, the first 10 days were warmer than normal and farm work that had been delayed by previous unfavorable conditions got away to a fairly good start. A large part of the oat seeding was done on the drier uplands and some flax and barley were also seeded. More than the usual amount of early potatoes were planted in the southwest. Spring plowing and disking of fall plowing were under way in the drier parts of the State. During this warm period, the longest of the month, showers occurred in the central and eastern sections on the 7th in connection with Maritime Polar and Maritime Tropic air, overflowing the cold Continental Polar air at the earth's surface. Overrunning Maritime Tropic air again caused showers from the 9th to the 12th, during which time some rain fell in all sections. The heaviest amounts were

## COMPARATIVE DATA FOR APRIL, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	43.2	83	24	3.13					
1874	41.9	76	16	1.90					
1875	43.0	77	10	2.20					
1876	48.1	78	24	3.06					
1877	47.5	91	14	3.33					
1878	52.4	82	26	3.14					
1879	50.3	88	12	1.13					
1880	47.9	92	15	2.08					
1881	42.5	84	10	2.26					
1882	48.8	91	20	3.73					
1883	49.9	90	24	2.25					
1884	46.8	86	18	2.54					
1885	47.5	80	16	2.94					
1886	50.3	88	4	2.70					
1887	51.1	94	9	1.38					
1888	48.8	90	20	2.65					
1889	50.3	86	10	2.35					
1890	51.2	88	2	1.73					
1891	50.6	93	13	2.15		8	14	7	9
1892	45.4	88	14	4.75	5.7	9	8	9	13
1893	45.5	96	15	4.21	6.0	10	8	9	13
1894	51.7	93	12	3.07	0.2	9	11	11	8
1895	54.2	98	8	2.62	2.1	5	14	8	8
1896	54.5	94	10	5.02	4.5	11	11	10	9
1897	47.9	89	19	5.35	T.	11	9	9	12
1898	48.1	91	14	2.56	T.	8	13	9	8
1899	48.9	89	1	2.40	2.0	7	12	11	7
1900	52.2	89	19	2.67	0.9	6	12	9	9
1901	49.9	92	15	1.79	2.0	5	14	8	8
1902	48.2	96	9	1.71	T.	5	14	11	5
1903	49.8	86	17	2.98	0.8	9	11	9	10
1904	44.1	86	13	3.63	1.4	7	15	6	9
1905	47.5	90	10	3.03	1.2	8	12	8	10
1906	52.5	94	22	2.42	0.6	8	14	9	7
1907	41.5	80	10	1.32	2.7	6	12	8	10
1908	50.5	91	8	2.24	0.3	8	14	8	8
1909	43.8	86	14	4.58	3.1	12	9	9	12
1910	52.5	99	15	1.48	3.0	7	14	7	9
1911	46.8	86	3	3.09	3.6	9	11	8	11
1912	49.9	84	20	2.66	1.1	8	13	8	9
1913	50.2	88	16	3.29	2.7	9	15	5	10
1914	48.6	88	11	2.52	0.3	8	10	8	12
1915	57.2	95	18	1.41	T.	7	15	10	5
1916	47.1	90	11	2.62	1.1	10	10	9	11
1917	45.5	88	17	4.55	3.8	11	9	7	14
1918	44.8	79	12	2.32	3.5	9	12	8	10
1919	48.4	81	20	4.78	0.7	14	8	8	14
1920	42.4	78	22	4.59	2.0	12	8	9	13
1921	52.4	88	14	3.34	3.6	10	13	7	10
1922	49.9	87	21	3.06	1.0	9	11	9	10
1923	48.4	85	11	2.09	0.8	8	15	7	8
1924	50.5	90	— 8	1.38	1.4	7	16	8	6
1925	56.5	95	21	2.20	T.	8	14	9	7
1926	46.1	85	9	0.91	1.5	4	16	7	7
1927	49.2	91	15	4.84	2.6	14	9	7	14
1928	44.3	88	6	2.24	4.9	8	12	9	9
1929	51.2	93	9	4.62	1.1	11	12	8	10
1930	52.1	96	5	2.67	0.3	9	14	7	9
1931	50.9	92	17	2.29	0.1	8	16	6	8
1932	50.0	84	21	1.96	T.	7	11	9	10
1933	48.8	85	16	1.21	0.2	6	12	9	9
1934	50.4	90	12	1.07	T.	4	14	9	7
1935	46.7	86	15	1.92	0.4	8	9	9	12
1936	45.9	92	0	1.10	3.9	7	14	8	8
1937	47.7	85	20	3.20	2.1	13	9	7	14
1938	50.3	87	15	3.66	3.7	10	11	9	10
1939	47.8	93	10	2.07	1.9	7	12	9	9
1940	47.5	89	10	3.22	0.2	11	10	9	11
1941	53.8	86	25	2.50	T.	10	9	10	11
1942	54.8	90	19	1.06	T.	5	16	8	6
1943	49.0	88	17	2.57	T.	8	13	9	8
Period	48.8	99	— 8	2.70	1.6	8	12	8	10

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

again reported from the central and eastern districts.

The temperature fell below normal over most of the State on the 11th, and the southward movement of a new mass of Continental Polar air on the 12th and 13th brought unseasonably low readings to Iowa. At most stations the lowest temperatures of the month occurred on the 14th or 15th.

CLIMATOLOGICAL DATA FOR APRIL, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy
<i>Northwest District</i>																				
Alta	Buena Vista	1,513	54	49.6	+ 3.1	84	24	20	14	2.45	- 0.28	0.96	12	0	6	10	14	6	nw.	D. E. Hadden
Alton	Sioux	1,305	39	49.6	+ 3.2	80	24	21	14	1.21	- 0.97	0.61	11	0	5	9	17	4	s.	W. S. Slagle
Cherokee	Cherokee	1,358	24	48.0	+ 1.5	82	24	21	14	1.52	- 0.82	0.53	29	T.	6	11	10	9	n.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	46.4	+ 1.0	80	24	20	13	1.10	- 1.34	0.58	23	T.	4	10	8	12	nw.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	50.9	+ 4.3	86	15†	22	14	1.17	- 1.23	0.78	11	0	6	14	6	10	nw.	Earl V. Slife
Inwood (near)	Lyon	1,474	41	48.0	+ 1.9	85	15	17	14	1.89	- 0.29	0.95	27	T.	6	15	8	7	nw.	A. C. Hanson
Lake Park	Dickinson	1,479	41	47.0	+ 2.0	78	24	20	13	0.71	- 1.59	0.29	11	T.	5	11	8	11	nw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	50.0	+ 2.9	86	24	20	14	1.00	- 1.52	0.66	11	0	4	14	9	7	s.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	47.6	+ 1.0	80	24	21	14	1.94	- 0.71	0.81	29	T.	4	7	11	12	nw.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17																	Scott King
Rock Rapids	Lyon	1,341	47	48.0	+ 2.0	82	15	21	13†	0.65	- 1.81	0.41	11	T.	3	10	11	9	e.	George Raveling
Sanborn	O'Brien	1,552	31	47.4	+ 1.9	78	24	18	14	0.86	- 1.64	0.39	11	0	5	13	5	12	nw.	Susie O. Dow
Sheldon	O'Brien	1,418	38	47.6	+ 1.9	80	24	20	13†	0.67	- 1.67	0.39	11	T.	6	14	9	7	nw.	Ross E. Forward
Sibley	Osceola	1,494	9	47.2	+ 1.6	78	24	18	13†	0.71	- 1.63	0.38	11	T.	4	16	6	8	sw.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		48.6	+ 1.9	84	24	19	15	1.32	- 1.38	0.50	22	0	4	13	8	9	nw.	Walter A. Simonsen
Spencer	Clay	1,319	36	48.1	+ 1.5	82	24	19	5	0.91	- 1.71	0.38	11	T.	6	11	11	8	nw.	E. W. Little
Storm Lake	Buena Vista	1,455	54	47.8	+ 0.9	79	24	20	13	1.61	+ 0.36	0.77	11	0	8	9	13	nw.	Paul B. Vance	
West Bend	Palo Alto	1,197	57	47.8	+ 1.2	83	24	20	14	1.13	- 1.31	0.38	22	0	6	13	9	8	nw.	Jos. Dorweiler
Means and extremes				48.2	+ 2.0	86	15+	17	14	1.23	- 1.22	0.96	12	T.	5	12	9	9	nw.	
<i>North Central Dist.</i>																				
Algona	Kossuth	1,200	83	47.4	+ 0.2	81	24	21	14	0.93	- 1.77	0.43	22	T.	5	15	8	7	nw.	Harry B. Nolte
Allison	Butler	1,060	30	46.6	- 0.4	78	24	22	14†	2.47	+ 0.17	0.78	29	T.	8	16	7	7	n.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	47.8	+ 1.1	81	24	20	13	0.69	- 1.71	0.38	22	0	4	19	6	5	nw.	Wilbur Fox
Belmond	Wright	1,175	35	46.4	- 0.2	81	24	19	15	1.01	- 1.73	0.46	11	0	5	13	10	7	nw.	W. H. Dempsey
Britt	Hancock	1,240	59	46.7	+ 0.2	82	24	20	14	0.90	- 1.46	0.53	22	T.	2	11	10	9	nw.	L. M. Naser
Charles City	Floyd	1,013	69	45.9	- 0.5	78	24	23	14	1.31	- 1.21	0.50	11	T.	6	13	8	9	nw.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	47.5	- 0.2	84	24	22	14	1.57	- 0.77	0.55	29	T.	6	9	10	11	n.	H. S. Brandsgard
Forest City	Winnebago	1,289	54	47.2	+ 1.0	80	24	20	14	0.85	- 1.39	0.41	12	T.	6	9	7	14	se.	Dr. M. B. Neil
Hampton	Franklin	1,142	53	46.4	- 0.6	80	24	21	15	2.18	- 0.50	0.67	29	T.	9	17	3	10	nw.	E. A. Saxton
Mason City	Cerro Gordo	1,148	52	45.4	- 0.5	78	24	19	15	1.08	- 1.22	0.35	11	T.	6	14	6	10	nw.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	44.8	- 0.6	78	24	20	14	0.72	- 2.00	0.31	11	0.5	5	8	14	8	nw.	Charles H. Dwelle
Osage	Mitchell	1,163	59	46.8	+ 0.9	74	8	22	14	0.36	- 2.08	0.20	22	T.	4	10	12	8	nw.	Harry D. Hedrick
Means and extremes				46.6	+ 0.1	84	24	19	15	1.17	- 1.33	0.78	29	T.	5	13	8	9	nw.	
<i>Northeast District</i>																				
Cedar Falls	Black Hawk	875	23							2.86	+ 0.21	0.80	29-30	T.	14	15	2	13	nw.	E. J. Cable
Cresco	Howard	1,260	7	44.8	- 1.1	75	24	20	13†	0.80	- 1.80	0.36	22-23	T.	8	13	7	10	nw.	William Hebig
Decorah	Winneshiek	880	61	44.4	- 1.7	76	24	17	15	0.99	- 1.63	0.40	23	0	6	12	14	4	nw.	Mrs. Fieta M. Rose
Delaware (near)	Delaware	1,083	65	46.0	- 1.7	73	24	21	15	3.07	+ 0.38	0.80	26-27	T.	13	14	9	7	nw.	Clair E. Paris
Dubuque	Dubuque	642	93	47.8	- 0.8	75	24	26	15	3.27	+ 0.42	0.90	26-27	T.	13	9	9	12	nw.	U. S. Weather Bureau
Elkader	Clayton	772	52	45.4	- 2.4	75	24	22	15	1.21	- 1.41	0.41	22-23	T.	7	16	4	10	n.	W. H. O'Brien
Fayette	Fayette	1,009	56	45.5	- 1.4	77	25	19	15	1.47	- 1.48	0.70	29	T.	6	13	9	8	n.	John P. Clyde
Guttenberg	Clayton			48.4	+ 1.5	75	24	25	13†	1.84	- 0.81	0.46	23	T.	7	11	7	12	nw.	U. S. Engineers
Independence	Buchanan	956	84	47.1	- 1.7	78	24	23	14†	3.07	+ 0.60	0.68	29	0	11	12	8	10	nw.	August Bracht
New Hampton	Chickasaw	1,161	47	45.6	- 0.8	77	24	20	14†	0.74	- 1.83	0.37	29	0	4	12	8	10	nw.	C. Maas
Oelwein	Fayette	1,036	23	44.7	- 3.1	78	24	20	14†	3.26	+ 0.32	0.80	29	0.2	10	18	12	0	nw.	John T. Ridler
Postville (near)	Clayton	1,130	53	44.3	- 1.4	74	24	20	15	1.34	- 1.42	0.43	22-23	0.5	7	13	9	8	nw.	V. H. Williams
Waterloo	Black Hawk	848	62	48.0	- 0.9	80	24	22	15	2.76	+ 0.31	0.53	27	T.	10	16	9	5	nw.	Ralph B. Slippery
Waukon	Allamakee	1,287	9	44.6	- 1.9	75	24	21	13†	1.11	- 1.49	0.42	22-23	T.	7	14	10	6	n.	Mrs. Albert S. Tousley
Waverly	Bremer	935	55	46.2	- 1.6	79	24	21	15	2.00	- 0.63	0.76	29	T.	9	14	9	7	nw.	Charles W. Wile
Means and extremes				45.9	- 1.4	80	24	17	15	2.00	- 0.67	0.90	26-27	T.	9	14	8	8	nw.	
<i>West Central Dist.</i>																				
Audubon (near)	Audubon	1,297	51	49.8	+ 1.8	85	24	21	14	2.50	- 0.10	0.90	11	0	11	8	16	6	nw.	Geo. Kibby
Carroll	Carroll	1,280	58	49.8	+ 2.0	85	24	21	14	1.72	- 0.74	0.52	29	T.	6	12	3	15	nw.	Ben H. Schenkelberg
Cushing (near)	Ida	1,350	10	48.6	+ 1.5	84	24	20	14	1.70	- 0.60	0.69	11	T.	8	8	14	8	se.	H. P. Lasher
Denison	Crawford	1,307	60	49.0	+ 1.1	85	24	21	14	1.49	- 0.86	0.46	11	0	7	18	6	6	ne.	E. M. Hug
Guthrie Center	Guthrie	1,217	49	49.6	+ 0.6	83	24	22	14	1.92	- 0.69	0.73	11	0	9	16	6	8	nw.	Wilbert Shaw
Harlan	Shelby	1,210	52	50.7	+ 2.4	85	24	24	14†	2.43	- 0.12	0.98	11	0	8	19	4	7	nw.	Elmer Buss
Jefferson	Greene	1,055	52	49.5	+ 1.3	83	24	22	14	2.21	- 0.33	0.53	29	T.	8	13	8	9	nw.	Will I. Lyon
Lake City	Calhoun	1,238	8																	Frank A. Taylor
Little Sioux	Harrison	1,040	43	52.4	+ 2.6	86	24	23	19	1.25	- 1.37	0.77	11	0	7	14	15	1	s.	H. W. Kerr
Logan	Harrison	1,120	78	52.0	+ 2.5	88	24	23	14	1.81	- 0.76	0.53	11	0	10	13	16	1	se.	Miss Amy Ann Stern
Mapleton (near)	Woodbury	1,225	5	49.4	+ 1.7	86	24	21	2	1.42	- 0.98	0.63	29	0	7	15	7	8	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069		53.2		86	24	24	14†	1.90		0.71	9-10	T.	7	14	5	11	nw.	S. Wm. Sorensen
Onawa	Monona	1,050	59	51.9	+ 3.5	87	24	22	14	1.45	- 1.15	0.72	11	0	8	15	11	4	s.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	48.9	+ 2.0	85	24	21	14	1.78	- 0.86	0.76	29	T.	8	19	5	6	nw.	F. C. Beitelspacher
Sac City	Sac	1,274	75	48.2	+ 1.2	84	24	21	13†	1.94	- 0.37	0.81	29	0	7	11	14	5	n.	James L. Leonard
Sioux City	Woodbury	1,111	69	49.5	+ 2.3	86														

CLIMATOLOGICAL DATA FOR APRIL, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit					Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry	Dallas	975	44	49.7	+ 0.8	84	24	22	15	2.06	- 0.43	0.62	11	T.	12	16	5	9	se.	Eugene N. Hastie
State Center	Marshall	1,068	7	47.8	- 1.5	83	24	22	14†	4.65	+ 1.90	1.55	29	T.	11	9	13	8	ne.	H. M. Meads
Toledo	Tama	929	50	48.4	- 1.2	81	24	22	14	4.45	+ 1.56	1.65	29	T.	11	13	12	5	ne.	H. P. Giger
Waukeech†	Dallas	1,042	46	50.2	+ 0.7	84	24	22	14	2.19	- 0.75	0.48	11	T.	9	18	6	6	n.	Ivan B. Speer
Webster City	Hamilton	1,042	60	46.4	- 1.0	82	24	18	15	3.26	+ 0.90	1.43	29	T.	7	11	10	9	nw.	Leo Holtkamp
Means and extremes				48.2	- 0.8	84	24	18	15	3.47	+ 0.66	1.65	29	T.	10	12	9	9	nw.	
<i>East Central Dist.</i>																				
Anamosa	Jones	878	15	46.9	- 1.7	76	24	22	15	3.76	+ 1.00	1.14	7	T.	12	14	9	7	nw.	State Reformatory
Belle Plaine	Benton	895	68	48.0	- 1.9	79	24	23	14†	4.70	+ 1.56	1.63	29	T.	14	14	8	8	se.	R. O. Burrows
Bellevue	Jackson	608	47	47.3	- 1.3	74	24	22	3	3.63	+ 0.85	1.08	27	T.	9	13	4	13	nw.	U. S. Engineers
Cedar Rapids	Linn	813	62	48.0	- 1.9	79	24	23	15	4.20	+ 1.60	1.20	7	T.	8	12	10	8	nw.	John T. Wurster
Clarence	Cedar	850	10	47.0	- 1.6	75	24	24	15	4.87	+ 2.07	1.24	26-27	T.	11	18	5	7	nw.	H. J. Klatt
Clinton	Clinton	640	73	49.4	- 0.5	75	24	25	15	4.91	+ 1.91	1.09	7†	T.	13	10	12	8	nw.	Samuel W. Williams
Davenport	Scott	579	73	49.4	- 0.5	75	24	28	14	6.21	+ 3.52	3.03	26-27	T.	13	10	10	10	nw.	U. S. Weather Bureau
Iowa City	Johnson	780	87	48.8	- 0.6	78	24	24	15	5.35	+ 2.29	1.96	26-27	T.	14	13	10	7	n.	Inst. Hydraulic Research
Maquoketa	Jackson	700	51	47.0	- 2.4	75	24	21	15	3.77	+ 0.97	0.93	7	T.	10	2	20	8	nw.	Otto J. Bisinger
Monmouth	Jones	870	3	49.1	- 0.6	77	24	21	15	6.34	+ 3.25	2.66	26-27	0	13	15	10	5	e.	G. Krieger
Muscatine	Muscatine	620	98	48.0	- 2.6	81	24	24	14	3.81	+ 1.11	1.33	7	T.	12	8	15	7	se.	H. J. Adams
Vinton	Benton	815	1	48.2	- 1.4	80	24	22	15	3.62	+ 0.76	1.49	27	0	8	15	5	10	nw.	Dr. F. C. Schadt
Williamsburg	Iowa	805	28	48.1	- 1.3	81	24	21	15	4.60	+ 1.74	3.03	26-27	T.	11	12	10	8	nw.	
Means and extremes				48.1	- 1.3	81	24	21	15	4.60	+ 1.74	3.03	26-27	T.	11	12	10	8	nw.	
<i>Southwest District</i>																				
Atlantic	Cass	1,110	57	50.4	+ 0.7	81	24	20	14	4.33	+ 1.67	1.23	25	T.	11	14	12	4	nw.	Roy L. Fancolly
Bedford	Taylor	1,215	40	52.6	+ 1.5	81	24	25	14	1.72	- 1.08	0.90	25	0	4	22	6	2	se.	H. J. Chambers
Clarinda	Page	1,004	72	52.8	+ 1.4	85	29	23	17	1.69	- 1.17	0.65	25	0	9	14	9	7	se.	Forrest E. Allison
Clarinda Erosion	Page	1,132	5	52.6	+ 1.1	84	24	24	14	1.96	- 0.92	0.58	25	0	8	21	4	5	se.	Soil Conservation Service
Corning	Adams	1,285	56	51.4	+ 1.4	83	24	23	14	3.42	+ 0.51	1.98	25	0	5	18	6	6	se.	S. W. Morris
Glenwood	Mills	1,100	54	54.0	+ 2.8	85	24	26	20	2.08	- 0.54	0.62	11	0	6	5	22	3	nw.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	50.2	+ 0.2	81	24	22	14	2.52	- 0.54	0.78	26-27	T.	9	10	8	12	se.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	51.0	+ 1.2	85	24	22	14†	2.49	+ 0.11	0.76	24-25	0	9	19	5	6	n.	M. E. Gray
Red Oak	Montgomery	1,077	5	52.7	+ 2.1	84	24	23	20	2.34	- 0.41	0.94	25	0	9	7	13	10	se.	Arthur E. J. Johnson
Red Oak (near)	Montgomery	1,030	37							2.30	- 0.46	1.04	25	0	5	17	10	3	s.	B. R. Bridge
Riverton (near)	Fremont	920	18							1.32	- 1.58	0.80	25	0	3	11	8	11	n.	Geo. C. Rader
Shenandoah	Page	974	9	53.7	+ 2.1	85	24	24	14†	1.92	- 0.98	0.86	25	0	8	9	16	5	nw.	Earl E. May Seed Co.
Thurman	Fremont	973	57	53.5	+ 1.6	86	24	23	14	1.88	- 1.09	0.78	25	0	5	19	5	6	nw.	Bernard Porter
Omaha, Nebr.	Fremont	1,035	79	53.4	+ 2.4	84	24	29	14	2.45	- 0.06	0.68	9-10	0	8	7	13	10	n.	U. S. Weather Bureau
Means and extremes				52.4	+ 1.6	86	24	20	14	2.32	- 0.46	1.98	25	T.	7	14	10	6	se.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	51.5	+ 0.8	83	29	23	14	2.44	- 0.91	0.80	25	0	9	16	7	7	nw.	S. R. Brown
Albia	Monroe	949	53	50.5	- 0.1	79	24	25	14	3.07	+ 0.07	0.92	25	T.	9	13	5	12	nw.	Arthur L. Freed
Centerville	Appanoose	1,013	51	51.5	+ 0.7	83	29	23	14	2.38	- 0.80	0.92	25	T.	9	13	4	13	n.	E. Grant Everman
Chariton	Lucas	940	50	50.4	+ 0.4	81	29	21	15	3.48	+ 0.55	1.53	26-27	0	9	14	10	6	ne.	Ellis Shaw
Creston	Union	1,293	43	49.8	+ 0.1	82	29	22	14†	2.60	- 0.42	0.74	10	0	9	13	11	6	e.	Mrs. Nellie Spangler
Indianola	Warren	972	63																	Seth F. Shenton
Knoxville	Marion	920	54	50.6	+ 0.2	81	24	24	14†	4.24	+ 1.32	0.86	27	T.	10	14	11	5	nw.	Mrs. Ella Mae Brobst
Lamoni	Decatur	1,138	40	51.4	+ 1.0	86	29	22	14	1.85	- 1.21	0.88	25	0	7	11	13	6	se.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	50.6	+ 0.4	83	29	23	14	3.20	- 0.05	0.95	25	T.	10	13	8	9	nw.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	51.4	+ 1.3	86	29	22	14	1.32	- 1.88	0.60	25	T.	6	11	16	3	se.	Mrs. Irene Hood
Osceola	Clarke	1,098	23	50.8	+ 0.4	83	29	23	14†	1.97	- 1.13	0.90	25	T.	8	16	5	9	nw.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	50.8	+ 0.4	85	29	22	14	2.12	- 1.03	1.43	24	T.	5	16	9	5	se.	Jas. A. Verploegh
Winterset	Madison	1,120	53	50.4	+ 0.4	80	24	23	14	2.27	- 0.80	0.66	11	T.	7	13	10	7	ne.	H. S. Ely
Means and extremes				50.8	+ 0.5	86	29	21	15	2.50	- 0.59	1.53	26-27	T.	8	14	9	7	nw.	
<i>Southeast District</i>																				
Bloomfield	Davis	825	20	50.2	- 1.1	80	24†	23	15	3.17	+ 0.02	0.95	25	T.	11	9	10	10	se.	Mrs. Leo Foster
Burlington	Des Moines	697	54	49.8	- 2.4	77	24	23	15	4.55	+ 1.35	2.20	26-27	T.	14	8	14	8	nw.	U. S. Weather Bureau
Columbus Jct.	Louisa	595	53	49.3	- 1.0	79	24	22	15	4.62	+ 1.51	1.16	9	T.	11	17	9	4	nw.	Miss Musa Todd
Fairfield	Jefferson	780	64	50.0	0.0	80	24	24	15	5.22	+ 1.81	2.04	26-27	T.	13	10	7	13	se.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	51.5	- 0.8	81	29	27	14†	3.88	+ 0.89	1.23	26-27	T.	10	10	13	7	sw.	U. S. Weather Bureau
Keosauqua	Van Buren	712	57	52.3	- 1.5	83	24	24	15	3.85	+ 0.75	1.18	26-27	T.	11	16	5	9	n.	Harry J. Schlotfeldt
Mt. Pleasant	Henry	722	68	51.4	+ 0.1	82	25	25	14	5.77	+ 2.48	2.10	26-27	0	8	14	8	8	s.	Raymond A. Hughes
Oskaloosa	Mahaska	813	68	49.6	- 0.5	81	24	21	15	3.98	+ 1.05	1.69	26-27	T.	10	9	16	5	se.	Perry Lytle
Ottumwa	Wapello	649	49	52.4	+ 1.4	82	24	22	15	4.11	+ 1.05	1.12	25	T.	13	14	7	9	nw.	C. L. Mikesh
Sigourney†	Keokuk	780	49	50.4	+ 0.6	80	24	23	14	3.13	+ 0.10	1.47	26-27	0	8	15	7	8	ne.	Mrs. Christie E. Chandler
Stockport	Van Buren	747	43	49.3	- 0.7	79	24	21	15	3.34	+ 0.24	1.16	26-27	T.	11	15	4	11	nw.	C. L. Beswick
Washington	Washington	762	60	50.2	- 0.5	80	24	23	15	3.62	+ 0.41	1.50	26-27	T.	8	14	13	2	n.	Clarence M. Logan
Means and extremes				50.5	- 0.3	83	24	21	15	4.04	+ 0.92	2.20	26-27	T.	10	13	9	8	nw.	
State means and extremes				49.0	+ 0.2	88	24	17	14	2.57	- 0.13	3.03	26-27	T.	8	13	9	8	nw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.  
 Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year record. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departures are based on the averages for the entire 71 years of record and must necessarily differ slightly from average station departures based on established normals.  
 T. Precipitation is less than



DAILY PRECIPITATION FOR APRIL, 1943—Continued

Stations	Basin Drainage	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>Central District</b>																																				
Ames†	Skunk					.10	.52	.32	.11	.45			T.	T.										.20	.16	T.	.07	.21	.39		1.17		3.70			
Boone	Des Moines					.11	.14	.35	.09	.41			T.	T.			T.							.37	.01	.07	.01	.13	.29		1.30		3.39			
Boone (rvr) <sup>2</sup>	Des Moines						.28		.45		.44														.42		.10		.30		1.20		3.19			
Des Moines†	Des Moines					.25	.06	.72	T.	.54			T.	T.	T.									.17		.22	.03	.70		.56		3.26				
Des Moines Apt.†	Des Moines					.24	.04	.57	T.	.58			T.	T.	T.									.17		.30	.07	.61		.40		2.98				
Dunbar (near)	Iowa					.03	.65	.16	T.	.48			T.	T.	T.									T.	T.		.25	.22		.88		3.04				
Fort Dodge <sup>2</sup>	Des Moines						.25		.18		.52		T.	T.	T.								.08		.23		.13		.08	T.	1.35		2.82			
Grinnell†	Iowa					.21	.34	.22	.03	.53			T.	T.	T.									.10	.13	.03	.09	.30	.87		1.29		4.14			
Grundy Center	Cedar					*	.80	.05	.40		.05		T.	T.	T.									T.	T.		.33	.13	.20		.78		3.00			
Iowa Falls <sup>2</sup> †	Iowa						.43		.06		.78		T.	T.										T.	.02		.35	.17	.22		.24	.37	2.64			
Marshalltown <sup>2</sup>	Iowa	T.				.90		.32		.54			T.	T.	T.										.38		.02		.70		.40	1.20	4.46			
Monroe	Des Moines					.13	.22	.09	.44	.16		T.	T.	T.										T.	.16		.51	.22	.73		1.02		3.68			
Newton	Skunk					.13	.24	.37	.20	.66		.02	T.	T.										T.	.15	.06	T.	.06	.25	.57		1.62		4.33		
Perry	Raccoon					.03	.07	.31	.11	.62			T.	T.	T.										.20	.03	T.	.06	.08	.08		.46		2.06		
State Center	Iowa					.08	.82	.25	.72				T.	T.	T.	T.									T.	.10	.37	.05	.11	.33	.27		1.55		4.65	
Toledo	Iowa					.10	.87	.37	.09	.51		T.	T.	T.										.02	T.		.05	.30	T.		.27	.22		1.65		4.45
Van Meter <sup>2</sup>	Raccoon						.28		.38	T.	.55		T.												.11		.36		.88		.20	.20		2.96		
Waukeo	Raccoon					.06		.28	.18	.48				T.												.10		.22	.12	.46		.29		2.19		
Webster City†	Boone						.47		.24		.46		T.												T.	.12		.20		T.		1.43		3.26		
Webster City (rv.) <sup>2</sup>	Boone						.23		.15		.53		T.												.01		.41	.07	.08		1.11	.33		2.92		
<b>East Central District</b>																																				
Anamosa	Wapsipicon					T.	1.14	.12	.22	.09														.09	.02		.18	.32	.04	.33	.40		.81		3.76	
Belle Plaine	Iowa					.03	.87	.26	.12	.54		.01	T.	T.										.03	T.		.04	.26	.02	.05	.28	.56		1.63		4.70
Bellevue LD 12 <sup>2</sup>	Mississippi						.64		.14		.28		T.	T.	T.		.05								.12		.87	T.	.04		1.08		T.	.41	3.63	
Cedar Rapids <sup>2</sup>	Cedar	T.					1.20		.12		.48		T.	T.	T.		T.								.02	T.		.34		.06		.95		T.	1.03	4.20
Ced. Rap. (rvr.) <sup>2</sup>	Cedar	T.					1.14		.06		.48		T.	T.													.43		.08		.96		T.	1.11	4.26	
Clarence	Wapsipicon						1.05	.11	T.	.40	.02	T.	T.					T.	.02	.03						.81		.08	.47	.77		1.11		4.87		
Clinton	Mississippi						1.09	.19	.09	.13	.17							T.	.11	.03						.83		.36	.30	.79		.72	.10		4.91	
Clinton (rvr.) <sup>2</sup>	Mississippi						.99		.19		.28		T.							.11	.03					.82	T.	.40		1.13		.84		4.79		
Davenport†	Mississippi					.51	.32	.08	.29		T.	T.	T.	T.		.03				.02	.01	T.			.70	.22	T.	.18	2.79	.24		.82		6.21		
Davenport LD 15 <sup>2</sup>	Mississippi	T.					.73		.09		.30		T.	.01	T.	.02				.02	T.					.90		.15	.04	2.95		.97		6.18		
Iowa City†	Iowa					.04	1.01	.26	.05	.41	.02	T.	T.							.03	.01					.08	.25	.26	.37	1.59		.97		5.35		
Le Claire <sup>2</sup>	Mississippi	T.					.74		.08		.25		T.							.02	T.					.61		.11	.01	1.80		1.22		4.84		
Le Claire LD 14 <sup>2</sup>	Mississippi	T.					.60		.11		.28		T.	T.	T.					.02	.01					.68		.14	.03	2.11		.94		4.92		
Maquoketa	Maquoketa						.93	.09	.03		.25		T.	T.	T.	T.					T.	T.				.08	.75	.04	.38	.57		.65		3.77		
Monmouth	Maquoketa						.93	.09	.03		.25		T.	T.	T.	T.					T.	T.				.08	.75	.04	.38	.57		.65		3.77		
Muscatine	Mississippi					T.	.72	.60	.51	.28	.03	T.	T.			.02		.01	T.	.02	.03					.18	.27	.31	.45	2.21		.75		6.34		
Muscatine (rvr.) <sup>2</sup>	Mississippi						.57		1.08		.26		T.							.02	T.					.41		.29		.98		.84		4.45		
Muscatine LD 16 <sup>2</sup>	Mississippi						.71		.83		.24		T.	.01		.01				.01	T.					.48		.28		3.09		.68		6.34		
Vinton	Cedar					T.	1.33	.12	.05	.24	T.	T.	T.			T.			.05	.02					.10	.23	.04		.29	.54		.80		3.81		
Williamsburg	Iowa						.02	.15	.49		T.	T.	T.													.01		.16	.45	1.49		.85		3.62		
<b>Southwest District</b>																																				
Atlantic <sup>2</sup>	Nishnabotna						.16	.08	.52	.13	1.15	.03						T.		.01						.16		1.23	.04	.82				4.33		
Bedford	Nishnabotna						.54		.25		.05																	.90	T.	.03				1.72		
Blockton SCS	Platte						.64	.08	.21		.05																.83	.14					1.95			
Clarinda <sup>2</sup>	Nodaway						.06	.26	.25		.25	.05															T.	.05	.04	.11				1.69		
Clarinda Eros.†	Tarkio						.33	.18	.51		.02	.13																.58	.15					1.96		
Corning	Nodaway						.59		.44																		T.	.18		1.98	.23				3.42	
Cumberland (near)	Nodaway					T.	.15	.42	.04	.90		.04	T.			.10										T.	.06	.04	.85	.14	.75		T.		3.49	
Emerson SCS <sup>2</sup>	Nishnabotna						.03	.35	.12	.61		.02	.12			.02												.70	.19	.13				2.31		
Glenwood	Missouri						T.	T.	.54	.09	.62		T.	.18														.42	.23	T.				2.08		
Greenfield	Nodaway					T.	.04	.36	T.	.57		T.	T.	T.		.10											T.	.08	.56	.10	.68		.03		2.52	
Oakland	Nishnabotna						.02	.47	.08	.50		.14															.10		.12	.64	.42				2.49	
Red Oak	Nishnabotna						.31	.18	.42		T.	.07																.14	.94	.09	.17		.02		2.34	
Red Oak (near)	Nishnabotna						.37		.60		.19																		1.04	.10					2.30	
Riverton (near)	Nishnabotna						.51		.01		T.																	.80	T.						1.32	
Shenandoah	Nishnabotna						.37	.11	.37		.04	.10																.86	.03						1.92	
Thurman	Missouri						.43	.16	.26		T.																	.78	.25					1.88		
Omaha, Nebr.†	Missouri	T.	T.				.23		T.	.66	.02	.59	.05															.28	.29	.33				T.	2.45	
<b>South Central District</b>																																				
Afton	Grand						.47	.03	.35		.05																	.08		.80	.46	.08		.07		2.44
Albia <sup>2</sup>	Des Moines	T.					.15		.33		.28	T.	T.	T.		.03												.92	.21	.86		T.	T.	.21	3.07	
Centerville†	Chariton					.16		.21	.25		.48		T.	T.														.92	.40	.07		.12		</		

DAILY PRECIPITATION FOR APRIL, 1943—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>Southeast District (Continued)</i>																																	
Donnellson <sup>2</sup>	Des Moines					.16			.40	.92	.08	.03		T.		.05			T.			.00	.22		.97	.35	.71		.16	T.		4.14	
Eddyville <sup>2</sup>	Des Moines						.25			.33		.56											.12		1.00	.15	1.60		.25	.90		5.16	
Fairfield	Skunk					.12			.46	.30	.45	.01	T.	T.		.04			T.		.02	*	.19		.98	1.08	.96	.02	.59		5.22		
Keokuk <sup>1†</sup>	Mississippi				T.	.15			.71		.10	T.	T.	T.		T.			T.		T.	.37	.02	.02	.94	.63	.60		.34		3.88		
Keokuk LD 19 <sup>2</sup>	Mississippi					.15			.28	.40		.14		T.	T.	T.			T.		T.		.35		.64	.28	1.11		.01	.34		3.70	
Keosauqua	Des Moines					.14			.23	.50	.21	.02	T.								.01		T.	.27		1.00	.43	.75		.29	T.	3.85	
Keosauqua (rvr.) <sup>2</sup>	Des Moines						.18			.48		.25				.10							.20		.70	.10	1.30	T.		.15		3.46	
Mt. Pleasant	Skunk					.13			.98	.26	.25		T.												1.10	.30	1.80		.95		5.77		
Oskaloosa	Des Moines					.09	.02		.22		.52		T.	T.		.01			T.		T.		.13		.79	.43	1.26		.51		3.98		
Ottumwa <sup>†</sup>	Des Moines					.13	.04		.26	.30	.25	.21	T.	T.		.04			T.		T.		.02	.16	1.12	.18	.91		.49		4.11		
Ottumwa (river) <sup>2</sup>	Des Moines	T.				.10			.24		.50	T.		T.	.05						T.		.20		.92	.30	1.25		.58		4.14		
Sigourney	Skunk					.06	.10		.11		.50	.04	T.												.85	.57	.90				3.13		
Stockport	Skunk					.19			.36	.23	.18	.07	T.	T.		.05			T.		T.		T.	.20		.62	.52	.64		.28	T.	3.34	
Wapello <sup>2</sup>	Iowa	T.				.32			1.40		.30	T.	.03	T.	T.								.35		.30	.05	1.78		T.	.65		5.18	
Washington <sup>†</sup>	Skunk					.28			.10		.30	T.	T.										.20		.50	.30	1.20		.74		3.62		

Except as otherwise indicated, observations are generally made in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.  
<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
T. Precipitation is less than 0.005 inch rain or melted snow.  
‡ Interpolated.  
† Station is equipped with recording gage.  
\* Precipitation included in next following measurement.

SUPPLEMENTAL TABLE, APRIL, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days			Prevailing direction of wind		
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear		Partly cloudy	Cloudy
Akron	Plymouth	1,153	17	0.98	- 1.22	0.80	11	0	4	17	5	8	s.
Cambrld. (nr.)	Cass	1,225	45	3.49	+ 1.03	0.90	11	0	11	12	11	7	n.w.
Dumont (nr.)	Butler	998	9	1.62	- 0.78	0.52	29	T.	8	8	16	6	n.
Dunbar (nr.)	Marshall	1,010	9	3.04	+ 0.19	0.88	29	T.	8	13	10	7	n.w.
Kanawha	Hancock	1,183	—	1.37	- 1.33	0.49	11	0	4	11	7	12	n.w.
Lake View	Sac	1,239	5	2.11	- 0.34	0.75	29	0	5	16	3	11	n.
Melrose	Monroe	871	15	2.98	- 0.02	1.10	25	T.	7	17	7	6	se.
Sloan	Woodbury	1,071	—	1.73	—	1.03	11	0	4	—	—	—	—

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

SOIL TEMPERATURES AT AMES, IOWA, APRIL, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	38.2	39.6	43.4	44.8	41.8		
Average 12 noon	51.8	53.0	43.8	44.4	42.3		
Average 7 p. m.	52.7	53.4	49.5	45.0	42.3	40.0	41.5
Highest Date	82 24	67 23	58 24†	52 25†	47 26†	44 29†	44 29†
Lowest Date	21 17	31 2†	35 14†	37 1	36 1	36 1†	39 2
Number of days with temperature							
24° or lower	2	0	0	0	0	0	0
32° or lower	10	5	0	0	0	0	0
40° or higher	30	29	28	26	24	19	20
50° or higher	27	24	15	7	0	0	0
60° or higher	16	9	0	0	0	0	0

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS

Stations	Sea-level pressure, extremes—inches				Wind†				Relative Humidity				Percentage of sunshine	Degree Days
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.	12:30 P. M.	6:30 P. M.		
Burlington	30.52	3	29.48	16	11.3	40	sw.	15†	70	76	49	56	65	457
Charles City	30.52	30	29.38	15	8.2	24	se.	15	—	—	—	—	62	582
Davenport	30.53	3	29.47	16	11.7	30	n.w.	1†	73	77	48	53	62	468
Des Moines	30.48	30	29.44	15	11.8	32	n.w.	29	67	73	52	53	62	458
Dubuque	30.53	3	29.37	16	8.2	24	se.	29	69	71	46	50	58	517
Sioux City	30.53	30	29.37	15	13.3	38	n.	4†	62	71	42	43	70	465
Omaha, Nebr.	30.50	20	29.49	15	15.0	46	n.	4	59	65	46	45	65	349
State	30.53	3†	29.37	15	11.4	46	n.	4	67	72	47	50	64	471
Normals and Records	30.75	9 1918	28.80	20 1893	9.9	157	n.	25	—	76	54	58	58	462

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.  
‡ Sioux City \*Davenport †and other dates †Sioux City

Light scattered showers marked the passage of a cold front on the 18th-19th. The end of the cold spell was attended by additional showers on the 22d and 23d as Maritime Tropic air first overran the Continental Polar air at the surface, after which, both air masses were displaced by Maritime Polar air from the west.

During the second decade of the month oats, barley and flax seedings were delayed by the cold, windy weather, and there was some damage by freezing of germinating oats and early oats that were just up out of the ground. Growth of pastures and hay crops was slow. Buds and blossoms of peaches, apricots and plums were damaged or killed by severe freezes in the southern counties. However, spring plowing for corn, soybeans and hemp made good progress except in areas where it was too wet.

Modified Maritime Polar air brought the highest temperatures of the month to most stations on the 24th. The warmth

lasted for only a three-day period, 23d-25th, and was followed by another relatively cool spell that continued until the end of the month. Showers occurred in some section or other daily during the last week of the month except on the 28th. The amounts were heaviest in the eastern sections, with excessively heavy downpours on the 26th. These heavy showers were occasioned by Maritime Tropic air overrunning cold Polar air at the earth's surface.

Pastures and meadows improved rapidly and plum trees came into bloom in central and western Iowa during the warm spell of the 23d-25th, but all vegetation was retarded by the cold weather at the close of the month. Plowing and preparation for planting of corn and soybeans made good progress in the drier western half, but work was at a standstill in the east. Considerable alfalfa and clover were plowed up because of winter-killing and damage from heaving. Most young animals were in good condition at the close of the month.

There were few damaging storms. Moderate to heavy hail was reported from scattered areas on the 24th, 26th, 27th and 29th, but except for fruit buds and blossoms there was little vegetation sufficiently advanced to be damaged.

On the night of the 15th wind squalls in Jefferson County damaged buildings and other property to the extent of about \$15,000. Most of the damage was near Libertyville, Parsonville, Beckwith and east and northeast of Fairfield. There was very little precipitation. The squalls occurred in connection with the passage of a cold front as Maritime air overlying Polar Continental air was replaced by a fresh outbreak of Polar Continental air.

The heavy showers on the 26th caused small streams to overflow and especially in Scott and Muscatine counties damaged streets, lawns and gardens by washing or depositing debris. Many basements were flooded in Davenport. The loss probably ran into thousands of dollars but is difficult to itemize.

Lightning caused some damage at Des Moines on the 29th. Auroras were observed on the 25th and 26th. An unusual display was observed at Northwood between 10 and 11 p. m. on the 25th.

Floods along the Missouri River flooded thousands of acres of Iowa farm land and caused considerable loss and inconvenience in cities and towns. Likewise, the Mississippi River was at or near flood stage at points along the eastern border, but in this case damage was relatively light. The total damage caused by flood waters is not yet known but a summary of the losses will appear in Climatological Data as soon as the statistics are available.

S. E. D.

**TEMPERATURE**

The average Iowa temperature during April, 1943, obtained from the averages of nine districts of nearly equal area, based on records of 120 stations, was 49.0°. This was practically normal, being 0.2° higher than the April average for the entire 71 years of record. In general, readings were somewhat above

normal over the western half of the State, and somewhat below in the eastern half. District averages ranged from 52.4° in the southwest to 45.9° in the northeast. The individual station averages showed a somewhat greater range from 54.0° at Glenwood to 44.3° at Postville (near). The highest observed was 88° at Logan on the 24th, while the lowest was 17° at Inwood (near) on the 14th, and at Decorah on the 15th. The average number of days with minimum temperature of 32° or lower was 10, ranging from 15 in the northeast section to 7 in the southwest district.

**PRECIPITATION**

The average total precipitation derived from the averages of nine districts, nearly equal in area, which in turn were based on the monthly totals at 121 stations, was 2.57 inches. This was 0.13 inch less than the all-time average but very close to the April median as there have been 34 wetter and 36 drier Aprils in the 71 years of record. The district averages were above normal in the central, east central and southeast sections, but were below normal elsewhere. The monthly totals ranged from less than an inch along the northern border to over six inches in parts of the east central district. The greatest total was 6.34 inches at Muscatine, while the least was 0.36 inch at Osage. The greatest 24-hour fall was 3.03 inches at Davenport on the 26th-27th. Except in the extreme west, most stations reported flurries of snow that melted as it fell on one or more days, but there were only a few measurable amounts. The heaviest fall of 0.5 inch occurred at Northwood. The average number of days with 0.01 inch or more was 8.

**MISCELLANEOUS PHENOMENA**

- Aurora:* 26th.
- Duststorm:* 3d, 15th, 16th, 24th, 27th, 28th, 29th.
- Fog, heavy:* 8th, 9th, 11th, 23d.
- Fog, light:* 1st, 7th, 8th, 11th, 15th, 18th, 21st, 22d, 23d, 24th, 27th.
- Hail:* 24th, 26th, 27th, 29th.
- Halo, lunar:* 9th, 10th.
- Halo, solar:* 15th.
- Thunderstorms:* 4th, 6th, 7th, 9th, 10th, 11th, 14th, 15th, 16th, 21st, 22d, 24th, 25th, 26th, 28th, 29th.
- Sleet:* 18th.
- Frost, killing:* 28th, 29th.

**SILENT OBSERVER**

It is with a feeling of personal sorrow that we announce the death on April 1 of E. J. Paris, Cooperative Observer, who lived near Delaware, Iowa. His death was sudden and unexpected. He was a very intelligent, faithful and efficient weather observer, and reported for the Weekly Crop Bulletin. Temporarily, his son, Clair E. Paris, is continuing the cooperative work of his father, but we fear that we may lose him to the military service unless some deferment can be arranged, because he is the only hope of maintaining a fine, productive farm, in full operation this season.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR APRIL, 1943 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames.....	(Evaporation.....)	.180	.144	.200	.235	.176	.182	.156	.213	.052	.104	.042	.066	.108	.089	.201	.262	.161	.156	.148	.162	.306	.064	.157	.373	.191	.137	.185	.151	.350	.260	.....	5.211
	(Wind Movement...)	111	65	134	131	59	135	74	49	79	145	98	91	132	110	122	137	46	83	137	49	88	87	48	140	68	109	119	42	138	130	.....	2,956
Cherokee..	(Evaporation.....)	.166	.101	.204	.276	.175	.141	.210	.206	.088	.114	.000	.107	.043	.163	.231	.252	.162	.187	.192	.156	.170	.065	.217	.341	.234	.183	.182	.159	.154	.413	.....	5.392
	(Wind Movement...)	134	65	167	218	60	156	21	76	80	118	115	91	211	157	173	160	63	98	80	34	118	63	53	163	70	86	216	47	166	142	.....	3,401
Clarinda..	(Evaporation.....)	.227	.209	.288	.309	.197	.346	.110	.225	.149	.140	.100	.127	.158	.137	.205	.394	.135	.253	.167	.131	.134	.109	.256	.471	.236	.083	.236	.185	.328	.317	.....	6.362
	(Wind Movement...)	117	74	156	195	55	135	84	73	81	100	95	190	199	154	166	177	40	105	106	46	89	101	91	159	101	58	174	51	178	165	.....	3,515
Ia. City....	(Evaporation.....)	.147	.140	.163	.254	.165	.149	.146	.169	.067	.159	.076	.117	*	.134	.168	.228	.136	.121	.102	.193	.226	.060	.160	.299	.152	.155	.180	.156	.189	.233	.....	4.644
	(Wind Movement...)	99	82	76	182	74	84	87	33	41	91	52	94	118	88	97	157	52	64	136	105	54	62	70	91	77	66	97	65	91	147	.....	2,632

For precipitation and temperature data, see tables on other pages of this publication.  
 †Monthly total evaporation includes interpolation for missing days. \*Included in following measurement.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF APRIL, 1943

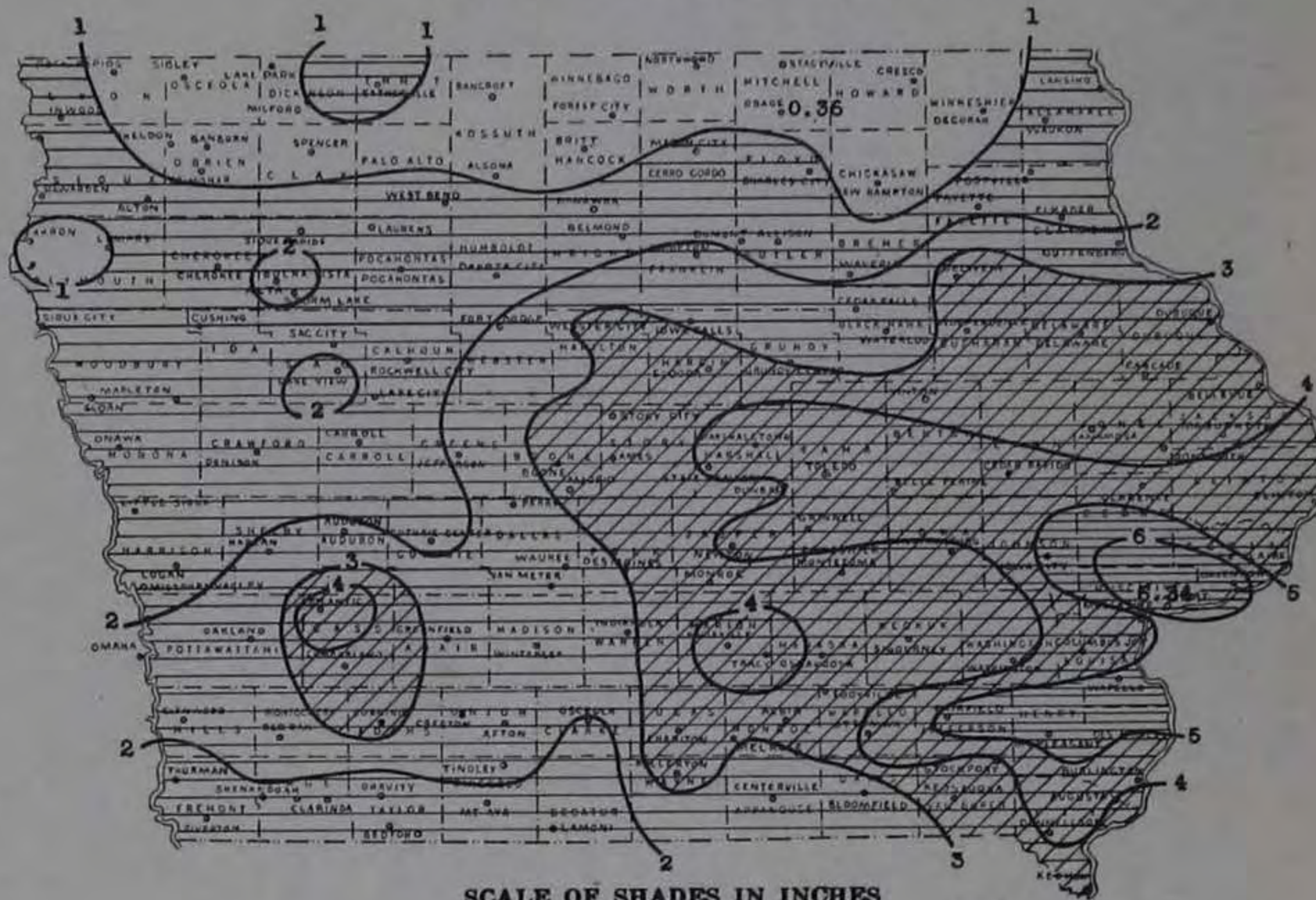
Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Mean	
<i>Northwest District</i>																																
Alta.....	(Maximum.....	53	53	62	62	55	58	72	78	70	57	54	50	43	48	74	73	62	60	56	66	67	60	72	84	79	65	56	67	74	70	63.3
	(Minimum.....	40	26	30	45	29	38	33	39	48	40	38	34	21	20	25	35	27	37	26	31	39	39	38	47	49	41	43	34	46	35	35.8
Alton.....	(Maximum.....	63	51	65	62	57	60	70	78	75	61	54	51	45	45	79	78	61	59	55	64	65	62	75	80	68	64	56	66	78	72	64.0
	(Minimum.....	40	25	31	45	25	40	31	37	49	40	39	35	22	21	26	40	23	36	24	23	39	41	36	48	46	42	44	29	48	34	35.3
Cherokee.....	(Maximum.....	53	48	63	61	54	60	70	76	65	55	52	51	34	43	76	62	60	52	55	63	64	57	72	82	68	56	53	65	75	56	60.0
	(Minimum.....	37	26	32	46	26	40	32	41	51	41	39	34	22	21	25	34	24	35	24	27	39	43	37	49	52	44	44	31	47	35	35.9
Estherville.....	(Maximum.....	50	42	57	58	52	56	65	73	60	61	53	50	39	41	70	65	60	54	53	62	65	60	72	80	65	58	56	67	73	56	59.4
	(Minimum.....	36	24	30	39	27	36	32	28	39	39	37	34	20	21	21	35	22	35	26	26	30	38	38	48	46	38	41	34	46	34	33.3
Hawarden.....	(Maximum.....	57	53	69	68	58	63	73	79	74	59	55	54	45	46	86	77	76	59	57	64	67	65	77	86	73	62	59	68	80	58	65.6
	(Minimum.....	41	26	34	46	25	41	31	33	51	44	40	36	25	22	26	39	24	36	24	25	44	45	35	50	45	44	43	29	49	33	36.2
Lake Park.....	(Maximum.....	59	45	60	57	53	57	65	72	69	60	57	47	41	40	71	70	59	56	51	60	63	60	70	78	66	59	52	65	76	57	59.8
	(Minimum.....	37	24	31	40	28	38	33	35	43	39	38	33	20	21	24	35	25	34	23	28	34	41	39	45	43	40	40	33	46	33	34.1
Le Mars.....	(Maximum.....	56	54	66	62	59	60	71	78	76	58	53	55	44	45	80	72	62	55	56	65	65	61	78	86	69	63	57	67	78	67	63.9
	(Minimum.....	39	26	33	44	26	39	32	40	51	43	39	34	22	21	25	39	24	37	24	23	42	43	35	50	47	43	44	30	48	35	36.1
Pocahontas.....	(Maximum.....	53	45	58	59	54	58	70	74	63	57	58	48	43	41	71	68	61	54	54	62	67	61	71	80	68	59	54	66	73	60	60.3
	(Minimum.....	40	27	32	38	28	38	38	29	45	39	37	33	23	21	22	37	24	38	27	26	34	44	36	48	40	37	47	30	43	43	34.8
Rock Rapids.....	(Maximum.....	55	48	64	61	53	62	68	75	68	58	54	48	42	43	82	73	62	56	53	64	67	64	75	81	66	59	53	64	78	55	61.7
	(Minimum.....	38	26	32	43	27	40	30	29	48	42	40	35	21	21	22	37	22	34	23	23	36	42	34	48	44	44	42	28	48	33	34.4
Sioux Rapids.....	(Maximum.....	59	51	61	60	57	58	69	76	74	58	48	51	50	43	74	73	61	61	54	64	65	60	72	84	75	61	55	66	76	71	62.9
	(Minimum.....	36	26	32	49	29	40	29	30	49	37	38	35	20	20	19	37	21	37	26	25	31	43	35	45	48	41	44	30	46	35	34.4
Spencer.....	(Maximum.....	58	49	60	60	58	60	68	74	70	62	57	47	44	43	73	70	61	57	54	63	65	57	74	82	70	64	54	64	70	68	62.2
	(Minimum.....	40	25	25	41	19	39	34	30	47	41	38	33	21	26	22	36	22	36	23	24	37	42	33	46	46	41	42	30	47	35	34.0
<i>North Central District</i>																																
Algona.....	(Maximum.....	50	43	56	57	53	58	68	74	69	61	52	48	40	40	69	65	59	55	53	62	70	60	71	81	67	57	56	66	73	63	59.9
	(Minimum.....	38	26	30	39	30	36	31	33	48	40	37	35	22	21	23	37	24	33	28	28	34	42	41	45	48	39	44	33	48	38	35.0
Bancroft.....	(Maximum.....	54	46	54	57	53	56	71	73	69	61	55	49	41	41	68	64	60	57	54	61	69	65	71	81	68	59	55	68	76	70	60.9
	(Minimum.....	37	26	31	38	29	36	29	38	45	40	37	31	20	22	23	37	27	40	28	30	34	42	38	42	40	38	42	31	47	36	34.7
Belmond.....	(Maximum.....	53	46	55	58	52	57	69	72	69	59	55	51	48	38	64	62	48	54	54	60	71	62	69	81	65	56	58	66	67	65	59.5
	(Minimum.....	33	25	30	39	29	36	31	29	46	37	34	32	23	20	19	37	21	37	28	27	30	43	37	39	42	39	44	30	46	38	33.4
Britt.....	(Maximum.....	53	43	50	59	52	59	69	74	71	60	50	51	36	38	67	60	57	50	54	60	72	61	72	82	66	57	52	68	71	64	59.3
	(Minimum.....	38	25	30	35	29	36	34	34	47	38	35	32	22	20	21	35	25	35	27	27	34	41	36	44	45	40	43	31	46	38	34.1
Charles City*.....	(Maximum.....	53	42	50	58	52	50	68	72	70	58	47	51	33	36	59	52	56	45	53	60	68	56	71	78	64	58	59	66	62	55	56.7
	(Minimum.....	33	26	31	38	32	38	38	32	49	36	34	33	25	23	23	36	27	33	32	31	32	40	41	43	49	42	40	33	47	37	35.1
Dakota City.....	(Maximum.....	53	44	56	58	54	57	69	74	71	57	53	48	41	40	66	68	58	50	53	61	71	58	70	84	67	56	54	66	71	62	59.7
	(Minimum.....	38	27	31	38	30	39	31	32	48	39	37	35	23	22	25	39	23	38	28	27	34	44	38	45	48	39	45	31	47	38	35.3
Mason City.....	(Maximum.....	53	41	51	58	52	51	69	71	67	58	49	50	37	37	59	56	56	49	54	59	69	60	78	78	65	56	57	66	66	65	57.6
	(Minimum.....	34	24	30	33	28	36	34	28	43	35	32	32	23	20	19	35	23	35	28	27	27	37	38	45	45	40	45	29	47	40	33.1
Northwood.....	(Maximum.....	51	42	49	55	50	50	65	71	65	59	45	48	38	36	59	52	56	45	53	57	68	57	70	78	62	57	57	65	63	65	56.3
	(Minimum.....	33	23	29	33	28	35	33	33	44	37	31	32	21	20	21	34	25	34	29	28	32	38	41	41	46	39	44	33	40	38	33.2
Osage.....	(Maximum.....	53	47	51	59	53	50	69	74	70	62	54	51	45	38	59	58	59	54	55	61	72	59	72	73	71	58	59	66	60	72	59.5
	(Minimum.....	34	24	30	36	29	35	35	45	34	31	33	23	22	23	36	26	26	36	29	29	33	38	41	42	48	38	45	31	46	40	34.2
<i>Northeast District</i>																																
Decorah.....	(Maximum.....	55	43	49	59	52	49	67	72	67	62	52	51	44	35	56	52	57	50	52	58	67	64	71	76	65	59	58	65	67	57	57.7
	(Minimum.....	27	24	23	38	30	27	37	26	33	33	27	32	24	22	17	36	20	34	31	26	21	31	42	31	47	31	46	27	46	43	31.1
Delaware (near).....	(Maximum.....	64	52	49	62	53	50	64	71	67	55	50	50	41	35	53	57	55	50	51	57	67	61	70	73	66	62	59	63	55	59	57.4
	(Minimum.....	33	23	24	37	31	34	41	36	48	34	31	31	27	22																	



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF APRIL, 1943—Continued

Stations	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Mean
<i>Central District (Continued)</i>																															
Grundy Center.....(Maximum.....)	59	48	52	60	55	56	68	71	61	61	50	50	40	38	61	60	57	47	56	61	70	60	70	79	67	59	60	66	61	64	58.9
Grundy Center.....(Minimum.....)	32	30	25	35	28	36	36	35	46	36	32	32	24	20	19	39	27	37	28	27	29	36	41	40	48	36	44	30	44	40	33.7
Iowa Falls.....(Maximum.....)	55	42	52	59	53	57	69	70	62	56	48	46	34	38	63	60	56	48	51	60	60	60	70	82	65	58	56	63	66	64	57.7
Iowa Falls.....(Minimum.....)	35	26	29	38	30	27	35	33	47	37	34	33	23	21	23	38	24	35	29	29	30	40	38	41	48	37	45	32	46	40	34.1
Marshalltown.....(Maximum.....)	64	44	54	62	58	59	71	74	62	59	48	51	42	41	65	66	58	52	55	62	71	62	72	81	70	63	60	65	65	67	60.8
Marshalltown.....(Minimum.....)	28	26	29	36	32	38	38	33	51	38	35	33	24	22	18	41	25	35	29	28	24	39	42	33	52	38	46	33	46	44	34.5
Newton.....(Maximum.....)	62	45	57	64	57	56	72	76	64	57	50	52	44	41	66	66	57	53	53	62	72	57	72	82	72	63	59	63	68	68	61.0
Newton.....(Minimum.....)	34	27	29	47	31	37	40	40	50	40	36	35	27	23	22	42	30	38	29	22	30	40	42	41	54	42	48	35	46	44	37.0
Perry.....(Maximum.....)	60	52	59	62	60	57	73	77	70	57	54	56	47	44	70	69	59	60	55	64	71	62	73	84	76	65	60	66	76	71	63.6
Perry.....(Minimum.....)	35	27	30	44	30	37	36	33	48	41	38	35	25	23	22	41	24	40	27	29	29	45	39	41	52	38	47	31	47	41	35.8
Webster City.....(Maximum.....)	54	44	53	57	55	56	69	71	63	57	49	47	42	40	66	63	56	48	52	60	68	59	70	82	65	56	55	63	68	65	58.4
Webster City.....(Minimum.....)	32	27	30	35	32	38	35	30	50	40	36	35	23	21	18	40	23	37	28	28	29	43	32	38	51	42	45	32	46	40	34.5
<i>East Central District</i>																															
Anamosa.....(Maximum.....)	63	45	50	64	53	51	68	71	64	57	50	51	44	36	55	62	55	53	49	57	67	62	71	76	69	63	60	64	60	61	58.4
Anamosa.....(Minimum.....)	32	26	26	40	32	35	39	33	52	35	31	34	27	24	22	42	28	31	32	31	26	36	45	36	55	40	50	33	44	44	35.4
Belle Plaine.....(Maximum.....)	63	46	52	62	55	52	67	74	60	58	48	50	46	40	62	58	57	52	51	59	68	58	71	79	69	65	59	63	63	56	59.1
Belle Plaine.....(Minimum.....)	35	27	28	35	32	38	40	41	50	38	35	35	26	23	23	42	29	37	31	30	35	42	43	44	54	41	48	35	46	45	36.9
Cedar Rapids.....(Maximum.....)	66	45	51	62	55	53	67	73	64	57	50	53	44	38	59	61	56	55	52	58	68	60	70	79	70	64	60	64	59	62	59.2
Cedar Rapids.....(Minimum.....)	31	28	29	42	35	38	40	36	52	38	33	35	27	25	23	43	29	32	33	33	29	39	45	38	56	42	48	35	45	46	36.8
Clarence.....(Maximum.....)	67	45	51	64	56	53	67	75	59	57	53	64	41	37	55	61	58	58	50	57	67	55	70	75	66	66	61	64	56	60	58.6
Clarence.....(Minimum.....)	31	27	25	35	33	34	40	41	46	37	30	35	26	25	24	40	29	31	33	33	30	35	47	42	46	39	47	35	44	45	35.5
Clinton.....(Maximum.....)	68	45	50	67	58	51	69	74	66	56	55	48	39	35	60	60	56	60	51	58	67	63	70	75	69	65	63	66	60	60	60.0
Clinton.....(Minimum.....)	33	29	26	40	35	34	40	38	52	38	32	37	29	27	25	47	35	33	35	38	33	40	49	54	56	42	53	37	49	48	38.8
Davenport*.....(Maximum.....)	67	46	52	66	57	55	68	74	61	54	56	54	37	38	59	62	56	60	50	60	67	55	71	75	67	66	63	65	63	59	59.4
Davenport*.....(Minimum.....)	37	30	29	44	35	38	42	45	48	37	34	37	29	28	29	44	36	36	35	38	39	43	49	52	49	44	45	39	46	44	39.4
Iowa City.....(Maximum.....)	67	46	52	65	57	54	70	75	64	59	53	52	42	41	58	62	56	58	50	59	68	58	71	78	69	66	61	63	61	63	59.9
Iowa City.....(Minimum.....)	32	29	27	41	34	39	40	42	51	40	32	36	28	25	24	44	32	34	34	35	31	40	46	40	56	42	51	38	45	46	37.8
Maquoketa.....(Maximum.....)	70	50	52	66	58	56	70	75	71	58	55	55	46	41	58	61	56	62	49	59	69	65	71	77	67	66	64	64	62	62	61.2
Maquoketa.....(Minimum.....)	28	28	27	43	32	36	40	35	51	40	34	36	29	25	21	45	31	31	34	36	26	36	48	36	54	45	54	36	45	47	37.0
Muscatine.....(Maximum.....)	63	45	53	62	58	56	60	73	63	57	52	51	44	39	60	61	58	53	52	60	62	57	73	81	67	65	61	65	69	63	59.4
Muscatine.....(Minimum.....)	31	29	28	40	31	32	40	35	52	38	34	34	26	24	28	44	28	30	33	32	30	39	44	39	58	42	47	35	46	46	36.5
Vinton.....(Maximum.....)	63	45	53	62	58	56	60	73	63	57	52	51	44	39	60	61	58	53	52	60	62	57	73	81	67	65	61	65	69	63	59.4
Vinton.....(Minimum.....)	31	29	28	40	31	32	40	35	52	38	34	34	26	24	28	44	28	30	33	32	30	39	44	39	58	42	47	35	46	46	36.5
<i>Southwest District</i>																															
Atlantic.....(Maximum.....)	65	54	62	65	61	58	75	79	66	58	53	59	49	45	75	71	58	60	52	65	60	68	75	81	69	60	58	68	77	68	63.8
Atlantic.....(Minimum.....)	37	27	32	46	28	41	37	41	51	45	39	36	25	20	26	40	23	40	26	28	32	47	35	45	48	41	48	33	51	40	36.9
Bedford.....(Maximum.....)	69	55	61	66	60	62	75	79	71	63	65	62	54	44	73	70	58	65	52	63	61	65	73	81	76	63	61	65	84	70	65.5
Bedford.....(Minimum.....)	40	32	33	45	34	40	45	46	54	45	42	36	28	25	27	46	28	39	27	30	41	48	39	48	49	43	49	36	53	42	39.7
Corning.....(Maximum.....)	65	57	60	63	60	58	73	76	68	60	54	61	55	42	74	68	59	63	50	61	62	67	71	83	78	64	60	64	81	73	64.3
Corning.....(Minimum.....)	40	31	32	46	32	40	44	45	54	45	40	36	27	23	25	44	26	36	28	30	35	42	39	47	50	42	48	36	51	41	38.5
Glenwood.....(Maximum.....)	69	58	65	67	62	67	76	81	78	64	58	64	54	46	76	70	59	60	54	62	56	69	75	85	78	64	60	69	81	72	66.6
Glenwood.....(Minimum.....)	42	35	38	50	29	44	52	48	54	49	42	38	29	27	33	47	27	39	29	26	44	45	48	51	52	47	50	34	54	41	41.5
Greenfield.....(Maximum.....)	62	51	57	62	56	55	72	76	70	57	52	58	51	41	72	70	57	60	51	61	65	65	71	81	75	60	57	63	79	72	62.6
Greenfield.....(Minimum.....)	38	29	33	43	33	38	40	42	49	41	37	35	25	22	26	42	29	38	28	32	36	45	40	43	51	41	48	37	50	40	37.8
Oakland.....(Maximum.....)	67	54	65	65	61	55	76	80	72	60	56	63	51	46	75	73	62	61	55	65	64	71	76	85	68	62	60	67	81	70	65.5
Oakland.....(Minimum.....)	35	30	33	40	24	42	36	45	52	45	40	36	28	22	24	42	22	35	24	22	31	45	35	44	50	42	51	32	52</		

TOTAL PRECIPITATION, APRIL, 1943



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV

DES MOINES, IOWA, MAY, 1943

No. 5

## GENERAL SUMMARY

May, 1943, was generally cold and wet. It was the coldest May since 1935, and while the precipitation excess was not large, showers were frequent and at times heavy. At the 7 first-order stations from which such data are available, heating requirements in degree days were almost 50% above normal.

There were 4 more cloudy days, 4 fewer clear days, and 2 more days with precipitation than are normal for May. The average per cent of possible sunshine was only 48, or 14% less than normal. The combination of relatively low temperature, insufficient sunshine, high humidity and frequent showers hampered farm activities and all other outdoor operations, especially in the southeast quarter of the State. The soil was cold and wet which delayed corn planting and in many cases resulted in uneven germination and irregular stands.

Cold weather at the end of April continued on the 1st but gave way to higher temperatures on the 2d and the first 5 days averaged above normal for the period. From the 6th to the 27th temperatures were almost continuously below the all-time average, and frosts or freezing temperatures occurred on the 1st, 7th, 8th and at scattered points in the north central area on the 13th and 14th. However, the last 4 days were unseasonably warm with maximum temperatures of 90° or higher at a majority of stations on the 29th. The delay in farm operations was greatest in the south central and southeast districts. At some stations there were as many as 14 to 17 consecutive days with at least a trace of precipitation. Destructive tornadoes, wind and hailstorms occurred on the 5th and 15th. Accounts of these phenomena appear under separate heads and also in the storm table in this and the June issue. Scattered storm damage on other dates is also listed in the storm table.

Polar air masses prevailed during most of the month except on the last few days. Only a few scattered showers occurred on the first 4 days but on the 5th unstable conditions developed in a trough of low pressure along the fronts separating Maritime Polar air from Maritime Tropic air overlain by a Superior air mass. Moderate to heavy showers occurred in all sections and in many cases were attended by local windstorms, hail and tornadoes.

During the next 3 weeks, the surface air over Iowa was usually of Polar origin and was frequently overrun by Maritime Tropic air. During this period areas of high pressure over the northwestern states or over Southwest Canada drifted southeastward over the Great Central Valleys. Troughs of low pressure would lie between the successive "highs", usually with frontal developments extending from the northeastern portion of the country towards the southwestern states. Showers were frequent in the low pressure troughs along the fronts and also with less frequency to the north due to over-running Maritime Tropic air. General rains touching all parts of the State occurred about the 12th, 15th-16th, 19th-20th, 23d-

## COMPARATIVE DATA FOR MAY, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	56.5	86	38	5.99					
1874.....	64.1	94	41	1.88					
1875.....	60.5	91	26	2.94					
1876.....	61.1	90	32	2.84					
1877.....	60.3	92	29	4.30					
1878.....	55.7	88	32	5.01					
1879.....	62.9	93	26	4.38					
1880.....	66.3	96	37	4.06					
1881.....	66.7	95	35	3.73					
1882.....	54.3	83	24	5.42					
1883.....	54.6	90	31	6.25					
1884.....	59.6	88	33	3.15					
1885.....	57.4	86	27	3.44					
1886.....	62.5	96	30	3.38					
1887.....	64.6	96	34	1.55					
1888.....	53.8	88	22	6.58					
1889.....	59.2	92	22	4.06					
1890.....	56.5	96	26	3.64					
1891.....	58.3	94	21	3.18					
1892.....	54.0	88	29	8.77					
1893.....	56.6	96	26	3.45					
1894.....	61.1	96	22	1.87					
1895.....	61.7	104	24	3.19					
1896.....	65.5	100	34	6.69					
1897.....	58.5	96	20	1.92					
1898.....	59.6	92	26	4.67					
1899.....	60.2	90	27	6.23					
1900.....	63.2	98	22	3.31					
1901.....	60.7	95	28	2.35					
1902.....	63.8	97	25	5.39					
1903.....	61.6	91	24	8.55					
1904.....	59.6	93	27	3.78					
1905.....	58.3	88	28	5.95					
1906.....	60.8	95	24	3.54					
1907.....	53.5	96	14	3.48	1.0				
1908.....	59.4	93	13	8.34					
1909.....	57.9	97	18	4.34	0.1				
1910.....	55.4	89	18	3.41	T.				
1911.....	64.9	98	23	3.76	0.7				
1912.....	62.7	97	29	3.33					
1913.....	59.4	102	30	6.24					
1914.....	62.2	98	25	3.31	T.				
1915.....	56.1	99	25	7.34	T.				
1916.....	59.9	94	27	4.93	T.				
1917.....	55.1	95	18	3.87	0.6				
1918.....	64.9	98	25	6.87	T.				
1919.....	58.2	93	30	3.11					
1920.....	59.4	89	29	3.26					
1921.....	63.3	99	25	4.23					
1922.....	63.4	91	34	3.53					
1923.....	59.6	90	20	2.84	T.				
1924.....	54.1	94	26	1.71	0.1				
1925.....	57.8	102	20	1.16	T.				
1926.....	64.5	97	25	2.76					
1927.....	58.4	91	30	4.69	T.				
1928.....	62.6	93	26	2.47					
1929.....	57.7	91	24	2.47	T.				
1930.....	60.2	91	26	3.72	T.				
1931.....	57.5	98	21	2.96	T.				
1932.....	62.3	95	28	3.99					
1933.....	60.5	93	32	4.36					
1934.....	60.6	111	30	1.02					
1935.....	55.0	84	23	4.84	0.3				
1936.....	66.2	95	31	2.91					
1937.....	61.8	95	27	4.07					
1938.....	59.5	89	29	5.45	0.6				
1939.....	66.4	105	30	2.07					
1940.....	58.4	96	26	2.07	0.1				
1941.....	66.0	97	31	3.26	T.				
1942.....	59.3	95	26	4.70	T.				
1943.....	57.5	97	21	4.40	T.				
Period.....	60.2	111	13	4.04	0.1	10	13	10	8

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

25th, and 30th-31st. The frequency of occurrence increased from the northwest corner towards the eastern and southern portions of the State and in the extreme southeast several stations reported 14 or more consecutive days with at least a trace of rain. From the 5th to the 25th inclusive, the 14th

CLIMATOLOGICAL DATA FOR MAY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54	57.1	-1.8	93	29	32	8	4.69	+0.02	2.63	16	0	11	9	15	7	se.	D. E. Hadden
Alton	Sioux	1,305	39	57.0	-1.8	95	29	30	8	2.73	-1.36	0.55	12	T.	11	2	22	7	s.	W. S. Slagle
Cherokee	Cherokee	1,358	24	56.4	-2.3	92	29	28	8	3.16	-1.08	0.87	16	T.	11	6	19	6	nw.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	55.1	-2.7	92	29	28	1	4.78	+0.63	2.64	16	T.	12	7	10	14	ne.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	57.8	-1.2	97	29	29	8	2.77	-0.98	1.08	31	T.	9	7	3	21	nw.	Earl V. Slife
Inwood (near)	Lyon	1,474	41	55.8	-2.7	96	29	28	7†	2.91	-0.87	0.96	31	0.7	9	14	10	7	se.	A. C. Hanson
Lake Park	Dickinson	1,479	41	54.4	-3.2	91	29	29	1†	6.01	+1.99	2.98	30	T.	7	12	6	13	nw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	57.4	-2.1	96	29	28	8	3.07	-1.23	0.84	30-31	T.	9	11	9	11	s.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	56.5	-2.5	92	29	30	8	4.87	+0.75	2.56	15	0	9	7	9	15	sw.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17																	Scott King
Rock Rapids	Lyon	1,341	47	55.5	-3.2	94	29	29	8	3.59	-0.43	1.67	30-31	0.5	7	3	20	8	nw.	George Raveling
Sanborn	O'Brien	1,552	31	55.5	-2.5	92	29	29	1†	3.76	-0.27	1.14	16	T.	9	7	10	14	se.	Susie O. Dow
Sheldon	O'Brien	1,418	38	55.5	-2.4	92	29	29	8	2.91	-1.11	0.74	16	0.4	10	11	13	7	nw.	Ross E. Forward
Sibley	Osceola	1,494	9	54.4	-2.6	91	29	27	8	3.41	-0.59	1.08	16	0.4	11	11	11	9	sw.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		56.6	-2.7	93	29†	30	1†	4.82	+0.37	2.17	16	T.	9	12	7	12	s.	Walter A. Simonsen
Spencer	Clay	1,319	36	56.2	-2.9	93	29	29	8	4.67	+0.31	1.63	16	T.	9	10	12	9	sw.	E. W. Little
Storm Lake	Buena Vista	1,455	54	56.2	-3.1	89	29	31	8	4.52	+0.40	2.68	15	0	12	8	11	12	ne.	Paul B. Vance
West Bend	Palo Alto	1,197	57	55.8	-3.3	90	29	30	13	5.21	+1.15	2.06	16	0	9	9	8	14	sw.	Jos. Dorweiler
Means and extremes				56.1	-2.5	97	29	27	8	3.99	-0.14	2.98	30	0.1	10	9	11	11	nw.	
<b>North Central Dist.</b>																				
Algona	Kossuth	1,200	83	56.1	-3.5	90	29	30	1	3.97	-0.57	2.38	15-16	0	10	11	8	12	ne.	Harry B. Nolte
Allison	Butler	1,060	30	55.9	-2.5	88	29	31	1	3.41	-1.16	1.20	15	0	7	9	7	15	n.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	55.5	-3.4	91	29	27	1	3.87	-0.43	2.55	16	0	6	16	6	9	sw.	Wilbur Fox
Belmond	Wright	1,175	35	55.4	-3.2	90	29	28	1	4.19	-0.11	1.11	15	0	12	12	5	14	se.	W. H. Dempsey
Britt	Hancock	1,240	59	56.2	-2.2	91	29	31	8	3.12	-1.48	2.36	15-16	0	6	11	8	12	sw.	L. M. Naser
Charles City	Floyd	1,013	69	55.7	-2.1	90	29	30	1	2.45	-1.88	1.16	15-16	0	10	7	10	14	n.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	56.5	-3.1	92	29	32	1†	3.69	-0.56	1.52	15	0	9	8	13	10	ne.	H. S. Brandsgard
Forest City	Winnebago	1,289	54	55.6	-2.2	90	29	31	1	3.73	-0.66	1.74	16	0	12	4	11	16	se.	Dr. M. B. Neil
Hampton	Franklin	1,142	53	56.6	-1.8	89	28†	29	1	4.91	+0.25	0.97	15	0	12	15	3	13	nw.	E. A. Saxton
Mason City	Cerro Gordo	1,148	52	54.9	-2.6	89	29	26	1	3.38	-1.00	0.94	16	0	12	12	5	14	ne.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	54.8	-2.6	88	29	31	1	2.84	-1.88	0.90	15	0	11	9	9	13	nw.	Charles H. Dwelle
Osage	Mitchell	1,170	59	55.4	-1.9	89	29	25	1	3.18	-1.44	0.66	15	0	12	8	11	12	sw.	Glen V. Yarger
Means and extremes				55.7	-2.6	92	29	25	1	3.56	-0.89	2.55	16	0	10	10	8	13	ne.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							4.17	+0.07	1.54	14-15	0	17	10	3	18	nw.	E. J. Cable
Cresco	Howard	1,298	7	57.0	-0.2	90	29	30	1	1.33	-3.21	1.01	6	0	8	14	6	11	nw.	William C. Patterson
Decorah	Winneshiek	880	61	54.6	-3.5	89	29	21	1	3.49	-1.01	1.10	16	0	12	7	17	7	ne.	Mrs. Fieta M. Rose
Delaware (near)	Delaware	1,083	65	56.6	-2.7	90	29	32	1	3.12	-0.94	1.57	15-16	0	13	11	5	15	w.	Clair E. Paris
Dubuque	Dubuque	642	93	57.6	-2.7	89	29	35	1	2.81	-1.41	1.30	15	0	15	3	8	20	s.	U. S. Weather Bureau
Elkader	Clayton	772	52	56.2	-3.2	90	29	26	1	3.02	-1.06	1.15	15	0	11	10	5	16	e.	W. H. O'Brien
Fayette	Fayette	1,009	56	57.3	-1.3	93	29	25	1	3.67	-0.85	1.50	16	0	7	13	5	13	s.	John P. Clyde
Guttenberg	Clayton			58.8	+0.1	87	29	35	1	2.39	-1.66	1.00	16	0	12	7	6	18		U. S. Engineers
Independence	Buchanan	956	84	57.0	-2.9	89	29	30	1	4.16	+0.06	1.60	15	0	16	6	5	20	nw.	August Bracht
New Hampton	Chickasaw	1,161	47	56.2	-1.9	90	29	32	1	4.87	+0.25	1.10	15	0	11	13	5	13	nw.	C. Maas
Oelwein	Fayette	1,036	22	56.2	-3.0	90	29	28	1	4.00	-0.15	0.90	5	0	10	11	1	19	nw.	John T. Ridler
Postville (near)	Clayton	1,130	53	55.2	-2.1	88	29	28	1	4.00	-0.70	1.26	15	0	12	9	12	10	nw.	V. H. Williams
Waterloo	Black Hawk	848	62	57.4	-3.0	90	29	30	1	4.07	-0.01	1.33	6	0	14	13	7	11	w.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	55.4	-3.6	87	29	30	1	3.12				0	14	6	11	w.	Mrs. Albert S. Tousley	
Waverly	Bremer	935	55	56.4	-2.7	88	29	29	1	3.12	-0.99	1.19	5-6	0	14	10	11	10	nw.	Charles W. Wile
Means and extremes				56.6	-2.3	93	29	21	1	3.44	-0.88	1.60	15	0	12	10	7	14	nw.	
<b>West Central Dist.</b>																				
Audubon (near)	Audubon	1,297	51	57.3	-2.1	92	29	34	8	5.02	+1.19	2.50	15	0	9	4	18	9	s.	Geo. Kibby
Carroll	Carroll	1,280	58	57.7	-2.1	93	29	34	1†	4.12	+0.03	2.10	15	0	10	9	7	15	se.	Ben H. Schenkelberg
Cushing (near)	Ida	1,350	10	56.6	-2.5	94	29	29	8	3.40	-0.50	1.37	15	T.	12	9	10	12	s.	H. P. Lasher
Denison	Crawford	1,307	60	56.8	-3.3	92	29	31	8	4.93	+0.93	3.19	15	0	9	15	4	12	ne.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	57.6	-2.3	91	29	35	1†	4.96	+0.90	2.22	15	0	10	12	6	13	sw.	Wilbert Shaw
Harlan	Shelby	1,210	52	58.2	-1.6	92	29	34	1	4.37	+0.55	1.78	15	0	8	14	4	13	nw.	Elmer Buss
Jefferson	Greene	1,055	52	57.8	-1.6	91	29	34	1	4.53	+0.43	2.05	15	0	12	9	8	14	sw.	Will I. Lyon
Lake City	Calhoun	1,238	8	58.0	-1.5	93	29	33	1	3.63	-0.69	1.88	15	0	9	6	8	17	e.	Frank A. Taylor
Little Sioux	Harrison	1,040	43	59.2	-2.1	94	29	31	8	3.47	-0.53	1.49	15	0	12	9	14	8	s.	H. W. Kerr
Logan	Harrison	1,120	78	58.6	-2.6	96	29	33	1†	5.01	+1.27	2.43	15	0	9	8	18	5	sw.	Miss Amy Ann Stern
Mapleton (near)	Woodbury	1,225	5	57.6	-2.5	93	29	33	7†	2.84	-1.21	1.33	15	0	9	12	10	9	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069		59.0		94	29	33	8	4.48		2.22	15	0	10	7	12	12	nw.	S. Wm. Sorensen
Onawa	Monona	1,050	59	58.8	-1.6	96	29	29	8	3.42	-0.72	1.06	15	T.	10	8	13	10	s.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	57.7	-0.9	93	29	33	1†	3.69	-0.87	1.60	15	0	10	14	6	11	nw.	F. C. Peitelspacher
Sac City	Sac	1,274	75	57.2	-1.8	92	29	30	1	6.14	+2.31	4.20	15-16	0	8	12	12	7	n.	James L. Leonard
Sioux City	Woodbury	1,111	69	57.3	-2.3	95	29	33	8	3.66	-0.39	1.69	30-31	T.	10	3				

CLIMATOLOGICAL DATA FOR MAY, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit						Precipitation, in inches					Number of days			Prevailing direction of wind	OBSERVERS																			
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy																		
<i>Central District (Continued)</i>																																						
Perry	Dallas	975	44	58.2	-2.4	92	29	31	1	4.15	+0.12	1.86	15	0	10	9	12	10	nw.	Eugene N. Hastie																		
State Center	Marshall	1,068	7	57.2	-3.3	90	29	31	1	4.99	+0.77	2.07	15	0	12	4	16	11	ne.	H. M. Meads																		
Toledo	Tama	929	50	57.4	-3.2	91	29	31	1	4.84	+0.44	2.52	15	0	14	9	8	14	ne.	H. P. Giger																		
Waukegan	Dallas	1,042	46	58.4	-2.4	93	29	32	13	3.54	-0.56	2.10	15	0	8	17	7	7	ne.	Ivan B. Speer																		
Webster City	Hamilton	1,042	60	55.2	-3.8	87	29	32	1	4.71	+0.43	1.96	14-15	0	10	9	8	14	e.	Leo Holtkamp																		
Means and extremes				57.3	-3.0	93	29	29	1	4.53	+0.26	2.62	15	0	12	9	9	13	ne.																			
<i>East Central Dist.</i>																																						
Anamosa	Jones	873	15	56.0	-4.1	88	29	29	1	3.73	-0.32	1.36	15	0	13	12	8	11	nw.	State Reformatory																		
Belle Plaine	Benton	895	68	57.5	-3.5	90	29	34	1	5.15	+0.74	2.56	15	0	14	6	9	16	se.	R. O. Burrows																		
Bellevue	Jackson	603	57.2	-3.2	88	29	29	1	3.70	-0.34	1.87	15-16	0	14	9	8	14	sw.	U. S. Engineers																			
Cedar Rapids	Linn	813	62	57.4	-3.6	90	29	30	1	4.03	+0.23	1.85	16	0	11	4	11	16	n.	John T. Wurster																		
Clarence	Cedar	850	10	57.1	-3.1	89	29	31	1	4.41	+0.36	1.34	17-18	0	13	12	6	13	nw.	H. J. Klatt																		
Clinton	Clinton	640	73	59.0	-2.2	89	29	35	1	4.10	+0.08	1.15	20	0	14	7	13	11	ne.	Samuel W. Williams																		
Davenport	Scott	579	73	59.0	-2.3	89	29	39	1	5.76	+0.82	1.73	14-15	0	17	4	7	20	ne.	U. S. Weather Bureau																		
Iowa City	Johnson	780	87	58.2	-2.2	89	29	35	1	5.03	+0.64	1.90	15	0	12	8	8	15	n.	Inst. Hydraulic Research																		
Maquoketa	Jackson	732	51	57.2	-2.7	88	30	32	9	3.47	-0.62	1.10	15	0	13	12	10	9	n.	Dr. E. V. Andrews																		
Monmouth	Jones	870	3	56.8	-3.5	88	29	32	1†	3.08	-1.00	0.96	15	0	12	2	21	8	nw.	Otto J. Bisinger																		
Muscatine	Muscatine	620	98	58.2	-3.2	90	29	31	1	5.63	+1.74	1.80	15	0	17	13	9	9	ne.	G. Krieger																		
Vinton	Benton	815	1	57.2	-4.4	91	29	31	1	4.29	-0.06	2.39	15-16	0	13	9	12	10	nw.	H. J. Adams																		
Williamsburg	Iowa	805	28	58.6	-2.4	91	29	35	1	5.13	+1.07	2.19	15	0	12	11	6	14	se.	Dr. F. C. Schadt																		
Means and extremes				57.6	-3.2	91	29	29	1	4.42	+0.33	2.56	15	0	13	8	10	13	nw.																			
<i>Southwest District</i>																																						
Atlantic	Cass	1,110	57	57.5	-3.4	92	29	32	1†	4.81	+1.03	1.85	16	0	14	2	17	12	s.	Roy L. Fancolly																		
Bedford	Taylor	1,215	40	59.0	-2.8	87	29†	35	8	5.09	+1.23	2.80	15	0	10	16	7	8	ne.	H. J. Chambers																		
Clarinda	Page	1,004	72	58.9	-3.1	89	29	36	8	4.52	+0.36	1.70	16	0	15	6	8	17	n.	Forrest E. Allison																		
Clarinda Erosion	Page	1,132	5	59.0	-3.1	90	29	35	8	4.35	+0.17	2.19	15	0	12	14	5	12	ne.	Soil Conservation Service																		
Corning	Adams	1,285	56	58.2	-2.8	89	29	35	1	4.89	+0.48	2.45	15	0	13	12	8	11	ne.	S. W. Morris																		
Glenwood	Mills	1,100	54	59.3	-2.5	92	29	33	8	5.02	+1.06	3.26	15	0	12	3	20	8	ne.	Dr. Thos. B. Lacey																		
Greenfield	Adair	1,368	48	57.4	-3.0	91	29	33	1	3.99	-0.29	2.56	15	0	13	6	9	16	ne.	Wallace Grounds																		
Oakland	Pottawattamie	1,100	31	58.8	-2.2	92	29	32	8	4.19	+0.64	2.20	15	0	10	17	4	10	se.	Fred Bussard																		
Red Oak	Montgomery	1,077	5	58.8	-2.7	90	29	35	8	4.25	+0.20	1.97	15	T.	12	6	9	16	ne.	Clarence M. Totty																		
Red Oak (near)	Montgomery	1,030	37							3.69	-0.42	1.90	15-16	0	11	7	11	13	s.	B. R. Bridge																		
Riverton (near)	Fremont	920	18							2.24	-1.96	1.80	15	0	7	6	5	20	s.	Geo. C. Rader																		
Shenandoah	Page	974	9	60.0	-2.2	92	29	34	8	3.99	-0.21	1.89	15	0	9	5	13	13	s.	Earl E. May Seed Co.																		
Thurman	Fremont	973	57	59.8	-2.7	93	29	34	8	3.81	-0.62	1.95	15	0	10	10	11	10	s.	Bernard Porter																		
Omaha, Nebr.	Fremont	1,035	79	58.9	-3.5	93	29	37	8	4.27	+0.50	2.40	14-15	0	12	3	9	19	s.	U. S. Weather Bureau																		
Means and extremes				58.8	-2.8	93	29	32	1†	4.22	+0.15	3.26	15	T.	11	8	10	13	s.																			
<i>South Central Dist.</i>																																						
Afton	Union	1,212	63	58.4	-3.2	90	28†	35	1†	5.91	+1.49	3.05	15	0	16	11	9	11	ne.	S. R. Brown																		
Albia	Monroe	949	53	58.6	-3.4	88	29	33	1	5.25	+0.90	2.15	16	0	19	8	8	15	ne.	Arthur L. Freed																		
Centerville	Appanoose	1,013	51	59.2	-2.5	88	29	33	1	6.23	+1.89	2.39	15	0	16	5	11	15	n.	E. Grant Everman																		
Chariton	Lucas	940	50	58.4	-2.5	89	29	30	1	5.11	+1.30	2.84	15-16	0	10	10	6	15	ne.	Ellis Shaw																		
Creston	Union	1,293	43	57.1	-3.5	86	29	35	8	4.53	+0.47	1.74	16	0	16	16	7	8	ne.	Mrs. Nellie Spangler																		
Indianola	Warren	972	63	57.2	-4.1	88	29	35	7	4.40	+0.39	2.65	15	0	12	3	8	20	ne.	Seth F. Shenton																		
Knoxville	Marion	920	54	59.3	-2.0	91	29	35	1	5.84	+1.97	2.80	15	0	14	10	11	10	e.	Mrs. Ella Mae Brobst																		
Lamoni	Decatur	1,138	40	58.5	-2.6	88	29	37	1†	6.64	+2.50	3.80	15	0	17	4	9	18	ne.	Dr. Gustav A. Platz																		
Millerton	Wayne	1,070	60	58.4	-2.8	87	29	34	1	5.42	+1.32	2.85	15	0	14	6	14	11	ne.	J. C. Davis																		
Mount Ayr	Ringgold	1,209	52	58.0	-3.1	88	29	35	1†	5.81	+1.35	4.10	15	0	8				se.	Mrs. Irene Hood																		
Osceola	Clarke	1,098	23	58.6	-2.6	89	29	35	1	4.52	+0.62	2.28	15	0	15	15	0	16	ne.	Mrs. Irene Davison																		
Tingley	Ringgold	1,275	20	57.6	-3.7	88	29	35	8	5.16	+0.76	2.88	15	0	11	10	10	11	ne.	Jas. A. Verploegh																		
Winterset	Madison	1,120	53	58.7	-2.7	88	29†	35	1	3.82	-0.07	1.48	15	0	11	10	9	12	ne.	H. S. Ely																		
Means and extremes				58.3	-3.0	91	29	30	1	5.28	+1.15	4.10	15	0	14	8	14	9	ne.																			
<i>Southeast District</i>																																						
Bloomfield	Davis	825	29	59.2	-3.1	91	29	33	1	6.30	+2.00	2.10	15	0	14	18	12	1	nw.	Mrs. Leo Foster																		
Burlington	Des Moines	697	54	58.6	-5.0	88	29	37	1	5.35	+1.21	1.14	15	0	19	5	7	19	n.	U. S. Weather Bureau																		
Columbus Jct.	Louisa	595	53	58.4	-2.5	89	28	33	1	5.96	+2.04	2.57	15	0	17	11	12	8	ne.	Miss Musa Todd																		
Fairfield	Jefferson	780	64	59.5	-1.8	90	29	34	1	6.47	+2.07	2.49	15	0	16	6	7	18	ne.	Prof. R. M. McKenzie																		
Keokuk	Lee	574	73	60.4	-3.4	90	5	40	1	5.81	+1.88	1.20	15	0	17	8	10	13	sw.	U. S. Weather Bureau																		
Keosauqua	Van Buren	712	57	60.4	-1.4	90	5	35	1	5.73	+1.62	1.30	15	0	15	11	8	12	n.	Harry J. Schlotfeldt																		
Mt. Pleasant	Henry	722	68	59.0	-3.7	88	5†	33	1	7.07	+3.15	1.20	15	0	15	11	7	13	s.	Raymond A. Hughes																		
Oskaloosa	Mahaska	813	68	58.6	-2.4	88	29	35	1	6.19	+2.43	3.47	15-16	0	13	7	5	19	n.	Clifford Bergstresser																		
Ottumwa	Wapello	649	49	60.6	-1.3	90	29	36	1	6.49	+2.21	2.08	15	0	16	9	7	15	n.	C. L. Mikesch																		
Sigourney	Keokuk	780	49	59.1	-1.6	89	29	35	1	5.70	+1.84	2.29	15-16	0	14	9	6	16	ne.	Mrs. Christie E. Chandler																		
Stockport	Van Buren	747	43	58.9	-2.3	87	5†	34	1	5.92	+1.82	1.69	15	0	18	10	7	14	n.	C. L. Beswick																		
Washington	Washington	762	69	59.2	-2.8	89	29	36	1	4.35	+0.65	2.25	15-16	0	12	9	12	10	n.	Clarence M. Logan																		
Means and extremes				59.3	-2.6	91	29	33	1	5.94	+1.90	3.47	15-16	0	16	10	8	13	n.																			
State means and extremes				57.5	-																																	

DAILY PRECIPITATION FOR MAY, 1943

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>Northwest District</b>																																	
Akron	Big Sioux				T.	T.	.05						.68			.30	.25					.33			.29	.13	T.			.03	.35	1.13	3.54
Alta <sup>2</sup>	Raccoon						.07						.38	.03		.27	2.63		.05		.13				.58	.03				.25	.27	4.69	
Alton	Floyd				T.		.15						.55			.22	.42			T.	.04				.33	.18	.06			.02	.31	.45	2.73
Cherokee	Little Sioux				T.		.02	.02			T.		.39			.65	.87	.02		T.	.08				T.	.66	.04				.39	.02	3.16
Emmetsburg	Des Moines																																
Estherville <sup>2</sup>	Des Moines					.01	.06				T.		.31	.04		.02	2.64		T.		.01	.01				.54	.18	.02		T.		.94	4.78
Hawarden	Big Sioux			.01								.70			.35	.19				T.					.27	.04	.01				.12	1.08	2.77
Inwood (near) <sup>2</sup>	Big Sioux				.03	T.						.51			.03	.50						.48				.13	.08				.19	.96	2.91
Lake Park	Little Sioux				T.		.20					.37			.36	1.34									T.	.55	.21				2.98		6.01
Le Mars	Floyd				T.		.05					.55			.35	.23		T.							T.	.45	.28	T.		.32	.33	.51	3.07
Milford	Okoboji				.01	.09						.43			.26	1.99						.02			.02	.49	.23			.70	.16	4.40	
Pocahontas	Des Moines				.13					T.	T.	.27			2.56	.65	.10		.08						T.	.60	.03			.45		4.87	
Pringhar	Little Sioux					.06						.52				2.12									.40								
Rock Rapids	Big Sioux	T.			T.	T.	T.					.58			.30	.75									.13	.16			T.	.51	1.16	3.59	
Sanborn	Floyd				T.		.08					.60			.22	1.14									.14	.38	.12			.56	.52	3.76	
Sheldon	Floyd				.04	T.	.05					.57			.41	.74				T.					.20	.18	.12			T.	.25	.35	2.91
Sibley	Big Sioux		T.		.01		.10					.68			.12	1.08						.01			.16	.22	.15				.35	.53	3.41
Sioux Rapids	Little Sioux				.03	.06						.38			.38	2.17	.02			T.	T.				T.	.79	.09				.90	T.	4.82
Spencer	Little Sioux				T.		.12			.15		.36			1.10	1.63										.63	.16	T.		.48	.04	4.67	
Spirit Lake SCS <sup>2</sup>	Okoboji					.10						.46			*	2.27						.10				.56	.40			.35	.42	4.66	
Storm Lake	Raccoon				T.	.10	.01					.35			2.68	.44	.04		.02	.01					*	.50				.34	.03	4.52	
Terril SCS	Little Sioux										T.		.60		2.60														T.	.70	.80	4.80	
West Bend	Des Moines				.08							.24			1.80	2.06	.03		T.	.06						.65	.11			.18	T.	5.21	
<b>North Central District</b>																																	
Algona	Des Moines				.40							.21			1.78	.60	.03		.05	.02					.46	.16			.26		3.97		
Allison	Cedar				T.	1.10				.15	T.	.12			1.20	.45	T.		T.	T.					.27	T.	T.		.12	T.	3.41		
Bancroft	Des Moines				T.	T.	.23					.23				2.55	T.		T.						.60		.24	T.		.02	T.	3.87	
Belmond	Iowa				T.	.08	.24				T.	.07			1.11	.60	.90	.04							.39	.09				.35		4.19	
Britt	Iowa				.22							.21			1.58	.78	T.									T.	.26	T.		.07		3.12	
Charles City <sup>1</sup>	Cedar				T.	.51				.08	T.	.11			1.08	.13	.04			T.					T.	.17	.17	.01		.15	T.	2.45	
Dakota City	Des Moines				T.	.23						.29			1.52	.62	.09		.05	T.					.45	.04			.40		3.66		
Dumont (near)	Cedar				T.	.50	.43			.10	.09	.16			.75	.28	.02									.28	.04	T.		.16		2.81	
Forest City <sup>2</sup>	Cedar				.01	.32						.11	.11		.29	1.74				T.		.01	.06			.45	.16	.29			.18	3.73	
Hampton	Cedar				*	.63				*	.54	.39			.97	.53	.58									.33	.07			.37	.50	4.91	
Kanawha	Boone				.11	.12				T.		.17			.84	.82	T.								.45	.35			.27		3.13		
Mason City	Cedar	T.	T.		T.	.08	.23			T.	.05	.09			.68	.94	.09				.02	T.			.42	.11	.02	T.	T.	.65	T.	3.38	
Mason City Apt. <sup>1</sup>	Cedar	T.			T.	.22	T.			.05		.11			1.54	.38	.69			T.	.02			.08	.30	.16			.35		3.30		
Northwood	Cedar		T.		T.	.17				T.		.35			.90	.55	T.	.02			.05				.35	.13	.04		T.	.24	.01	2.84	
Osage	Cedar				.50					.24		.16			.65	.48	.05				.02				T.	.31	.18	.04		.05	.49	T.	3.18
<b>Northeast District</b>																																	
Cedar Falls	Cedar		.10		*	1.25			*	.17		.27		*	1.54		*	.05		T.				*	.15	*	.08		.02	.36	.18	4.17	
Cresco	Turkey		T.			1.01			T.	.01		.01			.08	.04	T.	T.	T.						.02	.01			.05		1.33		
Decorah <sup>2</sup>	Mississippi				.02	.97				.11		.02	.03		.32	1.10			T.						.17	.08	.19		.12	.36	3.49		
Delaware (near)	Maquoketa	T.	.12		.07	.44			.02	.12		.05			1.24	.33									T.	.38	.09		.23	.03	3.12		
Dubuque <sup>1</sup>	Mississippi	T.	.09		T.	.25	.06	T.		.02	.07	.02	T.		1.30	T.	.07	.05	T.	.11				.35	.28	.07	T.		T.	.05	.02	2.81	
Dubuque LD 11 <sup>2</sup>	Mississippi	.01	.01	.08		T.	.32			.04	.03		.01		.15	1.09		.06			.06	.08			.25	.26	.08	T.		T.	.07	2.60	
Elkader	Turkey				.32	.43			T.	.05		.03			1.15	.22	T.		T.	.12					.23	.04	T.		.27	.16	3.02		
Fayette	Mississippi				.73	.45									.47	1.50									.12				.25		3.67		
Guttenburg LD 10 <sup>2</sup>	Mississippi				T.	.46				.05	.03		.02		.13	1.00		.02		.08	T.				.02	.19	.08		.31		2.39		
Independence	Wapsipinicon		.20		.16	.60			.07	.09		.09	.02		1.60	.41	.02			.04					.10	.03	.05		.56	.12	4.16		
Lansing <sup>2</sup>	Mississippi			T.	.03	1.01				.06	.03	T.	.03		.16	.96		.04		T.	.03				.20	.20	.14		.43		3.32		
New Hampton	Wapsipinicon				.20	.90			1.00		.15				1.10	.40	T.								.28	.15	.15		.12	.42	4.87		
Oelwein	Wapsipinicon				.90	.70			.10		.30				.70	.40						.10				.10			.60	.10	4.00		
Postville (near)	Mississippi				T.	.69	.49			T.	T.	.06			1.26	.35	.03			.05					T.	.21	.13	.15		.56	.02	4.00	
Waterloo <sup>2</sup>	Cedar		.06		T.	1.33				.10	.04		.21		.30	1.22		.04		.04					.08	.02	.05		.03	.55	4.07		
Waukon	Mississippi				T.				.03	.08		.04			1.48	.10	.02			T.	T.				.17	.38	.13		.19	.36	.04		
Waverly	Cedar				.01	*	1.19			.03	.03		.10		1.05	.34	.01		T.						T.	.08	*	.12		.11	.05	3.12	
Genoa, Wis. LD 8 <sup>2</sup>	Mississippi	T.			.10	.55			.09				.05		.10	1.07	.02	.05			.03				T.	.32	.09		.43		2.90		
Lynxville, W. LD 9 <sup>2</sup>	Mississippi	.01	.04		.02	.96			.05	T.			.03		.09	1.04	.01	.01		.02	.03				T.	.02	.29	.13		.37		3.12	
<b>West Central District</b>																																	
Anthon (nr.) SCS	Little Sioux				.10							.45			.85		T.		T.						.90	.10			.50		2.90		
Audubon (near)	Nishnabotna				1.10	.20			.21			.17			2.50		.15		T.	.27					.10	.32			T.		5.02		
Carroll <sup>2</sup>	Raccoon					.55	.29			.15			.52		.88	1.29		.07							T.	.24	T.		.02	.11	4.12		
Cushing (near)	Little Sioux				.03	.05				T.		.51			1.37	.25	.03		.06	.02					.35	.31	.01		.41	T.	3.40		
Denison	Missouri				.10	.13			.16			.59			3.19		.07									.46	.02		T.	.21		4.03	
Denison SCS <sup>2</sup>	Missouri				.19	.14			.11			.																					

DAILY PRECIPITATION FOR MAY, 1943—Continued

Stations	Basin Drainage	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>Central District</b>																																							
Ames†	Skunk		T.			.39	.80				.26	.07			.12	T.		1.54	.06	T.	.02	T.	.09										.52		4.14				
Boone	Des Moines			T.	1.29	.36	T.			.09	.02			.16	T.		1.79	.04	T.	.01	T.	.02										.50	T.	4.78					
Boone (rvr) <sup>2</sup>	Des Moines					1.50					.10				.20			.72	.99				.10									.46	.04	4.61					
Des Moines <sup>1</sup> †	Des Moines			T.		.37					.10	.13	T.		T.	T.		2.41	T.	.12	T.	.07	T.								.34	T.	.33	.05	3.92				
Des Moines Apt. <sup>1</sup> †	Des Moines			T.		.43					.12	.11	T.		T.	T.		2.52	T.	.14	T.	.06	T.								.39	T.	.35	.05	4.17				
Dunbar (near)	Iowa			T.		.03	.66				.07	.08			T.			1.16	.56		.01	.03	.13							.03	.05	.07		.92	.11	3.98			
Fort Dodge <sup>2</sup>	Des Moines					.50					.04	.01			.10	.32		.65	1.18		.10	.06								.22	.04	.01		.21	.32	3.76			
Grinnell†	Iowa					.98	T.				.04	.13			T.			2.27	.18		.07	.02	.29	.25						.09	.07		1.04	.08	5.51				
Grundy Center	Cedar					.46	.56				.72				.23			*	1.60	T.			.10	.01						.22	T.		.54	.02	4.46				
Iowa Falls <sup>2</sup> †	Iowa			.01			.90				.14	.01			.02	.21		.52	1.04				.01	T.						.35	.08	.01		.05	.48	3.84			
Marshalltown <sup>2</sup>	Iowa			T.		T.	.70				.11	.06						.51	1.62		.02	.01	.05	.02					.06	.10			T.	.89	4.15				
Monroe	Des Moines			T.		T.	.85				.32				T.		T.	2.49	.63		.29	.13	.20	.34						.21			.68	.08	6.22				
Newton	Skunk					.08	.73				.10	.17			T.	.01		2.62	.01		.12	.06	.16	.13						.02	.14		.56	.09	5.00				
Perry	Raccoon					.36	.81				.24	.03			.05			1.86	.02		T.		.29								.04	T.		.45		4.15			
State Center	Iowa					.27	.78	T.	T.		.12	.23	.03		T.			2.07	.37				.17							.16	.03		.68	.08	4.99				
Toledo	Iowa				T.	.05	.85				.05	.09						2.52	.04		.01	.05	.04	.20						.01	.08		.72	.13	4.84				
Van Meter <sup>2</sup>	Raccoon					.30					.12							.98	1.10		T.	T.	.15	.04						.23	T.		.06	.15	3.13				
Waukee	Raccoon					.05	.46	T.			.02	.06						2.10	.12												.49			.24		3.54			
Webster City†	Boone					*	1.28				.08				.23			*	1.96					.16							.26			.70		4.71			
Webster City (rvr.) <sup>2</sup>	Boone			.02		1.36					.12					.24		.66	1.41		.58			.10						.26	.31	T.	.07	.61	5.74				
<b>East Central District</b>																																							
Anamosa	Wapsipinicon			.08		T.	T.	.53			.10	.16	T.		T.			1.36	.48		.12	.15	.17							.20	T.		.23	.02	3.73				
Belle Plaine	Iowa					.01	.65				.05	.07			T.			2.56	.19		.06	.02	.23	.15						.12	.03		.83	.18	5.15				
Bellevue LD 12 <sup>2</sup>	Mississippi			T.	.12		T.	.17			T.				T.			.08	1.79			.69	.04	.18	.02						.12	.12	T.		.50	.01	3.70		
Cedar Rapids <sup>2</sup>	Cedar			T.		T.	.50				.11	.10			T.			.22	1.85			.21	.02	.28							.12	.12	T.		.50	.01	4.03		
Ced. Rap. (rvr.) <sup>2</sup>	Cedar						.50				.11	.15						.22	1.70			.04	.24	.03	.28	.03					.18	.12	T.		.52	.01	4.12		
Clarence	Wapsipinicon						.38	T.			.05	.22	.01			.02		1.18	.29		.29	1.05	.16	.31							.30			.15	T.	4.41			
Clinton	Mississippi			T.		T.	.19			.21	T.	.25	.02			.05		1.01	.60		.10	.14	.09	1.15						.03	.22	.04	T.		T.	4.10			
Clinton (rvr.) <sup>2</sup>	Mississippi			T.	T.		.18			.20	.03	.21			.05			.44	1.05		T.	.22	.04	.64	.42						.72				T.	4.22			
Davenport <sup>1</sup> †	Mississippi			T.		T.	.13	.26	.43		.05	.03	.49	T.		.08	.04	.03	1.72	.12		.34	.36	.31	1.10						.26				T.	.01	5.76		
Davenport LD 15 <sup>2</sup>	Mississippi			T.		T.	.38	.02	.48		.04	.46				.11			.36	1.36		.22	.50	.13	.90	.17					.01	.24			T.		5.38		
Iowa City†	Iowa						.63				.12	.18						1.41	.51		.11	.45	.26	.35							.03	.33			.65		5.03		
Le Claire <sup>2</sup>	Mississippi			T.	T.		.24	T.	.48		.05	.55				.12		.35	1.12		.21	.45	.09	.80	.50						.03	.27			T.		5.26		
Le Claire LD 14 <sup>2</sup>	Mississippi			.05	T.		.26	T.	.50		.04	.47				.10		.35	1.13		.19	.47	.10	.87	.26						.01	.06	.31		T.		5.17		
Maquoketa	Maquoketa		.13				.18				.03	.14	.02			.01		1.10	.46		.15	.85									.29				.05	.06	3.47		
Maquoketa	Maquoketa			*	.14	T.	.14				T.	.14						.96	.20		.15	.50	.18	.32							.30	T.	T.		.05		3.08		
Muscatine	Mississippi					T.	.40	.09	.25		.02	.35	.05			.04		1.80	.46		.40	.40	.28	.63							.03	.32	.03			.08	T.	5.63	
Muscatine (rvr.) <sup>2</sup>	Mississippi						.34	.02	.32		.03	.29				.03		.45	1.69		.14	.57	.25	.63	.01						.02	.26				.05	5.10		
Muscatine LD 16 <sup>2</sup>	Mississippi						.39		.34		.06	.28				.03		.52	1.62		.13	.54	.08	.61	.09						.01	.06	.27			.02	5.05		
Vinton	Cedar			.03		T.	.62				.06	.05						*	2.39	T.	.12	.03	.17								.12	.03	T.		T.	.56	.11	4.29	
Williamsburg	Iowa					T.	.56				.09	.10						2.19	.34		.15	.61	.25	.20							.01	.16			.47		5.13		
<b>Southwest District</b>																																							
Atlantic <sup>2</sup>	Nishnabotna			.12			.73				.04	.08				.07		.99	1.85			.13	.17								.02	.39	.05			.05	.12	4.81	
Bedford	102					.20		.30	T.		.07	.15						2.80			.27		.36	.30								.49			.15	T.		5.09	
Blockton SCS	Platte					.04		.29			.14							3.80	.46		.14		.53	.04								.35			.08		5.87		
Clarinda <sup>2</sup>	Nodaway			T.			.35		.09		.11	.02			.01	T.		.80	1.70		.14	.20	.21	.05							.14	.47	.01			.22	4.52		
Clarinda Eros.†	Tarkio					T.	.03	.58	.12		.02	.15						2.19			.43		.17	.04								.05	.51			.06		4.35	
Corning	Nodaway			.03			.79	.11	.13		.05	.09				T.		2.45	T.	.12	.03	.13	.09									.60				.27		4.89	
Cumberland (near)	Nodaway					T.	.81	.19	T.		.15	T.				.01		1.78			.12	.15	.04									.45		.01		T.	.18	3.89	
Emerson SCS <sup>2</sup>	Nishnabotna			.01			.10	.12	.13	.03	.09	.02				.02		2.16			.18		.15	.05								.04				T.	.10	T.	3.20
Glenwood	Missouri			T.			.28	.10	.06	.01	.12					.05		3.26			.42		.03	.06								.51	T.		.12		5.02		
Greenfield	Nodaway			.01		T.	.15	.29	T.	.03	.03	.10				T.		2.56	T.	.13	.01	.06	T.									.45	.01		.16		3.99		
Oakland	Nishnabotna						.62	.23			.12					.05		2.20			.30		.08									.30	.05			.24		4.19	
Red Oak	Nishnabotna						.25		.21		.03	.35	T.			.04		1.97			.23	T.	.34	.13								.04	.58			.08		4.25	
Red Oak (near)	Nishnabotna					.02	.26		.40	.09	.08							1.86	.04				.22	.14								.52			.06		3.69		
Riverton (near)	Nishnabotna			T.		T.	.05		.02	T.		T.	T.					1.80			.02	T.	.02	.03								.30				T.		2.24	
Shenandoah	Nishnabotna						.30	.14	.07		.07							1.89			.60		.20	.04															

DAILY PRECIPITATION FOR MAY, 1943—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>Southeast District (Continued)</i>																																	
Donnellson <sup>2</sup>	Des Moines			.13		.28	.38	.56	.03	.26	T.			.14		.80	.59	.62	.28	.22	.37				.11	.31					.11		5.20
Eddyville <sup>2</sup>	Des Moines	T.				.57	.04	.20		.08	.18			T.		.51	2.45	T.	.28	.42	.22	.04			T.	.18	T.			.10	.35	5.62	
Fairfield	Skunk			T.		.50	.14	.24	.06	.28	.02			.02		2.49	.62	.30	.43	.85	.14				.06	.20				.12		6.47	
Keokuk <sup>1</sup>	Mississippi	T.		.05		.34	.98	.12	.04	.31	.07			T.	.08	T.	1.20	.07	1.00	.25	.20	.49			.10	.28			.25		5.81		
Keokuk LD 19 <sup>2</sup>	Mississippi				.05	.31	.07	1.10		.06	.34			.07	.02	.35	.85	.05	1.17	.35	.48	.03			.04	.15	.12		.06	.12	5.79		
Keosauqua	Des Moines	T.		.13		.38		.90	.10	.15				.16		1.30	.50	.30	.44	.60	.12			.09	.42			.14		5.73			
Keosauqua (rvr.) <sup>2</sup>	Des Moines					.35		.85		.12	.11			.05		.44	1.43	.08	.63	.18	.55	T.		T.	.30	.10		.10		5.29			
Mt. Pleasant	Skunk					.20	.95	.20	.40					.15		1.20	.55	.95	.52	.60	.55			T.	.30	.05		.05	.40	7.07			
Oskaloosa	Des Moines		.04		T.	.54		.10	.08	.34	T.					2.97	.50	.21	.33	.50				.04	.19			.35	T.	6.19			
Ottumwa	Des Moines		.05		T.	.68	.03	.33	.01	.28						2.08	.62	.26	.31	.80	.29			.05	.26	.01		.43		6.49			
Ottumwa (river) <sup>2</sup>	Des Moines		.05			.66	.02	.33		.08	.16				T.	.57	2.08	.08	.38	.58	.44	.02		T.	.22	.12		.02	.30	6.11			
Sigourney	Skunk					.61	.01	.13	.02	.29						1.67	.62	.60	.27	.37	.18			.02	.15			.76		5.70			
Stockport	Skunk		.05		.06	.40	.27	.37	.06	.19	.04			T.	.07	T.	1.69	.49	.25	.56	.92	.06			.06	.32			.06	T.	5.92		
Wapello <sup>2</sup>	Iowa	T.	.05			.44		.60		.04	.35			.12		.46	1.46	.20	.75	.15	.68	.08		.05	.05	.10			T.	5.58			
Washington	Skunk	T.				.55	.05	.20		.20						* 2.25	.05	.17	.32	.23				T.	.20			.13		4.35			

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

<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.

<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.

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

‡ Interpolated

† Station is equipped with recording gage.

\* Precipitation included in next following measurement.

SUPPLEMENTAL TABLE, MAY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	17	3.54	- 0.06	1.13	31	T.	10	11	6	14	s.
Cmbrld. (nr.)	Cass	1,225	45	3.89	+ 0.25	1.78	15	0	11	7	11	13	ne.
Dumont (nr.)	Butler	998	9	2.81	- 1.79	0.75	15	0	11	6	12	13	se.
Dunbar (nr.)	Marshall	1,010	9	3.98	- 0.32	1.16	15	0	15	7	10	14	nw.
Kanawha	Hancock	1,183		3.13	- 1.12	0.84	15	0	8	7	4	20	nw.
Lake View	Sac	1,239	5	5.68	+ 1.54	3.63	15	0	9	8	12	11	n.
Melrose	Monroe	871	15	5.05	+ 0.85	2.75	15	0	12	7	9	15	e.
Sloan	Woodbury	1,071		2.54		0.74	23	0	6				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

SOIL TEMPERATURES AT AMES, IOWA, MAY, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	49.0	50.2	54.5	54.4	50.5		
Average 12 noon	60.5	64.3	55.1	54.2	50.9		
Average 7 p. m.	61.4	64.4	60.5	54.8	51.0	47.2 46.6	
Highest Date	91 29	85 28	73 29	65 30†	57 31	51 31 49 27†	
Lowest Date	33 1	39 1	46 8	50 1†	47 1†	44 1† 44 1†	
Number of days with temperature							
24° or lower	0	0	0	0	0	0	
32° or lower	0	0	0	0	0	0	
40° or higher	31	31	31	31	31	31	
50° or higher	31	30	31	31	25	5 0	
60° or higher	31	23	17	6	0	0 0	
90° or higher	1	0	0	0	0	0	

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS

Stations	Sea-level pressure, extremes—inches		Wind†				Relative Humidity				Percentage of sunshine	Degree Days			
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.			12:30 P. M.	6:30 P. M.	
Burlington	30.52	1	29.45	15	9.4	40	s.		2	83	84	65	66	45	237
Charles City	30.51	1	29.31	15	7.6	26	sw.		15	67				45	330
Davenport	30.53	1	29.47	15	10.5	27	se.		15	82	81	63	62	47	233
Des Moines	30.48	1	29.33	15	10.9	33	sw.		5	76	81	61	62	44	249
Dubuque	30.51	1	29.47	15	6.6	21	nw.		2	75	76	58	58	39	272
Sioux City	30.50	1	29.36	15	11.9	44	w.		31	72	80	52	51	60	285
Omaha, Nebr.	30.49	21	29.33	15	12.5	43	nw.		5	75	82	61	58	56	240
State	30.53	1	29.31	15	8.1	44	w.		31	77	79	60	60	48	264
Normals and Records	30.55	4 1910	29.02	7 1875	9.0	65	nw.		21	75	52	57	62	175	1893

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

‡ Sioux City \* Charles City and Dubuque † and other dates ¶ Omaha

and the 21st-22d were the only dates on which generally fair weather prevailed over the entire State. On the 15th numerous tornadoes and other local destructive storms again occurred and on the night of the 11th-12th light snow fell in the northwest portion.

During the last 4 days of the month, Maritime Tropic air covered the State and brought the only definitely warm period of the month. Mostly fair weather prevailed from the 27th through the 29th and on the latter date, temperature readings in the 90's were quite general. However, general showers again occurred on the 30th.

At the close of the month about 86% of the corn crop had been planted. This was 8% below normal and about 4 days late. Seeding had been completed in most of the northwest and north central counties and from 75% to 90% in a broad belt from southwest to northeast. In the south central and southeast districts, however, less than half had been planted



and in parts of the extreme southeast less than 25%. Much of the early planted seed lay ungerminated in the cold, wet soil until it was destroyed by rotting and pests and in some places up to 30% needed to be replanted.

Soybean planting got under way in the drier northwest counties about the middle of the month and was nearing completion in that section at the close of the month. In the southeast sections the work was just beginning.

Pastures and hay crops made slow growth until the warm weather at the close of the month and it was necessary to feed some livestock until the last week. Alfalfa was almost ready for cutting. Oats, barley and flax likewise made slow growth until the closing days. Hemp and sugar beets were planted during the 2d and 3d weeks but were slow in germinating.

Cherries, plums and pears were in full bloom at the time of the cold weather on the 12th, 13th and 14th, and some blossoms were killed. In addition many bees were winter-killed and this fact added to the cold made conditions very unfavorable for pollination.

Victory Gardens generally did well, despite the cool, wet weather and were yielding such items as asparagus, rhubarb, radishes and onions at the close of the first decade. Many potatoes were planted.

Estimates of damage caused by overflow of the Mississippi and Missouri rivers during April are not complete. S. E. D.

**TEMPERATURE**

The average Iowa temperature during May, obtained from the averages of nine districts of nearly equal area, and based on averages of 124 temperature observing stations, was 57.5°, or 2.7° below the all-time May average. It was the coldest May since 1935 and equalled the 16th coldest of record. The monthly averages were below normal in all sections and ranged from 55.7° in the north central district to 59.3° in the southeast. At individual stations the averages ranged from 53.8° at Mason City Airport to 60.6° at Ottumwa. The highest recorded was 97° at Hawarden on the 29th, while the lowest was 21° at Decorah on the 1st. At most northern and central stations, one or more days with minimum temperature of 32° or lower were recorded. Maximum readings of 90° or higher occurred at most stations in the northern and western districts. For the State as a whole, the average number of each was 1.

**PRECIPITATION**

The average total precipitation, obtained from the averages of the nine districts of nearly equal area, which in turn were derived from the measured totals of 126 stations, was 4.40 inches. This is 0.36 inch more than the average of 71 years of record and made this the 22d wettest May in the period. The district averages were somewhat below normal over the northern third of the State but were above normal in the central and southern sections. The greatest amount at any station was 7.07 inches at Mt. Pleasant while the least was 1.33

inches at Cresco. The maximum amount recorded in any 24-hour period was 4.20 inches at Sac City on the 15th-16th. The average number of days with measurable precipitation was 12. Light snow was observed in the northwest portion of the State with the heaviest fall amounting to 0.7 inch at Inwood.

**MISCELLANEOUS PHENOMENA**

- Aurora: None.
- Duststorms: 1st, 2d, 4th, 5th.
- Frost, light: 7th, 8th, 13th, 14th, 17th, 26th.
- Frost, heavy: 1st.
- Frost, killing: 1st, 7th, 8th, 13th, 14th.
- Fog, light: 4th, 6th, 8th, 10th, 11th, 13th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 24th, 25th, 26th, 27th, 28th, 30th.
- Fog, dense: 8th, 9th, 10th, 11th, 12th, 21st, 22d, 23d, 24th, 27th, 28th.
- Hail, light: 1st, 5th, 6th, 11th, 15th, 16th, 24th, 25th.
- Hail, moderate: 15th.
- Halo, lunar: 13th.
- Halo, solar: 28th.
- Parhelia: 22d.
- Snow: 12th.
- Thunderstorms: 1st, 2d, 5th, 6th, 15th, 16th, 17th, 18th, 19th, 21st, 28th, 29th, 30th, 31st.
- Tornadoes: 5th, 15th.

**THE SPRING OF 1943**

The Spring of 1943 was rather cold but in all other respects the average weather conditions in Iowa during March, April and May were just about normal for the season. Of course these conditions varied greatly between various sections of the State and also with time.

The average temperature for the 3-month period was 45.8°, or 2.1° below the all-time Spring average. March and May were unseasonably cool but in April the temperature averaged slightly above normal. The lowest temperature reported was -19° at Decorah, on March 11th, while the highest was 97°, at Hawarden, on May 29th. During the period the average number of days with 90° or higher was 1 (mostly occurring May 29th), the number of days on which the temperature did not rise above 32° was 10, all of them in March; days with minimum readings of freezing or lower averaged 35 and with zero or lower, 4, all of the zero readings occurring in March. Average heating requirements for the 3 months were 118% of normal. Killing frosts occurred in north central Iowa as late as May 14.

Precipitation, sunshine, humidity and sky condition values for the whole period were all close to the all-time average. The average total precipitation was 8.48 inches, or 0.03 inch more than normal. However, both March and April were

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR ~~APRIL~~ <sup>May</sup> 1943 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames.....	{Evaporation.....	.252	.307	.239	.281	.315	.224	.150	.122	.072	.007	.135	.149	.130	.206	.120	.064	.095	.199	.135	.170	.294	.97	.91	.118	.61	.24	.89	.153	.115	.132	2,824	
	{Wind Movement...	.81	.118	.86	.119	.234	.110	.72	.62	.48	.65	.78	.73	.46	.65	.184	.153	.70	.73	.78	.52	.26	.51	.181	.126	.127	.067	.148	.348	.244	.109	.199	5,389†
Cherokee..	{Evaporation.....	.252	.213	.315	.229	.319	.333	.167	.195	.108	.155	.194	.156	.191	.138	.044	.151	.073	.105	.169	.105	.259	.279	.119	.069	.176	.156	.143	.414	.374	.154	.385	6,140
	{Wind Movement...	.118	.174	.107	.94	.196	.197	.23	.46	.18	.7	.31	.72	.18	.50	.62	.173	.40	.17	.16	.26	.49	.79	.91	.113	.220	.91	.11	.167	.145	.98	.152	2,701
Clarinda..	{Evaporation.....	.373	.224	.306	.264	.348	.278	.106	.098	.101	.024	.114	.101	.201	.133	.301	.158	.130	.057	.071	.147	.223	.209	.078	.240	.177	.203	.234	.448	.212	.204	.262	6,025
	{Wind Movement...	.93	.179	.48	.127	.247	.82	.69	.50	.50	.56	.50	.81	.63	.70	.90	.95	.137	.24	.107	.57	.17	.47	.69	.115	.122	.67	.15	.105	.130	.161	.177	2,800
Ia. City....	{Evaporation.....	.193	.257	.235	.208	.278	.215	.108	.055	.118	.007	.158	.115	.148	.175	.068	.187	.037	.062	.064	.077	.132	.219	.091	.118	.101	.079	.151	.254	.253	.134	.158	4,455
	{Wind Movement...	.83	.109	.104	.84	.193	.77	.61	.53	.25	.41	.101	.50	.57	.39	.45	.110	.47	.57	.43	.68	.28	.30	.32	.40	.50	.49	.28	.51	.97	.86	.94	2,032

For precipitation and temperature data, see tables on other pages of this publication.  
 †Monthly total evaporation includes interpolation for missing days. \*Included in following measurement.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MAY, 1943

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>Northwest District</i>																																	
Alta.....	(Maximum.....	64	67	66	70	83	64	52	61	60	67	77	68	61	64	54	53	55	69	70	71	78	78	70	60	60	65	79	87	93	79	79	68.5
	(Minimum.....	34	45	36	47	58	42	33	32	43	46	47	34	36	40	47	41	38	42	47	50	46	54	48	41	43	42	59	67	66	66	66	45.7
Alton.....	(Maximum.....	65	66	67	73	80	75	54	61	61	72	76	66	59	62	56	55	56	68	70	69	78	76	72	58	62	66	77	90	95	87	83	69.6
	(Minimum.....	33	46	30	47	62	43	34	30	44	36	40	32	32	38	47	40	37	41	45	46	40	50	53	45	40	45	37	58	67	65	63	44.3
Cherokee.....	(Maximum.....	64	62	65	70	81	65	47	63	60	66	75	58	59	61	55	51	51	66	68	70	76	75	65	59	59	65	76	88	92	83	84	67.3
	(Minimum.....	33	47	37	46	61	42	33	28	44	46	47	34	34	40	48	42	38	38	46	51	42	50	54	48	41	44	38	59	68	66	66	45.5
Estherville.....	(Maximum.....	60	65	69	69	83	70	48	62	57	62	66	59	60	63	56	54	56	68	70	74	78	77	68	58	50	56	69	89	92	85	83	67.0
	(Minimum.....	28	49	35	40	52	44	30	31	41	44	37	32	30	33	44	40	35	39	43	51	45	52	51	44	41	43	37	49	69	65	65	43.2
Hawarden.....	(Maximum.....	67	68	68	76	81	72	52	66	64	72	77	67	59	60	56	53	57	69	73	73	79	77	73	58	69	70	80	93	97	89	89	71.0
	(Minimum.....	37	46	33	47	65	43	32	29	45	35	39	32	30	37	47	40	37	39	44	45	40	50	53	48	41	47	37	65	64	65	67	44.5
Lake Park.....	(Maximum.....	60	64	67	69	82	73	48	61	60	65	65	60	59	60	55	51	54	66	67	69	70	74	66	57	53	58	68	87	91	86	80	65.9
	(Minimum.....	29	45	36	42	54	43	30	29	41	39	37	31	31	37	44	40	36	39	42	50	45	51	50	43	40	42	35	52	67	65	64	42.9
Le Mars.....	(Maximum.....	67	68	67	72	83	73	55	65	60	70	78	67	61	62	57	53	57	68	70	72	79	77	70	57	64	69	80	90	96	81	85	70.3
	(Minimum.....	36	45	36	46	65	42	33	28	44	35	39	33	34	39	47	40	36	41	44	45	41	50	54	46	43	46	39	60	66	64	63	44.5
Pocahontas.....	(Maximum.....	64	67	70	70	84	65	51	62	57	63	74	63	59	60	62	55	55	68	70	69	77	78	69	60	61	60	75	89	92	84	85	68.3
	(Minimum.....	31	47	37	46	51	40	34	30	39	46	36	34	35	34	46	43	35	48	46	47	49	48	56	45	45	43	35	54	60	64	66	44.7
Rock Rapids.....	(Maximum.....	65	64	71	72	79	68	50	62	62	71	67	53	59	62	54	52	57	67	68	72	78	77	69	56	59	62	77	92	94	78	83	67.7
	(Minimum.....	33	46	35	43	60	42	32	29	42	34	48	31	30	35	47	41	38	40	42	46	40	49	44	41	45	34	53	64	65	63	43.3	
Sioux Rapids.....	(Maximum.....	64	67	70	70	84	72	58	64	60	67	72	60	61	65	57	55	54	67	70	73	77	77	74	60	53	63	77	90	93	86	86	69.7
	(Minimum.....	30	43	37	39	57	43	33	30	43	45	37	34	33	34	46	41	36	40	42	48	40	46	51	48	41	44	36	50	68	64	65	43.4
Spencer.....	(Maximum.....	64	66	71	67	83	70	53	65	61	65	70	62	61	66	56	50	56	69	71	73	80	77	73	64	55	66	70	88	93	87	86	69.0
	(Minimum.....	30	44	33	43	50	43	32	29	43	43	39	33	32	36	46	41	36	39	44	51	42	49	51	46	40	43	35	55	67	65	66	43.4
<i>North Central District</i>																																	
Algona.....	(Maximum.....	61	67	70	70	84	64	52	61	55	60	68	62	61	65	56	54	54	66	69	71	79	76	70	60	48	57	69	88	90	83	83	66.9
	(Minimum.....	30	45	38	45	54	46	32	33	41	46	39	35	34	39	45	43	37	42	47	51	49	51	58	46	42	44	40	51	70	65	67	45.3
Bancroft.....	(Maximum.....	61	64	68	69	88	65	53	63	59	62	66	62	60	67	61	52	59	68	70	71	78	73	62	47	56	67	84	91	88	85	67.6	
	(Minimum.....	27	37	38	37	49	45	31	32	40	45	37	33	33	46	41	38	38	44	50	46	48	56	45	43	43	39	50	70	65	67	43.4	
Belmond.....	(Maximum.....	59	68	62	66	84	64	61	65	60	58	71	60	60	63	58	58	56	63	70	70	78	75	71	59	51	56	67	88	90	84	80	66.9
	(Minimum.....	28	41	38	37	53	47	32	40	45	39	33	31	35	44	43	36	42	45	51	45	46	57	49	42	43	36	48	68	65	68	43.8	
Britt.....	(Maximum.....	62	68	69	70	85	65	51	65	59	60	71	61	61	65	56	55	56	68	70	71	80	81	69	60	47	57	68	90	91	84	85	67.7
	(Minimum.....	32	44	37	41	53	45	32	31	41	45	37	35	33	41	43	42	37	47	46	51	45	49	57	46	42	43	37	50	67	66	67	44.6
Charles City*.....	(Maximum.....	57	65	65	65	84	65	42	63	55	56	70	52	59	65	59	54	58	67	71	70	78	79	64	61	48	57	64	88	90	77	82	65.5
	(Minimum.....	30	45	40	41	55	40	35	38	42	46	43	40	38	36	45	44	38	48	48	52	45	50	56	45	44	44	44	49	69	66	68	45.9
Dakota City.....	(Maximum.....	61	68	68	69	84	64	53	64	57	60	73	62	60	64	58	56	55	63	70	70	76	78	70	61	51	58	73	90	92	83	85	67.6
	(Minimum.....	32	45	38	42	57	46	36	32	42	45	38	36	35	39	46	43	37	45	47	52	45	48	58	47	43	43	37	51	70	65	68	45.4
Mason City.....	(Maximum.....	57	64	66	65	83	64	50	64	55	56	69	59	60	63	55	54	56	68	70	71	78	77	70	59	47	56	64	88	89	83	80	65.8
	(Minimum.....	26	41	37	38	52	48	33	32	38	45	39	38	33	31	44	43	35	47	45	51	44	47	59	46	43	43	39	47	67	66	68	44.0
Northwood.....	(Maximum.....	57	61	65	65	83	63	52	63	55	56	66	61	58	63	55	55	56	68	71	69	77	77	67	58	47	54	61	86	88	81	79	65.1
	(Minimum.....	31	44	37	40	53	46	32	37	40	45	37	36	33	36	43	41	38	46	46	50	46	47	56	47	42	42	43	46	67	62	67	44.4
Osage.....	(Maximum.....	58	65	66	73	85	66	54	62	57	56	68	64	58	64	57	56	56	66	70	69	77	78	68	60	50	56	63	86	89	82	80	66.4
	(Minimum.....	25	44	39	37	52	48	33	35	41	45	39	37	35	35	43	43	38	46	49	51	45	48	55	48	42	43	42	46	66	62	68	44.5
<i>Northeast District</i>																																	
Decorah.....	(Maximum.....	58	68	67	67	81	65	57	61	57	53	69	55	59	63	57	56	57	64	69	67	78	78	67	61	54	57	54	85	89	81	79	65.6
	(Minimum.....	21	45	42	32	55	51	35	34	32	46	43	41	32	27	44	44	32	48	43	50	38	43	54	46	44	43	46	40	66	64	66	43.5
Delaware (near).....	(Maximum.....	55	69	69	67	80	66	59	62	56</																							

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MAY, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

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. †Interpolated.

IOWA STORMS, MAY, 1943

County, and Township or Town	Date	Time	Character of storm	Width of path Miles	Direction	Size of hailstones (Diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Fremont Co., Sidney, Knox, Anderson, Imogene, Farragut, northwest of Shenandoah	5	3:25 p. m. to 4:00 p. m.	Tornado, wind, hail	1/4 to 2	SW to NE	1/2	....	4	\$50,000	A tornado developed between Knox and Sidney and traveled northeastward for about 18 miles to the northeast corner of the county, striking at Sidney and near Anderson and Imogene. The storm track was not continuous and at times the tornado characteristics almost disappeared. At times the path of destruction was almost 2 miles wide. Damage also occurred simultaneously along another path about 5 miles long, parallel to and several miles east of the main storm. It is doubtful that the secondary storm was a fully developed tornado. Mrs. Harry Wilcoxson, Mrs. Ralph Nixon and Mr. Dean Hill were injured at Sidney and Mr. William Henry was injured near Sidney. There was also some damage from hail, wind and heavy rain in other sections of the county and the total loss was estimated at \$50,000.
Mills Co., Silver Creek and Anderson Twps.; Wesley Chapel, Henderson	5	3:30 p. m.	Tornado, hail, wind	1/2	SW to NE	1/2	....	2	20,000	A small tornado developed in Mills county at almost the same time as the Fremont county storm. It traveled along an irregular path about 8 or 10 miles long in open country, along the West Nishnabotna River. Greatest destruction occurred in an area surrounding the crossroads known as Wesley Chapel. Mr. Ralph Smith and Mr. Clinton Parker were injured near Wesley Chapel. Scattered light wind damage also occurred outside the main storm track, with total loss of about \$20,000 to \$25,000.
Pottawattamie Co., Hardin Twp.; McClelland and near Bentley	5	6:00 p. m.	Wind, hail						2,000	Heavy hail caused some damage in southwest Hardin township. Barns were blown down near Bentley. Windows, roofs, etc., damaged by wind and hail at McClelland.
Cass Co., Pleasant Twp., Griswold	5	About 3:00 p. m.	Tornado	Narrow	SW to NE			2		A number of apparently unrelated tornadoes, wind and hailstorms developed during midafternoon, the first group about 3 p.m. and the second about 4 p.m. A tornado developed southwest of Griswold and struck that town at about 3 p.m. The path of this storm was only a few miles long. At about the same time another tornado formed in Cass township a short distance north of the first storm and traveled northeast towards Lewis. This storm seems to have divided with damage occurring both to the west and south of Lewis. The greatest damage occurred along the southern track which lay in an east-west direction. About 4 p.m. another tornado formed and moved east and then turned north a few miles south of the earlier storm. The storm tracks were from 3 to 8 miles long and because of their proximity to each other it was difficult to separate the damage caused by each. Scattered wind damage occurred in Franklin township about 3:30 p. m. In Lincoln township hail fell in an area about 2 by 6 miles square and there was also considerable wind damage in the same area. Torrential rain fell at some points. It is possible that one or more of the tornadoes were redevelopments of the Mills county storm. Scattered wind damage in the northeast part of the county, especially near Wiota and Anita, may have been temporary redevelopment of the tornadoes near Lewis and Griswold. Mr. Earnest Beatty was seriously burned by lightning near Lewis and Mrs. Adam Kuester was injured near Griswold. Total storm damage in county amounted to from \$75,000 to \$100,000.
Cass Co., Cass Twp., near Lewis	5	3:00 p. m. to 4:00 p. m.	Tornado, wind, hail	Narrow	S to N WSW to ENE				60,000	
Cass Co., Franklin, Union Twps.	5	3:00 p. m. to 4:00 p. m.	Wind							
Cass Co., Massena and Victoria Twps.	5	3:00 p. m. to 4:00 p. m.	Wind, hail						10,000	
Cass Co., Lincoln Twp.	5	3:00 p. m. to 4:00 p. m.	Wind, hail	2	SW to NE W to E				12,000	
Adair Co., Summerset, Prussia, Grove, Richland, Eureka and Jefferson Twps.	5	4:00 p. m. to 4:30 p. m.	Wind, hail	1/2	SW to NE	3/4	....	1	25,000	Wind damaged farm homes and wrecked barns and outbuildings from about 4 miles north of Fontanelle to Howe with greatest damage in Grove, Prussia and Summerset townships. Heavy hail damaged roofs and gardens but because of the lateness of the vegetation crop loss was not serious. Chester Coleman was cut about the arm and leg when the storm struck near Howe. Although it exhibited some tornadic characteristics, this storm seems to have been a straight wind. However, a direct line projected northeastward along the path of the Fremont county tornado would pass through the center of the long axis of the damage area in Adair county.
Dallas, Greene and Boone Counties	5	3:00 p. m. to 7:00 p. m.	Wind, hail						10,000	Scattered local wind and hail damage of a light nature was reported from many points. The greatest loss was in Lincoln and Washington Twps., along highway 64 in Dallas county, especially near Panther and between Adel and Linden. Up to one-third of the oats were damaged in some fields and a few small buildings were blown down.
Story Co., New Albany Twp.; Marshall Co., Minerva Twp.; Grundy Co., Conrad	5	5:00 p. m.	Tornado, hail, wind	2	SW to NE	1/2			20,000	A tornado that originated several miles east of Colo in Story county moved forward along an irregular path northeastward across Marshall county, into Grundy county, then traveled almost due east for several miles. The total length of the path was about 28 miles. While the storm began its destructive existence as a tornado the funnel cloud lifted and disappeared along a good part of the path and damage was scattered. Hail damaged gardens and oats. This storm was followed by a second one about 2 hours later. The storm track is in a direct line with the paths of storms in Fremont and Adair counties.
Polk Co., Des Moines	5	8:00 p. m.	Wind		SW to NE					Trees and wires blown down by a squall in east part of city.

IOWA STORMS, MAY, 1943—Continued

County, and Township or Town	Date	Time	Character of storm	Width of path Miles	Direction	Size of hailstones (Diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Marshall Co., Minerva Twp.; St. Anthony, Liscumb	5	7:30 p. m.	Tornado, wind	1/2	SW to NE			2	5,000	The second tornado of the day in Marshall county developed near the Story county line at about 7:30 p.m. a few miles north of the track of an earlier storm listed above. Like the first storm it traveled northeastward and then turned almost due east. The change in direction occurred a few miles south of the Hardin county line and the storm passed south of Liscumb and finally disappeared shortly after it had crossed the path of the earlier storm. Also like the first storm, the tornado characteristics disappeared at times and only straight wind damage was noted at many points. The length of the over-all path was about 20 miles. Mr. and Mrs. Earl Pfantz were injured when the barn in which they were doing evening chores was demolished.
Fayette Co., Smithfield Twp.	5	6:00 p. m.	Wind, tornado		SW to NE				2,000	Wind uprooted trees and wrecked or damaged small buildings in a rather broad area 6 miles long. A "twister" appears to have developed near the center of the area and such development seems probable in view of other tornadoes reported, but most of the damage was caused by straight winds.
Clayton County	5	6:30 p. m.	Tornado		W to E				6,000	Wind caused damage in a small area about 12 miles south of Elkader, mostly on one farm. The storm seems to have been a tornado that was not fully developed. The Fayette and Clayton county storms appear to be along the same lines that link the chain of storms across the state from southwest to northeast.
Fremont Co., Washington, Madison, Riverton and Monroe Twps. Montgomery Co., West and Red Oak Twps.	15	3:00 p. m.	Tornado, wind	2	SW to NE	1/2		1	25,000	A tornado formed southwest of Hamburg, Iowa, on Nebraska Island and moved northeastward to north of Red Oak in Montgomery county, a total distance of between 45 and 50 miles. The path of the storm was not continuous; in fact after causing scattered damage from the southwest tip of the state to west of Riverton, it jumped to Monroe township where damage occurred in the vicinity of Imogene, the same area where the tornado of May 5 struck. The tornado then moved into Montgomery county destroying or damaging farm property southwest and west of Red Oak and finally disappearing about 5 miles north of that city. Some of the destruction was caused by straight winds, heavy rain, flooding and hail which accompanied the tornado. Loss in Montgomery county was estimated at \$15,000 and in Fremont county at \$10,000.
Pottawattamie Co., Council Bluffs, Oakland	15	Afternoon	Wind, rain, electrical							Heavy rain flooded streets in Council Bluffs and halted traffic. At Oakland lightning caused slight damage and wind blew down a wall under construction. Small streams overflowed, highways were covered with mud and side roads washed out.
Adams Co., Grand Twp.; Union Co., Platt, Douglas, Spaulding and Lincoln Twps., Creston	15	5:30 p. m. to 5:40 p. m.	Tornado, wind	1/4	SW to NE	1/2			50,000	A tornado formed in the southeast corner of Adams county and followed a curving path northeastward in extreme western Union county, passing over the east part of Creston and finally disappearing in the northeast corner of Lincoln Twp. of Union county. Scattered destruction was reported all along the storm's path but the greatest damage occurred in the immediate vicinity of Creston and northeast into Lincoln Twp. In Creston itself greatest damage was done to trees, chimneys, porches and small out-buildings but in the open country substantial barns and other farm buildings were wrecked. The storm's path was slightly over 20 miles in length.
Adair County, Richland, Summerset, Prussia, and Grove Twps.	15	5:30 p. m. to 6:00 p. m.	Tornado, wind		SSW to NNE				\$20,000	At the same time as the Creston tornado, considerable damage occurred on at least 10 farms in Adair county due to windstorms or a tornado. Reports from the storm area are meager but from such information as is available and assuming that the conditions were similar to those occurring in nearby areas, a tornado moved from SSW to NNE in an area where other destruction was caused by straight winds.
Ringgold Co., Washington, Tingley and Union Twps.	15	Late afternoon	Tornado	1	SW to NE				50,000	What was probably the most destructive tornado of the day developed south of Tingley in Ringgold county and traveled northeast to the northeast corner of the county and then continued on its direct course from the southwest corner of Clarke county almost to the northeast corner. At about the same time another small tornado traveled a short path in the northwest corner of Clarke county, while a third storm that developed near Van Wert in Decatur county crossed the southeast corner of Clarke county and disappeared after crossing into the extreme west central portion of Lucas county. This third storm may have redeveloped in Marion county and continued on in a northerly direction, as described in a following county report. So far as can be learned, the paths of these storms were parallel. The central storm formed south of Tingley and caused great damage south and east of the town. More than 200 insurance claims were filed. After passing into Clarke county, this storm was most destructive near Hopeville, Ward Center and Osceola. The path was about 30 miles long. Only a few details about the storm in northwest Clarke county were received, but its path was probably only a few miles long with greatest damage in a rural area. The path of the third storm was about 20 miles long with loss in rural areas near Van Wert and Weldon in Decatur county, and south and east of Woodburn in Clarke county. No reports were received from Lucas county and it is believed the storm lifted shortly after crossing the Clarke-Lucas county border. As in other storms of this date, the paths of the "twisters" were not continuous and there was some straight wind damage.
Clarke Co., Doyle, Ward, Fremont, Liberty, Madison, Green Bay, Franklin and Jackson Twps.	15	5:00 p. m. to 6:30 p. m.	3 tornadoes, wind	1	SW to NE				75,000	
Decatur Co., Long Creek and Franklin Twps.	15	5:40 p. m.	Tornado	1	SW to NE				8,000	
Lucas Co., West Central portion	15	6:30 p. m.	Tornado		SW to NE					

This table and discussion continued in June report.

drier than normal, while May was rather wet. The total snow-fall of 9.8 inches, practically all of it falling in March, was 2.7 inches more than usual. However, some light snow fell in the northwest part of the State as late as May 12.

The average per cent of possible sunshine was 59, or 1 less than normal. Sunshine was above normal in the first two months of the season but was 14% less than normal during May and this deficiency was an important contributing factor to the delay in farm operations and in the growth of vegetation. Similarly the number of clear, partly cloudy, cloudy and rainy days and the average humidity values were near normal with favorable early season conditions offset by May values.

The Spring began with cold wave conditions on March 1 that persisted during the following week with near record low temperatures for the season. Thereafter it was relatively warm from the 9th to the 15th, and again from the 23d to the 31st, with another severe cold spell from the 16th to the 22d. The cold wave of the 16th was preceded by severe local storms including several tornadoes on the 15th.

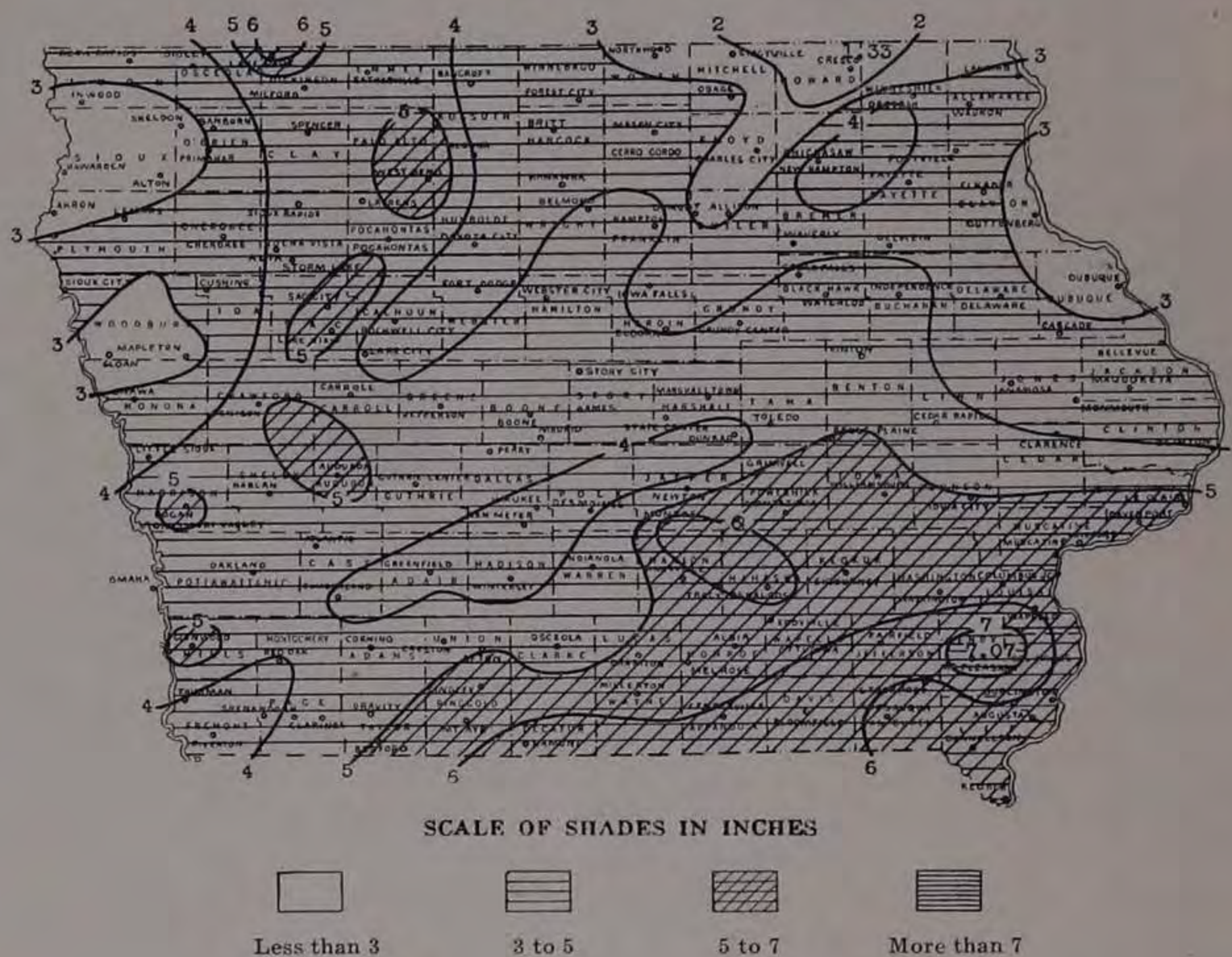
The first 10 days of April were rather warm, the second decade was cold and the last 10 days averaged near the seasonal normal. There were only a few scattered reports of damaging local storms but flood waters caused some damage along the Mississippi and Missouri rivers. Locally heavy rains caused some small streams to go out of banks and caused some erosion loss.

As already discussed in the monthly report, unseasonable cold prevailed from May 6th through the 27th. Tornadoes occurred on the 5th and 15th and scattered damage was caused on other dates by local storms. For more complete information concerning the weather by months the appropriate copies of Climatological Data should be consulted. S.E.D.

ERRATA

Report for April, 1943. Page 39, Bloomfield, number of days with 0.01 inch or more precipitation published 7, should be 9.

TOTAL PRECIPITATION, MAY, 1943



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV

DES MOINES, IOWA, JUNE, 1943

No. 6

## GENERAL SUMMARY

Iowa weather during June, 1943, was predominantly warm and wet. It was the 15th warmest June in the entire 71-year period of record, and the warmest since 1934. The State average temperature of 71.6° was 2.0° above the all-time average, and was the highest June mean since 1934. It was also the 15th wettest June of record, with the average total of 6.16 inches, exceeding the normal by 1.49 inches.

The number of days with rain was 40% above the June normal and the relative humidity was also appreciably higher than usual. On the other hand, the number of clear, partly cloudy, and cloudy days, was about the same as usual, while sunshine was somewhat deficient. The lowest barometer reading reduced to sea level of 29.08 inches at Sioux City, on the 2d, was only 0.04 inch above the record low reading of 29.04 inches in 1880.

Following as they did after the unseasonably cold and wet weather of May, the frequent showers during the first half of the month were very unfavorable for agricultural operations, and further hampered the efforts of Iowa farmers to produce bumper crops for the war effort. However, conditions improved remarkably during the last half of the month, and with favorable weather continuing during the first part of July, crop prospects became much brighter.

The week of May 28-June 3 was quite warm, in fact the warmest of the season up to that time, under the influence of Maritime Tropical air that covered Iowa. Continental Polar air overspread the State on the 3d and 4th, and temperature readings were again unseasonably low until the 10th. Maritime Tropical air flowing aloft above the surface cold mass resulted in frequent showers.

The Maritime air masses flowing northward from the Gulf of Mexico eventually replaced the Polar air at the surface as well as aloft, and generally dominated weather conditions over Iowa from the 11th to the 15th. Temperatures were again unseasonably high but the air was sufficiently unstable to produce frequent and copious showers. Successive waves of Polar Maritime and Polar Continental air brought temperatures down to near normal levels on the 16th and 17th, but by the 19th Maritime Tropical air had again become dominant. Temperatures once more rose to above normal values and maximum readings in the 90's were common. Despite their high moisture content, the tropical air masses were more stable than they had been earlier in the month, and showers were much less frequent. Most stations recorded the maximum temperature readings for the month on the 21st, or on the 24th, 25th, 26th or 27th.

A fresh outbreak of Continental Polar cold air reached northwestern Iowa on the 27th and rapidly overspread the State, bringing a return to unseasonably cool weather. At many eastern and southern stations, the lowest temperatures of the month occurred on the 30th, with Burlington reporting

## COMPARATIVE DATA FOR JUNE, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	74.5	96	56	4.68					
1874.....	71.4	98	47	5.83					
1875.....	67.5	92	45	7.81					
1876.....	67.6	92	41	4.09					
1877.....	66.9	92	40	6.80					
1878.....	66.7	94	44	6.34					
1879.....	69.4	92	40	5.12					
1880.....	71.0	96	42	4.40					
1881.....	70.4	100	40	7.37					
1882.....	68.1	98	33	7.48					
1883.....	67.6	96	38	6.69					
1884.....	70.2	95	36	3.65					
1885.....	67.9	89	42	5.08					
1886.....	69.3	98	34	1.73					
1887.....	72.1	103	40	2.93					
1888.....	69.4	102	34	2.93					
1889.....	66.7	98	33	4.75					
1890.....	72.2	106	39	6.67		11	12	10	8
1891.....	69.1	99	37	5.39		11	8	10	12
1892.....	69.2	102	42	5.19		10	12	11	7
1893.....	71.2	100	40	3.91		8	15	11	4
1894.....	73.2	104	34	2.67		7	16	10	4
1895.....	69.7	102	34	4.32		10	11	11	8
1896.....	69.1	100	40	3.11		9	12	13	5
1897.....	69.1	103	29	3.81		10	10	12	8
1898.....	71.4	99	42	4.72		9	13	10	7
1899.....	70.7	100	42	5.04		10	12	13	5
1900.....	69.7	102	38	3.98		5	17	10	3
1901.....	72.3	106	30	3.71		9	15	11	4
1902.....	65.2	97	32	7.16		14	8	11	11
1903.....	64.6	96	30	2.86		10	13	10	7
1904.....	67.1	94	35	3.45		7	13	10	7
1905.....	69.9	100	36	5.53		10	12	11	7
1906.....	67.9	99	37	3.92		8	15	10	5
1907.....	66.5	98	36	5.35		11	14	9	7
1908.....	67.1	94	35	5.66		13	12	10	8
1909.....	69.1	96	40	6.41		13	12	10	8
1910.....	69.5	105	33	1.99		7	18	7	5
1911.....	75.7	108	36	1.82		5	20	8	2
1912.....	66.2	101	34	2.74		7	15	9	6
1913.....	71.5	102	33	3.31		7	19	8	3
1914.....	72.2	101	40	5.57		13	12	14	4
1915.....	65.1	91	31	4.16		11	12	12	6
1916.....	64.5	96	38	3.71		10	13	11	6
1917.....	66.0	100	32	6.65		12	13	10	7
1918.....	70.8	104	38	5.29		11	16	10	4
1919.....	71.9	98	41	6.13		13	12	12	6
1920.....	70.7	99	40	3.56		9	16	10	4
1921.....	74.7	100	40	3.76		6	16	10	4
1922.....	72.2	104	38	1.82		6	19	8	3
1923.....	70.9	100	40	4.93		12	14	10	6
1924.....	66.8	96	35	8.10		14	11	14	5
1925.....	70.4	98	38	6.64		12	15	9	6
1926.....	66.2	105	32	4.52		8	16	9	5
1927.....	66.4	101	35	2.42		9	16	7	7
1928.....	64.5	88	31	5.38		12	10	10	10
1929.....	67.6	99	38	3.08		9	14	9	7
1930.....	69.0	101	37	5.83		10	16	10	4
1931.....	75.0	106	36	3.73		9	18	8	4
1932.....	72.0	99	48	5.17		11	12	12	6
1933.....	77.8	109	34	1.64		4	21	7	2
1934.....	77.2	111	43	3.49		9	16	11	3
1935.....	65.9	94	33	7.00		13	9	13	8
1936.....	70.1	108	37	2.85		8	17	9	4
1937.....	69.0	108	36	3.80		9	13	12	5
1938.....	69.2	102	38	4.67		11	14	11	5
1939.....	71.4	100	41	5.32		12	12	11	7
1940.....	71.3	102	42	3.56		8	15	11	4
1941.....	70.0	98	41	6.20		12	12	8	10
1942.....	69.7	99	34	5.93		12	9	13	8
1943.....	71.6	101	37	6.16		14	13	10	7
Period.....	69.6	111	29	4.67		10	14	10	6

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

the lowest of record for that date. At most western and northern stations the lowest monthly temperatures occurred on the 4th or 7th.

There was a great deal of damage by flooding due to locally heavy downpours during the numerous shower periods. There

## CLIMATOLOGICAL DATA FOR JUNE, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Northwest District</i>																				
Alta	Buena Vista	1,513	54	70.0	+ 2.1	97	21	42	4	9.14	+ 4.42	2.62	24-25	0	15	15	10	5	s.	D. E. Hadden
Alton	Sioux	1,305	39	70.1	+ 2.2	96	26	43	4	6.61	+ 2.80	1.31	13	0	15	9	12	9	s.	W. S. Slagle
Cherokee 1½NW	Cherokee	1,358	24	69.3	+ 1.7	95	26	41	4	8.59	+ 4.71	1.96	13	0	15	16	8	6	s.	J. Earl Wirth
Emmetsburg	Palo Alto	1,250																		Fred A. McCarty
Estherville	Emmet	1,298	50	69.0	+ 1.9	94	20	41	4	10.16	+ 5.86	2.59	27-28	0	14	12	7	11	se.	Mrs. Mayme P. Orvis
<i>Hawarden</i>																				
Hawarden	Sioux	1,191	17	70.9	+ 2.9	100	26	43	4	3.75	- 0.35	0.81	13	0	15	7	4	19	s.	Earl V. Slife
Inwood 2½SW	Lyon	1,474	41	69.4	+ 1.9	98	26	40	4	8.91	+ 4.19	3.12	12-13	0	15	13	9	8	se.	A. C. Hanson
Lake Park	Dickinson	1,479	41	68.3	+ 1.7	92	20†	41	4	10.18	+ 6.25	4.00	24-25	0	14	15	5	10	sw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	70.2	+ 1.8	98	25†	42	4	6.11	+ 2.05	1.22	1	0	14	14	10	6	s.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	70.4	+ 2.7	96	21	42	7	6.75	+ 2.22	1.46	21-22	0	13	14	8	8	sw.	Wilbern L. Boyd
<i>Primghar</i>																				
Primghar	O'Brien	1,517	17																	Scott King
Rock Rapids	Lyon	1,341	47	68.9	+ 1.4	95	26	42	4	10.17	+ 5.90	2.90	24-25	0	16	7	13	10	se.	George Raveling
Sanborn	O'Brien	1,552	31	68.6	+ 1.6	95	26	40	4	7.25	+ 4.27	2.75	24-25	0	13	10	12	8	se.	Susie O. Dow
Sheldon	O'Brien	1,418	38	68.6	+ 1.5	93	20†	41	4	7.95	+ 3.78	2.72	24-25	0	17	15	9	6	s.	Ross E. Forward
Sibley	Osceola	1,494	9	68.0	+ 1.5	93	26†	37	4	8.93	+ 4.68	2.11	11-12	0	15	12	10	8	sw.	R. D. Stewart
<i>Sioux Rapids</i>																				
Sioux Rapids	Buena Vista	1,275		70.9	+ 2.6	98	21	42	4	7.68	+ 3.43	2.31	27-28	0	16	18	8	4	se.	Walter A. Simonsen
Spencer	Clay	1,319	36	70.7	+ 2.6	96	26	41	4	8.92	+ 5.40	3.65	25	0	16	14	10	6	sw.	E. W. Little
Storm Lake 1½N	Buena Vista	1,455	54	69.9	+ 1.7	95	21	43	5	7.31	+ 2.74	2.30	24-25	0	15	13	11	6	s.	Paul B. Vance
West Bend	Palo Alto	1,197	57	70.0	+ 1.9	95	21	42	4†	4.52	+ 0.35	1.45	27-28	0	14	10	13	7	sw.	Jos. Dorweiler
<i>Means and extremes</i>																				
				69.6	+ 2.0	100	26	37	4	7.82	+ 3.65	4.00	24-25	0	15	13	9	8	s.	
<i>North Central Dist.</i>																				
Algona	Kossuth	1,200	83	69.9	+ 1.8	95	21	42	7	5.62	+ 1.38	2.34	27-28	0	16	15	9	6	se.	Harry B. Nolte
Allison	Butler	1,060	30	71.5	+ 4.5	95	21†	46	4†	5.96	+ 1.80	1.71	2	0	13	15	10	5	sw.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	69.7	+ 1.9	97	21	40	7	6.01	+ 1.66	1.52	27	0	14	15	8	7	sw.	Wilbur Fox
Belmond	Wright	1,175	35	70.2	+ 2.7	97	26	43	30	4.24	- 0.40	1.40	28	0	15	13	9	8	s.	W. H. Dempsey
Britt	Hancock	1,240	59	69.8	+ 2.8	97	21	42	4†	4.45	+ 0.05	1.34	27-28	0	14	16	8	6	sw.	L. M. Naser
<i>Charles City</i>																				
Charles City	Floyd	1,013	69	70.2	+ 3.7	95	27	45	30	3.87	- 0.76	0.90	16	0	17	14	7	9	s.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	70.2	+ 2.1	95	21	43	7	8.22	+ 3.73	2.69	21-22	0	13	15	12	3	se.	H. S. Brandsgard
Forest City	Winneshiek	1,289	54	69.5	+ 3.1	96	21	42	4	6.12	+ 1.72	1.64	28	0	16	12	9	9	se.	Dr. M. B. Neil
Hampton 3NW	Franklin	1,142	53	70.6	+ 3.8	97	27	43	4											E. A. Saxton
Mason City 3N	Cerro Gordo	1,148	52	70.0	+ 3.9	95	21†	42	30	3.53	- 1.18	1.29	27-28	0	13	13	11	6	se.	Amer. Crystal Sugar Co
<i>Northwood</i>																				
Northwood	Worth	1,222	48	68.8	+ 2.5	93	26	43	4	7.75	+ 3.03	4.90	11-12	0	15	11	13	6	sw.	Charles H. Dwelle
Osage	Mitchell	1,170	59	69.9	+ 4.0	96	21	44	30	5.09	+ 0.37	1.95	27-28	0	15	16	7	7	w.	Glen V. Yarger
<i>Means and extremes</i>																				
				70.0	+ 3.0	97	21†	40	7	5.53	+ 1.04	4.90	11-12	0	14	14	9	7	sw.	
<i>Northeast District</i>																				
Cedar Falls	Black Hawk	875	23							5.41	+ 1.01	1.98	27-28	0	13	11	10	9	s.	E. J. Cable
Cresco	Howard	1,298	7	70.7	+ 4.7	95	27	42	30	1.94	- 2.06	0.87	28	0	10	21	6	3	w.	William C. Patterson
Decorah 2S	Winneshiek	880	61	70.0	+ 2.8	95	21	37	30	3.53	- 0.38	1.09	1	0	8	7	19	4	sw.	Mrs. Fleta M. Rose
Delaware 1½W	Delaware	1,083	65	70.6	+ 2.8	94	26	44	30	4.02	- 0.26	0.93	16	0	12	17	6	7	sw.	Clair E. Paris
Dubuque	Dubuque	642	93	72.1	+ 2.7	95	26	48	30	4.42	+ 0.11	1.28	1-2	0	12	3	9	18	s.	U. S. Weather Bureau
<i>Elkader</i>																				
Elkader	Clayton	772	52	70.6	+ 2.7	94	26†	41	30	5.72	+ 1.71	1.90	22	0	10	11	12	7	se.	W. H. O'Brien
Fayette	Fayette	1,009	56	73.4	+ 6.0	98	26†	38	29	5.10	+ 0.84	1.96	28	0	13	21	2	7	s.	John P. Clyde
Guttenberg	Clayton			73.4	+ 6.0	95	26†	52	30	6.13	+ 2.13	1.54	2	0	14	9	12	9		U. S. Engineers
Independence 1½W	Buchanan	956	84	71.8	+ 3.7	95	26	43	30	5.48	+ 1.13	1.98	22	0	10	8	14	8	sw.	August Bracht
New Hampton	Chickasaw	1,161	47	70.7	+ 4.3	95	21†	46	4	5.17	+ 0.92	1.03	28	0	13	19	5	6	sw.	C. Maas
<i>Oelwein</i>																				
Oelwein	Fayette	1,036	22	70.9	+ 3.1	97	21†	40	30	6.20	+ 1.85	2.00	2	0	9	18	3	9	sw.	John T. Ridler
Postville 5SW	Clayton	1,130	53	69.4	+ 4.0	92	21	43	30	3.67	- 0.54	1.66	27-28	0	11	14	11	5	sw.	V. H. Williams
Waterloo	Black Hawk	848	62	72.0	+ 2.8	99	21	45	30	5.77	+ 1.60	1.95	27-28	0	14	16	9	5	se.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	69.8	+ 2.8	94	21	42	30	2.10	- 2.10	1.18	27-28	0	8	21	4	5	sw.	Mrs. Albert S. Tousley
Waverly 1W	Bremer	935	55	71.1	+ 3.3	96	26†	43	30	4.47	+ 0.15	2.40	26-27	0	14	13	10	7	sw.	Charles W. Wile
<i>Means and extremes</i>																				
				71.2	+ 3.7	99	21	37	30	4.61	+ 0.39	2.40	26-27	0	11	14	9	7	sw.	
<i>West Central Dist.</i>																				
Audubon 2SW	Audubon	1,297	51	71.2	+ 2.6	98	26†	45	4	4.84	+ 0.25	0.88	5	0	15	9	16	5	s.	Geo. Kibby
Carroll	Carroll	1,280	58	70.9	+ 2.6	97	26	43	4	6.22	+ 1.60	1.12	13	0	16	16	8	6	se.	Ben H. Schenkelberg
Cushing 2½NE	Ida	1,350	10	69.3	+ 1.4	97	27	42	4	6.83	+ 2.43	1.23	13†	0	16	14	10	6	s.	H. P. Lasher
Denison 2S	Crawford	1,307	60	69.8	+ 1.1	97	20†	43	4	4.80	+ 0.66	1.53	3	0	17	12	12	6	sw.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	70.8	+ 2.2	94	26†	46	30	5.70	+ 1.01	1.25	1	0	13	20	4	6	sw.	Wilbert Shaw
<i>Harlan</i>																				
Harlan	Shelby	1,210	52	71.9	+ 3.0	98	26†	47	4	5.44	+ 0.90	2.27	3	0	11	19	4	7	s.	Elmer Buss
Jefferson	Greene	1,055	52	71.3	+ 3.4	95	26	46	30	7.42	+ 2.94	1.73	28	0	16	20	4	6	sw.	Will I. Lyon
Lake City	Calhoun	1,238	8	70.8	+ 2.3	95	21†	44	4	7.53	+ 2.79	1.79	25	0	16	14	8	8	sw.	Frank A. Taylor
Little Sioux	Harrison	1,040	43	72.8	+ 2.8	99	26	45	4	5.68	+ 1.16	1.34	1	0	16	16	10	4	s.	H. W. Kerr
Logan	Harrison	1,120	78	72.8	+ 2.9	100	27	44	4	5.32	+ 0.62	2.25	3	0	14	11	15	4	sw.	Miss Amy Ann Stern
<i>Mapleton 5NW</i>																				
Mapleton 5NW	Woodbury	1,225	5	70.6	+ 1.6	97	26†	43	4	4.30	0.00	0.83	1	0	15	14	10	6	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069		73.2		98	26	45	4	5.85		2.60	3	0	16	16	8	6	s.	S. Wm. Sorensen
Onawa	Monona	1,050	59	72.4	+ 3.0	101	27	43	4	3.00	- 1.38	0.46	5	0	16	16	8	0	s.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	7																



CLIMATOLOGICAL DATA FOR JUNE, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit						Precipitation, in inches					Number of days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind	
<i>Central District (Continued)</i>																					
Perry 1 1/4 SE	Dallas	975	44	71.8	+ 2.5	96	27	45	30	5.52	+ 1.12	1.06	28	0	14	17	8	5	se.	Eugene N. Hastie	
State Center	Marshall	1,068	7	71.5	+ 2.4	95	26	48	4†	9.15	+ 4.83	2.27	22	0	13	11	13	6	sw.	H. M. Meads	
Toledo	Tama	929	50	71.8	+ 2.7	96	26	43	30	6.89	+ 2.08	2.11	1	0	14	17	8	5	se.	H. P. Giger	
Waukee 1 1/4 SW	Dallas	1,042	46	72.6	+ 3.0	96	26†	47	30	6.94	+ 2.34	2.05	16	0	13	23	2	5	s.	Ivan B. Speer	
Webster City 1 SE	Hamilton	1,042	60	68.6	+ 1.1	93	21†	43	4	5.92	+ 1.30	1.30	27	0	13	22	7	1	e.	Leo Holtkamp	
Means and extremes				71.4	+ 2.4	98	25	41	30	5.94	+ 1.36	2.27	22	0	14	14	10	6	sw.		
<i>East Central Dist.</i>																					
Anamosa 1 NW	Jones	873	15	71.1	+ 2.1	93	26†	40	30	4.81	+ 0.29	1.65	2	0	13	17	9	4	sw.	State Reformatory	
Belle Plaine	Benton	895	68	72.1	+ 2.8	95	26†	45	30	5.26	+ 0.73	1.40	1	0	12	9	11	10	se.	R. O. Burrows	
Bellevue	Jackson	603	63	71.8	+ 2.3	95	26†	41	30	4.00	+ 0.04	1.73	1-2	0	11	12	10	8	sw.	U. S. Engineers	
Cedar Rapids	Linn	813	62	72.0	+ 2.6	95	26	43	30	5.49	+ 1.49	1.41	4	0	12	5	14	11	s.	John T. Wurster	
Clarence	Cedar	850	10	71.1	+ 2.0	96	26	43	30	5.04	+ 0.64	1.10	22	0	13	19	7	4	s.	H. J. Klatt	
Clinton	Clinton	640	73	74.2	+ 4.0	96	26	46	30	1.99	- 2.24	0.36	16	0	11	7	17	6	sw.	Samuel W. Williams	
Davenport	Scott	579	73	74.0	+ 3.5	97	26	50	30	2.91	- 1.20	0.78	6	0	12	1	13	16	sw.	U. S. Weather Bureau	
Iowa City	Johnson	780	87	72.4	+ 3.3	95	26	45	30	5.32	+ 0.70	1.48	1	0	12	12	10	8	sw.	Inst. Hydraulic Research	
Maquoketa	Jackson	732	51	71.6	+ 2.6	95	26	42	30	5.55	+ 1.59	1.28	16	0	16	18	3	9	s.	Dr. E. V. Andrews	
Monmouth 4 SW	Jones	870	3	71.6	+ 3.1	94	26†	42	30	4.50	+ 0.25	1.28	16	0	13	1	22	7	sw.	Otto J. Bisinger	
Muscatine	Muscatine	620	98	73.2	+ 3.0	96	26	43	30	5.28	+ 1.06	1.97	22	0	12	16	7	7	s.	G. Krieger	
Vinton	Benton	815	1	71.4	+ 1.1	96	26	42	30	5.44	+ 0.99	0.99	15	0	14	15	8	7	sw.	H. J. Adams	
Williamsburg	Iowa	805	28	72.3	+ 2.8	93	21†	47	30	3.86	- 0.67	1.33	11	0	10	20	4	6	se.	Dr. F. C. Schadt	
Means and extremes				72.2	+ 2.7	97	26	40	30	4.57	+ 0.25	0.97	22	0	12	12	10	8	sw.		
<i>Southwest District</i>																					
Atlantic 1 E	Cass	1,110	57	71.3	+ 1.7	96	26†	46	4†	6.84	+ 1.86	1.48	1	0	17	9	15	6	s.	Roy L. Fancolly	
Bedford 1 1/4 N	Taylor	1,215	40	71.6	+ 1.7	92	26†	49	4	11.12	+ 6.79	3.43	5	0	14	22	4	4	sw.	H. J. Chambers	
Clarinda	Page	1,004	72	72.8	+ 2.2	95	26†	49	4†	13.04	+ 8.28	2.31	5	0	15	11	11	8	sw.	Forrest E. Allison	
Clarinda Erosion 8 W	Page	1,132	5	72.2	+ 1.4	95	26	48	4	11.10	+ 6.30	3.60	5	0	13	19	6	5	se.	Soil Conservation Service	
Corning 1 E	Adams	1,285	56	71.6	+ 1.5	93	26†	48	30	7.30	+ 2.64	1.83	11	0	14	13	10	7	s.	S. W. Morris	
Glenwood	Mills	1,100	54	73.4	+ 2.4	97	26†	48	4	6.75	+ 1.99	1.36	15	0	14	4	22	4	sw.	Dr. Thos. B. Lacey	
Greenfield	Adair	1,368	48	71.2	+ 1.5	94	26†	46	4†	7.72	+ 2.46	2.30	16	0	16	13	5	12	s.	Wallace Grounds	
Oakland	Pottawattamie	1,100	31	73.7	+ 3.8	99	26	48	4	6.93	+ 2.35	1.12	16	0	17	22	1	7	sw.	Fred Bussard	
Red Oak	Montgomery	1,077	5	72.2	+ 1.6	95	26†	47	29	7.31	+ 2.80	1.98	15	0	14	7	16	7	s.	Clarence M. Totty	
Red Oak 10 SW	Montgomery	1,030	37							8.68	+ 4.17	1.87	15	0	15	13	8	9	s.	B. R. Bridge	
Riverton (near)	Fremont	920	18							13.70	+ 8.60	5.00	5	0	13	11	5	14	s.	Geo. C. Rader	
Shenandoah	Page	974	9	74.3	+ 3.2	99	27	48	4	10.23	+ 5.38	3.90	5	0	13	14	9	7	s.	Earl E. May Seed Co.	
Thurman	Fremont	973	57	73.6	+ 1.8	97	26	49	4	6.88	+ 1.69	1.40	16	0	14	14	8	8	s.	Bernard Porter	
Omaha, Nebr.		1,085	79	72.8	+ 2.1	99	27	50	4	6.30	+ 1.74	1.77	2-3	0	17	9	9	12	s.	U. S. Weather Bureau	
Means and extremes				72.6	+ 2.1	99	26†	46	4†	8.85	+ 4.07	5.00	5	0	15	13	9	8	s.		
<i>South Central Dist.</i>																					
Afton	Union	1,212	63	72.0	+ 1.8	95	26†	46	30	6.71	+ 1.73	1.58	5	0	16	15	9	6	sw.	S. R. Brown	
Albia	Monroe	949	53	72.9	+ 2.6	94	25	45	30	6.67	+ 1.82	1.07	15	0	18	11	12	7	sw.	Arthur L. Freed	
Centerville 1 1/4 SW	Appanoose	1,013	51	73.2	+ 2.8	93	25†	46	30	6.79	+ 2.29	1.28	15	0	13	10	11	9	sw.	E. Grant Everman	
Chariton 3 E	Lucas	940	50	72.8	+ 3.2	94	26	47	30	8.03	+ 3.37	1.78	5	0	12	15	9	6	sw.	Ellis Shaw	
Creston	Union	1,293	43	71.1	+ 1.8	93	26†	47	30	8.55	+ 3.55	1.67	10	0	13	15	8	7	s.	Mrs. Nellie Spangler	
Indianola	Warren	972	63	72.6	+ 2.5	97	26	44	30	5.96	+ 1.39	1.78	5	0	15	10	11	9	se.	Seth F. Shenton	
Knoxville	Marion	920	54	73.6	+ 3.5	95	25†	47	30	5.20	+ 0.66	1.27	5	0	12	14	12	4	s.	Mrs. Ella Mae Brobst	
Lamoni 3/4 SW	Decatur	1,138	40	72.2	+ 2.3	93	26	46	30	6.82	+ 2.13	1.14	28	0	16	9	11	10	sw.	Dr. Gustav A. Platz	
Millerton	Wayne	1,070	60	72.0	+ 1.9	92	26	47	30	7.49	+ 2.55	1.29	5	0	16	7	17	6	sw.	J. C. Davis	
Mount Ayr	Ringgold	1,209	52	72.2	+ 2.8	94	26	47	29†	9.71	+ 4.74	2.50	5	0	15	10	18	2	se.	Mrs. Irene Hood	
Osceola	Clarke	1,098	23	72.4	+ 2.6	94	26†	46	30	7.95	+ 3.25	1.90	5	0	15	18	3	9	se.	Mrs. Irene Davison	
Tingley	Ringgold	1,275	20	70.8	+ 1.5	91	27	49	4	10.23	+ 5.33	2.64	5	0	16	16	7	7	sw.	Jas. A. Verploegh	
Winterset	Madison	1,120	53	72.4	+ 2.3	93	26†	48	30	7.29	+ 2.60	1.40	5	0	16	13	9	8	sw.	H. S. Ely	
Means and extremes				72.3	+ 2.4	97	26	45	30	7.49	+ 2.72	2.64	5	0	15	12	11	7	sw.		
<i>Southeast District</i>																					
Bloomfield 2 1/4 N	Davis	825	29	74.6	+ 3.4	98	26	47	30	5.61	+ 0.67	1.13	11	0	13	12	13	5	sw.	Mrs. Leo Foster	
Burlington 8 S	Des Moines	697	54	73.4	+ 1.5	95	26	46	30	4.68	- 0.02	1.46	5-6	0	14	5	12	13	s.	U. S. Weather Bureau	
Columbus Jet	Louisa	595	53	72.8	+ 3.1	96	26	44	30	5.25	+ 0.66	1.13	6	0	13	9	16	5	s.	Miss Musa Todd	
Fairfield 1 N	Jefferson	780	64	74.0	+ 4.3	96	26	44	30	5.05	- 0.03	1.05	15-16	0	13	9	10	11	sw.	Prof. R. M. McKenzie	
Keokuk	Lee	574	73	74.6	+ 2.1	95	25†	53	8	4.46	+ 0.33	0.98	13	0	12	9	14	7	sw.	U. S. Weather Bureau	
Keosauqua 1 1/4 SW	Van Buren	712	57	73.6	+ 3.2	94	26	47	30	4.48	+ 0.77	1.34	5	0	13	11	15	4	s.	Harry J. Schlotfeldt	
Mt. Pleasant 2 SE	Henry	722	68	74.0	+ 3.2	96	27	42	30	4.67	- 0.33	1.25	5	0	11	14	9	7	s.	Raymond A. Hughes	
Oskaloosa 1 1/4 S	Mahaska	813	68	72.4	+ 3.1	93	26	43	30	5.35	+ 0.71	1.38	5	0	10	8	12	10	sw.	Clifford Bergstresser	
Ottumwa 1 W	Wapello	649	49	74.6	+ 4.1	97	26†	47	30	5.88	+ 1.09	1.33	5	0	16	18	9	3	sw.	C. L. Mikes	
Sigourney	Keokuk	780	49	73.4	+ 3.9	95	26†	46	30	5.60	+ 0.76	1.10	9	0	13	9	10	11	sw.	Mrs. Christie E. Chandler	
Stockport 1 1/4 SW	Van Buren	747	43	73.2	+ 3.2	93	26	44	30	4.12	- 0.98	1.06	5	0	13	13	9	8	s.	C. L. Beswick	
Washington	Washington	762	69	73.2	+ 3.0	95	26	45</													







the State on the 17th. By contrast the remainder of the month was relatively dry, although showers occurred on the 22d in connection with an east-west warm front, and heavy showers fell in the northwest quarter on the 25th as warm air pushing northward converged and was lifted along a warm front, cutting across the northwest counties. The last rains of the month began in the northwest portion on the 27th and spread rapidly eastward as a mass of cold Polar air displaced the Tropical Gulf air and brought a sharp drop in temperature. These showers were very heavy in the northwest part of the State and were attended by destructive winds in that section.

It was necessary to replant an unusually large per cent of the corn crop due to washing and eroding rains and to the prolonged wet cold weather in May that caused seed to rot in the ground, or permitted destruction by rodents. In the southern part of the State especially, it was impossible to do much field work and such corn as was up was weedy, with many poor, irregular stands. Attempts to replant had been given up in most areas by the 15th with an appreciable amount of the intended acreage to be diverted to other crops, mostly soybeans. However, with better weather during the last part of the month a little corn of the short time early maturing varieties was planted up into the early part of July. On the drier uplands the early corn was up to 14 inches high by the middle of the month. With more favorable conditions during the latter half, corn averaged knee-high in most northern counties at the close of the month, and had received two or three cultivations, while in much of the southern half of the State the weeds were being brought under control but the stand was noticeably poorer than last year.

Soybean planting was mostly finished at the close of the third week except in the wetter southern counties.

Alfalfa haying was delayed about a month beyond the usual date until the last 10 days of the month. This resulted in the first cutting being rather coarse and stemmy but yielding a rather high tonnage. Dry, sunny weather came just in time for stripping and drying the crop of bluegrass seed, but the yield was not as large as last year. New seedings of grasses and clover made excellent growth and pastures were in fine condition.

Oats, barley and winter wheat made slow growth until the hot weather began at the middle of the month. Thereafter the crops were rushed too fast and it was feared that oats would not fill out properly. However, the change to cooler at the close of the month, and conditions in early July, were almost perfect for oats.

Victory gardens generally made good growth and yielded bountifully of seasonable vegetables. However, the gardeners were forced to fight a continual battle with weeds and insect

pests. Potatoes had a strong growth of tops but in some cases were not setting a good crop of tubers. Peas were thrifty and canneries were becoming active towards the end of the month. Strawberries yielded fairly well but were rather soft because of the frequent rain. Sugar beets were doing well. Hemp, being grown commercially to aid the war effort, made rapid, vigorous growth, and some was shoulder-high at the close of the month. Other crops reacted to the weather conditions in a similar manner to those listed above.

Preliminary estimates of flood damage in Iowa along the Missouri and Nishnabotna rivers placed the loss at about \$194,600. Final figures will not be available until the estimates can be checked and compared with surveys of other agencies, especially with estimates of the U. S. Engineers. Estimates of the flood loss at Iowa City on June 2 due to heavy rains near that city, place the damage at about \$85,000. Estimates of other flood losses are not available or are included in storm damage listed in the table of Iowa storms during June. The Mississippi River overflowed its northeastern Iowa banks at the close of the month, flooding lowlands. At Dubuque, this was the second time in over 70 years that two separate overflows have occurred in the same year.

S. E. D.

**TEMPERATURE**

The State average temperature for June, derived from the averages of nine districts of nearly equal area, and based on records of 124 temperature observing stations, was 71.6°, 2.0° above the average of the 71 Junes of record. The averages were in excess of the adopted normals at all stations, with the greatest departures from normal in the northeast and southeast districts. On the whole, it was coolest in the northwest and warmest in the southeast. The highest station average was 74.6° at Ottumwa and Bloomfield, while the lowest was 68.0° at Sibley. The highest observed was 101° at Onawa on the 27th, while the lowest was 37° at Sibley on the 4th and Decorah on the 30th. The average number of days with maximum readings of 90° or higher was 7, but there were only a few scattered reports of 100°.

**PRECIPITATION**

The average total precipitation was 6.16 inches, or 1.49 inches more than the all-time normal. This year's average, derived from the averages of nine districts of nearly equal area, and based on the monthly totals at 126 precipitation measuring stations, was the 15th greatest in the entire 71 Junes of record. The greatest district averages were reported from the southwest, northwest and south central districts, while the least amounts occurred in the three eastern districts. The greatest total was 13.70 inches at Riverton (near), while the least was 1.94 inches at Cresco. The heaviest 24-hour fall was 5.00 inches at Riverton (near) on the 5th. The average number of days with measurable precipitation was 14.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR JUNE, 1943 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames.....	{Evaporation.....	.276	.188	.418	.305	.103	.016	.047	.055	.090	.160	.208	.311	.286	.160	.176	.242	.230	.364	.337	.358	.340	.336	.285	.288	.308	.318	.392	.413	.308	.151	.....	7.487
	{Wind Movement...	79	114	142	72	53	60	52	57	44	34	97	147	63	134	97	39	69	108	132	99	83	51	51	51	53	53	90	66	56	15	.....	2,261
Cherokee	{Evaporation.....	.124	.271	.....	.234	.100	.036	.055	.024	.015	.275	.243	.233	.284	.250	.433	.250	.252	.369	.411	.387	.307	.282	.233	.231	.337	.443	.294	.322	.189	.177	.....	7.304†
	{Wind Movement...	53	77	146	120	17	53	20	34	21	41	104	138	66	134	45	85	77	161	164	112	71	57	49	48	101	55	69	124	50	31	.....	2,323
Clarinda	{Evaporation.....	.273	.382	.354	.242	.278	.143	.012	.064	.035	.113	.277	.477	.275	.235	.277	.405	.206	.359	.420	.284	.331	.173	.316	.190	.348	.297	.337	.431	.256	.093	.....	7.883
	{Wind Movement...	117	213	140	69	48	25	98	41	25	32	102	123	77	110	70	62	47	86	135	104	85	19	53	70	70	43	82	98	55	22	.....	2,321
Ia. City...	{Evaporation.....	.....	.181	.215	.219	.061	.056	.074	.073	.075	.138	.150	.221	.264	.294	.191	.135	.310	.289	.294	.247	.245	.211	.221	.269	.238	.264	.312	.299	.240	.122	.....	6.112
	{Wind Movement...	91	98	115	38	22	29	23	24	24	13	53	88	33	69	43	25	31	44	63	51	38	35	26	31	22	19	38	62	67	15	.....	1,330

For precipitation and temperature data, see tables on other pages of this publication.  
 †Monthly total evaporation includes interpolation for missing days. \*Included in following measurements.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JUNE, 1943

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>Northwest District</i>																																	
Alta.....	(Maximum.....	86	88	86	73	60	62	62	62	70	70	81	85	82	84	85	80	79	89	92	92	97	85	87	93	92	96	95	85	70	65	.....	81.1
	(Minimum.....	59	65	61	42	47	48	46	46	54	55	63	65	61	61	61	57	55	59	67	72	70	64	66	67	64	70	73	57	47	47	.....	59.0
Alton.....	(Maximum.....	84	89	85	75	59	63	60	61	68	76	81	79	81	82	81	80	79	89	92	93	93	89	84	90	94	96	95	73	69	68	.....	80.3
	(Minimum.....	61	66	62	43	48	48	45	53	53	55	64	64	61	63	61	58	58	62	70	71	72	65	65	68	65	70	70	59	48	50	.....	59.9
Cherokee.....	(Maximum.....	83	88	75	66	56	62	57	60	70	76	84	80	85	82	82	73	78	87	91	93	94	89	84	90	92	95	94	74	69	63	.....	79.1
	(Minimum.....	60	65	61	41	47	48	49	52	54	55	63	64	61	63	61	56	55	60	59	71	71	64	64	67	66	72	74	59	47	47	.....	59.5
Estherville.....	(Maximum.....	83	86	84	69	58	62	58	60	74	78	84	78	79	83	85	75	80	88	92	94	92	89	88	90	89	93	89	71	67	65	.....	79.4
	(Minimum.....	60	62	60	41	47	48	42	51	52	51	60	64	60	63	60	57	57	61	68	70	72	68	65	67	64	71	69	58	45	45	.....	58.6
Hawarden.....	(Maximum.....	82	91	83	74	58	65	63	64	72	79	86	85	84	85	83	73	81	91	93	96	92	87	85	91	99	100	99	72	71	66	.....	81.7
	(Minimum.....	61	67	62	43	48	47	47	53	55	57	64	62	60	63	60	58	56	63	71	70	73	65	67	67	69	70	72	58	46	48	.....	60.1
Lake Park.....	(Maximum.....	81	86	83	72	54	60	60	59	70	75	80	77	78	81	82	75	78	87	91	92	89	87	85	87	89	92	90	73	66	64	.....	78.1
	(Minimum.....	59	63	60	41	46	47	44	50	52	51	61	63	60	62	60	57	56	58	69	69	71	67	65	66	64	70	72	58	46	48	.....	58.5
Le Mars.....	(Maximum.....	83	90	80	72	56	66	58	65	70	79	83	80	83	78	83	75	81	90	93	94	96	88	86	93	98	98	94	72	70	69	.....	80.8
	(Minimum.....	59	68	62	42	48	51	47	54	52	50	61	62	62	63	60	57	55	62	70	72	71	65	65	61	67	72	76	58	45	49	.....	59.7
Pocahontas.....	(Maximum.....	86	89	86	73	63	63	60	59	69	78	85	79	86	86	83	80	79	89	93	94	96	89	86	91	95	94	95	78	68	65	.....	81.2
	(Minimum.....	60	67	63	43	47	49	42	53	51	53	62	66	60	69	63	57	56	59	69	73	70	64	66	68	61	71	73	61	47	45	.....	59.6
Rock Rapids.....	(Maximum.....	81	88	75	71	56	63	65	63	72	77	79	79	79	81	82	71	78	89	92	94	86	87	85	88	93	95	86	69	67	64	.....	78.5
	(Minimum.....	61	65	60	42	48	47	46	52	54	57	63	64	62	62	60	58	57	59	70	70	71	65	64	66	64	70	69	57	48	49	.....	59.3
Sioux Rapids.....	(Maximum.....	86	88	88	77	64	63	59	59	72	77	86	84	85	86	85	84	80	90	94	96	98	94	88	92	94	96	97	85	68	68	.....	82.8
	(Minimum.....	59	64	61	42	47	48	44	52	53	55	62	65	60	65	61	56	56	58	68	70	70	68	64	67	64	70	72	58	46	46	.....	59.0
Spencer.....	(Maximum.....	86	88	89	73	61	61	62	58	73	80	86	80	83	86	86	78	80	90	94	95	95	91	90	92	93	96	93	82	69	65	.....	81.8
	(Minimum.....	60	66	61	41	48	47	44	52	52	55	62	67	60	62	61	57	57	60	70	71	72	68	67	68	64	70	74	59	46	48	.....	59.6
<i>North Central District</i>																																	
Algona.....	(Maximum.....	85	85	82	72	61	61	59	58	67	78	82	76	85	86	83	79	80	88	92	93	95	87	86	89	89	94	93	72	65	67	.....	79.6
	(Minimum.....	61	68	63	44	48	52	42	54	54	60	62	61	67	64	59	58	58	60	69	71	71	67	67	67	65	73	67	60	48	48	.....	60.2
Bancroft.....	(Maximum.....	85	86	82	77	62	61	60	60	70	79	82	77	82	86	84	81	79	89	94	94	97	90	88	89	89	93	92	75	66	68	.....	80.6
	(Minimum.....	61	64	62	42	45	51	40	52	51	52	58	63	60	65	62	58	58	59	68	70	69	65	66	68	65	72	66	60	47	45	.....	58.8
Belmond.....	(Maximum.....	84	84	82	70	59	59	61	58	67	78	80	78	85	86	82	79	79	88	93	93	96	94	88	91	91	97	95	77	66	67	.....	80.2
	(Minimum.....	61	67	63	44	50	54	44	51	53	63	66	60	71	63	59	56	56	56	67	71	70	67	66	67	66	72	75	60	47	43	.....	60.2
Britt.....	(Maximum.....	85	85	80	71	62	60	60	58	68	78	82	77	87	86	86	77	81	89	94	94	97	87	89	91	90	95	95	70	66	68	.....	80.3
	(Minimum.....	61	61	61	42	42	52	43	52	53	53	59	67	61	68	63	59	57	56	66	70	70	66	67	67	66	71	70	60	47	46	.....	59.2
Charles City*.....	(Maximum.....	84	82	82	68	60	60	62	62	70	76	76	78	87	87	82	80	78	86	92	88	95	87	89	90	92	95	95	72	63	68	.....	79.5
	(Minimum.....	64	67	62	47	50	52	51	54	56	54	60	62	60	65	61	61	58	60	70	72	73	67	69	68	69	74	68	53	49	45	.....	60.8
Dakota City.....	(Maximum.....	84	86	83	67	60	63	60	58	67	78	83	79	86	86	82	78	80	89	93	94	95	80	87	90	89	93	94	72	66	63	.....	79.7
	(Minimum.....	61	67	63	45	50	48	43	53	55	61	66	62	73	66	59	57	57	60	70	73	70	66	67	68	65	72	72	61	49	47	.....	60.7
Mason City.....	(Maximum.....	82	82	79	73	57	61	60	59	70	77	77	78	85	86	83	77	78	88	93	92	95	87	88	89	91	95	95	73	65	67	.....	79.4
	(Minimum.....	63	66	65	43	47	55	45	53	54	51	58	68	57	73	64	59	57	59	69	72	72	66	68	67	69	73	71	60	48	42	.....	60.5
Northwood.....	(Maximum.....	80	81	80	73	59	58	61	69	74	76	74	76	82	84	81	79	76	86	90	89	92	84	88	89	88	93	92	70	62	67	.....	77.9
	(Minimum.....	63	65	63	43	48	52	46	52	52	53	57	65	60	70	62	63	57	58	67	69	69	66	67	67	67	72	67	60	47	44	.....	59.7
Osage.....	(Maximum.....	83	81	82	74	61	60	62	62	71	75	77	77	84	82	83	79	79	86	94	87	96	88	88	89	91	94	94	71	63	69	.....	79.4
	(Minimum.....	63	65	65	45	48	54	48	53	54	55	56	65	57	71	63	58	56	58	67	70	70	65	68	70	74	71	69	61	48	44	.....	60.4
<i>Northeast District</i>																																	
Decorah.....	(Maximum.....	84	83	84	78	64	58	63	65	74	76	74	81	87	88	82	81	79	85	90	88	95	88	89	90	92	94	93	74	68	71	.....	80.6
	(Minimum.....	62	62	70	49	47	55	50	54	48	55	48	68	53	71	63	62	52	52	68	70	71	63	65	62	70	73	68	65	46	37	.....	59.3
Delaware (near).....	(Maximum.....	85	80	86	70	62	62	63	64	71	77																						

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JUNE, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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. †Interpolated.

## IOWA STORMS, JUNE, 1943

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons Injured	Estimated value of damage	Remarks
Mills Co., Malvern	1	1:27 a. m.	Wind, squall	¼	SW to NE NW to SE				\$1,500	Wind squall overturned 15 Government steel grain bins and carried 3 of them over 600 feet across a highway overpass, more than 20 feet in the air. Many tree limbs were broken off and there was some slight damage to buildings. The squall came from the southwest but almost immediately the wind shifted to the northwest with increased violence. Several large plate glass windows were blown in and one blew outwards as the wind shifted. Rainfall amounting to 0.96 inch fell, most of it in only a few minutes.
Floyd Co., Charles City, Floyd, Rudd	1	3:30 a. m. to 4:00 a. m.	Wind		W to E				25,000	Considerable damage occurred on a half dozen farms northwest of Floyd and there was also some loss in the vicinity of Rudd and Charles City. At Dumont small buildings and trees were damaged by strong winds.
Butler Co., Dumont	1	3:30 a. m.	Wind		SW to NE				1,000	
Shelby Co., Cass, Center and Lincoln Twps.	1	2:00 a. m. to 4:00 a. m.	Heavy rain							Heavy local rains caused considerable erosion, flooded fields and damaged crops.
Delaware Co., Hopkinton	1		Wind						4,000	A barn valued at \$4,000 was destroyed by windstorm 15 miles southeast of Manchester, near Hopkinton. The time of the storm is unknown but it probably occurred early in the day.
Marshall Co., State Center and Eden Twps.; Haverhill, Dillon	1	5:00 p. m.	Wind, rain, hail, electrical						10,000	Heavy rain caused flash floods and damaged roads in all parts of the county but especially in State Center and Eden twps. A barn and its contents burned after being struck by lightning near Haverhill. Wind squall damaged trees and small buildings and broke windows at Dillon. Hail fell in many sections but amount of damage caused by it is unknown.
Tama Co., Montour	1	4:30 p. m.	Rain, flood		W to E					Heavy rain lasting for 40 minutes caused Indian Creek to overflow and cover 10 city blocks. Several foot-bridges were washed out or damaged. Amount of loss was unreported.
Johnson Co., Oxford, Tiffin, Iowa City	1	7:00 p. m. to 8:30 p. m.	Rain, flood		W to E				85,000	Excessively heavy rains caused Rhine Creek at Oxford, Clear Creek at Tiffin and Ralston Creek and the Iowa River to overflow at Iowa City. Crops were washed out and there was considerable erosion damage. Rail traffic was halted by track washouts. At Oxford a bridge was carried away and several buildings wrecked or damaged by flood waters.
Carroll, Shelby, Harrison and Pottawattamie Counties	2	Early night	Rain, flood							Heavy rains eroded soil, washed fields, caused small streams to overflow and flooded lowlands. Railroad tracks were washed out near Manning in Carroll Co., and near Minden, Neola and Honey Creek in Pottawattamie Co. Damage was as great as in the storms of the 1st and probably exceeded \$100,000 for the entire area.
Linn Co., Cedar Rapids	3	Afternoon	Rain, wind, electrical							Heavy rain flooded streets, washed out gardens and damaged roads and culverts. Lightning damaged one home. Some tree limbs down.
Fremont Co., Riverton (near)	5						1			Wm. Kelsay, age 80, drowned while attempting to cross a creek that is usually dry but was swollen by heavy rains.
Fremont Co.	4-5		Rain, flood, electrical							Excessive rains amounting to 5 inches in 24 hours washed fields and roads, damaged crops. Two horses killed and barn damaged on 4th when struck by lightning. Corn crib burned when struck by lightning on 5th. Train service interrupted by floods and washouts.
Boone Co., near Boone; Polk Co., near Farrar; Jasper Co., NW corner	9	8:00 a. m. to 9:00 a. m.	Hail, wind	½ to 1½	NW to SE	¼ to ½			15,000	Heavy hail fell at points along a line from west of Boone to Farrar in Polk Co., and in the northwest part of Jasper Co. near Ira and Mingo, badly damaging hemp, soybeans and oats. Light hail fell as far southeast as Newton and also west of the main storm track near Beaver in Boone Co. High wind damaged trees and small buildings in northwest Jasper Co.
Clarke Co., Osceola	9	Morning	Heavy rain							Heavy rain fell east of Osceola causing flood to rise above railroad track level. Much washing of crops and erosion. Estimate of 5 inches of rain in a few hrs.
Winnebago Co., Center and Nodaway Twps.; Lake Mills	11	4:30 p. m.	Tornado, rain, hail	1/24	S to N	Small			12,000	A small tornado developed about 6 miles southwest of Lake Mills and traveled northward along a very narrow path for about 8 or 9 miles. When 4 miles west of Lake Mills it caused great destruction on one farm and lesser damage on several others. The storm lifted and disappeared a few miles north of where it exhibited its greatest force.
Worth Co., northern tier of townships	11	9:00 p. m.	Rain, wind						5,000	Wind caused some damage to trees and buildings. Heavy rain flooded streets and basements in town, caused small streams to overflow and damaged highways and bridges. Some livestock drowned. Rain amounting to 4.90 inches fell in Northwood in 24 hours ending at 5 a. m. of the 12th, but amounts estimated at 8 to 10 inches fell in other sections and north of Minnesota line. Only sprinkles were reported 8 miles south and 15 miles east of Northwood.
Lyon Co.	11	Night	Rain, flood							Heavy rains flooded small streams and caused considerable loss by erosion, washing of fields and damage to highways.
Osceola Co., Sibley	11	10:30 p. m.	Wind							Many shade trees uprooted in Sibley. Heavy rains fell there and in open country. No estimate of damage available.



IOWA STORMS, JUNE, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Clayton Co., McGregor	13	Morning	Hail, wind							Hail and hard rain near McGregor killed chickens and damaged gardens. Scattered reports of high wind and hail but no estimates of loss received.
Osceola Co., Sibley and vicinity	14	8:10 p. m.	Wind	1/2	WSW to ENE				25,000	Strong wind damaged a house, 6 barns and numerous small buildings in and near Sibley. Railroad roundhouse damaged by wind and roadbed washed out by heavy rain. About 300 trees blown down or damaged and telephone and electric service disrupted. There was no definite evidence of a tornado.
Dickinson Co., Spirit Lake	14	Evening	Wind							News reports that "wind damage" occurred near Spirit Lake were not amplified or confirmed.
Sac Co., Sac City	14	8:15 p. m.	Tornado	1/16	SW to NE				5,000	Tornado funnel lowered and raised at intervals, causing scattered damage along path several miles long. This storm probably redeveloped in Pocahontas and Kossuth counties.
Pocahontas Co., Cedar and Des Moines Twps.; Fonda	14	Evening	Wind		SW to NE					Light damage to rural property was reported from the extreme southwest and northeast townships of county. Trees were uprooted, windows broken and buildings damaged at Fonda. These points are in a direct SW-NE line with the Sac City tornado.
Emmet Co., Ringsted	14	9:30 p. m.	Wind, tornado	1	W to E	1/4			10,000	Two barns, 2 silos, 2 hoghouses and several smaller buildings were wrecked or damaged; Government grain bins blown over, numerous trees, telephone and electric wires down. Freaks of storm indicate tornadic development.
Kossuth Co.	14	9:30 p. m.	3 tornadoes, wind		SW to NE W to E				40,000	Numerous local storms over county presented a confusing picture to one attempting to piece out individual storm paths. It appears as if the Sac and Pocahontas County storms redeveloped in the central part of the county and damaged farm property north of Algona and then continued to the vicinity of Titonka. A second tornado appears to have developed near Lone Rock and caused damage in scattered areas. A continuation of this storm probably caused damage in and near Bancroft, although no funnel cloud or direct evidence of a tornado was reported from that town. The third tornado moved from west to east from Ringsted in Emmet Co., north of Fenton and may have continued to Titonka. Other damage in the neighborhood of Fenton may have been a fourth tornado or may have been due to the storm listed as forming near Lone Rock. In addition, straight wind damage from W to E was reported from Riverdale Twp. As mentioned previously, damage near Titonka may have been due to either a storm moving east from Ringsted or northeast from near Algona, or from both. The time element is not very clearly defined but it is believed that for any point, damage caused by storms moving from the southwest occurred before damage was done by the westerly winds. Communication wires down in many areas.
Winnebago Co., Lake Mills	14	Night	Wind							Thirty trees blown down 5 miles SW of Lake Mills and 1 mile east and 1 mile south of where tornado caused damage on June 11.
Worth Co., Joice	14	Night	Wind							Barn wrecked and considerable other wind damage occurred near Joice. This storm and that in Winnebago Co. may be redevelopments of Kossuth Co. storms.
Greene Co., Jefferson, Seranton	14	8:30 p. m.	Tornado, wind		W to E				10,000	A tornado struck in north portion of Seranton about 9:00 p. m. The storm moved from W to E and may have continued in the air until it reached a point 4 miles north of Jefferson where farm buildings were wrecked. Discrepancies in time prevent certainty as to whether there were one or more storms.
Polk Co., Des Moines	14	Evening	Wind							Three airplanes damaged at Municipal airport by wind.
Southwest counties	15		Flood							See remarks in general summary concerning flood on Missouri and Nishnabotna rivers.
Adams Co., Colony Twp.; Union Co., Spaulding, Lincoln, Dodge Twps.	16	6:00 p. m.	Hail, wind, rain	1 1/2	W to E	1/2				Heavy hail pounded crops in an area about 24 miles long from Carl in Adams Co. into Dodge Twp. of Union Co. Corn, oats and soybeans were severely damaged in spots and other crops were injured less seriously. Strong winds and heavy washing rain accompanied the hail. Less heavy hail occurred at scattered points near the main area of destruction.
Clayton Co., near McGregor	16	7:00 p. m.	Hail, wind							Heavy washing rain and scattered hail damaged crops.
Boone Co., Boone	19	11:00 p. m.	Wind						80	Gusty wind blew down tree limbs and broke windows.
Appanoose Co., Centerville	20	7:00 p. m.	Wind							Oats flattened by wind.
Lyon Co., Wheeler Twp.; Pocahontas Co., Fonda; Calhoun Co., Pomeroy east part	21	Evening	Hail							Light to moderate hail damaged crops in scattered areas.
Jefferson Co.	21	Evening	Rain, hail, wind		SW to NE					Trees blown down in and near Jefferson; some buildings damaged; house set on fire by lightning; scattered reports of wind, heavy rain and flooded creeks all over county.
Washington Co., near Verdi	21	Evening	Hail, rain, wind						1,500	Heavy rain in southwest part of county flooded creeks; fences washed out. Estimated 7 inches of rain in 2 hours. Small buildings blown over or damaged.

## IOWA STORMS, JUNE, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Lyon Co., entire county, especially east portion	24	7:15 p. m.								A severe windstorm traveled southeastward from the Minnesota border passing over or near Rock Rapids, George, Little Rock, Boyden, Hoppers, Matlock, Sheldon, Sanborn and Paullina, wrecking barns and other farm buildings, blowing down trees and telephone and electric lines and causing other damage along a broad path about 8 miles wide and 50 to 60 miles long in Iowa. Less severe damage from wind occurred outside the main storm track and there was also considerable hail damage. In Lyon Co., where damage was greatest, about 80 barns were wrecked as well as hundreds of smaller buildings. There was some livestock killed. Two men suffered fractured legs and 6 other persons are known to have been cut and bruised. All R. E. A. lines were put out of service. Four areas of hail damage covered about 25 square miles. In Osceola Co., buildings on 100 farms were damaged and there was also considerable hail loss. Similar loss occurred in Sioux Co. In O'Brien Co., a new hangar was wrecked and 9 airplanes were damaged. About 50 barns were seriously damaged or wrecked, 57 out of 58 telephone toll lines were out of order, and local service was not restored to normal for 3 days. Electric service to 2,000 customers was interrupted and loss to power lines amounted to \$25,000. At least 55 Government steel grain bins were destroyed. Thousands of trees were down. Heavy rains flooded small streams and washed fields. Light wind damage occurred near Spencer, in Clay county.
Osceola Co., southwest corner	24	8:00 p. m.								
Sioux Co., northeast corner	24	8:00 p. m.	Wind, hail, rain	8	NW to SE	1		8	750,000	
O'Brien Co., north and west portions	24	8:00 p. m.								
Clay Co., near Spencer	24	Evening								
Sac Co., Sac City	24	Night	Electrical						12,000	Three large barns and their contents destroyed after being struck by lightning.
Clay Co., Fostoria, Langdon, Lake Center, Webb; Pocahontas Co., Laurens	27	Evening	Hail							Hail caused spotted damage in Clay Co., but details are unavailable. In Pocahontas Co., hail fell in an area 8 miles long and 4 miles wide, damaging corn, causing almost total loss of flax and soybeans and damaging oats 70%. Some damage by lightning.
Clay and Cherokee counties	27									Due to heavy rains of 24th and 27th, the Little Sioux river and its tributaries overflowed low ground causing considerable crop damage.

## NOTES ON THE STORMS OF JUNE, 1943

Although data concerning destructive storms are published in tabular form in this publication, it seems desirable to comment briefly on the meteorological conditions that prevailed at the time the storms occurred.

On the 1st, the storms that occurred shortly after midnight, and during the remainder of the morning, developed in advance of Maritime Polar air moving eastward. The afternoon thunderstorms that brought excessively heavy downpours of rain in Marshall, Tama and Johnson counties developed south of the same cold front after it had assumed an east-west direction. The air masses to the south consisted of Maritime Tropic at the surface and Continental Tropic aloft, while to the north Continental Polar air predominated, probably mixed with some Maritime Polar air. The southward movement of the cold air had practically ceased and the front was becoming stationary before changing to warm.

The excessively heavy downpours on the night of the 2d occurred in the warm sector of a barometric disturbance, probably at the time of the arrival of a cold front aloft. In this case, Maritime Tropic air prevailed at the surface over Iowa, while to the westward two waves of Maritime Polar air were pushing eastward with the second fresher air mass rapidly overtaking the first. The tip of a narrow tongue of Continental Tropic air barely reached southwest Iowa. Tornadoes occurred at Wood River and Shelton, Nebr., while heavier and more damaging downpours than those in Iowa were reported from Omaha.

The heavy downpour on the 4th-5th in southwest Iowa occurred as Maritime Tropic air overran Continental Polar air at the earth's surface. There was no fronts present near the storm area.

Hail that fell in the central portion of the State on the 9th was likewise of non-frontal character. Superior air aloft overlay a surface mass of Maritime Polar origin during the early morning, although at noon the upper air mass was identified as Maritime Tropic. The hail was the result of local unstable conditions.

The tornado near Lake Mills the night of the 11th, occurred in Maritime Tropic air a short distance south of a warm front a few miles north of the Iowa-Minnesota border. The St. Paul raysonde observation begun about 10:00 p.m. showed a very dry layer of air between 5,000 and 10,000 feet. An extension of this dry layer south of the front could easily cause formation of a local cold front aloft and conditions sufficiently unstable to account for development of the tornado and other severe local storms to the westward along the Minnesota boundary.

On the morning of the 14th, the Polar front extended from western Montana eastward to the middle Atlantic states. It crossed central Minnesota as a warm front and was joined by a stationary front extending in a semi-circle from northeastern Colorado to the northwest tip of

Iowa and thence almost due north. At 7:30 p.m., this surface stationary front had disappeared but a cold front aloft extended southward across the eastern Dakotas and then southwest across Nebraska. Maritime Tropic air prevailed east of this front and Maritime Polar to the west. Its eastward passage was marked by a squall line that reached the Mississippi River at midnight, and it caused all of the tornadoes and other local storms listed in the storm table as occurring on the 14th. A destructive tornado also occurred in Lyman County, South Dakota.

The hail storms on the 17th occurred in Maritime Polar air, sometime after the passage of a cold front.

On the 21st, the scattered local storms mostly occurred along a stationary front over extreme northern Iowa.

The most noteworthy and destructive storms of the month occurred during the early evening of the 24th, in the extreme northwest part of the State. In the early morning a cold front was advancing across eastern South Dakota toward Iowa. By noon it was well within the borders of the State, extending from Monona County to Mitchell County. By 7:30 p.m. it had reversed its direction and retreated northward and only the extreme northwest edge of Iowa was covered by the cold air mass. At midnight the front was stationary and touched the State only at the common boundary point of Minnesota, Iowa and South Dakota. While the Maritime Polar air was being pushed northward by Maritime Tropic air, the destructive windstorm in northwest Iowa traveled southward at an estimated speed of more than 50 miles an hour. The rapid southeastward movement of a comparatively small mass of cold Polar air against the strong broad stream of warm air from the south deserves more study than has been possible at this time. As a possible hypothesis to explain the storm, it may be that due to local instability the warm air rose over the colder mass, creating a narrow break in the front of warm air moving north. Or the break may have been due to topography or other causes. In any event, cold air rushed southeastward through the gap and its momentum permitted it to underrun the warm air mass for a considerable distance southeast of the break which acted as a funnel. The unstable condition produced rains of 4 inches or more over Dickinson County, amounts in excess of 2 inches south to Sac City, and of an inch to northern Green County. The general boundary of precipitation caused by this miniature outbreak of cold air, extended from Mitchell County southwest to Story County and thence due west to the Missouri River. However, from Greene County south to Ringgold County the effect of the underrunning cold air could still be noted in a narrow belt of scattered showers of diminishing intensity.

Although there were a few persons who called the storm a tornado because of the great destruction, most reliable observers emphasized that all buildings were blown from northwest to southeast and that no twisting action was noted.

S.E.D.

IOWA STORMS, MAY, 1943—Continued from May Report

County, and Township or Town	Date	Time	Character of storm	Width of path Miles	Direction	Size of hailstones (Diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Dallas Co., Colfax, Adel, Walnut and Van Meter Twps.	15	6:00 p. m.	Tornado, wind, hail	Narrow	S to N				15,000	A tornado struck about a mile west of Waukeec and damaged buildings on several farms. The path of the storm was close to that of the March 15 tornado of this year, but was from south to north and was only a few miles long. At about the same time, straight wind caused considerable damage, especially at and near Adel.
Polk Co., Des Moines and Johnston Station	15	6:20 p. m.	Tornado, wind	1/2	S to N	1/4			3,500	A small tornado developed in the northwest suburban residential area of Des Moines and skipped for a distance of about 5 miles to a point east and north of Johnson Station. Most of the damage was done to chicken houses, outbuildings, trees and roofs, although 2 small houses were demolished.
Boone County	15	Evening	Wind						750	Plate glass blown out in Boone; farm buildings damaged north part of county.
Marion Co., Dallas, Knoxville, Union and Polk Twps.	15	6:15 p. m.	Tornado, wind, hail	1/4	SSW to NNE	1/2			50,000	A tornado and windstorm destroyed much property along a line from the southwest corner of the county to a point several miles north of Knoxville, a distance of about 18 to 20 miles. Heaviest loss occurred between Newbern and Melcher, the damage becoming more spotted as the storm progressed northward. Along a considerable part of its path the storm was in the nature of a straight wind but at other times its "tornadic" characteristics were quite pronounced. There is some evidence that the storm may have been a redevelopment of the Decatur-southeast Clarke county tornado but the reported times of occurrence indicate simultaneous development of separate storms along the same line of instability.
Jasper Co., most of county	15	6:25 p. m. to 7:00 p. m.	Wind, hail		S to N				7,500	Scattered wind and hailstorms occurred in these counties, with damage areas mostly extending from south to north. Some of the storms, especially in Poweshiek county may have been redevelopments of the Marion county tornado but there is no certain evidence that any new tornadoes formed in the area. About \$5,000 of the loss was sustained by crops.
Poweshiek Co., western townships	15	6:30 p. m. to 7:00 p. m.	Wind, hail		S to N	1/4			13,000	
Marshall Co., extreme south, also NE corner	15	6:00 p. m. to 7:00 p. m.	Wind, hail			1/4			5,000	
Monroe Co., Jackson Twp.	15	6:30 p. m.	Wind, hail, flooding						2,000	Excessive rain caused small streams to overflow and there was scattered light wind damage in all sections of county. The only itemized losses were in Jackson township; wind \$400; hail \$100, and flood \$500.
Johnson Co., near Oxford, Swisher, Solon	15	7:45 p. m. to 8:00 p. m.	2 tornadoes, wind, hail		SW to NE				15,000	A small tornado caused great damage on one farm about 8 miles south of Iowa City. Another tornado striking near Oxford damaged buildings on two farms. At about the same time wind wrecked barns near Swisher and Solon. The Swisher storm may have been a continuation of the Oxford tornado. Hail damage of \$3,000 to tomato plants was reported.
Benton Co., Walford, Shellsburg, Norway	15	Evening	Hail, wind			1/4			3,000	Hail damaged tomato plants and injured oats near Walford and Norway, some wind damage in this area and also on one farm near Shellsburg.
Keokuk Co.	15	Evening	Wind, hail							Small streams overflowed and low ground flooded, trees blown down; light hail.
Jones Co., near Wyoming	15	Evening	Electrical							Barn struck and damaged by lightning.
Clinton Co., Delmar	15	Night	Wind, hail						10,000	Trees uprooted, one barn and many small buildings wrecked and other barns damaged by windstorms near midnight. Some livestock killed.
	31	Night								Damage from local storms the night of May 31-June 1 will be listed in June storm table as most of damage occurred after midnight.

LOCAL STORMS OF MAY 5TH AND 15TH, 1943

Practically all of the destructive local storms during May, 1943, occurred on either the 5th or the 15th. Rather detailed summaries of these phenomena are given in tabular form elsewhere in this publication but it seems desirable to summarize the conditions that caused them to occur. As most of the storm reports were based on Central War Time, the time used in discussing weather maps, charts, etc. is also Central War Time.

The 1:30 a.m. weather map of May 5 showed a typical low pressure area over the northern Great Plains with the lowest barometer reading near Pierre, South Dakota. The warm front of the storm curved eastward from Pierre to the northwest corner of Iowa, thence southeast to the south central boundary and then almost straight south to Louisiana. The cold front curved eastward from the northwest corner of South Dakota to the low pressure center and then southwest to northeast Colorado. Within the inner boundaries of the fronts, Superior air overlay a Maritime Tropical air mass. To the east Maritime Tropic overlay Continental Polar air while to the west cold Maritime Polar air covered the middle and northern Rockies.

At 7:30 a.m. the "low" was centered east of Aberdeen, South Dakota and the warm front extended eastward from the center to near the twin cities and thence south through eastern Iowa and then slightly southwest through central Missouri and Arkansas. The cold front extended almost straight south from the "low" center to northern Nebraska and then southwest to southern Colorado. From the low pressure center a diffuse line of cold frontolysis extended northwest to northern North Dakota. The air masses remained in the same relative positions.

At 1:30 p.m. the low pressure center was near Duluth, the warm front extended across Wisconsin and Lake Superior to Indiana, while the cold front extended southward to north central Iowa and then curved southwestward into Nebraska a short distance north of Omaha. Over northwest Kansas the front had become stationary.

At 7:30 p.m. the "low" center was located over western Lake Superior with the cold front stretching southwestward to a point northwest of Rochester, Minnesota. Here a wave had developed and the front was warm southwestward to the Iowa line. From this point the front was again cold and extended south from about the fourth tier of counties east of the South

Dakota boundary in the northern part of the State to the second tier of counties east of the Missouri River in the extreme southern part. From Iowa the cold front extended southwest to the Oklahoma Panhandle.

At 1:30 a.m. of the 6th, the cold front still passed over Iowa from east of Charles City to west of Lamoni.

Most of the destructive storms occurred between 3:00 p.m. and 8:00 p.m., so that the 1:30 p.m. weather map represents the conditions prevailing shortly before the storms began and the 7:30 p.m. map pictures the conditions about the time the last destruction occurred.

Upper air conditions were about what might have been expected from the surface charts. The radiosonde observations begun late in the morning of the 5th showed rather steep lapse rates (fall of temperature with altitude) at St. Paul, Omaha and Chicago, conditions which are favorable for strong convective air currents. At Omaha, a fairly high mixing ratio prevailed at 14,000 feet.

A trough of low pressure was shown over the northern Great Plains on the 5,000-foot and to a lesser extent on the 10,000-foot pressure maps. The 10:00 a.m. isentropic chart at the 308° potential temperature level showed a curved moist tongue extending from the Louisiana coast northwestward to eastern Oklahoma and then northeastward to southwest Iowa.

Winds aloft were mostly from a southerly or southwesterly direction in advance of the cold front and from a westerly or northwesterly direction in the rear of the front.

Most of the destructive storms occurred along a line extending from southwest to northeast across the State. At least nine separate and distinct tornado tracks were reported and it is possible that there were other incipient developments in open country areas that were not noted. The line on which most of the storms occurred was about 180 miles long although Clayton and Fayette counties are about 100 miles farther northeast.

When the surface cold front slowed its eastward movement, as shown by the 1:30 p.m. and 7:30 p.m. surface charts, the cold front aloft probably ran ahead of the surface front. The 4:00 p.m. wind aloft charts showed a wind shift from southwest to northwest over the western portion of Iowa. The wind shift line lay in the same general direction as the line along which the tornadoes formed. The tornadoes apparently developed in the unstable air east of the upper air cold front and traveled along the front.

In addition to the tornadoes, there were numerous local wind and hailstorms, often in the immediate vicinity of the "twisters". Total damage amounted to \$225,000 or more. Damage from hail was mostly confined to tomato plants and gardens as other vegetation was not sufficiently advanced to be injured.

Developments preceding the tornadoes and other local storms on the 15th, were somewhat different from those on the 5th, although the storms occurred over much the same area on both dates.

At 1:30 a.m. of the 15th the surface weather map showed the center of a low pressure area over northeastern New Mexico with a curved warm front extending from Colorado to Oklahoma and then to eastern Tennessee. Maritime Tropic air was overrunning Continental Polar air north of the front while Maritime Tropic air, overlain by Superior air prevailed south of the front. By 7:30 a.m. the "low" had moved to east central Colorado and the warm front extended from the center eastward along the southern boundaries of Kansas, Missouri and Kentucky. An upper air cold front reached from Pierre, South Dakota to the low center and continued southwestward as a surface cold front from that point.

At 1:30 p.m. the disturbance center had reached a point near Concordia, Kansas. The cold front aloft stretched south-

ward from Huron, South Dakota to the "low" center and continued as a surface cold front into western Texas. The warm front extended eastward from the center across Kansas, Missouri and southern Illinois and eastward. Northeast of the disturbance center Maritime Tropic air continued to overrun Continental Polar air at the surface. In the southeast quadrant, Continental Tropic overlay Maritime Tropic air while west of the cold front Maritime Polar cold air was moving eastward.

At 7:30 p.m. the "low" was centered over western Iowa and had become rather elongated in shape. An occluded cold front ran almost parallel with the western boundary of the State while a cold front aloft preceded it, extending from north to south west of Mason City, Des Moines and Lamoni and on down in extreme western Missouri, to the Ozarks. The warm front extended almost straight east across Missouri, about one-third of the way down from the Iowa boundary.

At 1:30 a.m. of the 16th, the disturbance was centered over extreme southeast Minnesota with the cold front stretching south over extreme eastern Iowa, touching the most westerly part of Illinois and then gradually curving southwestward to northwest Arkansas. The fronts immediately in advance of the storm center were becoming weaker and diffused.

Upper air charts showed a fairly steep lapse rate at Omaha, with considerable moisture up to 10,000 feet elevation but the conditions were not unusual. However, at the 10,000-foot level, the center of a definite low pressure area moved from northeast Wyoming at 10:00 p.m. of the 14th to the Black Hills at 10:00 a.m. on the 15th, and to Minnesota-Dakotas boundary at 10:00 p.m. of the 15th.

The isentropic charts again showed a moist tongue extending from Texas northward toward Iowa.

Unfortunately the stormy weather prevented pilot balloon observations from obtaining wind aloft data near the area where the storms occurred. Nevertheless, a sharp wind shift must have occurred along the cold front aloft that was a prominent feature of 7:30 p.m. maps.

At least eleven separate and distinct tornadoes developed between 3:00 p.m. and 8:00 p.m. in roughly the same area as on May 5. An interesting fact is that the tornadoes in the southern two tiers of counties moved from southwest to northeast but some of those that formed in the third and fourth tiers of counties from the Missouri line traveled from south to north. In cases where a path of damage crossed from the second into the third tiers of counties, the track curved toward the left. This does not appear to be true of the Johnson County tornadoes.

Heavy rains fell in connection with these storms, the amounts generally exceeding 2 inches throughout the southern half of the State, and with over 4 inches in Ringgold County and also in Crawford and Sac counties.

At Des Moines, a total of 2.41 inches fell from 1:00 a.m. to 8:00 p.m. with 0.81 inch of this amount falling at the time of the tornado in the northwest suburbs. Over one-half inch fell in 10 minutes. This storm was about 5 miles northwest of the Weather Bureau Office. When the tornado struck, the barometer suddenly dropped .08 inch and then rose .07 inch. However, the low point reached and the amplitude of the change were almost equalled by similar changes an hour before and an hour after the storm.

The energy released by the condensation and precipitation of vast quantities of moisture must have been an important factor in the development of the "twisters". As on the 5th, they probably developed in advance of and near the cold front aloft and followed paths that were dependent on the upper winds.

The outstanding common characteristic of atmospheric conditions on the two dates was the presence of low pressure aloft

over the northern Great Plains states. The path of the surface "low" on the 15th was no doubt governed by the disturbance aloft. In both cases Maritime Tropic air overran Continental Polar air north of the east-west warm front, Superior or Continental Tropic air was present above Maritime Tropic air south of the warm front and Maritime Polar air was advancing eastward west of the north-south cold front at the time the storms occurred. When carried aloft, the Maritime Polar, Superior and Continental Tropical air cool much more rapidly than does Maritime Tropical air, creating temperature differences that produce great instability. These conditions have been frequently noted when tornadoes occurred in Iowa during the past few years. A discussion of Mr. J. R. Lloyd's theory of tornado development and of its application to Iowa conditions, appeared in Climatological Data for June, 1942.

The total loss from the storms on the 15th was probably

close to \$300,000, and the combined loss of the 5th and 15th was near or over \$550,000. This seems to be a large figure yet it is probably only a small fraction of the loss to the State occasioned by the cold, wet weather which was so unfavorable for agriculture during the entire month. The spectacular nature of the storms attracts attention and of course severe losses were sustained by many individuals. Yet, if the unfavorable conditions result in only one per cent of valuable agriculture land going uncropped, or reduces yields of important feed crops by a fraction of a bushel per acre, the net loss to the economy of the State and Nation will far exceed and outweigh the damage caused by these local disturbances. Even the cost in time and labor and purchase of seed, to replant a small part of the Iowa corn crop, far exceeds that of making repairs after any but the most destructive storms when the cost is calculated on a State-wide basis.

S. E. D.

**MISCELLANEOUS PHENOMENA, JUNE, 1943**

*Corona*: 17th, 19th, 20th.

*Fog, heavy*: 9th.

*Fog, light*: 5th, 6th, 7th, 8th, 9th, 15th, 24th, 30th.

*Hail, light*: 1st, 2d, 11th, 12th, 15th, 16th, 23d, 24th, 25th, 28th, 29th.

*Halo, lunar*: 10th, 30th.

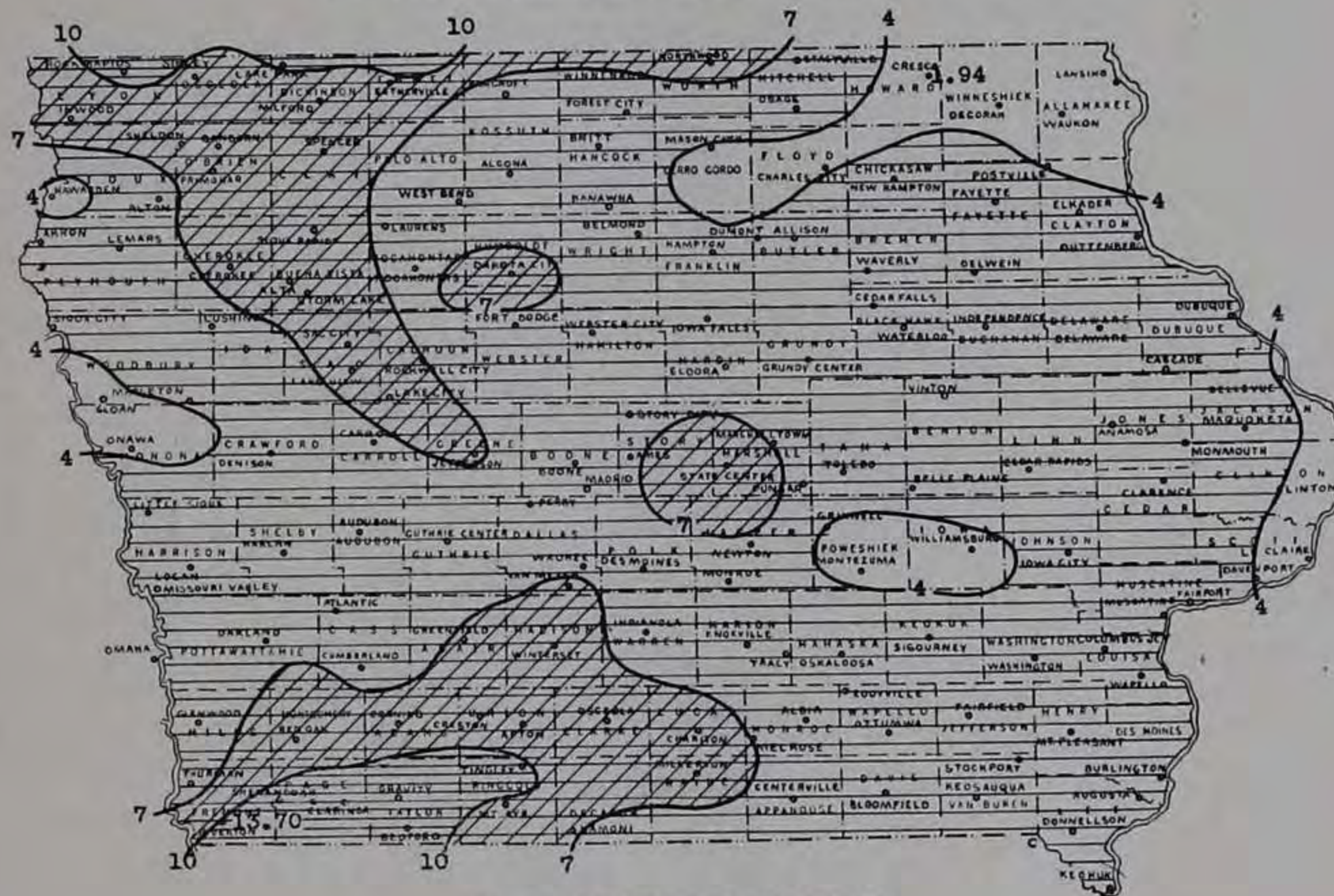
*Halo, solar*: 4th, 11th, 19th, 22d, 30th.

*Thunderstorms*: 1st, 2d, 3d, 5th, 6th, 11th, 12th, 13th, 14th, 15th, 16th, 22d, 23d, 24th, 25th, 27th.

**ERRATA**

Report for May, 1943. Page 50, Cresco, total precipitation published 1.33, should be 1.23; departure published -3.21, should be -3.31. Page 52, Cresco, total precipitation published 1.33, should be 1.23. Page 55; table headed "Daily Evaporation, etc. for April" should be for May.

**TOTAL PRECIPITATION, JUNE, 1943**



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, JULY, 1943 No. 7

GENERAL SUMMARY

July, 1943, was warmer and wetter than usual. While the departures from the all-time July values were moderate, the combination of warmth and wetness was rather unusual. There have been 28 warmer Julys and 17 with more precipitation, but there have been only 3 that were both warmer and wetter. The July weather followed the general pattern of June which was both the 15th warmest and 15th wettest of record, but which was exceeded in both temperature and precipitation by only 1 other June. There were no prolonged periods of excessive heat and for the first time since 1929 there were no temperatures of 100° or higher observed during July. As is usually the case when precipitation is above normal, excessively heavy falls occurred in some sections. On the other hand the monthly totals were deficient in the southwest and east central districts, although not seriously so, except in a few small, local areas.

Despite the frequent showers sunshine was slightly above and daytime cloudiness slightly below normal. The relative humidity was generally above normal except during the late afternoon. The average number of days with measurable precipitation was 2 more than the all-time July average.

At the beginning of the month a mass of cold Polar Continental air covered the midwest, including Iowa, and temperature readings were below normal. At a good many stations the minimum readings for the month occurred on the 1st, 2d, 3d, or 5th. Temperatures rose somewhat on the 3d and 4th as Maritime Tropic air flowed northward to replace the Polar air. The pressure gradient was quite flat but a rather broad and at times indefinite low pressure trough covered the Great Plains and extended northeast toward the Great Lakes. Frontal developments between new waves of Polar air from the west and moist Tropical air resulted in scattered showers from the 3d through the 6th with severe local storms in the northwest portion on the 4th. Polar air again covered the State on the 7th, but gradually gave way to Maritime Tropic air. The temperature was mostly above normal from the 8th through the 13th with only a few light and widely scattered showers reported. Temperature readings rose into the 90's and at many points the monthly maxima occurred on the 12th and 13th.

On the night of the 13th-14th a fresh mass of Maritime Polar air pushed rapidly eastward across Iowa, underrunning and displacing the Tropical air. Showers occurred generally along the cold front and temperature readings once more fell to somewhat below normal values generally. At some stations the temperatures were the lowest for the month, falling below the levels reached during the first 5 days.

On the 15th, a low pressure trough covered the Great Plains and was moving slowly eastward. In connection with this advance, a new wave of warm Maritime Tropic air moved northward across Iowa on the 16th causing general showers

COMPARATIVE DATA FOR JULY, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	74.0	96	54	2.78					
1874.....	77.8	101	56	3.04					
1875.....	72.8	97	56	6.05					
1876.....	74.2	95	54	6.15					
1877.....	74.0	97	54	2.35					
1878.....	76.5	104	52	5.13					
1879.....	76.0	102	55	2.20					
1880.....	73.8	98	48	4.16					
1881.....	75.9	100	50	5.33					
1882.....	69.1	94	46	3.66					
1883.....	72.9	100	46	5.14					
1884.....	71.0	96	50	5.41					
1885.....	74.6	102	48	4.73					
1886.....	76.2	104	48	0.50					
1887.....	77.0	105	45	2.85					
1888.....	75.8	103	38	4.31					
1889.....	72.6	102	40	4.00					
1890.....	75.2	110	45	2.04					
1891.....	68.5	99	41	4.22		8	13	13	5
1892.....	73.0	104	38	5.29		9	16	10	5
1893.....	75.0	102	47	3.33		7	19	10	2
1894.....	76.4	100	39	0.63		3	22	8	
1895.....	72.1	104	35	3.40		7	15	12	4
1896.....	73.6	104	42	6.90		9	14	11	6
1897.....	75.6	106	42	3.26		6	18	10	3
1898.....	73.4	102	42	2.98		7	19	9	3
1899.....	73.1	101	38	3.07		7	16	10	5
1900.....	73.4	102	37	6.15		9	16	10	5
1901.....	82.4	113	46	2.34		5	21	9	1
1902.....	73.1	99	41	8.67		13	14	10	7
1903.....	72.9	100	40	4.83		9	17	9	5
1904.....	70.6	100	38	4.41		10	16	9	6
1905.....	70.6	102	40	2.91		9	14	10	7
1906.....	70.9	102	42	3.04		8	18	10	3
1907.....	73.7	102	41	7.27		13	16	11	4
1908.....	73.0	100	42	3.66		8	16	10	5
1909.....	72.3	102	46	4.77		10	15	8	8
1910.....	74.5	108	43	1.86		7	19	8	4
1911.....	75.5	111	38	2.27		7	18	10	3
1912.....	74.6	103	38	3.71		10	17	10	4
1913.....	76.1	108	45	1.82		5	21	8	2
1914.....	76.6	109	43	2.27		5	20	8	3
1915.....	69.5	92	40	8.32		14	10	12	9
1916.....	79.7	105	48	1.78		5	23	7	1
1917.....	74.3	106	38	2.27		7	21	8	2
1918.....	73.1	105	40	3.17		8	19	8	4
1919.....	77.4	104	41	2.86		6	22	8	1
1920.....	72.3	102	45	4.22		9	19	9	3
1921.....	77.9	104	41	2.53		7	19	9	3
1922.....	71.5	98	40	6.31		11	14	12	5
1923.....	76.5	102	47	1.75		5	19	9	3
1924.....	70.2	99	41	3.67		9	16	11	4
1925.....	74.1	105	40	2.66		8	19	10	2
1926.....	74.8	109	38	3.72		10	15	10	6
1927.....	72.9	102	45	1.96		7	18	10	3
1928.....	73.9	98	43	4.43		8	18	10	3
1929.....	74.1	98	43	4.31		9	16	10	5
1930.....	77.9	112	40	1.49		4	21	8	2
1931.....	77.2	109	42	2.72		6	20	8	3
1932.....	75.8	106	40	3.12		7	20	8	3
1933.....	76.1	105	46	3.45		7	19	9	3
1934.....	79.7	118	40	3.85		10	17	10	4
1935.....	79.4	107	51	3.35		7	19	10	2
1936.....	83.4	117	43	0.51		3	23	7	1
1937.....	75.9	107	46	2.63		7	18	10	3
1938.....	76.5	107	48	4.24		10	18	10	3
1939.....	76.2	113	48	3.15		7	19	9	3
1940.....	76.7	110	42	4.57		7	18	10	3
1941.....	75.1	106	45	2.24		7	16	12	3
1942.....	74.3	105	42	4.89		10	16	12	3
1943.....	75.4	98	47	4.56		10	17	12	2
Period.....	74.7	118	35	3.68		8	18	9	4

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

along its front. A cold front in the low pressure trough then moved across the State from west to east, causing additional showers in some sections. During the next 5 days, air masses of both polar and tropical origin were present over Iowa and showers occurred in some portion of the State each day, along

CLIMATOLOGICAL DATA FOR JULY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy			Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54	75.6	+ 2.8	94	12†	53	1	4.87	+ 1.19	1.13	31	0	12	17	12	2	se.	D. E. Hadden
Alton	Sioux	1,305	39	74.9	+ 1.9	94	28	53	1	3.82	+ 0.44	1.00	13	0	11	13	17	1	s.	W. S. Slagle
Cherokee 1½NW	Cherokee	1,358	24	74.3	+ 2.1	93	12†	53	14	5.18	+ 0.73	3.13	19-20	0	10	22	8	1	s.	J. Earl Wirth
Eatherville	Emmet	1,298	50	73.8	+ 1.0	93	12†	54	1†	6.50	+ 2.91	1.07	28	0	13	14	14	3	se.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	76.2	+ 3.4	98	12	54	14	5.90	+ 2.45	2.25	19	0	8	18	4	9	s.	Earl V. Slife
<b>Inwood 2½SW</b>																				
Lake Park	Lyon	1,474	41	75.2	+ 2.6	96	12	53	1†	3.36	+ 0.14	1.10	19	0	7	22	6	3	s.	A. C. Hanson
Le Mars	Dickinson	1,479	41	73.4	+ 1.3	92	26	54	1†	4.80	+ 1.48	2.27	18	0	10	20	8	3	sw.	Frank O. Rood
Pocahontas	Plymouth	1,230	57	75.6	+ 2.7	96	28	53	14	5.30	+ 1.56	1.40	16	0	7	18	9	4	s.	D. N. Zeig
Primghar	Pocahontas	1,228	40	74.2	+ 1.2	93	12†	54	1	4.13	+ 0.77	1.10	5	0	11	15	14	2	s.	Wilbern L. Boyd
Rock Rapids	O'Brien	1,517	17	74.8†	+ 2.4	96	28	52	14	4.51†	+ 1.01	1.27	4†	0	11	16	5	10	se.	Scott King
<b>Rock Rapids</b>																				
Sanborn	Lyon	1,341	47	74.4	+ 2.4	94	26†	52	1	3.90	+ 0.30	1.78	4-5	0	9	14	11	6	s.	George Raveling
Sheldon	O'Brien	1,552	31	74.0	+ 1.6	95	28	51	1	7.29	+ 3.57	3.39	2-3	0	12	7	18	6	w.	Susie O. Dow
Sibley	O'Brien	1,418	38	73.6	+ 1.2	93	28	52	1†	5.22	+ 1.77	1.81	4	0	12	18	11	2	s.	Ross E. Forward
Sioux Rapids	Osceola	1,494	9	73.0	+ 2.0	93	26†	50	14	5.04	+ 1.68	2.10	18	0	12	23	4	4	s.	R. D. Stewart
Spencer	Buena Vista	1,275	74.8	+ 1.2	95	12†	51	18	4.72	+ 1.32	1.42	19	0	11	20	10	1	1	s.	Walter A. Simonsen
<b>Storm Lake 1½N</b>																				
West Bend	Clay	1,319	36	75.2	+ 1.6	96	12†	54	14	5.31	+ 2.46	1.49	19	0	10	18	10	3	sw.	E. W. Little
Means and extremes	Buena Vista	1,455	54	74.4	+ 1.1	92	24	50	5	6.12	+ 2.71	1.72	19-20	0	13	11	13	7	s.	Paul B. Vance
	Palo Alto	1,197	57	73.8	+ 0.7	91	23	53	14	4.83	+ 1.65	1.15	16	0	12	20	8	3	sw.	Jos. Dorweiler
				74.5	+ 1.8	98	12	50	5†	5.08	+ 1.60	3.39	2-3	0	11	17	10	4	s.	
<b>North Central Dist.</b>																				
Algona	Kossuth	1,200	83	74.4	+ 1.2	92	26	54	1	5.73	+ 2.81	1.33	28	0	15	19	11	1	se.	Harry B. Nolte
Allison	Butler	1,060	30	75.4	+ 2.9	94	12	52	1	3.58	+ 0.18	0.96	19	0	6	21	8	2	s.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	73.2	+ 0.1	92	13†	53	1	7.13	+ 3.73	2.54	2-3	0	13	17	9	5	sw.	Wilbur Fox
Belmond	Wright	1,175	35	74.0	+ 0.6	94	12	54	15†	6.82	+ 2.90	2.60	31	0	8	15	14	2	sw.	W. H. Dempsey
Britt	Hancock	1,240	59	74.4	+ 1.8	94	12†	53	1	7.41	+ 3.97	2.45	31	0	9	15	13	3	s.	L. M. Naser
<b>Charles City</b>																				
Dakota City	Floyd	1,013	69	73.8	+ 1.5	93	12	54	1	3.52	+ 0.25	1.33	24	0	9	18	7	6	s.	U. S. Weather Bureau
Forest City	Humboldt	1,133	60	74.2	+ 0.4	92	12†	55	1†	3.17	+ 0.18	1.05	5-6	0	8	19	10	2	s.	H. S. Brandsgard
Hampton 3NW	Winnebago	1,289	54	73.4	+ 1.2	93	12†	51	1	5.91	+ 2.56	1.89	29	0	11	9	18	4	se.	Dr. M. B. Neil
Mason City 3N	Franklin	1,142	53	74.6	+ 2.1	93	25	51	1	3.11	+ 0.24	1.25	3	0	9	22	8	1	sw.	E. A. Saxton
Northwood	Cerro Gordo	1,148	52	73.0	+ 1.4	92	12†	50	1	5.29	+ 1.79	1.46	28-29	0	13	18	9	4	se.	Amer. Crystal Sugar Co.
Osage	Worth	1,222	48	72.4	+ 0.7	90	13	52	1†	6.14	+ 2.68	1.28	3	0	16	15	14	2	sw.	Charles H. Dwelle
Means and extremes	Mitchell	1,170	59	73.6	+ 1.9	92	12†	52	1	5.15	+ 1.73	1.55	5	0	11	19	10	2	se.	Glen V. Yarger
				73.9	+ 1.3	94	12†	50	1	5.25	+ 1.73	2.60	31	0	11	17	11	3	s.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							5.32	+ 1.57	1.12	14	0	13	17	10	4	sw.	E. J. Cable
Cresco	Howard	1,298	7	73.1	+ 1.6	94	13	51	1	4.32	+ 0.62	0.93	29	0	11	16	13	2	e.	William C. Patterson
Decorah 2S	Winneshek	880	61	71.8	+ 0.2	93	12†	48	2	3.06	+ 0.77	1.20	17	0	11	11	19	1	sw.	Mrs. Fleta M. Rose
Delaware 1½W	Delaware	1,088	65	74.8	+ 2.1	93	13†	52	1	2.73	+ 0.78	1.03	16	0	8	21	8	2	sw.	Clair E. Paris
Dubuque	Dubuque	642	93	76.6	+ 2.5	94	13	55	1	2.71	+ 1.23	0.84	28-29	0	9	11	13	7	s.	U. S. Weather Bureau
<b>Elkader</b>																				
Fayette	Clayton	772	52	72.9	+ 0.2	93	13	50	2	2.88	+ 1.16	0.90	16-17	0	9	18	11	2	e.	W. H. O'Brien
Guttenberg	Fayette	1,009	56	73.9†	+ 1.2	93	9	50	23	2.20†	+ 1.91	0.64	10	0	5	20	10	1	s.	John P. Clyde
Independence 1½W	Clayton			77.2	+ 4.8	95	13	58	1	2.84	+ 0.91	1.20	17	0	9	14	12	5	sw.	U. S. Engineers
New Hampton	Buchanan	956	84	74.5	+ 1.1	94	13	49	1	3.72	+ 0.06	1.11	16	0	10	15	15	1	sw.	August Bracht
Oelwein	Chickasaw	1,161	47	74.0	+ 1.9	93	13	52	1	4.23	+ 0.67	1.27	16-17	0	9	22	7	2	nw.	C. Maas
<b>Postville 5SW</b>																				
Waterloo	Fayette	1,036	22	74.4	+ 1.4	98	13	48	1	3.88	+ 0.27	1.25	28	0	7	24	4	3	sw.	John T. Ridler
Waukon	Clayton	1,130	53	71.6	+ 1.4	89	13	51	1	3.92	+ 0.30	0.94	14	0	12	18	13	0	sw.	V. H. Williams
Waverly 1W	Black Hawk	848	62	75.0	+ 1.2	95	13	52	1	4.40	+ 0.65	1.02	25	0	10	18	12	1	sw.	Ralph B. Slippy
Means and extremes	Allamakee	1,287	9	72.3	+ 0.2	90	12	50	1†	4.45	+ 0.65	1.81	16-17	0	13	27	3	1	sw.	Mrs. Albert S. Tousley
	Bremer	935	55	74.0	+ 1.4	92	12†	49	1	6.40	+ 2.58	2.05	16-17	0	9	18	13	0	se.	Charles W. Wile
				74.0	+ 1.4	98	13	48	1†	3.92	+ 0.07	2.05	16-17	0	10	18	11	2	sw.	
<b>West Central Dist.</b>																				
Audubon 2SW	Audubon	1,297	51	75.6	+ 2.2	94	10†	53	3	4.64	+ 1.12	1.85	24	0	9	16	14	1	se.	Geo. Kibby
Carroll	Carroll	1,280	58	75.0	+ 1.5	94	12†	55	1†	5.18	+ 1.89	1.18	14	0	10	12	14	5	se.	Ben H. Schenkelberg
Cushing 2½NE	Ida	1,350	10	74.4	+ 1.9	93	12†	53	14	3.94	+ 0.44	1.18	19	0	12	21	7	3	s.	H. P. Lasher
Denison 2S	Crawford	1,307	60	74.7	+ 1.3	95	12	55	1†	5.43	+ 2.07	2.00	14	0	10	18	11	2	se.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	74.9	+ 1.3	93	12†	55	1†	3.60	+ 0.07	1.30	24	0	8	21	8	2	s.	Wilbert Shaw
<b>Harlan</b>																				
Jefferson	Shelby	1,210	52	75.4	+ 2.1	94	12	55	14†	5.09	+ 1.41	1.44	16	0	9	19	10	2	s.	Elmer Buss
Lake City	Greene	1,055	52	74.8	+ 2.0	93	13	55	14	6.38	+ 3.03	1.63	14	0	8	19	8	4	sw.	Will I. Lyon
Little Sioux	Calhoun	1,238	8	75.0	+ 1.8	94	28	55	1†	5.33	+ 1.86	1.89	20	0	10	22	6	3	sw.	Frank A. Taylor
Logan	Harrison	1,040	43	77.0	+ 2.4	95	12†	53	14	4.79	+ 0.09	0.92	3	0	10	15	16	0	sw.	H. W. Kerr
Mapleton 5NW	Harrison	1,120	78	77.4	+ 2.9	97	12†	55	14	4.09	+ 0.59	1.04	19	0	10	9	22	0	se.	Miss Amy Ann Stern
<b>Missouri Valley</b>																				
Onawa	Woodbury	1,225	5	75.3	+ 2.1	96	13	53	14	5.32	+ 1.92	1.84	19	0	9	22	7	2	sw.	LeRoy Wasmund
Rockwell City	Harrison	1,069		77.0		95	12†	55	14	5.39		1.50	2-3	0	11	23	5	3	s.	S. Wm. Sorensen
Sac City	Monona	1,050	59	76.4	+ 2.8	97	12†	54	14	4.07	+ 0.51	1.20	19	0	10	22	8	1	s.	W. J. Oliver
Sioux City	Calhoun	1,226	57	75.2	+ 2.6	94	12†	55	1†	4.82	+ 1.16	1.84	20	0	10	21	8	2	sw.	F. C. Beitelspacher
Means and extremes																				





DAILY PRECIPITATION FOR JULY, 1943

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			.10									.62			.78			.16	1.14				.01				.58			T.	T.	3.39
Alta <sup>2</sup>	Raccoon			.03		1.05							.51		.10	.05			.87	.90				.01	.04		.04				1.13	4.87	
Alton	Floyd		.04	.03	T.	T.						1.00		.54		.91		.61					.02			.03	.02	.30		.32	3.82		
Cherokee	Little Sioux	T.	T.	.29	.04	T.						.71	.02	.54			1.91	1.22					.06				T.	.11	.28	5.18			
Estherville <sup>2</sup>	Des Moines	T.		.65	.36	T.	.46	T.				.63	.48	.03		.71				.15				1.06			.06	1.07	.51	.33	6.50		
Hawarden	Big Sioux		.04	.05								.58			1.38		2.25	.94					T.				.54			.12	5.90		
Inwood (near) <sup>2</sup>	Big Sioux					.07						.39		.90		1.10		.23									.24		.43		3.36		
Lake Park	Little Sioux		.06			.36	.10					.67		.55	2.27		.08	.09										.57		.05	4.80		
Le Mars	Floyd			.13								.91		1.40		1.05	.77						T.				.40			.64	5.30		
Milford <sup>2</sup>	Okoboji		.64	.15		.07	.15					.42		.48	1.54	.16	.77	.25					.06	.19				.57		.13	4.88		
Pocahontas	Des Moines			.45		1.10	.05					.15	.06	.91		.50	.70										.05	.09	T.	T.	.07	4.13	
Primghar	Little Sioux		.22	.09	1.27	.15					1.27		.03	1.06	.03	.23	.13												.03			4.51	
Rock Rapids	Big Sioux		.10		1.69	.09	T.				.31		.96	.55	.10												.04	T.	T.	.06	3.90		
Sanborn	Floyd		3.31	.08	1.34	.16					.76		.41	.49	.22	.12							.09	.01			T.	.30	T.	.7.29			
Sheldon	Floyd		.60	.03	1.81	.13	.02					.85		.74	.52	.01	.54										.01	.02	.04	.05	5.22		
Sibley	Big Sioux	T.	.14		.72	.10						.61		.70	1.80	.30	.10	.08										.03	.21		.25	5.04	
Sioux Rapids	Little Sioux		T.	.32		.79	T.					.50		.73	.25	1.42	.31	T.									.08	.09	T.	.23	4.72		
Spencer	Little Sioux		.51			.68						.80	.15	1.06		1.49	.15	.20									.11	.16			5.31		
Spirit Lake SCS <sup>2</sup>	Okoboji		*	.38		.09	.80					.34		.97	T.	1.97	.35								.85		.05	.67	T.	.10	6.57		
Storm Lake	Raccoon		.27	.35	.60	.13	.02					.13		.50		.60	1.12									.15	.15			1.50	6.12		
Terril SCS	Little Sioux					.03	2.00					1.30		1.00		1.20	T.							.60			T.	.50		.40	7.03		
West Bend	Des Moines		.01	.45		.12	.94					.84		1.15		.50	.10	.01									.15	.28		.28	4.83		
<i>North Central District</i>																																	
Algona	Des Moines		.26	.63		.10	.04				.07		.92	.09	.63	.52	.34	.08	.27					.05				1.33		.40	5.73		
Allison	Cedar		T.	T.	T.	T.	T.					.60	.95	.12		.96	T.						T.	T.			.65	.30	T.		3.58		
Bancroft	Des Moines		1.17	1.37		.30	.30					.40	.50	.70	*	.85	.02						.07	T.			T.	*	1.45	T.	7.13		
Belmond	Iowa			.75								.28	.20	.42		.79	T.	.53									1.25		2.60	6.82			
Britt	Iowa		.72	.79	.02							.25	.45	T.	.09	1.42								T.			1.22		2.45	7.41			
Charles City <sup>1†</sup>	Cedar		.17	.12		T.	.02			T.		.54		.37	.49									1.33			.42	.06	T.		3.52		
Dakota City	Des Moines		.84		.85	.20					.12		.29		.59	.14							T.					.81	.04		.14	3.17	
Dumont (near)	Cedar		.47			T.					.42		.52		.79	.02								.03				.81	.04		.09	3.19	
Forest City <sup>2</sup>	Cedar		.39	.73	.02	.09	.02					.86		.33	1.49									.03			.06	1.89		.10	5.91		
Hampton	Cedar		1.25	.18		.14						.20		.05	1.02		.05											.10	.12		3.11		
Kanawha	Boone	T.	.95								.53		.31		.26	.40	1.06	.14	.51								1.07		1.10		6.33		
Mason City	Cedar		.18	.62		T.	T.				.30		.30	.58	.06	.10	1.18	.39	T.					.09			T.	1.11	.35	.03	5.29		
Mason City Apt. <sup>1</sup>	Cedar		.16	.36	T.		T.				.73		.93		.31	1.00		.01						T.		.06		.99	.04	T.	4.59		
Northwood	Cedar		.35	1.28		1.23	.02					.32	.33	.02	.73	.45	.40		.05					T.	.02		.13	.43	.36	.02	6.14		
Osage	Cedar		.41	.85		1.55					.14		.68		.09	.20	.48							.09				.39	.27		5.15		
<i>Northeast District</i>																																	
Cedar Falls	Cedar		.19			T.	.12					1.12	*	.76		.60	.03						*	.72	1.10			*	.49	.19	5.32		
Cresco	Turkey		.20	.08	T.	T.		.05	.70			.62	.12	.69	.45									.09		T.		.39	.93		4.32		
Decorah <sup>2</sup>	Mississippi		.17	.15	.03	.05						.40		1.20	.15									.05	.03		.09	.74			3.06		
Delaware (near)	Maquoketa			.42				.40				.23	1.03		T.									.03		.12	.45	.05			2.73		
Dubuque <sup>1†</sup>	Mississippi		.10		.62	.03	T.					.17	.78										T.	.01		.16	T.	.17	.67		2.71		
Dubuque LD 11 <sup>2</sup>	Mississippi	T.	.09		.18	.01						.18	.01	.97										.20	T.		.03	.82			2.49		
Elkader	Turkey		.05		.28			.37	T.	.05		.43	.70	.20	T.		.12						T.	T.	T.	T.		.43	.37		2.88		
Fayette	Mississippi							.64					.60			.02												.32	.52		2.20		
Guttenburg LD 10 <sup>2</sup>	Mississippi					T.	.39	.01				.03	.28		1.20	.02								.02	.04		T.	.85			2.84		
Independence	Wapsipinicon		.05									.40	.86	.25	.25									.84	.05		.48	.42	.12		3.72		
Lansing <sup>2</sup>	Mississippi		.02	.09	.04	1.86	T.					.27		1.22		.02								.19			.19	.34			4.24		
New Hampton	Wapsipinicon		.39	T.								1.22	.76	.51	.45								*	.35		.25	.30				4.23		
Oelwein	Wapsipinicon								.25			.70	.95	.25	.28											.20	1.25				3.88		
Postville (near)	Mississippi		.51		.59	.09						.94	.32	.20	.14								.17	.10		.04	.36	.46			3.92		
Waterloo <sup>2</sup>	Cedar		.02	.02								.83	.10	.76	.43	.02								.35	1.02		.85				4.40		
Waukon	Mississippi		.24		.37	.33			.28	.02		.33	1.70	.11	.05								T.	.04		.48		.36	.14		4.45		
Waverly	Cedar		.67			T.						.72	1.92	.13	1.20	T.								.35	.53		.80	T.	.08		6.40		
Genoa, Wis. LD8	Mississippi			.11		2.34	.14					.19		1.13	.03									.36	1.67		.14	.25			6.36		
Lynxville, W. LD9	Mississippi			.20	.09	1.62	T.					.35		.62										.06			.32	.36			3.62		
<i>West Central District</i>																																	
Anthon (nr.) SCS	Little Sioux		.55									.45		.15		2.20	.50	.30									.20				4.35		
Audubon (near)	Nishnabotna		.25	T.								T.	.01	.55		.72	.18	.45					.02	1.85			T.			.61	4.64		
Carroll <sup>2</sup>	Raccoon		.51		.43	.03	.01					1.18	.99	.06	.79		1.14						.04								5.18		
Cushing (near)	Little Sioux		.15	.42	.01							.37	.01	.16		1.18	.44						.15	.05			.15	T.		.85	3.94		
Denison	Missouri		.49									2.00	.63		.55	.55	.33							.17	.55		.06		.10		5.43		
Denison SCS <sup>2</sup>	Missouri		T.	.53	T.							1.95	.60		.87	.75	.42						.15	.96		.05			.10		6.38		
Guthrie Center	Raccoon			.04		T.						T.	.08	.38		.62	.04	.20					T.	1.30			.42	T.	.60		3.60		
Harlan	Nishnabotna		.52	T.	.07							1.63																					

DAILY PRECIPITATION FOR JULY, 1943—Continued

Stations	Basin Drainage	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>Central District</b>																																	
Ames†	Skunk			.02	T.	.21	T.							.67		1.62	.20		1.30	.51	.03			.03	T.								3.58
Boone	Des Moines			.02	T.	.28	.01							.74		1.19	.14	T.	.68	.43	.10			.01								T.	3.29
Boone (rvr) <sup>2</sup>	Des Moines					.37	.25	.05						.80		1.10	1.25		.85		.55											T.	2.03
Des Moines††	Des Moines			T.	.03	.05	T.	T.						.42		1.00		.88	.02	.07	.02				.42					.34	T.	1.20	
Des Moines Apt.††	Des Moines		.02	T.	.22	T.	T.				.54			.11	T.	1.10		.80	.03	.08	.02				.35					.61			1.70
Dunbar (near)	Iowa			.08											1.38		.78		1.09	.18	.35				.21	.19			.23			.66	
Fort Dodge <sup>2</sup>	Des Moines			.13	.36	.49	.08	.07						.10		.20	1.14		1.20		.55	.02			.09				.24	.01		.03	
Grinnell†	Iowa			.20	.19	.45	T.							.46		1.28		1.03	.38	.47				.05	.16	.04			1.63	.02		.31	
Grundy Center	Cedar			.10		.03								.75		.80			.50														
Iowa Falls <sup>2</sup> †	Iowa			.21	.03						.03				.28		.02	1.90		.94		.15								1.56			.17
Marshalltown <sup>2</sup>	Iowa			.07		T.		T.						1.38		.22	1.26		.81		1.27				.02	.04			.36			.04	
Monroe	Des Moines		T.	T.		.73	.02							.29		1.73	T.		.69	.34	.03				.35				T.	.63		2.33	
Newton	Skunk			.71	.12	.36				T.				.17		1.12	.01		.36	.45	.27				.13					T.		1.85	
Perry	Raccoon			T.		T.	T.							.19		.62	.12		.73	.41	.02				.13	.52				.49		.65	
State Center	Iowa			.43	.12	.04	T.			.12				.78		1.85	.07		.75	.57	1.22				T.	.12			T.			4.23	
Toledo	Iowa			.08	.15	.16	T.							1.76		.77	.01		.77	.20	.18				.03	.54			1.59			.28	
Van Meter <sup>2</sup>	Raccoon		T.	T.		.15		.05						.08		.60	.02		1.02		.14				.98							3.04	
Wauke	Raccoon				.16										.48	.02		.64	.14						2.20					.55		1.14	
Webster City†	Boone			.03	.14	.16	.03							.22		.63	.36		.62						.04				.24			.86	
Webster City (rvr.) <sup>2</sup>	Boone			.06	.13	.07	.21	.03								1.31		.73		.36	T.				.06				.32			.15	
<b>East Central District</b>																																	
Anamosa	Wapsipinicon			.02	.24	T.	T.		.02					.19		.60	.02		.02	T.	T.			.03	.04				.20	.04		.06	
Belle Plaine	Iowa			.89	.10		T.		T.	.87				1.43		1.26			1.05	.14					.16	.05			1.06			.35	
Bellevue LD 12 <sup>2</sup>	Mississippi				.18		.07							.20		T.	.74								.06					.68			1.93
Cedar Rapids <sup>2</sup>	Cedar			.03	.67		T.							.64		.18	.41		.20		.03				T.				T.	.46		2.64	
Ced. Rap. (rvr.) <sup>2</sup>	Cedar			T.	.92									.63		.32	.35		.25		.03				T.	.02			.39			2.91	
Clarence	Wapsipinicon			.53							.77				.28		.54		.04		.03					T.	.19		.30	.07		.03	
Clinton	Mississippi			.40		.34								T.	.18		.47				T.				.02	.05		.33		.14	.44		2.37
Clinton (rvr) <sup>2</sup>	Mississippi			.38		.08	.32							.15		.46					T.				.08			.32		.56			2.35
Davenport††	Mississippi			.57	.03	T.	.16							.16		.18	.23		T.	T.						.17			.43			1.93	
Davenport LD 15 <sup>2</sup>	Mississippi			.58	.04	T.	.04							.13		.82	.20		T.	T.					.11				.35			2.27	
Iowa City†	Iowa			1.31	.03	.05		.04						1.06		.86			.29	.04	.01				.03				.37			.37	
Le Claire <sup>2</sup>	Mississippi			.34	T.		.05							.21		.35					T.					T.			.38			1.33	
Le Claire LD 14 <sup>2</sup>	Mississippi			.53	.17		.06							.23		.67	.23				T.					.01			.32			2.22	
Maquoketa	Maquoketa			.15		.65	T.							.25		.27											.08	.17				1.57	
Monmouth	Maquoketa		T.	T.		.14	.06				.38			.21		.41										1.23	.44		.14			T.	3.01
Muscatine	Mississippi			.72	.44	.02				.02				.23		.50			.14	T.						.27			.15			.26	
Muscatine (rvr.) <sup>2</sup>	Mississippi			.82	.15	.14	.23						.03	.31		.46			.28							.22			.13			2.77	
Muscatine LD 16 <sup>2</sup>	Mississippi			.91	.14	.11	.05						T.	.26		.37	.09		.06							.11			.11			2.21	
Vinton	Cedar			.03	T.		.03							.53		.91			.28	T.	.03					1.09	.06		.54			.33	
Williamsburg	Iowa			.02	1.30			.10						1.53		.87			1.22	.10					T.	.12			1.21			.27	
<b>Southwest District</b>																																	
Atlantic <sup>2</sup>	Nishnabotna		.06		.03		.20									T.	.17	T.		.54						1.65						2.73	
Bedford	102			T.	.10	1.94										.60			.20	.12						T.			T.	1.37		4.33	
Blockton SCS	Platte					.29										.67			.27	.69									.07		.20	.33	
Clarinda <sup>2</sup>	Nodaway		1.26			.38									.01	.33	T.		.21		.03	T.				.02			T.	.01	.32	2.57	
Clarinda Eros.†	Tarkio					.27								.02	.03		.49		.28							.03			.19		1.28	2.59	
Corning	Nodaway					.07										.63			.45	.39						.06			T.			1.60	
Cumberland (near)	Nodaway		T.			1.20	.06									.21			.92	.84	.10					.60			T.			3.93	
Emerson SCS <sup>2</sup>	Nishnabotna			T.		.13									.26	.16			1.07		.06					.01			T.	T.		.05	
Glenwood	Missouri		T.	T.	.03	T.	.05								.47	T.	.07		1.01		.21				.05			T.	.02	T.	1.30		
Greenfield	Nodaway		T.		T.	1.19	.04								T.	.62			.72	.05	.11				T.	1.02			T.		.48	4.23	
Oakland	Nishnabotna		.02		.57	.05										.35			1.00		.31					.60					.12	3.02	
Red Oak	Nishnabotna				.01	.07									.32	.47			.41		.01					.08			.01	.01	.20	1.59	
Red Oak (near)	Nishnabotna			T.		.07									.59		.47			.39						.02			.02	T.	.21	1.77	
Riverton	Nishnabotna			T.			1.43								T.	.02	.65			1.60		.10							.08	.10	.03	.46	
Shenandoah	Nishnabotna					.46									.11		1.74			.82									.10		.10	2.11	
Thurman	Missouri			.12		.34									T.	.06	T.	.40		1.50		.10							T.	.05	.05	2.62	
Omaha, Nebr.††	Missouri			.05	.71	T.	.01								.09		.18			1.14	.14	.84	.06			.45	.04		.13	.01	T.	.05	
<b>South Central District</b>																																	
Afton	Grand			T.	T.	.10											1.03		.43	.03						1.35				.63		3.57	
Albia	Des Moines		T.		.56	1.45									.24		1.30	.09		.73	T.					1.10	.07		.84			6.38	
Centerville†	Chariton			.38	.52	1.24	T.								.80		.58			.09							.58			T.	.18	.98	
Chariton	Chariton				.78									.16		1.67		.33									.20			.34		1.72	
Creston <sup>2</sup>	Platte		.03			T.	.07									.83			.89		.01						.72			T.		2.55	
Indianola	Des Moines				.10	.13									.07		1.27			.40		.04					.24			T.	1.20	T.	2.04
Indianola (nr.) <sup>2</sup>	Des Moines				T.	T.					T.				.16		1																

DAILY PRECIPITATION FOR JULY, 1943—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>Southeast District (Continued)</i>																																	
Donnellson <sup>2</sup>	Des Moines				1.80	.91									.18	.16	.06		.08						.48					.89	.45	5.01	
Eddyville <sup>2</sup>	Des Moines				.60	.38	T.							.25	2.00	.04		.65		T.				.45					.80	.05	5.22		
Fairfield	Skunk				.64	.20								1.15	2.06			.18	T.					.65				.02	1.18	.90	6.98		
Keokuk <sup>1</sup> †	Mississippi				.03	2.93	.58							.13	.52	.25	.15		T.					.40				.01	.70	.88	6.58		
Keokuk LD 19 <sup>2</sup>	Mississippi				1.72	1.32	.30							.10	.80	.34			.03					*	.34			.61			5.65		
Keosauqua	Des Moines				.75	1.65	.78							.40	.55			.12						.73				.07	1.14	.86	7.05		
Keosauqua (rvr.) <sup>2</sup>	Des Moines				.55	2.08	.20							.45	.35	.15		.13					T.	.86				1.36		6.13			
Mt. Pleasant	Skunk	T.			.55	.24	.95							.22	1.15			.30					.40					.60	.98	5.39			
Oskaloosa	Des Moines				.09	1.20	.18			T.	T.			.55	1.90			.70	.04					.77				T.	.64	.52	6.59		
Ottumwa†	Des Moines				.78	.69	.01							.87	.57			.26	.01					.95				.03	.47	.91	5.55		
Ottumwa (river) <sup>2</sup>	Des Moines				.66	.34	.60							.83	.45			.53						.68	.11			.47		4.67			
Sigourney	Skunk				1.08	.43				.03				.19	1.20			.57	.09				.46	.01				1.37	1.21	6.64			
Stockport	Skunk				1.39	.82								.18	.63			.31	T.					.79				.02	1.03	.87	6.04		
Wapello <sup>2</sup>	Iowa				.74	.16	.14	.05						.16	.65	.03		.05						T.	.05			.88		2.91			
Washington†	Skunk				1.64	.40								.30	.62			.52						.15				.67	.30	1.15	5.75		

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

<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.

<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.

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

† Interpolated

‡ Station is equipped with recording gage.

§ Precipitation included in next following measurement.

\*\*Incomplete.

SUPPLEMENTAL TABLE, JULY, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	17	3.39	- 0.21	1.14	20	0	7	22	4	5	s.
Cambridge 4 1/4 NW	Cass	1,225	45	3.93	+ 0.63	1.20	4	0	7	11	13	7	s.
Dumont 3 1/4 NW	Butler	998	9	3.19	- 0.66	0.81	28	0	9	11	18	2	s.
Dunbar 2 NE	Marshall	1,010	9	5.15	+ 1.35	1.38	14	0	10	19	12	0	sw.
Kanawha 1/4 S	Hancock	1,183		6.33	+ 2.93	1.10	30	0	10	12	9	10	sw.
Lake View	Sac	1,239	5	6.86	+ 3.44	2.31	31	0	11	17	9	5	w.
Melrose	Monroe	871	15	7.21	+ 3.41	2.40	16	0	8	13	14	4	ne.
Sloan	Woodbury	1,071		3.57		0.98	18	0	9				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

PRESSURE, WIND, HUMIDITY AND SUNSHINE AND DEGREE DAYS, JULY, 1943

Stations	Sea-level pressure, extremes— inches				Wind†				Relative Humidity				Percentage of sunshine	Degree Days
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	7:30 A. M.	9:30 A. M.	12:30 P. M.	3:30 P. M.		
Burlington	30.30	1	29.71	29	6.3	29	w.	29	81	86	54	56	75	0
Charles City	30.21	18	29.71	28	4.7	22	se.	28		72			71	1
Davenport	30.23	18	29.68	29	6.8	34	sw.	29	83	84	54	54	76	0
Des Moines	30.23	1	29.65	29	7.4	32	w.	24	82	88	60	59	80	0
Dubuque	30.29	1	29.67	29	4.7	26	n.	29	78	80	51	54	81	0
Sioux City	30.18	17	29.65	28	8.6	34	nw.	20	84	88	58	58	78	0
Omaha, Nebr.	30.17	17	29.64	28	9.1	36	s.	18	81	85	57	55	84	0
State	30.30	1	29.64	28	6.8	36	s.	18	82	85	56	56	78	1
Normals and Records	*30.47	7	§29.20	9	7.3	†73	n.	19		78	52	57	76	
		1892		1926				1936						

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

§ Sioux City † Omaha \* Davenport

SOIL TEMPERATURES AT AMES, IOWA, JULY, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	65.2	68.1	74.3	74.0	68.3		
Average 12 noon	80.1	84.5	75.0	73.3	68.8		
Average 7 p. m.	81.8	88.5	82.4	74.7	68.9	62.5	59.0
Highest	92	96	90	80*	72	65	61
Date	12†	8, 27	27	27, 30	28-31	30	25-31
Lowest	53	60	66	67	66	60	56
Date	2	1	1	1	1-8	1	1
Number of days with temperature							
50° or higher	31	31	31	31	31	31	31
60° or higher	31	31	31	31	31	31	13
90° or higher	5	16	1	0	0	0	0

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

the fronts where the air masses of different properties met. There was considerable wind and hail damage in the northwest portion on the 20th. The showers were heaviest and most general in the west central and central districts. From the 14th through the 20th, temperature readings were mostly near or below normal. From the 22d until the end of the month, readings were again mostly above normal with many stations recording monthly maximum readings on the 23d, 26th and 28th.

Air masses of various types again alternated in dominating Iowa weather at frequent intervals during the last decade. Showers and local storms were widespread on the 24th, 28th and 31st. Most of these were caused by frontal activity between the various air masses but lack of space prevents description of each separate occurrence. However, a more detailed account of the damaging storms will be found in the regular storm table and storm notes that appear elsewhere in this publication.

On the whole, the month was favorable for agriculture. The steady improvement in the condition of the corn crop that

began about the middle of June continued through July and as of August 1 the U. S. Department of Agriculture estimated a yield of 565,136,000 bushels, or 52.0 bushels per acre. This is 6.0 bushels per acre more than was indicated for July 1, and will be the second largest crop of record if the prospective yield is realized. Had the weather in May and early June been as favorable as in 1942, and then been followed by this favorable July, a new record yield would almost surely have been the result.

Soybeans also made good to excellent progress and the indicated condition of 93 per cent on August 1 forecasts a greater yield than last year providing the same proportion of the acreage is harvested for beans.

Harvesting of oats generally made good progress, although heavy dews, high humidity and frequent showers hampered combining and much of the grain was shocked until it was sufficiently dry to thresh. There was some damage to shocked grain by storms and mildew. Nevertheless, the Department of Agriculture estimated a yield of about 39 bushels per acre, as high as last year, but the total crop will be somewhat smaller due to a 2 per cent lower acreage.

Hay cutting made good progress in drier sections of the State and between showers in the wet areas. A total production of 5,270,000 tons was indicated on August 1.

Flaxseed was estimated at 12.5 bushels per acre or a total yield of 3,762,000 bushels, exceeded only in 1941 when the yield per acre was higher.

Hemp, sugar beets, wheat, barley, sweet corn, potatoes, tomatoes and all sorts of garden truck followed the trend indicated above and except where ruined by hail or other local storms, promised large yields, except that in some sections potatoes rotted in the ground. Berries and fruits were short.

Storm damage was very great in some sections but the total crop loss from this source remains small in comparison with the total value of all Iowa crops.

S. E. D.

**TEMPERATURE**

The average July temperature for Iowa, obtained from the averages of nine districts of nearly equal area, which in turn were derived from the averages of 121 temperature observing stations, was 75.4°. This was 0.7° higher than the all-time July average for the entire 71 years of record. It was warmest in the extreme southwest and extreme southeast counties and coolest in the northeast. Only 3 stations reported averages below the adopted July normals. In general the temperature was nearest to the seasonal normal in the central district, while the greatest excess was in the west central section. The highest station mean was 79.0° at Keokuk, while the lowest was 71.6° at Postville (near). The average number of days with readings of 90° or higher was 10, but there were no readings of 100° or higher.

The highest observed was 98°, on the 12th, 13th, 23d, and 28th, the record being shared by 6 stations. The lowest reported was 47° at Anamosa and Monmouth on the 1st.

**PRECIPITATION**

The average total precipitation for July, computed from the averages of the nine climatological districts of approximately equal area, was 4.56 inches. Measured totals from 124 stations were used in arriving at the average which was 0.88 inch above the 71-year value. There have been 17 wetter Julys during the period of record. In general it was wettest in a broad area extending from northwest to southeast and was driest in the southwest and east central districts. The greatest total was 10.30 inches at State Center, while the least was 1.33 inches at the Le Claire river station. The greatest 24-hour fall was 4.23 inches, on the 31st, at State Center. The average number of days with measurable precipitation was 10.

**MISCELLANEOUS PHENOMENA**

- Aurora*: None.
- Corona*: None.
- Fog, heavy*: 7th, 14th, 24th.
- Fog, light*: 4th, 5th, 6th, 7th, 10th, 15th, 19th, 25th, 29th.
- Hail, heavy*: 18th, 31st.
- Hail, light*: 4th, 18th, 21st, 23d, 24th, 27th, 28th, 29th, 31st.
- Thunderstorms*: 2d, 3d, 4th, 5th, 9th, 10th, 11th, 13th, 14th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 24th, 26th, 27th, 28th, 29th, 30th, 31st.
- Wind damage*: 18th, 19th, 20th, 24th, 28th, 29th, 31st.

**ERRATA**

Report for May, 1943. Page 50, Onawa, number of days with 0.01 inch or more of precipitation published 10, should be 14; Sac City, mean temperature published 57.1°, should be 57.2°; departure published -1.8, should be -1.7. Page 51, Vinton, number of days with 0.01 inch or more of precipitation published 13, should be 12. Page 56, Sac City, mean maximum temperature published 69.1°, should be 69.0°.

Report for June, 1943. Page 63, Vinton, date of greatest 24-hour precipitation published 15 should be 16; Bedford, monthly mean temperature published 71.6 should be 71.8; departure published +1.1, should be +1.3. Page 69, Bedford, minimum temperature on 8th published 43, should be 50; mean minimum published 62.4, should be 62.6.

Report for May, 1943, page 52, and report for June, 1943, page 64. Near bottom of each page after name of station, Onawa, add reference mark 2, indicating that precipitation is for 24 hours ending in the morning.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR JULY, 1943 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames.....	{Evaporation.....	.250	.293	.144	.187	.138	.159	.242	.246	.218	.276	.306	.340	.391	.272	.322	.240	.259	.296	.292	.238	.190	.267	.189	.221	.210	.295	.299	.269	.232	.288	7.821†	
	{Wind Movement...	.59	.63	.43	.19	.47	.41	.44	.11	.5	.22	.32	.49	.91	.35	.36	.48	.34	.44	.48	.56	.85	.31	.46	.67	.18	.32	.37	.57	.39	.30	.85	1.354
Cherokee	{Evaporation.....	.169	.181	.112	.322	.147	.289	.183	.183	.390	.279	.311	.416	.306	.223	.279	.257	.230	.200	.188	.339	.259	.234	.231	.215	.206	.344	.252	.255	.219	.261	.274	7.754
	{Wind Movement...	.69	.80	.51	.25	.62	.81	.43	.8	.24	.23	.58	.93	.103	.63	.61	.58	.24	.92	.50	.37	.80	.29	.97	.10	.14	.81	.59	.72	.11	.28	.68	1.660
Clarinda..	{Evaporation.....	.221	.234	.179	.277	.353	.230	.220	.197	.384	.152	.310	.372	.320	.258	.273	.251	.482	.102	.311	.325	.248	.297	.269	.351	.227	.283	.214	.347	.320	.130	.307	8.444
	{Wind Movement...	.68	.78	.59	.43	.84	.51	.34	.7	.12	.14	.32	.70	.77	.41	.39	.63	.39	.44	.45	.102	.42	.21	.33	.35	.32	.27	.31	.61	.34	.22	.61	1.401
Ia. City...	{Evaporation.....	.214	.299	.258	.272	.135	.176	.227	.204	.199	.228	.170	.258	.284	.348	.234	.218	.256	.236	.209	.150	.205	.221	.226	.158	.206	.240	.242	.180	.227	.212	.137	6.829
	{Wind Movement...	.34	.44	.36	.34	.24	.28	.36	.18	.9	.7	.8	.22	.32	.43	.16	.44	.37	.25	.30	.14	.33	.21	.27	.22	.18	.18	.19	.30	.28	.13	.28	.798

For precipitation and temperature data, see tables on other pages of this publication.  
 †Monthly total evaporation includes interpolation for missing days. \*Included in following measurements.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JULY, 1943

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>Northwest District</i>																																
Alta.....(Maximum.....	79	83	83	90	80	82	87	91	92	91	90	94	93	85	89	90	89	84	84	84	86	85	92	91	89	93	88	94	89	92	93	88.1
Alta.....(Minimum.....	53	58	66	64	63	63	61	61	64	64	65	63	67	54	58	69	56	61	58	61	68	58	65	69	67	67	66	66	67	67	67	63.1
Alton.....(Maximum.....	77	82	79	85	82	81	83	87	88	87	89	93	90	83	85	85	82	87	88	90	85	84	92	87	91	93	87	94	87	88	91	86.5
Alton.....(Minimum.....	53	60	67	62	65	58	60	60	62	64	61	68	64	54	59	69	57	63	62	66	69	57	66	72	66	67	65	68	65	68	65	63.3
Cherokee.....(Maximum.....	77	83	79	85	81	79	83	88	89	89	88	93	91	84	87	88	83	86	87	81	83	82	89	88	89	93	85	92	88	89	91	86.1
Cherokee.....(Minimum.....	54	59	65	62	63	56	59	61	61	64	63	67	65	53	59	68	55	60	61	64	67	57	65	69	66	66	66	67	64	66	67	62.5
Estherville.....(Maximum.....	76	76	79	86	81	78	85	89	90	90	88	93	90	84	85	87	83	85	88	83	85	83	89	88	91	93	84	91	88	91	88	86.0
Estherville.....(Minimum.....	54	59	65	63	64	60	60	61	62	64	63	65	66	54	57	65	55	57	60	64	67	55	60	64	63	68	65	61	65	63	65	61.7
Hawarden.....(Maximum.....	78	87	83	90	84	84	88	92	94	91	93	98	93	87	89	85	86	90	91	87	87	83	95	91	92	95	89	95	89	96	89.4	
Hawarden.....(Minimum.....	55	61	64	62	63	57	58	60	62	63	60	71	66	54	60	67	57	62	61	62	67	57	67	67	73	66	68	65	68	65	66	63.1
Lake Park.....(Maximum.....	75	77	78	84	76	77	83	85	87	87	86	91	88	83	83	83	81	83	86	82	79	81	90	85	90	92	83	90	85	88	89	84.1
Lake Park.....(Minimum.....	54	59	65	63	64	61	59	62	63	65	64	66	65	54	59	65	55	60	59	64	67	57	64	66	64	70	66	63	65	66	69	62.7
Le Mars.....(Maximum.....	80	85	81	88	84	83	88	90	91	90	91	95	92	86	87	87	86	88	89	84	85	84	93	90	92	93	87	96	87	90	94	88.3
Le Mars.....(Minimum.....	54	59	65	62	64	57	58	59	64	64	62	70	63	53	62	68	55	63	62	63	67	56	66	70	67	69	65	68	65	64	62.8	
Pocahontas.....(Maximum.....	77	85	78	87	80	78	86	88	90	89	93	93	83	86	89	82	84	82	80	82	82	87	91	90	92	84	93	86	90	88	86.0	
Pocahontas.....(Minimum.....	54	56	61	62	60	62	58	60	60	65	61	67	67	55	58	67	56	60	59	64	71	55	62	71	67	67	67	64	68	67	67	62.5
Rock Rapids.....(Maximum.....	76	78	81	85	80	79	83	87	88	89	88	93	86	84	85	82	81	86	93	82	82	82	92	87	91	94	84	92	88	90	84	85.9
Rock Rapids.....(Minimum.....	52	59	66	63	63	58	60	62	63	63	61	67	65	55	57	67	55	60	60	66	67	55	65	71	65	69	67	67	65	67	69	62.9
Sioux Rapids.....(Maximum.....	77	82	81	86	83	79	86	90	91	91	89	95	95	84	87	90	84	86	89	89	85	83	91	92	92	95	93	95	94	91	90	88.2
Sioux Rapids.....(Minimum.....	54	58	65	61	61	60	60	60	60	62	59	65	69	53	55	66	55	51	59	64	67	55	63	69	66	62	63	64	66	65	65	61.4
Spencer.....(Maximum.....	78	79	80	86	83	80	86	91	90	91	89	96	92	86	86	88	84	85	90	87	87	85	92	92	90	96	89	96	93	90	91	88.0
Spencer.....(Minimum.....	56	59	65	63	62	60	59	61	62	65	62	67	66	54	58	66	54	60	60	64	67	56	64	68	63	66	66	66	67	66	67	62.5
<i>North Central District</i>																																
Algona.....(Maximum.....	75	81	78	86	80	70	84	88	90	91	87	91	91	85	84	82	83	84	87	81	83	82	85	88	89	92	86	91	87	91	85	85.3
Algona.....(Minimum.....	54	58	65	65	62	64	60	62	63	67	64	66	68	57	60	65	58	60	60	69	69	57	62	67	67	68	67	63	67	64	67	63.4
Bancroft.....(Maximum.....	76	76	79	85	80	70	84	88	89	91	88	91	92	83	84	87	82	83	87	85	82	82	84	88	90	92	87	89	87	89	90	85.4
Bancroft.....(Minimum.....	53	55	63	63	63	64	60	62	59	65	63	65	64	54	57	64	56	57	58	68	58	58	58	68	65	65	64	53	65	65	63	61.1
Belmond.....(Maximum.....	76	85	76	86	81	79	81	89	91	91	92	94	92	87	85	86	82	85	85	84	82	82	86	91	91	93	88	90	89	89	86	86.3
Belmond.....(Minimum.....	58	55	68	61	62	63	60	58	62	65	60	65	69	58	54	66	57	54	59	65	55	59	59	69	66	62	67	62	66	61	64	61.6
Britt.....(Maximum.....	78	81	76	87	82	79	85	89	91	91	90	94	93	84	86	88	83	86	86	87	82	82	86	90	94	86	90	87	91	87	86.5	
Britt.....(Minimum.....	53	55	64	61	63	62	61	61	63	67	63	66	67	54	57	65	57	59	59	67	67	58	61	70	68	64	66	61	66	62	66	62.4
Charles City*.....(Maximum.....	75	85	76	85	82	76	83	87	89	90	90	93	93	80	86	82	81	84	83	81	83	80	83	88	89	89	85	85	84	87	85	84.5
Charles City*.....(Minimum.....	54	54	64	64	65	64	63	61	64	67	66	68	68	60	60	67	60	60	61	67	60	58	61	69	69	67	65	63	63	61	67	63.2
Dakota City.....(Maximum.....	76	83	76	85	80	77	85	87	89	90	88	92	92	83	85	87	82	84	86	84	83	82	85	89	88	91	85	92	86	89	85	85.4
Dakota City.....(Minimum.....	55	56	65	63	63	62	60	62	63	67	62	62	70	55	58	66	58	59	61	66	66	56	60	68	68	69	65	64	69	66	67	62.9
Mason City.....(Maximum.....	75	82	74	85	81	78	84	88	89	89	89	92	92	80	84	84	79	85	83	80	82	80	82	90	89	91	85	85	85	86	85	84.3
Mason City.....(Minimum.....	50	53	66	61	65	62	61	59	62	64	63	66	70	56	55	65	57	57	57	60	68	56	58	68	67	65	66	60	65	59	68	61.8
Northwood.....(Maximum.....	73	78	70	82	78	75	82	85	88	89	87	89	90	79	82	82	80	82	80	79	80	79	81	86	88	89	87	82	83	84	89	82.5
Northwood.....(Minimum.....	52	52	65	63	63	62	61	62	65	67	65	66	67	56	58	65	57	59	58	66	66	58	58	67	68	65	66	60	63	59	69	62.2
Osage.....(Maximum.....	74	80	72	86	80	76	84	84	90	89	89	92	91	86	85	85	87	84	92	82	83	81	83	90	91	90	86	86	86	89	85	85.1
Osage.....(Minimum.....	52	54	64	64	66	63	60	62	64	65	65	65	62	57	61	65	59	57	59	65	66	57	58	67	67	65	67	61	63	58	65	62.0
<i>Northeast District</i>																																
Decorah.....(Maximum.....	74	82	79	83	84	76	83	88	90	89	92	93	93	85	87	81	82	86	84	85	84	81	82	88	89	89	87	81	85	88	88	85.1
Decorah.....(Minimum.....	49	48	60	66	65	64	57	55	60	60	61	61	64	56	51	57	59	54	57	61	64	51	52	63	66	60	65	54	58	59	58.5	
Delaware (near).....(Maximum.....	74	82	87	87	87	77	80	88	86	89	88	92	93	83	85	83	89	84	86	86	88	78	83	88	92	93	92	84	84	90	82	85.8
Delaware (near).....(Minimum.....	52	54	65	67	64	65	63	61	66	65	69	66	71	64	59	63	64	60	64	64	67	59	67	70	64	72	63	63	60	66	63.7	
Dubuque*.....(Maximum.....	75	84	89	87	87	76	84	88	89	88	88	92	94	83	87	85	82	88	85	86	88	81	85	89	92	93	92	84	85	90	84	86.5
Dubuque*.....(Minimum.....	55	59	67	72	68	68	65	65	68	69	69	70	75	67	62	65	67	62	69	68	68	64	63	70	72	68	72	67	62	64	68	66.7
Elkader.....(Maximum.....	76	83	86	85	87	77	83	88	89	89	90	92	93	84	87	81	81	85	82	83	85	80	83	87	90	89	88	84	84	88	85	85.3
Elkader.....(Minimum.....	51	50	64	65	64	64	60	58	64	63	64	63	66	61	54	59	62	55	60	61	64	55	53	64	67	61	69	59	58	57	61	60.5
Fayette.....(Maximum.....	79	88	91	90	90	78	86	8																								

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JULY, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

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. †Interpolated.

TOTAL PRECIPITATION, JULY, 1943



NOTES CONCERNING STORMS OF JULY, 1943

The severe hailstorm and attendant small tornadoes and wind squalls on July 4 occurred under conditions similar to those that have been frequently described in connection with storm studies of the past few years. Previous to the storm the cold front in advance of a mass of Polar Continental air had moved southward to southern Iowa and had become stationary. The 7:30 p. m. surface map showed the front over the southern third of the State as weak, while a low pressure center appeared a short distance northeast of Omaha. Maritime Tropic air south of the front and Continental Tropic air to the southwest, flowing northward towards the low center and being lifted above the Continental Polar air mass, probably developed a local cold front aloft because of differing lapse rates. The consequent instability and violent convective currents that produced the heavy hail were the result of these converging winds.

A somewhat similar condition prevailed on the 18th at the time of the devastating Cherokee County hailstorm. The 7:30 p. m. weather map showed the center of a low pressure area along the Nebraska-South Dakota boundary, just west of where those States touch Iowa. A line of fronto-genesis crossed northern Iowa and the hailstorm occurred along this line. To the north the air mass consisted of Maritime Polar over Continental Polar, while to the south they were Maritime Tropic and Continental Tropic in character.

The storms of July 20 provided an unusually fine example of a small local air mass moving contrary to the general circulation and maintaining its identity for several hours. Again a mass of cold Polar Continental air moving southward came to a halt with the cold front over northern Iowa, changing to stationary. On the south side of the front Superior air overlay the warm Maritime Tropic mass. The dry Superior air aloft being lifted along the surface front, caused a local cold front

to develop, and move southeastward as a line squall. Although damage by the squall was confined to Plymouth County and adjacent areas, its effect on wind and temperature conditions was marked for a considerable distance. At Des Moines the arrival of the squall shortly after noon was marked by a sharp drop in temperature and a wind shift from southwest to northwest. Northerly winds and low temperature persisted for most of the afternoon, and further showers occurred as the Tropical air overran the local cold mass. At Webster City, arrival of the squall at 10 a. m. was attended by a temperature drop from 78° to 66°; at 9 p. m. the temperature was 69° but with the return of warm air it rose to 87° at 11 p. m. and then fell back to 74° at midnight. Similar, although less sharp, changes were reported from other stations. This squall resembled the one of June 24, described on page 72 of Climatological Data, Iowa Section, for June, 1943.

The rather widespread storms of the 28th-29th occurred south of an east-west front and near the center of a low pressure area, moving eastward across the State. Both the cold and warm air masses seem to have been quite moist, which contributed to the instability and caused strong convective air currents.

On the 31st the Boone County hailstorm and the excessively heavy rains and violent thunderstorms in other parts of central Iowa, occurred in advance of a warm front as Maritime Tropic air overran Continental Polar air. Both air masses were cold relative to the surface, which fact aided in developing convective currents and the condensation of vast quantities of water vapor added to the instability.

Space will not permit a more complete discussion of the circumstances of these and other less damaging storms but it is hoped these comments will provide sufficient information for further study at a later date.

S. E. DECKER.

IOWA STORMS, JULY, 1943

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons Injured	Estimated value of damage	Remarks
Lowlands along Little Sioux River	1-8		Flood							Flood waters due to heavy rains at close of June and early July overflowed lowlands along Little Sioux River, especially in Cherokee county.
Lyon Co., Rock and Liberal Twps.	4	6:00 p. m.	Hail, wind		NW to SE					Hail fell in two areas, one 3 miles long and 1½ miles wide, the other 8 miles long and 1 mile wide, causing some damage to crops; oats flattened, lodged and twisted; wind damage \$6,000 to buildings and \$5,000 to crops in Rock Twp. Other damage unestimated. This storm redeveloped with increased intensity as listed below.
O'Brien Co., Grant and Waterman Twps.; Sutherland	4	6:30 p. m.	Tornado, wind, hail	¼	NW to SE				15,000	Two clouds, one moving from southwest and one from northwest converged near Waterman and developed a funnel that traveled from northwest to southeast across Waterman township, causing \$300 loss. At the same time wind and hail caused considerable damage in Grant township and in other parts of Waterman township. The storm track continued into Buena Vista Co. as described below.
Cherokee Co.	4	Evening	Wind, rain							Strong wind caused scattered damage. Heavy rains eroded fields. At Larrabee, 1.75 inches of rain fell in 15 minutes.
Clay Co., Peterson Twp.; Buena Vista Co., Brook, Barnes, Scott, Fairfield Twps.	4	7:30 p. m.	Hail, wind, flood	1-5	W to E NW to SE	1			175,000	Wind caused damage of \$2,500 in a path 1 mile wide in extreme southwest Clay and extreme northwest Buena Vista counties. This track of destruction is probably a continuation of the Sutherland tornado, although the funnel cloud had disappeared. In Barnes and Scott Twps. of Buena Vista Co., in and near Linn Grove and Rembrandt, hail damaged crops, wind wrecked barns and other farm buildings and excessive rain caused flooding of fields. Similar conditions prevailed near Albert City in Fairfield Twp., Buena Vista Co.; crop damage by hail amounted to over \$100,000, flood loss \$20,000, wind damage to buildings \$10,000 and to crops \$25,000. Reports from Rembrandt stated severe windstorm high above earth with lower velocity near ground level.
Pocahontas Co., Marshall, Dover, Grant, Belleville and Lizard Twps.	4	7:30 p. m. 8:00 p. m.	Hail, wind, tornado	2-4	NW to SE	1½			75,000	The hailstorm in Fairfield Twp., Buena Vista Co., moved east across southern edge of Marshall Twp., Pocahontas Co., and then diagonally southeastward across Grant and Bellville Twps. in a path several miles wide. Crop loss ranged from 5% to 25%. In Lizard Twp. a small tornado 200 ft. in diameter wrecked a barn with loss of \$1,500.
Calhoun Co., Lincoln Twp.; Manson, Greenfield Twp., Webster Co.	4	8:40 p. m.	Hail, wind, rain	3	NW to SE	1¼			175,000	The storms listed above continued across northeast corner of Calhoun county in strip 10 miles long and 3 miles wide. Severe damage in 8 to 10 sections. 4 barns and house damaged by wind with loss of \$10,000. One report stated wind damage was by a tornado. Hail extended into Webster Co., but no details of damage were received. Heavy rain flooded fields and caused erosion loss. Total loss along entire storm path from Lyon to Webster Co. probably exceeded \$500,000.
Fremont Co., Taylor Co.	5	Early morning	Rain, wind		W to E					Hard rain washed fields and caused erosion loss. Tree limbs blown down and corn flattened by high wind.
Worth Co.	6		Flood							Excessively heavy rain reported to be 8.25 inches in 24 hours at Albert Lea, Minn., caused overflow on Shell Rock River north of Northwood. Hay fields and meadows flooded.
Appanoose Co.	7		Hail			½				Some damage by hail in scattered areas but no details are known.
Lowlands along upper Mississippi River			Flood						103,915	Floods in late June and early July caused damage on Iowa side of river amounting to \$103,915 from Genoa, Wis., to near Bellevue, Iowa, according to estimates of Weather Bureau Office, Dubuque, Iowa. Estimates of loss below Bellevue are not yet complete.
Jefferson Co., Fairfield	16	Early morning	Electrical							Slight damage by lightning and fire to home in Fairfield. Barn destroyed by lightning set fire, nine miles north of Fairfield.
Dickinson Co., Richland Twp.	18	5:00 p. m.	Hail		N to S					Hail caused some damage to crops in Richland Twp. Some scattered hail in other sections of county.
Clay Co., Clay Twp., Fostoria	18	7:00 p. m.	Hail, wind, rain		N to S					Hail fell in two strips, each ½ mile wide in Clay Twp. Corn, oats and soybeans damaged. Oats flattened by wind and rain in other parts of county. No estimates of damage were received but there were probably numerous small losses.
Cherokee Co., Liberty, Cedar, Sheridan, Cherokee, Pilot, Pitcher and Diamond Twps.	18	7:30 p. m.	Hail, wind, rain	2-5	NW to SE	1½			500,000	Heavy hail fell in an area 20 to 25 miles long and 2 to 5 miles wide, attended by strong winds and excessive precipitation. Corn, oats and soybeans were severely damaged, and some areas were a total loss. Heaviest loss occurred west of Cherokee and south of Aurelia. Average crop loss in 30 sections amounted to about \$15,000 each. Some buildings were damaged by hail and others by wind. It is possible a small tornado developed west of Cherokee. In other sections of county, heavy rain washed soil.
Sioux Co., Alton	18	Evening	Wind							Strong wind broke trees and flattened grain.



## IOWA STORMS, JULY, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Fremont Co., Riverton, Fisher, Manison and Locust Grove Twps.	19	1:00 a. m.	Hail, rain, wind		NW to SE	1½			100,000	Hail pounded crops in an area from 2 to 6 miles wide and over 10 miles long; heavy rain washed soil and wind blew down tree limbs, corn and damaged small buildings. There were apparently 2 separate areas of almost total loss but definite data are lacking. Estimates of damage range up to \$300,000 but it seems more probable that it ranged between \$100,000 and \$150,000.
Sioux Co., Hawarden; Plymouth Co., Akron, Brunsville, Le Mars, Elgin Twps. Woodbury Co., Sioux City; Cherokee Co., Marcus, Cherokee	20	10:00 a. m.	Wind, electrical		NW to SE			2	25,000	Severe wind squalls caused damage in scattered areas. At Hawarden, Akron and Sioux City and in some open country areas there was some damage to communication and power wires. Some trees uprooted and many limbs blown down. At Brunsville a number of empty steel Government grain bins were wrecked or damaged. Greatest loss occurred at Western Union College Airport at Le Mars where 4 planes were completely wrecked and 14 damaged more or less seriously with loss of \$8,000. At Le Mars about 550 town and 350 country telephones were out of order. Electric lines were down in parts of the county. Two percent of the corn crop was damaged in Elgin Twp. Some trees were uprooted and many branches blown down at Marcus, Cherokee Co. One man was slightly injured at Le Mars airport and a girl was stunned by lightning at Sioux City. Although there were no other reports of damage, this storm apparently traveled southeast, reaching Des Moines about noon.
Calhoun Co., Garfield, Center and Sherman Twps.	20	4:00 p. m. to 7:00 p. m.	Hail			1½			25,000	Hail fell at scattered points and damaged crops in 2 separate areas, each several miles wide. One area was about 8 miles long, from near Lytton, Sac Co., to near Lavina, Calhoun Co. The other about 10 or 12 miles long stretched from Pocahontas Co., just north of Pomeroy, to the north central portion of Center Twp.
Cass Co., Wiota, Norway Center	20		Hail							Scattered hail damaged crops at and near Wiota and Norway Center but no details of storm are known.
Pottawattamie Co., Keg Creek Twp.	23	11:00 p. m.	Hail, wind		NW to SE	1			25,000	Crops damaged by hail, in a few cases over 90%; wind damage to buildings \$500.
Cass Co., Atlantic, Wiota, Anita	24	12:30 a. m.	Wind, tornado, hail		NW to SE SW to NE				20,000	Wind damaged trees, telephone and power lines from Atlantic to Anita. Buildings on at least 6 farms damaged near Wiota. Most damage was by wind from NW but one observer reported damage to farm property by a tornado moving from SW to NE. Lightning also caused some damage at Atlantic. Crop loss was spotted but seems to have been heaviest SE of Wiota where hail fell in scattered areas.
Adair Co., Jefferson, Richland, Grove Twps.	24	Early a. m.	Wind, hail						5,000	The Pottawattamie-Cass Co. storms continued into Adair Co., causing scattered crop damage but few details are available.
Keokuk Co.	24	12:30 a. m.	Hail							Some scattered hail damage occurred shortly after midnight of the 23rd.
Emmet Co., Estherville, Center Twp.	24	5:00 a. m.	Wind, hail			½			5,000	Electric service interrupted at Estherville. Some uncut oats flattened and other crops injured in Center Twp. Scattered damage elsewhere in county.
Iowa Co., Marengo; Washington Co., Wellman, near Washington	28	10:30 a. m.	Wind	Narrow	NW to SE				20,000	A wind squall caused some damage to buildings and crops at intervals along a narrow path from Marengo to north of Washington. Greatest damage seems to have been at Wellman where the top of a water tower was blown off. Some trees were uprooted and falling limbs damaged wires.
Lyon Co., Lyon and Richland Twps.	28	10:00 p. m.	Hail, wind	½	NW to SE				20,000	Hail and wind damaged crops up to 10% in an area several miles long and ¼ to ½ mile wide.
Carroll Co., Newton Twp.; Dedham	28	9:30 p. m.	Hail, wind	3	NW to SE	2½		1	150,000	Heavy hail damaged roofs and broke windows, causing loss of \$50,000, to property in Dedham. Almost all north and west windows were broken by the hail which was driven by a strong wind. Some farm buildings were damaged by wind and crops were seriously injured in surrounding country, mostly in Newton Twp. along Brushy Fork, with loss of nearly \$100,000. The storm continued southeast into Guthrie Co. There was some evidence of a tornado.
Guthrie Co.; Dallas Co., southwest corner	28	10:30 p. m.	Hail, wind	2½	NW to SE	2			100,000	The Carroll Co. hailstorm traveled across Guthrie Co., diagonally from NW to SE with the greatest damage in Orange and Highland Twps. in the NW portion, between the Brushy Fork and Middle Raccoon rivers. As the storm moved southeastward the hailstones decreased in size and damage became less severe and rather spotted. About 30,000 acres were in the path of the storm with crop loss of from 5% to 50% of the crops, and it is estimated the yield of about 1,000 acres of corn were lost. The storm passed into Dallas Co. and no further reports of damage were received after it reached Dexter.
Warren Co., Indianola, White Oak Twp.	28	11:15 p. m.	Wind, hail						18,000	Scattered light wind damage occurred along a line from 6 miles north to 12 miles south of Indianola. In Indianola 8 Government-owned grain bins were damaged, a falling tree damaged a home and many tree limbs and wires were down. Hail damage to crops in White Oak Twp. amounted to \$5,000. The hail was probably a redevelopment of the Carroll-Guthrie Co. storm.

IOWA STORMS, JULY, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Monroe Co.; Appanoose Co.	28	11:00 p. m.	Wind, hail							Strong winds were reported in an area from Albia, Monroe Co., to the southeast corner of Appanoose Co., especially near Moravia and Udell. Hail fell in scattered areas but loss was not heavy. Only definite estimate of loss was \$1,500 at Moravia where a hatchery was unroofed and trees and wires blown down.
Jasper Co., Poweshiek, Mound, Prairie, Washington, Palo Alto, Buena Vista, Fairview, Elk Creek and Lynn Grove Twps.	28	11:00 p. m.	Hail, wind	3	WNW to ESE	1½			150,000	Hail fell in an area several miles wide, extending from west of Colfax east-southeast past Reasnor, Killduff, Sully, and Lynnville, attended by destructive winds. Hail damage was estimated as being \$125,000 or more and wind loss at \$25,000 or more. There were some evidences of a tornado near Colfax and southeast of Sully. At the latter point the destructive wind was reported to have come from the southwest. This appears to be a separate development and not a part of the Carroll Co. storm, although both were caused by the same conditions.
Poweshiek Co., southern fourth	28-29	Mdt. of 28th	Hail, wind		W to E				50,000	The Jasper Co. storm moved eastward across the extreme southern part of Poweshiek Co. causing considerable damage, especially at and near Montezuma. At least 3 barns were wrecked and many smaller buildings were destroyed or damaged. Hail was spotted with great loss in small areas and very little in others. Again, evidence of a tornado was not conclusive.
Keokuk Co., Prairie, Washington, Van Buren and Sigourney Twps.	29	3:00 a. m.	Hail, wind		NW to SE	1			95,000	Hail fell in an area 4 to 5 miles wide extending from the northwest corner of county southeastward to south of Sigourney. The roof was blown off the grandstand and other buildings were damaged at the Fair Grounds at What Cheer. Spotted damage occurred in other parts of county outside the main area. Wind damage was estimated at \$10,000 to crops and \$10,000 to buildings while hail damage to crops amounted to \$75,000.
Washington Co., English River Twp.	29	1:00 a. m.	Hail		NW to SE				50,000	Heavy hail fell in a small area in English River Twp. and scattered hail fell in other sections. Few details were received.
Winneshiek Co., southeast corner; Fayette Co., northeast corner; Clayton Co., northwest portion.	28-29	Mdt. of 28th	Hail, wind	1	NW to SE	1½			80,000	Heavy hail fell at points along a path from northwest of Castalia in Winneshiek Co., southeastward to south of Garnaville in Clayton Co., severely damaging crops in scattered areas. Lighter hail fell in other sections. At Elkader the roof of grandstand at the Fair Grounds was blown down.
Dubuque Co., Dubuque	29	1:00 a. m.	Wind						250	Wind damaged trees, power lines, etc.
Boone Co., Des Moines, Worth, Jackson, Colfax, and Garden Twps.; Story Co., Washington, Palestine and Union Twps.	31	4:30 a. m.	Hail, wind, electrical, flood	5	NW to SE	2½			600,000	Heavy rain fell in an area about 5 miles wide and about 20 miles long extending from the city of Boone southeastward almost to Cambridge in Story Co. In the city of Boone there was considerable damage to electric signs, windows and roofs. Two greenhouses lost 2,300 panes of glass. Some automobile tops and some roofs were damaged in the southeast part of town. Crops were badly damaged or totally destroyed on about 200 farms, or on about 8,000 acres of land. Previous to the storm there were prospects for bumper yields of corn, soybeans and hemp, but after the hail some fields contained only short stumps of broken cornstalks. High wind blew down tree limbs and interrupted communication and power service, and blew down a few small buildings. Several barns burned after being struck by lightning. Heavy rains washed and flooded fields and damaged roads. Wind and rain damaged shocked oats. Some livestock killed. After the first storm, a second violent thunderstorm with heavy rain occurred about 8 a. m. While this storm was in progress an Army bomber crashed about 10 miles southwest of Boone, killing five persons but no report has been made as to whether the storm was a contributing cause to the disaster or not. 3.29 inches of rain fell at Boone and 3.58 inches at Ames, but many estimates of even heavier rains were received from points nearer the storm center.
Marshall and Jasper Cos., entire counties, especially western portions	31	7:30 a. m. to 9:30 a. m.	Wind, electrical, flood		W to E	1		2	50,000	Severe local storms occurred at many points throughout these counties with wind damage in the west portions from Clemons in Marshall Co., to Monroe in Jasper Co. State Center reported 4.23 inches of rain, Newton 1.85, and Monroe 2.33 inches. These storms were associated with the Boone hailstorm. Wind blew down trees and interrupted wire and power service at Prairie City and Monroe. At Monroe 2 persons were injured when a barn was wrecked. Grain bins were damaged. A barn was burned near Newton after being struck by lightning and much livestock was killed by lightning. All small streams overflowed with highest water in Marshall county, and many acres of crop land were flooded. Much livestock was drowned, one farm alone losing 23 sheep and another over 20 hogs. 3 outboard motor boats raced on flooded highways near Mingo. There was considerable damage to roads and highways, bridges, culverts and to some railroad grades. In towns many basements were partially flooded.

**TWENTY YEARS OF HAIL DAMAGE IN IOWA**  
1923-1942 for State, counties and townships  
From assessors' reports

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
<b>STATE</b>	3,092,360	20	7,975,686	1925	Cedar	1,280	6	16,720	1934	Fairfield	1,717	6	24,145	1927
<b>ADAIR COUNTY</b>	22,083	20	261,087	1942	Eden	879	5	14,118	1931	Grant	1,353	8	15,633	1942
<b>TOWNSHIPS</b>					Eldorado	3,117	8	31,900	1928	Hayes	1,916	11	18,430	1926
Bridgewater	0	0	0	0	Florence	305	3	5,000	1932	Lee	3,642	9	40,650	1942
Eureka	12	2	200	1939	Fremont	1,244	6	18,047	1931	Lincoln	1,320	13	7,022	1933
Grand River	309	10	1,572	1925	Harrison	1,473	10	14,420	1930	Maple Valley	1,303	8	14,636	1923
Greenfield	5	1	100	1924	Homer	4,299	9	68,610	1924	Newell	1,595	7	18,970	1932
Grove	1,242	9	21,055	1942	Iowa	685	2	11,745	1927	Nokomis	5,114	11	62,866	1933
Harrison	875	6	13,279	1927	Jackson	2,591	11	17,026	1930	Poland	202	7	2,007	1936
Jackson	354	7	5,627	1935	Kane	220	4	2,645	1942	Providence	656	9	3,783	1942
Jefferson	4,947	9	90,123	1942	Le Roy	74	4	552	1942	Scott	442	6	6,915	1933
Lee	147	1	2,947	1925	Monroe	3,291	9	28,697	1925	Storm Lake	74	5	1,125	1942
Lincoln	1,065	5	18,418	1927	Polk	665	4	11,850	1935	Washington	1,848	17	19,678	1933
Orient	1,734	7	18,496	1942	St. Clair	5,248	9	48,448	1942	<b>IN TOWNS</b>	68	5	528	1927
Prussia	624	14	7,158	1942	Taylor	1,086	9	4,650	1941	<b>BUTLER COUNTY</b>	18,445	18	122,897	1927
Richland	2,359	10	18,274	1940	Union	3,180	8	32,395	1928	<b>TOWNSHIPS</b>				
Summerset	563	3	6,802	1941	<b>IN TOWNS</b>	9	1	175	1930	Albion	58	6	550	1924
Summit	914	9	10,215	1923	<b>BLACK HAWK CO.</b>	24,815	19	162,055	1924	Beaver	362	3	3,875	1927
Union	349	4	5,603	1925	<b>TOWNSHIPS</b>					Bennezzette	1,311	4	18,979	1925
Walnut	6,214	9	116,285	1942	Barclay	1,207	7	13,152	1942	Butler	2,139	8	35,595	1927
Washington	319	4	4,375	1941	Bennington	3,092	5	40,069	1924	Coldwater	1,365	10	10,939	1927
<b>IN TOWNS</b>	51	4	790	1937	Big Creek	360	4	5,155	1941	Dayton	626	7	7,905	1927
<b>ADAMS COUNTY</b>	15,959	20	115,845	1925	Black Hawk	6	1	114	1934	Fremont	62	4	600	1936
<b>TOWNSHIPS</b>					Cedar	502	3	7,500	1941	Jackson	1,140	6	13,632	1927
Carl	1,519	6	25,940	1926	Cedar Falls	1,046	6	9,457	1927	Jefferson	1,085	11	6,124	1938
Colony	223	5	3,450	1936	Eagle	4,716	6	91,700	1934	Madison	1,965	11	13,163	1931
Douglas	239	8	2,931	1925	East Waterloo	4,998	4	97,560	1924	Monroe	2,739	12	27,736	1926
Grant	2,948	4	39,270	1925	Fox	404	3	6,660	1923	Pittsford	1,304	6	24,620	1927
Jasper	2,072	10	23,623	1925	Lester	340	5	3,545	1930	Ripley	1,106	11	12,630	1938
Lincoln	1,280	4	23,960	1925	Lincoln	1,910	7	24,115	1934	Shellrock	717	4	10,900	1923
Mercer	2,501	9	33,450	1935	Mt. Vernon	1,973	12	19,190	1936	Washington	1,444	7	18,710	1931
Nodaway	1,544	11	17,970	1925	Orange	99	3	1,877	1923	West Point	885	5	8,055	1927
Prescott	1,805	8	22,880	1935	Poyner	1,871	11	12,555	1942	<b>IN TOWNS</b>	137	7	1,444	1927
Quincy	1,284	7	18,879	1938	Spring Creek	171	4	1,900	1923	<b>CALHOUN COUNTY</b>	31,125	20	183,050	1926
Union	47	3	500	1931	Union	1,153	6	13,835	1923	<b>TOWNSHIPS</b>				
Washington	491	4	5,933	1924	Washington	47	3	375	1937	Butler	1,441	5	16,295	1927
<b>IN TOWNS</b>	6	1	115	1938	Waterloo	343	5	5,465	1942	Calhoun	2,328	5	28,302	1926
<b>ALLAMAKEE COUNTY</b>	14,509	18	113,664	1926	<b>IN TOWNS</b>	577	4	11,000	1941	Cedar	1,895	10	15,000	1926
<b>TOWNSHIPS</b>					<b>BOONE COUNTY</b>	19,726	20	127,863	1924	Center	353	4	5,000	1927
Center	2,043	8	34,049	1926	<b>TOWNSHIPS</b>					Elm Grove	972	7	12,750	1926
Fairview	40	2	790	1929	Amaqua	2,603	10	36,663	1927	Garfield	1,328	7	15,083	1934
Franklin	198	6	2,275	1934	Beaver	424	6	4,732	1937	Greenfield	6,212	3	67,110	1926
French Creek	198	1	3,955	1927	Cass	4	1	75	1941	Jackson	2,806	6	28,925	1925
Hanover	534	6	6,065	1934	Colfax	100	3	1,185	1937	Lake Creek	312	8	1,880	1928
Iowa	282	2	4,490	1927	Des Moines	1,204	7	15,523	1928	Lincoln	4,585	15	71,145	1941
Jefferson	203	4	3,470	1935	Dodge	2,387	11	22,545	1924	Logan	2,250	8	29,852	1926
Lafayette	1,524	2	28,400	1926	Douglas	185	1	3,700	1924	Reading	1,675	9	14,787	1924
Lansing	101	4	800	1927	Garden	3,962	6	48,745	1924	Sherman	1,513	12	10,484	1932
Linton	653	4	10,710	1934	Grant	2,663	7	17,774	1924	Twin Lake	869	3	9,670	1934
Ludlow	658	7	7,330	1928	Harrison	376	6	4,399	1925	Union	1,168	14	6,911	1926
Makee	886	9	7,423	1926	Jackson	842	6	13,017	1929	Williams	927	5	16,300	1927
Paint Creek	653	11	5,802	1935	Marey	408	3	3,880	1927	<b>IN TOWNS</b>	491	12	5,542	1941
Post	1,024	6	15,815	1933	Peoples	521	3	8,160	1937	<b>CARROLL COUNTY</b>	31,034	20	142,277	1942
Taylor	517	3	6,135	1927	Pilot Mound	1,017	8	16,972	1928	<b>TOWNSHIPS</b>				
Union City	1,004	3	12,975	1924	Union	503	5	4,565	1937	Arcadia	1,419	8	8,050	1928
Union Prairie	2,863	8	40,312	1926	Worth	1,365	4	25,313	1924	Eden	3,036	5	45,958	1942
Waterloo	1,128	3	17,248	1927	Yell	1,023	10	9,175	1928	Ewolt	2,630	3	52,150	1942
<b>IN TOWNS</b>	0	0	0	0	<b>IN TOWNS</b>	139	7	1,248	1928	Glidden	972	3	12,315	1929
<b>APPANOOSE COUNTY</b>	4,925	17	31,901	1926	<b>BREMER COUNTY</b>	12,483	18	89,225	1928	Grant	1,435	5	13,847	1942
<b>TOWNSHIPS</b>					<b>TOWNSHIPS</b>					Jasper	457	5	6,320	1926
Bellair	20	2	250	1925	Dayton	10	1	200	1931	Kniest	3,708	10	32,420	1936
Caldwell	511	3	6,750	1924	Douglas	1,069	7	11,671	1928	Maple River	895	11	13,170	1929
Chariton	36	4	397	1942	Franklin	397	4	3,738	1930	Newton	1,608	5	24,580	1937
Douglas	79	1	1,577	1925	Frederika	446	9	4,550	1926	Pleasant Valley	568	2	11,342	1937
Franklin	399	6	4,538	1927	Fremont	211	1	4,225	1930	Richland	2,633	4	43,200	1929
Independence	15	3	150	1923	Jackson	2,228	6	28,002	1927	Roselle	935	6	6,405	1925
Johns	1,047	6	9,430	1925	Jefferson	897	7	10,200	1923	Sheridan	594	3	11,080	1928
Lincoln	1,694	5	17,878	1941	Lafayette	1,038	4	12,610	1936	Union	2,013	4	38,665	1937
Pleasant	548	4	8,546	1926	Leroy	57	3	573	1926	Washington	3,963	7	54,539	1936
Sharon	204	1	4,070	1926	Maxfield	1,055	12	8,220	1942	Wheatland	4,081	11	53,776	1928
Taylor	150	2	2,715	1925	Polk	1,942	7	29,668	1928	<b>IN TOWNS</b>	87	5	1,000	1936
Udell	0	0	0	0	Sumner	409	6	3,360	1933	<b>CASS COUNTY</b>	33,721	20	172,074	1936
Union	15	2	227	1941	Warren	490	6	7,550	1936	<b>TOWNSHIPS</b>				
Vermillion	2	1	47	1925	Washington	2,028	4	37,232	1928	Bear Grove	118	5	800	1930
Walnut	36	3	500	1927	<b>IN TOWNS</b>	206	6	1,700	1931	Benton	2,043	9	20,675	1935
Washington	32	2	440	1926	<b>BUCHANAN COUNTY</b>	27,064	20	127,898	1931	Brighton	6,500	15	53,884	1923
Wells	122	5	1,767	1938	<b>TOWNSHIPS</b>					Cass	1,562	11	7,990	1939
<b>IN TOWNS</b>	15	4	140	1928	Buffalo	170	3	2,190	1924	Edna	1,393	8	16,375	1928
<b>AUDUBON COUNTY</b>	27,374	20	138,582	1936	Byron	5,005	6	44,350	1931	Franklin	7,484	10	78,650	1936
<b>TOWNSHIPS</b>					Cono	2,564	9	44,379	1927	Grant	1,730	7	18,566	1936
Audubon	860	9	5,803	1928	Fairbank	0	0	0	0	Grove	29	2	450	1923
Cameron	1,798	5	32,967	1942	Fremont	2,501	3	38,360	1928	Lincoln	1,837	7	13,180	1942
Douglas														

TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
Iowa	880	4	16,225	1941	Clayton	3,056	2	61,025	1929	<b>DECATUR COUNTY</b>	5,032	14	35,730	1928
Linn	325	4	5,632	1924	Cox Creek	0	0	0	0	<b>TOWNSHIPS</b>				
Massilon	351	3	6,375	1923	Elk	0	0	0	0	Bloomington	213	4	3,815	1930
Pioneer	1,532	6	18,200	1941	Farmersburg	4,862	5	95,000	1929	Burrell	1,012	4	19,970	1928
Red Oak	506	3	9,955	1924	Garnavillo	349	6	3,500	1942	Center	182	4	2,361	1932
Rochester	1,362	3	25,000	1941	Giard	1,172	5	11,800	1929	Decatur	333	5	5,140	1928
Springdale	5,279	5	86,670	1941	Grand Meadow	2,720	6	36,354	1929	Eden	283	3	4,640	1928
Springfield	2,680	3	50,770	1925	Highland	81	6	600	1941	Fayette	36	3	400	1932
Sugar Creek	1,956	5	36,682	1941	Jefferson	1,018	3	16,595	1940	Franklin	650	8	5,153	1937
IN TOWNS	0	0	0	0	Lodomillo	215	3	4,040	1924	Garden Grove	1,458	5	21,963	1924
<b>CERRO GORDO CO.</b>	23,361	20	84,550	1936	Mallory	45	2	697	1940	Grand River	14	2	250	1928
<b>TOWNSHIPS</b>					Marion	257	5	3,757	1933	Hamilton	532	4	6,610	1938
Bath	254	4	3,570	1925	Mendon	623	5	8,995	1929	High Point	10	1	200	1938
Clear Lake	1,488	7	15,396	1931	Millville	53	6	350	1942	Long Creek	182	4	3,454	1925
Dougherty	3,100	9	39,757	1934	Monona	5,055	3	97,050	1929	Morgan	215	4	2,570	1938
Falls	1,880	7	18,600	1937	Read	210	3	3,450	1942	New Buda	393	2	7,441	1923
Geneseo	1,584	8	16,406	1933	Sperry	476	4	6,465	1941	Richland	39	2	750	1928
Grant	0	0	0	0	Volga	413	1	8,265	1933	Woodland	72	6	455	1932
Grimes	1,052	4	12,529	1942	Wagner	2,431	5	27,610	1929	IN TOWNS	8	3	100	1938
Lake	2,342	5	44,820	1931	IN TOWNS	134	4	940	1935	<b>DELAWARE COUNTY</b>	12,627	20	66,279	1925
Lime Creek	439	7	4,617	1928	<b>CLINTON COUNTY</b>	31,954	16	442,305	1927	<b>TOWNSHIPS</b>				
Lincoln	400	4	5,975	1928	Bloomfield	45	2	500	1932	Adams	403	6	7,265	1931
Mason	1,525	6	10,899	1928	Brookfield	390	3	6,240	1925	Bremen	1,254	11	6,532	1931
Mt. Vernon	1,253	6	11,240	1931	Camanche	2,026	3	38,710	1927	Coffins Grove	1,333	10	19,350	1934
Owen	1,315	8	21,100	1941	Center	581	3	11,450	1927	Colony	1,284	10	8,123	1931
Pleasant Valley	4,246	10	73,105	1936	Deep Creek	32	2	500	1941	Delaware	348	3	3,800	1925
Portland	1,319	3	22,200	1937	De Witt	5,890	5	95,000	1927	Delhi	703	6	5,510	1925
Union	1,083	7	10,200	1942	Eden	7,922	2	155,150	1927	Elk	642	6	10,540	1942
IN TOWNS	81	7	1,040	1928	Elk River	12	1	250	1941	Hazel Green	1,163	6	12,561	1931
<b>CHEROKEE COUNTY</b>	59,507	20	335,340	1925	Grant	177	4	1,900	1925	Honey Creek	268	2	2,992	1925
<b>TOWNSHIPS</b>					Hampshire	829	3	16,472	1938	Milo	380	2	7,580	1927
Afton	1,470	8	19,895	1933	Liberty	890	6	10,750	1935	North Fork	84	3	1,450	1942
Amherst	426	8	2,705	1928	Lincoln	3,272	1	65,435	1927	Oneida	225	8	2,818	1925
Cedar	1,796	14	11,904	1933	Olive	3,912	5	45,995	1927	Prairie	1,802	11	17,405	1931
Cherokee	7,567	9	92,705	1925	Orange	2,313	6	29,850	1927	Richland	1,834	2	36,433	1925
Diamond	1,255	15	9,502	1934	Sharon	40	1	800	1942	South Fork	440	2	7,200	1942
Grand Meadow	9,267	12	79,983	1934	Spring Rock	712	8	9,425	1935	Union	345	6	4,526	1933
Liberty	2,643	15	11,750	1925	Spring Valley	10	1	200	1927	IN TOWNS	119	4	1,710	1925
Marcus	4,362	13	27,783	1925	Washington	253	4	2,250	1936	<b>DES MOINES CO.</b>	9,081	12	61,737	1938
Pilot	5,891	7	58,425	1924	Waterford	34	2	600	1938	<b>TOWNSHIPS</b>				
Pitcher	2,257	6	35,974	1942	Welton	2,586	4	46,830	1923	Augusta	35	2	640	1925
Rock	5,582	8	43,500	1927	IN TOWNS	28	4	465	1927	Benton	964	6	8,885	1934
Sheridan	6,302	10	80,180	1925	<b>CRAWFORD COUNTY</b>	64,547	20	405,654	1924	Concordia	275	3	3,655	1925
Silver	2,323	12	22,875	1932	<b>TOWNSHIPS</b>					Danville	371	2	7,385	1925
Spring	1,916	13	33,578	1933	Boyer	424	7	2,905	1942	Flint River	0	0	0	0
Tilden	4,980	13	37,450	1925	Charter Oak	913	3	10,320	1929	Franklin	746	3	7,969	1933
Willow	752	6	10,167	1937	Denison	442	6	4,135	1929	Huron	0	0	0	0
IN TOWNS	718	8	9,418	1925	East Boyer	3,581	9	48,505	1933	Jackson	156	2	2,250	1927
<b>CHICKASAW COUNTY</b>	12,534	19	58,192	1928	Goodrich	1,416	3	18,849	1928	Pleasant Grove	978	5	16,435	1925
<b>TOWNSHIPS</b>					Hanover	10	1	195	1929	Tama	31	2	500	1926
Bradford	2,681	6	39,938	1928	Hayes	4,972	11	44,359	1933	Union	451	2	6,917	1926
Chickasaw	539	3	10,647	1925	Iowa	3,754	11	47,141	1924	Washington	1,369	6	14,469	1938
Dayton	3	1	61	1925	Jackson	3,938	10	54,380	1928	Yellow Springs	3,312	8	44,565	1938
Deerfield	1,327	6	10,131	1928	Milford	10,586	10	97,880	1924	IN TOWNS	393	4	5,225	1925
Dresden	490	7	5,000	1933	Morgan	2,867	4	39,090	1923	<b>DICKINSON COUNTY</b>	18,760	18	107,612	1927
Fredericksburg	1,666	5	29,280	1933	Nishnabotna	2,280	7	14,460	1942	<b>TOWNSHIPS</b>				
Jacksonville	36	3	585	1925	Otter Creek	9,018	7	124,145	1924	Center Grove	1,707	4	25,420	1927
New Hampton	29	1	575	1928	Paradise	17	1	341	1932	Diamond Lake	1,978	8	13,062	1927
Richland	5	3	42	1926	Soldier	2,044	8	11,790	1927	Excelsior	3,397	13	45,800	1935
Stapleton	345	6	2,609	1937	Stockholm	11,864	6	108,140	1928	Lakeville	1,425	2	27,655	1935
Utica	2,546	7	16,958	1933	Union	613	3	10,300	1929	Lloyd	1,080	5	16,125	1927
Washington	2,758	5	25,142	1925	Washington	1,779	11	11,985	1929	Milford	1,977	9	31,900	1927
IN TOWNS	109	8	610	1925	West Side	3,729	6	55,038	1933	Okoboji	644	7	6,746	1941
<b>CLARKE COUNTY</b>	7,948	14	58,791	1923	Willow	196	5	1,780	1940	Richland	1,267	10	10,352	1942
<b>TOWNSHIPS</b>					IN TOWNS	104	8	600	1924	Silver Lake	1,048	10	6,616	1936
Doyle	1,978	3	36,669	1923	<b>DALLAS COUNTY</b>	10,996	14	67,110	1938	Spirit Lake	818	11	9,145	1927
Franklin	1,589	6	26,829	1937	<b>TOWNSHIPS</b>					Superior	2,732	13	27,460	1924
Fremont	58	5	388	1927	Adams	74	2	955	1942	Westport	595	6	6,510	1926
Green Bay	627	9	9,437	1937	Adel	656	2	10,675	1941	IN TOWNS	92	4	1,600	1927
Jackson	54	3	768	1938	Beaver	331	3	5,436	1928	<b>DUBUQUE COUNTY</b>	11,187	18	99,873	1939
Knox	1,138	4	20,630	1923	Boone	14	2	200	1925	<b>TOWNSHIPS</b>				
Liberty	9	3	104	1928	Colfax	1,048	5	18,158	1939	Cascade	852	3	15,150	1929
Madison	1,571	8	26,669	1942	Dallas	3,274	5	46,073	1938	Center	295	2	5,351	1939
Osceola	33	4	208	1926	Des Moines	188	3	1,549	1928	Concord	65	1	1,300	1939
Troy	763	4	11,000	1928	Grant	213	3	4,100	1926	Dodge	486	7	3,100	1929
Ward	1	1	18	1928	Lincoln	836	5	13,945	1938	Dubuque	814	2	16,200	1929
Washington	127	8	1,715	1937	Linn	204	3	2,580	1941	Iowa	2,096	5	33,775	1939
IN TOWNS	0	0	0	0	Spring Valley	151	3	1,746	1926	Jefferson	135	2	1,500	1940
<b>CLAY COUNTY</b>	37,575	19	351,291	1936	Sugar Grove	20	1	400	1928	Liberty	580	2	11,390	1939
<b>TOWNSHIPS</b>					Union	1,391	8	14,950	1927	Mosalem	490	4	8,743	1933
Clay	2,833	6	34,386	1925	Van Meter	391	4	5,055	1941	New Wine	461	4	3,625	1931
Douglas	2,521	9	33,627	1936	Walnut	472	5	5,335	1938	Peru	545	2	10,800	1929
Freeman	2,982	8	20,585	1934	Washington	1,537	3	17,562	1939	Prairie Creek	544	7		

TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
Swan Lake	5,246	10	80,600	1924	German	278	3	3,280	1928	St. John	27	5	318	1928
12-Mile Lake	2,090	5	25,670	1942	Grant	4,110	4	52,520	1927	Taylor	2,486	8	22,200	1932
IN TOWNS	477	11	4,550	1932	Lincoln	2,374	4	26,325	1926	Union	2,971	7	44,200	1924
<b>FAYETTE COUNTY</b>	<b>48,282</b>	<b>20</b>	<b>293,486</b>	<b>1925</b>	Melrose	5,112	8	49,753	1927	Washington	7,191	4	137,953	1940
<b>TOWNSHIPS</b>					Palermo	1,955	3	38,257	1927	IN TOWNS	65	4	1,035	1928
Auburn	6,816	9	108,699	1927	Pleasant Valley	967	6	16,000	1938	<b>HENRY COUNTY</b>	<b>38,937</b>	<b>14</b>	<b>516,054</b>	<b>1925</b>
Banks	364	3	6,954	1937	Shiloh	4,785	3	76,625	1924	Baltimore	876	2	12,010	1925
Bethel	939	6	15,342	1937	Washington	1,186	2	22,300	1927	Canaan	5,370	4	99,065	1925
Center	1,117	6	19,718	1925	IN TOWNS	84	3	1,410	1924	Center	1,563	7	28,750	1925
Clermont	1,937	4	31,135	1933	<b>GUTHRIE COUNTY</b>	<b>25,746</b>	<b>18</b>	<b>161,517</b>	<b>1942</b>	Jackson	2,320	3	39,870	1925
Dover	3,261	5	54,519	1933	<b>TOWNSHIPS</b>					Jefferson	10,248	6	116,230	1925
Eden	2,559	10	27,045	1928	Baker	472	2	7,835	1942	Marion	8,536	6	158,249	1925
Fairfield	1,925	7	19,139	1925	Bear Grove	5,816	9	53,122	1942	New London	2,568	4	26,338	1938
Fremont	1,286	9	16,079	1931	Beaver	362	4	6,515	1936	Salem	84	2	1,450	1938
Harlan	3,333	7	40,233	1929	Cass	200	3	2,201	1937	Scott	2,844	7	51,965	1924
Illyria	1,038	6	16,400	1927	Dodge	1,269	5	15,131	1942	Tippecanoe	158	2	2,570	1926
Jefferson	1,009	6	16,648	1927	Grant	6,029	9	56,185	1936	Trenton	1,634	1	32,680	1925
Oran	1,042	8	9,420	1931	Highland	3,356	6	55,210	1937	Wayne	2,638	4	42,965	1942
Pleasant Valley	617	6	8,528	1933	Jackson	897	4	11,925	1928	IN TOWNS	98	4	975	1925
Putnam	7,819	11	131,815	1925	Orange	312	8	2,863	1937	<b>HOWARD COUNTY</b>	<b>30,226</b>	<b>20</b>	<b>163,490</b>	<b>1927</b>
Scott	2,814	4	36,260	1925	Penn	1,450	4	19,140	1937	<b>TOWNSHIPS</b>				
Smithfield	2,801	7	32,313	1925	Richland	2,375	4	31,850	1928	Afton	1,322	7	24,690	1928
Union	3,130	7	40,856	1927	Seeley	23	2	435	1937	Albion	818	8	13,332	1942
Westfield	2,478	14	22,145	1927	Stuart	136	2	2,170	1927	Chester	1,522	6	9,425	1928
Windsor	1,342	4	25,319	1927	Thompson	2,855	8	46,750	1942	Forest City	2,240	6	38,500	1942
IN TOWNS	655	9	4,860	1927	Union	18	3	300	1931	Howard	1,669	10	12,310	1928
<b>FLOYD COUNTY</b>	<b>21,188</b>	<b>17</b>	<b>125,822</b>	<b>1936</b>	Valley	0	0	0	0	Howard Center	1,482	7	13,816	1925
<b>TOWNSHIPS</b>					Victory	149	2	2,900	1937	Jamestown	4,495	7	47,925	1927
Cedar	295	5	3,181	1923	IN TOWNS	27	3	270	1928	New Oregon	5,423	14	31,139	1925
Floyd	3,461	5	67,324	1936	<b>HAMILTON COUNTY</b>	<b>25,807</b>	<b>20</b>	<b>120,986</b>	<b>1925</b>	Oak Dale	1,814	5	24,795	1927
Niles	0	0	0	0	<b>TOWNSHIPS</b>					Paris	3,710	13	21,250	1928
Pleasant Grove	1,329	8	8,728	1925	Blairsburg	3,771	10	18,232	1928	Saratoga	4,447	9	29,146	1928
Riverton	1,152	3	14,555	1925	Cass	2,840	6	41,983	1932	Vernon Springs	899	8	4,537	1927
Rockford	775	6	13,381	1925	Clear Lake	1,348	6	23,850	1925	IN TOWNS	385	5	6,245	1925
Rock Grove	2,234	11	14,190	1934	Ellsworth	903	3	17,806	1925	<b>HUMBOLDT COUNTY</b>	<b>24,919</b>	<b>19</b>	<b>294,271</b>	<b>1924</b>
Rudd	2,534	4	46,664	1936	Freedom	261	2	5,115	1933	<b>TOWNSHIPS</b>				
St. Charles	2,809	7	39,971	1925	Fremont	2,535	9	23,529	1924	Avery	823	7	9,091	1925
Scott	1,676	6	16,286	1941	Hamilton	1,654	12	11,525	1928	Beaver	2,153	7	17,792	1926
Ulster	1,816	6	16,467	1925	Independence	1,851	8	10,595	1937	Corinth	488	6	2,555	1932
Union	2,965	9	38,708	1937	Liberty	1,624	8	15,795	1926	Delana	2,749	7	48,762	1924
IN TOWNS	142	5	1,700	1937	Lincoln	219	6	2,030	1926	Grove	5,932	10	70,112	1924
<b>FRANKLIN COUNTY</b>	<b>32,746</b>	<b>18</b>	<b>197,131</b>	<b>1924</b>	Lyon	22	1	450	1928	Humboldt	481	10	3,725	1925
<b>TOWNSHIPS</b>					Marion	1,401	2	20,515	1925	Lake	757	3	11,630	1923
Geneva	4,282	13	25,808	1931	Rose Grove	2,485	11	22,294	1933	Norway	4,812	6	73,883	1924
Grant	3,780	8	38,525	1936	Scott	451	3	8,905	1925	Rutland	264	1	5,280	1932
Hamilton	2,030	6	30,922	1924	Webster	637	4	6,724	1940	Vernon	1,367	4	12,732	1927
Ingham	191	5	2,300	1927	Williams	3,700	15	26,532	1925	Wacousta	4,122	7	73,420	1924
Lee	8,648	10	116,975	1924	IN TOWNS	105	7	1,065	1925	Weaver	798	11	5,453	1936
Marion	676	6	7,668	1933	<b>HANCOCK COUNTY</b>	<b>35,443</b>	<b>20</b>	<b>182,751</b>	<b>1932</b>	IN TOWNS	173	6	2,100	1924
Morgan	187	3	2,400	1925	<b>TOWNSHIPS</b>					<b>IDA COUNTY</b>	<b>48,965</b>	<b>19</b>	<b>380,795</b>	<b>1928</b>
Mott	3	2	34	1932	Amsterdam	2,711	9	16,596	1925	<b>TOWNSHIPS</b>				
Oakland	1,842	7	31,850	1924	Avery	1,183	5	16,460	1925	Battle	2,293	7	36,037	1927
Osceola	1,155	4	10,890	1924	Bingham	2,039	8	20,880	1932	Blaine	2,689	6	47,615	1928
Reeve	948	9	7,179	1927	Boone	2,623	17	31,133	1928	Corwin	2,186	7	17,452	1937
Richland	3,486	6	66,684	1936	Britt	1,915	14	24,208	1932	Douglas	3,934	8	50,329	1942
Ross	2,463	12	20,702	1928	Concord	2,009	2	40,000	1932	Galva	1,835	13	10,510	1924
Scott	701	12	10,233	1923	Crystal	1,392	9	10,600	1941	Garfield	7,296	10	72,550	1928
West Fork	1,201	5	17,278	1925	Ell	3,428	17	36,805	1932	Grant	6,245	8	73,968	1928
Wisner	784	9	5,920	1928	Ellington	599	8	7,035	1923	Griggs	3,077	9	26,775	1941
IN TOWNS	369	9	2,770	1925	Erin	3,767	15	36,002	1927	Hayes	11,119	9	110,985	1928
<b>FREMONT COUNTY</b>	<b>31,711</b>	<b>20</b>	<b>171,013</b>	<b>1923</b>	Garfield	558	5	10,020	1923	Logan	1,517	14	6,639	1933
<b>TOWNSHIPS</b>					Liberty	3,843	15	25,786	1932	Maple	6,133	8	57,758	1928
Benton	2,250	8	19,218	1924	Madison	1,329	12	14,462	1925	Silver Creek	527	7	6,705	1933
Fisher	827	6	7,805	1931	Magor	4,252	9	46,914	1930	IN TOWNS	114	4	1,480	1940
Green	1,368	9	20,100	1925	Orthel	1,696	16	17,500	1932	<b>IOWA COUNTY</b>	<b>44,174</b>	<b>17</b>	<b>309,262</b>	<b>1925</b>
Locust Grove	743	3	9,000	1928	Twin Lakes	1,943	12	18,397	1926	<b>TOWNSHIPS</b>				
Madison	4,561	9	54,515	1923	IN TOWNS	156	6	2,022	1925	Dayton	11,136	5	188,195	1925
Monroe	1,726	7	17,806	1939	<b>HARDIN COUNTY</b>	<b>35,156</b>	<b>18</b>	<b>149,629</b>	<b>1925</b>	English	5,997	5	70,475	1925
Prairie	6,628	10	60,955	1925	<b>TOWNSHIPS</b>					Fillmore	1,294	2	25,575	1924
Riverside	3,679	6	45,006	1925	Alden	8,569	12	105,550	1925	Greene	1,504	7	11,057	1942
Riverton	2,497	12	14,849	1938	Buckeye	608	8	7,350	1924	Hartford	2,152	4	33,223	1923
Scott	1,694	7	32,340	1923	Clay	19	2	300	1927	Hilton	1,114	5	12,485	1935
Sidney	7	1	150	1925	Concord	1,071	3	16,433	1925	Honey Creek	1,946	8	15,531	1936
Walnut	505	6	5,850	1928	Eldora	1,359	5	23,790	1927	Iowa	73	2	1,400	1933
Washington	5,226	11	50,542	1926	Ellis	3,406	7	59,843	1924	Lenox	44	4	440	1933
IN TOWNS	0	1	2	1939	Etna	50	3	720	1942	Lincoln	3,125	7	50,247	1925
<b>GREENE COUNTY</b>	<b>36,695</b>	<b>19</b>	<b>136,027</b>	<b>1942</b>	Grant	2,621	4	42,727	1934	Marengo	1,514	9	24,264	1941
<b>TOWNSHIPS</b>					Hardin	2,735	4	27,400	1942	Pilot	5,520	8	106,776	1941
Bristol	3,868	8	28,700	1928	Jackson	369	5	2,746	1923	Sumner	4,480	5	70,532	1941
Cedar	225	4	3,270	1925	Pleasant	1,988	7							

TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years						
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year					
Van Buren	375	2	5,800	1935	<b>KOSSUTH COUNTY</b> TOWNSHIPS	38,572	20	176,921	1941	<b>LYON COUNTY</b>									
Washington	22	2	225	1935						2,736	7	28,380	1929	42,487 20 222,832 1929					
IN TOWNS	45	2	868	1935						Burt	558	13	4,755	1930	TOWNSHIPS				
<b>JASPER COUNTY</b>	33,980	19	146,954	1924						Cresco	2,432	5	32,109	1933	Allison	3,125	6	27,127	1928
TOWNSHIPS										Eagle	153	8	1,132	1930	Centennial	799	6	8,800	1929
Buena Vista	915	7	15,196	1926						Fenton	576	7	8,326	1927	Cleveland	2,093	7	23,745	1928
Clear Creek	4,545	7	62,550	1941						Garfield	549	2	10,860	1924	Dale	681	11	4,631	1937
Des Moines	1,101	7	9,145	1930						German	1,689	15	16,926	1923	Doon	257	3	4,112	1934
Elk Creek	1,376	6	15,447	1924						Grant	844	13	8,584	1941	Elgin	134	5	1,858	1942
Fairview	53	1	1,060	1938						Greenwood	1,231	13	7,125	1929	Garfield	694	10	3,695	1934
Hickory Grove	1,758	3	19,325	1924						Harrison	521	12	4,216	1937	Grant	288	5	3,576	1925
Independence	1,159	6	14,440	1925						Hebron	1,681	4	14,401	1938	Larchwood	854	7	5,097	1925
Kellogg	3,099	8	38,745	1936						Irvington	1,392	8	17,710	1928	Liberal	2,985	15	13,848	1923
Lynn Grove	2,217	6	21,808	1924	Ledyard	4,773	14	85,912	1941	Logan	849	8	7,511	1925					
Malaka	2,877	10	36,745	1936	Lincoln	512	1	10,250	1938	Lyon	8,954	9	89,660	1929					
Mariposa	991	4	15,800	1924	Lotts Creek	341	3	5,225	1933	Midland	3,055	10	32,835	1942					
Mound Prairie	662	5	6,179	1938	Luverne	2,890	9	36,100	1924	Richland	6,104	7	108,807	1929					
Newton	199	9	1,125	1924	Phum Creek	363	4	6,394	1925	Riverside	3,126	12	21,875	1931					
Palo Alto	5,970	4	71,050	1924	Portland	4,429	7	43,181	1941	Rock	2,256	12	17,878	1923					
Poweshiek	728	7	10,362	1926	Prairie	2,718	3	53,020	1925	Sioux	2,934	12	15,625	1938					
Richland	3,345	8	23,950	1923	Ramsey	3,998	8	3,998	1929	Wheeler	1,648	8	26,850	1940					
Rock Creek	167	3	2,740	1923	Riverdale	1,250	7	19,707	1942	IN TOWNS	1,651	13	8,905	1928					
Sherman	288	8	1,580	1924	Seneca	256	5	3,861	1932	<b>MADISON COUNTY</b>	24,171	19	212,047	1937					
Washington	2,414	7	23,460	1938	Sherman	34	3	585	1933	TOWNSHIPS									
IN TOWNS	116	5	1,075	1934	Springfield	1,506	5	19,090	1941	Crawford	93	4	700	1930					
<b>JEFFERSON COUNTY</b>	12,685	12	119,169	1925	Swea	1,736	11	13,654	1942	Douglas	2,155	5	22,070	1928					
TOWNSHIPS					Union	217	6	2,460	1924	Grand River	2,049	9	23,791	1925					
Black Hawk	444	6	4,273	1941	Wesley	1,074	12	13,100	1942	Jackson	4,600	7	54,365	1928					
Buchanan	165	4	2,035	1938	Whittemore	1,283	4	14,850	1942	Jefferson	15	1	300	1941					
Cedar	96	4	1,150	1927	IN TOWNS	296	5	2,050	1942	Lee	248	3	2,660	1926					
Center	537	1	10,739	1927	<b>LEE COUNTY</b>	5,390	13	72,176	1925	Lincoln	2,038	4	20,714	1937					
Des Moines	1,440	6	25,365	1938	TOWNSHIPS					Madison	288	3	3,830	1941					
Liberty	2,843	4	54,385	1929	Cedar	683	5	7,520	1936	Monroe	748	9	8,430	1925					
Lockridge	268	2	5,310	1926	Charleston	154	8	1,190	1925	Ohio	758	7	5,899	1938					
Locust Grove	12	1	250	1938	Denmark	0	0	0	0	Penn.	6,162	2	122,775	1937					
Penn.	262	5	3,400	1926	Des Moines	254	1	5,075	1925	Scott	758	5	12,215	1937					
Polk	0	0	0	0	Franklin	85	5	825	1924	South	45	5	405	1932					
Round Prairie	71	2	1,330	1938	Green Bay	63	1	1,266	1925	Union	158	5	1,850	1936					
Walnut	6,515	2	119,154	1925	Harrison	284	2	5,580	1931	Walnut	682	11	5,501	1942					
IN TOWNS	32	3	450	1938	Jackson	573	4	9,435	1925	Webster	3,019	6	25,800	1928					
<b>JOHNSON COUNTY</b>	12,021	18	58,605	1927	Jefferson	92	3	1,210	1924	IN TOWNS	355	5	5,999	1928					
TOWNSHIPS					Marion	424	3	7,420	1925	<b>MAHASKA COUNTY</b>	16,788	18	120,786	1927					
Big Grove	125	7	830	1938	Montrose	662	4	8,665	1925	TOWNSHIPS									
Cedar	313	6	5,430	1938	Pleasant Ridge	1,640	2	30,105	1925	Adams	3	1	50	1926					
Clear Creek	25	1	500	1934	Van Buren	273	1	5,460	1925	Black Oak	327	2	6,398	1942					
East Lucas	0	0	0	0	Washington	15	3	150	1925	Cedar	605	7	6,053	1927					
Fremont	2,157	6	18,520	1927	West Point	140	1	2,810	1925	East Des Moines	157	4	3,010	1942					
Graham	1,104	3	21,729	1930	IN TOWNS	48	2	800	1926	Garfield	289	3	4,637	1942					
Hardin	616	2	11,590	1934	<b>LINN COUNTY</b>	27,996	20	92,073	1927	Harrison	915	3	16,600	1937					
Jefferson	654	6	9,650	1931	TOWNSHIPS					Jefferson	1,064	7	15,277	1925					
Liberty	731	4	7,340	1934	Bertram	1,009	6	13,186	1932	Lincoln	268	2	5,280	1932					
Lincoln	552	3	10,340	1941	Boulder	3,019	8	35,917	1924	Madison	627	4	8,485	1937					
Madison	462	4	8,783	1926	Brown	972	6	14,996	1928	Monroe	4,902	6	55,400	1927					
Monroe	439	1	8,780	1932	Buffalo	454	4	7,036	1924	Pleasant Grove	3,691	7	27,066	1927					
Newport	294	2	5,205	1928	Clinton	337	3	5,520	1931	Prairie	351	5	4,350	1928					
Oxford	332	4	3,100	1934	College	1,837	9	19,550	1931	Richland	20	1	400	1924					
Penn.	293	4	4,302	1933	Fairfax	3,362	7	46,735	1931	Scott	146	1	2,920	1938					
Pleasant Valley	1,524	5	23,250	1925	Fayette	497	3	9,160	1923	Spring Creek	977	4	13,900	1932					
Scott	1,034	5	16,444	1927	Franklin	3,099	9	28,480	1941	Union	313	3	4,700	1928					
Sharon	35	3	400	1936	Grant	2,652	15	42,727	1927	West Des Moines	457	3	9,049	1925					
Union	469	1	9,375	1927	Jackson	0	0	0	0	White Oak	1,674	5	30,655	1927					
Washington	0	0	0	0	Linn	2,109	5	37,400	1928	IN TOWNS	2	1	40	1928					
West Lucas	777	3	13,300	1927	Maine	1,649	7	22,270	1942	<b>MARION COUNTY</b>	3,364	16	13,118	1923					
IN TOWNS	85	3	810	1927	Marion	1,190	4	22,810	1935	TOWNSHIPS									
<b>JONES COUNTY</b>	9,976	16	131,639	1933	Monroe	326	6	1,775	1925	Clay	0	0	0	0					
TOWNSHIPS					Otter Creek	3,519	8	27,330	1927	Dallas	88	3	1,155	1923					
Cass	63	2	1,240	1928	Putnam	168	6	1,575	1927	Franklin	0	0	0	0					
Castle Grove	1,520	6	20,620	1933	Spring Grove	440	9	6,875	1927	Indiana	170	3	3,250	1925					
Clay	0	1	3	1941	Washington	1,159	4	22,000	1935	Knoxville	0	0	0	0					
Fairview	0	0	0	0	IN TOWNS	198	6	1,170	1932	Lake Prairie	196	4	1,700	1926					
Greenfield	1,273	3	24,646	1928	<b>LOUISA COUNTY</b>	7,618	17	61,751	1938	Liberty	1,053	5	9,120	1923					
Hale	50	1	1,000	1934	TOWNSHIPS					Perry	278	3	3,450	1930					
Jackson	67	3	627	1928	Columbus City	99	3	1,725	1929	Pleasant Grove	8	2	120	1931					
Levell	6,250	4	110,180	1933	Concord	122	2	2,250	1924	Polk	156	1	3,125	1938					
Madison	20	1	400	1942	Elliott	17	1	350	1924	Red Rock	276	5	4,100	1930					
Oxford	287	2	5,708	1942	Elm Grove	1,471	12	20,881	1924	Summit	912	7	8,675	1938					
Richland	0	0	0	0	Grandview	425	5	4,496	1933	Swan	175	1	3,500	1930					
Rome	117	6	1,809	1931	Jefferson	1,560	2	19,842	1942	Union	13	2	250	1931					
Scotch Grove	31	3	420	1935	Marshall	253	7	1,370	1924	Washington	0	0	0	0					
Washington	0	0	0	0	Morning Sun	744	5	10,750	1938	IN TOWNS	39	3	600	1937					
Wayne	207	2	3,662	1940	Oakland	0	0	0	0	<b>MARSHALL COUNTY</b>	31,994	19	189,355	1936					
Wyoming	77	4	990	1942	Port Louisa	1,703	7	22,775	1938	TOWNSHIPS									
IN TOWNS	14	1	285	1933	Union	202	2	2,823	1933	Bangor	1,123	8	12,590	1934					
<b>KEOKUK COUNTY</b>	78,310	20	592,809	1925	Wapello	1,022	6	13,272	1938	Eden	330	3	4,150	1925					
TOWNSHIPS					IN T														

TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
Center	2,452	11	41,502	1925	<b>O'BRIEN COUNTY</b>	40,709	20	182,839	1929	Colfax	613	4	7,600	1934
Deer Creek	1,345	5	10,305	1925	<b>TOWNSHIPS</b>					Cummins	8	2	136	1940
Glenwood	3,619	6	30,771	1925	Baker	3,808	13	33,720	1928	Des Moines	794	10	4,230	1932
Indian Creek	8,658	11	126,597	1942	Caledonia	2,875	10	20,557	1933	Dover	2,466	9	27,155	1933
Ingraham	7,059	9	42,845	1925	Carroll	6,336	10	102,072	1929	Garfield	4,520	6	47,560	1928
Lyons	2,127	9	24,900	1942	Center	167	5	1,983	1933	Grant	114	6	1,200	1925
Oak	8,925	5	117,821	1925	Dale	2,588	16	17,659	1926	Lake	2	1	35	1927
Plattville	606	4	5,859	1925	Floyd	3,082	11	27,975	1929	Lincoln	1,773	8	27,375	1934
Rawles	2,293	6	23,985	1923	Franklin	3,617	7	32,650	1929	Lizard	3,257	8	41,075	1926
St. Marys	1,256	4	21,477	1925	Grant	2,205	5	27,947	1925	Marshall	1,051	7	18,455	1927
Silver Creek	2,886	7	35,440	1925	Hartley	1,438	5	14,700	1924	Powhatan	2,647	6	45,031	1933
White Cloud	2,623	6	17,250	1939	Highland	439	7	4,810	1926	Roosevelt	1,631	7	15,354	1928
<b>IN TOWNS</b>	377	4	5,950	1925	Liberty	1,167	6	16,270	1926	Sherman	330	5	3,423	1928
<b>MITCHELL COUNTY</b>	46,871	19	448,513	1928	Lincoln	3,334	11	38,900	1933	Swan Lake	28	3	412	1936
<b>TOWNSHIPS</b>					Omega	1,613	5	30,410	1942	Washington	88	1	1,752	1933
Burr Oak	1,398	6	8,208	1926	Summit	2,966	14	25,238	1938	<b>IN TOWNS</b>	12	3	134	1924
Cedar	2,329	5	27,200	1936	Union	4,548	10	54,705	1933	<b>POLK COUNTY</b>	23,455	20	115,158	1928
Douglas	3,261	9	17,750	1928	Waterman	397	6	3,586	1924	<b>TOWNSHIPS</b>				
East Lincoln	2,164	9	34,393	1923	<b>IN TOWNS</b>	129	6	1,100	1929	Allen	2,564	9	20,041	1930
Jenkins	2,620	7	43,500	1928	<b>OSCEOLA COUNTY</b>	23,588	20	115,475	1935	Beaver	3,910	7	69,919	1937
Liberty	2,901	13	45,840	1928	<b>TOWNSHIPS</b>					Bloomfield	465	6	7,441	1936
Mitchell	87	3	1,400	1928	Allison	1,352	11	7,183	1935	Camp	1,633	6	22,530	1937
Newburg	3,191	7	25,000	1932	Baker	85	4	1,120	1932	Clay	1,364	7	8,560	1938
Osage	700	4	12,380	1936	Fairview	1,645	9	12,957	1935	Crocker	2,172	2	41,050	1928
Otranto	5,389	10	91,615	1928	Gilman	1,430	9	16,804	1927	Delaware	3	2	50	1927
Rock	553	8	3,485	1932	Goeway	3,352	12	30,935	1942	Douglas	1,164	6	20,200	1941
St. Ansgar	4,354	11	82,267	1928	Harrison	324	8	3,080	1923	Elkhart	1,265	5	14,889	1941
Stacyville	10,519	10	137,130	1936	Holman	4,083	14	26,041	1942	Four-Mile	538	4	8,790	1930
Union	5,997	10	77,990	1928	Horton	3,066	17	22,272	1935	Franklin	780	3	10,204	1938
Wayne	693	7	7,269	1928	Ocheyedan	2,842	15	21,940	1935	Jefferson	155	4	2,995	1924
West Lincoln	518	11	5,685	1936	Viola	797	8	10,039	1935	Lincoln	3,345	6	59,672	1928
<b>IN TOWNS</b>	197	7	1,619	1924	Wilson	4,475	14	33,003	1935	Madison	1,433	4	18,875	1926
<b>MONONA COUNTY</b>	55,061	18	447,245	1925	<b>IN TOWNS</b>	137	7	1,900	1935	Saylor	10	1	200	1928
<b>TOWNSHIPS</b>					<b>PAGE COUNTY</b>	14,398	19	72,334	1923	Union	792	6	11,500	1926
Ashton	11,358	8	156,835	1925	<b>TOWNSHIPS</b>					Walnut	131	2	2,365	1925
Belvidere	1,450	1	29,010	1941	Amity	1,450	7	9,690	1940	Washington	1,346	4	18,336	1941
Center	1,445	4	20,271	1940	Buchanan	866	13	13,724	1937	Webster	185	6	2,368	1928
Cooper	1,666	11	19,800	1940	Colfax	495	6	8,750	1923	<b>IN TOWNS</b>	200	8	1,460	1941
Fairview	1,186	6	16,225	1927	Douglas	581	7	3,555	1927	<b>POTTAWATTAMIE</b>	51,419	20	331,050	1925
Franklin	3,588	9	35,910	1925	East River	1,632	7	24,825	1937	<b>TOWNSHIPS</b>				
Grant	298	4	5,061	1929	Fremont	70	3	1,149	1942	Belknap	1,228	7	10,465	1938
Jordan	2,865	4	40,200	1940	Grant	21	1	415	1923	Boomer	2,207	3	42,725	1939
Kennebec	480	5	5,670	1940	Harlan	763	9	7,832	1942	Boomer	2,207	3	42,725	1939
Lake	1,338	7	11,307	1930	Lincoln	1,635	3	28,889	1923	Carson	1,601	6	26,950	1930
Lincoln	5,707	5	84,300	1925	Morton	1,736	7	21,426	1923	Center	282	7	2,055	1932
Maple	4,220	5	32,600	1937	Nebraska	391	2	7,590	1937	Crecent	118	3	860	1925
St. Clair	1,209	1	24,185	1929	Nodaway	3,314	8	25,212	1942	Garner	1,140	5	20,722	1925
Sherman	732	4	14,242	1941	Pierce	264	1	5,275	1930	Grove	80	2	1,308	1925
Sioux	1,606	3	31,851	1941	Tarkio	23	2	368	1927	Hardin	1,386	7	9,250	1942
Soldier	1,692	5	18,382	1933	Valley	834	6	13,415	1937	Hazel Dell	105	1	2,110	1939
Spring Valley	3,756	5	38,175	1937	Washington	266	5	2,542	1925	James	3,775	14	27,350	1923
West Fork	9,294	12	167,150	1925	<b>IN TOWNS</b>	57	6	400	1937	Kane	1,521	3	15,000	1925
Willow	732	5	12,350	1937	<b>PALO ALTO COUNTY</b>	23,670	18	89,388	1934	Keg Creek	846	4	10,000	1925
<b>IN TOWNS</b>	439	3	5,755	1929	<b>TOWNSHIPS</b>					Knox	545	9	3,975	1941
<b>MONROE COUNTY</b>	8,683	14	115,959	1926	Booth	2,146	12	18,274	1933	Lake	814	2	9,025	1939
<b>TOWNSHIPS</b>					Ellington	3,014	12	24,958	1927	Layton	4,409	13	49,937	1924
Bluff Creek	277	7	2,630	1925	Emmetsburg	72	5	565	1926	Lewis	9,178	13	136,305	1925
Cedar	0	0	0	0	Fairfield	309	7	3,022	1942	Lincoln	484	6	3,300	1941
Franklin	205	1	4,100	1926	Fern Valley	553	1	11,050	1942	Macedonia	127	5	1,725	1923
Guilford	2,921	6	57,525	1926	Freedom	628	1	12,550	1934	Minden	3,391	7	35,059	1925
Jackson	502	2	6,740	1926	Great Oak	31	4	319	1923	Neola	123	6	6,150	1924
Mantua	418	2	6,700	1926	Highland	3,139	11	42,457	1936	Norwalk	404	4	3,600	1941
Monroe	400	4	5,599	1926	Independence	70	1	1,400	1925	Pleasant	5,078	9	28,327	1925
Pleasant	620	5	4,780	1925	Lost Island	406	5	4,900	1936	Rockford	106	3	1,085	1928
Troy	1,192	8	20,225	1926	Nevada	1,823	3	18,700	1934	Silver Creek	2,074	9	19,265	1942
Union	333	4	4,403	1936	Rush Lake	3,330	6	62,546	1938	Valley	455	15	2,910	1923
Urbana	1,697	3	19,981	1937	Silver Lake	5,281	9	36,610	1936	Washington	2,352	7	40,295	1936
Wayne	120	4	1,620	1926	Vernon	740	7	7,130	1930	Waveland	1,859	7	31,537	1925
<b>IN TOWNS</b>	0	0	0	0	Walnut	315	4	4,500	1942	Wright	2,026	8	31,721	1936
<b>MONTGOMERY CO.</b>	35,816	18	457,181	1925	West Bend	1,598	6	20,950	1927	York	2,671	13	17,775	1931
<b>TOWNSHIPS</b>					<b>IN TOWNS</b>	215	4	2,500	1934	<b>IN TOWNS</b>	394	6	5,350	1936
Douglas	1,026	7	8,120	1925	<b>PLYMOUTH COUNTY</b>	174,668	20	622,623	1942	<b>POWESHIEK CO.</b>	41,119	19	233,336	1923
East	1,935	11	14,325	1937	<b>TOWNSHIPS</b>					<b>TOWNSHIPS</b>				
Frankfort	3,857	4	72,965	1925	America	7,652	10	81,900	1932	Bear Creek	4,800	5	70,094	1923
Garfield	6,435	8	41,232	1939	Elgin	12,566	11	109,420	1934	Chester	5,779	7	68,000	1924
Grant	2,216	5	38,700	1925	Elkhorn	11,171	5	159,054	1942	Deep River	405	5	4,663	1938
Lincoln	3,489	4	43,780	1925	Fredonia	6,628	11	71,370	1924	Grant	1,179	6	21,650	1936
Pilot Grove	5,168	4	96,040	1925	Garfield	18,191	11	240,976	1942	Jackson	690	4	6,720	1927
Red Oak	1,767	7	13,974	1925	Grant	16,683	9	116,897	1928	Jefferson	1,547	3	19,149	1941
Scott	4,351	11	67,618	1925	Hancock	2,206	5	31,500	1929	Lincoln	3,819	5	70,000	1925
Sherman	3,348	3	63,524	1925	Henry	1,413	10	9,315	1926	Madison	272	3	2,825	19

TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
Riley	72	2	940	1938	Union	588	2	11,569	1941	Jackson	5	1	105	1923
Tingley	160	5	2,295	1942	Warren	435	4	8,310	1931	Jefferson	0	0	0	0
Union	306	6	3,135	1927	Washington	2,487	3	46,720	1928	Liberty	462	3	5,115	1938
Washington	286	2	5,700	1942	IN TOWNS	223	4	3,625	1928	Lincoln	897	5	10,467	1938
Waubonsie	5	1	92	1926	<b>TAMA COUNTY</b>	34,800	17	193,681	1927	Linn	15	2	200	1924
IN TOWNS	57	5	895	1942	<b>TOWNSHIPS</b>					Otter	3	2	50	1940
<b>SAC COUNTY</b>	55,580	20	281,621	1933	Buckingham	1,744	3	20,274	1942	Palmyra	588	7	3,998	1927
<b>TOWNSHIPS</b>					Carleton	1,062	4	14,420	1929	Richland	1,808	5	22,867	1937
Boyer Valley	1,689	8	25,000	1932	Carroll	2,573	8	25,650	1924	Squaw	179	2	3,131	1932
Cedar	308	4	4,407	1934	Clarke	5,668	7	40,250	1924	Union	406	5	6,652	1937
Clinton	5,221	6	89,825	1933	Columbia	214	4	3,489	1924	Virginia	113	5	1,119	1932
Cook	8,660	6	71,150	1933	Crystal	895	3	12,500	1927	White Breast	143	2	1,981	1932
Coon Valley	2,640	10	23,712	1925	Geneseo	1,233	3	24,050	1931	White Oak	670	5	7,678	1937
Delaware	1,090	5	16,264	1937	Grant	1,499	5	22,670	1936	IN TOWNS	101	4	1,700	1930
Douglas	845	11	8,375	1937	Highland	1,216	8	14,995	1924	<b>WASHINGTON CO.</b>	57,234	19	575,266	1924
Eden	7,190	15	65,310	1933	Howard	121	3	2,200	1929	<b>TOWNSHIPS</b>				
Eureka	1,895	15	10,390	1933	Indian Village	0	0	0	0	Brighton	7,344	8	137,401	1925
Jackson	1,951	7	26,900	1924	Lincoln	2,116	4	17,519	1927	Cedar	2,795	3	55,735	1924
Levey	3,170	10	21,800	1929	Oneida	1,339	6	13,600	1924	Clay	251	2	4,627	1931
Richland	1,020	4	13,500	1924	Otter Creek	1,094	6	20,602	1936	Crawford	897	8	11,623	1938
Sac	190	3	3,641	1928	Perry	9,264	7	88,110	1927	Dutch Creek	8,049	9	134,090	1925
Viola	3,313	10	26,400	1928	Richland	387	8	2,515	1934	English River	2,416	3	47,372	1936
Wall Lake	1,396	10	8,919	1932	Salt Creek	281	2	5,525	1927	Franklin	8,191	6	134,500	1924
Wheeler	14,936	13	146,355	1928	Spring Creek	1,912	7	12,100	1934	Highland	714	5	10,508	1926
IN TOWNS	66	6	809	1933	Tama	52	6	450	1923	Iowa	456	3	7,920	1936
<b>SCOTT COUNTY</b>	45,768	20	241,315	1925	Toledo	565	6	9,218	1936	Jackson	859	6	6,362	1926
<b>TOWNSHIPS</b>					York	1,190	3	23,264	1927	Lime Creek	3,570	6	36,050	1924
Allens Grove	736	3	12,574	1938	IN TOWNS	375	8	5,310	1927	Marion	1,917	2	31,250	1925
Blue Grass	1,949	8	15,569	1933	<b>TAYLOR COUNTY</b>	12,583	20	88,969	1927	Oregon	313	9	1,900	1925
Buffalo	1,053	4	10,650	1925	<b>TOWNSHIPS</b>					Seventy-Six	19,024	11	319,325	1924
Butler	2,130	6	16,610	1942	Bedford	457	8	7,296	1938	Washington	419	6	7,475	1924
Cleona	1,632	18	20,735	1925	Benton	277	6	3,275	1938	IN TOWNS	19	4	200	1925
Davenport	1,590	4	29,439	1924	Clayton	1,524	13	25,450	1927	<b>WAYNE COUNTY</b>	6,207	12	55,948	1926
Hickory Grove	5,971	10	109,187	1925	Dallas	60	4	464	1928	<b>TOWNSHIPS</b>				
Le Claire	917	8	8,805	1923	Gay	765	6	12,599	1927	Benton	317	4	6,070	1937
Liberty	6,774	10	65,950	1927	Grant	371	3	5,570	1923	Clay	0	0	0	0
Lincoln	9,700	8	108,501	1942	Grove	387	8	3,800	1927	Clinton	28	1	550	1941
Pleasant Valley	699	3	7,180	1935	Holt	271	5	3,788	1942	Corydon	92	3	1,015	1930
Princeton	171	4	3,055	1938	Jackson	451	7	7,829	1934	Grand River	0	0	0	0
Rockingham	1,126	2	11,300	1925	Jefferson	87	7	1,218	1928	Howard	185	2	3,500	1941
Sheridan	6,355	10	65,784	1924	Marshall	2,856	5	45,350	1927	Jackson	576	4	5,786	1927
Winfield	3,387	11	20,717	1942	Mason	1,223	13	13,381	1931	Jefferson	105	3	1,560	1935
IN TOWNS	1,578	5	22,859	1924	Nodaway	1,208	9	10,357	1923	Monroe	35	4	488	1941
<b>SHELBY COUNTY</b>	65,581	20	673,876	1940	Platte	287	7	4,090	1923	Richman	0	0	0	0
<b>TOWNSHIPS</b>					Polk	895	13	10,415	1937	South Fork	1,418	1	28,369	1926
Cass	18,424	7	340,935	1940	Ross	1,218	6	22,628	1923	Union	935	5	19,107	1926
Center	1,839	4	32,371	1941	Washington	235	3	2,200	1939	Walnut	799	6	9,920	1941
Clay	2,394	6	22,981	1928	IN TOWNS	11	5	150	1935	Warren	1,208	2	22,615	1927
Douglas	1,944	9	17,423	1927	<b>UNION COUNTY</b>	16,061	19	88,824	1928	Washington	372	3	5,310	1926
Fairview	2,255	6	39,627	1940	<b>TOWNSHIPS</b>					Wright	14	1	272	1928
Greeley	3,052	10	48,845	1928	Dodge	371	7	5,378	1938	IN TOWNS	63	2	1,250	1926
Grove	4,430	10	49,034	1942	Douglas	1,520	12	11,050	1931	<b>WEBSTER COUNTY</b>	66,053	20	427,994	1924
Jackson	483	9	4,679	1930	Grant	1,631	13	12,991	1926	<b>TOWNSHIPS</b>				
Jefferson	837	8	8,978	1928	Highland	2,395	15	20,709	1928	Badger	355	6	5,225	1933
Lincoln	1,759	6	30,360	1940	Jones	631	7	10,124	1923	Burnside	7,931	9	102,300	1924
Monroe	4,749	17	43,420	1935	Lincoln	1,730	11	19,876	1938	Clay	2,617	5	39,105	1924
Polk	1,236	10	8,835	1923	New Hope	1,606	8	13,577	1938	Colfax	2,254	12	14,125	1931
Shelby	10,515	3	179,800	1940	Platte	552	6	9,743	1925	Cooper	571	7	6,296	1931
Union	2,412	10	14,785	1927	Pleasant	412	5	6,023	1923	Dayton	6,928	5	20,395	1924
Washington	7,215	9	63,870	1940	Sand Creek	2,355	5	43,350	1928	Deer Creek	1,305	7	15,148	1925
Westphalia	1,860	11	14,630	1942	Spaulding	2,409	14	18,509	1938	Douglas	208	6	1,648	1942
IN TOWNS	177	3	2,995	1940	Union	317	9	3,516	1927	Elkhorn	2,369	11	37,170	1924
<b>SIoux COUNTY</b>	139,525	20	1,076,280	1929	IN TOWNS	132	7	1,750	1931	Fulton	8,996	6	95,383	1926
<b>TOWNSHIPS</b>					<b>VAN BUREN COUNTY</b>	6,016	12	101,603	1929	Gowrie	3,237	9	37,125	1926
Buncombe	1,292	6	16,780	1926	<b>TOWNSHIPS</b>					Hardin	28	4	210	1925
Catel	2,279	5	39,945	1936	Bonaparte	814	3	13,355	1929	Jackson	924	9	7,510	1936
Center	6,215	8	61,770	1928	Cedar	17	2	275	1932	Johnson	2,884	10	46,450	1926
Eagle	7,574	10	53,055	1933	Chequest	0	0	0	0	Lost Grove	3,158	11	21,440	1926
East Orange	2,446	7	29,236	1933	Des Moines	119	2	1,384	1942	Newark	907	7	7,050	1924
Floyd	194	4	2,330	1925	Farmington	73	4	745	1929	Otho	1,350	4	26,200	1924
Garfield	8,009	17	75,624	1929	Harrisburg	160	6	1,487	1929	Pleasant Valley	276	6	1,700	1924
Grant	4,828	8	89,140	1929	Henry	446	3	7,300	1929	Roland	17,079	6	175,225	1926
Holland	1,275	3	20,540	1933	Jackson	0	0	0	0	Sumner	194	2	2,600	1933
Lincoln	11,520	11	203,400	1929	Lick Creek	2,135	6	39,000	1929	Washington	211	6	3,025	1925
Logan	1,291	9	11,109	1932	Union	1,277	3	24,621	1929	Webster	296	4	4,110	1925
Linn	1,908	5	21,962	1929	Van Buren	295	2	5,690	1929	Yell	439	8	6,800	1925
Nassau	6,182	8	55,150	1934	Vernon	77	2	1,490	1925	IN TOWNS	1,536	13	16,934	1926
Plato	3,941	16	43,771	1929	Village	84	1	1,687	1942	<b>WINNEBAGO COUNTY</b>	24,480	17	216,566	1941
Reading	7,195	8	104,150	1928	Washington	519	5	9,405	1929	<b>TOWNSHIPS</b>				
Rock	12,180	11	171,410	1929	IN TOWNS	0	0	0	0	Buffalo	2,740	12	17,580	1941
Settlers	7,679	14	57,200	1928	<b>WAPELLO COUNTY</b>	11,878	17	60,905	1925	Center	1,797	4	33,318	1941
Sheridan	10,207	10	179,050	1929	<b>TOWNSHIPS</b>					Eden	227	3	2,570	1942
Sherman	9,310	10												



TWENTY YEARS OF HAIL DAMAGE IN IOWA—Continued

County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years		County and township	20-year average \$	Years in 20 with hail	Greatest loss in 20 years	
			Amt. \$	Year				Amt. \$	Year				Amt. \$	Year
Hesper	2,181	7	21,870	1927	Miller	8,457	12	49,010	1930	Lincoln	1,830	8	25,310	1932
Highland	2,444	6	34,560	1927	Morgan	4,405	10	21,255	1930	Silver Lake	347	1	6,950	1928
Jackson	9,362	17	61,288	1933	Moville	9,831	9	65,130	1929	Union	1,445	5	26,000	1932
Lincoln	1,805	10	21,525	1933	Oto	5,374	10	40,800	1928	IN TOWNS	206	6	2,638	1932
Madison	2,906	8	31,698	1933	Rock	1,874	9	10,400	1929	<b>WRIGHT COUNTY</b>	23,748	20	130,310	1923
Military	4,483	2	87,447	1933	Rutland	3,591	7	61,057	1925	<b>TOWNSHIPS</b>				
Orleans	1,476	5	18,100	1925	Sioux City	528	9	6,500	1929	Belmond	1,280	9	19,185	1925
Pleasant	1,905	5	27,650	1923	Sloan	2,284	8	43,320	1929	Blaine	2,613	10	26,462	1925
Springfield	4,024	3	65,375	1933	Union	1,826	4	33,783	1942	Boone	880	7	6,300	1927
Sumner	7,645	14	64,695	1933	West Fork	2,992	6	46,950	1924	Dayton	40	2	420	1924
Washington	4,074	10	30,695	1927	Willow	6,059	8	53,360	1924	Eagle Grove	2,994	5	59,040	1923
IN TOWNS	1,475	11	13,121	1933	Wolf Creek	13,213	10	114,100	1925	Grant	1,698	9	14,938	1937
<b>WOODBURY COUNTY</b>	119,026	20	551,818	1930	Woodbury	352	2	5,800	1934	Iowa	198	1	3,953	1925
<b>TOWNSHIPS</b>					IN TOWNS	45	5	370	1928	Lake	413	3	5,976	1924
Arlington	8,130	12	73,279	1934	<b>WORTH COUNTY</b>	23,606	19	182,333	1932	Liberty	1,033	4	18,250	1928
Banner	3,602	6	37,030	1930	<b>TOWNSHIPS</b>				Lincoln	414	4	5,660	1924	
Concord	10,272	10	130,125	1929	Barton	4,090	10	42,130	1932	Norway	1,354	8	21,380	1925
Floyd	3,558	7	38,720	1929	Bristol	283	5	2,964	1942	Pleasant	673	8	6,882	1925
Grange	10,177	18	80,685	1924	Brookfield	1,066	2	21,115	1932	Troy	5,308	8	36,750	1923
Grant	7,694	12	72,472	1930	Danville	2,058	8	22,410	1932	Vernon	2,050	8	16,202	1928
Kedron	986	1	19,718	1941	Deer Creek	4,785	6	61,641	1928	Wall Lake	822	7	7,518	1931
Lakeport	133	7	840	1929	Fertile	690	5	5,215	1931	Woolstock	1,290	4	22,680	1923
Liberty	3,394	5	61,730	1930	Grove	2,480	4	22,199	1928	IN TOWNS	688	9	11,710	1923
Liston	5,859	7	83,532	1930	Hartland	216	2	2,650	1937					
Little Sioux	4,330	6	47,795	1928	Kensett	4,110	9	38,375	1932					

HAIL DAMAGE

The preceding table summarizes 20 years of hail losses in Iowa. Gathered by assessors in their annual visits to every farm the statistics represent the best available information concerning the amount of hail damage actually sustained in every part of the State.

However, the losses in dollars are not entirely indicative of the prevalence or absence of hail as a meteorological phenomenon. In rich agricultural counties the value of the crops at risk is much greater than in the poorer agricultural counties. The south central Iowa counties where damage from hail was least, are not nearly as productive as the northwest counties where the greatest losses were sustained. Furthermore, the losses in years when prices of farm crops were low, cannot be justly compared with the damage sustained in years of high prices without applying some sort of a correction factor to reduce the values to parity. Still another factor to be considered is that in some cases heavy hail has fallen in areas where crops had already been damaged by drouth, wind, flood or other causes, and as a result the loss caused by the hail was relatively light.

Nevertheless, the data show conclusively that destructive hail is most frequent in the northwest counties. The greatest average annual loss was \$174,668 in Plymouth, followed by \$139,525 in Sioux, and \$119,026 in Woodbury counties. The least loss was sustained in Lucas County, where the 20-year average amounted to \$2,183. Unfortunately, lack of space prevents publication of charts with isolines that show the distribution of the losses graphically.

The greatest annual hail loss was \$7,975,686 in 1925. Most of this occurred in one storm, on August 18, the damage area extending from the southeast corner of Poweshiek and southwest corner of Iowa counties, southeastward about 60 miles across Keokuk, Washington, Jefferson and Henry counties, and into Lee County. The total loss from this one storm was approximately \$5,000,000, and its effect is apparent in the 20-year averages.

The frequent local storms of the current year will not materially alter the general facts presented by the table, although naturally, some of the averages will be slightly changed when another full year of data can be included in the computations.

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, AUGUST, 1943 No. 8

GENERAL SUMMARY

During August, 1943, an unusual combination of warm and wet weather prevailed over Iowa for the third consecutive month. The average temperature of 74.0° was 1.8° above the all-time August average, making this equal the 19th warmest August of record. The average total precipitation of 5.07 inches was the 10th greatest of August record and 1.47 inches more than normal. But none of the warmer Augusts received as much precipitation and conversely none of the wetter Augusts were as warm as in 1943. This same weather pattern prevailed during the two preceding months. There was only one year in which June was both warmer and wetter than in 1943 and only three in which July was warmer and wetter. And, for the three months as a whole, there have been five wetter and sixteen warmer summers but none has been both warmer and wetter. Whether considered as the wettest warm summer or the warmest wet summer, the weather during the three-month period seems to have been ideal for crop growth and has resulted in the production of the greatest Iowa corn crop of record, as well as abundant yields of other crops so urgently needed for prosecution of the war.

Cloudiness, relative humidity and the number of rainy days were above normal, while sunshine and the number of clear days were deficient.

The northeast portion of the State, which had previously been rather dry, received the heaviest precipitation. Other areas of heavy rainfall were located over the lower Skunk River Valley, the middle and lower Raccoon Valley and over Taylor and adjacent counties. Despite the high average rainfall, there was a considerable deficiency of precipitation almost amounting to serious drouth in Plymouth, Sioux, Woodbury, Buena Vista, Pocahontas and Cherokee counties in the northwest portion, and in another area embracing much of Harrison, Shelby, Pottawattamie, Cass, Adams, Mills and Fremont counties in the southwest. Precipitation was also deficient in a belt from Grundy to Jackson counties. This latter dry area, which seems to be an extension of the one in the northwest part of the State, separates the peak of heavy precipitation over the northeast counties from a second peak over the lower Skunk Valley.

Fortunately there were no excessively high temperatures, so that the moisture requirements of crops were not nearly as great as in the hot summers of 1934 and 1936. As a result, damage from the incipient drouth was not serious except in a few local areas.

In general the temperature was highest along the western border of the State and lowest in the central sections.

The first two weeks were quite warm. This was followed

COMPARATIVE DATA FOR AUGUST, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	75.7	102	54	4.17					
1874	74.3	99	55	3.12					
1875	68.9	92	41	4.04					
1876	73.2	96	46	5.15					
1877	71.9	100	53	4.36					
1878	74.4	100	50	3.22					
1879	72.0	100	42	2.70					
1880	72.5	104	41	4.77					
1881	76.5	104	48	2.71					
1882	71.5	96	43	1.61					
1883	69.2	98	42	2.58					
1884	68.5	93	44	4.09					
1885	66.9	98	40	5.90					
1886	74.2	103	34	2.02					
1887	70.8	103	34	2.75					
1888	70.4	110	40	4.37					
1889	71.3	104	37	1.75					
1890	68.1	102	34	3.25					
1891	69.1	106	34	4.24		8	13	12	6
1892	71.4	102	40	2.24		5	18	9	4
1893	69.4	101	30	2.32		5	19	9	3
1894	74.6	108	38	1.58		4	21	8	2
1895	71.9	103	37	4.43		7	17	9	5
1896	71.7	104	34	3.52		8	15	11	5
1897	68.9	104	35	1.86		6	15	11	5
1898	71.2	103	40	3.44		6	17	9	5
1899	74.4	100	41	3.68		7	17	10	4
1900	77.4	103	44	4.65		6	18	10	3
1901	73.8	105	40	1.29		5	20	9	2
1902	69.1	98	37	6.58		11	11	11	9
1903	69.1	101	41	6.64		11	12	10	9
1904	69.1	97	35	3.43		7	17	8	6
1905	74.3	104	44	4.05		9	16	9	6
1906	74.1	101	33	3.95		9	17	9	5
1907	71.1	99	37	4.33		9	17	9	5
1908	70.0	101	38	4.77		9	17	9	5
1909	76.1	103	33	1.81		5	21	8	2
1910	71.9	104	36	3.88		8	15	10	6
1911	71.7	107	34	3.32		9	16	10	5
1912	71.0	101	40	3.78		10	15	10	6
1913	76.6	108	40	2.68		6	17	10	4
1914	73.7	103	40	2.19		7	17	10	4
1915	65.9	91	30	2.81		8	16	8	7
1916	74.0	106	35	2.58		7	18	9	4
1917	69.4	102	31	2.29		7	19	8	4
1918	76.0	113	38	3.61		8	16	10	5
1919	71.5	103	38	2.59		7	19	9	3
1920	69.3	98	39	3.35		7	18	8	5
1921	72.1	102	37	5.04		8	16	11	4
1922	73.8	102	42	3.06		8	19	8	4
1923	70.6	102	38	5.42		12	15	9	7
1924	71.7	100	40	5.35		10	16	10	5
1925	72.4	99	39	3.47		8	18	9	4
1926	73.5	103	47	3.80		10	16	10	5
1927	67.9	99	35	2.36		8	15	10	6
1928	72.7	100	37	6.42		9	19	8	4
1929	71.9	102	37	2.44		6	18	9	4
1930	74.4	113	41	2.42		8	15	11	5
1931	72.6	102	37	3.30		8	16	10	5
1932	72.2	100	43	7.10		12	15	9	7
1933	70.5	101	41	3.01		8	15	9	7
1934	73.4	116	33	2.84		9	15	11	5
1935	73.6	107	34	2.42		7	18	10	3
1936	79.2	114	46	3.48		8	15	12	4
1937	77.8	108	49	3.99		8	19	9	3
1938	75.7	105	42	3.82		7	18	9	4
1939	70.7	99	38	4.72		10	16	9	6
1940	70.7	101	39	6.44		14	10	11	10
1941	75.1	103	38	1.94		6	18	10	3
1942	72.2	102	34	3.17		7	16	11	4
1943	74.0	101	40	5.07		10	13	12	6
Period	72.2	116	30	3.60		8	16	10	5

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

by a cool spell from the 16th through the 20th which brought the lowest temperatures of the month and a few scattered reports of light frost on the 17th-18th. Thereafter unseasonably warm weather prevailed until the end of the month, except for a short cool wave on the 27th.

CLIMATOLOGICAL DATA FOR AUGUST, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54																	D. E. Hadden
Alton	Sioux	1,805	39	73.9	+ 3.5	95	24	46	17	2.44	- 0.98	1.41	11	0	8	10	18	3	s.	W. S. Slagle
Cherokee 1 1/2 NW	Cherokee	1,358	24	73.2	+ 3.2	92	12	44	17	1.01	- 2.03	0.27	3	0	10	15	15	1	s.	J. Earl Wirth
Estherville	Emmet	1,298	50	71.2	+ 1.4	93	12	43	18	4.80	+ 1.34	1.13	25	0	14	10	11	10	se.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	74.4	+ 3.8	96	8	43	17	1.94	- 1.06	0.98	22	0	10	11	8	12	s.	Earl V. Slife
Inwood 2 1/2 SW	Lyon	1,474	41	73.4	+ 2.9	95	24	41	17	3.93	+ 0.96	1.69	24-25	0	7	18	11	2	se.	A. C. Hanson
Lake Park	Dickinson	1,479	41	71.0	+ 1.6	90	1	45	17	4.12	+ 0.44	1.09	24-25	0	10	15	6	10	nw.	Frank O. Rood
Le Mars	Plymouth	1,280	57	74.8	+ 4.1	97	23	43	17	0.74	- 2.19	0.20	11	0	7	11	14	6	s.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	73.2	+ 2.6	94	24	44	18	1.12	- 2.65	0.80	12	0	5	8	14	9	sw.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17																	Scott King
Rock Rapids	Lyon	1,341	47	72.3	+ 2.8	93	8	44	17	5.75	+ 2.74	3.46	11	0	5	8	14	9	se.	George Raveling
Sanborn	O'Brien	1,552	31	71.8	+ 1.9	93	1	44	17	4.67	+ 0.97	1.58	22	0	7	9	13	9	se.	Susie O. Dow
Sheldon	O'Brien	1,418	38	72.2	+ 2.4	92	12	45	17	4.50	+ 1.21	2.16	11-12	0	10	14	13	4	se.	Ross E. Forward
Sibley	Osceola	1,494	9	71.4	+ 2.4	92	1	41	18	4.01	+ 0.51	2.24	11	0	10	15	7	9	s.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		73.4	+ 2.2	94	12	42	18	2.52	- 1.08	1.10	24-25	0	9	15	11	5	s.	Walter A. Simonsen
Spencer	Clay	1,319	36	73.0	+ 1.7	93	7	43	17	4.08	+ 0.50	1.78	24-25	0	10	12	12	7	sw.	E. W. Little
Storm Lake 1 1/2 N	Buena Vista	1,455	54																	Paul B. Vance
West Bend	Palo Alto	1,197	57	71.6	+ 1.2	92	12	44	17	2.84	- 0.88	0.87	24-25	0	12	10	17	4	se.	Jos. Dorweiler
<b>Means and extremes</b>				72.7	+ 2.4	97	23	41	17	3.23	- 0.18	3.46	11	0	9	12	12	7	s.	
<b>North Central Dist.</b>																				
Algona	Kossuth	1,200	83	72.0	+ 1.6	93	12	47	17	6.28	+ 2.28	2.33	24-25	0	13	15	8	8	se.	Harry B. Nolte
Allison	Butler	1,060	30	72.6	+ 2.7	94	12	49	17	5.07	+ 1.47	1.40	13	0	11	17	8	6	se.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	70.8	+ 1.0	92	12	44	17	5.63	+ 1.93	1.50	9	0	11	13	9	9	s.	Wilbur Fox
Belmond	Wright	1,175	35	71.9	+ 1.3	91	7	42	18	7.30	+ 3.38	1.90	13	0	11	14	9	8	se.	W. H. Dempsey
Britt	Hancock	1,240	59	72.0	+ 1.9	93	12	46	18	5.93	+ 1.93	1.85	24-25	0	11	14	9	8	sw.	L. M. Naser
Charles City	Floyd	1,013	69	71.3	+ 2.2	91	12	47	18	5.77	+ 2.29	1.68	12-13	0	15	10	10	11	s.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	72.6	+ 1.8	92	12	44	18	3.61	- 0.06	1.12	31	0	12	13	12	6	s.	H. S. Brandsgard
Forest City	Winnebago	1,289	54	70.8	+ 1.2	94	12	45	18	7.72	+ 4.16	2.10	9	0	16	7	9	15	sw.	Dr. M. B. Neil
Hampton 3NW	Franklin	1,142	53																	E. A. Saxton
Mason City 3N	Cerro Gordo	1,148	52	71.0	+ 2.1	91	12	43	18	7.12	+ 2.96	1.98	24-25	0	14	15	5	11	se.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	70.0	+ 1.1	90	12	47	17	8.70	+ 4.78	3.40	25	0	16	13	9	9	se.	Charles H. Dwelle
Osage	Mitchell	1,170	59	71.1	+ 2.4	91	12	45	18	7.25	+ 3.65	3.73	13	0	12	12	15	4	sw.	Glen V. Yarger
<b>Means and extremes</b>				71.5	+ 1.8	94	12	42	18	6.40	+ 2.61	3.73	13	0	13	13	9	9	se.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							4.50	+ 0.70	0.84	9	0	12	14	9	8	sw.	E. J. Cable
Cresco	Howard	1,298	7	70.4	+ 1.6	92	12	45	18	10.10	+ 6.20	3.62	13	0	9	16	11	4	e.	William C. Patterson
Decorah 2S	Winnesiek	880	61	70.3	+ 1.3	92	12	40	18	8.28	+ 4.36	2.70	13	0	11	12	12	7	sw.	Mrs. Fleta M. Rose
Delaware 1 1/2 W	Delaware	1,083	65	72.4	+ 2.1	91	2	48	17	3.81	+ 0.17	1.58	23	0	10	17	9	5	nw.	Clair E. Paris
Dubuque	Dubuque	642	93	74.0	+ 2.3	93	12	52	18	6.59	+ 3.25	2.85	12-13	0	12	6	13	12	s.	U. S. Weather Bureau
Elkader	Clayton	772	52	71.6	+ 1.0	92	1	44	18	6.49	+ 3.06	3.00	13	0	9	12	15	4	s.	W. H. O'Brien
Fayette	Fayette	1,009	56																	John P. Clyde
Guttenberg	Clayton			74.2	+ 4.2	92	1	52	18	6.72	+ 3.22	2.66	13	0	11	12	8	11		U. S. Engineers
Independence 1 1/2 W	Buchanan	956	84	72.6	+ 2.3	92	24	47	18	4.53	+ 0.79	1.20	23	0	10	8	18	5	s.	August Bracht
New Hampton	Chickasaw	1,161	47	71.4	+ 2.2	92	12	47	17	8.09	+ 4.03	2.00	13	0	8	18	9	4	sw.	C. Maas
Oelwein	Fayette	1,036	22	71.9	+ 1.4	92	8	44	18	7.85	+ 3.99	1.85	13	0	8	14	15	2	nw.	John T. Ridler
Postville 5SW	Clayton	1,130	53	70.0	+ 2.4	88	12	47	18	9.60	+ 5.69	4.52	13	0	8	14	12	5	sw.	V. H. Williams
Waterloo	Black Hawk	848	62	73.0	+ 1.9	91	12	46	18	3.51	- 0.29	0.97	9	0	11	15	10	6	nw.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	70.5	+ 1.5	90	1	46	18	9.52	+ 5.52	2.85	23	0	10	22	3	6	sw.	Mrs. Albert S. Tousley
Waverly 1W	Bremer	935	55	72.1	+ 2.0	91	12	44	18	6.07	+ 2.33	2.12	13	0	13	12	15	4	se.	Charles W. Wile
<b>Means and extremes</b>				71.9	+ 2.1	93	12	40	18	6.83	+ 3.04	4.52	13	0	10	14	11	6	sw.	
<b>West Central Dist.</b>																				
Audubon 2SW	Audubon	1,297	51	74.4	+ 2.9	92	31	50	17	5.19	+ 1.35	2.25	22	0	10	8	19	4	se.	Geo. Kibby
Carroll	Carroll	1,280	58	74.0	+ 2.7	94	24	47	17	5.36	+ 0.95	1.91	12	0	11	10	10	11	se.	Ben H. Schenkelberg
Cushing 2 1/2 NE	Ida	1,350	10	73.1	+ 2.5	90	23	47	17	3.29	- 0.21	2.13	11-12	0	12	11	8	12	se.	H. P. Lasher
Denison 2S	Crawford	1,307	60	74.0	+ 2.7	92	31	45	18	4.60	+ 0.70	1.51	24-25	0	11	18	9	4	se.	E. M. Hugg
Guthrie Center	Guthrie	1,217	40	73.2	+ 1.6	91	24	49	18	5.60	+ 1.60	1.92	25	0	11	13	11	7	se.	Wilbert Shaw
Harlan	Shelby	1,210	52	75.8	+ 4.9	95	31	46	18	3.02	- 1.00	1.35	22	0	6	14	13	4	s.	Elmer Buss
Jefferson	Greene	1,055	52	73.5	+ 3.2	91	13	46	18	7.06	+ 3.17	5.28	12	0	8	14	6	11	sw.	Will I. Lyon
Lake City	Calhoun	1,288	8	73.8	+ 2.8	92	24	48	17	7.60	+ 3.40	4.98	11-12	0	10	9	11	11	sw.	Frank A. Taylor
Little Sioux	Harrison	1,040	43	76.8	+ 4.2	94	23	44	17	3.38	- 0.29	1.91	22	0	12	14	16	1	se.	H. W. Kerr
Logan	Harrison	1,120	78	77.0	+ 4.6	99	31	46	18	1.79	- 1.93	0.87	22	0	10	9	22	0	se.	Miss Amy Ann Stern
Mapleton 5NW	Woodbury	1,225	5	75.1	+ 4.0	95	23	43	18	1.08	- 2.82	0.56	24-25	0	11	17	8	6	se.	LeRoy Wasmund
Missouri Valley	Harrison	1,069		77.6		97	31	45	17	2.12		1.54	21-22	0	8	17	12	2	se.	S. Wm. Sorensen
Onawa	Monona	1,050	59	75.8	+ 4.4	95	8	43	17	4.31	+ 0.32	3.30	22	0	10	16	11	4	s.	W. J. Oliver
Rockwell City	Calhoun	1,226	57	74.0	+ 3.3	93	1	45	18	3.50	- 0.50	2.39	12	0	9	14	13	4	se.	F. C. Beitelspacher
Sac City	Sac	1,274	75																	

CLIMATOLOGICAL DATA FOR AUGUST, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit						Precipitation, in inches				Number of days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<i>Central District (Continued)</i>																				
Perry 1 1/2 SE	Dallas	975	44	73.6	+ 2.3	92	23†	43	18	3.81	- 0.43	1.36	12	0	6	13	13	5	se.	Eugene N. Hastie
State Center	Marshall	1,068	7	73.6	+ 2.1	94	24	49	18†	5.12	+ 1.45	1.72	3	0	7	7	20	4	se.	H. M. Meads
Toledo	Tama	929	50	73.5	+ 2.2	95	24	45	18	4.93	+ 1.25	1.40	2-3	0	11	12	12	7	se.	H. P. Giger
Waukege 1 1/4 SW	Dallas	1,042	46	74.4	+ 2.3	94	24	50	18	7.17	+ 3.24	2.32	3	0	8	19	10	2	n.	Ivan B. Speer
Webster City 1 SE	Hamilton	1,042	60	71.6	+ 1.6	89	23	43	18	4.34	+ 1.06	1.56	12	0	9	24	4	3	se.	Leo Holtkamp
Means and extremes				73.5	+ 2.0	96	24	43	18	5.12	+ 1.28	2.92	11-12	0	10	12	12	7	se.	
<i>East Central Dist.</i>																				
Anamosa 1 NW	Jones	873	15	73.8	+ 2.3	94	11	44	18	5.12	+ 1.07	1.52	13	0	10	12	14	5	s.	State Reformatory
Belle Plaine	Benton	895	68	74.0	+ 2.2	91	23†	49	18	6.76	+ 2.95	3.87	3	0	10	11	10	10	se.	R. O. Burrows
Bellevue	Jackson	603		73.1	+ 2.1	92	12†	47	18	4.57	+ 0.89	1.90	13	0	14	13	10	8	sw.	U. S. Engineers
Cedar Rapids	Linn	813	62	73.8	+ 2.0	91	24†	47	18	6.26	+ 2.37	2.60	13	0	14	10	11	10	s.	John T. Wurster
Clarence	Cedar	850	10	74.0	+ 2.7	97	13	49	18	6.50	+ 2.45	2.99	13	0	10	18	10	3	s.	H. J. Klatt
Clinton	Clinton	640	73	75.2	+ 2.6	95	13	50	18	6.26	+ 2.21	2.25	13	0	11	13	12	6	sw.	Samuel W. Williams
Davenport	Scott	579	73	76.2	+ 3.1	93	13	54	17	4.36	+ 0.87	0.93	13	0	12	11	7	13	s.	U. S. Weather Bureau
Iowa City	Johnson	780	87	74.0	+ 2.4	93	13	50	18†	4.73	+ 0.74	1.85	3	0	9	14	7	10	s.	Inst. Hydraulic Research
Maquoketa	Jackson	732	51	73.2	+ 2.8	91	13†	45	18	3.41	- 0.39	0.86	13	0	10	19	6	6	n.	Dr. E. V. Andrews
Monmouth 4 SW	Jones	870	3	74.0	+ 2.5	92	2†	48	19	3.12	- 0.88	1.30	13	0	8	4	23	4	se.	Otto J. Bisinger
Muscataine	Muscataine	620	98	74.5	+ 2.0	95	13	46	18	3.12	- 0.92	0.77	3	0	11	18	12	1	s.	G. Krieger
Vinton	Benton	815	1	73.4	+ 1.6	93	24	44	18	3.16	- 0.69	0.70	9	0	9	16	8	7	w.	H. J. Adams
Williamsburg	Iowa	805	28	73.6	+ 1.9	91	13†	51	18	6.64	+ 2.39	2.70	3	0	10	17	10	4	se.	Dr. F. C. Schadt
Means and extremes				74.1	+ 2.3	97	13	44	18	4.92	+ 1.05	3.87	3	0	11	13	11	7	s.	
<i>Southwest District</i>																				
Atlantic 1 E	Cass	1,110	57	74.8	+ 2.2	94	13	43	18	3.96	- 0.03	1.48	22	0	10	7	20	4	s.	Roy L. Fancolly
Bedford 1 1/4 N	Taylor	1,215	40	75.6	+ 2.2	97	13	52	17	8.81	+ 5.11	5.00	3	0	12	23	7	1	se.	H. J. Chambers
Clarinda	Page	1,004	72	75.8	+ 2.5	97	24	44	18	6.10	+ 2.24	2.80	3	0	13	3	16	12	se.	Forrest E. Allison
Clarinda Erosion 8 W	Page	1,132	5	76.3	+ 2.8	96	25	47	18	4.87	+ 0.87	2.18	2-3	0	15	11	17	3	se.	Soil Conservation Service
Corning 1 E	Adams	1,285	56	75.6	+ 2.3	95	2	47	18	3.19	- 0.81	1.11	3	0	9	14	14	3	se.	S. W. Morris
Glenwood	Mills	1,100	54	77.6	+ 4.0	99	25	46	18	2.51	- 1.16	1.60	3	0	7	4	27	0	se.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	74.2	+ 0.8	92	25	49	18	4.86	+ 1.10	3.24	22	0	13	10	7	14	se.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	77.6	+ 5.1	97	25	43	18	3.40	- 0.72	1.43	22	0	7	27	2	2	sw.	Fred Busard
Red Oak	Montgomery	1,077	5	76.4	+ 3.0	98	25	43	18	6.33	+ 2.73	3.14	3	0	10	11	19	1	se.	Clarence M. Totty
Red Oak 10 SW	Montgomery	1,030	37							5.20	+ 1.64	3.50	3	0	10	14	16	1	s.	B. R. Bridge
Riverton	Fremont	920	18							3.11	- 1.19	0.82	12	0	10	24	6	1	s.	Wm. E. Stubbs
Shenandoah	Page	974	9	77.8	+ 4.1	101	25	46	18	4.64	+ 0.44	1.80	3	0	12	12	15	4	s.	Earl E. May Seed Co.
Thurman	Fremont	973	57	77.9	+ 3.8	100	25	48	18	4.73	+ 0.38	3.25	3	0	9	12	14	5	s.	Bernard Porter
Omaha, Nebr.		1,035	79	77.4	+ 4.2	98	25	52	17	1.68	- 1.37	0.84	11-12	0	9	8	15	8	se.	U. S. Weather Bureau
Means and extremes				76.4	+ 3.1	101	25	43	18	4.53	+ 0.66	5.00	3	0	10	13	14	4	se.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	74.8	+ 1.5	95	2†	48	18	5.94	+ 2.09	2.67	22	0	10	16	8	7	se.	S. R. Brown
Albia	Monroe	949	53	75.4	+ 2.0	96	24	47	18	6.41	+ 2.79	1.47	12	0	16	7	14	10	se.	Arthur L. Freed
Centerville 1 1/4 SW	Appanoose	1,013	51	76.0	+ 2.7	95	2†	47	18	4.61	+ 1.01	1.58	7-8	0	13	9	16	6	s.	E. Grant Everman
Chariton 3 E	Lucas	940	50	74.8	+ 1.9	95	2†	45	18	6.16	+ 2.48	1.80	9	0	10	17	8	6	ne.	Ellis Shaw
Creston	Union	1,293	43	74.0	+ 1.5	94	13†	48	18	5.46	+ 1.26	1.42	22	0	13	14	15	2	se.	Mrs. Nellie Spangler
Indianola	Warren	972	63	73.8	+ 0.8	95	24	44	18	5.57	+ 1.55	1.90	11-12	0	12	11	12	8	se.	Seth F. Shenton
Knoxville	Marion	920	54	75.5	+ 2.7	96	24	50	18	5.14	+ 0.94	2.50	12	0	11	11	17	3	e.	Mrs. Ella Mae Brobst
Lamoni 3/4 SW	Decatur	1,138	40	76.0	+ 3.2	95	2†	50	18	5.89	+ 1.93	3.00	3	0	12	14	9	8	se.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	75.5	+ 2.4	96	13	48	18	3.16	- 0.42	1.10	22	0	12	12	16	3	se.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	74.8	+ 2.4	94	13†	47	18	6.43	+ 2.43	4.40	3	0	8	5	26	0	e.	Mrs. Irene Hood
Osceola	Clarke	1,098	23	75.7	+ 2.9	94	2†	47	18	3.74	- 0.01	1.42	22	0	8	19	9	3	nw.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	75.0	+ 2.5	92	2†	46	18	4.92	+ 0.97	1.82	3	0	10	18	11	2	se.	Jas. A. Verploegh
Winterset	Madison	1,120	53	75.4	+ 2.4	93	25	48	18	4.02	+ 0.32	1.45	22	0	9	11	12	8	sw.	H. S. Ely
Means and extremes				75.1	+ 2.2	96	13†	44	18	5.19	+ 1.34	4.40	3	0	11	13	13	5	se.	
<i>Southeast District</i>																				
Bloomfield 2 1/4 N	Davis	825	29	76.8	+ 2.7	99	24	49	18	3.35	- 0.37	0.95	12	0	9	12	15	4	s.	Mrs. Leo Foster
Burlington 8 S	Des Moines	697	54	75.9	+ 1.6	95	31	52	18	2.89	- 0.66	1.60	3	0	10	8	11	12	se.	U. S. Weather Bureau
Columbus Jct.	Louisa	595	53	74.3	+ 2.3	94	13	48	19	7.67	+ 3.53	5.15	3	0	10	19	12	0	se.	Miss Musa Todd
Fairfield 1 N	Jefferson	780	64	75.5	+ 2.5	98	24	48	18	6.68	+ 3.02	2.05	3	0	13	10	8	13	sw.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	77.6	+ 2.6	99	24	55	17	2.24	- 0.96	0.88	8	0	10	8	19	4	sw.	U. S. Weather Bureau
Keosauqua 1 1/2 SW	Van Buren	712	57	76.1	+ 2.9	98	24	50	18	3.50	- 0.15	1.13	12-13	0	12	13	14	4	e.	Harry J. Schlotfeldt
Mt. Pleasant 2 SE	Henry	722	68	75.4	+ 1.9	95	2†	48	19	6.45	+ 2.88	2.92	3	0	8	17	7	7	s.	Raymond A. Hughes
Oskaloosa 1 1/4 S	Mahaska	818	68	74.4	+ 2.5	94	24	45	18	4.43	+ 0.73	2.57	12	0	7	9	13	9	s.	Clifford Bergstresser
Ottumwa 1 W	Wapello	649	49	77.2	+ 3.7	98	24	50	18	5.19	+ 1.33	2.13	12	0	10	15	12	4	se.	C. L. Mikesch
Sigourney	Keokuk	780	49	75.6	+ 3.4	96	24	51	18	7.66	+ 4.22	4.25	3	0	10	14	13	4	se.	Mrs. Christie E. Chandler
Stockport 1 1/4 SW	Van Buren	747	43	75.2	+ 2.7	95	24	49	18	4.44	+ 0.70	1.00	12	0	14	14	9	8	s.	C. L. Beswick
Washington	Washington	762	69	75.2	+ 2.9	94	13	50	18	10.49	+ 6.58									



DAILY PRECIPITATION FOR AUGUST, 1943—Continued

Stations	Basin Drainage	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>Central District</b>																																		
Ames†	Skunk	.02	2.00	.01						T.		2.22									T.		.05	T.	.01	.32	T.			.70	T.	T.	5.32	
Boone	Des Moines	.09	1.25	.02						T.	.08	2.84	T.				.05					T.	.05		.30				1.08	T.	T.	5.88		
Boone (rvr)²	Des Moines	.60	.40									2.65											.05	.13	.49	T.			.01	T.	.09	7.18		
Des Moines†	Des Moines	.29	2.66	T.			1.13	T.			.12	1.61					T.			T.	T.	.05	.55	.03	.16	1.90	T.	T.	.02	T.	.07	6.42		
Des Moines Apt.†	Des Moines	.08	1.52	T.			.30			.04	1.60										T.	T.	.31	.53			.01		.22	.03	T.	4.71		
Dunbar (near)	Iowa	.19	1.26						.62		.54	T.		1.00							T.	T.	.12	.03	.14	.04			.39		T.	2.50		
Fort Dodge²	Des Moines	.08	.58	.26					.15		.28	.03	.37								.02	.01	.08	.68	1.04		T.		.61			6.15		
Grinnell†	Iowa	.06	2.20	T.					.10		.76	.04	.56								.02		.37	.43	T.	T.			.31			3.45		
Grundy Center	Cedar	.01	.48	.04					.51		.68		.62									.02		.29	.35	.09			.40	.03	.24	3.93		
Iowa Falls²†	Iowa	.39	.05	.27					.76		.40	.14	.50																				4.71	
Marshalltown²	Iowa	.53	1.57	.31					.77		.67	T.	.75	.01							.01		T.	.08	.40			T.	.29		T.	5.39		
Monroe	Des Moines	.23	.79				.04			T.	1.88	.02										T.	.42	.08	.62	.90			.42	T.		5.40		
Newton	Skunk	.09	2.21						.03		1.41	.03	.09								.03		.28	.36	T.	.37	T.		1.26	T.		6.16		
Perry	Raccoon	.03	1.12							T.	1.36											T.	.41	.07	T.	.82	T.			T.		3.81		
State Center	Iowa	T.	1.72	.04					.28		1.08											T.	T.	T.	.95			T.	.45	T.	T.	5.12		
Toledo	Iowa	.01	.26	1.35	T.				.77		.93	.23	.67									T.		.34	.14			T.	.19	.04		4.93		
Van Meter²	Raccoon	.65	.04	2.50	.25				.57		.98	.23									.03		.57	.14	3.40	T.		.15			9.51			
Waukeo	Raccoon	.13	2.32				.08				1.72												.85		.04	2.00			.03			7.17		
Webster City†	Boone		.36						.46		1.56		.29								.05		.04		.27			1.27		.04	4.34			
Webster City (rv.)²	Boone	.52	.15	.29	T.				.26		.77	.03	.43									.04		.11	.16			1.40		.06	4.22			
<b>East Central District</b>																																		
Anamosa	Wapsipinicon	.10	.82	.05					.81		.21	1.52		.29										1.19	.12	.01						5.12		
Belle Plaine	Iowa	.14	3.87						.35		.36	.48	.61										T.	.50	T.	.12	T.		.32	.01		6.76		
Bellevue LD 12²	Mississippi	.01	.71	.11	T.		.02	T.	.21		.30	1.90	T.	.22	.01							T.		.74	.06	.15	.10	T.	.03		T.	4.57		
Cedar Rapids²	Cedar	.16	.09	.45	1.76	T.			.26		.23	2.60	T.	.13	.09									.37	.02	.04	.05		T.	.01	T.	6.26		
Ced. Rap. (rvr.)²	Cedar	.19	.13	.63	.93				.14		.26	2.45		.14	.06									.62	.03	T.			.07			5.65		
Clarence	Wapsipinicon	.16	.72	.57					.49		.35	2.99		.29										.66	.06	.21	T.					6.50		
Clinton	Mississippi	.19	.33	.03	T.				.10		.21	2.25		.21								T.	T.	.60	.13	2.17	.04					6.26		
Clinton (rvr.)²	Mississippi	T.	.17	.30					.08		.21	1.70	.63	.06	.13									.52	.08	.07	T.	2.37	.04			6.36		
Davenport†	Mississippi	.04	T.	.78	.75	T.			.29		.34	.82	.11	T.	.37								T.	T.	.61	.08	.01	.01	.15	T.	T.	4.36		
Davenport LD 15²	Mississippi	.04	T.	.82	.52	T.			.22		.32	.77	.11	T.	.34								T.		.53	.07	.02	T.	.09	T.	T.	3.85		
Iowa City†	Iowa	.12	1.85						.90	.33	.46												T.	.47	.07	.28	T.	.25				4.73		
Le Claire²	Mississippi		.60	.50	T.				.24		.29	1.52	.05	.18									T.	.39	.09	1.11		T.	.03	T.		5.06		
Le Claire LD 14²	Mississippi	T.	.55	.61					.30		.30	1.60	.09	.41									T.	.38	.06	1.07	.12	.09		.04	T.	5.62		
Maquoketa	Maquoketa	.11	.53	.04					.69		.29	.86	.18	.01										.62	.08			T.				3.41		
Monmouth	Maquoketa	.10	.62	.05			T.		.30		.25	1.30		T.									T.	.41	.09	T.	T.		T.	T.		3.12		
Muscatine	Mississippi	T.	.13	.77	.48				.25		.39	.10	.40											.33	.02	.08	T.	.17	T.			3.12		
Muscatine (rvr.)²	Mississippi	.26	.04	.63	.77				.15		.28	.14	.38											.22	.06	.01	.06	.02	.15			3.10		
Muscatine LD 16²	Mississippi	.30	.03	.68	.87				.11		.22	.16	.03	.32										.20	.06	.01	.08	.02	.19			3.28		
Vinton	Cedar	.26	.65	.05					.70		.45	.29	.44												.23			.09				3.16		
Williamsburg	Iowa	.16		2.70							1.45	.31	.71											.01	.56	T.	.18		.55	.01		6.64		
<b>Southwest District</b>																																		
Atlantic²	Nishnabotna	.47	.09	.45	.05				.47	.37		.37	.74	.37									.35	.10	T.	1.48	.03	.10		T.		3.96		
Bedford	102	.24	5.00	T.					.85	.24	.25	.14	.17											.53	.15	.18	.04	.08			.03	8.81		
Blockton SCS	Platte		4.45						.80	.05	.27	.31											.58	.14	.16		.56	T.	.06		T.	7.11		
Clarinda²	Nodaway	.26	.10	2.80	.01				.29	.08	.05	.05	.48	.07										.78	.20		.07	.17	.03	.01	.01	.45	6.10	
Clarinda Eros.†	Tarkio		.04	2.14																													4.87	
Corning	Nodaway		1.11						.06		.19	.34											.36	.83	.05	.10	.15					3.19		
Cumberland (near)	Nodaway		.17						T.		.49												.11	T.	1.62		.06	.04			T.	T.	2.49	
Emerson SCS²	Nishnabotna	.06	1.56	T.					T.		.39	.34	T.										.48	T.	.60		.41				T.	T.	3.84	
Glenwood	Missouri	T.	1.60		T.				T.		.13	.31		.21	T.	.13							.26	.02	3.24	.07	.01	.02	.04	.01	T.	T.	2.51	
Greenfield	Nodaway	.06	.56	T.			.07				.05	.45												.26	.02	3.24	.07	.01	.02	.04	.01	T.	T.	4.86
Oakland	Nishnabotna		.71						.78		.78												.27	1.43		.11	.09	.01					3.40	
Red Oak	Nishnabotna	.03	3.14	T.					.70		.34	.37		.01	.63								.63	.79		.10	.29			T.	.30	6.33		
Red Oak (near)	Nishnabotna		3.50					.02	.36		.35	.02		.02	.49								.02	.49		.04	.20				.20	5.20		
Riverton	Nishnabotna	.02	.65						.10		.82	.06		.52	.19								.52	.19					.18	T.	.50	3.11		
Shenandoah	Nishnabotna	.06	1.80				.06	.23			1.12	T.		.60										.33		.11	.03		.03	.01	.26	4.64		
Thurman	Missouri	T.	3.25					.09		T.	.65			.50									.03	.04		.05	.06		.06			4.73		
Omaha, Nebr.†	Missouri	.10	.26		T.	T.		T.		.80	.06		T.	T.								.02	.01	T.	.30	.11	T.	.02		T.	T.	1.68		
<b>South Central District</b>																																		
Afton	Grand	.06	.37					.11	T.		.27	.18											.28	2.67	.02	1.63	.35	T.				5.94		
Albia	Des Moines	1.25	.07	.68	.38	T.		.02	.38	.08		1.47	.17	T.									T.	.35	.56	.03	.43	.05	.03		.46	T.	6.41	
Centerville†	Chariton	T.	.05	.80				1.53	.05	.12		1.04	.19										.05	.43	.21	.02	.01		.11			4.61		
Chariton	Chariton	.19	.72					1.57	.20	1.80		.40	.06											.75	.28			T.	.19			6.16		
Creston²	Platte	.72	.04	.40																														

DAILY PRECIPITATION FOR AUGUST, 1943—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>Southeast District (Continued)</i>																																		
Donnellson <sup>2</sup>	Des Moines		.05	.40					.07	.78	T.	.96			.02		.02					T.		.10	.17		.01				.50			3.08
Eddyville <sup>2</sup>	Des Moines	.83	.15	.50	.05			.06	.20	.08			2.25	.25								T.		.10	.73		.50	T.		.45			6.15	
Fairfield	Skunk		.83	2.05	.03			.01	.24				1.90	.05	.26								.07	.55		.26	.01		.42	T.			6.68	
Keokuk <sup>1</sup> †	Mississippi			.18				.07	.88	T.		.07	.40	.04	.01							T.		.12	.04	T.	T.		.43	T.			2.24	
Keokuk LD 19 <sup>2</sup>	Mississippi			.12	.09				.67	.10			.21	.32	.04		.02					.01		T.	.12	.01			.35			2.00		
Keosauqua	Des Moines		.04	.35	.02			.15	.95				1.08	.05								.04		.24	.30		.03	T.		.25			3.50	
Keosauqua (rvr.) <sup>2</sup>	Des Moines	.86	.05	.20	.15	T.		T.	.80	.04			.10	1.08	.15	T.						.04	T.		.40	.06	.04		.20			4.17		
Mt. Pleasant	Skunk		.11	2.92									1.05	.45	.55						T.			.45	.50	T.		.42				6.45		
Oakaloosa	Des Moines		.13	.47					.20				2.57									T.		T.	.28	.44		.34	T.			4.43		
Ottumwa†	Des Moines		.13	1.52					.21		T.		2.13	.01		T.						T.		.11	.54	.19	.01	.34	T.			5.19		
Ottumwa (river) <sup>2</sup>	Des Moines	.99	.10	1.72	.10			.08	.19				2.20	.15		T.							.16	.34	.10	.14	.01	.08	.34			6.70		
Sigourney	Skunk		.14	4.25						.12			1.77		.39								.02	.34		.23	.03	.37				7.66		
Stockport	Skunk		.37	.29	.01			.05	.70				1.00	.40	.26							.01		.07	.27	.24	T.	.76	.01			4.44		
Wapello <sup>2</sup>	Iowa	.18	T.	4.65	.20					.08			.25	.35	.05	.30						T.	T.		.18	T.	.10	T.	T.	.35	T.		6.69	
Washington†	Skunk		.13	7.35							T.		1.50		.45									.28	.28	.10		.40				10.49		

Except as otherwise indicated, observations are generally made in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.  
<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
T. Precipitation is less than 0.005 inch rain or melted snow.  
† Interpolated.  
‡ Station is equipped with recording gage.  
<sup>4</sup> Precipitation included in next following measurement.      \*\*Incomplete.

SUPPLEMENTAL TABLE, AUGUST, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	17	0.75	- 2.25	0.30	21-22	0	8	14	12	5	s.
Cambridge 4 1/4 NW	Cass	1,225	45	2.49	- 1.29	1.62	22	0	6	10	15	6	s.
Dumont 3 1/4 NW	Butler	998	9	4.60	+ 0.90	1.34	13	0	10	8	17	6	s.
Dunbar 2 NE	Marshall	1,010	9	4.71	+ 1.11	1.26	3	0	10	11	15	5	se.
Kanawha 1/4 S	Hancock	1,183		5.01	+ 1.16	1.56	2	0	8	8	4	19	se.
Lake View	Sac	1,239	5	7.17	+ 3.41	5.44	12	0	6	14	14	3	w.
Melrose	Monroe	871	15										
Sloan	Woodbury	1,071		1.14		0.43	21	0	9				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

PRESSURE, WIND, HUMIDITY, AND DEGREE DAYS, AUGUST, 1943

Stations	Sea-level pressure, extremes—Inches			Wind†				Relative Humidity				Degree Days	
	Highest	Date	Lowest	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.	12:30 P. M.	6:30 P. M.		Percentage of sunshine
Burlington	30.21	6	29.68	13	6.9	26 n.w.	25	86	88	62	70	60	0
Charles City	30.20	6	29.61	31	5.2	19 s.w.	31					58	16
Davenport	30.14	5	29.69	12	7.1	42 s.w.	2	88	89	61	68	56	0
Des Moines	30.18	18	29.62	31	8.1	38 n.	29	88	91	68	72	58	1
Dubuque	30.20	6	29.68	13	5.0	22 s.	15	84	87	57	66	61	3
Sioux City	30.20	17	29.57	31	8.8	28 s.	28	83	91	60	59	67	6
Omaha, Nebr.	30.20	17	29.61	31	10.6	43 s.w.	11	81	87	60	61	68	1
State	30.21	6	29.57	31	7.4	43 s.w.	11	85	89	61	66	61	4
Normals and Records	30.43	29 1909	29.40	10 1874	7.1	54 s.w.	6 1916	81	54	60	70	70	9

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.  
§ Sioux City    || Omaha

SOIL TEMPERATURES AT AMES, IOWA, AUGUST, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	64.9	68.1	73.4	73.9	70.3		
Average 12 noon	77.8	81.2	73.7	73.3	70.6		
Average 7 p. m.	77.1	82.5	79.7	74.5	70.7	65.8	62.8
Highest Date	93 24	91 23	85 9†	78* 11†	72 1†	66 7-31	64 23†
Lowest Date	46 18	58 18	68 18†	70* 21†	69 22†	65 1-6	61 1-3
Number of days with temperature							
40° or higher	31	31	31	31	31	31	31
50° or higher	29	31	31	31	31	31	31
60° or higher	22	30	31	31	31	31	31
90° or higher	3	2	0	0	0	0	0

† And other dates.  
\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.  
Diurnal changes at 24 inches and deeper amount to less than 2°.  
Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

Showers were frequent but it was seldom that they occurred in all sections simultaneously. Thunderstorms occurred daily in some section or other except from the 4th to the 6th and the 17th to the 20th, all dates inclusive, and on the 27th.

During most of the month Iowa lay in the transition zone between areas dominated by Polar and Tropical air masses. Frequently these masses merged into each other so gradually or were so mixed that definite location of a front was impossible. At other times relatively local fronts developed and disappeared within a few hours after forming, so that frequently there was little continuity between successive 6-hour surface weather maps. For this reason it is difficult to discuss precipitation periods in terms of causative processes except to say that most of it occurred due to instability between the warm and cold masses along local fronts. As a result of these conditions, there was great variation in the amount of rain within relatively short distances. To cite only one example, there was

considerable difference between amounts measured at the Des Moines city office and at the airport 5 miles away. On the 2d-3d the downtown amount was 2.74 inches, the airport 1.60 inches. On the 7th the city office recorded 1.13 inches and the airport 0.30 inch, and on the 25th the city office rain measured only 0.49 inch while the airport amount was 1.90 inches.

In like manner many of the fronts crossed only a part of Iowa and precipitation was confined to a relatively small part of the State.

However, the showers of the 2d-3d are worthy of special note. In this case the precipitation was caused by the convergence of Polar and Tropical air along a front extending in an east-west direction across southern Iowa. A cold front had been pushed southward in advance of cold Polar air but became stationary late on the 2d. The front became warm along the Iowa-Missouri border and the overrunning Maritime air produced excessively heavy downpours the night of the 2d-3d in southwestern and southeastern Iowa, as described in the storm table. The synoptic conditions caused similar heavy downpours farther to the east in Illinois at about the same time. The center of the stream of moist Tropical air was diverted to the eastward and on the night of August 4th-5th excessively heavy downpours produced devastating floods and the loss of 23 lives in West Virginia.

Again on the night of the 11th-12th a warm front formed over the middle Missouri Valley and on the morning of the 12th was almost directly over the Raccoon River Valley, causing another series of flood producing, excessively heavy downpours. The frontal system degenerated but the interaction of Polar and Tropical air caused further showers in all sections with excessively heavy amounts of rain in the northeast portion during the following 24 hours.

Damage caused by storms and floods is summarized elsewhere in this publication. Lack of space prevents a more complete discussion of day by day conditions except to say that in general the most widespread period of fair weather was from the 16th to the 20th and that precipitation amounts were less heavy during the last 10 days than they were during the first part of the month.

As a result of the heavy rains, stream flow and ground water supplies were far above normal throughout the month.

Oat harvest was delayed by wet weather but the work was about three-fourths completed by the middle of the month with some threshing remaining to be done as late as the 25th. There was some spoilage in shocks and some heating of moist oats in bins.

Haying was done between rains and under great difficulties. Pastures were generally luxuriant. Fall plowing got under way during the last half of the month and an unusual amount was done for so early in the season. There was also much seeding of alfalfa.

Sweet corn canning was well under way by the 15th and continued until the close of the month. Canning of tomatoes began about a week earlier but was slowed somewhat by cool weather. Many potatoes spoiled because of too much rain. Commercial truck crops and Victory gardens generally yielded abundant harvests.

The three important crops still unharvested, corn, soybeans and hemp, generally made good progress. The improvement in the condition and prospective yield of corn continued at such a wonderful rate that as of September 1 the Department of Agriculture estimated a record-breaking yield of 630,000,000 bushels, or an average of 58 bushels per acre. This is 6 bushels per acre more than was estimated on August 1 and 12 bushels more than was indicated on July 1. With all due credit to hybrid seed, rich soil, power machinery and long hours of overtime toil by Iowa farmers, the fact remains that this improvement in prospects could not have been possible if the weather had been unfavorable. In view of the dire need for a bumper crop to assure sufficient food for this nation and its allies, this improvement in prospects during the two-month period may be justly classed as a miracle of Divine Providence. Nor is this the whole story for it is certain that the condition continued to improve during the early part of September.

Soybeans made good growth and prospects are that the total crop will be about the same as in 1942. Hemp, a new crop to Iowa, made good growth and seems destined to give a large yield although some will probably be unfit for processing.

S.E.D.

TEMPERATURE

The average temperature for August, derived from the averages of nine districts of almost equal area, and based on the averages of 119 temperature observing stations, was 74.0°. This is 1.8° higher than the average of the entire 71 years of record. There have been 18 warmer and one equally warm August in the 71-year period. The highest district average was 76.4°, in the southwest, while the lowest was 71.5°, in the north central area. In general for stations in the same latitude temperatures were highest in the western portions of the State, with the isothermal lines dipping southward in the central sections and then curving northward again as they approached the Mississippi River. The highest station average was 77.9° at Thurman, followed by 77.8° at Shenandoah. The lowest averages were 69.6° at the Mason City Airport, and 70.0° at Northwood and Postville (near). The highest observed was 101° at Shenandoah on the 25th, and the lowest was 40° at Decorah on the 18th. Shenandoah and Thurman were the only stations to report temperatures of 100°. The average number of days with 90° or higher for the State as a whole was 7, with Postville (near) being the only station at which the temperature failed to reach 90°.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR AUGUST, 1943 (24 hours ending 6:30 p. m.)

Station	Data	Day of Month																															Sums
		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	
Ames.....	{Evaporation.....	.252	.135	.....	.103	.181	.210	.208	.160	.216	.231	.211	.....	.265	.261	.247	.285	.208	.213	.265	.102	.103	.167	.214	.239	.160	.089	.103	.132	.295	.162	.321	6.134†
	{Wind Movement...	60	75	55	30	33	44	41	42	47	25	43	83	74	18	67	57	37	18	46	48	33	89	73	38	69	36	30	46	56	33	118	1,564
Cherokee	{Evaporation.....	.328	.137	.086	.218	.082	.142	.185	.169	.335	.219	.226	.191	.303	.244	.229	.364	.195	.258	.281	.181	.140	.169	.220	.218	.102	.111	.141	.117	.260	.113	.343	6.307
	{Wind Movement...	95	84	38	62	19	49	43	29	58	45	55	85	25	30	75	60	47	35	76	61	44	69	61	43	50	41	52	38	52	48	117	1,686
Clarinda	{Evaporation.....	.203	.217	.....	.210	.255	.239	.201	.211	.319	.120	.104	.192	.390	.146	.214	.319	.318	.079	.204	.069	.174	.310	.248	.205	.228	.113	.141	.153	.114	.095	.....	6.190†
	{Wind Movement...	52	64	47	32	19	53	40	30	28	24	21	73	56	24	28	29	15	16	12	45	18	73	47	19	38	22	42	40	90	36	136	1,269
Ia. City---	{Evaporation.....	.210	.162	.145	.098	.171	.234	.163	.132	.187	.251	.167	.290	.162	.279	.154	.261	.176	.164	.203	.136	.139	.146	.211	.195	.180	.105	.103	.120	.180	.132	.277	5.533
	{Wind Movement...	34	45	23	28	18	23	16	19	41	16	16	53	34	26	20	48	30	20	20	20	19	29	44	19	22	23	25	15	27	13	63	849

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days. \*Included in following measurements.



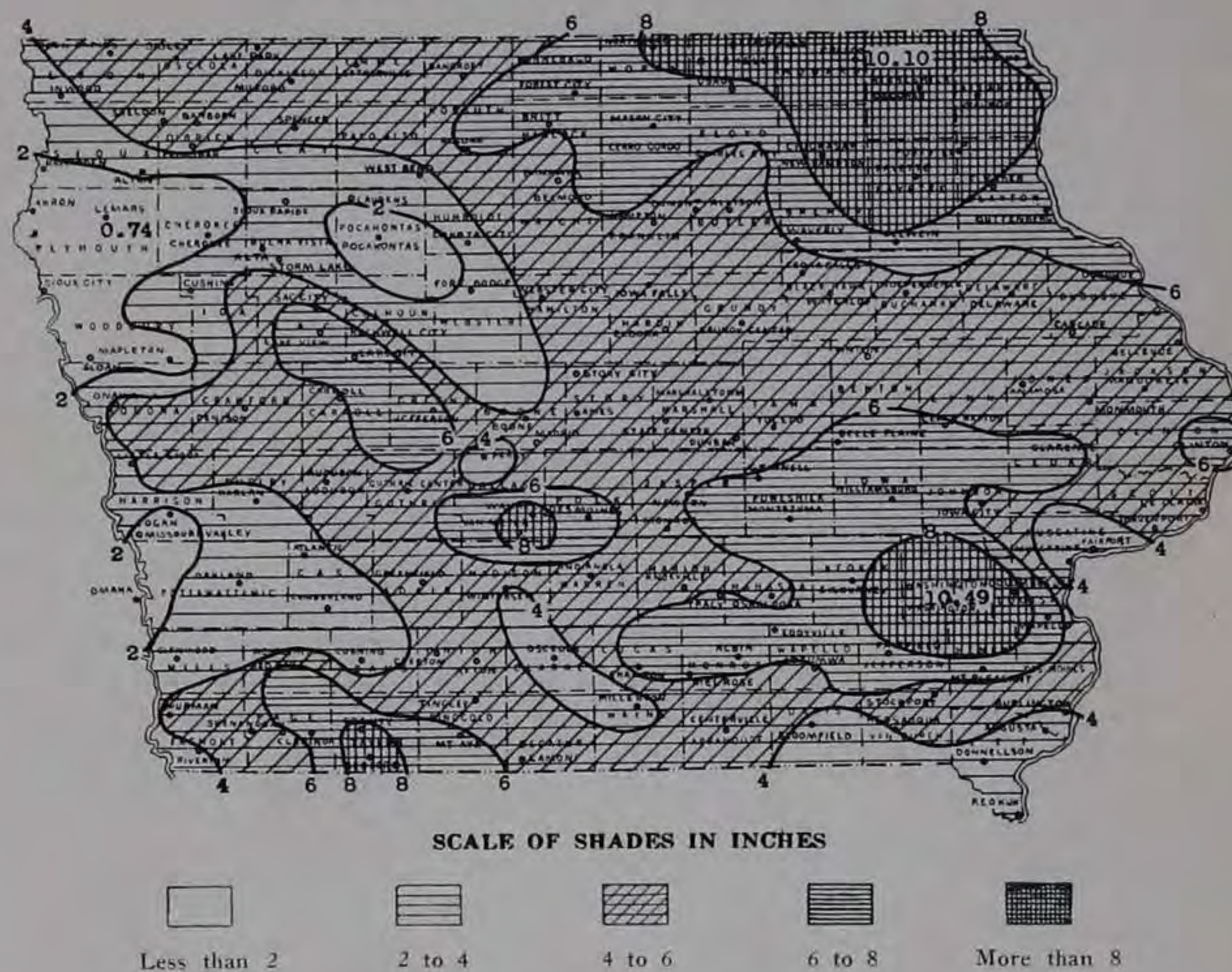
DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF AUGUST, 1943

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>Northwest District</i>																																			
Alta.....																																			
(Maximum.....)																																			
(Minimum.....)																																			
Alton.....	90	85	80	82	79	84	90	92	90	86	82	91	85	85	82	74	73	80	81	83	85	82	90	95	82	81	78	78	87	85	91	81.1			
(Maximum.....)																																			
(Minimum.....)	70	70	64	65	58	64	70	73	70	59	66	68	65	56	67	53	46	49	56	62	65	68	67	74	68	68	60	58	63	63	71	63.7			
Cherokee.....	90	81	75	83	75	84	90	90	86	87	92	85	85	83	67		75	81	82	84	85	86	91	92	83	80	71	82	89	85	91	83.8			
(Maximum.....)																																			
(Minimum.....)	69	71	63	63	57	63	70	72	68	58	68	68	65	53	61	51	44	47	54	62	62	66	65	73	68	68	58	57	62	65	70	62.6			
Etherville.....	92	82	72	85	80	85	92	90	84	86	81	93	84	85	78	65	73	79	81	82	79	84	90	88	83	76	68	81	87	87	90	82.6			
(Maximum.....)																																			
(Minimum.....)	65	69	62	60	54	58	67	70	66	57	65	65	62	52	60	50	44	43	51	61	59	62	65	67	64	65	56	55	63	65	60	59.9			
Hawarden.....	92	88	78	82	78	85	93	96	90	84	94	85	80	82	74		77	85	85	89	88	83	96	94	86	80	74	82	89	86	91	80.0			
(Maximum.....)																																			
(Minimum.....)	70	69	63	66	57	63	72	72	68	60	68	67	65	54	67	50	43	47	58	61	66	67	67	72	68	63	50	59	61	61	62	62.7			
Lake Park.....	90	86	73	80	78	84	89	89	85	80	77	87	83	83	75	68	71	77	80	81	81	77	87	85	81	77	72	79	85	85	89	81.1			
(Maximum.....)																																			
(Minimum.....)	68	66	61	60	55	60	68	71	67	58	63	64	65	55	61	51	45	47	54	61	60	60	65	67	65	65	56	56	60	65	67	60.8			
Le Mars.....	92	87	74	84	79	84	92	94	87	91	86	96	86	89	85	71	77	83	85	88	85	86	97	94	90	78	75	84	90	87	92	86.1			
(Maximum.....)																																			
(Minimum.....)	69	71	63	65	59	64	72	73	69	58	68	69	66	54	69	50	43	45	59	61	65	67	69	73	68	68	58	58	63	64	65	63.4			
Pocahontas.....	92	83	75	84	76	84	91	89	85	89	89	92	86	85	87	66	73	78	80	82	80	88	92	94	84	80	77	81	90	86	92	84.2			
(Maximum.....)																																			
(Minimum.....)	66	71	64	62	57	60	67	70	68	59	66	68	64	55	62	50	45	44	54	61	58	68	66	69	69	69	57	59	66	70	62.1				
Rock Rapids.....	92	84	75	82	80	87	92	93	88	82	76	88	82	84	76	64	73	80	82	84	86	80	89	88	81	77	69	80	87	83	89	82.4			
(Maximum.....)																																			
(Minimum.....)	70	62	64	64	54	62	70	73	69	56	62	66	64	54	64	52	44	46	53	63	65	65	67	71	68	66	60	58	60	65	71	62.2			
Sioux Rapids.....	92	85	77	85	82	84	91	91	87	89	86	94	86	85	83	73	76	73	82	84	81	83	93	92	83	81	78	80	91	87	92	84.9			
(Maximum.....)																																			
(Minimum.....)	67	68	62	62	58	60	70	72	68	56	67	67	65	53	63	51	46	42	52	62	60	67	66	69	63	70	58	57	60	66	70	61.8			
Spencer.....	92	84	75	86	80	86	93	91	89	88	84	93	86	87	82	72	75	83	85	83	80	83	90	89	82	80	72	81	91	90	91	84.6			
(Maximum.....)																																			
(Minimum.....)	66	70	62	61	51	61	70	71	66	58	63	67	63	53	62	51	43	44	62	60	61	66	66	68	67	68	58	58	59	65	68	61.5			
<i>North Central District</i>																																			
Algona.....	90	82	74	84	78	82	90	87	83	88	82	93	85	86	78	67	72	78	78	78	77	83	88	89	79	73	71	79	86	86	89	81.8			
(Maximum.....)																																			
(Minimum.....)	68	69	63	62	58	58	67	70	67	60	67	68	65	58	62	53	47	47	53	62	60	64	67	67	69	59	57	59	66	69	69	62.2			
Bancroft.....	90	83	75	83	78	83	91	87	83	83	83	92	85	84	78	67	72	76	79	79	74	83	90	90	82	76	73	79	85	87	89	81.9			
(Maximum.....)																																			
(Minimum.....)	66	70	60	62	55	58	67	69	64	57	64	68	63	53	59	50	44	44	50	57	56	63	65	62	61	66	55	55	56	63	67	59.6			
Belmond.....	80	88	76	81	81	83	91	85	83	86	88	91	86	84	80	69	72	76	78	79	81	86	91	91	81	79	70	79	86	86	89	82.7			
(Maximum.....)																																			
(Minimum.....)	65	61	64	61	59	56	67	69	60	56	66	68	67	56	60	52	45	42	52	63	57	64	68	69	67	69	59	56	58	65	68	61.1			
Britt.....	91	81	74	83	80	85	92	88	84	86	83	93	88	86	78	66	73	77	80	81	80	87	89	84	82	75	69	80	86	87	90	82.5			
(Maximum.....)																																			
(Minimum.....)	67	70	64	60	58	60	67	70	65	58	67	68	67	55	62	53	47	46	52	62	60	64	67	60	67	69	58	57	57	66	68	61.6			
Charles City*.....	89	87	67	76	79	82	86	88	83	85	88	91	85	81	72	64	70	73	78	76	81	86	86	87	80	72	70	77	83	85	89	80.7			
(Maximum.....)																																			
(Minimum.....)	68	67	64	62	57	59	67	69	64	59	67	68	63	57	59	54	50	47	52	62	59	66	68	69	67	64	60	56	60	66	69	61.0			
Dakota City.....	89	82	76	84	79	84	86	88	84	88	88	92	86	85	83	66	72	77	80	79	79	87	92	91	83	80	68	80	87	89	90	83.0			
(Maximum.....)																																			
(Minimum.....)	66	71	65	62	60	58	64	70	65	57	67	68	64	54	64	52	46	44	52	63	60	67	67	71	69	63	59	58	70	66	66	62.2			
Mason City.....	90	82	74	80	79	82	88	87	84	84	85	91	85	83	77	65	71	75	77	77	80	86	86	87	81	75	70	76	84	85	88	81.1			
(Maximum.....)																																			
(Minimum.....)	67	70	61	60	57	57	66	69	65	55	64	69	66	54	60	52	47	43	53	61	58	64	68	66	69	60	54	58	64	67	61.0				
Northwood.....	88	81	73	75	80	80	88	86	81	86	82	90	82	80	72	66	67	74	75	76	78	84	87	86	80	74	67	74	82	82	86	79.4			
(Maximum.....)																																			
(Minimum.....)	65	69	59	59	56	57	64	69	65	59	65	67	64	57	60	53	47	47	49	58	58	63	66												

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF AUGUST, 1943—Continued

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>Central District (Continued)</i>																																
Grundy Center.....	87	85	74	80	86	81	90	85	85	90	90	87	92	84	86	73	74	77	78	74	81	82	90	90	84	78	71	77	85	82	91	82.9
(Maximum.....)	87	85	74	80	86	81	90	85	85	90	90	87	92	84	86	73	74	77	78	74	81	82	90	90	84	78	71	77	85	82	91	82.9
(Minimum.....)	63	71	66	73	58	57	64	69	66	55	66	68	65	54	57	53	47	45	49	61	58	65	68	68	68	66	60	53	56	66	70	61.5
Iowa Falls.....	90	84	74	78	76	82	87	84	84	85	88	91	85	84	85	69	71	75	84	75	80	88	89	90	81	77	71	77	84	83	90	82.0
(Maximum.....)	90	84	74	78	76	82	87	84	84	85	88	91	85	84	85	69	71	75	84	75	80	88	89	90	81	77	71	77	84	83	90	82.0
(Minimum.....)	65	71	65	62	59	57	65	69	66	57	67	69	67	56	60	53	48	46	50	62	57	64	68	69	69	61	57	60	68	67	62.0	
Marshalltown.....	89	89	75	83	80	83	89	86	88	88	90	90	92	88	87	75	76	77	80	77	83	90	94	95	86	81	72	80	89	85	92	84.8
(Maximum.....)	89	89	75	83	80	83	89	86	88	88	90	90	92	88	87	75	76	77	80	77	83	90	94	95	86	81	72	80	89	85	92	84.8
(Minimum.....)	64	74	69	66	60	55	64	69	66	56	66	68	71	55	60	55	49	43	46	60	56	65	70	66	69	60	56	59	65	67	61.9	
Newton.....	90	91	76	82	80	85	90	88	87	89	91	88	94	87	88	78	74	78	82	79	84	87	93	96	90	82	75	80	89	84	92	85.5
(Maximum.....)	90	91	76	82	80	85	90	88	87	89	91	88	94	87	88	78	74	78	82	79	84	87	93	96	90	82	75	80	89	84	92	85.5
(Minimum.....)	64	74	70	69	63	60	65	72	68	60	70	69	74	59	63	59	53	48	48	62	59	65	69	68	68	71	67	59	59	60	68	64.2
Perry.....	89	85	79	84	81	83	87	85	86	86	88	89	91	86	89	79	74	77	81	74	78	85	92	92	89	83	82	79	90	85	91	84.5
(Maximum.....)	89	85	79	84	81	83	87	85	86	86	88	89	91	86	89	79	74	77	81	74	78	85	92	92	89	83	82	79	90	85	91	84.5
(Minimum.....)	62	74	68	65	61	62	67	72	67	57	66	67	73	55	65	57	50	43	48	56	60	66	67	67	69	71	59	57	59	65	71	62.8
Webster City.....	86	83	77	82	78	81	85	84	83	84	86	88	84	82	83	68	71	74	77	74	77	85	89	88	80	79	69	76	86	82	88	80.9
(Maximum.....)	86	83	77	82	78	81	85	84	83	84	86	88	84	82	83	68	71	74	77	74	77	85	89	88	80	79	69	76	86	82	88	80.9
(Minimum.....)	65	73	67	64	60	57	67	70	67	56	67	68	70	55	61	53	48	43	51	62	58	66	67	69	68	69	61	58	59	67	69	62.4
<i>East Central District</i>																																
Anamosa.....	89	90	77	79	80	86	80	91	92	90	94	92	90	81	89	82	75	75	77	78	84	87	88	88	88	80	70	76	82	88	90	84.1
(Maximum.....)	89	90	77	79	80	86	80	91	92	90	94	92	90	81	89	82	75	75	77	78	84	87	88	88	88	80	70	76	82	88	90	84.1
(Minimum.....)	65	72	66	67	59	60	63	70	62	69	65	72	72	63	60	60	50	44	47	58	60	66	68	68	68	69	62	60	60	68	72	63.4
Belle Plaine.....	87	90	82	79	78	80	87	84	86	88	90	90	88	86	78	72	72	75	77	77	80	86	91	91	85	79	72	77	84	84	90	83.1
(Maximum.....)	87	90	82	79	78	80	87	84	86	88	90	90	88	86	78	72	72	75	77	77	80	86	91	91	85	79	72	77	84	84	90	83.1
(Minimum.....)	66	73	70	69	61	60	67	71	67	61	69	69	71	69	63	57	52	49	53	63	61	69	69	68	71	70	62	59	61	68	70	64.8
Cedar Rapids.....	90	90	75	80	80	82	88	85	86	88	90	89	83	87	78	73	73	76	79	78	82	86	89	91	86	80	73	78	84	85	91	83.6
(Maximum.....)	90	90	75	80	80	82	88	85	86	88	90	89	83	87	78	73	73	76	79	78	82	86	89	91	86	80	73	78	84	85	91	83.6
(Minimum.....)	67	73	70	69	60	57	64	69	68	60	68	70	69	59	62	59	52	47	49	59	60	68	69	70	71	70	64	60	66	72	63.9	
Clarence.....	88	91	75	80	81	83	91	88	85	91	92	88	97	86	88	80	74	79	78	81	84	87	88	93	90	78	73	77	84	91	90	84.9
(Maximum.....)	88	91	75	80	81	83	91	88	85	91	92	88	97	86	88	80	74	79	78	81	84	87	88	93	90	78	73	77	84	91	90	84.9
(Minimum.....)	64	72	68	67	60	59	65	66	67	60	66	69	69	59	62	57	50	49	51	60	62	68	67	70	69	63	60	60	64	70	63.0	
Clinton.....	91	92	76	84	81	88	89	90	88	90	92	91	95	87	88	80	73	76	81	80	86	89	89	92	86	78	74	77	83	88	93	85.4
(Maximum.....)	91	92	76	84	81	88	89	90	88	90	92	91	95	87	88	80	73	76	81	80	86	89	89	92	86	78	74	77	83	88	93	85.4
(Minimum.....)	67	73	68	69	61	60	67	68	74	64	70	69	71	60	64	62	51	50	53	60	61	66	70	71	70	71	66	62	60	65	72	65.0
Davenport*.....	90	93	81	83	81	83	89	88	87	90	90	88	93	85	88	75	76	79	80	81	86	87	90	93	89	80	74	78	85	91	93	85.4
(Maximum.....)	90	93	81	83	81	83	89	88	87	90	90	88	93	85	88	75	76	79	80	81	86	87	90	93	89	80	74	78	85	91	93	85.4
(Minimum.....)	67	73	72	67	63	63	70	72	70	68	73	72	72	65	67	57	54	55	60	65	65	71	71	72	73	68	66	63	64	68	75	67.1
Iowa City.....	87	91	77	81	80	81	87	84	86	88	88	89	88	83	88	78	73	76	78	78	83	86	90	92	87	80	75	78	85	88	91	83.9
(Maximum.....)	87	91	77	81	80	81	87	84	86	88	88	89	88	83	88	78	73	76	78	78	83	86	90	92	87	80	75	78	85	88	91	83.9
(Minimum.....)	65	73	70	70	62	59	61	70	68	62	68	68	70	60	60	59	51	50	50	61	60	68	69	68	73	71	63	60	66	71	64.1	
Maquoketa.....	89	90	77	79	79	81	87	88	84	88	90	89	91	83	86	78	72	76	78	80	84	88	88	86	88	82	72	77	82	87	91	83.5
(Maximum.....)	89	90	77	79	79	81	87	88	84	88	90	89	91	83	86	78	72	76	78	80	84	88	88	86	88	82	72	77	82	87	91	83.5
(Minimum.....)	63	71	65	68	60	55	63	66	69	66	71	69	57	60	55	50	45	46	46	66	67	60	69	69	70	70	64	59	61	61	71	62.8
Muscatine.....	90	93	81	84	81	85	90	87	87	90	92	89	95	86	90	83	76	78	81	79	87	88	90	94	90	80	78	80	86	81	93	85.9
(Maximum.....)	90	93	81	84	81	85	90	87	87	90	92	89	95																			

## TOTAL PRECIPITATION, AUGUST, 1943

**PRECIPITATION**

The average monthly precipitation, computed from the averages of nine districts of almost equal area and based on the measured totals of 122 stations, was 5.07 inches which is 1.47 inches more than the all-time August average. There have been but 9 wetter Augusts in the 71 years of record. The district averages were above the adopted normals in all except the northwest portion, with the greatest excess in the northeast. A discussion of the distribution of dry areas appears in the general summary. The greatest district average was 6.83 inches in the northeast, and the least was 3.23 inches in the northwest. The greatest monthly total was 10.49 inches at Washington, followed by 10.10 inches at Cresco. The least amount was 0.74 inch at Le Mars. The heaviest 24-hour fall at a regular Weather Bureau station, was 7.35 inches at Washington, on the 3d. However, there were well authenticated reports of 12 inches of rain in 24 hours near Winfield, Scott Township, Henry County, during the same storm that produced the Washington fall, and of 10 inches at other surrounding points, some of the measurements having been made in rain gages of standard pattern. Again on the night of the 12th-13th, it seems rather certain that at least 10 inches of rain fell in Jenkins Township, Mitchell County. Further discussion of these rains, which equal or exceed the highest official monthly total, appears in the general summary and the storm table. The average number of days with 0.01 inch or more was 10.

**MISCELLANEOUS PHENOMENA**

*Aurora*: 29th, 30th, 31st.

*Fog, light*: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 10th, 11th, 13th,

14th, 15th, 18th, 19th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

*Fog, heavy*: 1st, 3d, 4th, 5th, 6th, 7th, 8th, 11th, 19th, 21st, 24th, 26th, 28th, 29th, 30th.

*Frost, light*: 17th.

*Hail, light*: 9th, 10th, 11th, 15th, 21st, 22d, 27th, 31st.

*Hail, moderate*: 21st.

*Halo, lunar*: None.

*Halo, solar*: 10th, 11th, 19th, 21st, 24th, 29th.

*Meteor*: 9th.

*Thunderstorms*: 1st, 2d, 3d, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 21st, 22d, 23d, 24th, 25th, 26th, 28th, 29th, 30th, 31st.

**ERRATA**

Report for July, 1943. Page 78, Spencer, date of maximum temperature published 14, should be 14<sup>+</sup>; Algona, date of minimum temperature published 1, should be 1<sup>+</sup>; Cedar Falls, date of greatest 24-hour precipitation published 14, should be 13-14; Harlan, highest temperature published 94 on 12th, should be 95 on 13th; Rockwell City, greatest precipitation in 24 hours published 1.84 on 20th, should be 1.90 on 20-21. Page 79, Centerville, greatest 24-hour precipitation published 1.24 on 5th, should be 1.76 on 4-5. Page 82, Cumberland (near), greatest 24-hour precipitation published 1.20 on 4th, should be 1.26 on 4-5; Dumont (near), greatest 24-hour precipitation published 0.81 on 28th, should be 0.85 on 28-29; Burlington, highest barometer published 30.30, should be 30.28; Charles City, highest barometer published 30.21 on 18th, should be 30.26 on 1st.

IOWA STORMS, AUGUST, 1943

County and Township or town	Date	Time	Character of storm	Width of path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Dickinson Co., Superior, Richland, Lloyd Twps.	1	2:30 a. m.	Hail, wind.....	7	N to S	¼ to 1¼			\$125,000	Heavy hail damaged corn, shocked grain and flax, injured some cattle, killed poultry, broke windows and damaged roofs. The most severe loss occurred in an area 10 miles long and 5 miles wide, between the towns of Raleigh, Superior and Terril. Near Raleigh some cornfields were a total loss. Less severe hail caused some loss in the country surrounding the main area. The total area covered by the storm extended from the Minnesota boundary, south-southeast across the east part of Dickinson Co., western Emmet Co., and northwest Palo Alto Co. Wind accounted for about \$25,000 of the total loss. Heavy downpours of rain were estimated at 5 to 6 inches near the center of the storm. Water stood in fields and hailstones were 6 inches deep in ditches, 12 hours after the storm had ended.
Emmet Co., Estherville, Emmet, Twelve-Mile Twps.	1	2:30 a. m.	Hail, wind, rain.....	7	N to S	¼ to 1¼			150,000	
Palo Alto Co., Lost Island Twp.....	1	3:00 a. m.	Hail, wind.....	7	N to S	¼ to 1			25,000	
Jasper Co., Fairview Twp.....	2	10:00 a. m.	Wind.....	5	NW to SE					Crops damaged 10%.
Winneshiek Co., Canoe Twp. (6 mi. N of Decorah)	2	Afternoon	Electrical, moderate rain				1	4		Frederick T. Einck, 30, killed; Robert Carolan and 3 others seriously injured.
Henry Co., Jefferson Twp., Wayland.....	2-3	Dusk of 2d to 7:30 a. m., 3d	Rain, flood.....	Entire Twp.	NW to SE				5,000	Jesse F. Eicher in town of Wayland had rain gage made by tinner to Weather Bureau specifications which measured rainfall of 7.00 inches.
Montgomery Co., West Twp.....	2-3	9:00 p. m. to 4:00 a. m.	Heavy rain, electrical, wind, hail						110,000	Worst electrical storm in years; storm worst at 10:00 p. m., 1:00 a. m. and 2:30 a. m.; livestock valued at \$500 killed by lightning; rain amounting to 3.50 inches in 7 hours. Wind damage to buildings \$100,000
Louisa Co., Elm Grove Twp.....	2-3	8:00 p. m. to 4:00 a. m.	Wind.....		NW to SE					Some damage to oats.
Louisa Co., Eliot Twp.....	2-3	11:00 p. m. 2d to 5:00 a. m. 3d	Rain, flood.....	Entire Twp.	Variable		1			George Elrick, 49, farmer, drowned while trying to save livestock from flood. Total loss to livestock cannot be estimated.
Louisa Co., Wapello Twp.....	2-3		Rain, flood, hail.....	Entire Twp.					100,312	Several thousand acres of crops severely damaged by water 4 feet deep; damage estimated by conference of farmers as follows: Corn, \$15,000; soybeans, \$66,600; oats, \$1,400; wheat, \$312; clover, \$2,000; pastures, \$12,000; hogs, \$2,000. Also hail damage to corn and soybeans estimated at from 3% to 5% with an additional \$1,000 loss. Hail covered a narrow strip about 2 miles long. Pastures were mudded so livestock moved to other pastures; many young hogs lost, one farmer lost 65 head; damage to corn would have been greater if it had been followed by bright sunshine; damage to clover mostly to new seedings. Reported by Earl Moyers.
Louisa Co., Marshall Twp.....	2-3	11:00 p. m. to 4:00 a. m.	Rain, flood.....		NW to SE				6,000	Thede Boysen living in SW corner of township estimates the rainfall at 10 inches in SW corner of township; damage to crops, also washouts. Harry Fletcher living in the north central part of township had a milk bucket out in garden that was full; it measured 10½ inches. He also had a feed cooker 15 inches deep, smaller at bottom, also running over.
Louisa Co., Morning Sun Twp.....	2-3	11:00 p. m. to 5:00 a. m.	Rain, flood.....	Entire Twp.	W to E					Chas. J. Schneider: "An average estimate of 8 inches of water fell in a few hours taking many bridges and fences."
Keokuk Co., .....	2-3	11:45 p. m. to 3:00 a. m.	Rain, flood, hail, wind				1		605,000	What Cheer hit hardest; rainfall at Sigourney measured by C. S. Chandler, Cooperative Observer in the Weather Bureau, 4.25 inches in 5¼ hours ending 7:30 a. m., hardest between 2 a. m. and 4 a. m.; unofficial rainfall measurements up to 7 inches were reported. Franklin Brower drowned. Small streams highest in 60 years.
Henry Co., Wayne Twp. (including Olds and Swedesburg)	2-3	Midnight to 6:00 a. m.	Severe lightning, rain, flood	Entire Twp.	NW to SE				10,000	Unofficial measurements of rainfall: 1. Earl J. Miller lives 2 miles NE of town of Olds, straight-sided cream can on a well platform away from buildings, measured 8.25 inches, 12:05 a. m. to 5:00 a. m. 2. J. M. Boshart in town of Olds, paint bucket with top slightly smaller than rest of bucket, 10.00 inches. 3. Virgil Lindell, 2 miles SE of Olds, 3 similar paint buckets, 8.75 inches. 4. Ernest Sandeen, 1 mile E and 1 mile S of Olds, 3 paint buckets, 8.50 inches. 5. Mrs. Ronald Metzger, lives in Olds, says: "I saw a lot of 8-inch straight-sided jars set out in the open on the ground that were full and had run over. I saw a 12-inch wash tub that was full and had run over." This tub probably had sloping sides. She adds, "I am sure that we had a good 10 inches of rain in the town of Olds." 6. Elsa M. Crawford, living 1 mile north of Olds, says: "This was 8-inch rain measured in buckets, commencing 11 p. m. and continuing for about 5 hours with very little wind." Damaged railroad, strawstacks, fences, chickens and pigs drowned, soil eroded, cellars flooded, pastures mudded. The Skunk River at Coppock in the extreme northwest corner of Henry County reached a stage of 21.57 feet, slightly under the highest known stage of June 15, 1930, and May, 1903. Though the center of heaviest rainfall was nearly 20 miles east of Coppock, the water had to pass through the East Fork to the Skunk river at Coppock. The crest stage at Augusta, some distance downstream, was 20.3 feet, compared with 22.55 feet, June 7, 1930.

IOWA STORMS, AUGUST, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width of path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Henry Co., Scott Twp., Winfield	2-3	Midnight to 6:00 a. m.	Rain, flood	Entire Twp.	NW to SE				10,000	Damage to corn, unthreshed oats, small hogs, railroad bridges and tracks. 1. It was rumored that several farmers living south of Winfield reported 14 inches of rain but these reports could not be verified. 2. A. F. Hale, living 4 miles NE of Winfield, says: "Damage to crops, largely from floods along creeks and on lowlands, caused by 8 to 10 inches of rainfall in about 6 hours. Railroad bridges and track badly damaged."
Washington Co., Cedar Twp.	2-3	8:10 p. m. to 10:05 a. m.	Rain, flood							Mrs. John G. McDowell, living 1½ miles north of West Chester measured 5.5 inches of rain.
Washington Co., Crawford, Washington, Oregon, Brighton and Franklin Twps.	2-3	During night	Rain, flood, electrical, hail, wind						217,000	Crops damaged about \$5,000 in Crawford Twp. In Washington Twp. rainfall of 7.35 inches in 14½ hours ending at 9:30 a. m. of the 3d, recorded by Clarence M. Logan, Cooperative Observer for U. S. Weather Bureau. Heavy rain and flood damaged buildings to the amount of about \$500, crops, \$65,000 and livestock, \$2,000. There were large losses in south part of county also from these causes but no estimate of damage is available. Hail damaged crops \$50,000, while wind caused damage to crops of about \$40,000 and to buildings \$50,000. No estimate of the damage is available from Oregon Twp. However, shocked oats were washed away and damaged; hogs and sheep drowned; rainfall estimated at 8 inches by Postmaster at Ainsworth. In Brighton Twp. all crops in an area about one-half mile wide on Skunk river bottoms were total loss. Total loss in township unestimated. In Franklin Twp. floods and heavy rain caused damage over most of entire township. Melvin Booth, 1 mile SE of West Chester, says: "This was a 7-inch rain which fell in 3 hours." Damage from flood was estimated as follows: to buildings, \$500; to crops, \$2,500; and to livestock, \$1,500.
Iowa Co., Honey Creek, Hartford, Sumner, Troy Twps.	3	Early morning	Rain, flood, wind	Entire Twps.					22,000	In Honey Creek Twp. floods swept small fields of grain away and covered many with mud. Damage in this township from floods was about \$1,000 to buildings, \$15,000 to livestock, and \$1,000 to crops. Wind damage to crops was estimated at about \$30,000. In Hartford Twp., where the storm was worst at 3 a. m. rain amounted to from 4 inches in west to 5 inches in east part of township. Damage to crops from flooding estimated at \$2,000. Rain, flood and wind damaged all crops in Sumner Twp. about 1%. In Troy Twp. the night's rain of 1.61 inches was followed by 1.09 inches during the afternoon of the 3d, making a total of 2.70 inches.
Warren Co., Otter Twp.	4		Wind	SW part of Twp.	NW to SE					Damaged buildings, oat shocks and trees.
Lyon Co., near Midland	11	Morning	Electrical, hail							Some hail fell during early morning thunderstorm. Barn burned after being struck by lightning.
Sioux Co., near Alton	11	6:00 p. m.	Hail							Hail fell along a line extending diagonally from northwest to southeast across O'Brien Co. causing considerable damage along its path. However, no estimates of loss or details of the storm were received. A second hailstorm began in the southeast corner of Sioux Co. and traveled along an irregular path in the northern part of Cherokee Co. The Cherokee storm was roughly parallel to the one in O'Brien Co. South of the Cherokee Co. hailstorm, there was some damage by wind and there was one report of a tornado north of Cleghorn. Near Aurelia an auto was blown from a highway. A funnel cloud was observed from the Buena Vista Co. fairground at Alta but dissolved before reaching the grounds. From information at hand it seems that the tornado caused only slight damage and did not develop into a destructive storm at any point, although its path was probably 20 miles long.
O'Brien Co., near Archer, Pringbar, Gaza, Sutherland	11	Evening	Hail		NW to SE					
Cherokee Co., Liberty, Marcus, Cedar, Spring Twps.; near Cleghorn and Aurelia	11	7:00 p. m.	Hail, wind, tornado	2	NW to SE	1½			200,000	
Buena Vista Co., Alta	11	Evening	Tornado		NW to SE					
Sac, Calhoun, Greene, Dallas, Carroll, Guthrie Counties, NE Crawford Co., vicinities of Boyer and Deloit	11-12	Night	Heavy rain, flood		NW to SE					Excessively heavy rain, exceeding 5 inches at some points, fell in the Raccoon River Valley from Sac County to the stream's mouth; washing fields, causing all small streams to overflow and causing river stages above bankful to move down the Raccoon. Heaviest downpours occurred between Lake City and Jefferson. Many small bridges were washed out, highways damaged, basements flooded and some barns and garages damaged. A barn burned near Lake City after being struck by lightning. Shocked oats and haystacks washed away. There were no outstanding spectacular losses but total damage amounted to many thousands of dollars. At Boyer, mink farm of V. M. Nelson lost 300 mink and 500 others were injured; large loss of livestock and corn; rained 6 to 8 inches from 9 p. m. to 3 a. m.; at Deloit water highest in 50 years.
Worth Co., Mitchell Co., especially Jenkins Twp.	12-13	Night	Heavy rain, flood, wind, electrical						65,000	Heavy rains washed fields, caused small streams to overflow; washed out bridges and damaged highways. Hay and shocked grain washed away. Lightning caused several fires. Some damage by wind.
Clayton Co., McGregor	12-13	Night	Heavy rain, flood, electrical						30,000	Storm sewer collapsed at McGregor after 4.50 inches of rain. Barn burned. Railroad tracks washed out near McGregor and Monona. Much damage by erosion and local flooding.
Dubuque Co., Dubuque	12-13	Night	Heavy rain							Heavy rain flooded some basements.

Storm table continued in September report.

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, SEPTEMBER, 1943 No. 9

GENERAL SUMMARY

In sharp contrast to the three preceding months September, 1943, was unusually cool and dry. The average temperature of 60.3°, was 1.1° lower than in 1942 and 3.6° below the all-time average. It was also the 10th lowest September average in the 71 years of record. The average total precipitation of 2.18 inches was 1.62 inches less than the 71-year mean and equalled the 16th driest September of record. It is noteworthy that most of the cooler Septembers were also dry. Other climatic elements such as wind movement, sunshine, relative humidity and the number of clear, partly cloudy and cloudy days were near the monthly normals. However, sunshine was rather deficient in the southeast and was above normal in the western portion of the State. Killing frost or freezing temperature was reported from about two-fifths of all the reporting stations, mostly in the northern and west central portions.

Continuing the summer trend, the first five days of the month were rather warm. Showers occurred on the 1st as a cold front moved from west to east between masses of Maritime Polar and Maritime Tropical air. Showers again occurred on the 4th and 5th in connection with a slow moving front and on the 5th-6th as the cold front of a mass of Maritime Polar air advanced eastward across Iowa. The associated low pressure trough caused the lowest barometer readings of the month on the 5th-6th.

The influx of cold Polar air on the 6th caused temperature readings to fall far below normal and thereafter unseasonably cool weather prevailed through the 26th.

Scattered precipitation occurred on the 8th in the northern third of the State but the amounts were light. The heaviest rains of the month occurred on the 12th in connection with the eastward movement of a low pressure center across Missouri. The rains began in the northwest portion on the 11th and continued in parts of the east and south on the 13th. Scattered rains caused by a cold front on the 14th-15th were mostly confined to the east and south portions. Another low pressure trough and associated frontal system produced rather general showers on the 19th. Thereafter precipitation was scattered and mostly confined to small local areas until the close of the month, but the 26th was the only date on which no rain was reported from at least a few stations. On the night of the 29th-30th Maritime Tropic air overrunning Maritime Polar air once more caused general light to moderate rains in all sections of the State.

The cold weather that overspread the State on the 6th continued for three weeks but on the 27th temperature readings once more rose to above normal and continued relatively high until the close of the month. In general the maximum readings occurred on one of the first 5 days, while the most common dates for minimum readings were the 17th and 20th. Killing

COMPARATIVE DATA FOR SEPTEMBER, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	59.1	89	33	2.18					
1874	62.8	90	40	6.04					
1875	60.6	92	37	5.02					
1876	60.4	86	38	6.42					
1877	65.4	96	40	1.95					
1878	62.9	92	38	3.13					
1879	59.3	90	24	2.70					
1880	61.1	90	30	4.18					
1881	64.5	103	37	7.14					
1882	63.4	97	31	0.87					
1883	58.5	93	30	2.04					
1884	66.5	95	30	5.20					
1885	61.7	92	32	3.04					
1886	63.0	97	30	4.68					
1887	62.1	98	30	6.17					
1888	59.9	96	26	1.07					
1889	60.7	96	23	2.80					
1890	59.5	96	23	2.71					
1891	67.3	104	28	1.33		4	20	7	3
1892	64.7	99	29	1.53	0	4	16	8	6
1893	64.7	102	18	2.34	0	4	20	6	4
1894	65.1	100	26	3.57	0	8	15	10	5
1895	66.8	103	22	3.03	T.	5	18	8	4
1896	58.5	95	22	4.09	0	10	11	9	10
1897	70.9	106	26	2.04	0	4	23	5	2
1898	65.3	99	29	2.69	0	7	16	9	5
1899	62.5	104	15	0.93	0	4	16	9	5
1900	64.4	99	26	4.98	T.	9	15	8	7
1901	63.3	102	26	4.77	0	9	13	9	8
1902	59.1	88	23	4.35	0	9	15	6	9
1903	60.8	94	28	3.81	0	10	14	6	10
1904	64.0	94	30	2.78	0	7	13	8	9
1905	65.8	96	36	3.81	0	8	14	8	8
1906	67.2	100	27	4.16	0	8	16	8	6
1907	62.8	98	25	2.75	0	8	15	9	6
1908	67.9	98	20	1.20	T.	3	21	6	3
1909	62.4	94	30	3.58	0	9	14	8	8
1910	63.2	99	30	3.59	0	9	14	7	9
1911	65.8	103	32	5.12	T.	10	11	9	10
1912	62.1	104	24	3.98	T.	11	12	8	10
1913	64.5	107	19	3.31	0	9	15	8	7
1914	64.5	99	30	7.88	0	10	16	7	7
1915	63.7	91	30	6.03	0	11	11	8	11
1916	62.5	98	21	3.89	T.	7	17	8	5
1917	62.6	97	28	2.90	0	7	15	7	8
1918	58.6	93	20	1.87	T.	6	16	8	6
1919	67.5	99	33	5.34	0	8	16	6	8
1920	66.5	98	24	3.30	0	8	17	8	5
1921	67.3	99	31	6.72	0	11	14	8	8
1922	67.1	103	31	2.03	0	6	20	6	4
1923	64.2	92	28	5.79	0	11	14	8	8
1924	59.1	91	25	3.13	0	8	16	7	7
1925	69.0	105	32	5.04	0	9	14	10	6
1926	63.0	92	18	9.76	T.	14	8	7	15
1927	67.4	101	29	4.56	T.	10	15	8	7
1928	60.5	93	24	3.08	0	6	19	7	4
1929	62.4	98	25	3.74	T.	9	14	7	9
1930	66.3	101	25	2.31	0	5	19	7	4
1931	71.0	105	35	6.69	0	12	15	8	7
1932	62.2	94	27	2.05	T.	5	21	6	3
1933	69.4	105	29	4.16	0	8	17	7	6
1934	61.0	94	25	5.07	0	12	13	7	10
1935	65.0	96	25	3.46	0	8	18	6	6
1936	68.0	102	31	7.22	0	11	14	8	8
1937	65.9	103	28	1.50	0	4	19	8	3
1938	66.8	101	29	5.67	T.	8	16	8	6
1939	69.3	107	16	0.82	T.	3	22	6	2
1940	65.8	98	27	0.94	0	3	20	7	3
1941	66.6	95	26	7.74	0	12	14	8	8
1942	61.4	96	18	4.13	0.7	12	11	9	10
1943	60.3	94	27	2.18	0	7	15	9	6
Period.....	63.9	107	15	3.80	T.	8	16	7	7

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

frosts at many northern and western stations on the 17th, 20th, 25th and 26th caused little damage.

In spite of the cool weather, the month was generally favorable for crops although the frequent threat of damaging frosts during the three-week period from the 6th to the 26th, caused

CLIMATOLOGICAL DATA FOR SEPTEMBER, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit					Precipitation, in inches				Number of days				Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	54																	D. E. Hadden
Alton	Sioux	1,305	39	59.9	-2.0	88	5	28	20	1.40	-1.77	1.01	5-6	0	6	6	20	4	s.	W. S. Slagle
Cherokee 1 1/2 NW	Cherokee	1,358	24	59.6	-2.3	89	5	28	20	0.56	-3.52	0.22	6	0	5	15	14	1	s.	J. Earl Wirth
Estherville	Emmet	1,298	50	57.3	-4.0	87	5	30	17 1/2	1.56	-2.19	0.59	6	0	8	8	13	9	sw.	Mrs. Mayme P. Orvis
Hawarden	Sioux	1,191	17	61.4	-1.2	91	2	27	20	0.41	-2.54	0.21	4	0	3	13	6	11	s.	Earl V. Slife
Inwood 2 1/2 SW	Lyon	1,474	41	60.0	-2.4	88	2	29	20	0.75	-2.17	0.38	5	0	5	18	8	4	se.	A. C. Hanson
Lake Park	Dickinson	1,479	41	57.8	-3.2	86	5	33	25	2.11	-1.53	1.05	5	0	7	15	9	6	nw.	Frank O. Rood
Le Mars	Plymouth	1,230	57	60.6	-2.0	89	2 1/2	29	20	1.16	-2.32	0.70	5	0	3	9	15	6	ne.	D. N. Zeig
Pocahontas	Pocahontas	1,228	40	58.9	-3.7	87	5	30	17 1/2	0.98	-2.95	0.35	30	0	5	11	14	5	n.	Wilbern L. Boyd
Primghar	O'Brien	1,517	17																	Scott King
Rock Rapids	Lyon	1,341	47	58.6	-2.3	86	2	29	20	2.34	-0.54	1.19	12	0	6	10	13	7	s.	George Raveling
Sanborn	O'Brien	1,552	31	57.4	-4.0	86	5	33	20 1/2	1.84	-1.88	0.86	12	0	8	13	9	8	s.	Susie O. Dow
Sheldon	O'Brien	1,418	38	58.1	-3.1	86	5	31	20	2.72	-0.59	1.15	12	0	8	15	8	7	s.	Ross E. Forward
Sibley	Osceola	1,494	9	57.4	-2.8	85	2 1/2	27	20	1.66	-1.87	1.11	5-6	0	8	18	9	3	se.	R. D. Stewart
Sioux Rapids	Buena Vista	1,275		59.1	-3.7	85	2	30	17 1/2	1.67	-2.13	0.87	12	0	8	18	8	4	n.	Walter A. Simonsen
Spencer	Clay	1,319	36	59.1	-3.3	88	5	30	20	1.18	-2.60	0.44	6	0	8	15	10	5	sw.	E. W. Little
Storm Lake 1 1/2 N	Buena Vista	1,455	54	58.9	-3.9	85	5	34	25	2.49	-1.26	2.20	12	0	3	16	8	6	nw.	Paul B. Vance
West Bend	Palo Alto	1,197	57	58.6	-4.4	85	5	31	17 1/2	0.75	-2.89	0.20	11-12	0	9	13	10	7	sw.	Jos. Dorweiler
<b>Means and extremes</b>				58.9	-3.0	91	2	27	20	1.47	-2.06	2.20	12	0	6	13	11	6	s.	
<b>North Central Dist.</b>																				
Algona	Kossuth	1,200	83	58.8	-3.3	84	5	33	17 1/2	1.22	-3.03	0.55	4	0	7	16	8	6	nw.	Harry B. Nolte
Allison	Butler	1,060	30	59.4	-2.4	85	1	34	25	2.32	-1.44	1.10	4	0	5	17	7	6	se.	D. Tellinghuisen
Bancroft	Kossuth	1,200	1	57.4	-3.8	85	1	31	17 1/2	1.07	-2.93	0.43	12	0	7	15	9	6	sw.	Wilbur Fox
Belmond	Wright	1,175	35	58.0	-4.5	84	3 1/2	31	17	1.97	-2.07	0.63	12	0	7	9	17	4	s.	W. H. Dempsey
Britt	Hancock	1,240	59	58.0	-3.9	85	5	33	25	1.51	-2.48	0.88	4	0	4	16	6	8	nw.	L. M. Naser
Charles City	Floyd	1,013	69	57.6	-3.4	83	27	35	20	1.84	-1.84	0.79	30-1	0	8	14	7	9	se.	U. S. Weather Bureau
Dakota City	Humboldt	1,133	60	58.6	-4.6	85	5	32	17 1/2	1.27	-2.46	0.52	12	0	6	17	9	4	n.	H. S. Brandsgard
Forest City	Winneshiek	1,289	54	57.4	-4.2	85	27	32	17	1.63	-2.11	0.87	1	0	9	9	12	9	nw.	Dr. M. B. Neil
Hampton 3NW	Franklin	1,142	53	57.6	-4.5	84	27	33	25	1.89	-2.53	0.65	11-12	0	5	21	5	4	nw.	E. A. Saxton
Mason City 3N	Cerro Gordo	1,148	52	57.0	-3.9	83	3 1/2	31	17 1/2	2.08	-1.82	0.62	1	0	8	16	8	6	se.	Amer. Crystal Sugar Co.
Northwood	Worth	1,222	48	56.7	-3.5	85	27	34	25	2.75	-1.47	1.35	4	0	8	18	5	7	sw.	Charles H. Dwelle
Osage	Mitchell	1,170	59	57.9	-2.4	85	3 1/2	32	17	1.21	-2.73	0.43	5-6	0	5	21	6	3	se.	Glen V. Yarger
<b>Means and extremes</b>				57.9	-3.7	85	1 1/2	31	17 1/2	1.73	-2.25	1.35	4	0	6	16	8	6	se.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	23							2.88	-1.12	1.14	4	0	9	16	7	7	nw.	E. J. Cable
Cresco	Howard	1,298	7	56.4	-4.0	84	3	33	23	3.12	-0.93	1.32	12	0	6	16	9	5	w.	William C. Patterson
Decorah 2S	Winneshiek	880	61	56.0	-5.1	86	3	29	17 1/2	3.34	-0.75	1.64	13	0	8	14	9	7	nw.	Mrs. Fleta M. Rose
Delaware 1 1/2 W	Delaware	1,083	65	58.2	-4.7	86	3	34	23	1.90	-2.40	0.81	5	0	7	19	6	5	nw.	Clair E. Paris
Dubuque	Dubuque	642	93	60.2	-3.8	86	3	41	17	1.86	-2.15	0.62	4	0	10	8	12	10	s.	U. S. Weather Bureau
Elkader	Clayton		52	58.7	-4.3	86	3	32	26	1.56	-2.42	0.84	12	0	6	12	13	5	n.	Henry M. Wolf
Fayette	Fayette	1,009	56	57.8	-4.7	85	1 1/2	30	20	2.07	-2.26	0.89	5	0	7	10	12	8	nw.	W. H. Walker
Guttenberg	Clayton		84	60.8	-1.7	85	1 1/2	40	17 1/2	2.20	-1.70	0.50	12	0	10	12	9	9	nw.	U. S. Engineers
Independence 1 1/2 W	Buchanan	956	47	58.7	-4.8	86	3	32	26	3.10	-0.87	1.10	5	0	8	12	11	7	nw.	August Bracht
New Hampton	Chickasaw	1,161	47	58.0	-3.4	85	1 1/2	34	20 1/2	3.51	-0.50	1.48	12	0	6	20	2	8	nw.	C. Maas
Oelwein	Fayette	1,036	22	58.8	-3.8	87	1 1/2	32	20	2.05	-2.35	0.70	19	0	5	22	0	8	nw.	John T. Ridler
Postville 5SW	Clayton	1,130	53	57.2	-3.4	82	3	36	17	3.63	-0.54	1.54	12	0	9	12	11	7	sw.	V. H. Williams
Waterloo	Black Hawk	848	62	58.9	-4.6	85	3	34	20 1/2	2.84	-1.27	1.70	5	0	10	17	8	5	nw.	Ralph B. Slippy
Waukon	Allamakee	1,287	9	55.7	-6.3	85	3	30	26	3.28	-0.92	1.73	12	0	9	17	9	4	se.	Mrs. Albert S. Tousley
Waverly 1W	Bremer	935	55	58.6	-3.7	86	3	32	20	1.94	-1.84	0.75	4 1/2	0	8	17	6	7	se.	Charles W. Wile
<b>Means and extremes</b>				58.1	-4.2	87	1 1/2	29	17 1/2	2.62	-1.48	1.73	12	0	8	15	8	7	nw.	
<b>West Central Dist.</b>																				
Audubon 2SW	Audubon	1,297	51	60.8	-3.2	86	5	38	17 1/2	2.34	-1.88	1.00	12	0	7	15	15	0	s.	Geo. Kibby
Carrroll	Carrroll	1,280	58	59.8	-3.7	88	5	31	17	1.71	-2.55	0.80	14-12	0	8	8	10	12	se.	Ben H. Schenkelberg
Cushing 2 1/2 NE	Ida	1,350	10	60.1	-2.4	87	5	36	20	0.97	-2.73	0.40	12	0	7	14	10	6	s.	H. P. Lasher
Denison 2S	Crawford	1,307	60	60.1	-3.6	88	5	32	20	1.89	-1.64	1.25	12	0	4	19	8	3	sw.	E. M. Hugg
Guthrie Center	Guthrie	1,217	49	58.2	-6.2	83	5	36	17	2.23	-1.76	0.93	12	0	8	18	5	7	nw.	Wilbert Shaw
Harlan	Shelby	1,210	52	62.0	-1.5	90	1 1/2	32	20	0.82	-2.98	0.48	6	0	4	22	3	5	s.	Elmer Buss
Jefferson	Greene	1,055	52	59.4	-3.8	84	3 1/2	33	20	2.89	-1.53	1.78	12	0	5	19	5	6	nw.	Will I. Lyon
Lake City	Calhoun	1,238	8	59.8	-3.4	85	3 1/2	35	25	3.10	-1.12	1.40	12	0	8	7	14	9	sw.	Frank A. Taylor
Little Sioux	Harrison	1,040	43	63.3	-1.5	92	5	30	20	0.93	-2.43	0.38	12-13	0	9	21	7	2	s.	H. W. Kerr
Logan	Harrison	1,120	78	62.7	-1.8	94	5	32	20	1.30	-2.11	0.55	12-13	0	8	17	10	3	nw.	Miss Amy Ann Stern
Mapleton 5NW	Woodbury	1,225	5	60.9	-2.3	90	5	29	20	2.58	-1.12	2.07	12	0	4	13	8	9	nw.	LeRoy Wasmund
Missouri Valley	Harrison	1,069	59	62.0	-1.4	92	5	27	20	0.92	-3.41	0.26	6	0	6	22	5	3	se.	S. Wm. Sorensen
Onawa	Monona	1,050	57	60.0	-2.7	87	5	34	17	2.81	-1.37	1.77	12	0	6	18	7	5	nw.	W. J. Oliver
Rockwell City	Calhoun	1,226	75	61.6	-1.0	89	1	32	20					0						F. C. Beitelspacher
Sac City	Sac	1,274																		James L. Leonard
Sioux City	Woodbury	1,111	69	60.9	-1.7	90	5	33	20	2.50	-0.53	1.85	11-12	0	6	7	15	8	s.	U. S. Weather Bureau
<b>Means and extremes</b>				61.0	-2.4	94	5	27	20	1.82	-2.02	2.07	12	0	6	16				

CLIMATOLOGICAL DATA FOR SEPTEMBER, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit					Precipitation, in inches					Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry 1 1/2 SE	Dallas	975	44	59.8	-3.9	87	3	31	20	3.06	-0.98	1.36	12	0	8	20	4	6	nw.	Eugene N. Hastie
State Center	Marshall	1,068	7	59.8	-4.5	85	3†	38	20†	5.04	+0.54	3.10	12	0	8	14	13	3	se.	H. M. Meads
Toledo	Tama	929	50	60.0	-4.3	83	3†	33	20	2.77	-1.99	1.27	4-5	0	7	16	9	5	nw.	H. P. Giger
Waukegan 1 3/4 SW	Dallas	1,042	46	61.1	-3.7	87	3	36	17†	2.38	-1.74	0.57	4-5	0	6	22	5	3	n.	Ivan B. Speer
Webster City 1 SE	Hamilton	1,042	60	57.8	-4.7	84	5	29	20	2.26	-2.10	1.12	4-5	0	7	21	6	3	se.	Leo Holtkamp
Means and extremes				59.7	-4.3	88	3†	29	20	2.92	-1.44	3.10	12	0	7	16	9	5	se.	
<i>East Central Dist.</i>																				
Anamosa 1 NW	Jones	873	15	59.0	-4.9	85	2†	34	17†	1.85	-2.10	0.65	6	0	6	20	6	4	nw.	State Reformatory
Beale Plaine	Benton	895	68	59.6	-4.9	85	3	36	20†	3.32	-1.12	1.19	4	0	6	13	11	6	nw.	R. O. Burrows
Bellevue	Jackson	603	59	59.4	-5.0	86	1†	32	26	1.66	-2.38	1.10	5	0	9	12	11	7	nw.	U. S. Engineers
Cedar Rapids	Linn	813	62	59.7	-4.8	86	3	36	20	2.94	-0.99	1.56	5	0	5	11	10	9	nw.	John T. Wurster
Clarence	Cedar	850	10	60.0	-4.1	89	3	35	26	3.28	-0.72	1.65	4-5	0	7	18	7	5	nw.	H. J. Klatt
Clinton	Clinton	640	73	61.0	-3.7	87	3	38	26	1.31	-2.84	1.08	12	0	7	13	14	3	nw.	Samuel W. Williams
Davenport	Scott	579	73	62.8	-2.8	87	5	42	17	1.59	-1.99	0.95	11-12	0	5	6	13	11	e.	U. S. Weather Bureau
Iowa City	Johnson	780	87	60.5	-4.1	86	3	37	26	4.04	-0.09	2.01	4	0	6	12	13	5	se.	Inst. Hydraulic Research
Maquoketa	Jackson	732	51	59.2	-4.7	87	3	31	26	1.42	-2.82	0.66	4-5	0	8	20	8	2	n.	Dr. E. V. Andrews
Monmouth 4 SW	Jones	870	3	60.2	-4.0	89	3	36	26	1.52	-2.58	0.80	4-5	0	6	8	16	6	se.	Otto J. Bisinger
Muscataine	Muscataine	620	98	61.0	-4.4	88	3†	36	17†	1.84	-2.09	1.06	12	0	6	18	10	2	e.	G. Krieger
Vinton	Benton	815	1	58.9	-5.6	87	3	32	20	3.50	-0.85	2.05	4	0	6	19	6	5	ne.	H. J. Adams
Williamsburg	Iowa	805	28	60.0	-4.8	82	3†	39	20†	3.41	-0.84	2.22	12	0	6	17	6	7	nw.	Dr. F. C. Schadt
Means and extremes				60.2	-4.4	89	3	31	26	2.44	-1.65	2.22	12	0	6	14	10	6	nw.	
<i>Southwest District</i>																				
Atlantic 1 E	Cass	1,110	57	61.0	-3.9	89	3	30	20	1.71	-2.31	0.73	6	0	8	11	13	6	s.	Roy L. Fancolly
Bedford 1 1/4 N	Taylor	1,215	40	62.3	-3.2	89	1†	40	17†	3.46	-0.92	1.26	12-13	0	9	24	0	6	se.	H. J. Chambers
Clarinda	Page	1,004	72	62.0	-3.8	88	5	35	20	3.46	-1.14	1.14	13	0	9	14	8	8	sw.	Forrest E. Allison
Clarinda Erosion 8 W	Page	1,132	5	61.9	-4.0	89	5	35	20	2.65	-1.93	0.81	5	0	12	20	4	6	se.	Soil Conservation Service
Corning 1 E	Adams	1,285	56	62.0	-3.3	86	3†	35	20	2.34	-2.08	0.85	1	0	8	19	5	6	s.	S. W. Morris
Glenwood	Mills	1,100	54	64.4	-1.5	92	5	30	20	1.41	-2.23	0.70	5	0	10	14	15	1	se.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	61.0	-4.6	85	3†	37	25	1.88	-1.90	0.52	6†	0	8	14	9	7	se.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	62.8	-2.4	90	5	30	20	3.30	-0.28	2.38	12-13	0	7	23	7	0	nw.	Fred Bussard
Red Oak	Montgomery	1,077	5	61.4	-4.2	89	3†	29	20	2.46	-1.79	0.93	5-6	0	7	14	10	6	se.	Clarence M. Totty
Red Oak 10 SW	Montgomery	1,030	37							2.50	-2.00	0.81	0.81	0	8	20	4	6	s.	B. R. Bridge
Riverton	Fremont	920	18							2.01	-2.49	1.30	6	0	7	24	2	4	s.	Wm. E. Stubbs
Shenandoah	Page	974	9	63.4	-2.6	90	5	33	20	3.03	-1.52	1.16	12	0	9	15	9	6	se.	Earl E. May Seed Co.
Thurman	Fremont	973	57	63.8	-2.3	91	5	34	20	2.35	-1.93	1.10	5	0	7	22	3	5	s.	Bernard Porter
Omaha, Nebr.	Fremont	1,035	79	63.6	-2.1	90	5	35	20	0.74	-2.47	0.34	5	0	6	10	12	8	se.	U. S. Weather Bureau
Means and extremes				62.5	-3.1	92	5	29	20	2.38	-1.78	2.38	12-13	0	8	18	7	5	se.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	60.2	-5.4	87	3	35	17†	1.89	-2.59	0.52	12	0	10	22	2	6	ne.	S. R. Brown
Albia	Monroe	949	53	61.8	-4.3	89	5	37	17†	1.72	-2.74	0.98	6	0	7	14	11	5	ne.	Arthur L. Freed
Centerville 1 1/4 SW	Appanoose	1,013	51	62.2	-3.7	89	1†	37	17	1.35	-2.93	0.78	6	0	4	11	12	7	se.	E. Grant Everman
Chariton 3 E	Lucas	940	50	60.6	-5.2	87	5	33	20	2.78	-1.71	2.13	4	0	4	17	8	5	se.	Ellis Shaw
Creston	Union	1,293	43	60.2	-4.2	84	5	37	17	2.63	-1.87	1.04	13	0	7	19	7	4	n.	Mrs. Nellie Spangler
Indianola	Warren	972	63	60.4	-5.3	88	3†	33	17†	2.54	-1.41	1.03	4-5	0	8	13	10	7	nw.	Seth F. Shenton
Knoxville	Marion	920	54	62.2	-3.7	88	1†	38	20	2.41	-2.06	1.07	4-5	0	8	21	5	4	s.	Mrs. Ella Mae Brobst
Lamoni 3/4 SW	Decatur	1,138	40	62.2	-3.1	89	5	38	17†	4.35	-0.03	1.91	2†	0	9	17	5	8	nw.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	62.0	-3.9	89	5	38	26	2.89	-1.78	1.41	4-5	0	7	15	9	6	nw.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	60.8	-4.2	89	1	35	20	3.25	-1.28	1.05	12	0	8	10	18	2	n.	Mrs. Irene Hood
Osceola	Clarke	1,098	23	60.8	-4.6	87	3	37	26	3.43	-1.02	1.48	4	0	8	21	3	6	se.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	61.3	-3.8	85	3†	38	20	4.13	-0.42	1.74	13	0	5	16	8	6	nw.	Jas. A. Verploegh
Winterset	Madison	1,120	53	62.2	-3.4	86	5†	35	20	1.99	-1.93	0.48	12	0	9	13	11	6	sw.	H. S. Ely
Means and extremes				61.3	-4.2	89	1†	33	17†	2.72	-1.67	2.13	4	0	7	16	8	6	nw.	
<i>Southeast District</i>																				
Bloomfield 2 1/4 N	Davis	825	29	62.2	-3.6	91	5	36	21	0.92	-3.38	0.60	6	0	3	22	7	1	nw.	Mrs. Leo Foster
Burlington 8 S	Des Moines	697	54	62.8	-4.6	91	3	40	17	1.03	-3.43	0.45	5-6	0	5	10	10	10	nw.	U. S. Weather Bureau
Columbus Jet	Louisa	595	53	60.9	-4.4	85	3	35	21	1.81	-2.25	0.78	12	0	7	17	12	1	ne.	Miss Musa Todd
Fairfield 1 N	Jefferson	780	73	61.8	-3.7	88	5	35	21	1.04	-3.10	0.34	15	0	8	10	11	9	sw.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	63.8	-3.7	90	5	42	26	1.34	-2.50	0.69	5-6	0	5	14	9	7	sw.	U. S. Weather Bureau
Keosauqua 1 1/2 SW	Van Buren	712	57	63.2	-2.5	90	5	37	21	0.95	-3.30	0.63	6	0	4	11	14	5	n.	Harry J. Schlotfeldt
Mt. Pleasant 2 SE	Henry	722	68	62.9	-3.5	92	1	37	21	1.87	-2.53	0.66	6	0	4	16	7	7	s.	Raymond A. Hughes
Oskaloosa 1 1/4 S	Mahaska	818	68	60.8	-4.1	87	3	36	20	2.37	-1.80	1.32	12	0	6	12	8	10	nw.	Clifford Bergstresser
Ottumwa 1 W	Wapello	649	49	63.4	-2.1	91	1†	37	17†	1.84	-2.44	0.98	6	0	5	16	7	7	se.	C. L. Mikesh
Sigourney	Keokuk	780	49	62.0	-3.1	88	3	39	20†	2.08	-2.05	0.86	12	0	6	15	12	3	ne.	Mrs. Christie E. Chandler
Stockport 1 3/4 SW	Van Buren	747	43	62.2	-3.3	88	5	36	21	1.48	-2.76	0.51	6	0	6	18	5	7	ne.	C. L. Beswick
Washington	Washington	762	60	61.6	-4.4	87	3†	37	26	2.00	-2.32	1.15	12	0	5	15	10	5	ne.	Clarence M. Logan
Means and extremes				62.3	-3.6	92	1	35	21	1.56	-2.66	1.32	12	0	5	15	9	6	ne.	
State means and extremes				60.3	-3.6	94	5	27	20	2.18	-1.62	3.10	12	0	7	15	9	6	se.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.

Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year record. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departures are based on the averages for the entire 71 years of record and must necessarily differ slightly from average station departures based on established normals.



DAILY PRECIPITATION FOR SEPTEMBER, 1943

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				.27	.27	.02					T.	.20	.03							T.											T.		
Alta <sup>2</sup>	Raccoon				.17	.86	.15					T.	.09								.04										T.	.09	T.	T.
Alton	Floyd				.15	T.	.22					T.	.12								.05													
Cherokee	Little Sioux					.03	.59		T.		T.		.57	.04			.04				T.	.04											.23	.02
Estherville <sup>2</sup>	Des Moines	T.																																
Hawarden	Big Sioux		T.		.21	.05							.15																					
Inwood (near) <sup>2</sup>	Big Sioux			.01	.38	.03					T.		.15	.18																				
Lake Park	Little Sioux				.17	1.05	.08					.08	.42																				.21	
Le Mars	Floyd				.40	.70							.06									T.												
Milford <sup>2</sup>	Okoboji				.06	.40	.17					.07	.29	.01		.02						.02										.08	.21	
Pocahontas	Des Moines				.10		.10					T.	.31									.12											.35	
Primghar	Little Sioux																					.61												
Rock Rapids	Big Sioux		T.		.16	.86	.07	.02				.04	T.	1.19			T.															T.		T.
Sanborn	Floyd			.04	.11	.55	.07						.86	.04																		.15	.02	T.
Sheldon	Floyd				.27	.71	.06					.06	.38	1.15	T.							.04										.05	T.	T.
Sibley	Big Sioux				.10	.90	.21					.05	.07	.22			T.					.01											T.	T.
Sioux Rapids	Little Sioux				.27	.33						.04	.01	.87	T.							.02											T.	.05
Spencer	Little Sioux				.24	.44						.07	.10	.02								.07											.17	
Spirit Lake SCS <sup>2</sup>	Okoboji					.08	.62					.04		.34							.12											.02		.02
Storm Lake	Raccoon	T.			.15		.14					T.	2.20									T.												
Terril SCS	Little Sioux				.10		.30					T.	.40	T.																				
West Bend	Des Moines		.04		.06	.09	.15					.06	.03	.17			T.					.12											.03	
<i>North Central District</i>																																		
Algona	Des Moines				.55	.07						.13	.05	.29							.10													
Allison	Cedar				1.10		.30					.08	T.	.10	T.						.74												T.	
Bancroft	Des Moines		.20		.28		.11					T.	.43				.03				.02													T.
Belmond	Iowa		.09		.51		.06					.06		.63			T.				.32												.30	
Britt	Iowa				.88		.04					T.	T.	.27			T.				.32													T.
Charles City <sup>1</sup>	Cedar				.27	.15	.12					.23	.11			.05					.32												.59	
Dakota City	Des Moines				.21	.06	.06					.07	.52								.27												.14	
Dumont (near)	Cedar	T.			.36		.27					.04	.06	.13	T.					.67												.83		
Forest City <sup>2</sup>	Cedar		.87		.22	.02	.06					.02	.13	.07						.21												.03		
Hampton	Cedar					.15						.50	.15								.54												.55	
Kanawha	Boone		.68		.20	.05	.04					.09	.86							.29												.55		
Mason City	Cedar		.62		.24	.09	.13					T.	.32	.01						.33												.34		
Mason City Apt. <sup>1</sup>	Cedar				.37	.09	.01					T.	.04	.27						.06													T.	.48
Northwood	Cedar		.10		1.35	.02	.15					T.	.05				T.	.07		.31												.70		
Osage	Cedar		.29		.29	.14								.20						.20												.29		
<i>Northeast District</i>																																		
Cedar Falls	Cedar		.06		1.14	*	.96					.04	.07	.03						.54													.04	
Cresco	Turkey		.46		.11	.51	.53						1.32	T.						T.												.19		
Decorah <sup>2</sup>	Mississippi		.05		.69	.07							1.64							.57											.14		.02	
Delaware (near)	Maquoketa				.39	.81	.17					T.	.01	.22						.26	T.											.04		
Dubuque <sup>1</sup>	Mississippi				.62	T.	.01					.01	.10	.42	.02	T.	T.			.31												.18		
Dubuque LD 11 <sup>2</sup>	Mississippi				.31	.01	T.					T.	.40	.04	T.	T.				.20												T.	.19	
Elkader	Turkey					.09							.84							.40													.14	
Fayette	Mississippi					.89	.07						.05	T.	T.					.45	.53	.02										T.	.04	
Guttenberg LD 10 <sup>2</sup>	Mississippi		.02		.45	.49							.50	.10						.29												.05	.07	
Independence	Wapsipinicon		.13		1.04	1.10	.19					.02	.20	.02					.40														.09	
Lansing <sup>2</sup>	Mississippi		.12		.47	.27	T.						.64	.20					.10	.50											.01	.22		
New Hampton	Wapsipinicon		.10		.11	.78	.24						1.48	T.			T.		.80														T.	
Oelwein	Wapsipinicon		.15		.65	.45	.10						.70						.70															
Postville (near)	Mississippi		.05		.19	.73	.22						1.54				.03		.78													.06		
Waterloo <sup>2</sup>	Cedar		.05		1.70	.18						.05	.09	.02					.12	.57												.01		
Waukon	Mississippi				.10	.41	.21					T.	1.73	.03					.62			.02										.03	.13	
Waverly	Cedar		.05		.20	.55	.20					.03	.05	.01					.75													T.	.10	
Genoa, Wis. LD8 <sup>2</sup>	Mississippi		.23		.50	.34	T.						.05	.19					.39													.03	.13	
Lynxville, W. LD9 <sup>2</sup>	Mississippi		.13		.28	.46							.42	.31					.39													T.	.20	
<i>West Central District</i>																																		
Antho (nr.) SCS	Little Sioux				.65	.30							.65							.28														
Audubon (near)	Nishnabotna				.02	T.	.32						T.	1.00	.05					.05	.18											T.	.65	
Carroll <sup>2</sup>	Raccoon		.01		.12	.30							.83	.20						.02													.02	
Cushing (near)	Little Sioux				.20	.26	.03						.40	.02						.02													.04	
Denison	Missouri					.36							1.25							.21													.07	
Denison SCS <sup>2</sup>	Missouri					.39							1.38							.26														
Guthrie Center	Raccoon		.39		.13	.35						T.	.93	.09						.23													T.	.10
Harlan	Nishnabotna					.48							.08							.19														T.
Jefferson	Raccoon		.40		.19	.21							1.78							.31													T.	T.
Lake City	Raccoon		.20		1.01	.05	.21						1.40	.02						.20													.01	
Lake View	Raccoon				.50	.77				</																								



DAILY PRECIPITATION FOR SEPTEMBER, 1943—Continued

Table with columns: Stations, Drainage Basin, Day of Month (1-31), Totals. Rows include Southeast District (Continued) with stations like Donnellson, Eddyville, Fairfield, Keokuk, Keokuk LD 19, Keosauqua, Mt. Pleasant, Oskaloosa, Ottumwa, Ottumwa (river), Sigourney, Stockport, Wapello, and Washington.

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

1 Precipitation is for 24-hour period midnight to midnight.

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

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

‡ Interpolated

† Station is equipped with recording gage.

° Precipitation included in next following measurement. \*\*Incomplete.

SUPPLEMENTAL TABLE, SEPTEMBER, 1943

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Precipitation (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), No. of Days (With precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind.

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

SOIL TEMPERATURES AT AMES, IOWA, SEPTEMBER, 1943

Table with columns: Temperature, 4 feet above ground, At Depth in Soil of (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Rows include Average 7 a. m., Average 12 noon, Average 7 p. m., Highest Date, Lowest Date, Number of days with temperature.

† And other dates.

° This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, SEPTEMBER, 1943

Table with columns: Stations, Sea-level pressure, Wind, Relative Humidity, Percentage of sunshine, Degree Days. Rows include Burlington, Charles City, Davenport, Des Moines, Dubuque, Sioux City, Omaha, Nebr., State, Normals and Records.

‡ True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

\*Sioux City. †Des Moines. ‡Davenport.

a great deal of anxiety, especially among seed corn growers.

As of the 12th, 54% of the corn crop was safe from moderate frost. A week later, 70% was safe, on the 26th, 82% and on October 3 about 93% was safe from frost. Most of the corn that had not matured by the close of September was in late planted fields in the southern portion where excessive spring and early summer rains delayed field work. A part of the very late planted was expected to mature if favorable conditions continued. The U. S. Department of Agriculture October 1 estimate of yield amounted to 635,778,000 bushels, or 39,000,000 bushels above the record yield of last year. The yield per acre was estimated at 58.5 bushels.

Soybeans made slower growth than corn but at the close of the month about 65% were safe from frost. Cutting of beans for hay began during the second week. Frosts killed most of the leaves in the northern third and during the warm closing days of the month the entire crop rushed to maturity. The U. S. Department of Agriculture estimated a total yield

IOWA STORMS, SEPTEMBER, 1943

County, and Township or Town	Date	Time	Character of storm	Width of path Miles	Direction	Size of hailstones (Diam.) (inches)	Persons Killed	Persons Injured	Estimated value of damage	Remarks
Crawford Co., Jackson Twp.	1	11:00 p. m.	Hail	Narrow	NW to SE	1/4				Hail damaged crops from 5% to 20% in a narrow strip across the northern part of Jackson Twp.
Winnebago, Worth, Cerro Gordo Counties	1	Early a. m.	Wind							Severe thunderstorms attended by high wind caused scattered damage to crops, trees, etc.
Calhoun Co., Butler and Twin Lakes Twp.; Greene Co., Highland Twp.	4	4:30 p. m. to 6:00 p. m.	Hail, wind		W to E	1			\$50,000	Hail damaged crops up to 20% in an area 2 miles wide and 6 miles long west of Twin Lakes in Calhoun Co. about 4:30 p. m. An hour later hail at and near Adaza in Greene Co. broke windows, killed chickens and damaged crops up to 75% in an area 2 miles square and caused lesser damage in an area 2 miles wide and about 6 miles long. Loss at Adaza was estimated at \$1,000 to windows and buildings and \$20,000 to crops.
Osceola Co., near Sibley; Keokuk Co., Sigoourney; Worth Co., Silver Lake Twp.	5		Hail							Hail fell in widely scattered areas. The only definite report of damage was from Silver Lake Twp. of Worth Co., where corn and soybeans were damaged from 50% to 90% in some areas.
Wapello Co., Ottumwa	6		Wind							Trees blown down and other property damaged by high wind.
Lyon, Emmet, O'Brien, Greene, Guthrie, Adair Counties	11-12		Hail							Scattered hail damage occurred in the counties named. In Lyon Co., tomatoes and truck crops destroyed and other crops damaged in an area from 1/2 to 2 miles wide and 6 to 8 miles long. Hail stripped leaves from corn and soybeans and badly damaged gardens in an area stretching from near Jefferson in Greene Co. to Bagley and Bayard in Guthrie Co., about 12 miles to the south. Details are lacking from other areas.

of about 39,000,000 bushels, about the same as in 1942.

Sweet corn canning came to an end about the middle of the month. The cool weather slowed tomato canning but where killing frost did not occur, tomatoes were still being harvested at the end of the month.

Late haying, silo filling, fall plowing, stripping of sorghum cane for syrup, etc., were accomplished under the most favorable conditions for field work encountered during the present season. Winter wheat seeding made good progress but the growing drouth area in western Iowa, especially in Monona and Harrison counties, was unfavorable for germination and growth. Sugar beet lifting began during the closing days.

Hemp harvest made good progress but the dry weather was unfavorable for retting. Rain was needed in much of the western part of the State for wheat, pastures and new seedlings of grasses and to put the ground in shape for plowing.

TEMPERATURE *September* S. E. D.

The State average temperature for ~~August~~ *September*, obtained from the averages of nine districts of nearly equal area, which in turn were derived from the averages at 123 temperature observing stations, was 60.3°. This was 3.6° below the 71-year average and the lowest since 1924. All stations reported averages below the adopted normals for September, with lowest values in the northeast portion. The highest station average was 64.4°, at Glenwood, and the lowest was 55.7°, at Waukon. The maximum was 94°, at Logan and Missouri Valley on the 5th, while the lowest observed was 27°, at Hawarden, Sibley and Onawa on the 20th. Maximum readings of 90° or higher were

recorded at 19 stations on one or more days, while minima of 32° or lower were reported from 48 stations on one or more days.

PRECIPITATION

The average total precipitation, obtained from the averages of nine districts of about equal area which in turn were based on the measured totals at 126 stations, was 2.18 inches, or 1.62 inches less than the 71-year September average. In general amounts were heaviest in the central district and least in the northwest and southeast. The monthly totals were below adopted normals at all stations except State Center where there was a slight excess. The greatest total was 5.04 inches at State Center, and the least 0.34 inch at Onawa. The greatest 24-hour fall was 3.10 inches at State Center on the 12th. The average number of days with measurable rain was 7.

MISCELLANEOUS PHENOMENA, SEPTEMBER, 1943

- Aurora: None.
- Fog, light: 2d, 3d, 4th, 5th, 8th, 9th, 12th, 13th, 14th, 15th, 17th, 18th, 19th, 20th, 21st, 22d, 25th, 26th, 28th, 29th, 30th.
- Fog, heavy: 2d, 4th, 5th, 10th, 14th, 17th, 21st, 26th, 30th.
- Frost, light: 8th, 9th, 10th, 16th, 17th, 20th, 23d, 25th.
- Frost, heavy: 16th, 17th, 20th, 25th, 26th.
- Frost, killing: 17th, 20th, 25th, 26th.
- Hail, light: 4th, 5th, 6th, 11th, 12th.
- Hail, moderate: 11th.
- Thunderstorms: 1st, 2d, 3d, 4th, 5th, 6th, 8th, 11th, 12th, 13th, 15th, 16th, 18th, 19th, 24th.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR SEPTEMBER, 1943 (24 hours ending 6:30 p. m.)

Station	Data	Day of Month																															Sums
		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	
Ames	{Evaporation.....	.270	.215	.154	.087	.199	.237	.172	.141	.154	.197	.201	.104	.033	.115	.182	.160	.171	.251	.083	.100	.135	.115	.139	.198	.141	.182	.188	.166	.131	.022	.....	4.643
	{Wind Movement....	.82	.24	.15	.20	.49	.89	.87	.75	.50	.40	.66	.77	.57	.57	.30	.42	.39	.135	.64	.19	.74	.25	.25	.96	.29	.57	.61	.35	.44	.50	.....	1,613
Cherokee	{Evaporation.....	.249	.240	.226	.045	.143	.222	.241	.112	.150	.171	.039	.126	.066	.109	.201	.138	.166	.299	.112	.136	.116	.123	.141	.208	.130	.177	.221	.186	.089	.080	.....	4.662
	{Wind Movement....	.89	.64	.46	.47	.69	.157	.109	.108	.69	.12	.87	.24	.52	.44	.43	.56	.45	.205	.78	.30	.77	.45	.44	.80	.36	.66	.143	.35	.42	.11	.....	2,013
Clarinda	{Evaporation.....	.231	.205	.184	.149	.472	.339	.261	.236	.185	.186	.179	.103	.171	.047	.224	.158	.139	.277	.094	.100	.175	.082	.099	.171	.107	.165	.185	.150	.008	.024	.....	5.106
	{Wind Movement....	.92	.24	.11	.15	.50	.136	.83	.88	.15	.18	.45	.50	.42	.48	.38	.21	.33	.123	.61	.10	.63	.24	.13	.79	.16	.43	.83	.16	.35	.10	.....	1,385
Ia. City	{Evaporation.....	.246	.165	.132	.....	.151	.298	.179	.150	.143	.137	.146	.114	.040	.107	.153	.150	.088	.201	.108	.104	.129	.124	.136	.086	.086	.140	.081	.107	.135	.025	.....	3.994†
	{Wind Movement....	.44	.14	.12	.22	.24	.57	.42	.42	.35	.18	.40	.44	.22	.27	.35	.38	.15	.68	.50	.30	.36	.26	.30	.34	.23	.56	.32	.15	.30	.7	.....	958

For precipitation and temperature data, see tables on other pages of this publication.  
 †Monthly total evaporation includes interpolation for missing days. \*Included in following measurements.

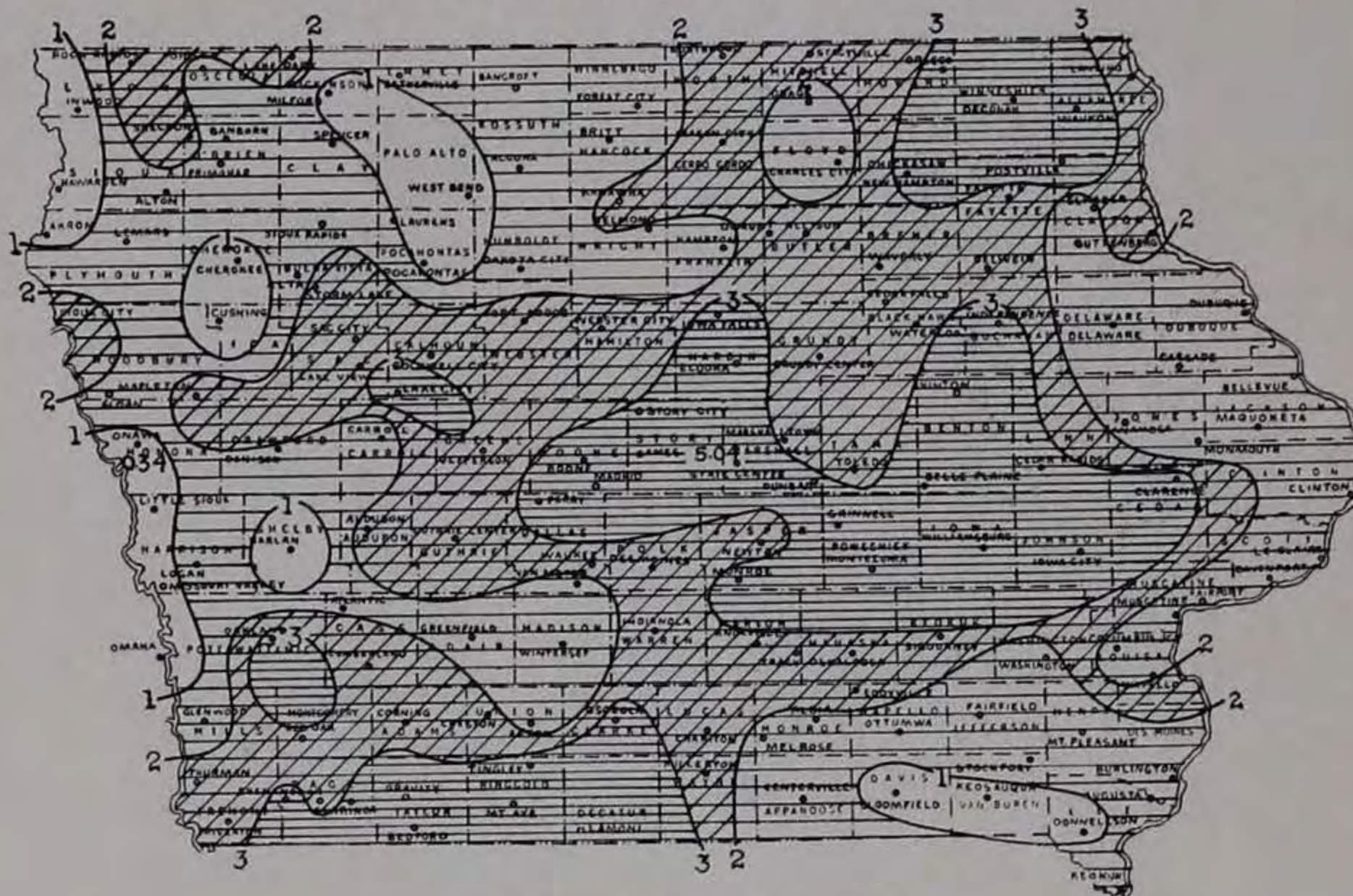
DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF SEPTEMBER, 1943

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>Northwest District</i>																																	
Alta.....	Maximum.....																															72.9	
Alton.....	Maximum.....		81	87	83	79	88	64	68	65	67	67	71	65	62	72	70	63	67	81	77	65	73	73	67	72	68	79	80	81	78	73	46.9
	Minimum.....		58	56	62	61	52	48	47	45	40	40	45	53	51	48	41	40	32	53	45	28	50	40	33	42	31	42	55	58	52	60	47.1
Cherokee.....	Maximum.....		79	87	81	72	89	65	69	58	69	68	72	58	62	76	71	63	68	79	67	66	76	66	69	71	68	79	83	74	78	72.2	
	Minimum.....		58	54	59	59	53	47	51	45	38	39	46	52	51	48	48	39	31	51	44	28	46	42	36	45	33	41	58	58	53	61	47.1
Estherville.....	Maximum.....		78	82	80	72	87	63	68	56	68	64	67	57	59	73	70	59	67	75	67	66	66	65	68	71	67	77	82	81	76	73	70.1
	Minimum.....		57	49	59	57	53	47	46	43	39	37	38	47	48	43	42	37	30	47	44	39	44	39	33	44	30	37	57	56	46	57	44.5
Hawarden.....	Maximum.....		81	91	86	75	89	68	71	64	71	72	73	70	65	71	73	65	71	84	81	68	71	70	71	78	72	82	84	86	78	80	75.4
	Minimum.....		59	61	62	61	55	47	47	45	37	36	46	54	53	47	40	38	32	53	47	27	53	40	35	44	30	45	57	61	54	60	47.5
Lake Park.....	Maximum.....		74	81	78	74	86	61	64	57	64	62	65	58	57	70	67	58	65	75	70	64	66	64	66	69	65	74	81	79	74	75	68.8
	Minimum.....		56	53	59	58	54	45	47	42	39	39	43	50	52	48	50	39	35	48	45	34	47	41	39	45	33	40	57	48	58	46.7	
Le Mars.....	Maximum.....		82	89	83	76	89	67	70	60	72	72	77	67	64	75	72	65	70	82	77	67	77	65	71	76	72	80	85	81	83	75	74.7
	Minimum.....		59	55	60	59	55	47	50	44	36	40	48	54	52	40	42	40	33	53	45	29	38	41	35	46	30	42	58	50	53	54	46.6
Pocahontas.....	Maximum.....		78	84	81	77	87	69	69	60	69	68	70	62	60	74	70	59	65	77	67	65	73	67	68	74	65	76	84	83	78	71	72.2
	Minimum.....		58	47	57	60	56	46	49	45	37	38	43	47	50	46	44	42	30	46	45	30	45	40	33	47	30	38	55	58	47	60	45.6
Rock Rapids.....	Maximum.....		76	86	79	71	80	66	66	58	68	65	66	60	62	70	69	61	68	81	78	66	74	62	70	72	69	79	84	82	73	78	71.3
	Minimum.....		58	53	62	59	53	47	44	44	37	39	44	49	52	46	40	37	32	52	41	29	49	38	34	43	31	42	55	61	49	61	46.0
Sioux Rapids.....	Maximum.....		84	85	82	78	83	76	69	66	70	69	70	64	59	76	70	66	66	76	75	65	72	68	71	75	68	77	82	82	79	78	73.4
	Minimum.....		58	49	57	61	52	48	44	44	38	38	42	44	50	44	41	39	30	48	44	30	46	40	33	40	30	36	57	52	49	60	44.8
Spencer.....	Maximum.....		80	85	83	76	88	84	67	59	70	71	67	60	61	74	72	61	66	77	76	66	70	70	67	72	67	76	81	82	77	71	72.5
	Minimum.....		57	52	59	60	53	44	46	44	38	41	42	50	50	45	41	37	32	48	44	30	47	40	34	42	32	40	57	57	60	60	45.7
<i>North Central District</i>																																	
Algona.....	Maximum.....		78	80	79	75	84	66	67	59	68	64	67	58	58	73	70	57	64	72	66	65	68	66	68	72	65	75	83	83	79	73	70.1
	Minimum.....		60	53	61	61	57	50	48	45	42	41	43	49	50	47	47	40	33	47	46	33	46	43	37	47	35	40	54	58	52	61	47.5
Bancroft.....	Maximum.....		85	80	81	76	84	78	66	62	66	66	67	58	59	72	67	58	64	73	67	64	67	64	67	67	69	75	84	81	78	72	70.5
	Minimum.....		58	51	59	53	50	47	43	41	39	38	39	41	49	45	43	40	31	46	44	31	42	40	35	35	33	38	51	59	50	60	44.4
Belmond.....	Maximum.....		82	81	84	76	84	74	66	58	66	68	68	60	59	74	68	58	64	73	64	65	71	68	61	70	65	74	84	82	79	70	70.5
	Minimum.....		57	50	59	61	56	52	45	42	41	39	41	48	49	45	44	40	31	45	45	32	39	43	33	42	33	36	52	54	53	60	45.6
Britt.....	Maximum.....		78	81	81	75	85	69	67	56	67	66	67	57	61	73	68	58	65	73	63	65	69	65	66	70	64	75	84	81	78	67	69.8
	Minimum.....		57	56	59	62	54	49	45	43	39	41	42	47	49	46	44	40	34	47	44	34	43	35	43	33	40	51	58	50	60	46.3	
Charles City*.....	Maximum.....		76	79	82	74	82	65	56	65	63	66	54	60	73	67	58	62	70	57	61	68	65	64	68	60	70	83	78	77	73	68.0	
	Minimum.....		59	54	59	60	59	48	47	45	42	42	43	49	50	49	46	46	36	45	39	35	43	45	36	41	35	38	51	57	52	61	47.1
Dakota City.....	Maximum.....		78	81	83	79	85	71	67	57	67	68	69	59	60	74	70	58	64	74	66	65	74	66	67	72	65	75	84	82	78	69	70.9
	Minimum.....		58	52	59	62	54	50	45	41	42	43	42	50	47	44	40	32	49	45	33	42	42	35	43	32	37	51	56	52	61	46.3	
Mason City.....	Maximum.....		81	79	83	75	82	75	66	53	65	65	65	67	60	72	66	57	62	71	63	62	66	63	64	60	60	70	83	79	77	68	68.6
	Minimum.....		58	49	58	61	56	50	45	44	39	38	38	48	49	47	44	42	31	45	43	32	44	40	33	45	31	40	48	54	49	60	45.4
Northwood.....	Maximum.....		80	77	82	73	80	66	62	58	62	61	66	58	58	70	63	55	61	70	62	65	63	60	62	66	60	70	85	80	77	65	67.2
	Minimum.....		58	53	58	60	55	50	43	44	40	42	39	48	48	45	45	46	35	45	45	36	42	43	37	46	34	38	49	55	50	58	46.2
Osage.....	Maximum.....		80	78	85	74	83	76	67	59	66	64	67	62	61	70	68	60	64	72	66	63	69	66	65	69	62	72	85	81	79	70	70.1
	Minimum.....		58	53	58	61	53	50	44	43	39	41	39	47	48	46	45	45	32	44	45	36	43	44	34	44	33	35	48	53	49	60	45.7
<i>Northeast District</i>																																	
Decorah.....	Maximum.....		81	81	86	74	82	74	66	57	65	61	65	56	58	75	67	59	58	69	60	63	69	66	63	66	63	69	82	76	78	75	68.8
	Minimum.....		59	48	53	57	55	43	42	43	36	32	45	48	51	43	40	29	40	47	29	34	36	30	39	38	30	46	53	46	54	43.3	
Delaware (near).....	Maximum.....		82	82	86	73	81	72	66	59	67	65	66	57	57	73	72	58	62	67	66	60	67	66	64	69	60	68	80	79	76	72	69.1
	Minimum.....		62	57	60	65	59	54	47	44	43	43	41	47	50	53	47	40	35	42	46	40	41	36	34	41	35	38	50	56	51	60	47.2
Dubuque*.....	Maximum.....		82	82	86	77	82	72	68	58	65	65	66	55	58	73	69	66	61	68	68	63	71	68	62	65	61	68	78	79	77</		

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF SEPTEMBER, 1943—Continued

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>Central District (Continued)</i>																																	
Grundy Center.....	(Maximum.....	82	83	86	79	83	75	66	57	65	70	66	58	59	75	70	60	64	70	62	62	72	68	66	78	65	70	83	79	75	73	.....	70.7
	(Minimum.....	59	51	58	60	55	48	45	43	40	42	42	49	49	45	43	42	34	41	41	32	39	45	34	44	32	35	48	54	51	59	.....	45.3
Iowa Falls.....	(Maximum.....	82	82	85	75	84	73	65	55	64	63	65	58	57	75	67	58	62	71	62	62	72	62	64	71	60	71	84	78	75	74	.....	69.2
	(Minimum.....	59	53	58	62	55	49	48	46	42	44	44	49	50	48	44	42	34	45	44	33	41	47	35	47	35	38	51	57	50	60	.....	47.0
Marshalltown.....	(Maximum.....	83	84	88	78	86	72	69	60	69	72	69	58	60	79	75	63	65	72	60	66	76	69	70	76	65	75	85	82	77	76	.....	72.6
	(Minimum.....	61	50	54	60	55	53	49	46	41	39	43	51	50	44	44	42	34	41	45	31	34	47	36	43	33	32	45	51	47	60	.....	45.4
Newton.....	(Maximum.....	88	84	87	80	86	74	74	68	70	70	71	60	59	80	73	62	66	73	59	65	77	67	68	74	64	74	84	83	78	77	.....	73.1
	(Minimum.....	67	56	60	65	59	54	49	46	41	45	47	54	50	48	47	44	38	44	47	36	38	51	39	39	36	37	49	55	52	61	.....	48.5
Perry.....	(Maximum.....	85	83	87	78	86	77	72	62	71	71	72	67	60	80	72	68	66	74	65	65	77	68	70	77	65	74	83	81	75	74	.....	73.5
	(Minimum.....	59	51	57	61	59	51	48	44	38	45	46	54	50	46	41	41	33	43	45	31	41	46	37	42	32	34	48	52	51	60	.....	46.2
Webster City.....	(Maximum.....	80	79	82	76	84	73	67	56	67	67	66	59	58	76	67	57	62	71	64	62	74	66	67	71	63	72	82	81	77	70	.....	69.9
	(Minimum.....	58	50	57	60	57	52	47	45	41	40	47	52	52	46	40	43	30	45	43	29	40	45	32	39	33	36	48	51	50	64	.....	45.7
<i>East Central District</i>																																	
Anamosa.....	(Maximum.....	83	85	85	76	82	75	77	58	64	67	64	59	58	75	66	60	60	68	68	63	71	67	63	68	61	68	80	79	77	78	.....	70.2
	(Minimum.....	64	65	59	64	60	53	49	47	43	41	46	49	50	47	51	42	34	43	49	34	37	45	35	44	39	35	48	53	52	60	.....	47.9
Belle Plaine.....	(Maximum.....	82	82	85	76	84	73	69	61	67	68	67	62	58	75	69	61	62	69	63	63	72	65	65	71	61	68	80	78	76	72	.....	70.1
	(Minimum.....	64	55	61	63	58	56	49	46	42	46	48	51	51	52	49	44	40	42	47	36	42	50	39	46	36	40	50	57	55	61	.....	49.2
Cedar Rapids.....	(Maximum.....	82	83	86	75	83	72	69	60	66	70	67	58	59	74	69	60	65	69	65	66	72	67	65	71	63	68	79	79	77	73	.....	70.4
	(Minimum.....	66	55	61	64	60	57	49	49	44	43	47	50	51	54	50	43	38	43	49	36	39	48	38	44	37	37	52	53	51	61	.....	49.0
Clarence.....	(Maximum.....	83	84	89	75	83	70	70	61	67	71	69	56	59	75	70	60	70	68	72	66	71	70	64	68	66	68	79	83	78	80	.....	71.5
	(Minimum.....	65	57	60	63	62	54	47	47	43	43	44	48	50	54	51	43	37	39	48	37	42	52	40	42	39	35	48	54	50	59	.....	48.4
Clinton.....	(Maximum.....	86	83	87	83	85	75	73	65	69	72	68	64	60	73	73	63	64	71	70	67	73	76	66	62	71	80	83	81	80	.....	72.8	
	(Minimum.....	71	61	62	65	67	60	51	49	50	44	46	50	52	55	58	44	39	43	47	42	40	52	43	45	44	38	47	57	51	58	.....	51.0
Davenport*.....	(Maximum.....	87	86	85	79	87	74	64	07	73	67	60	61	73	71	62	63	70	73	65	73	74	65	69	62	69	80	82	78	80	.....	72.3	
	(Minimum.....	60	63	66	68	67	56	54	50	48	51	51	51	56	53	45	42	46	50	43	45	55	46	49	44	45	54	61	57	62	.....	53.3	
Iowa City.....	(Maximum.....	83	84	86	76	84	74	72	63	68	70	68	61	59	75	70	62	64	69	69	65	73	70	65	71	63	69	79	80	79	73	.....	71.5
	(Minimum.....	66	57	62	65	63	56	48	47	42	44	48	51	51	54	52	44	41	40	48	38	39	52	41	43	39	37	49	55	53	60	.....	49.5
Maquoketa.....	(Maximum.....	83	84	87	79	82	79	71	62	66	69	68	57	60	72	69	62	63	69	73	64	71	72	63	79	61	67	78	80	77	79	.....	71.5
	(Minimum.....	65	54	58	64	62	54	46	45	45	39	42	49	50	54	53	41	32	39	46	35	35	46	39	41	40	31	46	52	47	59	.....	47.0
Muscatine.....	(Maximum.....	84	86	88	80	88	78	75	67	68	75	70	63	62	76	72	63	65	71	73	67	73	72	66	70	64	70	77	82	80	77	.....	73.4
	(Minimum.....	66	55	61	65	62	58	48	45	43	39	51	52	52	53	53	44	36	41	46	40	36	48	43	39	39	37	47	50	49	59	.....	48.6
Vinton.....	(Maximum.....	82	84	87	78	85	73	68	59	67	70	68	60	59	76	71	64	63	70	61	66	73	68	66	71	65	71	81	80	78	75	.....	71.3
	(Minimum.....	60	52	56	62	55	54	47	45	40	42	44	48	50	49	46	45	40	38	46	32	37	45	35	45	35	35	48	54	50	60	.....	46.5
<i>Southwest District</i>																																	
Atlantic.....	(Maximum.....	84	86	89	85	88	68	71	65	73	78	80	74	59	79	72	66	68	75	65	68	80	65	69	77	70	78	82	84	67	69	.....	74.5
	(Minimum.....	57	53	58	62	55	49	50	45	38	45	51	54	51	47	44	39	32	47	45	30	41	46	41	45	32	41	52	55	56	60	.....	47.4
Bedford.....	(Maximum.....	89	89	83	82	85	81	74	67	72	75	76	72	64	74	76	67	64	70	68	64	76	67	66	74	79	78	71	66	60	60	.....	73.6
	(Minimum.....	57	59	62	64	60	50	48	45	43	51	65	57	53	49	51	45	40	49	46	40	41	45	44	41	46	55	58	60	60	.....	51.0	
Corning.....	(Maximum.....	82	82	86	84	86	67	72	66	71	76	80	72	63	78	72	65	65	75	70	64	78	75	68	75	78	75	82	82	72	67	.....	74.2
	(Minimum.....	61	58	60	64	56	53	49	47	38	49	52	52	52	48	48	44	37	47	47	35	44	52	45	43	37	41	60	57	60	61	.....	49.9
Glenwood.....	(Maximum.....	85	88	89	87	92	76	72	68	73	78	81	75	72	81	73	66	69	79	74	68	86	81	70	78	72	79	83	84	76	68	.....	77.4
	(Minimum.....	62	55	60	66	63	53	52	48	41	49	55	61	54	51	49	45	36	50	47	30	47	51	48	46	39	46	60	58	62	59	.....	51.4
Greenfield.....	(Maximum.....	83	81	85	80	85	80	70	64	69	72	75	71	59	76	70	63	66	72	67	63	78	71	65	73	65	75	81	82	70	68	.....	72.6
	(Minimum.....	59	57	60	64	60	51	47	45	39	49	49	54	51	46	48	46	39	47	46	38	42	52	43	44	37	42	54	58	60	.....	49.3	
Oakland.....	(Maximum.....	86	88	87	85	90	81	70	68	74	76	81	79	68	78	77	71	69	77	73	69	84	81	69	77	74	79	82	82	77	69	.....	77.4
	(Minimum.....	59	52	58	64	55	50	47	44	36	44	53	57	53	50	45	44	35	49	45	30	40	49	44	44	34	39	52	56	60	62	.....	48.3
Red Oak.....	(Maximum.....	83	84	89	86	89	89	71	66	70	79	79	78	69	79	71	65	67	77	64	67	81	70	68	76	69	73	81	82	72	69	.....	74.8
	(Minimum.....	59	55	60	64	54	52	46	44	35	46	54	58	53	49	45	41	33	49	42	29	41	48	45	40	32	44	55	55	51	61	.....	48.1
Shenandoah.....	(Maximum.....	85	86	88	88	90	70	74	69	73	78	82	79	62	82	74	66	68	78	73	68	83	76	67	75	68	78	82	81	67	61	.....	76.0
	(Minimum.....	60	56	60	66	55	53	48	46	40	51</																						

### TOTAL PRECIPITATION, SEPTEMBER, 1943



SCALE OF SHADES IN INCHES



## IOWA STORMS, AUGUST, 1943—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons Injured	Estimated value of damage	Remarks
Johnson Co., Iowa City	12-13	Night	Electrical							Garage, drug store, confectionery and residence struck by lightning.
Washington Co., Washington	13		Electrical						10,000	Barn and contents destroyed in fire set by lightning.
Lyon Co., near Rock Rapids	21	Morning	Electrical				1	5		Ervin E. Thielvoldt, 32, killed and 5 companions stunned or burned by lightning bolt.
Cherokee Co., Afton Twp.	21	9:00 p. m.	Hail						1,000	Hail damaged crops.
Bremer Co., Waverly	22-23	Night	Hail, electrical, wind							Hail caused some crop damage in scattered areas. Trees blown down. Power service interrupted; 6 cows valued at \$800 killed by lightning.
Floyd Co., near Charles City	23	Night	Electrical							Barn destroyed by lightning-set fire.
Chickasaw Co., near New Hampton	23		Electrical						10,000	Barn destroyed by lightning-set fire.
Wapello Co., Ottumwa	23		Electrical				1			Edward Mason, 56, killed by lightning.
Lyon Co., Rock Rapids	24	5:30 p. m.	Electrical				1			C. C. Brinkman, 51, killed by lightning.
Mitchell Co., Osage	24	9:30 p. m.	Electrical						3,500	Lightning "fired" barn which burned to ground.
Mitchell Co., Osage	25		Electrical						500	55 pigs killed by lightning.
Lyon Co., Midland Twp.	29	1:15 a. m.	Hail							Crops damaged up to 10% in small area.
Jasper Co., Newton	29	3:30 a. m.	Wind, heavy rain							Trees, wires, etc., damaged by high wind. Small creeks flooded and damaged oats after heavy rain.
Jefferson Co., Des Moines and Cedar Twps.	29	5:00 a. m.	Hail, electrical							Hail damaged crops in area 1 mile long and ½ mile wide in Des Moines Twp. Barn burned after lightning bolt in Cedar Twp.

## THE SUMMER OF 1943

The summer of 1943 was unusually warm and wet. The average temperature was 73.7°, or 1.5° above the all-time average. The average total precipitation amounted to 15.79 inches, or 3.84 inches more than the average of the 71 summers of record. There have been only 16 warmer and 5 wetter summers in the period of record. None of the warmer summers received more rain and none of the wetter summers was warmer than in 1943. So, depending on the point of view, this was either the warmest wet summer or the wettest warm summer of record.

What was true of the summer as a whole, was also true of the individual months of June, July and August. All three were warmer and wetter than normal but the warmth was steady and there were no excessively hot periods. The average number of days with maximum temperature of 90° or higher was 24, with 7 such days in June and August, and 10 in July. The highest observed was 101° at Onawa, on June 27, and at Shenandoah, on August 25. Only a half dozen stations, all of them in counties bordering on the Missouri River, reported readings of 100°. For the first time since 1929 there were no readings of 100° reported during July. The lowest observed was 37° at Sibley, on June 4, and at Decorah, on June 30.

The average per cent of possible sunshine was 72, or 5% less than normal. Relative humidity averaged 6% above normal. The average number of clear days was 43, partly cloudy, 34, cloudy, 15, and days with rain 34, compared with summer normals of 48 clear, 29 partly cloudy, 15 cloudy and 26 days with measurable precipitation. The prevailing wind was from the south.

Damaging local storms were more numerous than usual and caused considerable crop loss as well as loss to other property. Stream flow and surface and ground water supplies were at high levels throughout the summer. A developing tendency towards deficient precipitation is discussed in the general summary for August.

As pointed out in the August summary, the temperature and precipitation conditions have resulted in the production of bountiful crops, including a corn crop that will exceed the

all-time total yield. On the unfavorable side, farm work was delayed, weeds made rank growth, much hay was spoiled, harvest of small grains delayed, some potatoes rotted in the ground and cut grain and flax were damaged by the excess moisture. But these were relatively unimportant items in the broad picture of great abundance.

The extent of Iowa's good fortune in having such favorable weather during this year can be even better appreciated when comparison is made with conditions in other sections of the country. At Washington, D. C., for example, this was the hottest summer in more than 100 years and the driest since 1854. The states of Mississippi, Arkansas, Louisiana, Texas and Oklahoma, and much of Nebraska suffered from drouth. In Mississippi the drouth was the worst of record and in Arkansas conditions were almost as bad, the month of August being the hottest of record. In Oklahoma this summer's drouth is the worst since 1936.

S.E.D.

## SILENT OBSERVER

It is with much regret that we announce the death of our very faithful cooperative weather observer, Mr. W. H. O'Brien of the station at Elkader, Iowa, on August 21. His death came suddenly and we found his records intact and complete to the date of August 19. Mr. O'Brien was always alert to carry out the suggestions offered by the Section Director and rendered a very much appreciated service to the general public in his section of the State. He was a very much respected citizen of the town.

At the same time we are very fortunate in securing the consent of Mr. Henry M. Wolf to succeed Mr. O'Brien. Mr. Wolf is the manager of the Electric Light and Power Company in Elkader and Mr. O'Brien served under Mr. Wolf as superintendent of the plant for 26 years before he retired from active service. Mr. Wolf has the distinction of having two sons in the Army, two sons in the Navy and a fifth son about to be inducted. Mr. Wolf is prominent in all sorts of community affairs and is the head of the local ration board. The cooperative station is well located on Mr. Wolf's premises.



**DAVID E. HADDEN BROKE RECORD FOR LONG SERVICE**

Climatology suffered a great loss when David E. Hadden, Cooperative Weather Observer at Alta, Iowa, died on September 20, 1943. He began weather observations at Alta on January 1, 1890, and took his last observation on August 6, 1943. For 53 years, 7 months and 5 days, he maintained daily observations without a break though for short absences the observations were taken by a member of the family, usually his daughter, Mrs. Lola Pepper. No one else in Iowa has ever observed the weather continuously for so long; and few, if any, in the United States have equaled this record.

His work was so carefully done that month after month passed without errors or inconsistencies being found in the rigid examinations given his reports at Des Moines and Washington, D. C. He was alert to detect and report defects that occasionally developed in his instruments, which made prompt replacements possible.

Upon the completion of 50 years of service he received a cordial letter of commendation from the Chief of the Weather Bureau in Washington, in which he said, "Your service, fidelity and devotion are of the kind that cannot be purchased with money. Your record stands as a monument to your memory that will be revered and appreciated by unborn generations beside which words of commendation from us who at the moment are administering the affairs of the Weather Bureau, are but weak, fleeting and transitory."

He received a small grant in aid from the Carnegie Foundation to conduct some research in statistically analyzing his long and valuable meteorological records. Many interesting things were discovered that cannot be mentioned in this brief notice, such as a decrease in the annual precipitation at Alta of 3.96 inches in 51 years. The fact that the observations were taken in the same ideal spot with the instruments exposed and observed in the same way, makes the record especially valuable.

Mr. Hadden also achieved distinction as an astronomer, and especially in the field of sunspots and other solar phenomena. He had an excellent 6-inch telescope, well mounted, in a standard astronomical observatory tower. His standing in this line was recognized by his being a fellow of the Royal Astronomical Society.



Mr. David E. Hadden at his instrument shelter

He made his living as a druggist and served for some years as a member of the State Pharmacy Board, part of the time as Chairman. He gave the public many free lectures on scientific subjects.

Herewith is a picture of Mr. Hadden at his thermometer shelter about the time that he completed 50 years of service.

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, OCTOBER, 1943 No. 10

GENERAL SUMMARY

During much of October, 1943, Iowa weather conditions were of the type that has come to be known as "Indian Summer" and were almost ideal for maturing and harvesting the enormous record-breaking corn crop. There was an increase of 6% in the maturity of the corn crop during October, bringing the final figure November 1 to 94% of the crop matured without frost damage. The month was also favorable for soybean harvest and for most other agricultural and outdoor activities.

The average temperature of 51.6°, was practically normal, being 0.1° lower than the all-time October average. However, heating requirements were somewhat higher than usual for October. There were two definite warm periods from the 8th to the 12th and from the 19th to the 23rd, all dates inclusive. During the remainder of the month the temperature was near or somewhat below the seasonal normal. Sunshine averaged 8% above the October normal.

The average precipitation of 1.66 inches was 0.70 inch less than the all-time October value and the number of days with measurable rainfall was 5, or 2 less than normal. Relative humidity averages were somewhat higher than usual at night and during the early morning but were rather low during the daytime and early evening hours.

The warm spell during the closing days of September came to an end on October 1. Showers that attended the colder change ended during the night of September 30. Polar air, usually of continental origin, covered the State most of the time during the first 12 days of the month. Temperature readings that averaged slightly below normal after the first day rose to above seasonal levels at the end of the first week and reached monthly maximum values at all stations during the period from the 8th to the 12th, the most common date being the 9th. During the first decade clear skies were the rule and sunshine was almost uninterrupted during the daytime hours.

The first rains of the month came in the form of widespread showers on the 12th-13th. Maritime Polar air overran the surface mass and this development was followed by a fresh outbreak of cold Polar air. A troughlike area of low pressure moved eastward across the upper Mississippi Valley with its attendant frontal systems passing over Iowa. In the northwest district the rains were the heaviest of the month.

The following high pressure area moved rather slowly and the stream of Polar air flowing southeastward over Iowa became colder. Surface temperatures continued to fall until the 16th and at most points the lowest readings of the month were recorded on the 15th, 16th or 17th. The 1943 growing season came to an end in southern and eastern Iowa as the first State-wide killing frosts occurred. Killing frosts had previously been reported from some northern and western stations during the last half of September.

COMPARTIVE DATA FOR OCTOBER, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	46.0	76	15	2.64					
1874	51.2	84	25	1.52					
1875	47.8	77	22	1.36					
1876	47.0	78	18	1.16					
1877	49.6	93	28	4.45					
1878	48.9	85	10	2.73					
1879	58.3	90	11	2.19					
1880	47.6	83	13	1.90					
1881	52.1	86	26	6.42					
1882	54.4	86	23	3.97					
1883	47.2	88	20	3.37					
1884	54.2	86	17	4.20					
1885	46.7	80	20	2.62					
1886	55.0	88	18	2.51					
1887	46.4	86	3	1.46					
1888	47.7	84	22	1.16					
1889	47.5	94	12	0.58					
1890	49.2	84	15	3.44					
1891	50.0	92	19	2.77		6	18	7	6
1892	54.5	96	14	1.55	0.0	4	21	6	4
1893	52.4	94	10	1.28	0.0	4	16	9	6
1894	51.7	90	20	2.67	0.2	8	14	8	9
1895	46.0	88	4	0.47	T.	2	19	8	4
1896	47.8	88	12	3.13	T.	5	18	6	7
1897	56.8	97	12	1.14	0.0	4	17	8	6
1898	47.5	88	17	3.56	3.6	8	7	9	15
1899	56.7	95	17	1.73	0.0	5	17	8	6
1900	59.3	90	21	3.91	0.0	7	16	7	5
1901	54.2	88	20	1.98	T.	6	17	7	7
1902	53.5	83	20	2.54	T.	5	16	8	7
1903	52.2	90	16	1.95	0.0	5	19	6	6
1904	53.1	96	16	1.67	T.	6	15	8	8
1905	49.2	95	16	3.40	1.6	8	16	6	9
1906	50.5	87	7	1.96	0.1	6	14	7	10
1907	50.4	85	10	1.50	0.0	5	20	5	6
1908	51.1	89	17	3.38	2.6	8	16	6	9
1909	49.7	97	10	2.22	T.	6	16	6	9
1910	55.2	93	10	0.77	0.1	4	21	4	6
1911	48.7	87	14	3.34	0.6	10	12	8	11
1912	52.2	92	16	2.98	T.	6	21	3	7
1913	49.2	89	2	3.03	1.2	9	15	8	8
1914	55.9	88	14	3.23	T.	9	16	6	9
1915	54.4	86	19	1.31	T.	5	19	6	6
1916	50.9	92	6	2.00	2.0	8	16	7	8
1917	42.9	85	0	1.41	2.2	6	10	11	10
1918	55.1	93	21	3.64	0.8	7	13	7	11
1919	50.7	89	8	3.02	T.	10	11	8	12
1920	57.7	90	11	2.13	T.	6	19	6	6
1921	54.6	90	21	1.96	T.	6	17	8	6
1922	56.1	96	14	1.81	T.	5	21	4	6
1923	48.5	81	10	1.22	1.7	6	18	6	7
1924	53.1	89	21	0.87	0.0	4	22	5	4
1925	40.2	78	-15	2.91	4.9	10	8	8	15
1926	51.2	91	14	1.53	T.	7	13	9	9
1927	55.5	91	24	3.25	T.	7	19	5	7
1928	54.2	93	17	3.66	0.1	8	15	5	11
1929	51.8	84	23	3.10	0.7	9	15	5	11
1930	50.7	95	9	2.08	0.4	7	14	7	10
1931	56.8	92	28	3.01	T.	10	13	8	10
1932	49.6	90	19	1.79	0.3	7	12	8	11
1933	50.1	84	17	1.36	T.	5	18	7	6
1934	56.6	92	18	1.52	T.	4	21	6	4
1935	50.9	89	12	2.76	T.	8	14	8	9
1936	50.9	88	10	1.69	T.	6	15	8	8
1937	50.3	94	12	2.03	1.5	8	15	7	9
1938	59.4	97	20	0.88	0.2	4	21	6	4
1939	53.4	95	14	1.48	T.	6	18	7	6
1940	57.8	90	22	2.32	0.0	7	18	8	5
1941	54.5	84	15	6.11	0.6	14	12	7	12
1942	53.1	90	10	1.53	T.	5	18	7	6
1943	51.6	87	15	1.66	T.	5	19	4	8
Period	51.7	97	-15	2.36	0.5	7	16	7	8

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

The temperature began rising again on the 17th and after that date was mostly above normal through the 23d. The frontal system of another barometric disturbance passed eastward over Iowa on the 20th causing the second general shower period of the month. In the eastern districts the 24-hour

CLIMATOLOGICAL DATA FOR OCTOBER, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit					Precipitation, in inches				Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more			Clear	Partly cloudy
<b>Northwest District</b>																			
Alta	Buena Vista	1,513	54															W. S. Slagle J. Earl Wirth Mrs. Mayme P. Orvis Earl V. Slife	
Alton	Sioux	1,305	39	51.3	+ 2.5	81	10	20	16†	1.13	- 0.51	0.62	12-13	0	6	19	5		7
Cherokee 1½NW	Cherokee	1,358	24	51.2	+ 2.3	84	9	22	15†	1.96	+ 0.14	0.76	12-13	0	6	23	6		2
Esterville	Emmet	1,298	50	49.5	+ 1.2	81	8	18	16	1.57	- 0.27	0.82	31	0	4	19	4		8
Hawarden	Sioux	1,191	17	51.6	+ 2.4	84	8†	20	27	1.72	+ 0.02	1.10	12-13	0	5	22	1		8
Inwood 2½SW	Lyon	1,474	41	50.7	+ 2.2	85	9	23	15†	2.67	+ 0.91	1.70	13	0	2	25	0		6
Lake Park	Dickinson	1,479	41	50.0	+ 2.0	78	8†	23	16	2.51	+ 0.71	0.95	12-13	0	5	20	3		8
Le Mars	Plymouth	1,230	57	51.9	+ 2.3	86	9	20	16	1.35	- 0.34	0.85	12	0	3	21	3		7
Pocahontas	Pocahontas	1,228	40	50.6	+ 0.8	81	9	17	16	1.11	- 1.19	0.40	30	0	6	17	5		9
Primghar	O'Brien	1,517	17																se.
Rock Rapids	Lyon	1,341	47	49.6	+ 1.8	83	8	21	27	2.45	+ 0.74	1.32	12-13	0	5	21	3	7	s.
Sanborn	O'Brien	1,552	31	49.9	+ 1.9	81	9	22	16	1.86	+ 0.06	0.76	12-13	0	5	20	5	6	se.
Sheldon	O'Brien	1,418	38	50.0	+ 1.9	83	9	23	15†	1.48	- 0.28	0.72	12-13	0	6	22	2	7	sw.
Sibley	Osceola	1,494	9	49.0	+ 0.8	80	8†	20	16†	1.89	+ 0.15	1.12	12-13	0	5	21	3	7	se.
Sioux Rapids	Buena Vista	1,275		50.8	+ 2.0	84	9	18	16†	1.78	- 0.07	1.26	30-31	0	5	22	3	6	s.
Spencer	Clay	1,319	36	50.5	+ 1.5	82	9	20	16	1.68	- 0.12	0.87	30-31	0	5	20	3	8	sw.
Storm Lake 1½N	Buena Vista	1,455	54	51.3	+ 1.8	81	9	23	16	1.53	- 0.38	1.06	30	0	5	19	6	6	se.
West Bend	Palo Alto	1,197	57	51.2	+ 1.9	80	9	18	16	1.26	- 0.68	0.94	30-31	0	4	21	5	5	sw.
Means and extremes				50.6	+ 1.8	86	9	17	16	1.75	- 0.07	1.70	13	0	5	21	3	7	s.
<b>North Central Dist.</b>																			
Algona	Kossuth	1,200	83	51.2	+ 1.5	80	8†	22	16	1.44	- 0.68	0.87	30-31	0	5	21	2	8	se.
Allison	Butler	1,060	30	50.4	+ 1.0	81	9	22	17	1.83	- 0.39	0.82	30-31	0	5	18	5	8	n.
Bancroft	Kossuth	1,200	1	49.6	+ 0.8	78	9†	20	17	1.22	- 0.88	0.75	30-31	T.	5	22	3	6	s.
Belmond	Wright	1,175	35	49.6	+ 0.1	81	9	20	27	1.43	- 0.77	0.78	30-31	0	5	17	6	8	s.
Britt	Hancock	1,240	59	50.2	+ 1.0	83	9	22	16	1.47	- 0.71	0.84	30-31	0	5	17	6	8	nw.
Charles City	Floyd	1,013	69	48.8	+ 0.2	78	11	23	17	1.91	- 0.42	0.65	30-31	T.	6	18	2	11	se.
Dakota City	Humboldt	1,133	60	50.5	+ 0.4	83	9	20	16	1.57	- 0.67	0.87	30	0	5	21	2	8	e.
Forest City	Winnebago	1,289	54	48.8	+ 0.7	79	11	21	16†	1.29	- 1.05	0.56	31	T.	5	19	5	7	nw.
Hampton 3NW	Franklin	1,142	53	49.6	+ 0.3	80	9	22	17	3.47	+ 0.89	1.61	1	0	6	22	2	7	nw.
Mason City 3N	Cerro Gordo	1,148	52	48.0	- 0.4	78	11	20	17	1.63	- 0.43	0.60	30-31	T.	6	19	3	9	nw.
Northwood	Worth	1,222	48	49.2	+ 1.3	77	8	22	16	1.72	- 0.73	0.60	20	T.	6	17	5	9	nw.
Osage	Mitchell	1,170	59	49.8	+ 1.9	78	8†	24	17	2.47	+ 0.11	0.65	21	0	6	20	2	9	n.
Means and extremes				49.6	+ 0.8	83	9	20	16†	1.79	- 0.47	1.61	1	T.	5	19	4	8	nw.
<b>Northeast District</b>																			
Cedar Falls	Black Hawk	875	23							2.67	+ 0.22	1.27	20	T.	5	18	1	12	nw.
Cresco	Howard	1,298	7	47.6	+ 0.1	76	11	21	17†	2.75	+ 0.30	0.89	1	0	5	18	4	9	w.
Decorah 2S	Winneshiek	880	61	46.4	- 2.2	78	11	18	28	2.26	- 0.27	0.73	21	0	4	17	5	9	nw.
Delaware 1½W	Delaware	1,083	65	49.7	- 0.2	80	9	23	17	2.42	- 0.16	1.07	20-21	T.	7	17	6	8	nw.
Dubuque	Dubuque	642	93	51.8	- 0.1	79	11	30	17	3.23	+ 0.75	2.29	20-21	T.	7	14	6	11	nw.
Elkader	Clayton		52	49.3	- 1.3	80	8†	20	28	1.76	- 0.80	0.74	30-31	T.	6	17	4	10	nw.
Fayette	Fayette	1,009	56	48.7	- 1.1	80	9	20	28	3.09	+ 0.64	1.77	20-21	0	5	14	7	10	w.
Guthrie	Clayton			52.2	+ 2.1	80	11	27	17	1.84	- 0.66	1.00	20-21	0	6	17	1	13	nw.
Independence 1½W	Buchanan	956	84	49.9	- 1.1	81	9	23	17	2.28	- 0.18	1.02	30-31	0	5	16	6	9	nw.
New Hampton	Chickasaw	1,161	47	48.6	- 0.5	77	9	23	17	2.42	+ 0.06	0.70	1	0	6	18	1	12	nw.
Oelwein	Fayette	1,036	22	49.4	- 0.6	80	9	20	17	2.50	- 0.09	1.10	31	0	3	18	13	0	nw.
Postville 5SW	Clayton	1,130	53	48.9	0.0	77	11	24	17	3.15	+ 0.50	1.69	20-21	0	7	16	6	9	sw.
Waterloo	Black Hawk	848	62	49.6	- 1.6	81	9	21	17	3.06	+ 0.59	1.65	21	0	4	17	7	7	nw.
Waukon	Atlamakee	1,287	9	47.2	- 2.3	76	11	20	17	3.27	+ 0.72	2.03	20-21	T.	8	19	2	10	se.
Waverly 1W	Bremer	936	55	49.2	- 0.7	80	9	21	17	1.47	- 0.97	0.77	30-31	T.	6	19	5	7	nw.
Means and extremes				49.2	- 0.6	81	9	18	28	2.54	+ 0.04	2.29	20-21	T.	6	17	5	9	nw.
<b>West Central Dist.</b>																			
Audubon 2SW	Audubon	1,297	51	53.0	+ 2.1	85	10	22	16	1.38	- 0.89	0.94	30	0	4	17	7	7	sw.
Carroll	Carroll	1,280	58	51.8	+ 0.9	83	10	18	16	1.51	- 0.92	0.90	31	0	3	11	10	10	se.
Cushing 2½NE	Ida	1,350	10	52.0	+ 2.6	81	9	24	15†	1.20	- 0.70	0.57	20	0	6	22	1	8	se.
Denison 2S	Crawford	1,307	60	51.5	+ 0.5	84	10	18	27	0.86	- 1.33	0.60	30	0	5	22	4	5	ne.
Guthrie Center	Guthrie	1,217	49	52.5	+ 0.1	84	9	23	16	0.81	- 1.69	0.56	30	0	5	20	4	7	sw.
Harlan	Shelby	1,210	52	52.4	+ 0.9	86	10	18	27	0.81	- 1.59	0.64	30	0	2	25	1	5	nw.
Jefferson	Greene	1,055	52	51.0	+ 0.5	79	19	20	16	1.36	- 1.04	0.61	30	0	5	21	2	8	sw.
Lake City	Calhoun	1,288	8	52.2	+ 1.6	80	9	21	16	1.46	- 0.88	0.96	30-31	0	6	12	7	12	nw.
Little Sioux	Harrison	1,040	43	53.4	+ 1.0	85	10	17	16	0.71	- 1.47	0.28	30	0	7	20	7	4	sw.
Logan	Harrison	1,120	78	53.1	+ 0.6	86	10	18	16	0.47	- 1.61	0.20	30	0	6	19	9	3	se.
Mapleton 5NW	Woodbury	1,225	5	51.1	+ 0.6	85	10	15	16	0.74	- 1.31	0.36	30-31	0	6	20	3	8	se.
Missouri Valley	Harrison	1,069		54.7		87	10	16	16	0.40		0.21	30	0	5	24	1	6	se.
Onawa	Monona	1,050	59	52.2	+ 1.1	86	9†	15	16	0.91	- 1.15	0.35	31	0	6	21	3	7	s.
Rockwell City	Calhoun	1,226	57	52.2	+ 1.9	83	9	20	16	1.28	- 0.98	0.92	30-31	0	6	21	4	6	nw.
Sac City	Sac	1,274	75																
Sioux City	Woodbury	1,111	60	51.2	+ 1.5	84	9	22	16	1.63	- 0.14	0.97	12	0	5	20	4	7	se.
Means and extremes				52.3	+ 1.4	87	10	15	16	1.04	- 1.16	0.97	12	0	5	20	4	7	se.
<b>Central District</b>																			
Ames 4SW	Story	1,004	68	51.2	- 0.7	81	9	24	16†	0.99	- 1.63	0.57	30-31	T.	6	19	9	3	nw.
Boone	Boone	1,136	59	52.4	+ 1.4	81	9	25	16	1.22	- 1.36	0.73	30-31	0	5	17	4	10	se.
Des Moines	Polk	800	67	53.0	- 0.4	84	9	27	16	0.75	- 1.75	0.42	30	0	3	18	4	9	n.

CLIMATOLOGICAL DATA FOR OCTOBER, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit						Precipitation, in inches					Number of days				OBSERVERS	
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy	Cloudy		Prevailing direction of wind
<i>Central District (Continued)</i>																				
Perry 1 1/2 SE	Dallas	975	44	52.0	+ 0.6	86	9	19	27	0.92	- 1.49	0.58	30-31	0	5	19	7	5	nw.	Eugene N. Hastie
State Center	Marshall	1,068	7	51.8	- 0.2	81	9	26	16†	1.81	- 0.77	0.55	30	T.	5	18	5	8	se.	H. M. Meads
Toledo	Tama	929	50	51.6	- 0.6	85	9	23	17†	1.58	- 0.95	0.78	30-31	0	5	19	2	10	ne.	H. P. Giger
Waukee 1 1/4 SW	Dallas	1,042	46	52.6	+ 0.1	84	9	23	16†	1.14	- 1.22	0.75	30	0	3	22	4	5	ne.	Ivan B. Speer
Webster City 1 SE	Hamilton	1,042	60	48.6	- 1.1	84	9	16	27	1.47	- 0.79	0.93	30-31	0	5	24	4	3	sw.	Leo Holtkamp
Means and extremes				51.5	- 0.2	86	9	16	27	1.46	- 1.05	0.93	30-31	T.	5	19	4	8	ne.	
<i>East Central Dist.</i>																				
Anamosa 1 NW	Jones	873	15	50.2	- 0.6	81	9	21	28	1.54	- 1.16	0.60	12-13†	T.	6	18	7	6	ne.	State Reformatory
Belle Plaine	Benton	895	68	51.0	- 1.0	79	9	23	17	1.46	- 1.06	0.93	30-31	T.	5	18	4	9	s.	R. O. Burrows
Bellevue	Jackson	603		51.2	- 0.9	82	9	26	28	3.70	+ 1.08	2.70	20-21	T.	5	15	6	10	nw.	U. S. Engineers
Cedar Rapids	Linn	813	62	51.4	- 0.3	81	9	25	28	1.98	- 0.33	0.75	31	T.	6	16	4	11	n.	John T. Wurster
Ciarence	Cedar	850	10	51.8	+ 0.5	81	9	24	17	2.55	- 0.20	1.38	20-21	0	5	19	5	7	nw.	H. J. Klatt
Clinton	Clinton	640	73	53.4	+ 0.4	83	9†	26	17	2.04	- 0.73	1.12	21	0	5	17	7	7	nw.	Samuel W. Williams
Davenport	Scott	579	73	54.3	+ 0.6	82	9	28	17	2.29	- 0.10	1.30	21-22	0	6	15	6	10	w.	U. S. Weather Bureau
Iowa City	Johnson	780	87	52.4	+ 0.3	82	9	25	17	1.64	- 1.11	0.60	20	0	6	18	4	9	nw.	Inst. Hydraulic Research
Maquoketa	Jackson	732	51	50.4	- 0.6	81	9	24	17†	4.59	+ 1.76	3.50	21	0	4	18	10	3	n.	Dr. E. V. Andrews
Monmouth 4 SW	Jones	870	3	51.8	- 0.1	84	9	24	28	3.22	+ 0.47	2.20	21	0	5	11	16	4	nw.	Otto J. Bisinger
Muscataine	Muscataine	620	98	52.3	- 0.5	82	9	25	17†	3.29	+ 0.79	1.58	21	T.	6	19	4	8	w.	G. Krieger
Vinton	Benton	815	1	51.2	- 1.1	80	9	23	28	1.69	- 0.86	0.86	30-31	0	6	18	4	9	nw.	H. J. Adams
Williamsburg	Iowa	805	28	52.6	+ 0.5	83	9	25	17†	1.86	- 0.68	1.02	30-31	0	5	21	4	6	ne.	Dr. F. C. Schadt
Means and extremes				51.8	- 0.3	84	9	21	28	2.45	- 0.16	3.50	21	T.	5	17	6	8	nw.	
<i>Southwest District</i>																				
Atlantic 1 E	Cass	1,110	57	51.9	- 0.2	87	10	17	16	1.50	- 1.09	0.83	31	0	6	17	10	4	se.	Roy L. Fancolly
Bedford 1 1/4 N	Taylor	1,215	40	53.8	+ 0.4	81	9†	21	16	0.63	- 2.25	0.45	30	0	3	25	2	4	ne.	H. J. Chambers
Clarinda	Page	1,004	72	52.6	- 0.8	82	9†	19	15†	1.09	- 1.76	0.72	30	0	4	23	5	3	se.	Walter L. Weaklend
Clarinda Erosion 8 W	Page	1,132	5	53.2	- 0.1	83	9†	22	16†	1.08	- 1.77	0.66	30	0	6	24	2	5	sw.	Soil Conservation Service
Corning 1 E	Adams	1,285	56	53.0	+ 0.1	85	10	20	16	0.69	- 2.22	0.53	30	0	6	20	3	8	sw.	S. W. Morris
Glenwood	Mills	1,100	54	54.0	+ 0.4	85	9	18	16	0.50	- 1.70	0.35	30	0	4	14	11	6	e.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	52.9	0.0	83	9†	23	16	0.97	- 1.63	0.56	30	0	6	18	6	7	sw.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	52.9	+ 0.7	84	9†	17	27	1.02	- 1.30	0.55	30	0	5	25	4	2	sw.	Fred Bussard
Red Oak	Montgomery	1,077	5	51.0	- 2.2	83	9†	15	16	1.04	- 1.31	0.85	30	0	4	19	7	5	se.	Clarence M. Totty
Red Oak 10 SW	Montgomery	1,030	37							1.20	- 1.22	1.02	30	0	4	22	5	4	s.	B. R. Bridge
Riverton	Fremont	920	18							1.22	- 1.48	0.59	30	0	4	23	6	2	s.	Wm. E. Stubbs
Shenandoah	Page	974	9	53.1	- 0.2	85	9†	18	16	1.24	- 1.51	0.84	30	0	5	18	8	5	n.	Earl E. May Seed Co.
Thurman	Fremont	973	57	53.5	+ 0.3	85	9†	19	27	0.69	- 1.90	0.46	30	0	3	23	4	4	s.	Bernard Porter
Omaha, Nebr.	Fremont	1,035	79	52.9	- 0.5	86	9	22	16	0.55	- 1.62	0.32	30	0	5	16	9	6	s.	U. S. Weather Bureau
Means and extreme				52.9	- 0.2	87	10	15	16	0.96	- 1.62	1.02	30	0	5	20	6	5	s.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	52.2	- 1.3	82	9†	21	16	0.85	- 1.90	0.48	30	0	5	21	5	5	sw.	S. R. Brown
Albia	Monroe	949	53	53.6	- 0.2	83	10	27	17†	1.54	- 1.00	0.76	31	0	7	20	1	10	sw.	Arthur L. Freed
Centerville 1 1/4 SW	Appanoose	1,013	51	53.0	- 0.9	83	10	26	17†	1.31	- 1.35	0.68	30-31	0	5	15	6	10	ne.	E. Grant Everman
Chariton 3 E	Lucas	940	50	52.0	- 1.9	83	9†	21	17†	1.55	- 1.02	0.74	12	0	3	16	7	8	ne.	Ellis Shaw
Creston	Union	1,293	43	51.9	- 0.3	84	10	22	16	1.02	- 1.61	0.41	13	0	5	18	6	7	s.	Mrs. Nellie Spangler
Indianola	Warren	972	63	53.2	- 0.3	82	9	23	16	0.67	- 1.73	0.20	30	0	6	12	9	10	nw.	Prof. Francis I. Moats
Knoxville	Marion	920	54	53.4	- 0.3	84	9	24	15	1.70	- 0.80	0.68	30-31	0	5	18	4	9	s.	Mrs. Ella Mae Brobst
Lamoni 1/4 SW	Decatur	1,138	40	53.8	+ 0.3	83	10	24	16	0.84	- 2.13	0.35	12-13	0	6	19	4	8	nw.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	54.2	+ 0.2	83	10	26	16†	1.78	- 1.01	0.89	30	0	5	18	3	10	n.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	53.2	+ 0.2	81	9†	22	16	0.71	- 2.09	0.31	30	0	3	17	11	3	ne.	Mrs. Irene Hood
Osceola	Clarke	1,088	23	52.2	- 0.8	81	9†	24	16†	0.61	- 2.04	0.23	12	0	7	22	3	6	nw.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	53.5	+ 0.5	82	9	21	17	0.78	- 2.02	0.45	30	0	4	21	5	5	se.	Jas. A. Verploegh
Winterset	Madison	1,120	53	53.5	- 0.2	86	9	25	27	0.32	- 2.26	0.23	30	0	2	24	4	3	s.	H. S. Ely
Means and extremes				53.1	- 0.3	86	9	21	16†	1.05	- 1.61	0.89	30	0	5	19	5	7	s.	
<i>Southeast District</i>																				
Bloomfield 2 1/4 N	Davis	825	29	53.8	- 0.1	84	9†	25	17	1.23	- 1.57	0.72	30-31	0	4	18	5	8	nw.	Mrs. Leo Foster
Burlington 8 S	Des Moines	697	54	54.2	- 0.6	83	10	25	17	3.27	+ 0.58	2.33	20-21	T.	6	14	6	11	nw.	U. S. Weather Bureau
Columbus Jct.	Louisa	595	53	53.0	- 0.5	84	9	25	17†	1.78	- 0.88	0.72	21	0	4	20	5	6	ne.	Miss Musa Todd
Fairfield 1 N	Jefferson	780	73	53.5†	+ 0.9	86	10	24	17	1.29†	- 1.61	0.56	20	0	5	18	3	10	ne.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	55.9	+ 0.5	82	10	29	17	3.16	+ 0.90	1.72	20-21	0	7	19	3	9	sw.	U. S. Weather Bureau
Keosauqua 1 1/2 SW	Van Buren	712	57	54.8	+ 2.2	87	10	26	17	1.60	- 1.17	0.78	31	0	5	17	4	10	n.	Harry J. Schlotfeldt
Mt. Pleasant 2 SE	Henry	722	68	53.8	- 0.3	84	10	24	28	1.49	- 1.04	0.70	13	0	4	19	6	6	s.	Raymond A. Hughes
Oskaloosa 1 1/4 S	Mahaska	813	68	52.0	- 0.8	82	9†	20	17	1.44	- 1.11	0.74	30	0	3	16	4	11	nw.	Clifford Bergstresser
Ottumwa 1 W	Wapello	649	49	54.6	+ 0.7	87	9	23	17†	1.40	- 1.44	0.65	31	0	6	19	5	7	nw.	C. L. Mikes
Sigourney	Keokuk	730	49	53.7	+ 0.9	83	9†	25	17†	1.64	- 0.91	0.85	31	0	5	19	4	8	nw.	Mrs. Christie E. Chandler
Stockport 1 1/4 SW	Van Buren	747	43	53.2	+ 0.3	84	10	22	28	1.71	- 0.91	0.81	12-13	0	6	20	1	10	n.	C. L. Beswick
Washington	Washington	762	69	53.2	0.0	83	9	23	17	2.11	- 0.58	0.90	20	0	6</					

DAILY PRECIPITATION FOR OCTOBER, 1943

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											.47	.22											.01						.30	.13	1.13	
Alta <sup>2</sup>	Raccoon																							.03						.36	.11	1.13	
Alton	Floyd											.36	.26									.01		.03						.47	.08	1.96	
Cherokee	Little Sioux											.54	.22									.62		.03						.47	.08	1.96	
Estherville <sup>2</sup>	Des Moines	T.										.66	.02									.07				T.	T.			.82	.17	1.57	
Hawarden	Big Sioux											.90	.20											.05	T.				.32	.25	1.72		
Inwood (near) <sup>2</sup>	Big Sioux	T.											1.70											T.	T.				.97	.27	2.67		
Lake Park	Little Sioux											.52	.43									.68							.51	.37	2.51		
Le Mars	Floyd											.85	T.										T.						.40	.10	1.35		
Milford <sup>2</sup>	Okoboji											.63	.33										.54						.45	.20	2.15		
Pocahontas	Des Moines	.10										.05	.17									.06							.40	.33	1.11		
Primghar	Little Sioux																												.60	.44	2.45		
Rock Rapids	Big Sioux											1.02	.30										T.		.09				.50	.15	1.86		
Sanborn	Floyd											.59	.17										.45						.47	.19	1.48		
Sheldon	Floyd											.68	.04										.05				T.		.47	.19	1.48		
Sibley	Big Sioux											.50	.62										T.		.10				.40	.27	1.89		
Sioux Rapids	Little Sioux											.30	.11										.11		T.				.87	.39	1.78		
Spencer	Little Sioux											.42	.12										.27						.62	.25	1.68		
Spirit Lake SCS <sup>2</sup>	Okoboji												.97										.50						.78	.25	2.25		
Storm Lake	Raccoon	.12										.13	.05										T.						1.06	.17	1.53		
Terril SCS	Little Sioux											.90											.20						.90		2.00		
West Bend	Des Moines											T.	.20										.12						.52	.42	1.26		
<i>North Central District</i>																																	
Algona	Des Moines											.13	.14										.30						.65	.22	1.44		
Allison	Cedar	.18										*	.55	T.									.28						.10	.72	1.83		
Bancroft	Des Moines												.20	T.									.27						*	.75	1.22		
Belmond	Iowa											.05	.30										.30						.55	.23	1.43		
Britt	Iowa											.07	.48										.08						.46	.38	1.47		
Charles City <sup>1†</sup>	Cedar	.21										.39	.21	T.									.45						.62	.03	1.91		
Dakota City	Des Moines											.15	.31										.24						.72	.15	1.57		
Dumont (near)	Cedar											.37	.14										.42						.42	.25	1.80		
Forest City <sup>2</sup>	Cedar											.05	.39	.06	T.								.23						.56	.19	1.29		
Hampton	Cedar	1.61										*	.70										.24						*	.92	3.47		
Kanawha	Boone																						.37						.25	.35	1.63		
Mason City	Cedar	.20										.10	.36	T.	T.								.26						.59	.03	1.13		
Mason City Apt. <sup>1</sup>	Cedar											.18	.07	T.	T.								.60						.25	.32	1.72		
Northwood	Cedar											.08	.40	T.	T.								.38	.65					.58	.27	2.47		
Osage	Cedar	.26										.34	.26										.38	.65					.58	.27	2.47		
<i>Northeast District</i>																																	
Cedar Falls	Cedar	T.										*	.65	T.									1.27				T.		*	.75	2.67		
Cresco	Turkey	.89										.23	.55										.41						T.	.67	2.75		
Decorah <sup>2</sup>	Mississippi	.30											.61										.73						.62	.26	2.26		
Delaware (near)	Maquoketa											.10	.37	T.	T.								.44	.63			.07		.29	.52	2.42		
Dubuque <sup>1†</sup>	Mississippi	T.										.36	.14	T.									.75	1.54		.01	T.		.42	.01	3.23		
Dubuque LD 11 <sup>2</sup>	Mississippi	.02										.40	.03	T.	T.								1.66	.40			.02		.31	.28	2.84		
Elkader	Turkey											.04	.42	T.									.54				.02		.09	.65	1.76		
Fayette <sup>2</sup>	Mississippi											.30	.06										1.62	.15					.96	.30	3.09		
Guttenberg LD 10 <sup>2</sup>	Mississippi	.02										.13	.04										.51	.49					.65	.18	1.84		
Independence	Wapsipinicon											.18	.23										.85						.20	.82	2.28		
Lansing <sup>2</sup>	Mississippi	.03										.42	.02		T.								.83	.38					.03	.21	2.31		
New Hampton	Wapsipinicon	.70										.27	.43										.32						.25	.45	2.42		
Oelwein	Wapsipinicon											.50											.90						1.10	.25	2.50		
Postville (near)	Mississippi											.06	.57										1.31	.38		.04			.16	.63	3.15		
Waterloo <sup>2</sup>	Cedar											.35	.10		T.								1.65						.96	.30	3.06		
Waukon	Mississippi	.06										.05	.43		T.								1.27	.76			.08		.07	.55	3.27		
Waverly	Cedar											.20	.12		T.								.37	.01					.72	.05	1.47		
Genoa, Wis. LD8 <sup>2</sup>	Mississippi	.08										.34	.02	.05	T.								1.20	.52					.41	.21	2.62		
Lynxville, W. LD9 <sup>2</sup>	Mississippi	.06										.34	.05										.56	.38		.01			.53	.19	1.93		
<i>West Central District</i>																																	
Anthon (nr.) SCS	Little Sioux																						.40						.40		1.10		
Audubon (near)	Nishnabotna	.25										T.	.04										.15				T.		.94		1.38		
Carroll <sup>2</sup>	Raccoon	.21										.16	.01	T.									.57						.31	.10	1.20		
Cushing (near)	Little Sioux												.04										.07						.60		0.86		
Denison	Missouri	.10																											.61		0.91		
Denison SCS <sup>2</sup>	Missouri												.10										.20						.56	.01	0.81		
Guthrie Center	Raccoon	.09										T.	.07										T.						.64		0.81		
Harlan	Nishnabotna											.04	.35										.09						.61		1.36		
Jefferson	Raccoon	.27										.01	.23										.10						.88	.08	1.46		
Lake City	Raccoon	.16																													1.60	1.71	
Lake View	Raccoon											.03	.02										.06						.28	.02	0.71		
Little Sioux	Little Sioux	.07										.08	T.										.07			.17	.02		.20	.05	0.47		
Logan	Missouri												.02										.07			.10	.03		.20	.05	0.47		
Mapleton (near)	Little Sioux											.04	.02										.14			.18		T.	.31	.05	0.74		
Missouri Valley	Missouri	T																															

DAILY PRECIPITATION FOR OCTOBER, 1943—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>Central District</i>																																	
Ames†	Skunk											.22	.04	T.	T.							.14	.02									.41	.16
Boone	Des Moines											.17	.18									.11									.65	.08	
Des Moines†	Des Moines	T.									T.	.22	T.	T.								.11			T.	T.	T.				.42	T.	
Des Moines Apt.†	Des Moines	T.										.14	T.	.01								.08				T.	T.				.26	T.	
Dunbar (near)	Iowa											.36	.06	T.	T.							.71	.07								.28	.25	
Fort Dodge <sup>2</sup>	Des Moines	.09										.19	.02									.34									.85	1.49	
Grinnell†	Iowa											.50	.03		T.							.43	.04				.02			*	.78	1.80	
Grundy Center	Cedar											.59	.14									.35									.70	1.78	
Iowa Falls <sup>2</sup> †	Iowa	.10										.32	.04		T.							.38								.72	1.56		
Marshalltown <sup>2</sup>	Iowa											T.	.45	.01		T.						.34						T.		.71	1.51		
Monroe	Des Moines	T.										.51	.16	T.								.37	.09				T.			T.	.69	1.82	
Newton	Skunk											.60	.11	T.	T.							.55	.01				.02			.63	.05		
Perry	Raccoon											.01	.20	T.								.13								.50	.08		
State Center	Iowa											.52	.12		T.							.26						T.		.55	.36		
Toledo	Iowa											.30	.01									.49						T.		.48	.30		
Van Meter <sup>2</sup>	Raccoon											T.	.23	T.	T.							.12				T.		T.		.70	1.05		
Waukee	Raccoon											.18	T.									.21								.75	1.14		
Webster City†	Boone	.39										T.	.05																.70	.23			
<i>East Central District</i>																																	
Anamosa	Wapsipinicon											.24	.36									.11	.23							.13	.47		
Belle Plaine	Iowa											.18	.01	T.	T.							.34	T.			T.				.44	.49		
Bellevue LD 12 <sup>2</sup>	Mississippi	T.										.59	.04		T.							2.32	.38			T.	T.	T.		.37	3.70		
Cedar Rapids <sup>2</sup>	Cedar	.03										.51	.02	T.	T.							.49	.18							.75	1.98		
Ced. Rap. (rvr.) <sup>2</sup>	Cedar	.02										.44	.02									.42	.32			.02				.86	2.10		
Clarence	Wapsipinicon	T.										.60	.09									.03	1.35							T.	.48	2.55	
Clinton	Mississippi	T.										.15	.33	T.								1.12				.02	T.			.42	2.04		
Clinton (rvr.) <sup>2</sup>	Mississippi											.45	T.									1.18	T.							.42	2.05		
Davenport†	Mississippi	T.	T.									.60	.08									1.28	.02				T.	T.		.31	2.29		
Davenport LD 15 <sup>2</sup>	Mississippi	T.	.02									.46	.07									1.25	.02				T.			.27	2.09		
Iowa City†	Iowa											.16	.37									.22	.38							.41	.10		
Le Claire <sup>2</sup>	Mississippi		T.									.26	.01									1.21	T.				T.	T.		.37	1.85		
Le Claire LD 14 <sup>2</sup>	Mississippi		T.									.28	.04									1.55	.02							.37	2.26		
Maquoketa	Maquoketa											.07	.70									3.50								.32	4.59		
Monmouth	Maquoketa											.20	.44	T.	T.							T.	2.20							.02	.36		
Muscatine	Mississippi	.08										.61	.46		T.							1.58								.02	.54		
Muscatine (rvr.) <sup>2</sup>	Mississippi	.04	.06									.72	.02		T.							.95	.52							.46	2.77		
Muscatine LD 16 <sup>2</sup>	Mississippi	.01	T.									.87	T.									1.30	.06							.47	2.71		
Vinton	Cedar											.13	.12	.08								.50								.18	.68		
Williamsburg	Iowa											.10	.31									.43	T.				T.			.50	.52		
<i>Southwest District</i>																																	
Atlantic <sup>2</sup>	Nishnabotna	.45											.05	T.								.03	.07				.07			.83	1.50		
Bedford	102	.10										T.	.08									T.								.45	.63		
Blockton SCS	Platte											.18	.18									.20					T.			.41	.97		
Clarinda <sup>2</sup>	Nodaway	.26										T.	.09	T.								.09								.72	.02		
Clarinda Eros.†	Tarkio	.04										.19	T.									.13				.02	.04			.66	1.08		
Corning	Nodaway	.05										.04										.05					.01			.53	.01		
Cumberland (near)	Nodaway											T.	.08	T.								.04					.09	T.		.65	.01		
Emerson SCS <sup>2</sup>	Nishnabotna	.05										T.	.18									.11					T.	.05		.64	.12		
Glenwood	Missouri											T.	.08									.05		T.			T.	T.		.35	.02		
Greenfield	Nodaway	.02										.01	.28									.10					T.	T.		.52	.04		
Oakland	Nishnabotna	.10										.30										.04					.03			.55	1.02		
Red Oak	Nishnabotna	T.										.03	.01									.15				T.	T.			.85	1.04		
Red Oak (near)	Nishnabotna											T.	.14									.04								.98	.04		
Riverton	Nishnabotna	.27										.02										T.					.34			.59	1.22		
Shenandoah	Nishnabotna	.23										.03										.14					T.			.82	.02		
Thurman	Missouri	.20										.03	T.									T.				T.	T.			.46	T.		
Omaha, Nebr.†	Missouri	T.										T.	.01	T.								T.	.08		.04	.10	T.			.32	.55		
<i>South Central District</i>																																	
Afton	Grand											.20		T.								.11				.01				.48	.05		
Albia	Des Moines	.02										.04	.50	.02	T.							.19					.01			T.	.76	1.54	
Centerville†	Chariton											.49										.13				.01				.58	.10		
Chariton	Chariton											.74	T.									.20								.61	T.		
Creston <sup>2</sup>	Platte	.03										.41	T.									.09				.10				.39	1.02		
Indianola	Des Moines											.15	.04	.02								.10		T.	T.					.20	.16		
Indianola (nr.) <sup>2</sup>	Des Moines											T.	.39	T.								.15								.34	.88		
Knoxville†	Des Moines											.55										.21	.26				T.			.25	.43		
Lamoni	Grand											.34	.01									.16				T.	.06			.21	.06		
Melrose	Des Moines											.55	T.									.20	.56				T.	T.		.85	2.16		
Millerton	Chariton											.66										.13	.10			T.	T.			*	.89		
Mount Ayr†	Grand											.20	T.									.20				T.				.31	.71		
Osceola	Des Moines	.04										.23	.03									.07					.06			.14	.04		
Tingley	Platte											.24										.09								.40	.05		
Tracy <sup>2</sup>	Des Moines											T.	.55									.19								.85	1.59		
Winterset	Des Moines											T.										.09											

DAILY PRECIPITATION FOR OCTOBER, 1943—Continued

Stations	Drainage Basin	Day of Month																															Total		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Southeast District (Continued)</i>																																			
Donnellson <sup>2</sup>	Des Moines												.65	.11																				.40	2.30
Eddyville <sup>2</sup>	Des Moines	.15												.45																				.62	1.42
Fairfield	Skunk												.54	.08								.40	.16										.11	1.29	
Keokuk <sup>1†</sup>	Mississippi	.01		T.								.89	T.	T.							1.40	.32		.02	.17	T.					T.	.35	3.16		
Keokuk LD 19 <sup>2</sup>	Mississippi												.70	.01																			.14	2.75	
Keosauqua	Des Moines												.65	.10								T.	.05		.02	T.							.78	1.60	
Keosauqua (rvr.) <sup>2</sup>	Des Moines	.08											.80										.06										.82	1.76	
Mt. Pleasant	Skunk											.10	.70									T.	.27										.42	1.49	
Oskaloosa	Des Moines											.39		T.								.31											.74	1.44	
Ottumwa†	Des Moines	.02										.33	.12									.17	.11										.65	1.40	
Ottumwa (river) <sup>2</sup>	Des Moines	.03											T.	.34	.01								.19	.23			T.						.62	1.19	
Sigourney	Skunk											.32	.05																					.85	1.64
Stockport	Skunk												.76	.05									T.	.10		T.	.05	T.					.71	.04	1.71
Wapello <sup>2</sup>	Iowa	T.	.05										.68	.02																				.29	2.27
Washington†	Skunk											.40	.20										.10	.80										.61	2.11

Except as otherwise indicated, observations are generally made in the afternoon, near sunset, and precipitation recorded is for 24 hours ending at the time of observation.  
<sup>1</sup> Precipitation is for 24-hour period midnight to midnight.  
<sup>2</sup> Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.  
T. Precipitation is less than 0.005 inch rain or melted snow.  
‡ Interpolated  
† Station is equipped with recording gage.  
\* Precipitation included in next following measurement. \*\*Incomplete.

SUPPLEMENTAL TABLE, OCTOBER, 1943

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	17	1.13	-0.57	0.47	12	0	5	21	3	7	s.
Cambrld. 4 1/4 NW	Cass	1,225	45	0.87	-1.67	0.65	30	0	5	20	6	5	se.
Dumont 3 1/4 NW	Butler	998	9	1.80	-0.55	0.67	30-31	0	6	17	8	6	se.
Dunbar 2 NE	Marshall	1,010	9	1.73	-0.77	0.78	20-21	T.	6	18	3	10	sw
				1.15		0.76	30	0	6	18	10	3	se.
Kanawha 1/4 S	Hancock	1,183											
Lake View	Sac.	1,239	5	1.71	-0.53	1.60	30	0	4	11	12	8	w.
Melrose	Monroe	871	15	2.16	-0.49	0.85	30	0	4	16	8	7	ne.
Sloan	Woodbury	1,071		1.11		0.41	13	0	4				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

SOIL TEMPERATURES AT AMES, IOWA, OCTOBER, 1943

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	41.8		50.3	53.6	56.2		
Average 12 noon	57.0		50.5	53.4	56.5		
Average 7 p. m.	52.9		54.6	53.7	56.3	57.6	
Highest Date	81 9	64 1, 11	64 1	63* 1	62 2	60 1-6	60 1-6
Lowest Date	24 16, 17		41 17, 28	46* 28	51 31	54 31	
Number of days with temperature							
40° or higher	31		31	31	31	31	31
50° or higher	27		23	24	31	31	31
60° or higher	22		7	3	7	6	6

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.  
Diurnal changes at 24 inches and deeper amount to less than 2°.  
Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

PRESSURE, WIND, HUMIDITY AND SUNSHINE, AND DEGREE DAYS, OCTOBER, 1943

Stations	Sea-level pressure, extremes— inches		Wind†			Relative Humidity				Percentage of sunshine	Degree Days			
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.			6:30 A. M.	12:30 P. M.	6:30 P. M.
Burlington	30.50	6	29.54	13	7.5	33	s.	12	76	84	47	63	62	342
Charles City	30.55	4	29.38	13	5.4	20	s.	12					62	501
Davenport	30.51	4	29.52	13	8.3	32	se.	13	82	86	49	62	57	343
Des Moines	30.54	6	29.41	13	8.2	27	se.	19	71	81	54	56	77	374
Dubuque	30.54	4	29.44	13	5.4	17	se.	12	76	82	50	57	61	409
Sioux City	30.54	6	29.39	13	9.0	33	nw.	13	74	82	48	51	73	426
Omaha, Nebr.	30.55	6	29.43	13	9.7	40	se.	19	76	83	45	50	75	381
State	30.55	4†	29.38	13	7.7	40	se.	19	76	83	49	56	67	397
Normals and Records	*30.72	6	‡28.96	20	8.3	‡47	sw.	16					59	356
		1935		1876				1880		81	54	62		

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.  
\*Sioux City ‡Des Moines ††Davenport †††And other dates.

amounts were the heaviest of the month and most of the excess precipitation in the northeast portion was caused by these rains.

Cold Polar air again dominated the weather from the 24th to the 29th. The influx of cold air occasioned rather widely scattered showers in the west portion on the 23d, in the south on the 24th, and in the east portion on the 25th. At a few stations the lowest temperatures of the month occurred on the 27th or 28th.

The third general rain of the month occurred on the 30th-31st. In much of the southwest quarter the amounts received in a 24-hour period were the heaviest of the month. The northward flow of Maritime air that produced the precipitation also caused rising temperatures but readings did not go above normal generally.

Practically all of the corn crop escaped damage from killing frost. In fact the freezing temperatures of the 15th-17th were of immense benefit as the green stalks were killed, permitting the cobs to dry and making husking and cribbing possible. In the

southern counties silo filling continued up to the time of the general freeze. In the drier northwest and west central counties husking got well under way during the second week but in most areas it was too moist for safe cribbing until the third decade. The Department of Agriculture estimated a total yield of 641,212,000 bushels, or about 7% more than in 1942, the previous high record crop. The estimated yield per acre was 59.0 bushels, somewhat lower than in 1942. As of October 11 the average moisture content was 27.2%, ranging from 24.0% in the northwest to 31.3% in the south central district. Progress of soybeans paralleled that of corn. Combining got well under way in the northern counties during the first week but in some southern areas beans were still green enough to cut for hay during the early part of the month. However, in general, the beans dried rapidly and the moisture content was the lowest in years, ranging down to 8% or 9% in some localities. The soybean harvest continued at a rapid pace throughout the month with combines operating on Sundays and late into the night. The speed with which the work was accomplished was limited only by the shortage of combines that were available. In many far northern counties the work was nearing completion at the close of the month. The Department of Agriculture estimate of total yield as of November 1 was 39,000,000 bushels, or about the same as in 1942.

Late truck crops fared well and beans, pumpkins, peppers and tomatoes made good progress towards maturity during the warm, sunny weather of the first ten days.

Sugar beet harvest was completed during the last half with rather disappointing yields. Potato digging, apple picking and harvesting of other minor crops was sandwiched between the major activities of harvesting corn and soybeans.

The rainfall was generally insufficient for newly seeded grasses, alfalfa, clover, winter wheat and other fall planted crops and perennials. Fall plowing was also difficult because of dry soil but a considerable amount was done up to the last week. While rain was needed for all of these activities, especially in much of the west and south, more precipitation would have been very detrimental to the more important activities of harvesting corn and soybeans.

While the weather was almost perfect for combining and husking, the shortage of combines and pickers and of farm labor made it impossible to take full advantage of this condition. In fact harvesting of the entire bumper corn crop without loss is dependent upon having an unusually long, favorable harvest season to offset the shortage of labor and machinery.

S.E.D.

**TEMPERATURE**

The State average temperature for October, computed from the averages of nine districts of approximately equal area and based on the averages of 121 temperature observing stations, was 51.6°. This was 0.1° colder than the October average for the 71 years of record but was slightly above the median value,

as there have been 34 warmer and 36 colder Octobers. In general it was warmest in the southeast district and coolest in the northeast. The district averages were above the adopted normals in the northwest, north central, west central and southeast sections and slightly below normal in the remaining areas. The highest station average was 55.9° at Keokuk, while the lowest was 46.4° at Decorah. Maximum readings of 87° at Ottumwa on the 9th, and Keosauqua, Missouri Valley and Atlantic, on the 10th, were the highest observed, while the State minimum was 15° at Mapleton, Onawa and Red Oak, on the 16th. There were no maximum readings below freezing but the average number of days with 32° or lower was 7.

**PRECIPITATION**

The average October precipitation in Iowa, derived from the averages of the nine districts of almost equal area and utilizing the measured totals at 124 stations was 1.66 inches. This was 0.70 inch less than the all-time October average. During the 71 years for which records are available, there have been 22 drier and 48 wetter Octobers. The heaviest falls occurred in the east central and northeast districts and were slightly in excess of normal in the latter area. The lightest falls were in the southwest section where the average amount was less than one inch. The greatest station total was 4.59 inches at Maquoketa, and of this amount 3.50 inches fell within a 24-hour period on the 21st. The lowest total was 0.32 inch at Winterset. The average number of rainy days was 5. A number of stations reported light snow flurries but there were no measurable amounts.

**ERRATA**

Report for July, 1943. Page 81, Atlantic, precipitation on 21st published .78, should be .08. Report for August, 1943. Page 98, Des Moines, mean temperature published 75.1, should be 75.2; departure published +2.0, should be +2.1. Page 100, Forest City, precipitation on the 11th published .03, should be .06. Page 104, Des Moines, maximum temperature on 20th published 74, should be 75; mean maximum published 84.1, should be 84.2. Report for September, 1943. Page 110, Waverly, number of days with .01 or more published 8, should be 9. Carroll, greatest 24-hour precipitation published .83 on 12th, should be 1.03 on 11th-12th. Monroe, maximum temperature published 86 on 30th, should be 87 on 27th. Page 111, Webster City, date of greatest 24-hour precipitation published 4-5, should be 5; Red Oak, 10 mi. SW, greatest 24-hour precipitation published .81 on 12th, should be .88 on 5th; Millerton, date of greatest 24-hour precipitation published 4-5, should be 4. Page 114, Akron, greatest 24-hour precipitation published .27 on 4th, should be .29 on 5th-6th; Charles City, lowest barometer published 29.63, should be 29.62. Page 115, first line of temperature paragraph published "The State average temperature for August, etc., should be, "The State average temperature for September," etc.

34

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR OCTOBER, 1943 (24 hours ending 6:30 p.m.)**

Station	Data	Day of Month																															Sums
		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	
Ames.....	{Evaporation.....	.208	.167	.115	.135	.119	.103	.158	.194	.155	.137	.215	.087	.041	.058	.064	.077	.101	.108	.169	.041	.134	.100	.089	.053	.091	.085	.053	.097	.070	.024	.059	3.307
	{Wind Movement...	55	33	11	17	16	11	34	69	54	42	109	135	120	35	42	49	45	30	94	99	53	19	41	36	87	58	16	48	27	84	149	1,718
Cherokee	{Evaporation.....	.223	.148	.107	.180	.123	.128	.185	.220	.191	.114	.310	.081	.088	.039	.057	.045	.064	.132	.114	.157	.099	.105	.044	.076	.063	.044	.058	.072	.062	.035	.047	3.411
	{Wind Movement...	34	11	13	29	41	32	52	95	44	15	163	90	105	130	4	36	38	49	111	11	40	130	23	49	53	31	44	80	13	83	162	1,811
Clarinda.	{Evaporation.....	.132	.147	.124	.119	.140	.076	.144	.164	.144	.209	.223	.119	.105	.131	.084	.029	.114	.143	.137	.203	.156	.130	.103	.086	.047	.090	.100	.079	.053	.080	.089	3.600
	{Wind Movement...	34	25	16	7	15	10	18	35	57	33	127	153	162	52	45	20	44	28	93	154	55	43	59	44	56	40	15	47	34	76	150	1,747
Ia. City...	{Evaporation.....	.121	.145	.114	.097	.097	.108	.119	.121	.129	.129	.178	.054	.056	.059	.033	.061	.055	.081	.129	.065	.168	.078	.040	.046	.058	.066	.058	.063	.065	.109	.054	2.756
	{Wind Movement...	37	30	20	15	14	21	17	15	20	29	49	56	115	36	36	54	23	18	32	43	52	11	4	33	58	64	31	23	16	43	38	1,053

For precipitation and temperature data, see tables on other pages of this publication.



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF OCTOBER, 1943

Table with columns for Stations, days 1-31, and Mean. Rows are categorized by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes maximum and minimum temperature values for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF OCTOBER, 1943—Continued

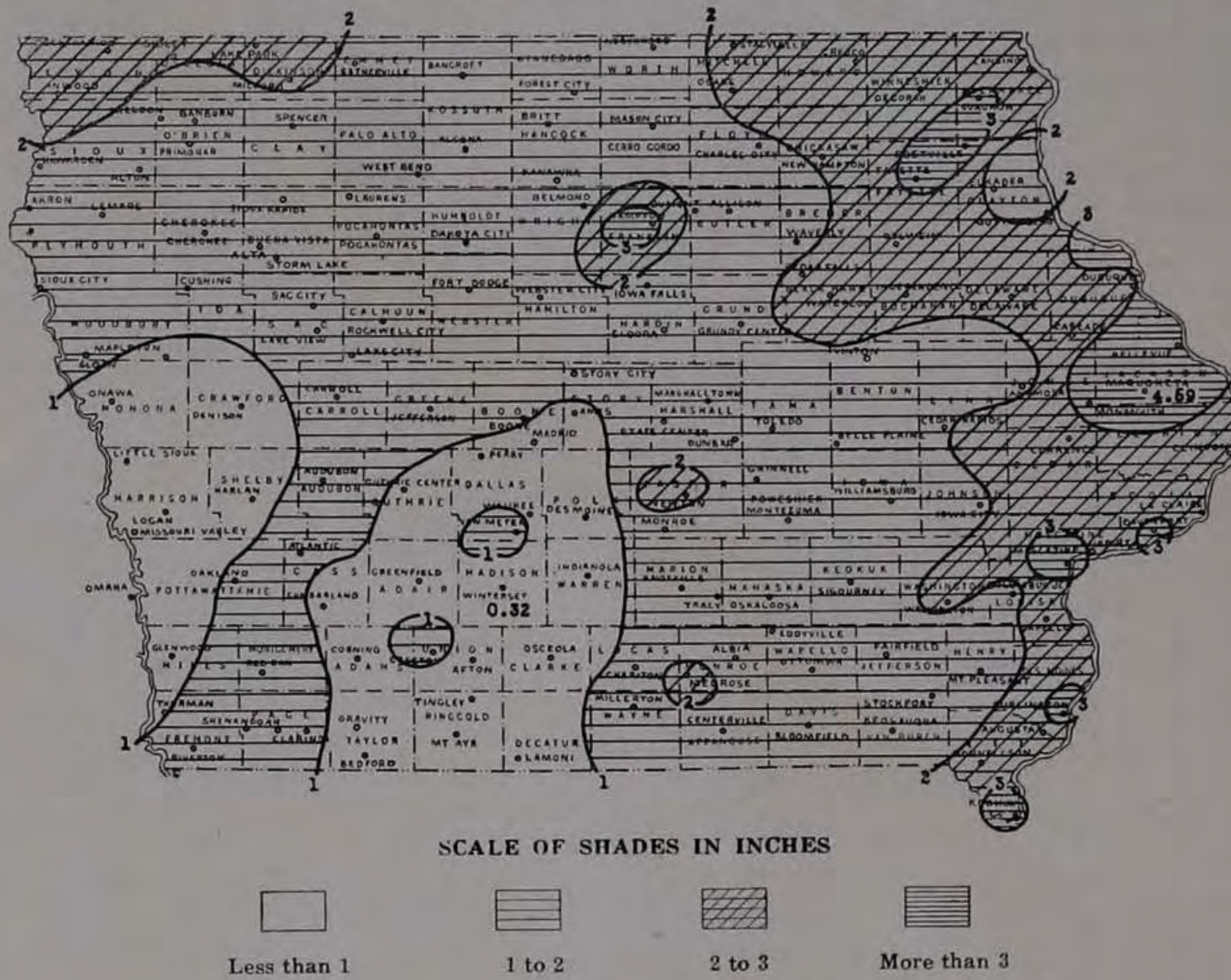
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

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. †Interpolated.

MISCELLANEOUS PHENOMENA

- Aurora*: 1st, 16th, 27th, 28th.
- Fog, light*: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 12th, 13th, 15th, 18th, 19th, 20th, 21st, 23d, 24th, 27th, 28th, 29th, 30th, 31st.
- Fog, heavy*: 3d, 4th, 5th, 6th, 7th, 9th, 10th, 13th, 15th, 22d, 23d, 27th, 28th.
- Frost, killing*: 15th, 16th, 17th.
- Hail*: 20th.
- Halo, Lunar*: 8th, 12th.
- Halo, Solar*: 11th.
- Thunderstorms*: 12th, 13th, 20th, 21st, 29th, 30th, 31st.

TOTAL PRECIPITATION, OCTOBER, 1943



# CLIMATOLOGICAL DATA

11

## IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, NOVEMBER, 1943

No. 11

### GENERAL SUMMARY

November, 1943, was cool and dry. There was only one important precipitation period and the rather persistent sub-normal temperatures were interrupted by only one general warm spell of more than a single day's duration. The only noteworthy meteorological event was a rather heavy and widespread snowstorm over the northwest and north central counties at the end of the first week.

Other climatological averages, such as sunshine, humidity, wind movement, and the number of clear, partly cloudy and cloudy days, were close to the all-time normals for November. However, in line with the precipitation and temperature values, there were only two-thirds as many days with precipitation as usual, while heating requirements were 116% of normal.

Moderately cool and sunny weather prevailed during the first few days of the month under the influence of Polar Continental air flowing eastward over Iowa. The temperature rose slowly and at many northwestern stations the maximum readings of the 3d were the highest of the month. The eastward passage of an area of low pressure and subsequent southward movement of a new mass of cold polar air on the 4th-5th had little effect on Iowa weather. However, as the mass of cold air moved south and eastward, a trough developed between it and a mass of Maritime Polar air over the far northwestern States. On the morning of the 6th the surface synoptic weather map showed a rather deep barometric disturbance over eastern Oklahoma, with a cold front extending southwestward over Texas and a warm front extending northeastward over southern Missouri and southern Illinois. A line of warm type occluded frontolysis extended from eastern South Dakota along the western boundaries of Iowa and Missouri to the Ozarks.

During the next two days the low pressure center moved slowly in a general northerly direction. By the evening of the 6th it overlay east central Missouri, with a trough extending south-southwest over eastern Texas. The warm front extended almost due eastward, while the cold front was in the middle of the low pressure trough. In the next 24 hours the center of the barometric disturbance had filled in and had reached central Indiana. However, pressure had fallen to the northwest of the low center. The cold front extended almost straight southward from central Lake Michigan through the low center to Mobile Bay. The warm front stretched almost due east from Lake Michigan.

On the following morning (November 7) a new deep low pressure center had formed over northeast Iowa. The original cold front extended from Lake Huron to the west slope of the Appalachians, and thence south to the Gulf of Mexico. The warm front stretched eastward from northern Lake Huron into the St. Lawrence Valley, while a warm front type occlusion was located along the south shores of Lake Superior. During

### COMPARATIVE DATA FOR NOVEMBER, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	36.2	64	-4	0.72					
1874.....	32.9	74	-6	2.21					
1875.....	30.1	60	-16	0.19					
1876.....	31.3	68	-6	1.70					
1877.....	33.3	82	-10	1.86					
1878.....	39.7	72	12	0.63					
1879.....	36.3	75	4	4.08					
1880.....	25.3	68	-12	1.29					
1881.....	34.4	85	-1	2.01					
1882.....	37.5	76	4	1.71					
1883.....	36.8	70	-3	1.44					
1884.....	35.6	68	-15	0.79					
1885.....	36.4	67	14	0.69					
1886.....	32.1	75	-4	1.49					
1887.....	35.1	78	-25	0.85					
1888.....	37.1	82	0	1.56					
1889.....	33.0	68	-9	1.44					
1890.....	38.9	78	-2	1.31					
1891.....	30.5	84	-24	1.70		7	10	8	12
1892.....	33.3	70	-3	1.10	1.8	4	11	8	11
1893.....	34.0	86	-13	1.17	4.6	4	16	8	6
1894.....	22.7	72	-5	0.92	0.4	4	9	11	10
1895.....	34.3	86	-12	1.51	4.9	6	9	8	13
1896.....	29.6	82	-15	1.83	2.9	6	9	8	13
1897.....	34.3	81	-19	0.66	1.2	5	12	8	10
1898.....	32.2	78	-17	1.50	8.7	6	14	8	8
1899.....	43.9	86	8	1.20	0.5	5	12	8	10
1900.....	33.5	79	-6	1.06	3.7	6	12	7	11
1901.....	35.8	77	2	0.86	2.6	3	18	6	6
1902.....	41.2	79	4	2.13	1.8	7	9	7	14
1903.....	34.2	76	-5	0.52	1.1	3	13	8	9
1904.....	41.0	80	4	0.15	0.5	1	20	6	4
1905.....	38.4	70	-12	2.84	0.6	5	16	7	7
1906.....	35.4	76	-5	2.03	4.4	8	9	7	14
1907.....	36.7	68	-4	1.03	0.9	4	17	6	7
1908.....	39.3	80	5	1.56	1.4	5	14	7	9
1909.....	42.4	84	-3	5.39	6.8	10	10	7	13
1910.....	33.4	76	5	0.34	0.7	3	13	9	8
1911.....	29.9	79	-8	1.42	1.6	6	11	8	11
1912.....	40.1	77	6	0.98	T.	2	18	8	4
1913.....	44.1	78	10	1.18	0.4	6	11	7	12
1914.....	41.0	80	-4	0.22	T.	2	19	6	5
1915.....	40.2	83	-5	1.94	1.2	6	11	10	9
1916.....	37.3	80	-8	1.61	3.6	5	16	6	8
1917.....	40.7	77	3	0.28	1.4	3	14	6	10
1918.....	39.9	76	0	2.11	4.4	7	13	5	12
1919.....	33.6	68	-12	3.40	6.3	8	11	7	12
1920.....	35.4	71	5	2.18	1.2	8	10	5	15
1921.....	33.6	70	-5	0.58	3.4	5	10	5	15
1922.....	42.2	74	11	3.54	0.3	9	11	6	13
1923.....	40.1	72	9	0.58	1.2	3	16	6	8
1924.....	38.9	82	0	0.58	0.4	4	15	7	8
1925.....	36.1	68	-6	0.71	4.0	4	15	6	9
1926.....	32.6	71	-3	2.10	4.2	7	8	7	15
1927.....	37.7	81	0	0.87	0.6	5	7	6	17
1928.....	38.7	70	8	3.83	6.9	9	13	4	13
1929.....	32.3	66	-12	1.24	2.7	6	13	8	9
1930.....	41.3	79	-16	2.12	1.1	5	17	6	7
1931.....	43.9	81	1	5.76	1.6	12	10	5	15
1932.....	33.2	68	-5	1.55	3.8	4	13	8	9
1933.....	37.9	83	-7	0.31	1.2	3	13	8	9
1934.....	41.9	79	11	5.03	7.2	10	12	4	14
1935.....	34.0	73	-7	2.70	1.8	8	8	5	17
1936.....	35.5	77	-5	0.66	2.3	4	16	7	7
1937.....	33.9	82	-17	0.72	5.2	4	15	7	8
1938.....	37.6	83	-8	2.76	3.1	6	15	8	7
1939.....	39.9	74	9	0.51	T.	3	17	6	7
1940.....	33.6	78	-12	2.45	5.0	8	10	6	14
1941.....	40.0	78	2	1.71	2.6	5	13	5	12
1942.....	38.8	80	-10	1.76	5.1	8	11	7	12
1943.....	33.8	72	1	1.01	3.1	4	12	8	10
Period.....	36.3	86	-25	1.60	2.6	6	13	7	10

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

the next 12 hours the new "low" moved eastward out of Iowa, and a fresh outbreak of Continental Polar air covered the State.

During the two-day period described above, Maritime Tropic air overran the surface cold air to the east of the low pressure center. To the west and north of the center, Maritime













into deep drifts in cornfields, and much of it did not melt until the close of the month. This had the effect of cooling the air locally and of holding down daytime temperatures, with the result that in most of the northwest and north central districts the maximum temperatures of the 3d and 4th were not exceeded during the remainder of the month. In other areas the readings of the 17th and 18th, and in a few cases of the 30th, were considerably higher than those during the early part of the month.

In a few respects the storm was similar to the Armistice Day blizzard of November 11, 1940. The heavy snow caused the death of thousands of turkeys and caught a considerable amount of unharvested corn and soybeans in the fields. However, the Polar air mass was not as cold as in 1940, and the following cold weather not as severe.

From the 6th through the 16th temperature readings were generally below normal under the influence of Continental Polar air. Fresh outbreaks, with attendant fronts, failed to cause any precipitation, but rather high winds were experienced on the 12th. A few observers reported the lowest readings of the month on the 11th, but at the majority of stations the lowest occurred on the 16th.

After the 16th the temperature rose rapidly on the 17th and 18th. On the latter date most stations reported the highest temperature for the month. The warm weather was of short duration, and on the 21st readings again fell to near or slightly below normal.

The passage of a shallow trough of low pressure between two large areas of high pressure produced a temporary rise in temperature on the 25th, followed by scattered light precipitation on the 25th-26th as a cold front moved from west to east across Iowa.

Another period of relatively high temperature began on the 30th and continued into December. A few stations recorded readings as high or higher on the 30th as were previously observed on the 17th-18th.

The dry weather was due to the fact that except during the storm period of the 6th-7th, the air masses were almost solely of Continental origin. Maritime Polar air was noted on only a few days, and there was no Maritime Tropic air reported over Iowa during the month. In general, the month was favorable for corn husking and soybean combining. The work was greatly delayed by the precipitation of the 6th-7th as the ground became too soft for the use of heavy harvest machinery. The heavy snow crushed some soybeans in the northwest and the slow melting prevented much field work in that area until near the end of the month. However, favorable weather in December permitted most of the work to be completed so that the only crop loss due to the storm was a part of the comparatively small amount of unharvested soybeans. New seedings of grasses, pastures and winter wheat were benefited by such precipitation as did occur. There was considerable fall plowing in some sections. The U. S. Geologic Survey reports that stream flow was near or above normal during the month.

#### TEMPERATURE

The November average temperature for Iowa, derived from the averages of nine districts of nearly equal area, which in turn were based on reports from 121 temperature observing stations, was 33.8° or 2.5° below the all-time November mean. All stations reported monthly averages below the adopted normals, with the greatest deficiencies in the southeast district. The highest district average was 36.2° in the southeast, while lowest was 30.8° in the north central area. The highest station averages were 39.4° at the Keokuk Dam, and 38.4° at the Keokuk city office. The lowest mean was 29.6° at Forest City. The highest observed was 72° at six south central and southeastern stations on the 18th, and the lowest was 1° at

Forest City on the 16th. The average number of days on which the maximum temperature failed to rise above the freezing mark, was 3, while the number of days with minimum readings of 32° or lower was 27.

#### PRECIPITATION

The State average precipitation for November was 1.01 inches, or 0.59 inch less than the October average for the entire 71-year period of record. At ten stations, all in the northwest quarter of Iowa, the monthly totals were slightly in excess of normal, but at all remaining points the amounts were below normal, with the greatest deficiency in the extreme south. The greatest total was 2.05 inches at Fort Dodge; the least was 0.32 inch at the Soil Conservation Service Experiment Station between Clarinda and Shenandoah. The greatest 24-hour fall was 1.69 inches at Davenport on the 6th-7th. The average number of days with 0.01 inch or more was 4. A considerable part of the precipitation was in the form of snow, as outlined in the following paragraph.

#### SNOWFALL

The average total snowfall amounted to 3.1 inches, 0.5 inch more than the all-time November normal. The heaviest amounts fell in the northwest fourth of the State, with 16.0 inches at Lake Park, 14.0 inches at Spirit Lake, and 13.1 inches at Rockwell City. The fall amounted to 10 inches or more at Carroll, Cushing, Estherville, Spencer, Sanborn, Sheldon and Sibley. However, except in the first two tiers of counties south of the Minnesota border, the amounts in the eastern half of Iowa ranged from a trace to two inches. Most of the snow fell on the 7th with the storm beginning late on the 6th and continuing until the 8th. In the area where it was heaviest, much of the snow was blown into fields of unhusked corn where it melted very slowly and remained until near the close of the month. In most other sections the snow disappeared within a few days after falling.

#### THE AUTUMN OF 1943

The sharp reversal in the weather trend between the months of August and September is reflected in a comparison of the summer averages with those of autumn. The summer was warm and wet, in fact it was the warmest wet summer of record. In the 71 years since the climatological service was established, there have been but 16 warmer and 5 wetter summers.

On the other hand, there have been only 14 colder and 12 drier autumns. Only two years, 1888 and 1889, have been both drier and cooler.

The average temperature during the three months of September, October and November, was 48.6°, or 2.0° less than normal. Relatively, September was the coldest month with a departure of -3.6°. October was only 0.1° below the all-time average, but November was 2.5° below normal. The extremes were well within the records of previous years. The highest observed was 94° on September 5 at Logan and Missouri Valley. The lowest was 1° at Forest City on November 16. Heating requirements at a representative group of stations amounted to 118% of the autumn normal.

The average total precipitation was 4.85 inches, or 2.91 inches less than normal. All three months showed deficiencies, varying from -1.62 inches in September to -0.59 inch in November. During September, showers were rather frequent but in October there were only four periods of general precipitation, and in November only one of any importance. Snowfall averaged exactly normal but practically all of it occurred during one storm in November, and was unevenly distributed.

All other weather elements, such as sunshine, humidity, wind movement and cloudiness, were close to the all-time averages.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF NOVEMBER, 1943

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District (Alta, Alton, Cherokee, Estherville, Hawarden, Lake Park, Le Mars, Pocahontas, Rock Rapids, Sioux Rapids, Spencer), North Central District (Algona, Bancroft, Belmond, Britt, Charles City\*, Dakota City, Mason City, Northwood, Osage), Northeast District (Decorah, Delaware (near), Dubuque\*, Elkader, Fayette, Independence, New Hampton, Waterloo, Waverly), West Central District (Carroll, Denison, Guthrie Center, Harlan, Jefferson, Little Sioux, Logan, Mapleton, Rockwell City, Sac City, Sioux City\*), and Central District (Ames, Boone, Des Moines, Fort Dodge, Grinnell).

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF NOVEMBER, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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. §Interpolated.

On the whole, the autumn was very favorable for agricultural operations, and most of the record breaking corn crop and the large soybean crop were harvested without serious loss. A few soybeans were damaged and a considerable number of turkeys were killed by the November snowstorm described elsewhere in this publication. More precipitation would have benefited winter wheat, pastures and fall seeded grasses.

It is again desired to emphasize that the autumn months were almost ideal for curing and harvesting the record corn crop and the large crop of soybeans so urgently needed in prosecuting the war effort.

Except for the November snowstorm there were no phenomena to threaten any serious damage to either of these crops. While killing frosts were recorded in some areas, especially in the northwest as early as September 17, the first general freeze did not occur until October 16. Corn was benefited by the freeze as the green stalks were killed, permitting the crop to dry and become safe for cribbing.

More ideal weather to meet the food needs of our country at war could scarcely be imagined.

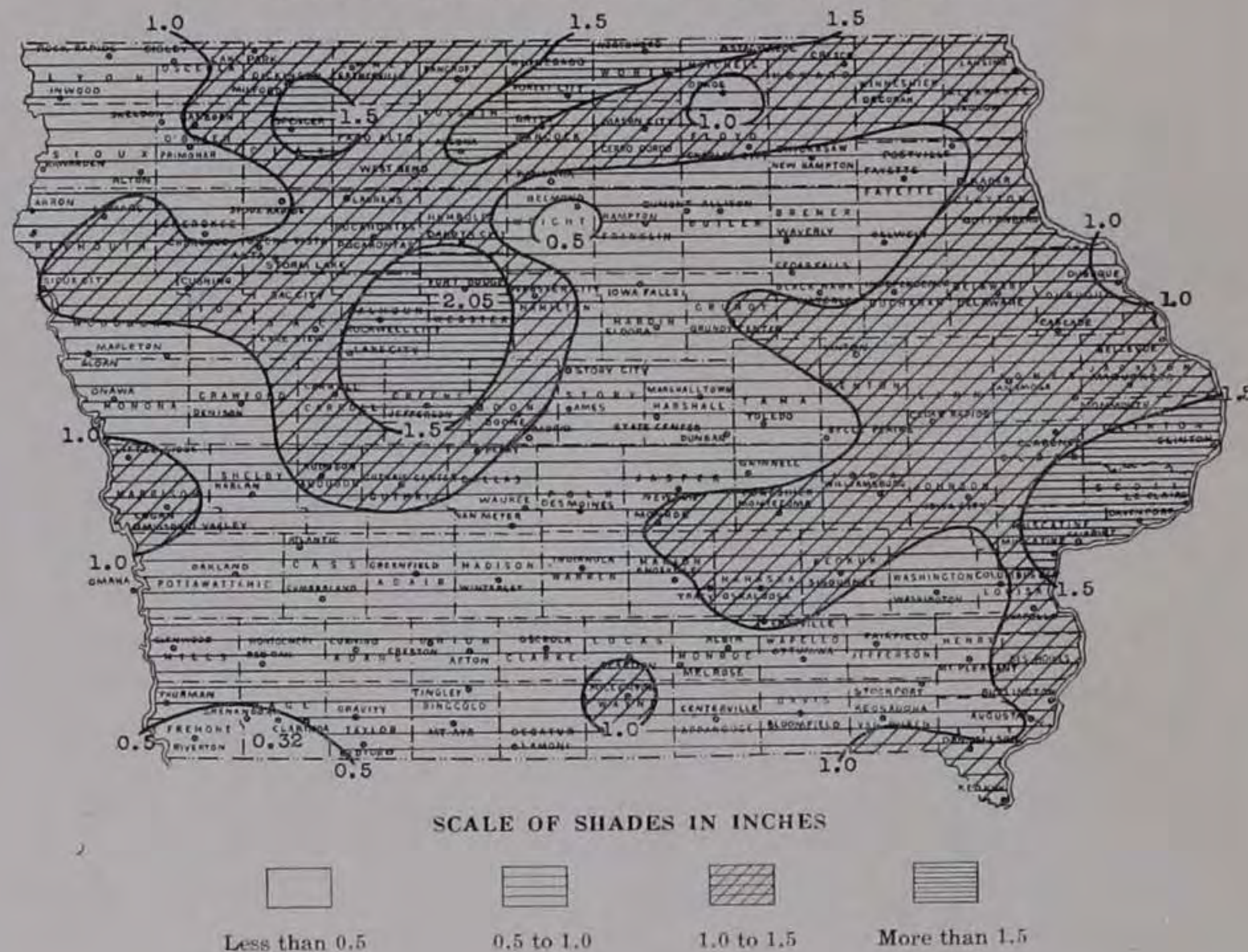
MISCELLANEOUS PHENOMENA

- Aurora: None.
- Fog, light: 1st, 3d, 5th, 6th, 7th, 11th, 12th, 13th, 14th, 15th, 18th, 19th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th.
- Fog, heavy: 5th, 12th, 24th, 25th, 27th.
- Glaze: 7th, 15th, 18th.
- Hail: 6th.
- Halo, Lunar: 4th, 18th, 23d.
- Halo, Solar: 4th, 18th, 23d, 25th.
- Sleet: 5th, 6th, 7th, 8th, 15th, 28th.
- Snow, drifting: 7th, 8th.
- Snow, heavy: 6th, 7th.
- Thunderstorm: 6th.
- Winds, high: 7th, 8th, 10th, 12th.

ERRATA

Report for October, 1943. Page 129, Burlington, minimum temperature on 12th published 60, should be 59.

TOTAL PRECIPITATION, NOVEMBER, 1943



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV DES MOINES, IOWA, DECEMBER, 1943 No. 12

GENERAL SUMMARY

December, 1943, was warm and dry. These conditions were the reverse of those experienced in 1942 when cold and wet weather prevailed. It was the fourth consecutive month with subnormal precipitation, the State average amounting to only 44% of the December normal. Over large parts of the western and northern counties, comprising about one-third of the total area of the State, the monthly totals amounted to less than one-tenth of an inch, and at a dozen stations there were no measurable amounts reported. The average snowfall of 1.1 inches equaled the least amount of December record during the 42 years for which such statistics are available.

This was the first month since August with average temperature above the all-time monthly normal. The greatest excess occurred in the extreme northwest and diminished to negative departures at a number of stations in the extreme southern part of the State.

There were more clear and fewer cloudy days than in any other December except those of 1905 and 1912. Sunshine was considerably in excess of normal and the greatest amount in December since 1912. Heating requirements were slightly below normal. The average relative humidity was lower than usual while the wind movement was slightly above normal.

Despite the prolonged dry weather stream flow continued above normal over the northern two-thirds of Iowa but this favorable condition cannot be expected to continue long if precipitation remains subnormal. In general, the month was quite favorable for outdoor operations and harvesting of scattered fields of late corn, combining of a few fields of soybeans, and hauling of hemp to the mills were accomplished. Livestock was mostly in good condition.

Temperatures were generally above normal during the first 11 days. At most stations the monthly maximum readings occurred on the 4th, although at a few places temperatures as high or higher were reported on the 1st and 11th.

The most important precipitation occurred on the 5th-6th. On the morning of the 5th low barometric pressure covered the southern and central Great Plains, while a stationary front between relatively cold and warm air crossed Iowa in an easterly direction. During the next 24 hours the low pressure system moved eastward to Lake Michigan, attended by a north-south cold front. Some Maritime Tropic air overran the colder surface air masses over Iowa causing rather general rain. The amounts were heaviest along and to the south of the stationary front and exceeded one inch in an area roughly extending from Dubuque and Jackson counties westward to Marshall and Jasper counties.

A deep low pressure area moved eastward along the Canadian border on the 7th-8th and caused the lowest barometer readings of the month in the west portion of Iowa but there was no precipitation.

COMPARATIVE DATA FOR DECEMBER, 1943

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	22.6	65	-10	2.51					
1874.....	24.0	60	-18	0.84					
1875.....	30.0	68	-18	2.06					
1876.....	11.9	56	-28	0.24					
1877.....	36.8	65	-11	2.18					
1878.....	17.2	52	-17	0.77					
1879.....	16.1	58	-35	1.40					
1880.....	16.1	55	-25	0.85					
1881.....	33.8	60	-10	1.24					
1882.....	21.0	54	-23	1.57					
1883.....	24.8	62	-24	1.03					
1884.....	16.2	59	-30	2.15					
1885.....	24.6	55	-22	1.45					
1886.....	14.4	55	-32	0.80					
1887.....	20.3	57	-25	2.17					
1888.....	28.6	66	-6	1.46					
1889.....	35.8	69	-2	1.06					
1890.....	28.5	68	-18	0.58					
1891.....	32.3	62	-14	2.41		6	14	9	8
1892.....	18.9	68	-29	1.65	10.9	8	9	8	14
1893.....	22.0	66	-21	1.31	7.6	7	10	9	12
1894.....	30.1	73	-17	0.95	1.3	3	15	6	10
1895.....	25.4	63	-16	1.63	4.1	5	11	9	11
1896.....	30.8	66	-10	0.65	1.6	4	10	8	13
1897.....	18.0	60	-25	1.65	15.9	6	11	7	13
1898.....	18.1	60	-25	0.48	3.9	3	15	8	8
1899.....	22.6	61	-19	1.61	4.3	5	12	9	10
1900.....	26.9	63	-10	0.45	2.4	4	13	6	12
1901.....	20.5	64	-31	0.93	5.4	6	10	9	12
1902.....	20.1	59	-20	2.23	12.9	8	9	6	16
1903.....	19.6	58	-27	0.41	3.7	4	11	9	11
1904.....	23.4	67	-19	1.44	12.3	5	12	7	12
1905.....	27.0	62	-11	0.52	4.2	3	19	6	6
1906.....	25.7	65	-9	1.43	1.4	6	11	7	13
1907.....	28.8	62	-9	1.00	4.7	5	10	7	14
1908.....	27.2	67	-17	0.57	3.8	3	15	8	8
1909.....	15.1	60	-26	2.18	13.7	11	10	5	16
1910.....	23.4	57	-14	0.37	3.0	3	15	7	9
1911.....	27.9	60	-24	2.57	12.6	7	13	6	12
1912.....	29.2	64	-13	0.74	1.1	3	18	7	6
1913.....	32.0	65	-13	1.02	1.3	4	15	5	11
1914.....	15.7	63	-31	1.30	11.1	9	10	6	15
1915.....	25.0	56	-10	0.69	4.6	5	11	8	12
1916.....	18.7	67	-25	1.04	6.7	6	15	8	8
1917.....	14.5	62	-40	0.56	6.7	6	10	9	12
1918.....	32.7	68	-7	1.30	5.1	8	9	8	14
1919.....	15.0	52	-36	0.54	5.8	4	11	7	13
1920.....	26.4	65	-26	1.16	7.4	5	10	8	13
1921.....	28.2	69	-22	1.02	2.9	4	14	9	8
1922.....	24.0	65	-25	0.37	2.2	3	16	7	8
1923.....	33.5	68	-21	0.76	4.4	4	14	6	11
1924.....	15.4	62	-33	1.79	8.1	8	12	6	13
1925.....	21.0	64	-25	1.30	10.6	5	12	8	11
1926.....	21.9	58	-21	1.06	5.7	4	10	7	14
1927.....	18.7	59	-22	1.04	4.4	5	13	8	10
1928.....	28.7	57	-15	0.89	2.3	5	12	7	12
1929.....	24.8	65	-13	0.39	3.8	5	12	6	13
1930.....	26.7	65	-10	0.57	3.0	4	12	6	13
1931.....	34.1	61	3	2.48	5.7	8	11	4	16
1932.....	21.9	64	-27	1.44	5.5	5	14	7	10
1933.....	27.1	69	-30	1.05	2.8	5	11	8	12
1934.....	21.5	48	-17	0.57	5.5	5	7	7	17
1935.....	22.4	59	-19	0.95	7.6	8	9	6	16
1936.....	28.7	65	-16	1.55	5.1	5	11	7	13
1937.....	22.8	59	-11	0.74	5.4	6	9	8	14
1938.....	26.3	56	-15	0.71	4.7	5	12	8	11
1939.....	32.4	74	-9	0.62	4.2	4	15	8	8
1940.....	28.4	68	-32	1.36	10.0	6	8	6	17
1941.....	32.1	67	-15	1.91	9.5	7	10	7	14
1942.....	20.3	53	-20	1.59	6.5	7	8	7	16
1943.....	26.2	65	-13	0.52	1.1	2	17	7	7
Period.....	24.3	74	-40	1.18	5.8	5	12	7	12

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

On the morning of the 9th Maritime Tropic air overran Continental Polar air at the surface over Missouri and southern Iowa. Later in the day a fresh mass of cold Polar air moved southward and caused the heaviest snowfall of the month in the two southern tiers of Iowa counties, and also over parts of



CLIMATOLOGICAL DATA FOR DECEMBER, 1943—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit						Precipitation, in inches				Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry 1 1/2 SE	Dallas	975	44	26.8	+ 2.8	60	4	-11	15	0.75	- 0.25	0.60	5-6	1.5	3	18	8	5	nw.	Eugene N. Hastie
State Center	Marshall	1,068	7	25.0	+ 0.7	54	4	-8	23	1.03	- 0.04	0.86	6	0.2	3	15	9	7	sw.	H. M. Meads
Toledo	Tama	929	50	26.6	+ 2.4	60	4	-7	23	1.01	- 0.14	0.98	5-6	T.	4	18	5	8	s.	H. P. Giger
Waukee 1 1/4 SW	Dallas	1,042	46	27.0	+ 2.3	56	1†	-11	15	0.90	- 0.16	0.75	6	2.0	3	24	2	5	sw.	Ivan B. Spear
Webster City 1 SE	Hamilton	1,042	60	24.8	+ 2.5	53	4	-8	23	0.35	- 0.52	0.27	6	1.0	2	27	3	1	se.	Leo Holtkamp
Means and extremes				26.1	+ 1.9	62	4	-11	15	0.82	- 0.26	1.22	6	0.6	3	19	6	6	sw.	
<i>East Central Dist.</i>																				
Anamosa 1 NW	Jones	873	15	25.4	+ 1.3	57	4	-7	23	1.27	- 0.03	0.99	6	0	2	20	5	6	sw.	State Reformatory
Belle Plaine	Benton	895	68	25.9	+ 1.5	55	4	-6	23	1.33	- 0.07	1.32	5-6	0.2	3	19	5	7	s.	R. O. Burrows
Bellevue	Jackson	603		27.4	+ 2.5	56	5	-2	15†	1.04	- 0.21	1.04	5-6	0.1	1	17	10	4	nw.	U. S. Engineers
Cedar Rapids	Linn	813	62	26.4	+ 1.8	56	4	-5	23	1.38	+ 0.30	1.37	5-6	0.1	2	18	4	9	s.	John T. Wurster
Clarence	Cedar	850	10	25.5	+ 1.0	58	4	-7	23	0.78	- 0.62	0.76	5-6	T.	3	20	3	8	nw.	H. J. Klatt
Clinton	Clinton	640	73	28.9	+ 2.5	60	4†	-3	15†	0.78	- 0.76	0.72	5-6	0.3	2	18	7	6	sw.	Samuel W. Williams
Davenport	Scott	579	73	28.4	+ 1.3	59	5	-2	23	0.55	- 0.93	0.50	5	0.5	4	16	4	11	sw.	U. S. Weather Bureau
Iowa City	Johnson	780	87	26.7	+ 1.3	56	4†	-5	23	0.63	- 0.77	0.61	5-6	0.3	3	17	3	11	nw.	Inst. Hydraulic Research
Maquoketa	Jackson	732	51	26.3	+ 1.6	56	4†	-5	23	0.84	- 0.42	0.84	6	T.	1	17	13	1	sw.	Dr. E. V. Andrews
Monmouth 4 SW	Jones	870	3	26.8	+ 2.6	57	4†	-8	23	1.01	- 0.34	1.01	5-6	T.	1	12	6	13	nw.	Otto J. Bisinger
Muscatine	Muscatine	620	98	26.8	+ 0.5	57	4†	-6	15	0.62	- 0.88	0.57	6	0.6	3	18	6	7	w.	G. Krieger
Vinton	Benton	815	1	26.6	+ 2.4	56	4	-6	23	1.17	- 0.13	1.17	5-6	T.	2	17	10	4	nw.	H. J. Adams
Williamsburg	Iowa	805	28	26.2	+ 0.9	56	4	-5	15†	1.05	- 0.27	1.01	5-6	0.4	2	18	3	10	sw.	Dr. F. C. Schadt
Means and extremes				26.7	+ 1.6	60	4†	-8	23	0.96	- 0.40	1.37	5-6	0.2	2	17	6	8	sw.	
<i>Southwest District</i>																				
Atlantic 1 E	Cass	1,110	57	26.4	+ 1.1	61	4	-9	15†	0.16	- 0.88	0.13	6	0.3	2	10	16	5	sw.	Roy L. Fancolly
Bedford 1 1/4 N	Taylor	1,215	40	27.2	+ 0.4	64	4	-7	15	0.46	- 0.53	0.41	6	5.0	2	23	1	7	sw.	H. J. Chambers
Clarinda	Page	1,004	72	25.8	- 1.1	63	4	-11	15	0.76	- 0.31	0.50	5-6	2.6	3	15	6	10	s.	Walter L. Weakland
Clarinda Erosion 8 W	Page	1,132	5	26.4	- 0.4	62	4	-6	15	0.83	- 0.23	0.58	5-6	2.9	5	7	13	11	nw.	Soil Conservation Service
Corning 1 E	Adams	1,285	56	27.1	+ 1.2	61	4	-13	15	0.69	- 0.38	0.34	5	1.5	4	17	7	7	sw.	S. W. Morris
Glenwood	Mills	1,100	54	28.7	+ 2.1	62	4	-7	23	0.09	- 0.75	0.06	6	T.	2	5	23	3	nw.	Dr. Thos. B. Lacey
Greenfield	Adair	1,368	48	26.4	+ 1.7	56	4	-8	15	0.56	- 0.45	0.56	5-6	T.	2	16	6	9	sw.	Wallace Grounds
Oakland	Pottawattamie	1,100	31	27.4	+ 1.9	62	4	-10	23	0.14	- 0.66	0.14	6	T.	1	20	1	10	sw.	Fred Bussard
Red Oak	Montgomery	1,077	5	25.9	- 0.4	64	4	-13	15	0.67	- 0.33	0.44	5	3.0	3	10	14	7	nw.	Clarence M. Totty
Red Oak 10 SW	Montgomery	1,030	37							0.53	- 0.53	0.34	5-6	3.0	4	20	7	4	s.	B. R. Bridge
Riverton	Fremont	920	18							0.40	- 0.65	0.25	9	3.0	2	19	7	5	sw.	Wm. E. Stubbs
Shenandoah	Page	974	9	27.6	+ 0.8	65	4	-7	15	0.68	- 0.37	0.40	5-6	4.0	5	14	11	6	sw.	Earl E. May Seed Co.
Thurman	Fremont	973	57	28.2	+ 1.6	63	4	-11	15	0.02	- 1.07	0.02	5	0	1	19	9	3	s.	Bernard Porter
Omaha, Nebr.		1,035	79	28.0	+ 1.6	62	4	-5	23	T.	- 0.93	T.	13†	T.	0	10	13	8	s.	U. S. Weather Bureau
Means and extremes				27.1	+ 0.9	65	4	-13	15	0.43	- 0.57	0.58	5-6	1.8	3	15	9	7	sw.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	63	25.1	- 1.0	50	4	-10	15	0.74	- 0.32	0.40	6	3.0	5	20	5	6	nw.	S. R. Brown
Albia	Monroe	949	53	27.4	+ 0.2	59	4	-8	15	0.83	- 0.29	0.62	5-6	2.1	4	15	6	10	nw.	Arthur L. Freed
Centerville 1 1/4 SW	Appanoose	1,013	51	27.3	- 0.4	59	4	-11	15	1.09	- 0.18	0.65	6	6.0	3	14	4	13	w.	E. Grant Everman
Chariton 3 E	Lucas	940	50	26.2	- 0.9	58	4	-13	15	0.84	- 0.21	0.70	5-6	2.0	3	13	8	10	nw.	Ellis Shaw
Creston	Union	1,293	43	25.6	+ 0.4	59	4	-12	15	0.66	- 0.31	0.44	6	3.0	3	18	4	9	sw.	Mrs. Nellie Spangler
Indianola	Warren	972	63	28.2	+ 2.2	57	4	-8	15	0.76	- 0.38	0.69	5-6	1.0	3	14	8	9	s.	Prof. Francis I. Moats
Knoxville	Marion	920	54	28.0	+ 1.3	58	4	-8	15	0.64	- 0.67	0.57	5-6	1.0	3	16	9	6	s.	Mrs. Ella Mae Brobst
Lamoni 3/4 SW	Decatur	1,138	40	25.6	- 0.9	63	4	-10	15	1.14	+ 0.07	0.67	5-6	3.7	5	12	11	8	sw.	Dr. Gustav A. Platz
Millerton	Wayne	1,070	60	26.4	- 0.8	62	4	-12	15	0.97	- 0.24	0.58	6	5.0	3	16	9	6	sw.	J. C. Davis
Mount Ayr	Ringgold	1,209	52	25.8	- 1.0	65	4	-11	15	0.92	- 0.21	0.51	9-10	6.0	4	7	20	4	n.	Mrs. Irene Hood
Osceola	Clarke	1,088	23	26.5	- 0.1	57	4	-9	15†	0.65	- 0.45	0.43	5-6	1.8	4	21	1	9	nw.	Mrs. Irene Davison
Tingley	Ringgold	1,275	20	26.6	+ 0.6	62	4	-11	15	0.81	- 0.29	0.40	6	4.0	4	16	7	8	nw.	Jas. A. Verploegh
Winterset	Madison	1,120	53	28.3	+ 1.8	55	1†	-8	15	0.30	- 0.76	0.20	6	1.5	2	19	4	8	sw.	H. S. Ely
Means and extremes				26.7	+ 0.1	65	4	-13	15	0.80	- 0.32	0.70	5-6	3.1	4	16	7	8	nw.	
<i>Southeast District</i>																				
Bloomfield 2 1/4 N	Davis	825	20	26.4	- 1.1	58	4	-9	15	1.13	- 0.22	0.68	6	5.0	3	14	6	11	nw.	Mrs. Leo Foster
Burlington 8 S	Des Moines	697	53	26.4	- 2.6	59	4	-6	15	0.45	- 1.18	0.26	5-6	2.5	4	14	4	13	nw.	U. S. Weather Bureau
Columbus Jct.	Louisa	595	53	26.8	0.0	58	5	-8	15†	0.44	- 0.92	0.40	6	1.4	2	17	6	8	sw.	Miss Musa Todd
Fairfield 1 N	Jefferson	780	78	26.6	+ 0.2	58	4	-8	15	1.30	- 0.12	0.83	13-14	3.5	6	15	3	13	sw.	Prof. R. M. McKenzie
Keokuk	Lee	574	73	28.4	- 1.2	58	4†	-7	15	0.94	- 0.51	0.51	9-10	5.7	6	12	9	10	nw.	U. S. Weather Bureau
Keosauqua 1 1/2 SW	Van Buren	712	57	28.4	+ 0.9	58	4	-7	15	0.54	- 0.88	0.26	6	5.0	3	16	2	13	nw.	Harry J. Schlotfeldt
Mt. Pleasant 2 SE	Henry	722	68	27.4	- 0.5	59	4	-8	15	0.50	- 0.93	0.35	6	2.3	3	18	2	11	s.	Raymond A. Hughes
Oskaloosa 1 1/4 S	Mahaska	813	68	26.4	- 0.1	59	4	-11	15	0.84	- 0.46	0.71	6	1.5	3	14	5	12	nw.	Clifford Bergstresser
Ottumwa 1 W	Wapello	649	49	28.8	+ 1.6	61	4	-7	15†	0.95	- 0.31	0.74	6	2.3	3	18	6	7	nw.	C. L. Mikesch
Sigourney	Keokuk	730	49	27.4	+ 1.4	58	4	-7	15	0.81	- 0.48	0.72	6	1.2	3	15	7	9	w.	J. Geo. Sanderson
Stockport 1 1/4 SW	Van Buren	747	43	26.6	- 0.4	58	4	-8	16	0.43	- 0.93	0.30	6	2.5	4	11	8	12	nw.	C. L. Beswick
Washington	Washington	762	69	27.5	+ 1.4	57	4	-8	15	0.61	- 0.76	0.51	6	1.0	2	16	4	11	n.	Clarence M. Logan
Means and extremes				27.3	0.0	61	4	-11	15	0.68	- 0.69	0.74	6	2.8	4	15	5	11	nw.	
State means and extremes				26.2	+ 1.9	65	4	-13	14†	0.52	- 0.66	1.37	5-6	1.1	2	17	7	7	sw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals







DAILY PRECIPITATION FOR DECEMBER, 1943—Continued

Table with columns: Stations, Drainage Basin, Day of Month (1-31), Totals. Rows include Southeast District (Continued) stations like Donnellson, Eddyville, Fairfield, Keokuk, Keokuk LD 19, Keosauqua, Mt. Pleasant, Ottumwa, Ottumwa (river), Sigourney, Stockport, Wapello, Washington.

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

- 1 Precipitation is for 24-hour period midnight to midnight.
2 Precipitation measured in the morning; amount then recorded is for the preceding 24 hours.
T. Precipitation is less than 0.005 inch rain or melted snow.
§ Interpolated
† Station is equipped with recording gage.
\* Precipitation included in next following measurement. \*\*Incomplete.

SUPPLEMENTAL TABLE, DECEMBER, 1943

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, years, Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall, With precipitation .01 inch or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind.

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, DECEMBER, 1943

Table with columns: Stations, Sea-level pressure, extremes—inches (Highest, Date, Lowest, Date), Wind† (Average hourly velocity, Maximum velocity, Direction, Date), Relative Humidity (12:30 A. M., 6:30 A. M., 12:30 P. M., 6:30 P. M., Percentage of sunshine), Degree Days.

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.
\*Sioux City §Dubuque ||Burlington †And other dates.

SOIL TEMPERATURES AT AMES, IOWA, DECEMBER, 1943

Table with columns: Temperature, 4 feet above ground, At Depth in Soil of— (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Rows include Average 7 a. m., Average 12 noon, Average 7 p. m., Highest Date, Lowest Date, Number of days with temperature.

† And other dates.
\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.
Diurnal changes at 24 inches and deeper amount to less than 2°.
Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

northern Missouri. The heaviest Iowa fall was 6 inches at Mt. Ayr. The snow cover had an important bearing on weather conditions during the remainder of the month and resulted in relatively low temperature readings in the southern counties due to nocturnal radiation from the snow surface. The effects of the snow cover may be judged from the fact that the monthly average temperature was below normal along the Missouri border and ranged up to over 6° above normal in the extreme northwest where no measurable snow fell.

On the 12th an outbreak of Continental Arctic air moved southward rapidly and caused temperature readings to fall below normal generally for the first time during the month. This was followed within 24 hours by a second wave of Arctic air on the 13th, which caused a further drop in temperature and brought light snow ranging from flurries to an inch and one-half to nearly all sections of the State. The cold was severe and subzero readings occurred on the next three mornings. At many points the lowest readings of the month occurred on the

Handwritten notes: 49, 49, 1149

15th. Most streams froze over on the 14th or 15th. Continental Polar warm air replaced the Arctic mass on the 17th-18th and temperatures again rose to above normal, remaining relatively high until the 21st.

Temperatures again fell to normal levels on the 21st as cold Continental Polar air pushed southward and was followed by an outbreak of Arctic air. On the 23d the peak of the high pressure area was located over Iowa, and the highest barometer readings of the month were recorded. At some points the temperature fell even lower than on the 15th, and zero readings were general. The cold weather was of short duration and warm Continental Polar air caused relatively high temperature readings from Christmas until the end of the month.

During the last 4 days of the month the air mass over Iowa was very stable, with little temperature change between the surface and 7500 feet. The moisture content of the mass was low, with most of it concentrated in the lower iso-thermal layer. This condition resulted in the formation of dense ground fog in some sections, especially in the southeast, probably because of nocturnal radiation. The fog prevented the sun's rays from warming the air in contact with the ground, and daytime maximum temperatures were held below the freezing point, while at places only a short distance away readings of 40° or higher were recorded. The minute fog droplets formed a deposit of rime on wires, trees and some buildings, and gave a heavy coating of frost to the earth's surface, presenting a beautiful picture that persisted during most of the day. Similar conditions also were reported on other dates in various parts of the State, but the occurrence at the close of the month was the most general and persistent.

S.E.D.

**TEMPERATURE**

The State average temperature, computed from the averages of nine districts of nearly equal area, which in turn were obtained from averages of 120 temperature observing stations, was 26.2°. This was 1.9° higher than the all-time December average. There have been 29 warmer and 41 colder Decembers in the 71-year period of record. The temperature distribution was unusually uniform, ranging from 24.6° in the north central district to 27.3° in the southeast. This southeast district average was exactly normal, while the northwest district average of 25.4°, was 5.2° above normal. The highest station average at a point where the instruments have standard exposure was 28.8° at Ottumwa, and on the Keokuk Dam it was 31.0°. The lowest average was 23.4° at Decorah. The highest observed was 65° at Shenandoah and Mt. Ayr on the 4th; the lowest was -13° at 7 different stations on the 13th, 14th, 15th or 23d. The average number of days with minimum readings of zero or lower was 4, with 32° or lower was 30, and on which the temperature failed to rise above the melting point of ice, 9.

**PRECIPITATION**

The average total precipitation obtained in the same manner as the average temperature, but utilizing measured totals at 122 stations, was 0.52 inch. This was 0.66 inch less than the average of all 71 Decembers of record, and equaled the 7th driest in the period. Less than one-tenth of an inch fell along the Missouri River and over most of the west central, northwest and north central districts. A dozen stations reported only a trace. The heaviest amounts, in excess of an inch, fell in an area from Dubuque and Jackson counties westward to Marshall and Jasper counties and near the south central border. However, only 5 stations reported totals exceeding the normals. The greatest amount was 1.38 inches at Cedar Rapids, of which 1.37 inches fell in a 24-hour period on the 5th-6th. The average number of days with measurable amounts was 2.

**SNOWFALL**

The average total snowfall was 1.1 inches, 4.7 inches below the December normal. This equaled the 1912 average, which is the lowest since snowfall records began in 1892. The heaviest falls occurred over the southern third of the State, with the greatest total of 6.0 inches reported at Centerville and Mt. Ayr. At many points only traces or light flurries occurred, and Anamosa and Thurman reported none. In the greater part of the State where measurable amounts of snow fell, the ground was covered for periods of from 4 to 6 days, but in local areas near the Missouri border, the snow remained for as long as 2 to 3 weeks. In general, the ground was bare at the close of the month except for patches in protected areas on north slopes.

**MISCELLANEOUS PHENOMENA**

*Aurora:* None.

*Fog, light:* 2d, 3d, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 15th, 16th, 17th, 18th, 19th, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.

*Fog, dense:* 6th, 8th, 11th, 16th, 26th, 27th, 28th, 29th, 30th, 31st.

*Glaze:* 26th, 27th.

*Halo, lunar:* 1st, 7th, 9th.

*Halo, solar:* 8th, 9th, 13th, 17th, 19th.

*Parhelia:* 8th, 14th.

*Rime:* 26th, 29th, 30th, 31st.

**ERRATA**

Report for November, 1943. Page 133, Centerville, date of lowest temperature published 16, should be 16†; page 135 Melrose, total precipitation published 1.16, should be 1.11; page 139, Davenport, minimum temperature on 22d published 26, should be 27.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF DECEMBER, 1943

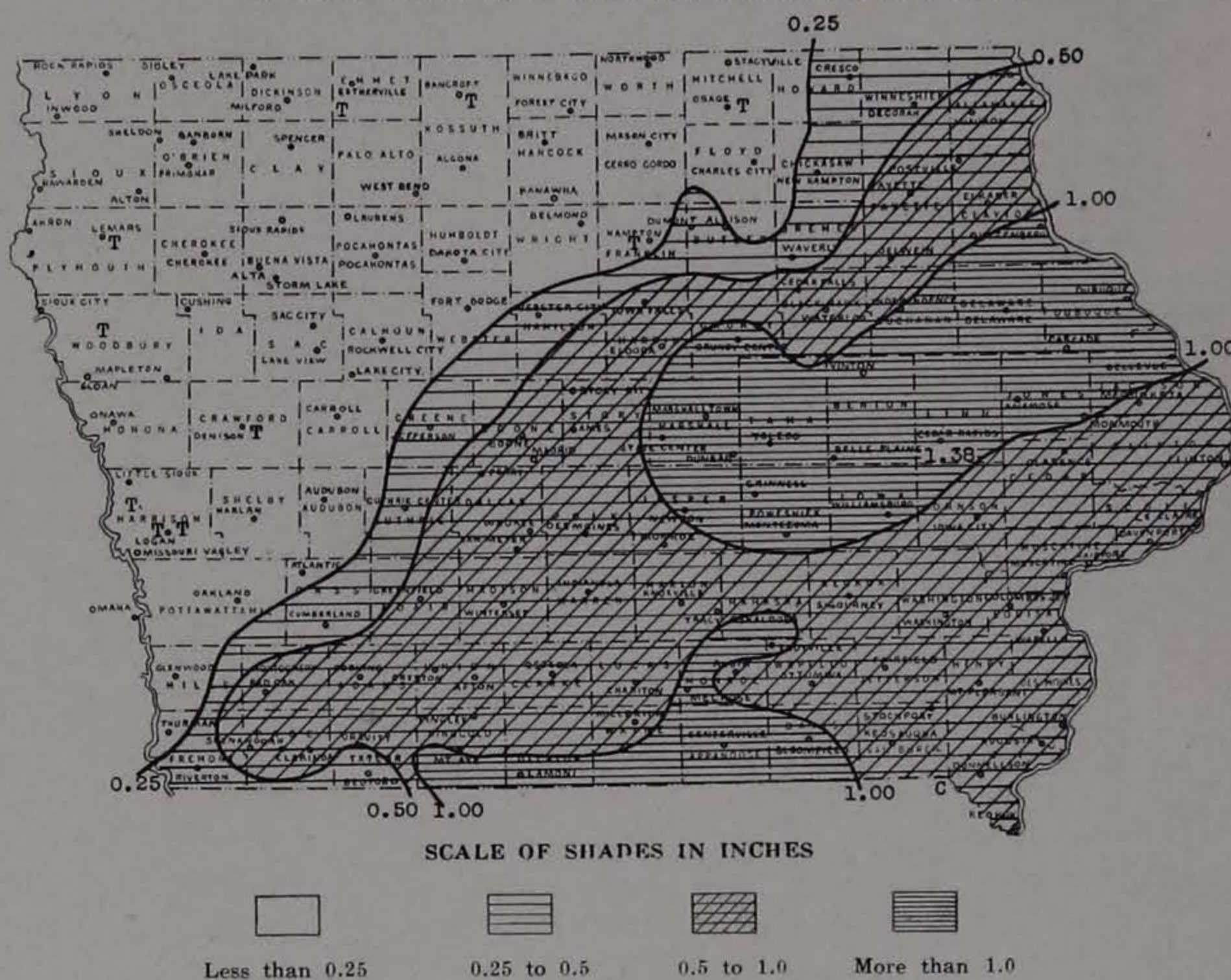
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District (Alta, Alton, Cherokee, Estherville, Hawarden, Lake Park, Le Mars, Pocahontas, Rock Rapids, Sioux Rapids, Spencer), North Central District (Algona, Bancroft, Belmond, Britt, Charles City\*, Dakota City, Mason City, Northwood, Osage), Northeast District (Decorah, Delaware (near), Dubuque\*, Elkader, Fayette, Independence, New Hampton, Waterloo, Waverly), West Central District (Carroll, Denison, Guthrie Center, Harlan, Jefferson, Little Sioux, Logan, Mapleton, Rockwell City, Sac City, Sioux City\*), and Central District (Ames, Boone, Des Moines\*, Fort Dodge, Grinnell).

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF DECEMBER, 1943—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

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. †Interpolated.

TOTAL PRECIPITATION, DECEMBER, 1943



# CLIMATOLOGICAL DATA

11

## IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV      DES MOINES, IOWA, ANNUAL, 1943      No. 13

### GENERAL SUMMARY

Extreme weather was infrequent or noticeably absent in 1943. The most outstanding temperature features were a rather warm February and rather cold or cool March and September. Temperatures of 100° were almost entirely absent. The average temperature of the year, 47.9° is 0.2° below normal. The summer was both warmer and wetter than usual but without extremes, which favored luxuriant growth of all vegetation. Yields and quality of crops were very good to excellent. Pastures were unusually productive. Frequent rains caused a good deal of trouble in haying and harvesting, particularly with alfalfa.

Belated corn planting caused a threat of frost damage but on November 1, crop reports showed 94% of the corn had matured without frost damage as usual following a June averaging 2° above normal in temperature. This was in spite of the average date of first killing frost in autumn for the State being October 6, a day earlier than normal. The average date of last killing frost in spring was April 28, 5 days earlier than normal, which made the so-called growing season 161 days, or 3 days longer than normal, but because of its late start, corn could not take full advantage of this.

Precipitation was above normal in the growing season, May to August, when it was most needed, and below normal in the colder months when it is somewhat of a nuisance. June was the wettest month, with an average of 6.16 inches, which is 1.49 inches, or 32% above normal. December was the driest month, with an average of 0.52 inch, which is 0.66 inch, or 44% of normal. The greatest accumulated depth of snow on the ground was 33.0 inches at Elkader, January 19-21.

Evaporation at four stations, April to October, averaged 39.746 inches, which is 0.714 inch less than 1942. The greatest was 43.700 inches at Clarinda, and the least was 34.323 inches at Iowa City.

Early estimates, based on the experience of insurance companies, indicate that hail loss to crops was 43% greater than in 1942, which was reported by assessors as \$4,184,133. It thus seems likely that the hail loss of 1943 is approximately \$6,000,000, which is about the fourth largest in 21 years of record. Windstorm and tornado damage was greater than usual.

### SYNOPSIS BY MONTHS

Mild weather prevailed the first half of January but a severe cold wave swept over the State on the 16th, followed by rather decided fluctuations between warmer and colder the rest of the month. While the average precipitation for the State was less than the long-time average, there were a good many northern and northeastern counties in which precipitation was above normal due to heavier snows than usual, particularly in the extreme northeast counties. At Dubuque the total of 25.7 inches of snowfall has been exceeded in only two other months since records have been kept. One of these was 32.0 inches in December, 1887, and the other was 34.3 inches in January, 1929. The greatest accumulated depth of snow on the ground at any time was 33.0 inches at Elkader. In about the northern two-thirds of the State the snow cover was continuous throughout the month. The rather general snow of the 18th-19th was badly drifted; highway traffic was halted in places, and trains and busses were late. Many rural and some city schools were closed due to the blizzard, the cold, and the shortage of fuel. Two persons were frozen to death. Heating requirements were 8% greater than the all-time average.

February was generally mild except a rather cold period with zero temperatures 10th-16th. Temperatures averaged 5.1 degrees above normal and heating requirements 91% of normal. Precipitation was evenly distributed over the State but deficient everywhere except slight excesses at State Center and Melrose. Snowfall averaged only 2.9 inches, or 3.8 inches less than the 52-year average. Only five Februarys had less snow. Ice began breaking up in the Des Moines River and its tributaries from just above Des Moines to below Ottumwa on the night of February 2. Ice gorges formed below Tracey and Eddyville causing serious overflows. Highway 137 leading from Eddyville to Albia was overflowed. The gorges held so the water worked its way slowly through and averted a flood at Ottumwa.

March, 1943, was the coldest since 1932, and there were two periods of unseasonable cold during which the temperature fell to near record low readings for so late in the season. These were followed by shorter periods of unseasonable warmth, which partially obscured the severity of the late wintry conditions. Twenty per cent more heat was required than normal in March. There were 10 days on which the temperature failed to rise above the freezing point as compared with 8 such days in February. The number of days with zero or lower was 4 in both months. This was one of the snowier Marches of record. The average snowfall was 9.8 inches, 4.4 inches above the March normal, and 6.7 inches more than the average of the preceding month of February. Despite the heavy snow, and some excessively heavy rain and thunderstorms on the 15th, the precipitation averaged slightly below normal. There were some hailstorms and tornadoes in connection with the thunderstorms on the 15th. Much less than the usual amount of field work was done in March. A little corn husking was done during the abnormally warm last three days

### MONTHLY STATE DATA FOR 1943

Month	Barometric pressure inches (sea level)				Temperature degrees, F.				Relative humidity, per cent				Precipitation, inches				Average number of days			Average sunshine		Wind			
	Highest	Date	Lowest	Date	Average	Departure from 70-yr. average	Highest	Lowest	12:30 a. m.*	6:30 a. m.*	12:30 p. m.*	6:30 p. m.*	Average	Departure from 70-yr. average	Greatest	Least	Average snowfall	With .01 inch or more precipitation	Clear	Partly cloudy	Cloudy	Per cent of possible	Departure from normal	Average hourly velocity	Prevailing wind direction
January	30.82	19	28.96	15	16.7	- 1.9	54	-31	81	82	71	76	0.79	-0.30	2.54	T.	9.2	8	12	7	12	49	- 2	10.0	nw
February	30.77	14	29.31	9	27.5	+ 5.1	71	-20	78	82	62	67	0.77	-0.31	1.82	0.37	2.9	4	16	8	4	74	+18	10.5	nw
March	30.73	2	29.24	15	31.0	- 3.6	90	-19	74	77	59	61	1.51	-0.21	2.86	0.30	9.8	6	14	9	8	64	+ 6	11.5	nw
April	30.53	3†	29.37	15	49.0	+ 0.2	88	17	67	72	47	50	2.57	-0.13	6.34	0.36	T.	8	13	9	8	64	+ 6	11.4	nw
May	30.53	1	29.31	15	57.5	- 2.7	97	21	77	79	60	60	4.40	+0.36	7.07	1.33	T.	12	9	10	12	48	-14	8.1	nw
June	30.35	30	29.08	2	71.6	+ 2.0	101	37	84	86	65	64	6.16	+1.49	13.70	1.94	0	14	13	10	7	62	- 7	8.9	sw
July	30.30	1	29.64	28	75.4	+ 0.7	98	47	82	85	56	56	4.56	+0.88	10.30	1.33	0	10	17	12	2	78	+ 2	6.8	s
August	30.21	6	29.57	31	74.0	+ 1.8	101	40	85	89	61	66	5.07	+1.47	10.49	0.74	0	10	13	12	6	61	- 9	7.4	se
September	30.54	17	29.51	5	60.3	- 3.6	94	27	80	85	53	61	2.18	-1.62	5.04	0.34	0	7	15	9	6	64	+ 1	7.8	se
October	30.55	4†	29.38	13	51.6	- 0.1	87	15	76	83	49	56	1.66	-0.70	4.59	0.32	T.	5	19	4	8	67	+ 8	7.7	nw
November	30.77	23	29.51	8	33.8	- 2.5	72	1	82	85	63	70	1.01	-0.59	2.05	0.32	3.1	4	12	8	10	48	- 2	8.3	nw
December	30.75	23	29.64	7†	26.2	+ 1.9	65	-13	76	79	58	65	0.52	-0.66	1.38	T.	1.1	2	17	7	7	65	+20	9.1	sw
YEAR	30.82	Jan. 19	28.96	Jan. 15	47.9	- 0.2	101	-31	78	82	59	63	31.20	-0.32	13.70	T.	26.1	90	170	105	90	62	- 2	9.0	nw
Averages and records	31.09	Jan. 25 1905	28.68	Jan. 3 1906	48.1		118	-47			80	59	31.52		19.80	0.00	29.9	84	172	97	96	64		8.6	nw

\*Normal central time    †And other dates



of the month, and some fields cleared of cornstalks. Some oats were seeded in the extreme southern counties.

April averaged warmer than normal in the western and colder than normal in the eastern portions of the State. Wind movement was greater than usual in this normally windiest month of the year. During the rather warm first 10 days of the month field work, such as seeding of oats, flax and barley, got a good start, and more than the usual amount of early potatoes were planted in the southwest counties. Spring plowing and disking of fall plowing made good progress during this warm period till showers came in the central and eastern sections on the 7th. From the 11th to the 20th the weather was generally cold, and abnormally cold on the 13th and 14th, with hard freezes. The last killing frosts of spring were scattered through the last half of April and early May, with the average on April 28, though very little frost actually occurred on that average date. Buds and blossoms, peaches, apricots, plums and possibly pears, were seriously injured by frequent frosts and freezes, particularly in the southern counties, and conditions were not very favorable for pollination of cherries and later fruits that came into bloom in May. Farm work made pretty good progress in the warmer and drier western portions of the State, but was much retarded by too much rain in the south-eastern and some central counties. During the second decade, oats, barley and flax seedings were delayed by cold, windy weather, and there was some damage by freezing of germinating oats that were just up. Floods along the Missouri River from heavy March snows in the Dakotas inundated thousands of acres of Iowa farm land and caused considerable loss and inconvenience in cities and towns. The estimated losses in Iowa from this flood were: Buildings, fences, highways, bridges, railroads, etc., \$1,490,081; matured crops in bins, barns and cribs, \$104,611; prospective crops, \$481,906 (on 41,465 acres); livestock and other movable farm property, \$121,728; supervision of business, including wages of employees, \$31,000; total losses, \$2,229,326. Money value of property saved by flood warnings, \$5,955,000.

May was mostly cold and wet, with only occasional warm days. Heating requirements were almost 50% above normal. Sunshine averaged only 48% of the possible, or 14% below normal. The combination of relatively low temperature, insufficient sunshine, high humidity, and frequent showers, hampered farm activities and all other outdoor operations, especially in the southeast quarter of the State. The soil was cold and wet, which delayed corn planting, and in many cases resulted in uneven germination and irregular stands. Frosts or freezing temperatures occurred on the 1st, 7th, 8th, and at scattered points in the north central area on the 13th and 14th. At some stations there were as many as 14 to 17 consecutive days with at least a trace of precipitation. Destructive tornadoes, wind and hailstorms, occurred on the 5th and 15th. On May 15 only 34% of the corn had been planted, which is about two-thirds of the usual and three days later than usual. At the close of the month about 86% of the corn had been planted, which is 8% below normal, and four days late. In the south central and some southeast counties less than half of the corn was planted. Much of the early planted seed lay ungerminated in the cold, wet soil until it was destroyed by rotting and pests, and in some places up to 30% had to be replanted. Soybean planting got under way in the northwest counties about the middle of the month and was nearing completion in that section near the close of the month, while in the southeast sections the work was just beginning. Cherries, plums and pears were in full bloom at the time of the cold weather on the 12th, 13th and 14th, and some blossoms were killed. Many bees had been winter-killed, and this, with the cold weather, made unfavorable conditions for pollination. Victory Gardens made pretty good progress.

Following the warm period in the closing days of May and the opening days of June, there was a cold week, after which warm weather, with frequent showers, was the rule. Agricultural operations were greatly handicapped till the rains nearly ceased, about the 18th. Though there were rainy periods there were also some sunny days. The warmth and abundant soil moisture brought both crops and weeds on rapidly. Conditions were much more favorable in the northern than the southern portion of the State. In the southwest counties rains were generally in excess of normal, particularly in Page, Taylor and portions of Fremont counties. While corn averaged knee-high at the close of June in most northern counties, and had received two or three cultivations in much of the southern half of the State, the weeds were brought under control with difficulty, and the stand was noticeably poor. Soybean planting was mostly finished at the close of the third week except in the wetter southern counties. Alfalfa haying was delayed about a month beyond the usual date, and little was accomplished till the last 10 days of June. This resulted in the first cutting being coarse and stemmy but yielding a rather high tonnage. New seedings of grasses and clover made excellent growth, and pastures were luxuriant. Oats, barley and winter wheat made slow growth until the warm weather began at the middle of June. Thereafter the crops were rushed too fast but the change to cooler at the close of June and early July was favorable.

July averaged warmer than normal in all portions of Iowa except the extreme northeast corner and the vicinity of Monroe, and it was wet-

ter than normal except the southwest, south central, east central and a few northeast counties. It is quite unusual for July to average both warmer and wetter than normal. There were no prolonged periods of excessive heat, and no temperature of 100 degrees or higher for the first time in 14 years. In spite of frequent showers, sunshine was slightly above, and daytime cloudiness slightly below normal. Tornadoes and damaging storms of wind, hail and flooding rains were more numerous and destructive than usual. Harvesting of oats made fair progress although heavy dews, high humidity and frequent showers, hampered combining and much of the grain was shocked until it was sufficiently dry to thresh. There was some damage to shocked grain by storms and mildew. Nevertheless, the yield was good and the quality fair. The yield of flax seed was very good and has been exceeded only in 1941. Haying was done with difficulty between showers, yet the quality of the second cutting of alfalfa was better than the first cutting. All other crops except fruits produced well, except where damaged by storms. The absence of excessively high temperatures during the corn pollination period, the latter half of July, favored the production of a large crop.

The unusual combination of warmth and moisture continued through most of August. August temperature averaged about normal at every station, and precipitation was above normal over most of the State except from the west central counties eastward over a narrow belt from Cherokee County to the Mississippi River and in a few other localities. Conditions were ideal for producing a record crop of corn and soybeans. Storm damage, particularly by rain and floods, was very destructive in some areas. A rainfall of several inches in a few hours occurred during the night of August 2-3, and the early morning of the 3d, from Keokuk County to the Mississippi River. The heaviest rain probably exceeded 12 inches in the vicinity of Olds though no official rain gage is exposed in that area. On the night of the 11th-12th heavy downpours of rain caused considerable flood damage in Sac, Calhoun, Greene, Dallas, Carroll, Guthrie, and the northeast part of Crawford counties. Though temperatures averaged 1.8 degrees higher than the long-time normal, there were no excessively hot periods, and no 100-degree temperatures except at Shenandoah and Thurman on the 25th.

In sharp contrast to the three preceding months, September was unusually cool and dry. All of the first five days and the last four days had temperatures averaging above normal. Between these periods the weather was continuously and abnormally cool, but in spite of this adverse condition the corn crop continued to mature satisfactorily at about the normal rate, probably because the crop had received its quota of accumulated degrees of effective temperature during the three preceding months. Killing frosts were recorded in some areas, especially in the northwest, as early as September 17, and there were a number of killing frosts in small overlapping areas during the rest of September, with the most widespread frost probably on the 20th. By the end of the month killing frost or freezing temperature had been reported from about two-fifths of all the reporting stations, mostly in the northern and western counties. By the 12th, 54% of the corn crop was safe from moderate frost, a week later 70%, one week later 82%, and on October 1, 87%. Soybeans made slower progress than corn but at the close of the month about 65% were safe from frost. Cutting of beans for hay began during the second week. Frosts killed most of the leaves in the northern third, and during the warm, closing days of the month the entire crop rushed to maturity. Sweet corn canning came to an end about the middle of the month. The cool weather slowed tomato canning, but in considerable areas frosts only killed the leaves of tomatoes and left a large crop of undamaged and partly ripened fruit on the vines, and this fruit ripened in the Indian Summer weather that followed in October, so that the canning plants packed a lot of late crop tomatoes. A more favorable summer for crop production than 1943 can scarcely be imagined. Because of this favorable weather and the increased acreage, the corn crop exceeded all previous figures for total production. This was in contrast to the damaging heat and drouth of the eastern and southern States.

During much of October, Iowa weather conditions were of the type that has come to be known as "Indian Summer," and were almost ideal for maturing and harvesting the enormous record-breaking corn crop. There was an increase of 6% in the maturity of the corn crop during October, bringing the final figure on November 1 to 94% matured without frost damage. The month was also favorable for soybean harvest and for most other agricultural and outdoor activities. However, the corn had a rather high moisture content as shown by tests on October 10, which delayed active husking. Generally dry and sunny weather was favorable, but the earlier frosts did not kill the stalks of the corn, and these continued to pump moisture into the cobs so that the ears of corn were more than normally moist throughout the month. Not until the first general freeze on October 16 was this condition remedied. The average date of first killing frost in autumn was October 6, though little or no frost actually occurred on that date. From the average date of last killing frost in the spring, April 28, to the average date of first killing frost, October 6, was a growing period of 161 days, which is three more than the normal.

November averaged cool and dry and with conditions generally favor-

able for harvesting the large crops of corn and soybeans, except a blizzard that hit the extreme western and northern counties on the 6th-7th. A foot of snow was reported over a considerable area and up to 16 inches at Lake Park. Banks of snow 3 feet deep were drifted into the north and west sides of the cornfields and into the low spots so that husking machines and combines could not be generally used, and hand husking went very slow because of the shortage of labor. Some of this corn and some of the beans in the northwest counties were still in the fields toward the close of December, though the percentage of the total crop in these areas was small. Several thousand turkeys were killed in the snowstorm of the 6th-7th. Heating requirements of the month averaged 16% above normal.

December was warm and dry in contrast with 1942. Its 44% of normal precipitation was the fourth consecutive month with subnormal precipitation. The deficiency was most pronounced in the western and northern counties. The average snowfall, 1.1 inches, equals the least December snowfall of record in 42 years. Sunshine was the greatest for December since 1912. Most streams froze over on December 14th or 15th. Ice 12 inches thick, of good quality, was harvested in the northern sections toward the close of December. The month was favorable for outdoor operations, such as harvesting scattered fields of late corn, combining soybeans, and hauling hemp to the mills. More rain through the fall months would have hastened the "retting" of the hemp, which is a new crop for Iowa, though some was raised in the vicinity of Osage in 1925. There was much ground fog during the nights and early forenoons toward the end of December.

**SUMMARY OF AIR AND SOIL TEMPERATURES  
AT AMES, IOWA, 6 YEARS, 1938-1943**

	4 ft. above ground	At depth in soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Annual average temperature, 7 a.m., noon, and 7 p.m.	49.2	51.7	51.5	51.4	51.5	51.0	52.0
Highest observed temperature	102	106	95	82	75	68	65
Mean date of highest temperature	July 22	July 18	July 19	July 19	Aug. 5	Aug. 18	Aug. 29
Average of highest temperatures	99	102	92	81	74	67	64
Extreme variation of highest temperatures	8	10	5	3	3	2	1
Lowest observed temperature	-25	-4	7	20	29	35	39
Mean date of lowest temperature	Jan. 28	Jan. 31	Feb. 2	Feb. 3	Feb. 14	Feb. 27	Mar. 14
Average of lowest temperatures	-15	1	13	23	32	36	40
Extreme variation of lowest temperatures	20	7	11	8	5	3	3
Extreme variation highest to lowest temperature	127	110	88	62	46	33	26
Average range highest to lowest temperature	*114	101	79	58	42	31	24

\*Average annual range of air temperature for 49 years, 118°; absolute range 146°, from 109° July 24, 1901, to -37° January 25, 1894.

The rate and amount of penetration of temperature extremes into the soil depends upon several factors, such as air temperature, sunshine, available moisture at or near the surface for evaporation, snow cover and vegetative cover, and tith. In this series of observations the ground was kept bare of vegetation because a bare surface is easier to keep in uniform condition while a surface covered with vegetation is bound to vary considerably in the amount it retards both solar and terrestrial radiation. When not frozen, the surface 2 inches of soil were kept loose and tilled with a garden rake.

No effort was made to keep snow cover uniform. A snow cover of only 0.1 inch shows a noticeable effect on the soil temperature. Immediately following a rain, the temperature of the upper 6 inches of soil follows the wet bulb air temperature more closely than it does the dry bulb, due to the evaporation.

The average annual air temperature 4 feet above the ground at Ames in the 6 years, 1938-1943, based on observations at 7 a.m., noon, and 7 p.m., was 49.2°, while the average for the same period based on the daily maximum and the daily minimum, divided by 2, which is the mean commonly used, was 49.1°. The soil temperature was higher at all depths down to 72 inches but the 6-year averages were 2.8° higher at that depth and only 1.8° higher at 48 inches, which was the coolest of the 6 depths. There seemed to be a distinct tendency to higher temperature with increasing depth at 72 inches, and probably this increase continues indefinitely toward the center of the earth at the rate of about 1° for each 60 feet as given in some textbooks.

In the spring the soil near the surface warms faster and reaches a higher temperature than the air 4 feet above it. The average date of maximum temperature in the air was July 22, while the average date of maximum temperature 1 inch deep in the soil was 4 days earlier, on July 18. The average of the highest observed temperatures in the air was 99°, while 1 inch deep in the soil the average was 102°. The maximum temperature averages to penetrate from the 1 inch depth to the 6 inch depth in 1 day; from 1 to 12 inches the same; from 1 to 24 inches in 17 days; from 1 to 48 inches in 20 days, and from 1 to 72 inches in 42 days, or an average date of August 29. The winter average minimum of -15° in the air is reached on the average date of January 28. It penetrates the first inch of soil on an average of 3 days later, or January 31, at a temperature of 1° above zero; to 6 inches in 5 days at 13°; to

**COMPARATIVE DATA FOR THE STATE—ANNUAL**

Year	Temperature				Precipitation in Inches				
	Average Annual	Highest	Date	Lowest	Date	Average Annual	Greatest annual	Least annual	Average snowfall
1873	46.1	102	August 31	-38		33.92	41.04	23.34	
1874	47.7	101	July 5	-24	January 24	30.76	39.76	25.43	
1875	43.3	97	July 16	-31	January 14	35.83	48.42	28.55	
1876	45.9	96	August 24	-28	December 9	36.65	53.57	19.92	
1877	48.4	100		-31	January 8	35.16	49.82	22.52	
1878	50.0	104		-13	January 6	34.53	42.08	20.92	
1879	48.0	102		-35	December 25	28.23	46.71	16.49	
1880	47.9	104		-25	December 27	30.95	51.10	14.90	
1881	47.5	104		-40	January 9	44.16	56.81	34.02	
1882	48.4	98		-23	December 7	33.40	50.30	17.71	
1883	44.8	100		-38		34.54	46.15	18.00	
1884	46.0	96		-38	January 5	35.59	46.60	23.35	
1885	44.7	102	July 30	-42	January 28	32.23	44.89	17.91	
1886	46.4	103	July 13	-34	February 4	24.71	35.48	15.55	
1887	46.6	105	July 29	-34	January 7	26.31	38.61	12.30	
1888	45.3	110	August 2	-43	January 15	31.44	41.17	20.00	
1889	48.0	104	August 30	-28	February 23	24.95	37.61	13.66	
1890	47.5	110	July 13†	-27	January 22	29.48	45.45	16.54	
1891	47.3	106	August 9	-31	February 4	32.90	49.05	23.48	
1892	46.6	104	July 11	-38	January 19	36.58	48.77	24.78	34.2
1893	45.7	102	July 13†	-36	January 14	27.59	33.27	19.10	37.2
1894	49.7	109	July 26	-37	January 25	21.94	29.81	15.65	19.2
1895	47.2	104	May 28	-33	February 1	26.77	35.25	18.57	26.0
1896	48.6	104	July 3	-20	January 4	37.23	51.60	28.68	22.6
1897	47.8	106	July 23†	-30	January 25	26.08	36.18	20.21	38.8
1898	47.7	103	August 20	-25	December 31	31.34	55.47	19.51	40.3
1899	47.3	104	Sept. 6	-40	February 11	28.68	42.06	21.79	23.4
1900	49.3	103	August 3	-27	February 15	35.05	47.33	25.05	25.8
1901	49.0	113	July 22	-31	December 15	24.41	37.69	16.35	38.5
1902	47.7	98	July 30	-31	January 27	43.82	58.80	20.14	28.0
1903	47.2	101	August 24	-27	December 13	35.39	50.53	26.41	19.4
1904	46.3	100	July 17	-32	January 27	28.51	38.93	19.34	29.2
1905	47.2	104	August 11	-41	February 2†	36.56	52.26	24.66	38.3
1906	48.4	102	July 21	-32	February 10	31.60	44.34	20.63	32.8
1907	47.4	102	July 5	-31	February 5	31.61	43.00	19.93	24.0
1908	49.4	101	August 3	-18	January 29	35.09	49.98	24.11	22.7
1909	47.4	103	August 15†	-26	February 15†	40.01	53.48	37.20	49.0
1910	48.6	108	July 16	-35	January 7	19.89	27.99	12.11	23.4
1911	49.5	111	July 3†	-35	January 3	31.37	46.77	19.74	35.3
1912	46.3	104	Sept. 8	-47	January 12	28.65	33.13	15.25	38.0
1913	49.7	108	July 16†	-25	January 8	29.95	45.18	20.31	25.4
1914	49.1	109	July 12	-31	December 26	31.93	44.11	23.30	27.5
1915	47.8	99	May 14	-32	January 28	39.53	51.15	27.29	31.3
1916	47.2	106	August 4	-34	January 13	28.90	46.34	22.48	29.5
1917	44.8	106	July 30	-40	December 29	27.81	36.00	20.78	31.6
1918	49.2	113	August 4	-36	February 4	32.78	47.53	25.03	33.6
1919	48.6	104	July 30†	-36	December 10	36.76	48.16	26.88	26.6
1920	48.2	102	July 23	-26	January 4†	31.75	44.00	20.95	21.7
1921	52.2	104	July 11†	-22	December 25	32.03	46.47	20.44	20.7
1922	50.2	104	June 23	-29	January 6	29.98	44.20	19.08	13.5
1923	49.0	102	July 22†	-23	February 3†	29.50	37.47	21.36	36.3
1924	46.4	100	August 21†	-36	January 5	31.39	43.85	19.41	37.2
1925	48.8	105	July 1†	-25	December 29	28.24	45.53	13.77	29.2
1926	48.3	109	July 19†	-22	January 28	33.07	48.36	22.35	27.8
1927	48.8	102	July 11	-27	January 15	29.35	47.54	18.75	17.9
1928	49.4	100	August 1	-20	January 2	35.96	47.81	24.67	22.5
1929	46.4	102	August 22	-35	February 20	30.20	44.24	20.57	41.8
1930	50.2	113	August 3†	-37	January 22	26.10	35.65	16.15	23.6
1931	53.2	109	July 28	-15	January 21	35.37	49.23	18.20	23.7
1932	48.2	106	July 27	-27	December 16	32.28	48.17	22.67	38.5
1933	50.8	109	June 10	-31	February 8	24.94	35.70	17.28	18.4
1934	51.5	118	July 20	-25	February 27	26.85	37.47	16.77	27.2
1935	48.6	107	July 28	-30	January 23	33.16	52.73	20.79	24.0
1936	48.6	117	July 25	-35	February 16	26.00	33.97	13.83	48.9
1937	47.5	108	June 24†	-30	January 10†	27.60	36.13	17.86	35.8
1938	51.2	107	July 11	-25	January 10	36.29	47.63	25.60	24.9
1939	51.1	113	July 12	-23	February 11	25.16	35.92	14.56	34.1
1940	47.9	110	July 25	-32	December 3	30.66	43.38	20.78	46.4
1941	51.1	106	July 24†	-18	February 19	36.84	49.61	24.00	31.9
1942	48.9	105	July 17	-36	January 4	32.63	46.16	19.28	32.3
1943	47.9	101	June 27†	-31	January 19	31.20	46.45	16.40	26.1
Period	48.1	118	July 20, 1934	-47	January 12, 1912	31.52	58.80	12.11	29.9

†And other dates.

12 inches in 6 days at 23°; to 24 inches in 17 days at 32°; to 48 inches in 30 days at 36°; and to 72 inches in 45 days at 40°. The average annual range in temperature varied from 114° in the air to 24° at a depth of 72 inches. Fitting a curve to the lower line of figures in the above table and extrapolating the curve, it appears that there was no appreciable range or change in temperature at a depth of 17 feet, and that with the extreme range in air temperature in the 49 years of record, of 146° from 109° to -37°, it would appear that the sun's heat does not penetrate below 20 or 21 feet or that the internal heat of the earth becomes dominant at that depth. Some textbooks place this at 30 to 40 feet.

Line 8 of the table indicates that on the average a minimum temperature of 32° is reached at a depth of 24 inches on an average date of February 14. This is not likely to be the average date, depth and degree at which the soil is frozen. Laboratory tests show that the freezing point of most soils is 24°F. See Journal of Agricultural Research, Vol. 20; No. 4, November 15, 1920, p. 267. A slight agitation of the soil at this temperature will cause it to freeze. This would indicate the average freezing of the soil at Ames in this 6-year period, at a depth of about 13 inches on February 4.

CLIMATOLOGICAL DATA FOR YEAR 1943

STATIONS	COUNTIES	Elevation, feet	Temperature, in Degrees Fahrenheit						Precipitation, in Inches						Number of Days				Prevailing direction of wind	
			Length of record, years	Average	Highest	Date	Lowest	Date	Length of record, years	Total	Greatest Monthly	Month	Least Monthly	Month	Total snowfall (unmelted)	Precipitation .01 in. or more	Clear	Partly cloudy		Cloudy
<b>Northwest District</b>																				
Akron	Plymouth	1,153						17	18.57	5.57	June	0.01	Dec.	25.1	73	190	79	96	s	
Alta	Buena Vista	1,513	53	46.8				54	32.12											
Alton	Sioux	1,305	38	47.1	96	June 26	-25	Jan. 19	39	23.06	6.61	June	0.05	Dec.	35.7	85	117	181	67	
Cherokee 1 1/2 nw	Cherokee	1,358	22	46.4	95	June 26	-22	Jan. 19	24	25.44	8.59	June	0.06	Dec.	30.8	88	175	122	68	
Estherville	Emmet	1,298	49	44.8	94	June 20	-24	Jan. 19	50	35.00	10.16	June	0.05	Dec.	44.6	102	138	102	125	
<b>Hawarden</b>																				
Inwood 2 1/2 sw	Sioux	1,191	6	48.2	100	June 26	-24	Jan. 19	17	20.27	5.90	July	0.01	Dec.	19.5	81	169	67	129	
Lake Park	Lyon	1,474	40	46.2	98	June 26	-27	Jan. 19	41	27.68	8.91	June	0.02	Dec.	28.2	73	203	92	70	
Le Mars	Dickinson	1,479	30	44.8	92	June 20	-25	Jan. 19	32	34.70	10.18	June	0.05	Dec.	49.1	79	175	72	118	
Pocahontas	Plymouth	1,230	49	47.8	98	June 25	-24	Jan. 19	57	21.67	6.11	June	T.	Dec.	28.0	65	174	109	82	
Pocahontas	Pocahontas	1,228	40	45.9	96	June 21	-24	Jan. 19	40	24.57	6.75	June	0.07	Dec.	24.0	75	111	135	119	
<b>Rock Rapids</b>																				
Sanborn	Lyon	1,341	44	45.7	95	June 26	-31	Jan. 19	47	32.12	10.17	June	0.02	Dec.	35.6	70	130	131	104	
Sheldon	O'Brien	1,552	30	45.1	95	June 26	-26	Jan. 19	31	32.19	7.29	July	0.02	Dec.	36.2	84	140	118	107	
Sibley	O'Brien	1,448	30	45.3	93	June 20	-27	Jan. 19	38	28.40	7.95	June	0.02	Dec.	35.2	97	179	111	75	
Sioux Rapids	O'Connell	1,494	9	44.4	93	June 26	-30	Jan. 19	9	28.53	8.93	June	0.03	Dec.	33.9	81	192	80	93	
Sioux Rapids	Buena Vista	1,275	2	46.6	98	June 21	-23	Jan. 19	2	27.55	7.68	June	0.05	Dec.	29.9	85	196	88	81	
<b>Spencer</b>																				
Spirit Lake	Clay	1,319	29	46.1	96	June 26	-25	Jan. 19	36	31.60	8.92	June	0.07	Dec.	43.3	87	170	110	85	
Storm Lake 1 1/2 n	Dickinson	1,455	44	46.2	95	June 21	-21	Jan. 19	54	35.96	9.23	June	0.09	Dec.	46.8	85	166	93	106	
West Bend	Buena Vista	1,455	44	46.2	95	June 21	-21	Jan. 19	54	30.68	7.31	June	0.06	Dec.	27.3	85	159	115	91	
West Bend	Palo Alto	1,197	49	45.6	95	June 21	-26	Jan. 19	57	24.55	5.21	May	0.08	Dec.	32.5	85	166	114	85	
<b>North Central District</b>																				
Algona	Kossuth	1,200	70	45.7	95	June 21	-22	Jan. 19	83	29.64	6.28	Aug.	0.10	Dec.	33.1	94	182	96	87	
Allison	Butler	1,060	29	46.0	95	June 21	-24	Jan. 19	30	30.10	5.96	June	0.20	Dec.	38.0	77	195	89	81	
Bancroft	Kossuth	1,200	1	44.7	97	June 21	-27	Jan. 19	1	30.00	7.13	July	T.	Dec.	36.2	81	209	77	79	
Belmond	Wright	1,175	34	45.1	97	June 26	-26	Jan. 19	35	31.15	7.30	Aug.	0.02	Dec.	25.1	84	148	128	89	
Britt	Hancock	1,240	46	45.2	97	June 21	-25	Jan. 19	59	28.62	7.41	July	0.04	Dec.	32.5	71	156	100	109	
<b>Charles City</b>																				
Dakota City	Floyd	1,013	53	44.7	95	June 27	-24	Jan. 19	69	26.30	5.77	Aug.	0.21	Dec.	45.8	101	156	83	126	
Dumont 3 1/4 nw	Humboldt	1,133	52	46.1	95	June 21	-21	Jan. 19	60	27.18	8.22	June	0.05	Dec.	30.4	82	172	103	90	
Forest City	Butler	998						9	24.88	4.60	Aug.	0.29	Dec.	38.2	86	129	158	78		
Hampton 3 nw	Winneshiek	1,289	50	44.6	96	June 21	-25	Jan. 19	54	32.59	7.72	Aug.	0.06	Dec.	40.2	108	136	100	129	
Hampton 3 nw	Franklin	1,142	42	45.6	97	June 27	-24	Jan. 19	53	30.04	4.91	May	T.	Dec.	39.5					
<b>Mason City 3 n</b>																				
Northwood	Cerro Gordo	1,148	46	44.1	95	June 21	-26	Jan. 19	52	28.86	7.12	Aug.	0.03	Dec.	39.6	98	175	86	104	
Osage	Worth	1,222	48	43.6	93	June 26	-26	Jan. 19	48	35.63	8.70	Aug.	0.05	Dec.	43.8	109	162	109	94	
Osage	Mitchell	1,170	43	45.0	96	June 21	-25	Jan. 19	59	29.26	7.25	Aug.	T.	Dec.	34.7	80	170	102	93	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875						23	32.81	5.41	June	0.74	Feb.	33.8	108	171	63	131		
Cresco	Howard	1,298	7	44.0				7	29.22	10.10	Aug.	0.30	Dec.	35.3						
Decorah 2 s	Winneshiek	880	50	43.7	95	June 21	-27	Jan. 19	61	30.12	8.28	Aug.	0.49	Dec.	39.0	83	146	149	70	
Delaware 1 1/2 w	Delaware	1,083	43	45.7	94	June 26	-22	Jan. 19	65	27.25	4.02	June	0.45	Feb.	26.0	95	197	87	81	
Dubuque	Dubuque	642	93	47.8	95	June 26	-16	Jan. 20	93	31.92	6.59	Aug.	0.71	Feb.	35.4	114	108	115	142	
<b>Elkader</b>																				
Fayette	Clayton	730	47	45.5	94	June 26	-23	Jan. 20	52	29.00	6.49	Aug.	0.56	Feb.	47.0	84	151	106	108	
Guttenberg	Fayette	1,009	53	45.4	98	June 26	-24	Jan. 19	56	31.59	8.40	Aug.	0.69	Feb.	28.4					
Independence 1 1/2 w	Clayton			48.2	95	June 26	-21	Jan. 20		29.74	6.72	Aug.	0.46	Feb.	24.4	103	152	76	137	
New Hampton	Buchanan	956	80	46.3	95	June 26	-23	Jan. 19	84	32.61	5.48	June	0.80	Feb.	34.7	94	143	113	109	
New Hampton	Chickasaw	1,161	46	44.9	95	June 21	-26	Jan. 19	47	34.72	8.09	Aug.	0.30	Dec.	32.7	76	164	89	112	
<b>Oelwein</b>																				
Postville 5 sw	Fayette	1,036	21	45.3	98	July 13	-24	Jan. 19	21	35.93	7.85	Aug.	0.80	Nov.	38.2	71	203	63	99	
Waterloo	Clayton	1,130	53	44.4	92	June 21	-23	Jan. 19	53	35.06	9.60	Aug.	0.41	Feb.	37.8	96	162	123	80	
Waukon	Black Hawk	848	58	46.8	99	June 21	-22	Jan. 19	62	31.58	5.77	June	0.69	Feb.	21.2	100	202	87	76	
Waverly 1 w	Allamakee	1,287	9	44.0	94	June 21	-24	Jan. 19	9	35.39	9.52	Aug.	0.66	Feb.	50.7	96	213	60	92	
Waverly 1 w	Bremer	936	47	45.6	96	June 26	-24	Jan. 19	55	29.81	6.40	July	0.48	Dec.	28.4	107	157	133	75	
<b>West Central District</b>																				
Anthony	Woodbury								22.27	6.32	June	T.	Dec.	14.5	55	204	66	95		
Audubon 2 sw	Audubon	1,297	48	48.3	98	June 26	-21	Jan. 19	51	29.38	5.19	Aug.	0.23	Dec.	21.3	88	128	164	73	
Carroll	Carroll	1,280	54	48.0	97	June 26	-18	Jan. 19	58	29.12	6.32	June	0.02	Dec.	22.7	82	127	117	121	
Cushing 2 1/2 ne	Ida	1,350	10	47.1	97	June 27	-20	Jan. 19	10	24.21	6.83	June	0.04	Dec.	25.1	99	172	96	97	
Denison 2 s	Crawford	1,307	49	47.6	97	June 26	-20	Jan. 19	60	26.23	5.43	July	T.	Dec.	12.5	74	212	84	69	
<b>Guthrie Center</b>																				
Harlan	Guthrie	1,217	48	48.0	94	June 26	-18	Jan. 19	49	28.78	5.70	June	0.23	Jan.	14.6	86	201	71	93	
Jefferson	Shelby	1,210	44	49.0	98	June 26	-21	Jan. 19	52	24.22	5.44	June	0.10	Dec.	13.5	64	216	66	83	
Lake City	Greene	1,055	39	48.0	95	June 26	-18	Jan. 19	52	37.04	7.42	June	0.42	Dec.	24.5	83	183	78	104	
Lake View	Calhoun	1,238	8	47.5	95	June 21	-19	Jan. 19	8	35.47	7.60	Aug.	0.02	Dec.	22.7	96	111	112	142	
Lake View	Sac	1,239						4	36.03	7.33	June	0.02	Dec.	26.8	69	155	107	103		
<b>Little Sioux</b>																				
Logan	Harrison	1,040	39	50.0	99	June 26	-22	Jan. 19	43	23.00	5.68	June	0.03	Dec.	17.5	94	184	142	39	
Mapleton 5 nw	Harrison	1,120	77	49.9	100	June 27	-24	Jan. 19	78	22.65	5.32	June	T.	Dec.	21.9	83	149	184	32	
Missouri Valley	Woodbury	1,225	5	47.7	97	June 26	-23	Jan. 19	5	20.48	5.32	July	0.05	Dec.	12.5	79	199	81	85	
Onawa	Harrison	1,069	3	50.6	98	June 26	-20	Jan. 19	3	23.68	5.85	June	0.01	Dec.	17.0		186	110	69	
Onawa	Monona	1,050	42	49.4	101	June 27	-21	Jan. 19	59	19.68	4.31	Aug.	0.01	Dec.	17.3	78	205	90	70	
<b>Rockwell City</b>																				
Sac City	Calhoun	1,226	47	47.4	97	June 21	-20	Jan. 19	57	28.65	6.63	June	0.04	Dec.	37.9	88	211	75		

CLIMATOLOGICAL DATA FOR YEAR 1943—Continued

Table with columns: STATIONS, COUNTIES, Elevation, feet, Temperature, in Degrees Fahrenheit (Average, Highest, Date, Lowest, Date), Precipitation, in Inches (Total, Greatest Monthly, Month, Least Monthly, Month), Number of Days (Total snowfall, Precipitation .01 in. or more, Clear, Partly cloudy, Cloudy), and Prevailing direction of wind.

†And other dates. §Interpolated. Figures and letters following name of station show distance in miles and direction from post office.

MEAN MONTHLY AND ANNUAL TEMPERATURES WITH DEPARTURES FROM THE NORMAL, FOR 1943

STATIONS	January		February		March		April		May		June		July		August		September		October		November		December		Annual			
	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.		
<b>Northwest District</b>																												
Alta	12.2	-2.6	26.1	+7.6	29.2	-1.7	49.6	+3.1	57.1	-1.8	70.0	+2.1	75.6	+2.8	73.5*	+2.9	59.0*	-4.0	51.3*	+1.9	32.1*	-0.7	25.9*	+5.2	46.8	+1.2		
Alton	12.7	-2.2	27.6	+9.7	29.2	-1.7	49.6	+3.2	57.0	-1.8	70.1	+2.2	74.9	+1.9	73.9	+3.5	59.9	-2.0	51.3	+2.5	32.7	-0.1	26.4	+8.0	47.1	+1.8		
Cherokee	12.6	-2.8	26.6	+8.0	28.5	-2.5	48.0	+1.5	56.4	-2.3	69.3	+1.7	74.3	+2.1	73.2	+3.2	59.6	-2.3	51.2	+2.3	32.0	-0.9	25.6	+5.0	46.4	+1.0		
Estherville	9.2	-3.8	22.4	+5.8	27.2	-2.0	46.4	+1.0	55.1	-2.7	69.0	+1.9	73.8	+1.0	71.2	+1.4	57.3	-4.0	49.5	+1.2	31.0	-1.5	25.0	+4.7	44.8	+0.3		
Hawarden	13.8	-1.7	28.6	+9.6	30.4	-1.0	50.9	+4.3	57.8	-1.2	70.9	+2.9	76.2	+3.4	74.4	+3.8	61.4	-1.2	51.6	+2.4	34.0	+0.8	27.8	+7.3	48.2	+2.5		
<b>Inwood (near)</b>																												
Lake Park	10.0	-3.1	26.0	+9.4	27.9	-2.6	48.0	+1.9	55.8	-2.7	69.4	+1.9	75.2	+2.6	73.4	+2.9	60.0	-2.4	50.7	+2.2	31.8	-0.1	25.8	+6.9	46.2	+1.4		
Le Mars	14.1	-1.9	28.6	+8.9	30.6	-1.4	50.0	+2.9	57.4	-2.1	70.2	+1.8	75.6	+2.7	74.8	+4.1	60.6	-2.0	51.9	+2.3	33.4	-0.4	26.6	+5.1	47.8	+1.7		
Pocahontas	11.4	-3.7	24.4	+5.9	27.6	-3.8	47.6	+1.0	56.5	-2.5	70.4	+2.7	74.2	+1.2	73.2	+2.6	58.9	-3.7	50.6	+0.8	31.0	-2.7	24.6	+3.1	45.9	+0.1		
Primghar	11.8	-1.8	26.8	+9.7	29.2	-0.7	48.0	+2.0	55.5	-3.2	68.9	+1.4	74.4	+2.4	72.3	+2.8	58.6	-2.3	49.6	+1.8	31.8	-0.2	25.2	+5.8	45.7	+1.2		
<b>Rock Rapids</b>																												
Sanborn	10.3	-3.2	25.4	+8.7	28.0	-2.4	48.0	+2.0	55.5	-3.2	68.9	+1.4	74.4	+2.4	72.3	+2.8	58.6	-2.3	49.6	+1.8	31.8	-0.2	25.2	+5.8	45.7	+1.2		
Sheldon	10.4	-2.9	24.8	+7.9	27.2	-2.8	47.6	+1.9	55.5	-2.4	68.6	+1.5	73.6	+1.2	72.2	+2.4	58.1	-3.1	50.0	+1.9	30.9	-0.8	24.2	+5.3	45.3	+0.9		
Sibley	8.8	-3.7	23.2	+7.2	27.3	-2.7	47.2	+1.6	54.4	-2.6	68.0	+2.5	73.0	+2.0	71.4	+2.4	57.4	-2.8	49.0	+0.8	29.9	-2.7	23.8	+4.2	44.4	+0.4		
Sioux Rapids	11.8	-3.3	25.6	+7.0	29.2	-2.6	48.6	+1.9	56.6	-2.7	70.9	+2.6	74.8	+1.2	73.4	+2.2	59.1	-3.7	50.8	+2.0	32.3	-0.7	25.6	+4.3	46.6	+0.7		
<b>Spencer</b>																												
Storm Lake	10.9	-2.7	24.4	+7.0	28.4	-2.5	48.1	+1.5	56.2	-2.9	70.7	+2.6	75.2	+1.6	73.0	+1.7	59.1	-3.3	50.5	+1.5	31.6	-1.2	24.8	+4.6	46.1	+0.7		
West Bend	12.6	-2.9	25.8	+6.2	27.4	-4.0	47.8	+0.9	56.2	-3.1	69.9	+1.7	74.4	+1.1	72.3	+1.1	58.9	-3.9	51.3	+1.8	32.2	-1.3	26.2	+5.2	46.2	+0.2		
<b>North Central District</b>																												
Algona	10.8	-4.1	23.4	+5.2	27.9	-3.5	47.4	+0.2	56.1	-3.5	69.9	+1.8	74.4	+1.2	72.0	+1.6	58.8	-3.3	51.2	+1.5	31.6	-2.0	25.3	+4.0	45.7	-0.1		
Allison	12.4	-2.6	22.5	+4.1	27.6	-3.9	46.6	-0.4	55.9	-2.5	71.5	+4.5	75.4	+2.9	72.6	+2.7	59.4	-2.4	50.4	+1.0	32.2	-1.4	25.4	+3.8	46.0	+0.5		
Bancroft	9.6	-3.2	21.8	+4.9	27.3	-2.7	47.8	+1.1	55.5	-3.4	69.7	+1.9	72.3	+0.1	70.8	+1.0	57.4	-3.8	49.6	+0.8	29.8	-2.6	24.2	+4.2	44.7	-0.2		
Belmond	12.6	-1.6	22.0	+4.4	26.5	-4.8	46.4	+0.2	55.4	-3.2	70.2	+2.7	74.0	+0.6	71.9	+1.3	58.0	-4.5	49.6	+0.1	30.6	-2.7	24.2	+3.4	45.1	-0.4		
Britt	10.6	-4.0	22.0	+4.4	27.0	-4.3	46.7	+0.2	56.2	-2.2	69.8	+2.8	74.4	+1.8	72.0	+1.9	58.0	-3.9	50.2	+1.0	30.8	-2.2	24.4	+3.7	45.2	0.0		
<b>Charles City</b>																												
Dakota City	11.8	-1.9	20.5	+3.4	25.4	-5.3	45.9	-0.5	55.7	-2.1	70.2	+3.7	73.8	+1.5	71.3	+2.2	57.6	-3.4	48.8	+0.2	31.2	-1.8	24.2	+3.8	44.7	0.0		
Forest City	12.8	-2.5	24.3	+5.4	28.4	-3.8	47.5	-0.2	56.5	-3.1	70.2	+2.1	74.2	+0.4	72.6	+1.8	58.6	-4.6	50.5	+0.4	32.0	-1.9	25.6	+3.7	46.1	-0.2		
Hampton	10.4	-3.8	21.4	+4.4	26.8	-4.1	47.2	+1.0	55.6	-2.2	69.5	+3.1	73.4	+1.2	70.8	+1.2	57.4	-4.2	48.8	+0.7	29.6	-3.2	24.1	+3.7	44.6	+0.1		
Mason City	12.4	-2.5	22.6*	+4.5	27.8	-3.9	46.4	-0.6	56.6	-1.8	70.6	+3.8	74.6	+2.1	71.6*	+1.8	57.6	-4.5	49.6	+0.3	31.6	-2.1	25.4	+4.1	45.6	+0.3		
<b>Northwood</b>																												
Osage	10.6	-2.9	20.2	+3.3	25.6	-4.8	45.4	-0.5	54.9	-2.6	70.0	+3.9	73.0	+1.4	71.0	+2.1	57.0	-3.9	48.0	-0.4	29.8	-3.1	24.0	+3.8	44.1	+0.8		
<b>Northeast District</b>																												
Cresco	9.2	-3.9	19.1	+2.8	24.7	-5.1	44.8	-0.6	54.8	-2.6	68.8	+2.5	72.4	+0.7	70.0	+1.1	56.7	-3.5	49.2	+1.3	30.0	-1.6	23.8	+4.5	43.6	+0.4		
Decorah	12.2	-1.2	21.2	+4.5	26.7	-3.4	46.8	+0.9	55.4	-1.9	69.9	+4.0	73.6	+1.9	71.1	+2.4	57.9	-2.4	49.8	+1.9	31.0	-1.5	24.8	+4.8	45.0	+0.8		
<b>Fayette</b>																												
Guttenberg	11.0	-2.2	19.6	+3.1	24.6	-5.2	44.8	-1.1	57.0	-0.2	70.7	+4.7	73.1	+1.6	70.4	+1.6	56.4	-4.0	47.6	+0.1	29.7*	-3.9	23.6*	+4.0	44.0	-0.2		
Delaware (nr)	11.0	-3.6	20.4	+2.8	25.6	-5.1	44.4	-1.7	54.6	-3.5	70.0	+2.8	71.8	-0.2	70.3	+1.3	56.0	-5.1	46.4	-2.2	30.2	-4.0	23.4	+2.6	43.7	-1.3		
Dubuque	13.4	-3.6	22.0	+1.2	28.4	-4.4	46.0	-1.7	56.6	-2.7	70.6	+2.8	74.8	+2.1	72.4	+2.1	58.2	-4.7	49.7	-0.2	31.8	-3.9	24.4	+1.5	45.7	-0.9		
Elkader	16.8	-2.3	24.8	+2.6	30.6	-3.4	47.8	-0.8	57.6	-2.7	72.1	+2.7	76.6	+2.5	74.0	+2.3	60.2	-3.8	51.8	-0.1	34.3	-2.7	27.0	+2.3	47.8	-0.3		
<b>Fayette</b>																												
Independence	13.6	-3.5	22.1	+1.3	28.6	-4.0	45.4	-2.4	56.2	-3.2	70.6	+2.7	72.9	+0.2	71.6	+1.0	58.7	-4.3	49.3	-1.3	32.5	-3.2	24.8	+1.5	45.5	-1.3		
New Hampton	12.2	-3.8	21.6	+2.5	27.6	-4.1	45.5	-1.4	57.3	-1.3	73.4	+6.0	73.9	+1.2	71.2*	+1.2	57.8	-4.7	48.7	-1.1	31.2	-2.9	24.0	+2.3	45.4	-0.4		
Oelwein	16.2	-1.1	24.5	+3.5	30.4	-1.8	48.4	+1.5	58.8	+0.1	73.4	+6.0	77.2	+4.8	74.2	+4.2	60.8	-1.7	52.2	+2.1	34.6	-0.8	27.6	+4.8	48.2	+1.8		
Postville (nr)	14.4	-3.3	23.0	+1.5	29.8	-3.7	47.1	-1.7	57.0	-2.9	71.8	+3.7	74.5	+1.1	72.6	+2.3	58.7	-4.8	49.9	-1.1	32.5	-3.8	24.5	+0.9	46.3	-1.0		
Waukon	12.0	-2.2	21.2	+3.5	26.5	-4.6	45.6	-0.8	56.2	-1.9	70.7	+4.3	74.0	+1.9	71.4	+2.2	58.0	-3.4	48.6	-0.5	30.8	-2.5	24.0	+3.3	44.9	-0.1		
Waverly	12.8	-3.7	21.2	+1.2	27.6	-4.5	44.7	-3.1	56.2	-3.0	70.9	+3.1	74.4	+1.4	71.9	+1.4	58.8	-3.8	49.4	-0.6	31.8	-3.2	23.6	+1.3	45.3	-1.1		
<b>West Central District</b>																												
Audubon (nr)	12.6	-2.7	21.0	+2.9	26.6	-3.9	44.3	-1.4	55.2	-2.1	69.4	+4.0	71.6	+1.4	70.0	+2.4	57.2	-3.4	48.9	0.0	31.2	-2.1	24.5	+3.9	44.4	-0.1		
Carroll	15.4	-1.8	24.2	+3.5	30.6	-3.0	48.0	-0.9	57.4	-3.0	72.0	+2.8	75.0	+1.2	73.0	+1.9	59.9	-4.6	49.6	-1.6	32.4	-3.4	25.4	+2.3	46.8	-0.6		
Cushing (nr)	12.1	-3.5	20.0	+1.5	26.4	-4.5	44.6	-1.9	55.4	-3.6	69.8	+2.8	72.3	-0.2	70.5	+1.5	55.7	-6.3	47.2	-2.3	30.8	-4.2	23.2	+1.8	44.0	-1.6		
Guthrie Cntr.	13.6	-2.0	21.8	+2.9	28.0	-4.4</																						

MEAN MONTHLY AND ANNUAL TEMPERATURES WITH DEPARTURES FROM THE NORMAL, FOR 1943—Continued

STATIONS	January		February		March		April		May		June		July		August		September		October		November		December		Annual			
	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.	Temp.	Dep.		
<b>East Central District</b>																												
Anamosa.....	16.1	- 2.2	24.5	+ 2.2	30.0	- 4.1	46.9	- 1.7	56.0	- 4.1	71.1	+ 2.1	74.6	+ 1.4	73.8	+ 2.3	59.0	- 4.9	50.2	- 0.6	33.1	- 3.5	25.4	+ 1.3	46.7	- 1.0		
Belle Plaine.....	16.8	- 2.3	26.6	+ 3.7	31.5	- 3.1	48.0	- 1.9	57.5	- 3.5	72.1	+ 2.8	75.6	+ 1.6	74.0	+ 2.2	59.6	- 4.9	51.0	- 1.0	34.0	- 3.3	25.9	+ 1.5	47.7	- 0.7		
Bellevue.....	18.4	- 1.2	25.5	+ 2.9	31.0	- 3.7	47.3	- 1.3	57.2	- 3.2	71.8	+ 2.3	74.6	+ 0.5	73.1	+ 2.1	59.4	- 5.0	51.2	- 0.9	34.8	- 2.5	27.4	+ 2.5	47.6	- 0.7		
Cedar Rapids.....	17.3	- 1.7	26.2	+ 3.6	31.6	- 2.8	48.0	- 1.9	57.4	- 3.6	72.0	+ 2.6	75.5	+ 1.5	73.8	+ 2.0	59.7	- 4.8	51.4	- 0.3	34.2	- 2.8	26.4	+ 1.8	47.8	- 0.5		
Clarence.....	16.9	- 2.3	25.2	+ 2.4	30.4	- 4.1	47.0	- 1.6	57.1	- 3.1	71.1	+ 2.0	75.2	+ 1.6	74.0	+ 2.7	60.0	- 4.1	51.8	+ 0.5	34.0	- 2.2	25.5	+ 1.0	47.3	- 0.7		
Clinton.....	20.7	- 0.4	27.0	+ 2.6	33.0	- 3.1	49.4	- 0.5	59.0	- 2.2	74.2	+ 4.0	77.3	+ 2.7	75.2	+ 2.6	61.9	- 3.7	53.4	+ 0.4	35.9	- 2.8	28.9	+ 2.5	49.7	+ 0.2		
Davenport.....	20.4	- 1.4	28.4	+ 3.5	33.6	- 2.5	49.4	- 0.5	59.0	- 2.3	74.0	+ 3.5	78.4	+ 3.1	76.2	+ 3.1	62.8	- 2.8	54.3	+ 0.6	36.4	- 2.6	28.4	+ 1.3	50.1	+ 0.2		
Iowa City.....	18.9	- 1.3	27.6	+ 3.9	32.4	- 3.2	48.8	- 0.6	58.2	- 2.2	72.4	+ 3.3	75.8	+ 2.2	74.0	+ 2.4	60.5	- 4.1	52.4	+ 0.3	35.2	- 2.7	26.7	+ 1.3	48.6	0.0		
Maquoketa.....	.....	.....	.....	.....	.....	.....	.....	.....	57.2	- 2.7	71.6	+ 2.6	74.5	+ 0.6	73.2	+ 2.8	59.2	- 4.7	50.4	- 0.6	33.4	- 3.6	26.3	+ 1.6	.....	.....		
Monmouth.....	17.6	- 1.6	25.3	+ 2.3	30.9	- 3.9	47.0	- 2.4	56.8	- 3.5	71.6	+ 3.1	74.8	+ 1.0	74.0	+ 2.5	60.2	- 4.0	51.8	- 0.1	34.4	- 2.5	26.8	+ 2.6	47.6	- 0.5		
Muscataine.....	20.2	- 1.2	28.4	+ 3.6	33.5	- 3.0	49.1	- 0.6	58.2	- 3.2	73.2	+ 3.0	75.6	+ 1.5	74.5	+ 2.0	61.0	- 4.4	52.3	- 0.5	34.8	- 3.8	26.8	+ 0.5	49.0	- 0.5		
Vinton.....	16.6	- 3.1	25.6	+ 3.1	31.2	- 3.5	48.0	- 2.6	57.2	- 4.4	71.4	+ 1.1	75.4	+ 1.4	73.4	+ 1.6	58.9	- 5.6	51.2	- 1.1	34.6	- 2.9	26.6	+ 2.4	47.5	- 1.1		
Williamsburg.....	18.0	- 2.0	27.4	+ 3.9	32.2	- 3.2	48.2	- 1.4	58.6	- 2.4	72.3	+ 2.8	75.6	+ 1.2	73.6	+ 1.9	60.0	- 4.8	52.6	+ 0.5	35.1	- 2.5	26.2	+ 0.9	48.3	- 0.4		
<b>Southwest District</b>																												
Atlantic.....	19.4	+ 0.4	30.6	+ 7.0	32.2	- 3.1	50.4	+ 0.7	57.5	- 3.4	71.3	+ 1.7	75.1	+ 0.7	74.8	+ 2.2	61.0	- 3.9	51.9	- 0.2	34.7	- 2.8	26.4	+ 1.1	48.8	+ 0.1		
Bedford.....	22.3	+ 0.7	34.0	+ 8.1	35.2	- 2.3	52.6	+ 1.5	59.0	- 2.8	71.8	+ 1.3	76.2	+ 1.0	75.6	+ 2.2	62.3	- 3.2	53.8	+ 0.4	36.6	- 1.9	27.2	+ 0.4	50.6	+ 0.5		
Clarinda.....	21.8	0.0	32.4	+ 6.4	34.5	- 3.5	52.8	+ 1.4	58.9	- 3.1	72.8	+ 2.2	76.8	+ 2.0	75.8	+ 2.5	62.0	- 3.8	52.6	- 0.8	35.4	- 3.3	25.8	- 1.1	50.1	- 0.1		
Clarinda Eros.....	21.4	- 0.2	32.6	+ 6.5	34.1	- 4.0	52.6	+ 1.1	59.0	- 3.1	72.2	+ 1.4	76.4	+ 1.4	76.3	+ 2.8	61.9	- 4.0	53.2	- 0.1	36.0	- 2.5	26.4	- 0.4	50.2	- 0.1		
Corning.....	20.8	+ 0.6	32.3	+ 8.0	33.6	- 2.3	51.4	+ 1.4	58.2	- 2.8	71.6	+ 1.5	76.2	+ 1.6	75.6	+ 2.3	62.0	- 3.3	53.0	+ 0.1	36.0	- 2.2	27.1	+ 1.2	49.8	+ 0.5		
Glenwood.....	21.2	- 0.3	34.0	+ 8.5	34.8	- 2.8	54.0	+ 2.8	59.3	- 2.5	73.4	+ 2.4	77.3	+ 1.8	77.6	+ 4.0	64.4	- 1.5	54.0	+ 0.4	36.8	- 1.6	28.7	+ 2.1	51.3	+ 1.1		
Greenfield.....	19.2	+ 0.1	31.0	+ 7.5	32.0	- 3.2	50.2	+ 0.2	57.4	- 3.0	71.2	+ 1.5	75.2	+ 0.7	74.2	+ 0.8	61.0	- 4.6	52.9	0.0	34.4	- 3.3	26.4	+ 1.7	48.8	- 0.1		
Oakland.....	19.8	- 0.1	31.5	+ 7.1	32.3	- 3.7	51.0	+ 1.2	58.8	- 2.2	73.7	+ 3.8	77.2	+ 2.8	77.6	+ 5.1	62.8	- 2.4	52.9	+ 0.7	35.4	- 1.8	27.4	+ 1.9	50.0	+ 1.0		
Red Oak.....	21.3	+ 0.5	32.4	+ 7.4	33.7	- 3.1	52.7	+ 2.1	58.8	- 2.7	72.2	+ 1.6	76.2	+ 1.5	76.4	+ 3.0	61.4	- 4.2	51.0	- 2.2	35.2	- 3.2	25.9	- 0.4	49.8	+ 0.1		
Shenandoah.....	22.4	+ 0.9	33.8	+ 7.6	35.2	- 2.9	53.7	+ 2.1	60.0	- 2.2	74.3	+ 3.2	77.8	+ 2.5	77.8	+ 4.1	63.4	- 2.6	53.1	- 0.2	36.7	- 2.2	27.6	+ 0.8	51.3	+ 0.9		
Thurman.....	22.2	+ 0.9	34.0	+ 8.1	34.6	- 3.2	53.5	+ 1.6	59.8	- 2.7	73.6	+ 1.8	77.8	+ 2.0	77.9	+ 3.8	63.8	- 2.3	53.5	+ 0.3	36.6	- 1.4	28.2	+ 1.6	51.3	+ 0.9		
Omaha, Nebr.....	19.9	- 1.0	32.4	+ 8.1	33.5	- 2.6	53.4	+ 2.4	58.9	- 3.5	72.8	+ 2.1	78.3	+ 3.1	77.4	+ 4.2	63.6	- 2.1	52.9	- 0.5	35.8	- 2.5	28.0	+ 1.6	50.6	+ 0.8		
<b>South Central District</b>																												
Afton.....	20.5	- 0.3	31.6	+ 6.7	33.2	- 3.3	51.5	+ 0.8	58.4	- 3.2	72.0	+ 1.8	76.0	+ 0.8	74.8	+ 1.5	60.2	- 5.4	52.2	- 1.3	33.8	- 4.5	25.1	- 1.0	49.1	- 0.6		
Albia.....	21.7	0.0	31.4	+ 6.0	34.4	- 3.0	50.5	- 0.1	58.6	- 3.4	72.9	+ 2.6	76.7	+ 1.8	75.4	+ 2.0	61.8	- 4.3	53.6	- 0.2	36.2	- 2.5	27.4	+ 0.2	50.0	- 0.1		
Centerville.....	23.0	- 1.3	32.9	+ 6.9	35.4	- 1.9	51.5	+ 0.7	59.2	- 2.5	73.2	+ 2.8	76.8	+ 1.9	76.0	+ 2.7	62.2	- 3.7	53.0	- 0.9	36.2	- 3.3	27.3	- 0.4	50.6	+ 0.3		
Chariton.....	21.5	+ 0.4	31.2	+ 6.4	33.8	- 2.8	50.4	+ 0.4	58.4	- 2.5	72.8	+ 3.2	75.8	+ 1.6	74.8	+ 1.9	60.6	- 5.2	52.0	- 1.9	34.9	- 4.4	26.2	- 0.9	49.4	- 0.3		
Creston.....	19.8	0.0	30.2	+ 6.3	32.0	- 3.5	49.8	+ 0.1	57.1	- 3.5	71.1	+ 1.8	74.2	+ 0.2	74.0	+ 1.5	60.2	- 4.2	51.9	- 0.3	34.9	- 2.5	25.6	+ 0.4	48.4	- 0.3		
Indianola.....	19.5	- 0.7	28.9	+ 4.8	31.8	- 4.5	49.0	- 1.4	57.2	- 4.1	72.6	+ 2.5	75.6	+ 0.7	73.8	+ 0.8	60.4	- 5.3	53.2	- 0.3	36.4	- 2.2	28.2	+ 2.2	48.9	- 0.6		
Knoxville.....	20.4	- 0.1	30.9	+ 6.6	34.1	- 2.5	50.6	+ 0.2	59.3	- 2.0	73.6	+ 3.5	77.4	+ 2.8	75.5	+ 2.7	62.2	- 3.7	53.4	- 0.3	36.4	- 2.4	28.0	+ 1.3	50.2	+ 0.6		
Lamoni.....	21.3	+ 0.2	31.9	+ 6.7	33.6	- 3.1	51.4	+ 1.0	58.5	- 2.6	72.2	+ 2.3	77.0	+ 2.7	76.0	+ 3.2	62.2	- 3.1	53.8	+ 0.3	36.2	- 2.1	25.6	- 0.9	50.0	+ 0.4		
Millerton.....	20.6	- 1.0	32.0	+ 6.7	34.2	- 2.8	50.6	+ 0.4	58.4	- 2.8	72.0	+ 1.9	76.0	+ 1.4	75.5	+ 2.4	62.0	- 3.9	54.2	+ 0.2	36.1	- 3.0	26.4	- 0.8	49.8	- 0.1		
Mount Ayr.....	21.3	- 0.1	32.4	+ 7.3	33.6	- 3.1	51.4	+ 1.3	58.0	- 3.1	72.2	+ 2.8	76.0	+ 2.3	74.8	+ 2.4	60.8	- 4.2	53.2	+ 0.2	35.4	- 3.0	25.8	- 1.0	49.6	+ 0.2		
Osceola.....	21.0	0.0	31.3	+ 6.5	33.8	- 2.7	50.8	+ 0.4	58.6	- 2.6	72.4	+ 2.6	76.2	+ 1.5	75.7	+ 2.9	60.8	- 4.6	52.2	- 0.8	35.4	- 3.6	26.5	- 0.1	49.6	0.0		
Tingley.....	20.6	- 0.4	31.4	+ 6.7	33.7	- 2.7	50.8	+ 0.4	57.6	- 3.7	70.8	+ 1.5	75.3	+ 1.0	75.0	+ 2.5	61.3	- 3.8	53.5	+ 0.5	36.2	- 2.1	26.6	+ 0.6	49.4	0.0		
Winterset.....	20.8	+ 0.4	31.5	+ 7.1	34.0	- 2.3	50.4	+ 0.4	58.7	- 2.7	72.4	+ 2.3	76.7	+ 1.6	75.4	+ 2.4	62.2	- 3.4	53.5	- 0.2	35.8	- 2.9	28.3	+ 1.8	50.0	+ 0.4		
<b>Southeast District</b>																												
Bloomfield.....	22.2	- 0.3	31.6	+ 5.7	34.0	- 3.5	50.2	- 1.1	59.2	- 3.1	74.6	+ 3.4	78.1	+ 2.7	76.8	+ 2.7	62.2	- 3.6	53.8	- 0.1	35.8	- 3.7	26.4	- 1.1	50.4	- 0.2		
Burlington.....	22.0	- 1.9	29.7	+ 2.1	33.2	- 5.4	49.8	- 2.4	58.6	- 5.0	73.4	+ 1.5	77.2	+ 0.7	75.9	+ 1.6	62.8	- 4.6	54.2	- 0.6	36.2	- 4.1	26.4	- 2.6	50.0	- 1.7		
Columbus Jet.....	20.5	- 1.5	29.5	+ 3.9	33.9	- 3.2	49.3	- 1.0	58.4	- 2.5	72.8	+ 3.1	75.6	+ 1.7	74.3	+ 2.3	60.9	- 4.4	53.0	- 0.5	35.1	- 4.0	26.8	0.0	49.2	- 0.5		
Fairfield.....	22.0	+ 0.8	31.4	+ 6.9	34.6	- 1.9	50.0	0.0	59.5	- 1.8	74.0	+ 4.3	76.8	+ 2.4	75													

MONTHLY AND ANNUAL PRECIPITATION WITH DEPARTURES FROM THE NORMAL, FOR 1943

STATIONS	January		February		March		April		May		June		July		August		September		October		November		December		Annual		
	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	Prec.	Dep.	
<b>Northwest District</b>																											
Akron.....	0.45	-0.10	0.52	-0.28	0.74	-0.41	0.98	-1.22	3.54	-0.06	5.57	+1.57	3.39	-0.21	0.75	-2.25	0.79	-2.21	1.13	-0.57	0.70	-0.50	0.01	-0.74	18.57	-6.98	
Alta.....	0.86	+0.12	0.70	-0.32	1.41	+0.02	2.45	-0.28	4.69	+0.02	9.14	+4.42	4.87	+1.19	3.25	-0.37	2.00*	-1.85	1.65*	-0.41	1.05*	-0.55	0.05*	-0.89	32.12	+1.10	
Alton.....	0.93	+0.25	0.76	-0.05	1.23	+0.04	1.21	-0.97	2.73	-1.36	6.61	+2.80	3.82	+0.44	2.44	-0.98	1.40	-1.77	1.13	-0.51	0.75	-0.43	0.05	-0.73	23.06	-3.27	
Cherokee.....	0.50	+0.06	0.61	+0.02	1.43	+0.51	1.52	-0.82	3.16	-1.08	8.59	+4.71	5.18	+0.73	1.01	-2.03	0.56	-3.52	1.96	+0.14	0.86	-0.36	0.06	-0.58	25.44	-2.22	
Etherville.....	1.15	+0.53	0.52	-0.35	1.43	+0.19	1.10	-1.34	4.78	+0.63	10.16	+5.86	6.50	+2.91	4.80	+1.34	1.56	-2.19	1.57	-0.27	1.38	+0.09	0.05	-0.67	35.00	+6.73	
Hawarden.....	0.43	-0.17	0.57	-0.23	0.94	-0.26	1.17	-1.23	2.77	-0.98	3.75	-0.35	5.90	+2.45	1.94	-1.06	0.41	-2.54	1.72	+0.02	0.66	-0.44	0.01	-0.74	20.27	-5.53	
Inwood (nr).....	0.82	+0.26	0.51	-0.19	1.08	-0.11	1.89	-0.29	2.91	-0.87	8.91	+4.19	3.36	+0.14	3.93	+0.96	0.75	-2.17	2.67	+0.91	0.83	-0.29	0.02	-0.66	27.68	+1.88	
Lake Park.....	1.17	+0.59	0.56	-0.26	1.32	+0.11	0.71	-1.59	6.01	+1.99	10.18	+6.25	4.80	+1.48	4.12	+0.44	2.11	-1.53	2.51	+0.71	1.16	+0.05	0.05	-0.62	34.70	+7.62	
Le Mars.....	0.41	-0.17	0.66	-0.15	0.84	-0.32	1.00	-1.52	3.07	-1.23	6.11	+2.05	5.30	+1.56	0.74	-2.19	1.16	-2.32	1.35	-0.34	1.03	-0.27	T.	-0.71	21.67	-5.61	
Milford.....	0.35		0.40		1.20		0.89		4.40		8.80		4.88		5.50		1.28		2.15		1.01		0.03		30.89		
Pocahontas.....	0.56	-0.14	0.71	-0.23	1.25	-0.21	1.94	-0.71	4.87	+0.75	6.75	+2.22	4.13	+0.77	1.12	-2.65	0.98	-2.95	1.11	-1.19	1.08	-0.44	0.07	-0.85	24.57	-5.63	
Primghar.....	0.92	+0.24	0.73	-0.15	1.51	+0.29							4.51	+1.01													
Rock Rapids.....	0.86	+0.19	0.49	-0.23	1.05	-0.20	0.65	-1.81	3.59	-0.43	10.17	+5.90	3.90	+0.30	5.75	+2.74	2.34	-0.54	2.45	+0.74	0.85	-0.35	0.02	-0.70	32.12	+5.61	
Sanborn.....	1.11	+0.43	0.83	-0.09	1.37	+0.13	0.86	-1.64	3.76	-0.27	7.25	+3.27	7.29	+3.57	4.67	+0.97	1.84	-1.88	1.86	+0.06	1.33	+0.03	0.02	-0.92	32.19	+3.66	
Sheldon.....	0.58	-0.07	0.48	-0.33	1.02	-0.20	0.67	-1.67	2.91	-1.11	7.95	+3.78	5.22	+1.77	4.50	+1.21	2.72	-0.59	1.48	-0.28	0.85	-0.34	0.02	-0.74	28.40	+1.43	
Sibley.....	0.62	-0.02	0.49	-0.31	0.94	-0.31	0.71	-1.63	3.41	-0.59	8.93	+4.68	5.04	+1.68	4.01	+0.51	1.66	-1.87	1.89	+0.15	0.80	-0.35	0.02	-0.68	28.53	+1.26	
Sioux Rapids.....	0.75	+0.05	0.49	-0.41	0.94	-0.36	1.32	-1.38	4.82	+0.37	7.68	+3.43	4.72	+1.32	2.52	-1.08	1.67	-2.13	1.78	-0.07	0.81	-0.59	0.05	-0.85	27.55	+1.70	
Spencer.....	0.94	+0.20	0.62	-0.34	1.56	+0.39	0.91	-1.71	4.67	+0.31	8.92	+5.40	5.31	+2.46	4.08	+0.50	1.18	-2.00	1.68	-0.12	1.66	+0.24	0.07	-0.89	31.60	+3.84	
Spirit Lake.....	1.03		0.85		1.70		1.21		4.66		9.23		6.57		4.50		1.49		2.25		2.38		0.09		35.96		
Storm Lake.....	1.20	+0.53	0.56	-0.32	2.25	+1.00	1.61	-1.09	4.52	+0.40	7.31	+2.74	6.12	+2.71	1.93	-1.58	2.49	-1.26	1.53	-0.38	1.10	-0.33	0.06	-0.71	30.68	+1.71	
West Bend.....	0.72	-0.01	0.75	-0.11	1.07	-0.12	1.13	-1.31	5.21	+1.15	4.52	+0.35	4.83	+1.65	2.84	-0.88	0.75	-2.89	1.26	-0.68	1.39	-0.09	0.08	-0.86	24.55	-3.80	
<b>North Central District</b>																											
Algona.....	0.72	-0.06	0.80	-0.21	1.24	-0.13	0.93	-1.77	3.97	-0.57	5.62	+1.38	5.73	+2.81	6.28	+2.28	1.22	-3.03	1.44	-0.68	1.59	0.00	0.10	-0.83	29.64	-0.81	
Allison.....	1.50	+0.54	0.98	-0.14	2.02	+0.45	2.47	+0.17	3.41	-1.16	5.96	+1.80	3.58	-0.18	5.07	+1.47	2.32	-1.44	1.83	-0.39	0.76	-0.80	0.20	-0.72	30.10	-0.40	
Bancroft.....	0.86	+0.08	1.08	+0.12	1.28	-0.04	0.69	-1.71	3.87	-0.43	6.01	+1.66	7.13	+3.73	5.63	+1.93	1.07	-2.93	1.22	-0.88	1.16	-0.29	T.	-0.85	30.00	+0.39	
Belmond.....	0.76	-0.25	0.72	-0.46	2.19	+0.71	1.01	-1.73	4.19	-0.11	4.24	-0.40	6.82	+2.30	7.30	+3.38	1.97	-2.07	1.43	-0.77	0.50	-1.32	0.02	-1.10	31.15	-1.22	
Britt.....	0.67	-0.01	0.72	-0.06	1.30	+0.09	0.90	-1.46	3.12	-1.48	4.45	+0.05	7.41	+3.97	5.93	+1.93	1.51	-2.48	1.47	-0.71	1.10	-0.45	0.04	-0.73	28.62	-1.34	
Charles City.....	1.14	+0.09	0.70	-0.40	2.32	+0.55	1.31	-1.21	2.45	-1.88	3.87	-0.76	3.52	-0.25	5.77	+2.29	1.84	-1.84	1.91	-0.42	1.26	-0.27	0.21	-1.09	26.30	-5.19	
Dakota City.....	0.60	-0.21	0.66	-0.32	1.29	-0.12	1.57	-0.77	3.69	-0.56	8.22	+3.73	3.17	-0.18	3.61	-0.06	1.27	-2.46	1.57	-0.67	1.48	-0.32	0.05	-0.73	27.18	-2.67	
Dumont (nr).....	0.65	-0.30	0.66	-0.44	1.73	-0.02	1.62	-0.78	2.81	-1.79	4.20	-0.05	3.19	-0.66	4.60	+0.90	2.36	-1.54	1.80	-0.55	0.97	-0.63	0.29	-0.66	24.88	-6.52	
Forest City.....	0.97	+0.03	0.85	-0.19	1.74	+0.33	0.85	-1.39	3.73	-0.66	6.12	+1.72	5.91	+2.56	7.72	+4.16	1.63	-2.11	1.29	-1.05	1.72	+0.09	0.06	-0.84	32.59	+2.65	
Hampton.....	1.22	+0.23	0.73*	-0.40	2.00*	+0.14	2.18	-0.50	4.91	+0.25	4.48*	+0.12	3.11	-1.01	4.90*	+1.14	1.89	-2.53	3.47	+0.89	1.15	-0.73	T.	-1.04	30.04	-3.44	
Kanawha.....	0.66	-0.19	1.03	-0.02	1.54	+0.14	1.37	-1.33	3.13	-1.12	4.71	+0.16	6.33	+2.93	5.01	+1.16	2.76	-1.34									
Mason City.....	0.74	-0.12	0.37	-0.61	2.15	+0.75	1.08	-1.22	3.38	-1.00	3.53	-1.18	5.29	+1.79	7.12	+2.96	2.08	-1.82	1.63	-0.43	1.46	-0.14	0.03	-0.95	28.86	-1.97	
Northwood.....	1.02	-0.03	0.42	-0.85	1.87	+0.07	0.72	-2.00	2.84	-1.88	7.75	+3.03	6.14	+2.68	8.70	+4.78	2.75	-1.47	1.72	-0.73	1.65	-0.32	0.05	-1.17	35.63	+2.11	
Osage.....	1.04	+0.10	0.76	-0.36	1.93	+0.35	0.36	-2.08	3.18	-1.44	5.09	+0.37	5.15	+1.73	7.25	+3.65	1.21	-2.73	2.47	+0.11	0.82	-1.07	T.	-1.15	29.26	-2.52	
<b>Northeast District</b>																											
Cedar Falls.....	1.27	+0.17	0.74	-0.31	1.30	-0.50	2.86	+0.21	4.17	+0.07	5.41	+1.01	5.32	+1.57	4.50	+0.70	2.88	-1.12	2.67	+0.22	0.85	-0.85	0.84	-0.31	32.81	+0.86	
Cresco.....	1.05	+0.07	0.37	-0.78	1.89	+0.09	0.80	-1.80	1.23	-3.31	1.94	-2.06	4.32	+0.62	10.10	+6.20	3.12	-0.93	2.75	+0.30	1.35*	-0.59	0.30*	-0.90	29.22	-3.09	
Decorah.....	0.77	-0.39	0.53	-0.59	2.14	+0.26	0.99	-1.63	3.49	-1.01	3.53	-0.38	3.06	-0.77	8.28	+4.36	3.34	-0.75	2.26	-0.27	1.24	-0.75	0.49	-0.74	30.12	-2.66	
Delaware (nr).....	1.03	+0.21	0.45	-0.41	2.45	+0.71	3.07	+0.38	3.12	-0.94	4.02	-0.26	2.73	-0.78	3.81	+0.17	1.90	-2.40	2.42	-0.16	1.24	-0.64	1.01	-0.13	27.25	-4.25	
Dubuque.....	1.67	+0.37	0.71	-0.67	2.75	+0.72	3.27	+0.42	2.81	-1.41	4.42	+0.11	2.71	-1.23	6.59	+3.35	1.86	-2.15	3.23	+0.75	0.81	-0.89	1.09	-0.35	31.92	-0.98	
Elkader.....	1.54	+0.61	0.56	-0.54	2.05	+0.09	1.21	-1.41	3.02	-1.06	5.72	+1.71	2.88	-1.16	6.49	+3.06	1.56	-2.42	1.76	-0.80	1.29	-0.64	0.92	-0.28	29.00	-2.84	
Fayette.....	1.18	+0.04	0.69	-0.70	1.90	-0.22	1.47	-1.48	3.67	-0.85	5.10	+0.84	2.20	-1.91	8.40*	+4.38	2.07	-2.26	3.09	+0.64	0.95	-1.03	0.87	-0.43	31.59	-2.98	
Guttenberg.....	0.91	-0.14	0.46	-0.74	2.07	+0.09	1.84	-0.81	2.39	-1.66	6.13	+2.13	2.84	-0.91	6.72	+3.22	2.20	-1.70	1.84	-0.66	1.30	-0.50	1.04	-0.16	29.74	-1.84	
Independence.....	1.50	+0.56	0.80	-0.11	1.81	+0.28	3.07	+0.60	4.16	+0.06	5.48	+1.13	3.72	+0.06	4.53	+0.79	3.10	-0.87	2.28	-0.18	1.01	-0.69	1.15	+0.01	32.61	+1.64	
Lansing (riv).....	2.14	+1.10	0.69	-0.49	2.61	+0.80	1																				

MONTHLY AND ANNUAL PRECIPITATION WITH DEPARTURES FROM THE NORMAL, FOR 1943—Continued

Table with columns for STATIONS, months (January-December), and Annual. Each month has Precipitation (Prec.) and Departure (Dep.) values. Stations include Marshalltown, Toledo, East Central District, Southwest District, So. Central District, and Southeast District.

\*Interpolated.



SUPPLEMENTARY PRECIPITATION TABLE

Recording rain gages are maintained at the stations listed in this table by the Hydrologic Service of the Weather Bureau, in cooperation with the U. S. Engineers. Recording gages are also maintained at other stations, as indicated in the footnote to the precipitation table in Monthly Climatological Data.

Table with 16 columns: Station, County, Latitude, Longitude, Jan., Feb., Mar., April, May, June, July, Aug., Sept., Oct., Nov., Dec., Annual. Rows include Mississippi Drainage Basin (Alburnett, Beaver, Cascade, etc.) and Missouri Drainage Basin (Allerton, Denison SCS, Derby, etc.).

\*Interpolated. §May 1 to June 1, inclusive. †June 2 to June 30, inclusive.

DATES OF KILLING FROST, 1943

Charles City, Davenport, Des Moines, Dubuque, Keokuk, excluded from averages because of city influence.

Large table with 12 columns: STATIONS, Last in Spring, First in Autumn, Days in Growing Season. Divided into districts: Northwest, West Central, Southwest, North Central, Central, South Central, Northeast, East Central, Southeast. Includes Rural Average and Normal values for each district.

† Date of last temperature of 32° or lower in the Spring, or first temperature of 32° in the Autumn, (as the case may be).

SOIL TEMPERATURES, AMES, IOWA, 1943

Main table of soil temperatures at depths of 1, 24, 6, 48, 12, and 72 inches, including average, highest, lowest, and number of days with various temperature ranges from Jan. to Dec. and Yearly averages.

§Interpolated.

†And other dates.

\*This is the highest and lowest of all readings at the 12-inch depth at 7 a.m., noon and 7 p.m.; a diurnal maximum about 1° higher than 7 a.m. or 7 p.m. readings probably occurs about midnight but no readings are taken at that hour.

‡Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

AVERAGE AIR TEMPERATURE AND RELATIVE HUMIDITY AT AMES, IOWA, 1943

For Certain Hours, 4 feet Above Ground

Table with 13 columns (Jan-Dec-Year) and 23 rows for temperature and relative humidity at different times of day.

†And other dates.

EVAPORATION (Inches), WIND MOVEMENT (Miles), AVERAGE TEMPERATURE (F.°), AND TOTAL PRECIPITATION (Inches), APRIL TO OCTOBER, 1943, IOWA

Summary table for Ames, Cherokee, Clarinda, and Iowa City, showing monthly and period averages for evaporation, wind movement, temperature, and precipitation.

†Monthly total evaporation includes interpolation for missing days.

### NORMAL ANNUAL PRECIPITATION

Inches

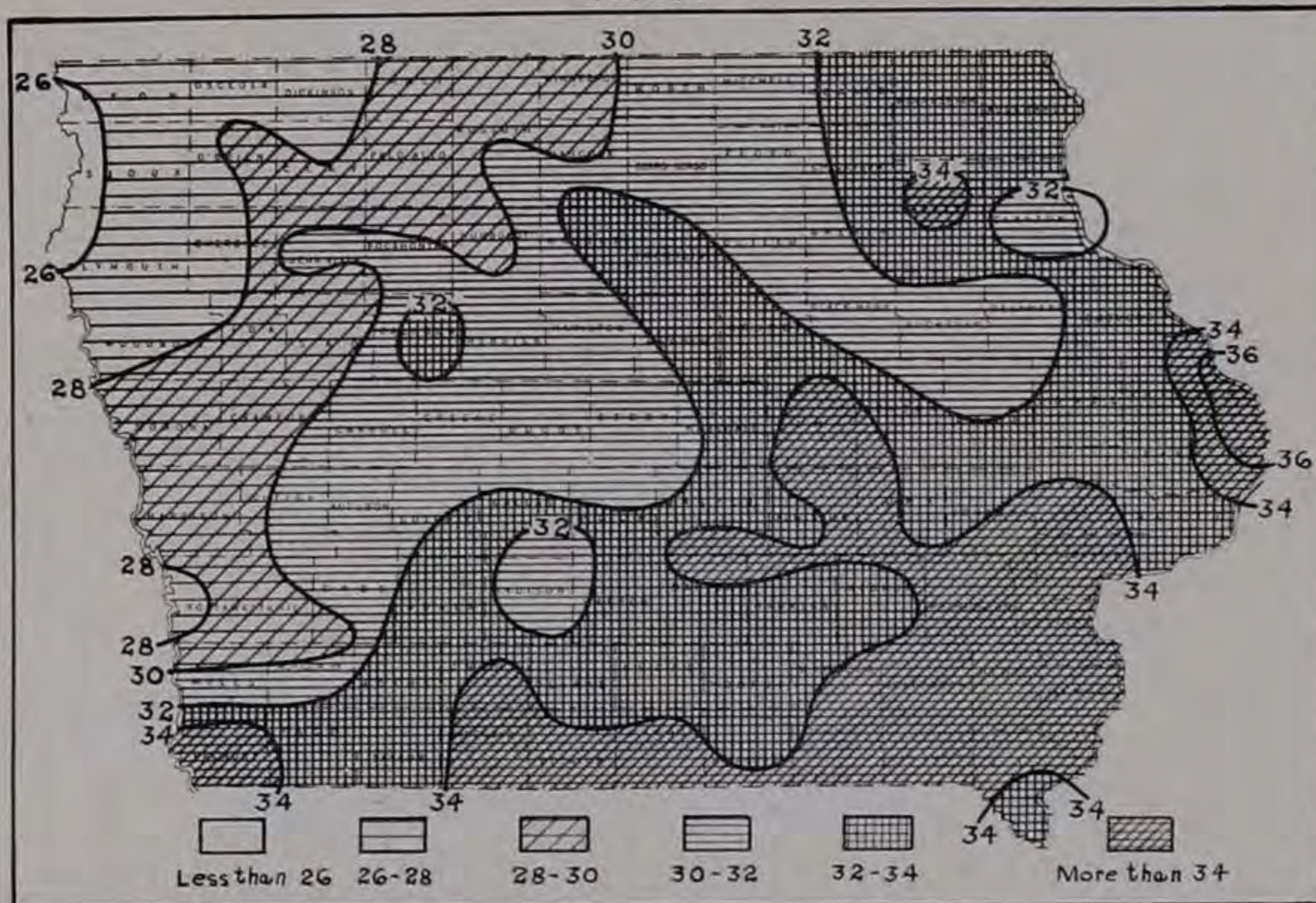


Figure 1—Theoretical normals based on 35 years of record (Brückner cycle), 1898-1932.

### TOTAL PRECIPITATION, YEAR 1943

Inches

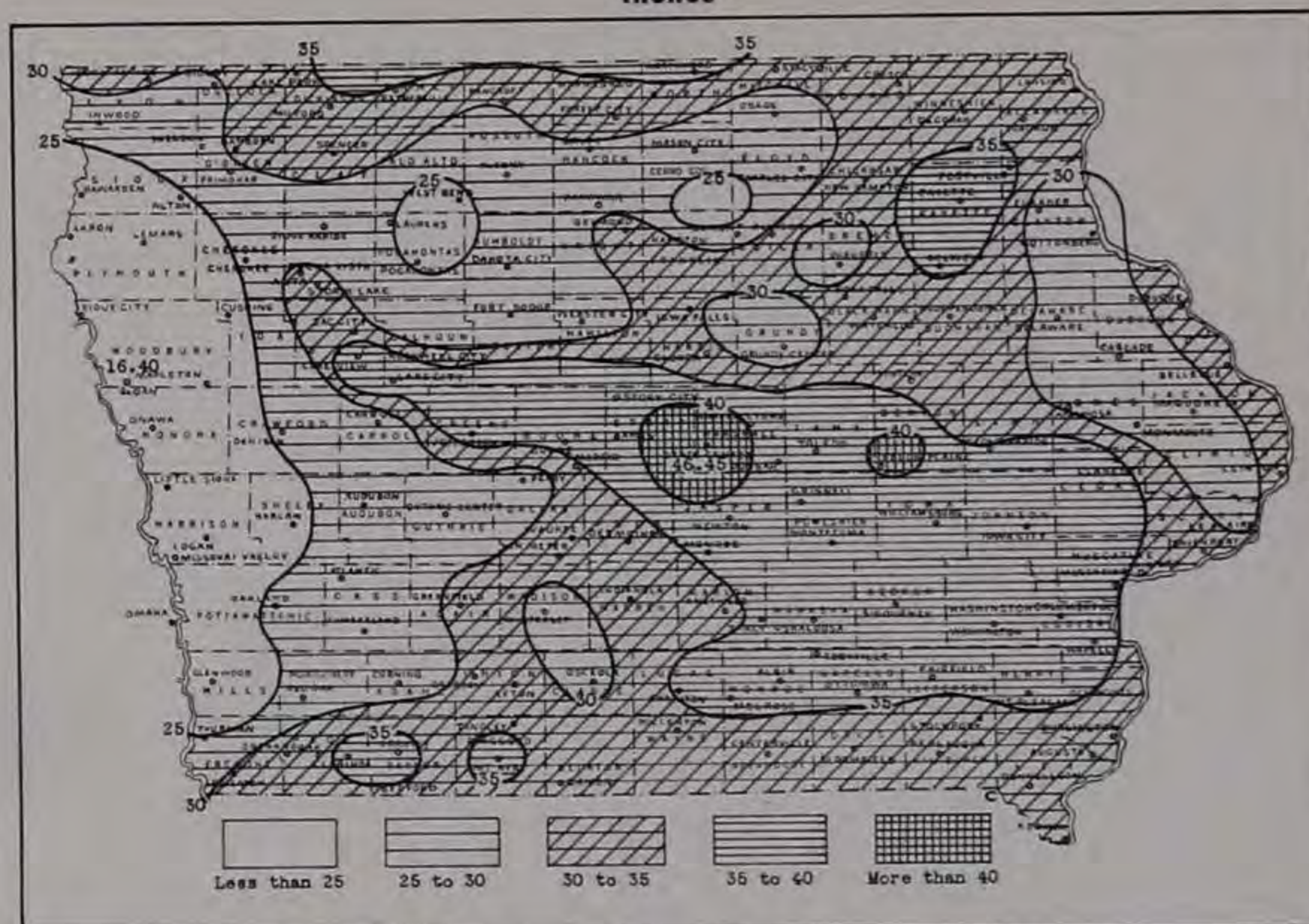


Figure 2.

### NORMAL RAINFALL DURING CROP SEASON

April to September, inclusive

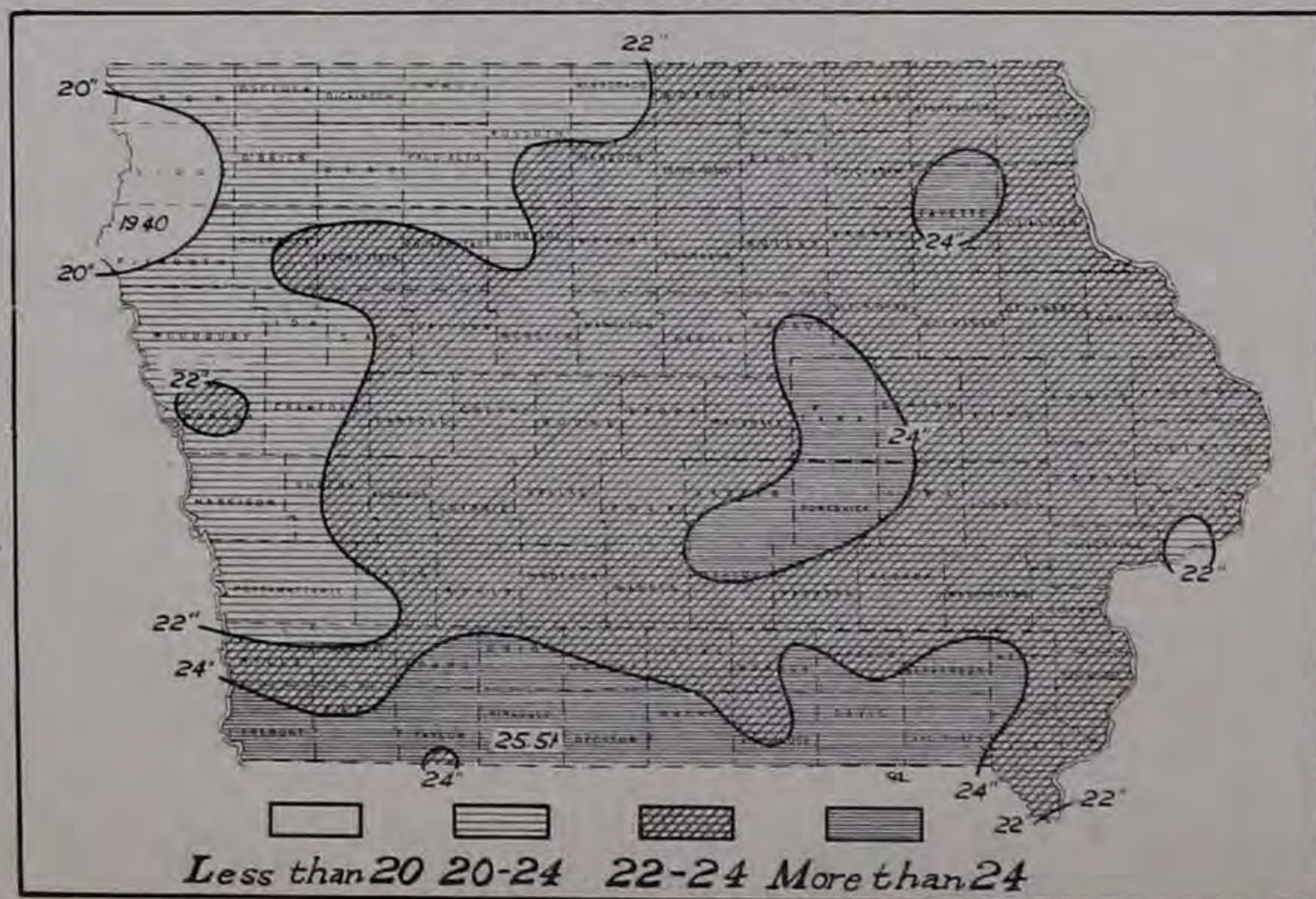


Figure 3—Theoretical normals based on 35 years of record (Brückner cycle), 1898-1932.

### TOTAL RAINFALL DURING CROP SEASON, 1943

April to September, inclusive

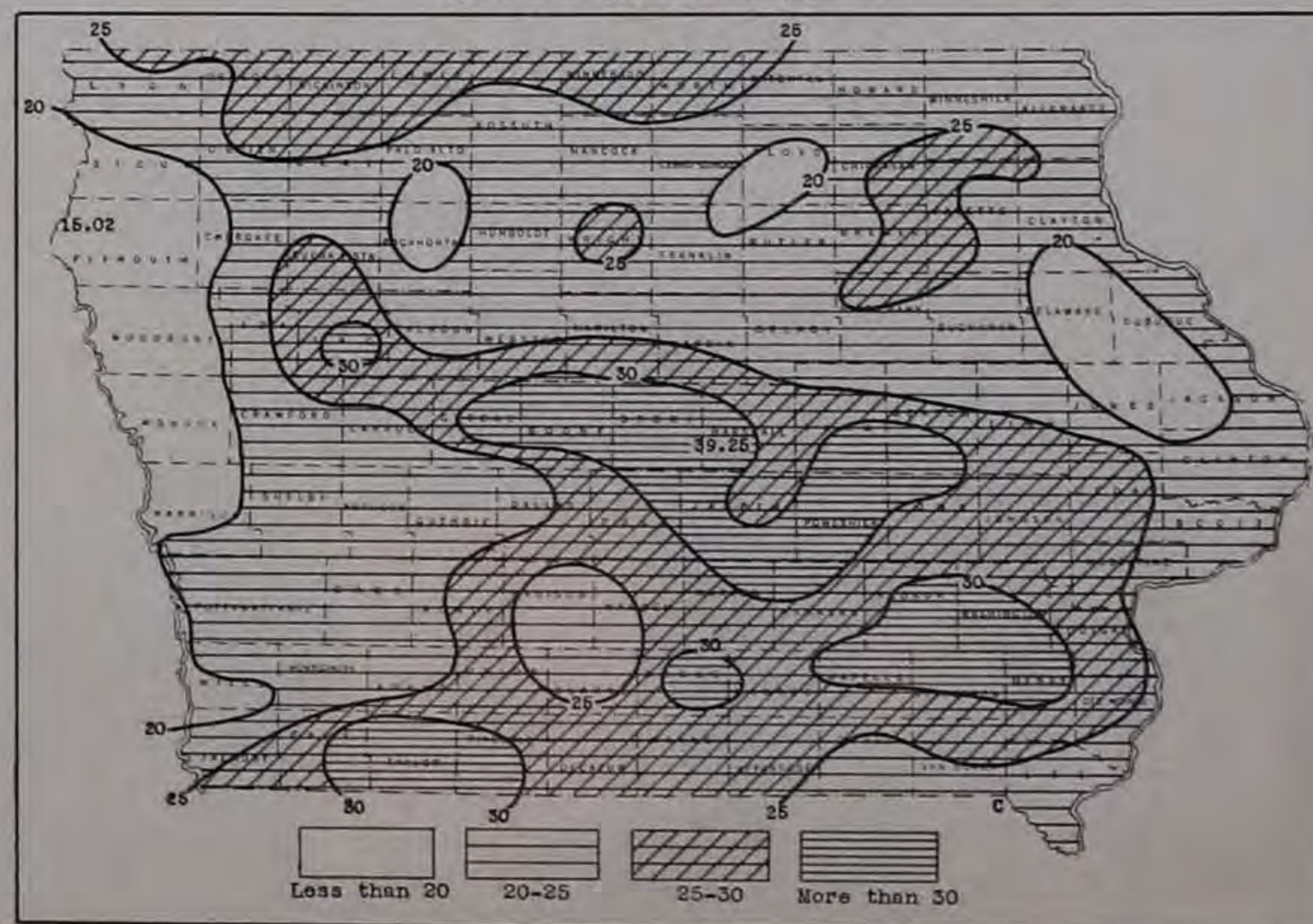


Figure 4.

WARM SEASON PRECIPITATION, 1943
APRIL TO SEPTEMBER, INCLUSIVE

Table with columns: Station, Amount, Station, Amount, Station, Amount. Rows include Northwest District, West Central District, Southwest District, North Central District, East Central District, and South Central District.

MAXIMUM AMOUNTS OF PRECIPITATION IN 1943—Continued

Table with columns: Stations and Dates, Minutes (5, 10, 20, 30, 45, 60, 80, 100, 120, 150, 180). Rows include Dubuque, Sioux City, Omaha, Ames, Alburnett, Clarinda Erosion, Coon Rapids, Dakota City, Hartley, Monona, Ottumwa, and various other stations.

\*Not included in District Average.

MAXIMUM AMOUNTS OF PRECIPITATION IN 1943

For all storms when at some time during the storm rain fell at the excessive rate of 0.01 inch per minute plus 0.20 inches, including all intervals of 5 minutes to 180 minutes, though at some intervals during the storm rain fell at less than the excessive rate.

Table with columns: Stations and Dates, Minutes (5, 10, 20, 30, 45, 60, 80, 100, 120, 150, 180). Rows include Burlington, Charles City, Davenport, Des Moines, and other stations.

\*Estimated. §Unknown, due to hail stopping automatic gage. Figures in black face indicate all previous records broken.

DRIEST PERIODS OF THE YEAR, 1943

Table with columns for STATIONS, precipitation categories (1.00 inch or less, 0.25 inch or less, None or traces), and dates. It lists various Iowa locations and their driest periods during the 1943 crop season.

†And other dates.

MISCELLANEOUS DATA

Table for Northwest, North Central, Northeast, West Central, and Central Districts. Columns include STATIONS, Temperature (Maximum/Minimum), Precipitation (0.1, .25, 1.00 in.), Snow covered ground (Max. Accumulated depth), Date, and Total days 0.1 inch or more.

Table for East Central, Southwest, South Central, and Southeast Districts. Columns include STATIONS, Temperature (Maximum/Minimum), Precipitation (.01, .25, 1.00 in.), Snow covered ground (Max. Accumulated depth), Date, and Total days 0.1 inch or more.

†And other dates.

§Interpolated.

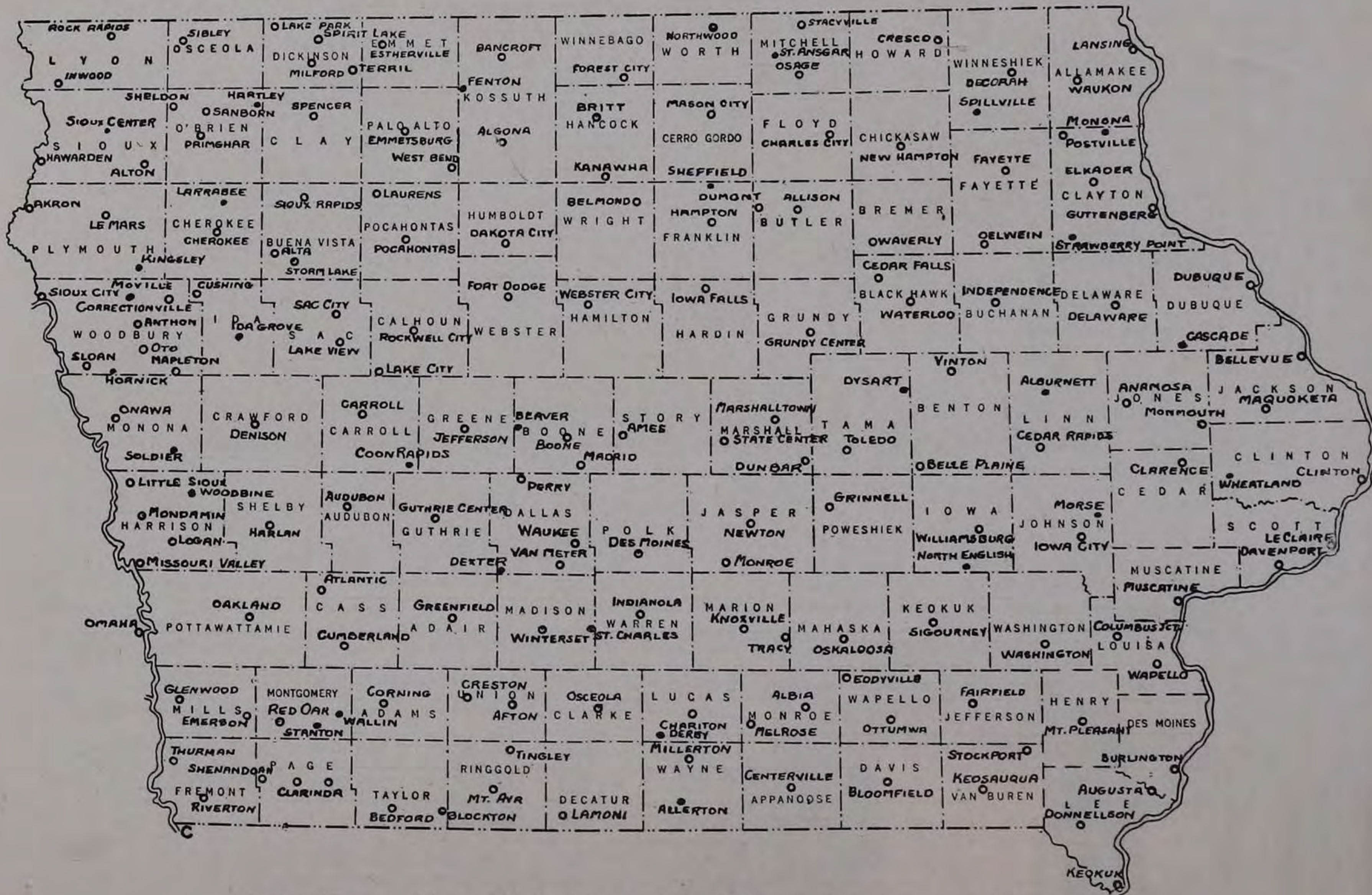


Figure 5—A new map will be prepared and mailed at an early date showing recent changes in stations and the kind of records or functions performed at each station. This could not be prepared in time for this issue.

12.0 55 - 3 8 2.53

U. S. DEPARTMENT OF COMMERCE, WEATHER BUREAU

# CLIMATOLOGICAL DATA

# 11

### IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV

DES MOINES, IOWA, JANUARY, 1944

No. 1

#### COMPARATIVE DATA FOR JANUARY, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	10.6	64	-24	1.07					
1874.....	19.6	64	-24	1.67					
1875.....	4.9	48	-30	0.82					
1876.....	23.5	62	-16	1.49					
1877.....	13.7	58	-31	1.09					
1878.....	25.4	55	-13	0.48					
1879.....	16.1	54	-30	0.48					
1880.....	32.0	68	-6	1.36					
1881.....	9.6	48	-40	0.94					
1882.....	23.4	60	-17	0.65					
1883.....	8.0	46	-38	1.31					
1884.....	13.3	52	-38	0.52					
1885.....	9.4	51	-42	1.28					
1886.....	8.1	52	-33	2.59					
1887.....	8.8	55	-34	1.13					
1888.....	5.4	53	-43	1.30					
1889.....	21.6	62	-25	1.22					
1890.....	18.0	64	-27	1.79					
1891.....	26.0	62	-4	1.75		4	13	7	11
1892.....	15.3	62	-38	1.09	6.9	5	16	8	6
1893.....	9.3	54	-34	0.74	6.9	6	11	9	11
1894.....	19.3	69	-37	1.09	6.0	5	14	9	8
1895.....	13.6	68	-31	0.85	8.7	4	15	7	9
1896.....	23.4	68	-20	0.48	2.8	3	10	10	11
1897.....	17.2	66	-30	2.01	8.2	7	12	7	12
1898.....	23.4	52	-11	1.00	12.6	5	15	6	10
1899.....	19.8	68	-34	0.28	1.5	3	15	10	6
1900.....	25.6	66	-20	0.53	2.3	3	16	7	8
1901.....	23.7	60	-21	0.74	6.2	4	14	9	8
1902.....	22.4	63	-31	0.88	9.4	4	17	8	6
1903.....	23.0	60	-12	0.28	2.0	4	13	7	11
1904.....	14.0	57	-32	1.18	6.1	6	12	8	11
1905.....	11.2	56	-30	0.91	11.1	7	14	7	10
1906.....	24.6	69	-19	1.52	11.3	5	14	6	11
1907.....	18.8	68	-22	1.52	6.0	7	8	7	16
1908.....	24.9	60	-18	0.44	4.6	2	17	8	6
1909.....	21.2	72	-25	1.66	7.8	6	9	6	16
1910.....	18.1	56	-35	1.57	12.6	6	13	7	11
1911.....	20.2	66	-35	0.97	7.3	5	9	8	14
1912.....	4.2	49	-47	0.53	5.5	5	14	7	10
1913.....	20.9	62	-25	0.77	7.2	5	14	9	8
1914.....	27.8	64	-10	0.88	5.1	5	11	8	12
1915.....	17.5	59	-32	1.63	7.3	8	13	8	10
1916.....	17.8	63	-34	2.62	7.2	10	12	6	13
1917.....	17.0	60	-28	0.83	7.2	4	17	8	6
1918.....	8.6	53	-35	1.02	11.2	7	13	8	10
1919.....	26.8	64	-32	0.24	2.8	2	20	5	6
1920.....	16.7	58	-26	0.42	4.6	4	12	8	11
1921.....	28.4	67	-9	0.51	4.1	4	11	7	13
1922.....	19.8	57	-29	0.89	5.3	4	17	6	8
1923.....	26.7	58	-10	0.85	6.5	6	10	7	14
1924.....	13.9	59	-36	0.89	5.5	5	17	7	7
1925.....	19.4	55	-24	0.40	4.2	3	17	7	7
1926.....	22.7	58	-22	1.09	5.0	7	11	8	12
1927.....	21.7	59	-27	0.29	3.0	4	14	8	9
1928.....	25.2	70	-20	0.17	0.9	3	15	8	8
1929.....	10.2	47	-29	2.06	17.5	9	11	6	14
1930.....	10.5	58	-37	1.33	14.7	8	14	8	9
1931.....	28.9	64	-15	0.50	5.1	2	18	6	7
1932.....	22.5	61	-22	1.81	13.6	8	9	6	16
1933.....	32.5	62	-10	0.95	1.4	5	13	8	10
1934.....	26.9	67	-14	0.83	4.4	5	10	7	14
1935.....	20.6	58	-30	1.16	2.9	6	12	5	14
1936.....	9.5	56	-33	1.68	19.4	10	11	7	13
1937.....	12.8	46	-30	2.25	10.5	7	15	7	9
1938.....	21.0	59	-25	1.14	6.8	7	11	8	12
1939.....	28.7	69	-12	0.86	6.0	7	10	9	12
1940.....	8.4	45	-26	0.83	9.9	4	16	6	9
1941.....	23.8	59	-8	1.73	10.2	10	10	5	16
1942.....	21.6	64	-36	0.76	8.1	2	18	7	6
1943.....	16.7	54	-31	0.79	9.2	8	12	7	12
1944.....	30.1	70	-15	1.06	0.8	2	16	9	6
Period.....	18.7	56	-47	1.09	7.0	5	13	8	10

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

On the night of the 26th, Mr. Ferdinand Vogel, age 76, and Mrs. Vogel, age 80, living near Panora, apparently became lost about 10:30 p. m. while searching for a strayed cow. A heavy fog prevailed at the time and was followed by heavy rain. The aged couple apparently succumbed to exhaustion and died of

#### GENERAL SUMMARY

January, 1944, was unseasonably warm with near normal precipitation. The mean temperature of 30.1 was the third highest of record for January and was exceeded only by 32.0° in 1880 and 32.5° in 1933, and was 11.4° above the all-time January average. Although the average total precipitation of 1.06 inches was only 0.03 inch less than normal, most of it fell within a 24-hour period on the 26th-27th. This rain marked the ending of a protracted spell of dry weather that began in September and continued throughout the autumn and early winter. The average total snowfall was only 0.8 inch and was the least of record for January, amounting to only slightly more than one-tenth of the normal. There were more clear days and more sunshine than usual, while the number of cloudy days and of days with precipitation equaled the lowest numbers of record for January. Relative humidity was also below normal.

A considerable number of local records were broken at some of the reporting stations. Among these were 16 stations, mostly in the northwest portion, that reported the highest January mean temperature of record. At about 35 stations the monthly maximum temperatures exceeded all previous January readings, and at an even larger number, new records were set for one or more individual dates. At many others, mostly in the southern part of the State, this was the first January of record without measurable snowfall. On the other hand the general rain on the 26th-27th exceeded all previous 24-hour totals for January at a number of stations. At some points it was the heaviest January rain of record but did not exceed the record moisture previously received in the form of snow.

Heating requirements, as shown by the degree-day totals at first order stations, amounted to only 80% of the January normal.

During the latter half of the month especially, the weather was favorable for all outdoor activities. Some plowing was done and livestock were turned into the fields. Conditions were favorable for trucking and shipping hogs to market, and packing plants and stockyards were swamped, necessitating imposition of embargoes on shipments at a number of points. Extension of Government support prices on hogs to heavier weights was one result of this condition. Egg production was at high levels. There were some reports of grasshoppers and numerous reports of flies being observed. On the whole, the mild temperature and lack of snowfall conserved feed and fuel and made for efficient use of labor.

Despite the dry weather the U. S. Geological Survey reported that stream flow in Iowa was above normal in all except the southeast portion of the State. Ice broke up on most streams after the rain of the 26th-27th and rivers were free of ice at the end of the month.

A duststorm occurred over the northwest counties on the 18th and scattered reports of dust were received from other sections on that date.



CLIMATOLOGICAL DATA FOR JANUARY, 1944

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures, in Degrees Fahrenheit						Precipitation, in inches				Number of days				OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours†	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear	Partly cloudy		Cloudy	Prevailing direction of wind
<b>Northwest District</b>																				
Alta	Buena Vista	1,513	55																W. S. Slagle J. Earl Wirth Mrs. Mayme P. Orvis Earl V. Slife	
Alton	Sioux	1,305	40	29.2	+14.3	66	25	-12	8	1.22	+ 0.54	0.77	27	1.0	5	13	13	5		w.
Cherokee 1½NW	Cherokee	1,358	25	29.1	+13.7	66	25	-15	8	0.98	+ 0.54	0.77	26-27	1.8	4	19	9	3		s.
Estherville	Emmet	1,298	51	29.2	+16.2	66	25	-12	8	0.97	+ 0.35	0.55	28	1.7	4	15	9	7		sw.
Hawarden	Sioux	1,191	18	29.4	+13.9	66	25	-9	8	1.02	+ 0.42	0.79	27	1.5	4	16	8	7		nw.
Inwood 2½SW	Lyon	1,474	42	27.8	+14.7	62	20	-6	8†	1.15	+ 0.59	0.69	28	1.0	3	25	2	4		nw.
Lake Park	Dickinson	1,479	42	29.2	+16.7	63	25	-5	7†	1.24	+ 0.66	1.20	27	0.6	2	17	5	9		sw.
Le Mars	Plymouth	1,230	58	29.6	+13.6	67	25	-14	8	1.33	+ 0.75	0.92	27	1.5	4	20	3	8		s.
Pocahontas	Pocahontas	1,228	41	28.9	+13.8	66	25	-12	8	0.79	+ 0.09	0.74	27	0.5	2	8	19	4		sw.
Primghar	O'Brien	1,517	18																	Scott King
Rock Rapids	Lyon	1,341	48	28.3	+14.8	63	25	-7	8	0.96	+ 0.29	0.83	27	2.0	4	15	10	6		s.
Sanborn	O'Brien	1,552	32	28.7	+15.7	65	25	-5	8	1.21	+ 0.53	0.77	27	1.5	5	15	10	6	se.	
Sheldon	O'Brien	1,448	39	28.1	+14.8	65	25	-8	8	1.00	+ 0.35	0.76	27	1.2	3	15	12	4	nw.	
Sibley	Osceola	1,194	10	27.8	+15.3	64	25	-10	8	0.98	+ 0.34	0.82	27	1.1	4	18	8	5	sw.	
Sioux Rapids	Buena Vista	1,275	1	29.3	+14.2	68	25	-15	8	1.06	+ 0.36	0.99	26-27	0.5	3	19	6	6	nw.	
Spencer	Clay	1,319	37	28.3	+14.7	66	25	-12	8	1.03	+ 0.29	0.88	27	2.0	3	15	9	7	sw.	
Storm Lake 1½N	Buena Vista	1,455	55	29.4	+13.9	61	25	-6	13	1.12	+ 0.45	0.95	26-27	1.0	3	17	9	5	nw.	
West Bend	Palo Alto	1,197	58	28.9	+14.5	67	25†	-12	8	0.70	- 0.03	0.65	27	0.5	2	15	10	6	sw.	
Means and extremes				28.8	+14.7	68	25	-15	8	1.05	+ 0.40	1.20	27	1.2	3	16	9	6	sw.	
<b>North Central Dist.</b>																				
Algona	Kossuth	1,200	84	29.8	+14.9	66	25	-9	8	0.84	+ 0.06	0.75	27	1.0	2	15	11	5	nw.	
Allison	Butler	1,060	31	29.2	+14.2	60	27	-9	8	1.27	+ 0.31	1.19	27	0	2	19	7	5	n.	
Bancroft	Kossuth	1,200	2	28.0	+15.2	65	25	-10	8	0.62	- 0.16	0.60	26-27	T.	2	18	8	5	nw.	
Belmond	Wright	1,175	36	28.1	+13.9	64	25	-12	8	0.98	- 0.03	0.95	27	0	2	15	10	6	sw.	
Britt	Hancock	1,240	60	28.4	+13.8	65	25	-8	8	0.70	+ 0.02	0.65	26-27	1.0	2	17	10	4	nw.	
Charles City	Floyd	1,013	70	27.4	+13.7	60	25	-9	8	1.21	+ 0.16	1.08	27	0.5	6	16	4	11	nw.	
Dakota City	Humboldt	1,183	61	28.6	+13.3	66	25	-12	8	0.99	+ 0.18	0.88	27	2.0	2	11	12	8	s.	
Forest City	Winnebago	1,289	55	28.1	+13.9	64	25	-9	8	0.57	- 0.37	0.26	27-28	1.5	3	15	6	10	sw.	
Hampton 3NW	Franklin	1,142	54	28.4	+13.5	62	25	-10	8	1.40	+ 0.41	1.32	27	1.0	2	21	5	5	sw.	
Mason City 3N	Cerro Gordo	1,148	53	27.3	+13.8	62	25	-14	8	0.88	+ 0.02	0.78	27	1.0	3	15	5	11	se.	
Northwood	Worth	1,222	49	27.6	+14.5	63	25	-11	8	0.93	- 0.12	0.90	27	0.5	2	20	4	7	s.	
Osage	Mitchell	1,170	60	27.8	+14.4	60	25	-7	8	1.07	+ 0.13	0.87	27	1.5	2	18	4	9	s.	
Means and extremes				28.2	+14.1	66	25	-14	8	0.96	+ 0.06	1.32	27	0.8	2	17	7	7	nw.	
<b>Northeast District</b>																				
Cedar Falls	Black Hawk	875	24							1.44	+ 0.34	1.20	27	1.5	3	14	6	11	nw.	
Cresco	Howard	1,298	8																	
Decorah 2S	Winneshiek	880	62	26.6	+12.0	59	25	-15	8	0.93	- 0.23	0.73	26-27	1.0	4	17	8	6	sw.	
Delaware 1½W	Delaware	1,083	66	27.6	+10.6	59	27	-9	8	1.08	+ 0.26	0.87	27	2.0	3	14	10	7	s.	
Dubuque	Dubuque	642	94	29.7	+10.6	62	27	-3	8	1.31	+ 0.01	0.92	26-27	3.3	5	11	8	12	s.	
Elkader	Clayton		53	27.6	+10.5	59	27	-10	8	1.46	+ 0.53	1.19	27	0.8	3	16	9	6	n.	
Fayette	Fayette	1,009	57	27.3	+11.3	61	27	-15	8	1.13	- 0.01	0.60	28	1.2	4	12	11	8	w.	
Guttenberg	Clayton			30.5	+13.2	62	27	-5	8	1.06	+ 0.01	0.88	27†	1.0	5	14	6	11		
Independence 1½W	Buchanan	956	85	28.0	+10.3	61	27	-9	8	1.31	+ 0.37	1.05	27	1.4	4	13	12	6	s.	
New Hampton	Chickasaw	1,161	48	27.4	+13.2	57	27	-5	7†	1.27	+ 0.30	1.09	27	1.0	3	13	9	9	sw.	
Oelwein	Fayette	1,036	23	28.5	+12.0	60	27†	-5	7†	0.87	- 0.11	0.60	27	0.5	4	18	9	4	nw.	
Postville 5SW	Clayton	1,130	54																	
Waterloo	Black Hawk	848	63	28.7	+11.5	60	25†	-11	8	1.30	+ 0.30	1.06	27	0.8	4	18	7	6	nw.	
Waukon	Allamakee	1,287	10																	
Waverly 1W	Bremer	936	56	27.4	+11.8	59	25†	-12	8	1.24	+ 0.09	1.00	27	0.5	4	13	10	8	nw.	
Means and extremes				28.1	+12.0	62	27	-15	8	1.20	+ 0.16	1.20	27	1.2	4	14	9	8	nw.	
<b>West Central Dist.</b>																				
Audubon 2SW	Audubon	1,297	52	30.6	+12.5	66	25	-5	8	1.17	+ 0.26	1.10	27	0.1	4	11	17	3	sw.	
Carroll	Carroll	1,280	59	30.6	+13.1	68	25	-12	8	1.07	+ 0.35	1.07	26-27	T.	1	14	6	11	nw.	
Cushing 2½NE	Ida	1,350	11	29.4	+12.6	66	25	-7	8	0.87	+ 0.23	0.76	27	1.0	3	13	11	7	nw.	
Denison 2S	Crawford	1,307	61	30.5	+13.0	67	25	-10	8	0.89	+ 0.19	0.89	27	T.	1	21	4	6	sw.	
Guthrie Center	Guthrie	1,217	50	31.7	+12.8	65	25	-5	8	1.35	+ 0.43	1.33	27	T.	2	17	10	4	sw.	
Harlan	Shelby	1,210	53	30.7	+12.6	68	25	-8	8	0.92	+ 0.13	0.91	27	T.	2	19	5	7	nw.	
Jefferson	Greene	1,055	53	30.7	+13.0	66	25	-9	8	1.14	+ 0.23	1.09	27	0.5	2	18	7	6	sw.	
Lake City	Calhoun	1,238	9	30.6	+13.6	67	25	-10	8	0.97	+ 0.06	0.86	27	1.0	4	15	5	11	nw.	
Little Sioux	Harrison	1,040	44	31.4	+12.2	69	25	-11	8	0.85	+ 0.14	0.72	27	1.0	4	17	11	3	nw.	
Logan	Harrison	1,120	79	31.2	+11.4	68	25	-9	8	0.64	- 0.10	0.64	26-27	T.	1	16	11	4	sw.	
Mapleton 5NW	Woodbury	1,225	6	29.1	+12.0	67	25	-13	8	1.03	+ 0.33	0.95	27	4.0	3	12	10	9	nw.	
Missouri Valley	Harrison	1,069	1	32.5		70	25	-8	8	0.80		0.74	26-27	0.4	4	19	6	6	s.	
Onawa	Monona	1,050	60	30.2	+11.6	69	25	-14	8	0.87	+ 0.13	0.73	26-27	1.0	4	14	12	5	nw.	
Rockwell City	Calhoun	1,226	58	29.7	+13.5	66	25	-8	8	0.98	- 0.08	0.87	26-27	1.3	2	20	4	7	nw.	
Sac City	Sac	1,274	76																	
Sioux City	Woodbury	1,111	70	28.5	+12.2	68	25	-9	8	0.96	+ 0.22	0.80	26-27	1.3	4	11	9	11	nw.	
Means and extremes				30.5	+12.8	70	25	-14	8	0.96	+ 0.16	1.33	27	0.8	3	16	8	7	nw.	
<b>Central District</b>																				
Ames 4SW	Story	1,004	69	29.5	+11.4	61	25	-8	8	2.24	+ 1.49	2.07	26-27	1.3	5	11	17	3	sw.	
Boone	Boone	1,136	60	31.0	+13.4	64	25	-6	8	1.26	+ 0.39	1.16	26-27	0.5	4	13	9	9	nw.	
Des Moines	Polk	800	68	31.5	+11.4	61	26	-4	8	1.37	+ 0.30	1.24	26-27	1.6	5	14				

CLIMATOLOGICAL DATA FOR JANUARY, 1944—Continued

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Temperatures in Degrees Fahrenheit					Precipitation, in inches					Number of days			Prevailing direction of wind	OBSERVERS		
				Mean	Departure from normal	Highest	Date	Lowest	Date	Total	Departure from normal	Greatest in 24 hours†	Date	Total snowfall (unmelted)	Precipitation, .01 in. or more	Clear			Partly cloudy	Cloudy
<i>Central District (Continued)</i>																				
Perry 1½SE	Dallas	975	45	30.6	+12.2	65	25	-10	8	1.27	+ 0.37	1.15	26-27	0.8	4	19	7	5	nw.	Eugene N. Hastie
State Center	Marshall	1,068	8	28.4	+10.2	59	27	-10	8	2.23	+ 1.31	1.78	27	1.2	4	14	10	7	sw.	H. M. Meads
Toledo	Tama	929	51	30.0	+11.8	62	27	-10	8	1.17	+ 0.09	0.87	27	2.0	3	19	7	5	sw.	H. P. Giger
Waukee 1¼SW	Dallas	1,042	47	31.8	+12.8	62	26	-8	8	1.46	+ 0.38	1.33	27	1.0	3	22	3	6	sw.	Ivan B. Spear
Webster City 1SE	Hamilton	1,042	61	29.0	+13.2	63	25	-12	8	1.23	+ 0.46	1.12	27	1.5	3	18	8	5	nw.	Leo Holtkamp
Means and extremes																				
				29.7	+11.6	66	25	-15	8	1.41	+ 0.43	2.07	26-27	1.6	4	16	9	6	sw.	
<i>East Central Dist.</i>																				
Anamosa 1NW	Jones	873	16	28.4	+10.1	58	25	-10	8	1.24	- 0.01	1.00	27	3.0	3	16	11	4	w.	State Reformatory
Beute Prairie	Benton	895	69	29.5	+10.4	60	27	-9	8	1.09	- 0.31	0.89	27	2.0	3	12	11	8	s.	R. O. Burrows
Bellevue	Jackson	603		29.6	+10.0	63	27	-3	8†	1.55	+ 0.41	1.27	27	1.0	6	13	15	3	nw.	U. S. Engineers
Cedar Rapids	Linn	813	63	29.6	+10.6	61	27	-7	8	1.29	+ 0.30	1.04	27	1.6	6	13	12	6	s.	John T. Wurster
Clarence	Cedar	850	11	29.5	+10.3	60	27	-5	8	1.37	- 0.03	1.24	27	1.0	5	20	8	3	sw.	H. J. Klatt
Means and extremes																				
				29.9	+10.1	65	27	-10	8	1.29	+ 0.02	1.75	27	1.3	5	15	11	5	s.	
<i>Southwest District</i>																				
Atlantic 1E	Cass	1,110	58	30.8	+11.8	65	25	-7	8	1.47	+ 0.57	1.25	27	0.1	2	10	17	4	s.	Roy L. Fancolly
Bedford 1¼N	Taylor	1,215	41	33.6	+12.0	65	25	0	8	0.84	- 0.09	0.84	27	0	1	23	5	3	w.	H. J. Chambers
Clarinda	Page	1,004	73	31.1	+ 9.3	64	25	-4	8	1.00	+ 0.13	1.00	26-27	T.	1	18	4	9	sw.	Walter L. Weakland
Clarinda Erosion 8W	Page	1,132	6	31.4	+ 9.8	64	25	-5	8	1.02	+ 0.19	0.98	26-27	T.	2	15	12	4	sw.	Soil Conservation Service
Corning 1E	Adams	1,285	57	32.2	+12.0	66	26	-5	8	0.95	+ 0.01	0.95	27	0	1	18	10	3	nw.	S. W. Morris
Means and extremes																				
				31.9	+11.1	69	25	-10	8	1.08	+ 0.27	1.25	26-27	0.1	2	16	10	5	sw.	
<i>South Central Dist.</i>																				
Afton	Union	1,212	64	30.2	+ 9.4	60	25	-7	8	1.48	+ 0.59	1.40	27	0.5	3	20	4	7	sw.	S. R. Brown
Albia	Monroe	949	54	32.4	+10.7	60	25†	-4	8	0.78	- 0.29	0.67	27	T.	5	17	8	6	sw.	Arthur L. Freed
Centerville 1¼SW	Appanoose	1,013	52	32.6	+10.3	60	25	-3	8	0.71	- 0.41	0.68	27	0	2	13	10	8	nw.	E. Grant Everman
Chariton 3E	Lucas	940	51	30.7	+ 9.6	60	25	-6	8	0.96	+ 0.05	0.84	27	0	2	14	10	7	sw.	Ellis Shaw
Creston	Union	1,293	44	31.0	+11.2	60	25	-4	8	1.02	+ 0.13	0.90	26-27	0.3	5	20	5	6	sw.	Mrs. Nellie Spangler
Means and extremes																				
				31.8	+10.8	64	26	-7	8	1.05	+ 0.06	1.50	27	0.2	3	16	9	6	sw.	
<i>Southeast District</i>																				
Bloomfield 2¼N	Davis	825	30	31.8	+ 9.3	60	27	-6	8	0.76	- 0.44	0.55	27	T.	4	11	8	12	w.	Mrs. Leo Foster
Burlington 8S	Des Moines	697	55	30.6	+ 6.7	62	27	1	8	0.63	- 1.08	0.22	25	T.	4	10	12	9	s.	U. S. Weather Bureau
Columbus Jet	Louisa	595	54	30.6	+ 8.6	63	27	-3	8†	0.23	- 1.03	0.12	24-25	0.2	3	15	9	7	sw.	Miss Musa Todd
Fairfield 1N	Jefferson	780	74	31.6	+10.4	64	27	-3	8	0.41	- 0.83	0.26	27	0.1	4	21	3	7	sw.	Prof. R. M. McKenzie
Keokuk	Lee	574	74	33.3	+ 8.4	64	27	4	8	0.42	- 1.14	0.18	27	0	4	14	12	5	sw.	U. S. Weather Bureau
Means and extremes																				
				31.8	+ 9.7	65	27	-6	8	0.53	- 0.76	0.97	27	0.1	3	15	9	7	s.	
<i>State means and extremes</i>																				
				30.1	+11.4	70	25	-15	8	1.06	- 0.03	2.07	26-27	0.8	2	16	9	6	sw.	

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.

Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year record. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departure are based on the averages for the entire 72 years of record and must necessarily differ slightly from average station departures based on established normals.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated.

T. Trace or 0.005 inch or less.

† Data interpolated.

‡ Partly interpolated.

† And other dates.

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

‡ Best available used for stations not equipped with recorders.

DAILY PRECIPITATION FOR JANUARY, 1944

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				.10																							.15	.80			.14		1.19		
Alta 2	Raccoon																									T.	T.	.19	.77	.05		.11		1.22		
Alton	Floyd			.10																						T.	T.	.01	.76			.06		0.98		
Cherokee	Little Sioux				T.	.15							T.																						0.97	
Estherville 2	Des Moines				.15			T.					T.														T.		.26	.55		.01				
Hawarden	Big Sioux					T.	T.																			T.	T.	.08	.79	.02		.13		1.02		
Inwood (near) 2	Big Sioux							T.																			T.		.38	.09		.08		1.15		
Lake Park	Little Sioux							T.	T.																	T.			1.20			.04		1.24		
Le Mars	Floyd				.12			T.																		T.	T.	.20	.92			.09		1.33		
Milford	Okoboji				T.	.13																						.02	.86		.04			1.05		
Pocahontas	Des Moines					.05																					T.			.74				0.79		
Primghar	Little Sioux																										T.	T.	.03	.83	.05	.05		0.96		
Rock Rapids	Big Sioux					T.	T.																				T.	T.	.16	.10	.77		.14	1.21		
Sanborn	Floyd				.04																						T.		.13	.78	T.	.11		1.00		
Sheldon	Floyd				T.	T.	T.																													
Sibley	Big Sioux					T.																						T.		.05	.82	.05	.06	0.98		
Sioux Rapids	Little Sioux					T.	.05																					T.		.99		.02		1.06		
Spencer	Little Sioux						.12																					T.		.03	.88			1.03		
Spirit Lake SCS 2	Okoboji				*	.36																						T.		.87	.05	.12		1.40		
Storm Lake	Raccoon					T.	.15																					T.		.95		.02		1.12		
Terril SCS	Little Sioux					T.																						T.	T.	1.40				1.40		
West Bend	Des Moines					.05																						T.	T.	.65				0.70		
<i>North Central District</i>																																				
Algona	Des Moines					.09																								.75	T.			0.84		
Allison	Cedar																										.08	T.	1.19			T.		1.27		
Bancroft	Des Moines				T.	.02																					T.	T.	.60					0.62		
Belmond	Iowa					T.																					.03		.95					0.98		
Britt	Iowa					T.	.05																					T.		.65	T.			0.70		
Charles City 1 1/2	Cedar				.02	.02												T.										.03		1.08	.01	.05		1.21		
Dakota City	Des Moines					T.	.11																					T.	.88					0.99		
Dumont (near)	Cedar					T.	.02																				.04	.02	T.	.91	T.	.02		1.01		
Forest City 2	Cedar					.13																						T.	T.	.18	.26	T.		0.57		
Hampton	Cedar				T.	.08	T.																							1.32					1.40	
Kanawha	Boone																																			
Mason City	Cedar				T.	.09	T.											T.									.01	T.	T.	.78	T.		T.	0.88		
Mason City Arpt 1/2	Cedar				.04	.02																						.03	T.	.75	.01		T.	0.85		
Northwood	Cedar					.03																						T.	T.	.90	T.		T.	0.93		
Osage	Cedar					.20																						T.	T.	.87			T.	1.07		
<i>Northeast District</i>																																				
Cedar Falls	Cedar					T.	.11																						.13		1.20				1.44	
Cresco	Turkey																																			
Decorah 2	Mississippi					.09																							.11	.27	.46			T.	0.93	
Delaware (near)	Maquoketa					T.	.06																					.15	T.	.87				T.	1.08	
Dubuque 1 1/2	Mississippi				T.		.24	T.																					.09	T.	.01	.91		.06	1.31	
Dubuque LD 11 2	Mississippi					.05	.10																							.06	T.	.41	.38		.06	1.06
Elkader	Turkey					.09																							.18		1.19		T.		1.46	
Fayette 2	Mississippi					.10																							.14	.29	.60			T.	1.13	
Guttenberg LD 10 2	Mississippi					.10	T.																						.14	.38	.38		.06		1.06	
Independence	Wapsipinicon					.10																							.15	.01	1.05				1.31	
Lansing 2	Mississippi					.15	T.																						.01	.23	.13	.63		.02	1.17	
New Hampton	Wapsipinicon					.10																							.08		1.09	T.			1.27	
Oelwein	Wapsipinicon					.02																							.10	.15	.60				0.87	
Postville (near)	Mississippi																																			
Waterloo 2	Cedar					.08																							.16	.66	.40				1.30	
Waukon	Mississippi																																			
Waverly	Cedar				.01	.05																									1.00		T.		1.24	
Genoa, Wis. LD 8 2	Mississippi					.03	.01																						.24	.12	.58		T.		0.98	
Lynxville, W. LD 9 2	Mississippi					.06	.01																						T.	.12	.30	.37		.02	0.88	
<i>West Central District</i>																																				
Anthon (nr.) SCS	Little Sioux					T.	.01	.01																												.70
Audubon (near)	Nishnabotna																																	.05	1.17	
Carroll 2	Raccoon				T.																														1.07	
Cushing (near)	Little Sioux					.04	.03																													0.83
Denison	Missouri					T.	T.																												0.89	
Denison SCS 2	Missouri					T.	T.																												1.05	
Guthrie Center	Raccoon					.02	T.																												1.35	
Harlan	Nishnabotna					T.	T.																												.01	0.92
Jefferson	Raccoon					T.	.05																													

DAILY PRECIPITATION FOR JANUARY, 1944—Continued

Stations	Drainage Basin	Day of Month																																	
		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	Total		
<i>Central District</i>																																			
Ames	Skunk				T	.09						T													.03		.01	2.06			.05		2.24		
Boone	Des Moines				T	.04	T																		.01	T	T	1.16			.05		1.26		
Des Moines <sup>1</sup> †	Des Moines			T	.02	.08																			.03		.22	1.02			T		1.37		
Des Moines Apt <sup>1</sup> †	Des Moines			T	.04																					.02		.43	.82			T		1.31	
Lunbar (near)	Iowa				T	.23																			.18		.43	.86			T		1.07		
Fort Dodge <sup>2</sup>	Des Moines					.13						T													.01	T		.97	.21		T		1.32		
Grinnell†	Iowa				T	.07																			.18			.87					1.12		
Grundy Center	Cedar					.06					T														.15		T	1.25					1.46		
Iowa Falls <sup>2</sup> †	Iowa					.12																					.04	.90	.10					1.16	
Marshalltown <sup>2</sup>	Iowa					.18																				.03	.12	.89	.17					1.30	
Monroe	Des Moines				T	.07						T													.24	T		.85					1.16		
Newton	Skunk					.01	.14					T													.14	T	T	.90					1.19		
Perry	Raccoon					T	.08	T				T														T		.01	1.14		.04		1.27		
State Center	Iowa					.10	.20																			.15		T	1.78			T		2.28	
Toledo	Iowa					T	.17					T														.13	T	T	.87			T		1.17	
Van Meter <sup>2</sup>	Raccoon					.05																				.03			1.18	T				1.26	
Waukeo	Raccoon					.08																				.05			1.33					1.46	
Webster City†	Boone				T	.08					T															T	.08		1.12			T		1.28	
<i>East Central District</i>																																			
Anamosa	Wapsipinicon					.16																				.08	T		1.00					1.24	
Belle Plaine	Iowa					.08																				.12			.89			T		1.09	
Bellevue LD 12 <sup>2</sup>	Mississippi	T				.01	.08																				.06	.75	.52		.13		1.55		
Cedar Rapids <sup>2</sup>	Cedar	T				.07	.08															T					.08	.69	.35		.02		1.29		
Ced. Rap. (rvr.) <sup>2</sup>	Cedar	T				.12	.09																				.01	.81	.27		.03		1.33		
Clarence	Wapsipinicon					.02																					.04		1.24			.04		1.37	
Clinton	Mississippi					.12					T															.13	.09	.78			T		.05	1.17	
Clinton (rvr.) <sup>2</sup>	Mississippi					.04	.04																				.13	.07	.45	.38		.04		1.15	
Davenport <sup>1</sup> †	Mississippi		T			T	.01					T															.13	.08	.35	.16		.08		0.81	
Davenport LD 15 <sup>2</sup>	Mississippi	T	T			T	.01					T															.13	.09	.28	.14		.09		0.74	
Iowa City	Iowa				T	.06																				.10		1.75			.05		.02	1.98	
Le Claire <sup>2</sup>	Mississippi					T	.03					T															.05	.10	.08	.23		.08		0.57	
Le Claire LD 14 <sup>2</sup>	Mississippi					T	T																				T	.05	.15	.08	.21		.08	0.57	
Maquoketa	Maquoketa					.25																					.14	.01	1.40			.13		1.93	
Monmouth	Maquoketa					.16															T						.10	.09	1.39			.12		1.86	
Muscatine	Mississippi	T				.01																				.13	T	.15			.10		0.39		
Muscatine (rvr.) <sup>2</sup>	Mississippi					T																					.10	.14	.03			.07		0.34	
Muscatine LD 16 <sup>2</sup>	Mississippi					.01	.01																					.10	.01	.20	.07		.07		0.47
Vinton	Cedar				T	.02																					.20	T	.08	.70		T		1.00	
Williamsburg	Iowa					.02	.06																				.09		.91			.02		1.10	
<i>Southwest District</i>																																			
Atlantic <sup>2</sup>	Nishnabotna				T	T																							1.25	.22		T		1.47	
Bedford	102																											.84			T		.84		
Blockton SCS	Platte			T	.18																						T		.85				1.03		
Clarinda <sup>2</sup>	Nodaway				T																								1.00					1.00	
Clarinda Eros <sup>1</sup>	Tarkio					.04																							.98			T		1.02	
Corning	Nodaway																												.95					0.95	
Cumberland (near)	Nodaway					T																					T		1.50			T		1.50	
Emerson SCS <sup>2</sup>	Nishnabotna		T	T		.05																					T	T	1.27			.09		1.41	
Glenwood	Missouri					T	T																					T	.81			.12		0.93	
Greenfield	Nodaway					T	.02																				.01		.01	1.18			T		1.22
Oakland	Nishnabotna					.01																						T		1.25			.10		1.36
Red Oak	Nishnabotna					T																						T	.66	.48			T		1.14
Red Oak (near)	Nishnabotna					T																						T		1.06			.06		1.12
Riverton	Nishnabotna					T																							1.15						1.15
Shenandoah	Nishnabotna					.04																						T		1.09					1.13
Thurman	Missouri																												1.00						1.00
Omaha, Nebr. <sup>1</sup> †	Missouri		T	T		.01	T					T														.01	T		.18	.49		.06		0.75	
<i>South Central District</i>																																			
Afton	Grand					.05																						.03		1.40			T		1.48
Albia	Des Moines					.01																						.04		.64	.03		.06		0.78
Centerville†	Chariton																											.03		.68					0.71
Chariton	Chariton																											.12		.84			T		0.96
Creston <sup>2</sup>	Platte					.01	.09																					.02		.79	.11				1.02
Indianola	Des Moines				T	.09																						.04		1.10			T		1.23
Indianola (nr.) <sup>2</sup>	Des Moines																											.16		.85			T		1.05
Knoxville†	Des Moines					.04																						.08		.83			.02		0.93
Lamoni	Grand				T	T																							.80			.02		0.85	
Melrose	Des Moines					T	T																					T	.03	.80			.02		0.85
Millerton	Chariton					T																						.03		.85			.08		0.96
Mount Ayr†	Grand					.01																													

DAILY PRECIPITATION FOR JANUARY, 1944—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>Southeast District (Continued)</i>																																		
Donnellson <sup>2</sup>	Des Moines				T.	.01																				.04	T.	T.	.13			.02		0.20
Eddyville <sup>2</sup>	Des Moines				T.																						T.		.65	.06		.03	0.74	
Fairfield	Skunk				T.	.01																				.12	T.	.26			.02	T.	0.41	
Keokuk <sup>1†</sup>	Mississippi				T.																					.03	.17	.18			.04		0.42	
Keokuk LD 19 <sup>2</sup>	Mississippi					.02																				.03	.13	.02	.08		.06		0.34	
Keosauqua	Des Moines				T.																					.07	T.		.08		T.		0.15	
Keosauqua (rvr.) <sup>2</sup>	Des Moines					T.																				.15	T.	.03	.12		T.		0.30	
Mt. Pleasant	Skunk																										T.	.15	.20				0.35	
Oakaloosa	Des Moines					.04																				.06			.07		T.		1.07	
Ottumwa <sup>†</sup>	Des Moines					.01																				.12	.02	.63		T.	.04		0.82	
Ottumwa (river) <sup>2</sup>	Des Moines					.02																					.13	T.	.46	.10		.03	0.74	
Sigourney	Skunk					T.																				.09		.81				.09	0.90	
Stockport	Skunk					T.																				.13	T.	T.	.09		T.		0.22	
Wapello <sup>2</sup>	Iowa					T.																					.14	T.	.10	.10		.05	0.39	
Washington <sup>†</sup>	Skunk					T.																				.10	T.	.25		T.	T.	.05	0.35	

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.  
<sup>1</sup> Midnight to midnight.  
<sup>2</sup> Measured in the morning; for the preceding 24-hours.  
T Trace or 0.005 inch or less.  
\* Included in next measurement.  
† Recording gage.  
‡ Windshield on gage.  
¶ Data interpolated.  
§ Partly interpolated

SUPPLEMENTAL TABLE, JANUARY, 1944

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours <sup>4</sup>	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	18	1.19	+ 0.64	0.80	27	2.5	4	22	5	4	n.
Cmbrld. 4 3/4 NW	Cass	1,225	46	1.50	+ 0.74	1.50	26-27	0	1	20	6	5	s.
Dumont 3 3/4 NW	Butler	998	9	1.01	+ 0.06	0.91	27	0.7	5	6	20	5	s.
Dunbar 2 NE	Marshall	1,010	9	1.07	- 0.03	0.66	27	3.5	3	17	3	6	sw.
Emerson	M'tg'mery	1,112	1	1.41		1.27	26-27	0.5	3	18	8	5	s.
Kanawha 1/4 S.	Hancock	1,183	1										
Lake View	Sac	1,239	6	1.34	+ 0.47	1.28	27	1.0	2	25	2	4	w.
Melrose	Monroe	871	16	0.85	- 0.25	0.80	27	0	3	14	10	7	ne.
Sloan	Woodbury	1,071	1	0.77		0.75	26-27	0.1	3				

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.  
<sup>4</sup>Best available used for stations not equipped with recorders.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, JANUARY, 1944

Stations	Sea-level pressure, extremes— inches				Wind <sup>†</sup>				Relative Humidity				Percentage of sunshine	Degree Days
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.	12:30 P. M.	6:30 P. M.		
Burlington	30.74	13	29.85	27	10.3	34	nw.	19	81	86	64	70	56	1067
Charles City	30.72	7	29.69	27	6.4	23	s.	27					60	1165
Davenport	30.72	13	29.85	20	9.0	31	sw.	27	85	87	64	72	54	1015
Des Moines	30.72	12	29.67	27	8.3	35	sw.	27	79	83	66	67	72	1038
Dubuque	30.69	12	29.75	21	5.7	18	nw.	5	74	82	65	65	62	1094
Sioux City	30.76	7	29.53	24	10.3	41	sw.	27	81	83	64	67	62	1131
Omaha, Nebr.	30.73	12	29.55	24	10.8	33	nw.	31	79	83	59	60	69	1035
State	30.76	7	29.53	24	8.7	41	sw.	27	80	84	64	67	62	1078
Normals and Records	31.09	25 1905	28.68	3 1906	8.9	156	nw.	6 1903 <sup>‡</sup>		84	69	77	51	1347

<sup>†</sup>True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.  
<sup>‡</sup>Sioux City    §Dubuque

SOIL TEMPERATURES AT AMES, IOWA, JANUARY, 1944

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	22.0	26.2	27.6	29.1	33.0		
Average 12 noon	32.0	28.1	27.7	29.2	33.3		
Average 7 p. m.	30.2	29.9	29.1	29.3	33.2	38.4	
Highest Date	61 25	47 27	38 27	33* 27	35 1	40 1-5	
Lowest Date	-8 8	14 13	19 8 9, 13	24* 9, 13	32 13-21 <sup>†</sup>	37 27-31	
Number of days with temperature							
0° or lower	1	0	0	0	0	0	
24° or lower	20	14	10	2	0	0	
32° or lower	28	28	30	31	10	0	
40° or higher	20	3	0	0	0	5	
50° or higher	5						

<sup>†</sup> And other dates.  
\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.  
Diurnal changes at 24 inches and deeper amount to less than 2°.  
Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

exposure. The body of Mrs. Vogel was found on the following Saturday (29th) and that of Mr. Vogel on Sunday (30th).

The mild, dry weather at the close of December continued during the first few days of January. On the 4th-5th, however, a trough of low pressure moved eastward across the State and caused light snow over most of the northern two-thirds. This was followed by an outbreak of Arctic air that pushed southward from Manitoba and Saskatchewan on the 6th and caused temperatures to fall to subzero levels on the 7th and 8th. The lowest readings of the month were generally recorded on the 8th. Temperature readings rose to above normal on the 10th but fell again as a new cold air mass moved southward, causing local snow flurries.

However, it became unseasonably warm on the 14th and from that date until the close of the month the temperatures ranged from 10° to 35° above the seasonal normal. During the first 10 days of this warm period high barometric pressure prevailed west of the continental divide from the surface to at

least the 20,000-foot level. The high pressure aloft over the Plateau began to diminish after the 21st and on the 24th pressure isolines appeared as an inverted V with lowest readings off the west coast and the crest over the Mississippi Valley. The evening radiosonde observations on the 25th showed a V-shaped low pressure area aloft covering the Dakotas and east slope of the Rockies at 5,000 feet, and covering the Great Basin at 20,000 feet. At the evening observations on the 26th, the 20,000-foot map showed a troughlike area of low pressure over the Rockies at 10,000 and 20,000 feet, and a "low" near Hudson Bay, with a trough extending southwestward at 5,000 feet. These upper air conditions were related to northward movements of warm air masses that brought record or near record high temperatures for January to much of Iowa. At the surface a trough of low pressure extended from Lake Superior to the Texas Panhandle at noon on the 26th. In the eastern part of this trough Maritime Tropic air was moving northward, while Continental Polar air was drifting eastward across the upper Missouri Valley. As the cold air and attendant high pressure area moved eastward along the Canadian border, an area of low pressure moved almost due north from Texas to Nebraska, and thence northeastward over Minnesota and Lake Superior. The path of the surface barometric disturbance was plainly governed by the pressure distribution and wind systems aloft. As the various air masses converged over Iowa in advance of the surface low pressure area, the warm, moist air from the south was forced to rise and as it cooled by expansion, heavy rains fell in all sections of the State, attended by widespread thunderstorms. As previously stated, in some cases the rains were the heaviest ever recorded in January. Light damage was caused to a commercial radio station transmitter at Dubuque by lightning. Showers had also occurred in connection with frontal passages on the 24th. Following the rains of the 26th-27th, relatively warm air of continental origin caused a continuation of mild temperatures, but further light scattered showers attended the passage of low pressure waves and fronts on the 30th and 31st.

#### TEMPERATURE

This was the third warmest January of record with a State average temperature of 30.1°, or 11.4° above the all-time normal. As usual, the State average was computed from the averages of nine districts of nearly equal area, and was based on reports of 119 stations. All stations reported averages considerably in excess of the adopted normals, with the amount of the departures tending to increase from southeast to northwest. The highest station averages were 33.6° at Winterset and Bedford, and 34.2° at the Keokuk Dam, while the lowest was 26.6° at Decorah. The maximum reported was 70 at Missouri Valley on the 25th, while the monthly minimum was -15° at Sioux Rapids, Cherokee, Decorah, Fayette and Marshalltown, on the 8th. The average number of days with minimum readings of zero or lower was 3, and of 32° or lower was 28. The average number of days with maximum readings of freezing or lower was 6.

#### PRECIPITATION

The average total precipitation, which was also obtained from the averages of nine districts of about equal area, was 1.06 inches, only 0.03 inch less than the 72-year mean. Although the total averaged slightly below normal, it was slightly above the median value, as there have been only 33 wetter Januaries, while 38 have been drier. The monthly totals were generally above normal in all sections except the southeast, where there was a considerable deficiency. The greatest monthly to-

tal was 2.24 inches at Ames, and the least was 0.15 inch at Keosauqua. The heaviest 24-hour fall was 2.07 inches on the 26th-27th, also at Ames. The average number of days with measurable precipitation was 2.

#### SNOWFALL

The State average snowfall amounted to only 0.8 inch, the least of record for January, and only slightly more than one-tenth of the 7 inch average for all years of record. The heavier amounts fell in local areas, with 5.7 inches at Spirit Lake, 4.0 inches near Mapleton, and 4.3 inches at the Mississippi River Dam 11 at Dubuque. In some north central areas, most of the west central district, and over all of the southern third, the monthly totals were less than one inch, with many stations reporting no snow or only scattered flurries. In areas where measurable snow fell the ground was covered for periods ranging from 5 to 12 days, mostly following the 5th, and the ground was bare in all sections at the close of the month.

#### MISCELLANEOUS PHENOMENA

*Aurora*: None.

*Dust*: 18th.

*Fog, light*: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 15th, 16th, 17th, 18th, 20th, 23d, 24th, 25th, 26th, 27th, 30th, 31st.

*Fog, heavy*: 1st, 2d, 3d, 4th, 5th, 6th, 17th, 23d, 24th, 26th, 27th, 31st.

*Glaze*: 4th, 5th, 18th, 24th.

*Halo, lunar*: 3d, 5th, 6th, 7th, 9th, 10th.

*Halo, solar*: 1st, 7th, 9th.

*Parhelia*: 9th.

*Parsalene*: None.

*Rime*: 1st, 2d, 3d, 4th.

*Sleet*: 3d, 4th, 5th, 19th, 24th, 26th, 30th, 31st.

*Thunderstorms*: 26th, 27th.

#### ERRATA

Report for December, 1944, page 146; maximum wind velocity at Burlington published 56, should be 49, and footings in the table should show 49 for the current month and the all time record.

#### DEATH OF E. W. LITTLE

On February 1, 1944, Mr. E. W. Little, Cooperative Observer at Spencer, died suddenly after a very brief illness, at the age of 78. He was born in Virginia on October 28, 1865. He began observations on January 29, 1919, and his last complete observation was on January 29, 1944, a total service of 25 years and 1 day, though he left a memorandum of the reading of the minimum thermometer on the morning of January 30. He thus qualified for the letter of honorable mention which was about to be issued. He greatly prized the beautiful "Certificate of Authority" as a cooperative observer to take weather observations, and did his work in a faithful and conscientious manner. He also made good use of the Cooperative Observer's Climatological Record Books, in furnishing information of past weather to persons in his community who were interested.

No decision has been reached as to the future of the station but it may be combined with the work at the airport.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JANUARY, 1944

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>Northwest District</i>																																
Alta	(Maximum)																															
Alta	(Minimum)																															
Alton	45	41	40	35	33	25	20	20	35	41	28	28	40	50	45	40	48	55	50	64	53	51	48	48	66	55	55	39	47	43	34	42.6
Alton	(Minimum)																															
Cherokee	45	42	37	31	31	22	14	20	31	37	18	22	37	50	42	34	48	52	43	59	49	49	47	52	66	55	52	37	44	39	32	39.9
Cherokee	(Minimum)																															
Eatherville	47	44	40	32	35	18	18	20	37	35	17	23	37	53	37	35	47	52	42	58	48	47	48	42	66	55	56	38	45	38	33	40.1
Eatherville	(Minimum)																															
Hawarden	48	46	43	36	34	29	18	26	36	40	26	26	40	50	45	34	48	53	45	64	56	49	50	66	55	55	39	39	39	34	42.5	
Hawarden	(Minimum)																															
Lake Park	46	43	39	35	36	28	12	18	36	32	20	21	36	50	42	34	47	49	45	55	52	44	46	43	63	58	54	38	42	35	33	39.7
Lake Park	(Minimum)																															
Le Mars	45	41	41	34	36	27	15	20	35	40	26	25	39	47	42	35	49	53	47	64	54	49	48	49	67	54	55	38	44	40	36	41.8
Le Mars	(Minimum)																															
Pocahontas	44	41	41	34	31	23	12	18	33	38	19	22	36	48	39	36	48	52	42	54	49	47	48	46	66	57	55	40	43	40	32	39.8
Pocahontas	(Minimum)																															
Rock Rapids	46	43	41	32	35	20	16	21	36	35	19	26	39	50	40	35	48	52	44	61	49	48	48	47	63	45	51	37	42	36	30	39.9
Rock Rapids	(Minimum)																															
Sioux Rapids	46	42	37	35	34	24	15	20	34	39	29	25	38	53	50	36	50	52	49	58	52	50	49	46	68	63	56	51	40	42	38	42.6
Sioux Rapids	(Minimum)																															
Spencer	45	42	40	32	30	20	15	17	31	37	25	23	36	48	38	35	47	50	43	56	51	47	47	47	66	60	55	37	42	39	33	39.8
Spencer	(Minimum)																															
<i>North Central District</i>																																
Algona	46	44	40	35	32	23	11	16	35	40	19	22	37	50	38	36	45	52	43	55	49	48	47	43	66	57	60	41	46	41	32	40.3
Algona	(Minimum)																															
Bancroft	42	42	39	36	30	24	10	16	32	34	20	19	38	47	37	35	44	51	43	54	51	41	46	40	65	55	56	42	42	37	33	38.7
Bancroft	(Minimum)																															
Belmond	47	42	40	36	32	22	13	19	30	38	18	19	36	49	42	34	40	53	44	53	45	48	45	41	64	55	58	44	43	44	33	39.8
Belmond	(Minimum)																															
Britt	48	42	40	32	32	20	12	18	27	36	17	19	36	51	39	40	45	50	40	53	44	48	46	43	65	51	58	42	43	38	30	38.9
Britt	(Minimum)																															
Charles City*	41	40	40	32	28	22	11	19	24	37	15	18	35	46	44	36	45	51	33	50	46	48	43	43	60	51	58	37	42	35	32	37.5
Charles City*	(Minimum)																															
Dakota City	47	42	40	34	31	21	12	18	29	39	19	22	37	48	40	35	48	51	41	46	45	48	47	42	66	55	57	41	44	40	33	39.3
Dakota City	(Minimum)																															
Mason City	45	38	41	33	29	22	13	18	26	36	17	19	35	49	41	34	45	50	41	50	45	47	44	41	62	53	57	43	41	35	33	38.2
Mason City	(Minimum)																															
Northwood	44	37	40	35	28	20	10	16	28	34	18	18	35	51	41	33	45	50	40	52	44	37	45	45	63	50	55	42	42	35	32	37.5
Northwood	(Minimum)																															
Osage	42	38	40	35	31	20	11	18	26	31	26	17	34	45	45	39	45	50	44	51	48	48	43	37	60	55	57	54	42	40	34	38.0
Osage	(Minimum)																															
<i>Northeast District</i>																																
Decorah	42	47	43	36	32	24	13	21	25	39	32	18	33	48	41	37	45	51	45	45	47	49	44	39	59	56	48	50	43	37	36	39.5
Decorah	(Minimum)																															
Delaware (near)	34	45	41	32	31	28	9	19	23	37	23	17	29	40	39	36	43	51	43	43	47	45	43	41	56	52	59	45	41	44	35	37.8
Delaware (near)	(Minimum)																															
Dubuque*	35	46	42	37	34	28	11	19	25	37	22	17	30	40	40	35	44	51	40	45	49	46	44	44	56	58	62	42	44	46	37	38.9
Dubuque*	(Minimum)																															
Elkader	40	46	42	34	34	29	15	21	25	39	29	18	32	43	43	36	45	54	46	44	40	40	43	41	57	55	59	55	43	42	39	40.2
Elkader	(Minimum)																															
Fayette	41	40	42	32	31	28	15	21	24	40	26	19	32	44	43	36	46	53	43	45	49	50	44	38	56	54	61	47	44	42	36	39.6
Fayette	(Minimum)																															
Independence	39	48	39	32	32	27	15	22	23	39	28	19	32	43	42	37	46	54	48	46	48	48	45	39	57	53	61	48	44	42	37	39.8
Independence	(Minimum)																															
New Hampton	40	40	43	33	29	24	13	22	21	38	28	18	33	47	45	38	45	50	40	47	46	48	44	40	56	55	57	52	42	35	35	38.8
New Hampton	(Minimum)																															
Waterloo	41	48	40	35	31	26	13	18	25	39	30	20	33	42	42	37	46	53	44	42	44	49	43	43	60	56	60	43	44	44	34	39.5
Waterloo	(Minimum)																															
Waverly	41	45	40	33	30	20	13	20	26	40	23	19	32	42	43	37	45	53	44	47	47	48	44	39	50	49	50	46	43	38	35	38.7
Waverly	(Minimum)																															
<i>West Central District</i>																																
Carroll	44	43	38	33	34	27	22	25	35	41	28	24	38	55	45	39	53	55	47	55	47	50	49	49	68	59	57	43	45	43	36	42.8
Carroll	(Minimum)																															
Denison	43	45	35	31	33	30	20	22	34	40	25	24	37	53	43	35	51	54	46	57	49	49	45	52	67	58	56	37	44	43	35	41.7
Denison	(Minimum)																															
Guthrie Center	41	43	38	32	34	28	17	22	32	41	31	23	36	52	45	38	52	54	42	55	46	49	46	50	65	54	56	39	44	43	35	41.4
Guthrie Center	(Minimum)																															
Harlan	39	44	38	32	34	33	21	24	35	42	34	24	36	51	46	42	52	55	51	57	51	50	43	53	68	61	54	43	45	43	39	43.2
Harlan	(Minimum)																															
Jefferson	43	42	36	35	33	25	20	16	32	41	31	25	37	49	44	38	52	56	47	56	47	40	47	47	66	58	58	44	47	43	44	42.2
Jefferson	(Minimum)																															
Little Sioux	43	47	40	34	35	32	21	24	33	42	30	24	39	48	47	38	53	56	51	65	50	49	45	55	69	61	55	41	47	47	42	44.0
Little Sioux	(Minimum)																															
Logan	41	46	35	33	34	31	22	22	33	40	37	21	36	45	45	38	50	56	54	59	56	48	46	54	68	64	56	41	42	44	37	43.0
Logan	(Minimum)																															
Mapleton	42	44	35	30	32	29	16	25	33	39	24	23	38	49	44	35	50	54	44	61	50	49	47	51	67	60	55	38	43	42	36	41.5
Mapleton	(Minimum)																															
Rockwell City	45	41	39	34	32	23	11	20	32	40	30	23	36	47	42	37	48	53	44	54	46	49	48	47	66	58	57	42	44	41	35	40.8
Rockwell City	(Minimum)																															
Sac City	16	17	23	26	14	6	0	-8	3	15	7	-1	4	15	22	20	19	30	24	16	25	20	13	32	45	42	34	24	22	28	23	18.6
Sac City	(Minimum)																															
Sioux City*	48	45	42	28	33	22	15	23	32	37	19	22	40	48	44	38	51	55	45	65	45	48	48	51	68	49	54	38	43	41	34	41.0
Sioux City*	(Minimum)																															
<i>Central District</i>																																
Ames	43	43	43	31	31	23	17	18	28	40	32	23	36	45	41	36	47	54	46	54	47	49	46	44	61	53	58	42	44	40	35	40.3
Ames	(Minimum)																															
Boone	42	41	44	32	31	24	13	18	30	40	28	22	37	45	43	36	47	54	45	55	46	49	46	47	64	55	57	43	45	40	35	40.5
Boone	(Minimum)																															
Des Moines*	41	49	44	32	32	26	12	18	30	40	23	24	36	46	43	37	50	55	42	55	48	50	44	51	60	61	50	39	47	42	38	41.1
Des Moines*	(Minimum)																															
Fort Dodge	47	42	42	34	32	24	12	21	30	40	28	23	38	49	41	36	49	54	43	56	47	48	49	45	66	55	59	39	46	43	35	41.1
Fort Dodge	(Minimum)																															

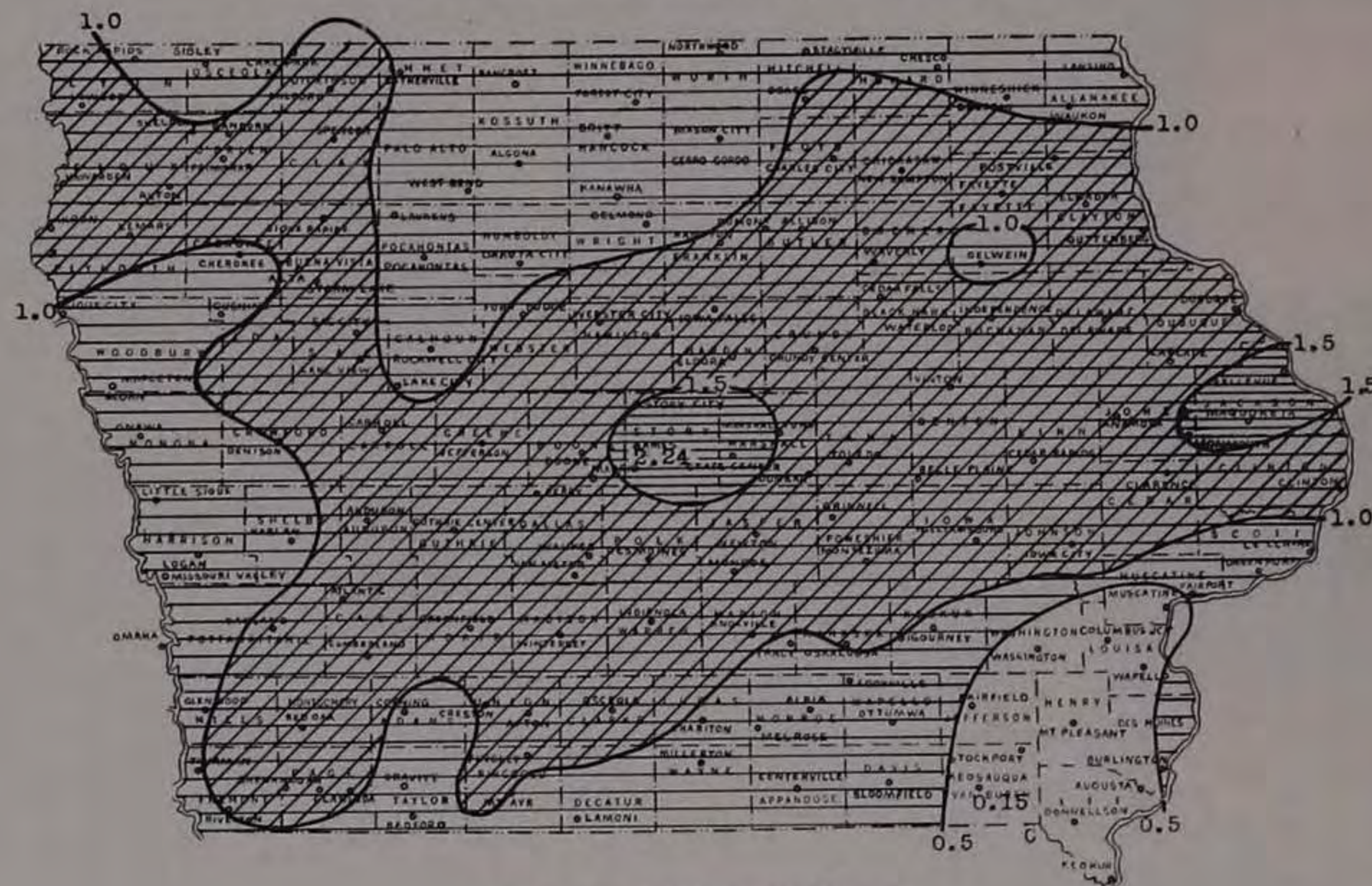
DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JANUARY, 1944—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are categorized by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

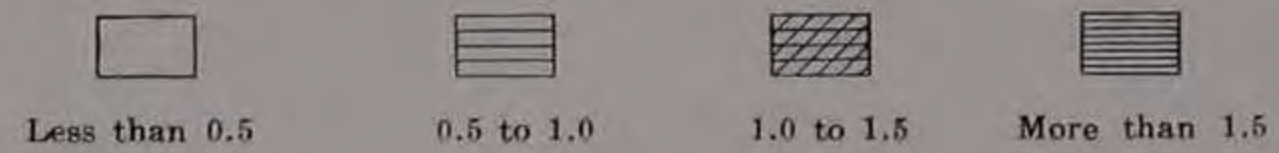
Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight. †Interpolated.



TOTAL PRECIPITATION, JANUARY, 1944



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

**11**

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, FEBRUARY, 1944 No. 2

COMPARATIVE DATA FOR FEBRUARY, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	19.2	49	-25	1.17					
1874.....	21.2	59	-20	1.28					
1875.....	6.4	48	-31	1.72					
1876.....	25.5	68	-16	1.11					
1877.....	34.0	63	-5	0.21					
1878.....	34.4	60	-8	0.59					
1879.....	21.6	57	-20	0.68					
1880.....	27.4	68	-12	0.64					
1881.....	17.0	57	-24	3.10					
1882.....	33.5	72	-12	0.91					
1883.....	17.7	62	-33	1.89					
1884.....	18.3	56	-23	1.32					
1885.....	12.5	54	-32	0.82					
1886.....	21.2	56	-34	0.59					
1887.....	17.1	60	-25	2.14					
1888.....	20.2	64	-34	1.01					
1889.....	17.8	62	-28	0.47					
1890.....	25.1	68	-24	0.83					
1891.....	19.4	70	-31	1.16		3	13	7	8
1892.....	28.1	68	-20	1.20	5.0	6	6	7	16
1893.....	16.0	60	-28	1.39	8.1	6	10	8	10
1894.....	19.7	60	-19	0.89	8.4	3	16	8	4
1895.....	16.4	73	-33	0.49	3.3	4	13	9	6
1896.....	27.4	78	-13	0.71	5.4	4	12	9	8
1897.....	24.7	61	-24	0.89	8.0	5	6	10	12
1898.....	24.2	62	-18	1.20	7.8	5	10	9	9
1899.....	12.2	75	-40	0.89	7.1	5	11	10	7
1900.....	14.8	60	-27	1.30	9.9	6	10	8	10
1901.....	17.5	49	-21	1.01	9.7	4	15	7	6
1902.....	17.6	62	-21	0.73	2.6	4	13	8	7
1903.....	19.8	56	-21	1.18	7.9	4	13	7	8
1904.....	14.8	70	-26	0.41	4.5	4	10	9	10
1905.....	12.8	69	-41	1.57	15.5	7	14	6	8
1906.....	23.6	66	-32	1.29	6.1	5	14	7	7
1907.....	25.0	65	-31	0.71	4.6	4	14	6	8
1908.....	24.3	59	-16	1.69	8.9	6	12	6	11
1909.....	26.2	62	-26	1.54	7.7	5	11	6	11
1910.....	17.8	58	-21	0.46	4.0	3	14	8	6
1911.....	27.3	71	-13	2.76	7.0	6	12	6	10
1912.....	18.1	57	-30	1.21	11.2	5	10	9	10
1913.....	20.2	70	-24	0.82	7.3	4	14	7	7
1914.....	16.8	59	-29	0.87	9.2	6	10	9	9
1915.....	29.1	62	-8	2.93	9.4	9	9	5	14
1916.....	19.0	62	-32	0.55	6.0	4	14	8	7
1917.....	15.2	68	-37	0.36	3.5	3	14	8	6
1918.....	23.0	70	-36	0.95	6.0	5	14	7	7
1919.....	24.9	65	-16	2.42	9.9	8	11	5	12
1920.....	24.0	59	-22	0.56	4.1	5	9	6	14
1921.....	31.0	76	-5	0.77	6.5	5	13	7	8
1922.....	23.7	70	-20	1.59	1.3	4	14	7	7
1923.....	20.1	61	-23	0.40	3.2	3	13	8	7
1924.....	25.8	70	-15	1.27	11.2	7	15	5	9
1925.....	28.4	66	-16	0.82	2.6	4	11	7	10
1926.....	31.2	67	-2	0.76	3.3	4	10	7	11
1927.....	30.6	65	-17	1.15	4.4	5	13	6	9
1928.....	28.6	65	-14	1.95	4.4	7	15	5	9
1929.....	14.0	52	-35	1.31	12.5	8	10	7	11
1930.....	35.5	80	-34	0.67	2.8	5	11	10	7
1931.....	35.4	65	-4	0.25	0.9	2	16	5	7
1932.....	28.9	74	-16	0.83	5.1	5	12	8	9
1933.....	22.3	69	-31	0.32	3.6	3	17	6	5
1934.....	25.0	71	-25	0.47	4.1	3	14	8	6
1935.....	29.1	64	-19	1.13	5.5	6	9	7	12
1936.....	6.0	71	-35	1.33	15.9	9	9	10	10
1937.....	19.6	60	-24	1.04	6.7	6	12	7	9
1938.....	29.0	71	-22	0.94	4.6	7	7	7	14
1939.....	20.3	60	-23	1.75	14.9	5	14	6	8
1940.....	24.2	56	-27	1.18	11.1	9	8	6	17
1941.....	22.3	59	-18	0.50	2.2	4	10	9	9
1942.....	23.4	52	-21	1.15	9.4	6	6	9	13
1943.....	27.5	71	-20	0.77	2.9	4	16	8	4
1944.....	26.7	68	-30	1.10	6.7	6	11	9	9
Period.....	22.5	80	-41	1.08	6.7	5	12	8	9

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

As the cold air mass moved eastward the temperature rose rapidly to near normal. A trough of low pressure formed over the Great Plains and as it moved eastward general light snow fell over southern and eastern Iowa, with falls becoming moderately heavy in the southeast. Over most of the Raccoon

## GENERAL SUMMARY

February, 1944, was a rather warm month with precipitation averaging close to the normal. In many respects the weather was similar to that which prevailed during the preceding month, except that the temperature excess was not as pronounced as in January and a considerable portion of the precipitation was in the form of snow.

This was the third consecutive month in which the temperature averaged above normal but it was the first time since August that the precipitation exceeded the all-time average. The amount of the excess was slight, amounting to only 0.02 inch. The January deficiency was 0.03 inch so that for the first two months of 1944 the total precipitation was 0.01 inch less than the normal for the period.

Sunshine and humidity were slightly in excess of normal while wind movement, cloudiness and other climatic factors were near the seasonal averages. Heating requirements were slightly below normal.

Warm, dry and mostly sunny weather prevailed during the first eight days, although conditions became somewhat unsettled in local areas at times. Continental Polar air masses predominated during this period. On the fourth the maximum temperatures for the month occurred at a majority of stations in the northwest quarter of the State, and strong winds occurred on the 4th and 5th.

On the 9th a mass of Continental Arctic air that was warm relative to the earth's surface, covered the upper Mississippi Valley. A ridge of high barometric pressure extended from a peak in northwest Canada southward over the Mississippi Valley. At the same time an energetic barometric disturbance was centered over extreme southwest Wyoming. During the next two days the low pressure center at the earth's surface moved southeastward to Oklahoma and then northeast into the Ohio Valley while Continental Arctic air pushed southward over the Great Plains and then spread eastward. Charts of pressure aloft showed deep barometric disturbances over western Kansas at the 5,000 and 10,000-foot levels shortly before midnight on the 9th. At the same time on the 10th troughs of low pressure appeared on the 5,000, 10,000 and 20,000-foot charts. At 20,000 feet the trough extended from the east slope of the Rockies to Hudson Bay and at 5,000 feet the trough extended from east Texas to just west of the Gulf of St. Lawrence. These conditions were attended by light to moderate snow over the entire State of Iowa, with the heaviest falls in the extreme west part of the State, amounting to about 8 inches.

The outbreak of Continental Arctic air brought a sharp drop in temperature, and except at one or two stations the lowest temperatures of the month occurred on the morning of the 12th. The crest of the high pressure area caused by the Arctic air covered southwest Iowa, and the lowest readings occurred in counties along the western border of the State where the preceding snowfall had been heaviest.









DAILY PRECIPITATION FOR FEBRUARY, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. Includes sub-section 'Southeast District (Continued)' with stations like Donnellson, Eddyville, etc.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- 1 Midnight to midnight.
2 Measured in the morning; for the preceding 24-hours.
T Trace or 0.005 inch or less.
\* Included in next measurement.
† Recording gage.
‡ Windshield on gage.
§ Data interpolated.
¶ Partly interpolated.

SUPPLEMENTAL TABLE, FEBRUARY, 1944

Table with columns for Stations, Counties, Elevation, Length of record, years, and Precipitation, in inches (Total, Departure from normal, etc.).

Rainfall data for river stations, erosion stations and other miscellaneous stations appear in the daily precipitation table only.

\*Best available used for stations not equipped with recorders.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, FEBRUARY, 1944

Table with columns for Stations, Sea-level pressure, Wind, Relative Humidity, Percentage of sunshine, and Degree Days.

†True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.
§Sioux City \*Davenport

SOIL TEMPERATURE AT AMES, IOWA, FEBRUARY, 1944

Table with columns for Temperature, 4 feet above ground, and At Depth in Soil of (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches).

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

Valley and adjacent areas no snow or only light flurries occurred. Some light snow again fell over much of the State on the 15th, 16th and 17th, attending the passage of fronts between air masses or due to instability caused by passage of fronts outside the borders of the State.

From the 10th through the 19th the temperature remained almost continuously below the freezing point and snow that had fallen during the periods mentioned above melted rather slowly. Although temperatures were near normal on the 14th and 16th, the period as a whole was quite cold and brought the most "winter-like" weather of the season. In general there was less inconvenience caused by the cold than is usually the case, although some roads were blocked and numerous traffic accidents occurred as a result of drifting, blowing snow on the 10th.

During the last 10 days of the month the temperature was again continuously above normal. Except in the northwest portion, the monthly maximum readings generally occurred on the 25th.

On the 22d a barometric disturbance passed over Iowa as it moved from western Kansas northeastward to the southern portion of the Lake region. Rather general precipitation occurred in connection with the passage of the low with the heaviest amounts occurring in the east central section. A number of thunderstorms were also reported in the eastern counties.

Again on the 25th-26th a deep barometric disturbance crossed Iowa from southwest to northeast as it traveled from Kansas to the Great Lakes. Shortly before midnight of the 25th a V-shaped low pressure trough covered the Rocky Mountain region from the 5,000-foot to the 20,000-foot level and moved eastward as the surface low moved northeast. The lowest barometric readings of the month occurred as the disturbance passed. Precipitation was widespread but was of a showery character. In the center of the State the amounts were light with many stations reporting none or only traces. In the extreme northwest (Lyon County) heavy downpours occurred, flooding streets of Rock Rapids and halting traffic. Moderately heavy showers occurred in the eastern counties and thunderstorms were reported from all sections, especially where the rainfall was heaviest.

S.E.D.

#### TEMPERATURE

The State average temperature derived from the averages of nine districts of approximately equal area and based on averages of 116 temperature observing stations, was 26.7°. This was 4.2° above the average of the entire 72 Februaries of record, and 0.8° lower than February, 1943. There have been warmer and 52 colder Februaries during the period of record. All stations reported averages above the adopted normals, with the greatest excesses in the northern third of the State. The highest station average was 31.5° at Keokuk, while the lowest was 21.6° at Inwood. The highest observed was 68° at Fairfield on the 25th, the lowest -30° at Hawarden on the 12th. Temperatures failed to rise above freezing on an average of 9 days, while the average number of days with minimum temperature of 32° or lower was 27, and of zero or lower, 5.

#### PRECIPITATION

The average precipitation, which was also obtained from the averages of nine districts of about equal area and based on reports of 119 precipitation measuring stations, was 1.10 inches, or 0.02 inch more than the all-time February average. There have been 32 wetter and 39 drier Februaries in the 72 years of State record. The averages were above the district normals in the three eastern and the northwest districts. The greatest amounts fell in the southeast and east central sections, with a secondary area of heavy fall in the northwest district. Mt. Pleasant reported the greatest total of 2.42 inches, while the least was 0.41 inch at Creston. The average number of days with measurable precipitation was 6, one more than normal. The greatest 24-hour fall was 1.46 inches at Rock Rapids on the 25th-26th.

#### SNOWFALL

The average snowfall amounted to 6.7 inches, or exactly normal. Since the total precipitation was practically normal, the proportion of snowfall to all forms of precipitation was also normal. In general, the heaviest falls occurred in the eastern and southern districts, with a secondary area of maximum fall in the northwest, but variations were not marked. Augusta river station reported a monthly total of 13.5 inches, Clinton 12.4, Lamoni Airport 12.2, and several other stations in excess of 10 inches. The least amounts were 1.9 inches at Denison SCS, 1.9 at Milford (near) and Sibley, and 2.0 at Harlan. Although there was considerable variation in the duration of snow cover, the only period in which the ground was covered in nearly all sections was from the 10th to the 20th.

#### MISCELLANEOUS PHENOMENA

*Aurora*: None.

*Corona*: 4th.

*Fog, light*: 1st, 2d, 3d, 4th, 7th, 8th, 9th, 12th, 13th, 14th, 16th, 17th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th.

*Fog, dense*: 2d, 3d, 17th, 20th, 21st, 22d, 23d, 25th, 26th.

*Glaze*: 5th, 22d.

*Hail*: 25th, 26th.

*Halo, lunar*: 6th.

*Halo, solar*: 5th, 9th, 11th, 15th.

*Parhelia*: 11th.

*Rime*: None.

*Sleet*: 1st, 2d, 5th, 8th, 21st, 22d.

*Thunderstorms*: 21st, 22d, 25th, 26th.

#### THE WINTER OF 1943-1944.

Following the cool and dry weather that persisted throughout the autumn months there was a change to warmer and wetter conditions as the winter progressed. The reversal in trend affected temperature readings first, and after a lag of several weeks was also reflected in the precipitation averages.

For the winter months as a whole (December, January and February) the average temperature was 27.7°, or 5.8° above the all-time mean. It was the 6th warmest winter of record during the 72 years for which data are available. Heating requirements as measured by degree-day values at first order stations were about 90% of the normal. Sunshine averaged 63% of the possible amount, or 12% above normal.

The highest observed temperature during the winter was 70° at Missouri Valley on January 25. The lowest was -30° at Hawarden on February 12. December was the coldest month and January the warmest of the season.

Precipitation averaged 2.68 inches for the season. This was 0.67 inch less than the all-time winter average, and has been exceeded in 47 winter seasons. However, the deficiency was nearly all chargeable to December as both January and February averaged close to normal.

The total snowfall of 8.6 inches was the least of record for any winter since such data were first tabulated in 1892. December snowfall equaled the least of record for that month and January set a new monthly record for low snowfall. However, the February amount was normal for that month.

There were more clear and fewer cloudy days than usual, while the number of days with measurable precipitation has been exceeded in every previous winter except two.

As mentioned previously, the swing towards above normal temperature reached its climax in January, when the monthly average of 30.1° was the third highest January value of record. Although February was relatively warm, the excess was not as marked as in January, and temperatures fell to near or below normal early in March. On the other hand, there was still a considerable precipitation deficiency in December, but the combined January-February amounts were only 0.01 inch less than normal, and these months were followed by relatively heavy precipitation in March.

It is interesting to note that all three winter months began and ended with periods of above normal temperature, while the cold weather occurred during the middle portions. Details of the weather elements may be found in the monthly summaries.

S.E.D.



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF FEBRUARY, 1944

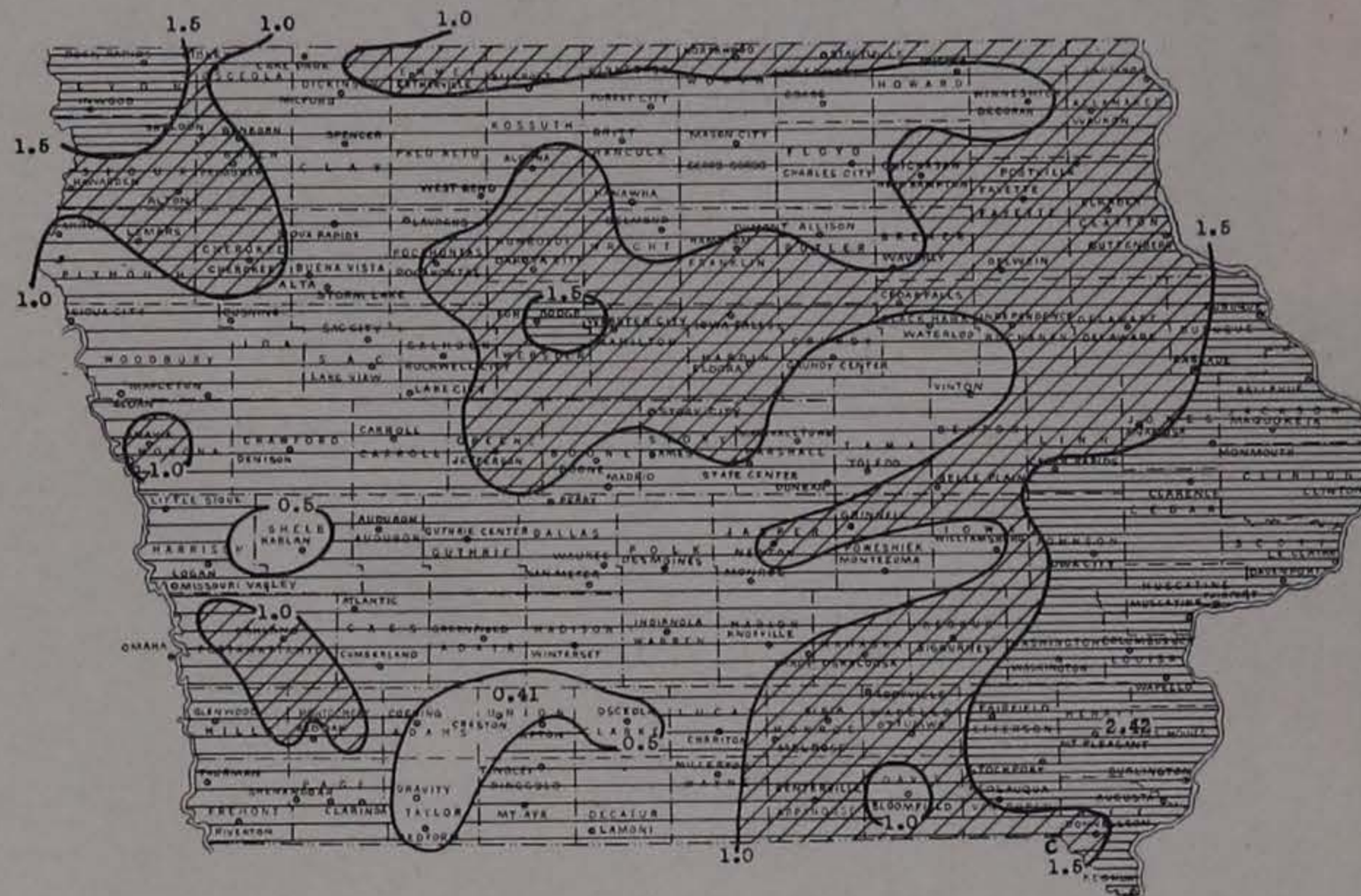
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes maximum and minimum temperature values for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF FEBRUARY, 1944—Continued

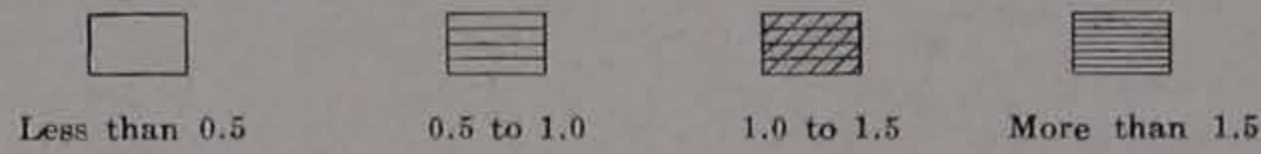
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District, East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values.

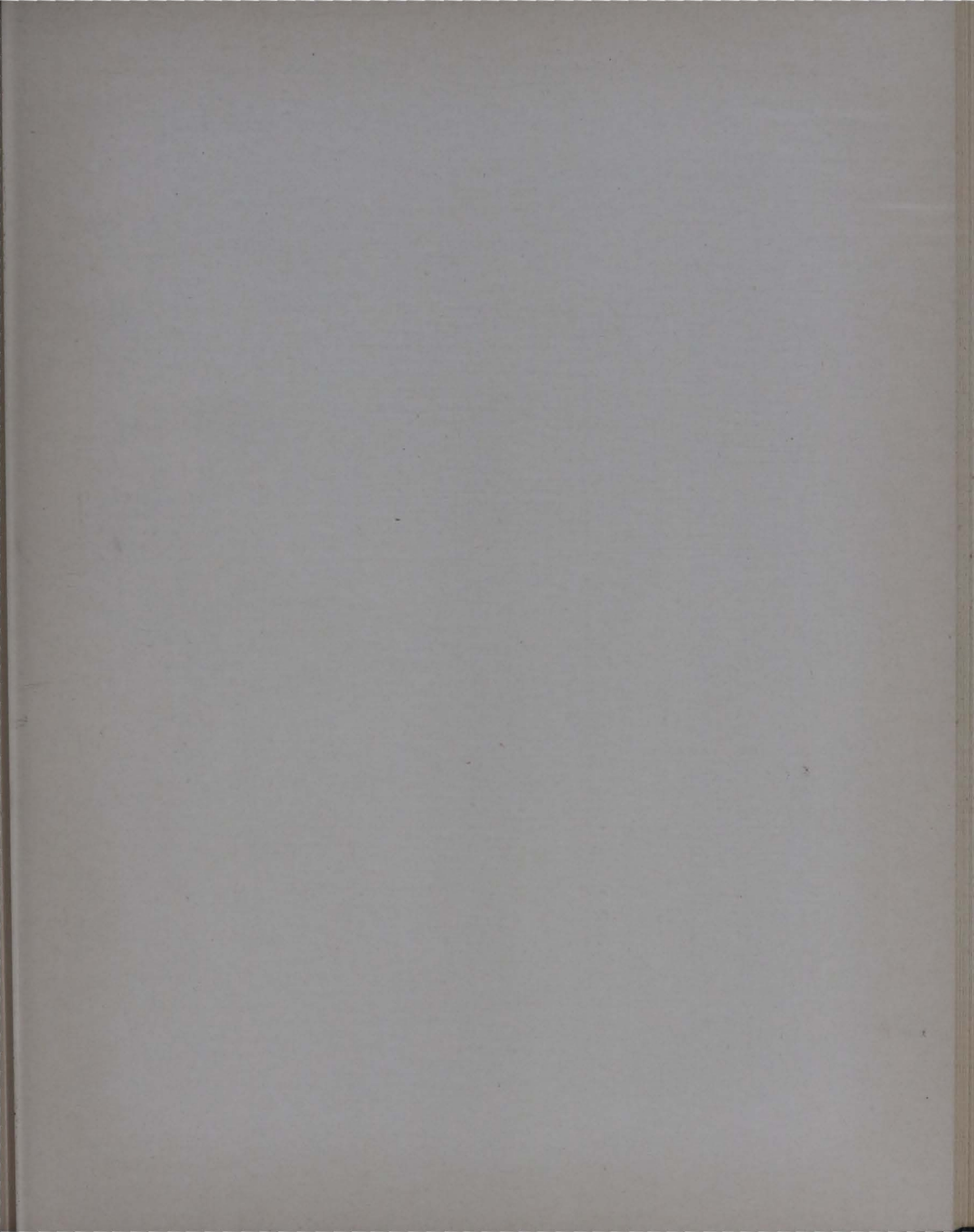
Temperatures are for the 24-hour period ending from about sunset to 7 p. m., except where otherwise noted. \*For 24 hours, midnight to midnight. †Interpolated.

TOTAL PRECIPITATION, FEBRUARY, 1944



SCALE OF SHADES IN INCHES





# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV

DES MOINES, IOWA, MARCH, 1944

No. 3

## GENERAL SUMMARY

Iowa weather during March, 1944, was generally cloudy, wet and cold, and was unfavorable for early spring farm operations and other outdoor work. It was the coldest March since 1932, 0.7° colder than March of last year, and the 14th coldest of record. The average temperature of 30.3° was only 0.2° warmer than January of this year, and heating requirements were practically the same as in January. As far as human and animal comfort are concerned, March was the most wintry month. In January there was little precipitation, but much sunshine, and daytime temperatures generally, rose to higher levels than in March. There were only 6 days on which the temperature failed to rise above freezing. In March on the other hand, nighttime minimum readings were relatively high but cloudy skies prevented much rise during the day, and there was an average of 8 days with maximum readings below 32°. Furthermore, frequent rain and snow caused sloppy conditions under foot in contrast to the dry roads, walks and streets that prevailed during most of January.

Precipitation averaged 2.58 inches, or 0.85 inch more than normal. This amount lacked only 0.10 inch of equaling the combined falls of the three preceding months. The number of days with measurable precipitation was the greatest of record for March, and exceeded by 2 the combined number of rainy days for December, January and February.

The wintry weather was even more pronounced in the snow-fall values. The average total of 11.9 inches was the fourth greatest of record for March, and exceeded by 0.2 inch the combined falls of all the preceding months from October through February. This, of course, is accounted for by the fact that the autumn and early winter were dry; nevertheless, the contrast between the fine weather of January and the gloomy conditions of March applies in a general way to the entire autumn and winter season as compared with March and at least the first half of April. This general weather pattern follows that of 1943, but does not furnish an index to future conditions.

The warmest March of record, 1910, with an average temperature of 48.9°, was also the driest, with an average of only 0.17 inch of rain and a trace of snow. However, the wettest March of record, 1878, with 3.36 inches of precipitation, was also unusually warm, with average temperature of 45.6°. The coldest March of record had slightly less than normal precipitation.

In addition to having the greatest number of days with measurable precipitation of record for March, the month also equaled the least number of clear days of record and came within one of equaling the number of cloudy days. Sunshine was deficient, while relative humidity was considerably above normal. The prevailing winds were from the northwest, with average velocities considerably above the March normal.

The month was unfavorable for farm operations. There was practically no clearing of fields of cornstalks, although

## COMPARATIVE DATA FOR MARCH, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	34.0	72	-18	1.42					
1874.....	31.7	68	-4	1.43					
1875.....	26.9	80	-10	1.62					
1876.....	27.2	75	-6	3.24					
1877.....	27.3	72	-14	2.28					
1878.....	45.6	80	-20	3.36					
1879.....	37.2	80	-3	1.18					
1880.....	33.6	80	-21	1.26					
1881.....	27.1	56	0	1.91					
1882.....	36.3	78	4	1.82					
1883.....	30.6	72	-13	0.55					
1884.....	32.0	72	-16	2.57					
1885.....	31.3	65	-16	0.24					
1886.....	30.6	74	-9	1.72					
1887.....	33.5	76	-8	0.93					
1888.....	26.4	78	-12	3.04					
1889.....	39.7	80	8	0.47					
1890.....	28.1	75	-24	1.49					
1891.....	26.8	66	-19	2.60		10	6	8	17
1892.....	31.0	84	-6	2.22	3.9	6	11	8	12
1893.....	31.8	84	-8	2.14	4.0	8	9	11	11
1894.....	41.0	84	-5	2.03	2.7	6	13	10	8
1895.....	34.4	94	-11	0.83	2.9	4	16	8	7
1896.....	30.9	81	-12	1.10	5.4	5	12	9	10
1897.....	32.0	72	-22	2.39	5.5	8	9	8	14
1898.....	37.5	72	-2	1.94	3.7	6	12	9	10
1899.....	23.0	75	-16	1.62	8.0	6	7	12	12
1900.....	30.7	81	-13	2.06	6.6	5	12	9	10
1901.....	34.2	76	-8	2.64	12.6	7	10	8	13
1902.....	39.1	79	-12	1.45	1.3	7	9	11	11
1903.....	38.8	82	6	1.38	3.9	7	11	7	13
1904.....	34.8	78	3	2.18	4.4	7	8	8	15
1905.....	41.5	84	1	2.04	4.1	7	8	8	15
1906.....	27.1	65	-14	2.34	8.9	10	8	7	16
1907.....	40.6	92	-7	1.35	4.1	6	14	7	10
1908.....	37.9	85	-8	1.58	1.1	6	13	7	11
1909.....	32.5	71	-15	1.53	9.8	6	12	10	9
1910.....	48.9	92	-10	0.17	T.	1	23	6	2
1911.....	39.4	83	2	0.93	1.9	5	16	9	6
1912.....	24.9	70	-19	2.01	19.1	7	15	6	10
1913.....	31.9	78	-23	2.48	5.3	9	11	10	10
1914.....	34.7	78	-5	1.69	1.8	7	12	8	11
1915.....	29.3	61	-5	0.96	8.8	5	8	9	14
1916.....	35.2	80	-18	1.57	2.9	6	11	9	11
1917.....	34.6	85	-12	1.84	6.2	6	14	8	9
1918.....	42.9	85	0	0.63	2.6	3	19	7	5
1919.....	37.5	78	-11	2.33	1.1	6	15	8	8
1920.....	38.0	80	-21	3.02	2.4	7	15	7	9
1921.....	42.8	86	4	1.57	0.2	7	14	8	9
1922.....	38.3	74	-5	1.97	3.4	7	12	6	13
1923.....	29.4	78	-22	2.87	18.5	7	13	9	9
1924.....	31.9	72	3	2.65	10.5	8	8	8	15
1925.....	40.1	82	-6	0.93	2.9	4	17	9	5
1926.....	32.1	78	-4	1.06	8.1	6	12	9	10
1927.....	39.6	75	0	1.92	2.9	9	11	7	13
1928.....	38.9	88	1	1.44	3.0	5	15	8	8
1929.....	39.1	83	-5	1.44	3.5	5	12	8	11
1930.....	37.3	80	-4	0.89	1.3	5	14	8	9
1931.....	34.9	64	5	1.68	10.3	6	11	8	12
1932.....	28.4	77	-8	1.46	10.2	7	11	11	9
1933.....	36.0	77	-3	3.09	9.2	8	11	9	11
1934.....	34.4	81	-13	1.09	6.0	6	12	10	9
1935.....	40.7	85	-2	1.47	5.5	8	12	9	10
1936.....	39.2	80	-1	1.02	2.3	5	13	11	7
1937.....	32.9	76	-2	1.63	4.4	7	11	9	11
1938.....	43.7	89	0	2.35	1.2	9	13	8	10
1939.....	36.4	86	-9	1.79	7.1	6	15	8	8
1940.....	31.6	79	-2	1.72	10.1	10	8	8	15
1941.....	33.5	71	-10	0.99	6.8	6	10	10	11
1942.....	38.3	77	5	1.96	2.5	9	8	8	15
1943.....	31.0	90	-19	1.51	9.8	6	14	9	8
1944.....	30.3	67	-7	2.58	11.9	12	7	8	16
Period.....	34.5	94	-24	1.73	5.6	7	12	8	11

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

some of this work was done during January. Only a few scattered fields of oat were sown during the closing week. The weather was unfavorable for new lambs, chicks and pigs, especially pigs. The glut of marketable hogs during January, which caused the animals to be held back on farms and con-



CLIMATOLOGICAL DATA FOR MARCH, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

Temperature normals are based on the inter-station relationships during the 10-year period ending December 31, 1930, harmonized with the normals of first order stations for the 46-year period, July 3, 1875 to July 2, 1921.

Precipitation normals are based on the 35-year averages, 1898-1932, for stations having records covering that period. For stations having 15 years of record and less than 35, normals have been adjusted to the 35-year record. For stations having less than 15 years of record, normals have been interpolated from normal maps constructed from the 35-year and adjusted means. However, State departure is based on the averages for the entire 72 years of record and must necessarily differ slightly from average station departures based on established normals.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated. † Trace or 0.005 inch or less. ‡ Data interpolated. § Partly interpolated. † And other dates. ‡ Received too late to be included in means and summaries. † Best available used for stations not equipped with recorders.







DAILY PRECIPITATION FOR MARCH, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. Rows include Southeast District (Continued) with stations like Donnellson, Eddyville, Fairfield, etc.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon. 1 Midnight to midnight. 2 Measured in the morning; for the preceding 24-hours. T Trace or 0.005 inch or less. \* Included in next measurement. † Recording gage. ‡ Windshield on gage. § Data interpolated. ¶ Partly interpolated.

SUPPLEMENTAL TABLE, MARCH, 1944

Table with columns for STATIONS, COUNTIES, Elevation, Length of record, Precipitation (Total, Departure, Greatest, Date, Total snowfall), No. of Days (With precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind.

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only. \*Best available used for stations not equipped with recorders. † Figures and letters following stations indicate distance in miles and direction from the city P.O. unless otherwise noted.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, March, 1944

Table with columns for Stations, Sea-level pressure, Wind (Average hourly velocity, Maximum velocity, Direction, Date), Relative Humidity (12:30 A. M., 6:30 A. M., 12:30 P. M., 6:30 P. M.), Percentage of sunshine, Degree Days.

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7. §Sioux City \*Davenport

SOIL TEMPERATURES AT AMES, IOWA, MARCH, 1944

Table with columns for Temperature, 4 feet above ground, and At Depth in Soil of (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Rows include Average 7 a. m., Average 12 noon, Average 7 p. m., Highest Date, Lowest Date, Number of days with temperature.

† And other dates. \* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

sume feed grains, resulted in a shortage of corn in many counties, and the shortage was aggravated by the cold, wet March. This condition and the unfavorable hog market and labor situation caused a reduction in the number of brood sows. Likewise, the low price of eggs, feed shortage, and the cold, stormy weather, caused a good many farmers to cancel their orders to the hatcheries for baby chicks.

Precipitation was so frequent that it is difficult to make a generalized statement concerning any period. In some instances precipitation in the eastern part of the State occurred in connection with the passage of a cold front at the same time that overrunning moist air was causing showers in the west.

The warm weather that prevailed during the last part of February continued during the first few days of March as a barometric disturbance moved eastward over Minnesota. On the morning of the 3d a cold front extended from the Great Lakes to the Oklahoma Panhandle, crossing northern Missouri. During the next 24 hours a barometric disturbance moved northeast along the front and caused showers over most of Iowa, with the heaviest falls of the month in the southwest part of the State. This was followed by somewhat lower temperatures.

On the 5th a barometric disturbance began moving eastward over the central Great Plains and on the morning of the 6th appeared as a trough of low pressure extending from Canada to Arkansas, with disturbance centers over northern Minnesota and east-central Missouri. A cold front stretched between the centers passing over Iowa. Barometer readings reached the lowest values of the month in the eastern parts of the State and precipitation was general in all sections. There was a considerable fall of snow which was picked up and drifted by winds of over 30 miles per hour, the storm reaching blizzard proportions over much of the State, especially the northwest. Late on the 6th and on the 7th dust that was picked up by the winds before reaching Iowa mingled with the drifting, blowing snow, causing the surface of the snow to present a dirty brown appearance at least as far southeast as Des Moines, but especially in the northwest section. The drifting and blowing continued after the fall of new snow ceased, roads and highways were blocked, and motor traffic practically came to a halt until the wind subsided on the 8th. Many rural schools were closed and rail traffic was hampered. Many employees of the Des Moines Ordnance Plant spent the night of the 7th in the plant because of travel hazards to the city of Des Moines, 8 miles south. It was the most general traffic tie-up of the winter.

The storm was followed by a fresh outbreak of cold Polar air that overspread Iowa and caused the lowest temperature readings of the month on the 9th. Subzero readings were general in the northern and central districts. An area of high pressure attending the outbreak of cold air passed directly over the State and produced the highest barometer readings of the month.

Following these low readings on the 9th the temperature rose rapidly and on the following date a few stations reported maximum readings as high as any to occur during the month. Temperatures were mostly above normal on the 10th and 11th. More showers occurred on the 11th as new cold fronts passed over the State and temperature readings again fell below normal on the 12th and remained low through the 21st.

On the 13th, 14th and 15th, thunderstorms occurred in many sections, and hail, sleet and freezing rain fell over much of the State as Maritime Tropic air overran Continental Polar air at the surface. Excessively heavy downpours fell in the eastern districts, especially in the southeast, where some tributary streams overflowed their banks. During this period barometric disturbances forming over the southwestern States moved eastward to the south of Iowa, but with frontal areas crossing Missouri.

Traffic was again hampered and as on the 7th and 8th there were numerous accidents caused by the hazardous driving conditions. In addition there were many personal injuries due to falls on the icy walks and streets. Additional precipitation occurred in some section or other on the next 3 days, but the 19th and 20th were generally fair.

Temperatures once more rose to slightly above normal from the 22d through the 24th, and the highest readings of the month generally occurred on the 23d and 24th. A barometric disturbance moving north and thence east passed over Iowa and caused showers and thunderstorms, as well as rising temperatures on the 21st-22d. Over much of the northwest portions the heaviest 24-hour falls of the month occurred on these dates.

Another "low" moved eastward across Minnesota and brought the lowest barometer readings of the month on the 24th. This was followed by a fresh outbreak of cold Polar air that once more caused temperatures to fall below normal on the 25th and to remain unseasonably low until the end of the month and into April. Precipitation occurred in some section or other daily from the 26th to the 30th in connection with the passage of disturbances or frontal systems, but space does not permit discussion of the rather involved synoptic conditions that prevailed.

Unlike March of last year, there were no destructive windstorms or tornadoes. However, the effect of the prolonged cold may ultimately be far greater on the farm and commercial economy of the State as a whole, than would have been the effect of numerous destructive local storms. S.E.D.

#### TEMPERATURE

The average Iowa temperature for March, obtained from the averages of nine districts of about equal area, and based on reports from 117 temperature observing stations, was 30.3°. This was 4.2° lower than the average of all of the 72 Marchs of record, and was also 0.7° colder than March, 1943. There have been but 13 colder Marchs, while 58 have been warmer. The warmest March of record was in 1910 when the average temperature was 48.9°; the coldest occurred in 1899, in which year the average temperature was 23.0°. District averages ranged from 34.2° in the southeast to 27.0° in the northwest, and in a general way departures from normal increased from east to west. The highest station average, 36.3°, was reported from Keokuk, while the lowest was 25.2° at Sibley and Sanborn. At Keokuk Dam where temperatures are affected by the masonry and by the water surface, the average was 37.7°. The absolute high was 67.0° at Muscatine on the 12th, and the lowest was -7.0° at Delaware (near) on the 9th. For the State as a whole the average number of days with maximum readings of 32° or lower was 8, days with minima of freezing or lower 27, and days with zero or lower 1. In the southern third of the State only a few stations near the Missouri River reported zero readings.

#### PRECIPITATION

The average total March precipitation derived from the average values of nine districts of almost equal area, and the measured totals at 120 stations, was 2.58 inches. This was 0.85 inch more than the all-time March average, based on records of 72 years. While the averages were above normal in all districts, the excess increased to the east and south of the northwest corner, culminating in an average of 3.91 inches, 1.65 inches more than normal in the southeast district. The greatest total was 5.20 inches at Burlington, which also reported the greatest 24-hour fall of 3.19 inches on the 14th-15th. However, at Dam 18 in the Mississippi River at Burlington, the monthly total amounted to 5.37 inches. The average number of days with measurable precipitation was 12, the greatest of record since 1891, when tabulation of these data began. That part of the precipitation that fell as snow is discussed in the following paragraph.

#### SNOWFALL

The average snowfall amounted to 11.9 inches, or 6.3 inches more than normal. District averages varied from 16.0 inches in the west central and 15.9 inches in the northeast, to 4.8 inches in the southeast. The greatest total was 24.5 inches at Logan. Other falls in excess of 20 inches were 21.2 at Little Sioux, 24.0 at Lake View, 22.2 at Atlantic, 21.5 at Northwood, 20.5 at Independence, 20.3 at Decorah, and 20.0 inches at Marshalltown, Glenwood and Emerson (near). The least reported was 1.8 inches at Lamoni. There have been only 3 Marchs with greater snowfall since 1892. The greatest of record was 19.1 inches in 1912 and the least a trace in 1910.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MARCH, 1944

Table with 32 columns (days 1-31) and 32 rows (stations). Rows include Northwest District (Alta, Alton, Cherokee, Estherville, Hawarden, Lake Park, Le Mars, Pocahontas, Rock Rapids, Sioux Rapids, Spencer), North Central District (Algona, Bancroft, Belmont, Britt, Charles City, Dakota City, Mason City, Northwood, Osage), Northeast District (Decorah, Delaware, Dubuque, Elkader, Fayette, Independence, New Hampton, Waterloo, Waverly), West Central District (Carroll, Denison, Guthrie Center, Harlan, Jefferson, Little Sioux, Logan, Mapleton, Rockwell City, Sac City, Sioux City), and Central District (Ames, Boone, Des Moines, Fort Dodge, Grinnell). Each station lists maximum and minimum temperatures for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MARCH, 1944—Continued

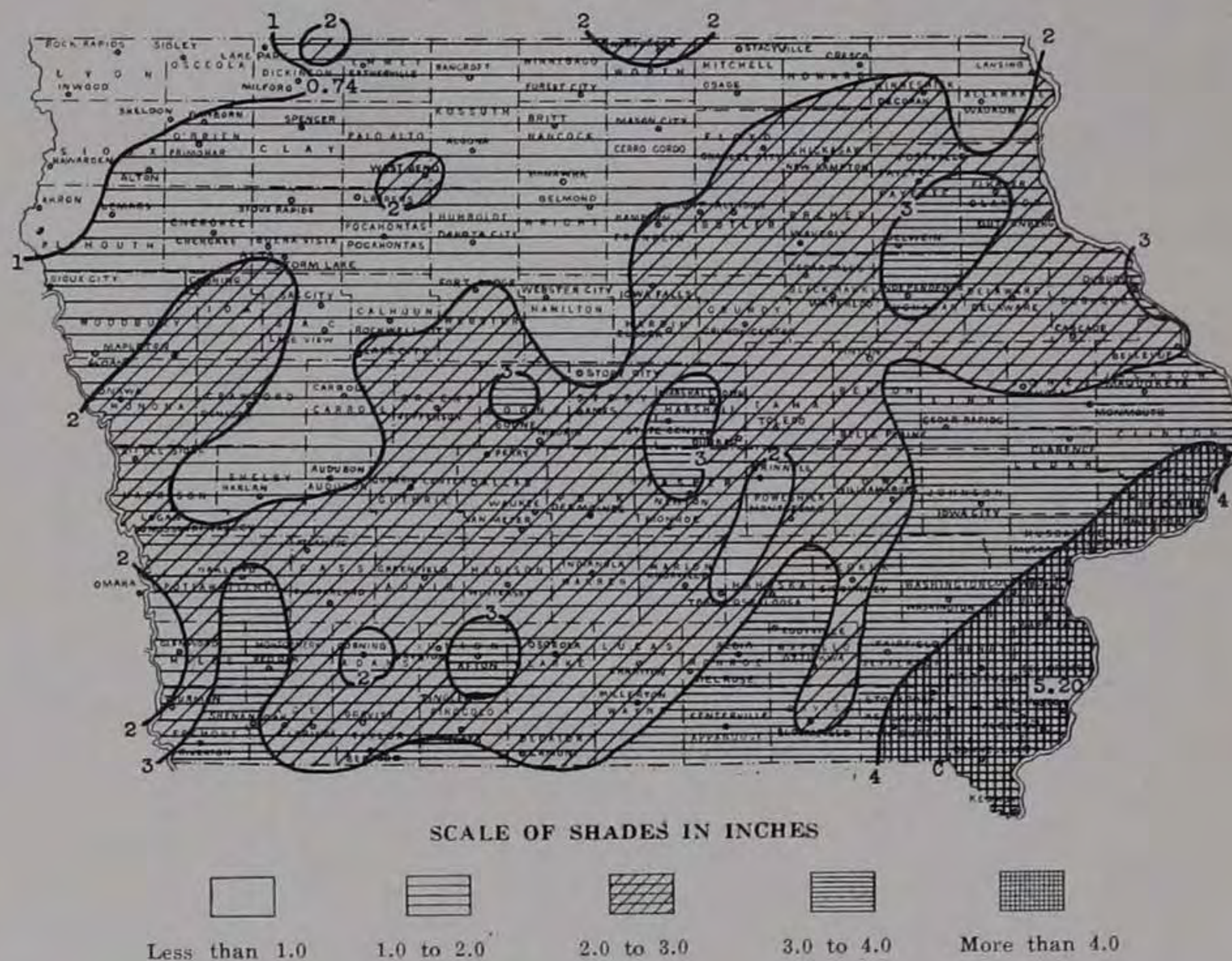
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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

*Auroras* None.  
*Dust*: 7th.  
*Dust and snow*: 7th.  
*Fog, light*: 1st, 2d, 3d, 4th, 5th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 20th, 21st, 22d, 23d, 24th, 26th, 27th, 28th, 29th, 30th.  
*Fog, heavy*: 3d, 5th, 6th, 11th, 14th, 15th, 16th, 22d, 26th, 27th.  
*Glaze*: 2d, 3d, 4th, 13th, 14th, 15th, 16th, 26th.  
*Hail*: 13th, 14th, 15th, 22d..  
*Halo, lunar*: None.  
*Halo, solar*: 18th, 21st, 28th.  
*Parhelia*: 7th, 8th, 28th, 30th.  
*Sleet*: 3d, 4th, 5th, 6th, 13th, 14th, 15th, 16th, 22d, 26th, 27th, 29th.  
*Thunderstorms*: 13th, 14th, 15th, 22d, 23d, 31st.

TOTAL PRECIPITATION, MARCH, 1944



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIV

DES MOINES, IOWA, APRIL, 1944

No. 4

## GENERAL SUMMARY

The unseasonably cold, cloudy and wet weather that characterized March continued through the greater part of April, 1944. It was the coldest April since 1928 and the wettest since 1929. There have been 10 colder Aprils and 8 that were wetter, and 1 that was equally wet since standard observations were begun 72 years ago, but during the entire period there have been but 2 Aprils that were both colder and wetter.

Heating requirements, relative humidity and wind movement were all somewhat above normal, but as was to be expected, sunshine was deficient.

It is not possible to attempt a detailed analysis of the synoptic conditions that prevailed from day to day during the month and to relate the precipitation and cold to the flow and interaction of various air masses over Iowa. In general, however, Continental Polar air was present at the earth's surface almost continuously, and a good part of the precipitation was caused by lifting of warm, moist tropical air over the cold mass at the surface.

The beginning of the month was marked by the longest period of fair weather, with abundant sunshine during the first 5 days. However, temperatures were low and at most points the monthly minima were recorded on the 1st, 2nd or 5th. This was followed by another 5-day period of generally mild temperature but with precipitation over the central and southern portions. Thereafter temperature readings again fell below normal and remained unseasonably low with only brief interruptions until the close of the month. In the northeast quarter of Iowa the monthly maximum readings were recorded on the 23d as a deep barometric disturbance moved eastward. In the remainder of the State the highest readings mostly occurred on the 30th. Precipitation occurred in some part of the State daily from the 11th through the 26th, and after only a 2 to 3 day respite showers again fell on the 30th. The heaviest falls were reported on the 10th-11th and 22d-23d.

During the showers of the 10th-11th high wind caused considerable damage in many southern and eastern portions of the State. Telephone and electric wires were blown down and roofs, small buildings and trees were damaged. Most damage was reported from Pottawattamie, Polk, Muscatine, Scott and Clinton counties and adjoining areas.

On the 21st, between 8 and 9 p.m., wind caused considerable damage to small buildings, windmills, roofs, grain bins, etc., in Jefferson and Henry counties. There were several reports of small tornadoes in Henry County but it has not been possible to determine whether there was more than one storm. Air masses present were of the type usually associated with tornadic activity. Incomplete reports of damage indicate the loss in both Jefferson and Henry counties was between \$15,000 and \$20,000. On the 30th a freak windsquall wrecked or damaged buildings on 2 farms in the northeast corner of Chickasaw

## COMPARATIVE DATA FOR APRIL

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	43.2	83	24	3.13					
1874.....	41.9	76	16	1.90					
1875.....	43.0	77	10	2.20					
1876.....	48.1	78	24	3.06					
1877.....	47.5	91	14	3.33					
1878.....	52.4	82	26	3.14					
1879.....	50.3	88	12	1.13					
1880.....	47.9	92	15	2.08					
1881.....	42.5	84	10	2.26					
1882.....	48.8	91	20	3.73					
1883.....	49.9	90	24	2.25					
1884.....	46.8	86	18	2.54					
1885.....	47.5	80	16	2.94					
1886.....	50.3	88	4	2.70					
1887.....	51.1	94	9	1.38					
1888.....	38.8	90	20	2.65					
1889.....	50.3	86	10	2.35					
1890.....	51.2	88	2	1.73					
1891.....	50.6	93	13	2.15		8	14	7	9
1892.....	45.4	88	14	4.75	5.7	9	8	9	13
1893.....	45.5	96	15	4.21	6.0	10	8	9	13
1894.....	51.7	93	12	3.07	0.2	9	11	11	8
1895.....	54.2	98	8	2.62	2.1	5	14	8	8
1896.....	54.5	94	10	5.02	4.5	11	11	10	9
1897.....	47.9	89	19	5.35	T.	11	9	9	12
1898.....	48.1	91	14	2.56	T.	8	13	9	8
1899.....	48.9	89	1	2.40	2.0	7	12	11	7
1900.....	52.2	89	19	2.67	0.9	6	12	9	9
1901.....	49.9	92	15	1.79	2.0	5	14	8	8
1902.....	48.2	96	9	1.71	T.	5	14	11	5
1903.....	49.8	86	17	2.98	0.8	9	11	9	10
1904.....	44.1	86	13	3.63	1.4	7	15	6	9
1905.....	47.5	90	10	3.03	1.2	8	12	8	10
1906.....	52.5	94	22	2.42	0.6	8	14	9	7
1907.....	41.5	80	10	1.32	2.7	6	12	8	10
1908.....	50.5	91	8	2.24	0.3	8	14	8	8
1909.....	43.8	86	14	4.58	3.1	12	9	9	12
1910.....	52.5	99	15	1.48	3.0	7	14	7	9
1911.....	46.8	86	3	3.09	3.6	9	11	8	11
1912.....	49.9	84	20	2.66	1.1	8	13	8	9
1913.....	50.2	88	16	3.29	2.7	9	15	5	10
1914.....	48.6	88	11	2.52	0.3	8	10	8	12
1915.....	57.2	95	18	1.41	T.	7	15	10	5
1916.....	47.1	90	11	2.62	1.1	10	10	9	11
1917.....	45.5	88	17	4.55	3.8	11	9	7	14
1918.....	44.8	79	12	2.32	3.5	9	12	8	10
1919.....	48.4	81	20	4.78	0.7	14	8	8	14
1920.....	42.4	78	22	4.59	2.0	12	8	9	13
1921.....	52.4	88	14	3.34	3.6	10	13	7	10
1922.....	49.9	87	21	3.06	1.0	9	11	9	10
1923.....	48.4	85	11	2.09	0.8	8	15	7	8
1924.....	50.5	90	— 8	1.38	1.4	7	16	8	6
1925.....	56.5	95	21	2.20	T.	8	14	9	7
1926.....	46.1	95	9	0.91	1.5	4	16	7	7
1927.....	49.2	91	15	4.84	2.6	14	9	7	14
1928.....	44.3	88	6	2.24	4.9	8	12	9	9
1929.....	51.2	93	9	4.62	1.1	11	12	8	10
1930.....	52.1	96	5	2.67	0.3	9	14	7	9
1931.....	50.9	92	17	2.29	0.1	8	16	6	8
1932.....	50.0	84	21	1.96	T.	7	11	9	10
1933.....	48.8	85	16	1.21	0.2	6	12	9	9
1934.....	50.4	90	12	1.07	T.	4	14	9	7
1935.....	46.7	86	15	1.92	0.4	8	9	9	12
1936.....	45.9	92	0	1.10	3.9	7	14	8	8
1937.....	47.7	85	20	3.20	2.1	13	9	7	14
1938.....	50.3	87	15	3.66	3.7	10	11	9	10
1939.....	47.8	93	10	2.07	1.9	7	12	9	9
1940.....	47.5	89	10	3.22	0.2	11	10	9	11
1941.....	53.8	86	25	2.50	T.	10	9	10	11
1942.....	54.8	90	19	1.06	T.	5	16	8	6
1943.....	49.0	88	17	2.57	T.	8	13	9	8
1944.....	45.0	78	14	4.55	0.4	13	8	7	15
Period.....	48.8	99	— 8	2.72	1.6	9	12	8	10

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

County, while hail broke a few windows at Burlington. Information concerning all of these storms is still incomplete. Likewise, damage caused by overflow of the Missouri River amounted to many thousands of dollars, but estimates of the loss have not been thoroughly checked.

CLIMATOLOGICAL DATA FOR APRIL, 1944

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. The table is divided into Northwest District, North Central Dist., Northeast District, West Central Dist., and Central District.



CLIMATOLOGICAL DATA FOR APRIL, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, feet, Length of record, years, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall (unmelted)), Number of days (Precipitation, .01 in. or more, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed.

State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated.

T. Trace or 0.005 inch or less.

‡ Data interpolated.

§ Partly interpolated.

† And other dates.

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

\*Best available used for stations not equipped with recorders.

+1.83

DAILY PRECIPITATION FOR APRIL, 1944

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. Rows are organized by district: Northwest, North Central, Northeast, and West Central. Each row lists a station and its drainage basin, followed by daily precipitation values for each day of the month and a total for the month.



DAILY PRECIPITATION FOR APRIL, 1944—Continued

Stations	Drainage Basin	Day of Month																															Total		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31			
<i>Southeast District (Continued)</i>																																			
Donnellson <sup>2</sup>	Des Moines								.42		T.	1.00	.65	T.		.54	.10	T.	.02	.20		.14	T.	.99	1.01	.31		.36	.10			.42		6.26	
Eddyville <sup>2</sup>	Des Moines								.32		T.	.72	1.05	.25		T.	1.35	.32		.54	T.	.08	.08	1.25	.78	.20		.12	.30			.36		7.72	
Fairfield	Skunk								.31			.20	.76	.78	.03		.67	.33	.02	.01	.48		.29	.29	1.11	2.22	.15		.16	.02			.27		8.10
Keokuk <sup>1</sup>	Mississippi							.15	.41			.02	1.45	T.			.78	.01		.02	.07	T.	.09	.67	1.45	.26	.05	.02	.39	.03			.57		6.44
Keokuk LD 19 <sup>2</sup>	Mississippi								.55				.02	1.71	.04		.01	.66	.01		.07		.11		.94	1.15	.24		.07	.36			.35		6.29
Keosauqua	Des Moines								.40			.05	.68	.82	.02		.30	.17			.27		.24	.08	1.00	2.15			.16				.25		6.59
Keosauqua (rvr.) <sup>2</sup>	Des Moines								.48		T.	T.	1.50	.27			.35	.05		.30	T.	.20		1.10	1.95	.20	T.	T.	.27			.27		6.94	
Mt. Pleasant	Skunk								.60			.10	.55	1.20			.25	.10	T.		.80		.30	T.	.87	2.05	.15		.27				.55		7.79
Oskaloosa	Des Moines								.50			.38	.55	.62			1.24	.33			.70		.13	.50	.57	.71	.07		.32				.41		7.03
Ottumwa <sup>1</sup>	Des Moines								.30			.30	.45	.95	.07		.64	1.14			.42		.11	.46	.58	.98	.05		.19				.34		6.98
Ottumwa (river) <sup>2</sup>	Des Moines								.30			.10	.20	1.10	.29		1.85	.10		.40	.02	.12		1.04	.93	.20	.02	.05	.10			.30		7.12	
Sigourney <sup>2</sup>	Skunk								.36				.26	.76	.07		1.60	.09		.49	.05	.17		1.08	.78	.09	.03	.06	.16			.28		6.33	
Stockport	Skunk								.42		T.	.06	.56	.99	.03		.14	.11	T.	.34		.22	.09	.81	1.52	.09		.18	T.			.18		5.74	
Wapello <sup>2</sup>	Iowa								.26		T.		.06	.86	.08		.90	.05		.43	T.	.25		1.05	1.60	.12	T.	T.				.50		6.16	
Washington <sup>1</sup>	Skunk								.20			.11	.37	.95			.22	.93			.60		.19	.40	.70	1.38	.11		.18			.15		6.49	

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- <sup>1</sup> Midnight to midnight.
- <sup>2</sup> Measured in the morning; for the preceding 24-hours.
- T Trace or 0.005 inch or less.
- \* Included in next measurement. \*\*Incomplete
- † Recording gage.
- ‡ Windshield on gage.
- § Data interpolated.
- ¶ Partly interpolated

SUPPLEMENTAL TABLE, APRIL, 1944

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours <sup>1</sup>	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	18	2.74	+ 0.34	1.70	23	T.	9	10	4	16	n.
Cmbrld. 4 <sup>1</sup> / <sub>2</sub> NW	Cass	1,225	46	4.81	+ 2.47	0.89	11	0	13	7	4	19	n.e.
Dumont 3 <sup>1</sup> / <sub>2</sub> NW	Butler	998	10	2.70	+ 0.10	0.84	11	0.5	10	4	8	18	n.e.
Dunbar 2 NE	Marshall	1,010	10	4.05	+ 1.30	0.96	9	1.2	14	10	4	16	se.
Emerson 5 NE	M'tg'mery			6.14	+ 3.59	1.37	10-11	T.	15	8	7	15	se.
Kanawha 1/4 S.	Hancock	1,183											
Lake View	Sac	1,239	6	4.19	+ 1.94	1.24	10-11	T.	12	7	6	17	s.
Melrose	Monroe	871	16	7.27	+ 4.52	0.92	21-22	T.	15	7	7	16	n.e.
Sloan	Woodbury	1,071		4.45	+ 2.10	1.37	11						

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

<sup>1</sup>Best available used for stations not equipped with recorders.

Figures and letters following stations indicate distance in miles and direction from the city P.O. unless otherwise noted.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS  
April, 1944

Stations	Sea-level pressure, extremes—inches			Wind <sup>1</sup>				Relative Humidity				Degree Days	
	Highest	Date	Lowest	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.	12:30 P. M.	6:30 P. M.		Percentage of sunshine
Burlington	30.50	28	29.21	15	12.3	40 n.e.	10	80	87	67	67	40	546
Charles City	30.52	28	29.32	23	7.1	23 se.	23					48	631
Davenport	30.50	28	29.28	15	12.0	46 e.	11	80	86	60	63	44	533
Des Moines	30.48	28	29.23	14	10.4	34 e.	23	80	86	68	63	40	568
Dubuque	30.56	28	29.30	23	6.9	26 e.	11	76	82	60	61	47	593
Sioux City	30.52	2	29.24	14	11.6	30 se.	29	88	88	66	68	47	620
Omaha, Nebr.	30.50	2	29.15	14	12.7	45 n.e.	10	83	87	69	68	37	568
State	30.56	28	29.15	14	10.4	46 e.	11	81	86	65	65	43	580
Normals and Records	30.75	9	28.80	20	9.9	59 n.	25	76	54	58	58	58	462
		1918	1893				1902						

<sup>1</sup>True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

§Sioux City \*Davenport

SOIL TEMPERATURES AT AMES, IOWA, APRIL, 1944

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	37.4	39.9	42.0	42.7	41.1		
Average 12 noon	47.1	44.6	42.3	42.4	41.2		
Average 7 p. m.	49.4	49.1	47.0	43.5	41.4	40.0	
Highest	71	62	58	53*	47	43	
Date	30	27	29	30	30	27†	
Lowest	21	30	34	35*	36	38	
Date	2†	2†	1†	1†	1†	1†	
Number of days with temperature							
24° or lower	5	0	0	0	0	0	
32° or lower	11	4	0	0	0	0	
40° or higher	30	26	30	25	23	19	
50° or higher	22	16	9	3	0	0	
60° or higher	7	4	0	0	0	0	
90° or higher	0	0	0	0	0	0	

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

Naturally, the weather was very unfavorable for agricultural operations. At the close of the month much of the oat seeding had not been done, and many fields intended for corn and soybeans remained unplowed. Moreover, it was too late for oat seeding except for hay, in much of the south, and as a result, much land will be diverted to corn and soybeans. Planting of peas for canneries was much delayed, and it was considered to be too late to plant in the southern part of the State where the ground remained too wet and cold at the close of the month. Fruit tree bloom was beneficially delayed and very few trees were in bloom at the end of the month.

Partly because of economic factors, such as low price of eggs and high cost of feed, but also because of the cold, many farmers canceled orders for baby chicks. The extension of the feeding season for hogs and other livestock caused a shortage of corn and feed and made it difficult to plan for future feeding. The weather was also very unfavorable for all young stock and the net result seems to make a reduction in poultry

and pork supplies necessary. Barnlots were ankle deep in mud, manure hauling was impossible, and many dirt roads were impassable in the southern half of the State. However, farmers were prepared to take advantage of any change to better weather and to operate tractors, plows, etc., day and night, as soon as field work became possible.

S.E.D.

**TEMPERATURE**

The average Iowa April temperature derived from the averages of nine districts of practically equal area and based on reports from 117 stations, was 45.0°. It was the coldest April since 1928 and the 11th coldest of record, the average for the month being 3.8° lower than the all-time April average. The district averages ranged from 42.8° in the northwest to 47.1° in the southeast. The warmest individual station was Keokuk with an average of 48.5°, while Sibley was the coldest with 41.2°. The highest observed was 78° on the 30th at Keosauqua, and the lowest was 14° at Onawa on the 5th. The average number of days with minimum temperature of 32° or lower was 11.

**PRECIPITATION**

The average precipitation derived from the nine district averages, and using reports from 120 stations, was 4.55 inches, or 1.83 inches more than the average of the 72 Aprils of record. In general, precipitation increased from northwest to southeast although the heaviest individual total was reported from the extreme southwest. The averages of all districts were above the adopted normals although in areas in the northwest and north-east sections, covering five or six counties in each, the measured totals were below the station normals. All southern districts averaged above 6 inches, all central districts between 4 and 5 inches, and the northern districts above 2 inches. The greatest total was 8.62 inches at Riverton, while the least reported was

1.58 inches at Sibley. The greatest 24-hour fall was 2.90 inches on the 22d-23d at Maquoketa. The average number of days with measurable rain was 13.

**SNOWFALL**

The average snowfall was 0.4 inch, one-fourth of the normal amount. The heaviest falls were reported from Glenwood, Little Sioux and Northwood, where 3.0 inches fell. Many stations reported none and an even greater number only a trace. Most of the snow melted soon after falling.

**MISCELLANEOUS PHENOMENA**

- Aurora*: 2d
- Dust*: None.
- Fog*, heavy: 7th, 8th, 9th, 19th, 20th, 21st, 22d, 23d, 24th.
- Fog*, light: 7th, 9th, 14th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 26th, 27th, 28th.
- Frost*, heavy: 13th.
- Frost*, light: 6th, 8th, 13th, 17th, 27th, 28th.
- Frost*, killing: 2d, 3d, 4th, 5th, 6th, 12th, 13th, 16th, 17th, 25th.
- Glaze*: 15th.
- Hail*: 11th, 15th, 21st, 22d, 23d, 30th.
- Halo*, lunar: None.
- Halo*, solar: 6th, 8th, 21st, 23d, 28th, 29th.
- Parhelia*: None.
- Sleet*: 11th, 15th, 17th.
- Thunderstorms*: 1st, 4th, 7th, 10th, 11th, 13th, 14th, 15th, 20th, 21st, 22d, 23d, 30th.

**ERRATA**

Report for March 1944. Page 22, Charles City, monthly mean temperature published 28.5, should be 28.4; departure published -2.2, should be -2.3. Page 28, Charles City, maximum temperature on 22nd published 40, should be 39; monthly mean maximum temperature published 34.8, should be 34.7.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR APRIL, 1944 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames	Evaporation.....	.081	.107	.124	.146	.114	.211	.030	.173	.023	.105	.....	.108	.149	.....	.015	.033	.076	.007	.021	.021	.002	.....	.052	.047	.097	.043	.162	.257	.262	.132	.....	2.887†
	Wind Movement...	95	52	68	89	44	89	55	78	69	194	214	40	77	115	171	71	62	104	15	70	56	95	117	119	84	78	78	77	122	176	.....	2.774
Cherokee	Evaporation.....	.068	.089	.103	.158	.142	.190	.133	.066	.042	.110	.057	.115	.111	.029	.006	.054	.083	.051	.031	.006	.007	.039	.003	.013	.100	.031	.200	.147	.232	.134	.....	2.550
	Wind Movement...	132	66	76	98	42	104	54	66	74	169	123	37	70	112	148	47	39	55	16	44	51	53	136	202	100	54	58	61	124	114	.....	2.525
Clarinda	Evaporation.....	.120	.076	.128	.109	.123	.161	.067	.116	.079	.059	.....	.120	.232	.106	.008	.063	.002	.023	.036	.034	.062	.008	.057	.122	.147	.013	.008	.115	.203	.215	.....	2.702†
	Wind Movement...	141	11	93	51	40	96	45	54	74	203	166	43	96	124	82	71	68	84	18	151	55	61	100	249	30	111	60	58	107	235	.....	2.777
Ia. City...	Evaporation.....	.065	.089	.104	.114	.098	.147	.029	.096	.039	.060	.046	.103	.158	.054	.084	.054	.086	.021	.091	.061	.045	.072	.314	.039	.109	.052	.132	.238	.202	.160	.....	2.962
	Wind Movement...	103	89	76	107	54	57	40	43	39	94	161	72	54	55	133	90	43	51	36	75	39	60	135	96	84	44	58	47	76	180	.....	2.291

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF APRIL, 1944

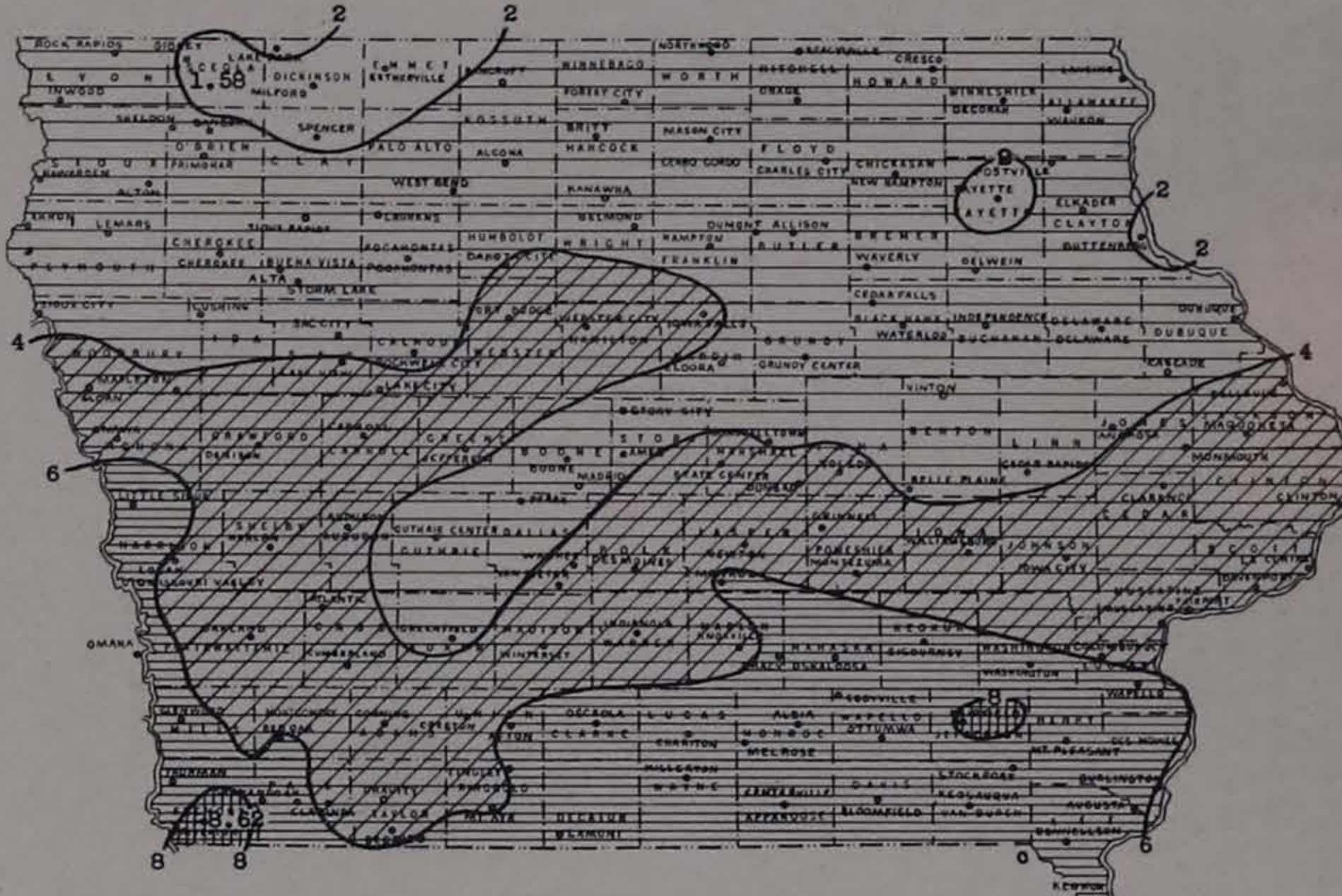
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District (Alta, Alton, Cherokee, Estherville, Hawarden, Lake Park, Le Mars, Pocahontas, Rock Rapids, Sioux Rapids, Spencer), North Central District (Algona, Bancroft, Belmont, Britt, Charles City\*, Dakota City, Mason City, Northwood, Osage), Northeast District (Decorah, Delaware (near), Dubuque\*, Elkader, Fayette, Independence, New Hampton, Waterloo, Waverly), West Central District (Carroll, Denison, Guthrie Center, Harlan, Jefferson, Little Sioux, Logan, Mapleton, Rockwell City, Sac City, Sioux City\*), and Central District (Ames, Boone, Des Moines\*, Fort Dodge, Grinnell).

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF APRIL, 1944—Continued

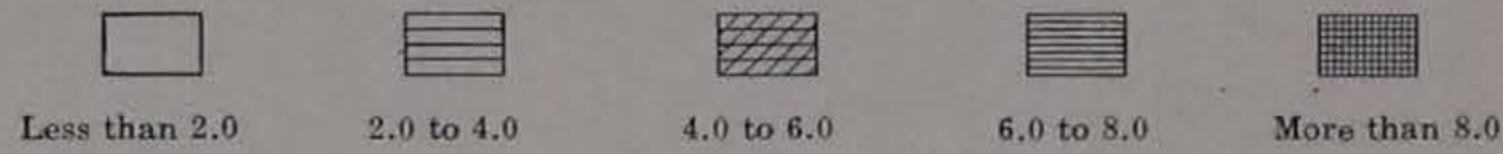
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station lists maximum and minimum temperatures for each day.

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.

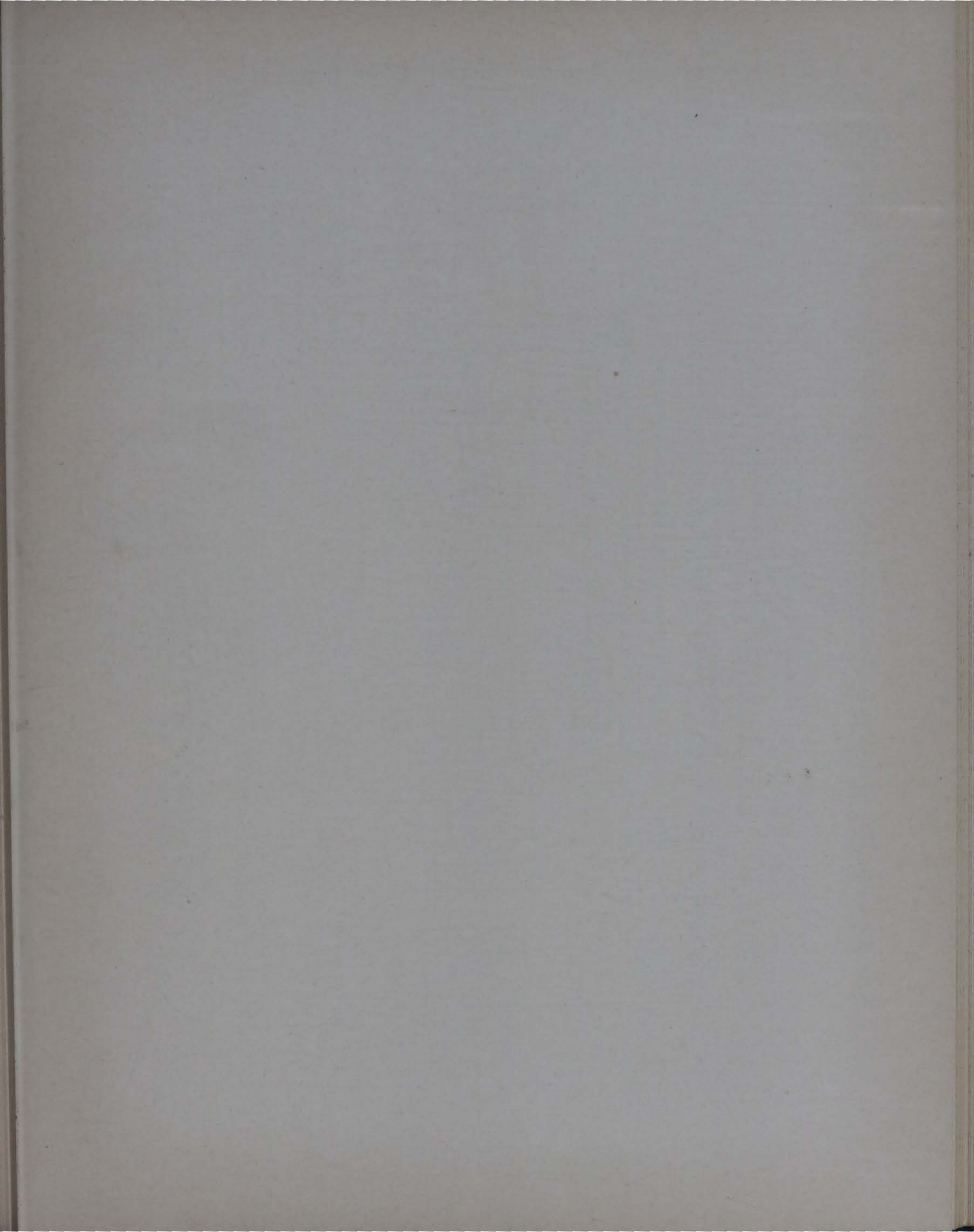
TOTAL PRECIPITATION, APRIL, 1944



SCALE OF SHADES IN INCHES







# CLIMATOLOGICAL DATA

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, MAY, 1944 No. 5

GENERAL SUMMARY

After two months of subnormal temperatures warm weather again returned to Iowa at the close of the first decade of May. The average temperature for the month, 64.6°, equaled that of the 10th warmest May of record. The trend towards excessive precipitation of the two preceding months continued, and the month was noteworthy because of the widespread damage caused by locally heavy downpours, floods and tornadoes.

The average temperature for the State was 4.4° above the 72-year mean and was 7.1° higher than in 1943. There were no unusually warm days but readings were almost continuously above normal in all sections from the 10th until the end of the month. Heating requirements were slightly less than usual and for all practical purposes the heating season ended by the middle of the month.

The total precipitation averaged 6.13 inches, or 2.06 inches above normal. There have been only 10 wetter Mays in the preceding 71 years. Only two Mays, 1896 and 1918, have been both warmer and wetter.

There was more snow than usual although most of it melted as it fell. Sunshine was somewhat deficient, and there were more cloudy and partly cloudy days and fewer clear days than normally occur in May. Relative humidity readings were unusually high as might be expected in a warm, wet month, during which Maritime Tropic air masses were dominant much of the time after the first decade.

A record of May storms appears in tabular form on other pages of this publication. Moreover, a discussion of the floods and more important destructive storms also appears under special heads.

Temperature readings were mild at the beginning of the month, with low barometric pressure over the great central valleys and high pressure over both the Atlantic and the North-western States.

On the evening of the 2d a low pressure center appeared over south-central Minnesota, while a wide trough extended southwestward to the Gulf. During the next two days this surface "low" moved slowly northeastward to southern Ontario, and was replaced by high pressure. However, aloft the "low" maintained its identity from 5,000 to above 20,000 feet, and remained over the upper Mississippi Valley for several days, drifting southward to Missouri on the 6th. This condition was attended by widespread precipitation over Iowa, with rather general snow on the 4th, 5th and 6th. The snow mostly melted as it fell, and in no case was the ground covered for any length of time. The lowest pressures of the month generally occurred on the 3d, on which date the highest wind velocities were also recorded at most stations. The temperature fell sharply with the influx of cold Polar air on the 2d, and continued falling to the lowest readings of the month on the 5th and 6th. Freezing temperatures were general on the 4th, 5th and 6th, killing any tender vegetation that might have begun to grow. The

COMPARATIVE DATA FOR MAY, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	56.5	86	38	5.99					
1874.....	64.1	94	41	1.88					
1875.....	60.5	91	26	2.94					
1876.....	61.1	90	32	2.84					
1877.....	60.3	92	29	4.30					
1878.....	55.7	88	32	5.01					
1879.....	62.9	93	26	4.38					
1880.....	66.3	96	37	4.06					
1881.....	66.7	95	35	3.73					
1882.....	54.3	83	24	5.42					
1883.....	54.6	90	31	6.25					
1884.....	59.6	88	33	3.15					
1885.....	57.4	86	27	3.44					
1886.....	62.5	96	30	3.38					
1887.....	64.6	96	34	1.55					
1888.....	53.8	88	22	6.58					
1889.....	59.2	92	22	4.06					
1890.....	56.5	96	26	3.64					
1891.....	58.3	94	21	3.18		8	14	9	8
1892.....	54.0	88	29	8.77	T.	16	5	9	17
1893.....	56.6	96	26	3.45	0	9	13	9	9
1894.....	61.1	96	22	1.87	0	6	17	10	4
1895.....	61.7	104	24	3.19	0	9	11	12	8
1896.....	65.5	100	34	6.69	0	12	11	12	8
1897.....	58.5	96	20	1.92	0	5	16	10	5
1898.....	59.6	92	26	4.67	0	12	9	10	12
1899.....	60.2	90	27	6.23	0	13	9	12	10
1900.....	63.2	98	22	3.31	0	8	14	10	7
1901.....	60.7	95	28	2.35	0	7	16	9	6
1902.....	63.8	97	25	5.39	0	13	10	12	9
1903.....	61.6	91	24	8.55	0	16	9	12	10
1904.....	59.6	93	27	3.78	0	8	13	10	8
1905.....	58.3	88	28	5.95	0	14	12	11	8
1906.....	60.8	95	24	3.54	0	11	13	10	8
1907.....	53.5	96	14	3.48	1.0	10	11	10	10
1908.....	59.4	93	13	8.34	0	15	9	11	11
1909.....	57.9	97	18	4.34	0.1	9	12	12	7
1910.....	55.4	89	18	3.41	T.	10	15	7	9
1911.....	64.9	98	23	3.76	0.7	9	16	9	6
1912.....	62.7	97	29	3.33	0	10	14	11	6
1913.....	59.4	102	30	6.24	0	13	11	8	12
1914.....	62.2	98	25	3.31	T.	10	14	11	6
1915.....	56.1	99	25	7.34	T.	14	9	9	13
1916.....	59.9	94	27	4.93	T.	12	13	10	8
1917.....	55.1	95	18	3.87	0.6	10	15	8	8
1918.....	64.9	98	25	6.87	T.	13	13	11	7
1919.....	58.2	93	30	3.11	0	9	13	11	7
1920.....	59.4	89	29	3.26	0	8	14	9	8
1921.....	63.3	99	25	4.23	0	10	14	10	7
1922.....	63.4	91	34	3.53	0	12	13	10	8
1923.....	59.6	90	20	2.84	T.	10	14	10	7
1924.....	54.1	94	26	1.71	0.1	9	13	9	9
1925.....	57.8	102	20	1.16	T.	6	19	8	4
1926.....	64.5	97	25	2.76	0	9	15	11	5
1927.....	58.4	91	30	4.69	T.	11	10	10	11
1928.....	62.6	93	26	2.47	0	8	17	8	6
1929.....	57.7	91	24	2.47	T.	8	11	12	8
1930.....	60.2	91	26	3.72	T.	11	14	7	10
1931.....	57.5	98	21	2.96	T.	9	15	7	9
1932.....	62.3	95	28	3.99	0	10	15	9	7
1933.....	60.5	93	32	4.36	0	12	9	10	12
1934.....	69.6	111	30	1.02	0	4	21	7	3
1935.....	55.0	84	23	4.84	0.3	15	7	10	14
1936.....	66.2	95	31	2.91	0	9	15	10	6
1937.....	61.8	95	27	4.07	0	12	12	11	8
1938.....	59.5	89	29	5.45	0.6	14	7	14	10
1939.....	66.4	105	30	2.07	0	7	16	11	4
1940.....	58.4	96	26	2.07	0.1	8	13	11	7
1941.....	66.0	97	31	3.26	T.	9	13	14	4
1942.....	59.3	95	26	4.70	T.	12	9	12	10
1943.....	57.5	97	21	4.40	T.	12	9	10	12
1944.....	64.6	95	23	6.13	0.3	15	9	13	9
Period.....	60.2	111	13	4.07	0.1	10	13	10	8

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

temperatures were only a few degrees removed from record low readings on these dates, and for phenological purposes the freeze on the 6th marked the last killing frost or freeze in spring. However, because of previous cold, there was little vegetation sufficiently advanced to be damaged.







DAILY PRECIPITATION FOR MAY, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. It lists precipitation data for various Iowa locations across different drainage basins for the month of May 1944.

DAILY PRECIPITATION FOR MAY, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. Includes sub-section 'Southeast District (Continued)' with stations like Des Moines, Skunk, and Keokuk.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- 1 Midnight to midnight.
2 Measured in the morning; for the preceding 24-hours.
T Trace or 0.005 inch or less.
\* Included in next measurement. \*\*Incomplete
† Recording gage.
‡ Windshield on gage.
§ Data interpolated.
¶ Partly interpolated

SUPPLEMENTAL TABLE, MAY, 1944

Table with columns for STATIONS, COUNTIES, Elevation, Length of record, years, Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall, With precipitation .01 inch or more), No. of Days (Clear, Partly cloudy, Cloudy), and Prevailing direction of wind.

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

\*Best available used for stations not equipped with recorders.

Figures and letters following stations indicate distance in miles and direction from the city P.O. unless otherwise noted.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, MAY, 1944

Table with columns for Stations, Sea-level pressure, extremes—inches (Highest, Date, Lowest, Date), Wind† (Average hourly velocity, Maximum velocity, Direction, Date), Relative Humidity (12:30 A. M., 1:30 A. M., 12:30 P. M., 3:00 P. M., Percentage of sunshine), and Degree Days.

†True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

§Sioux City \*Charles City and Dubuque ¶Omaha

SOIL TEMPERATURES AT AMES, IOWA, MAY, 1944

Table with columns for Temperature, 4 feet above ground, and At Depth in Soil of— (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Rows include Average 7 a. m., Average 12 noon, Average 7 p. m., Highest Date, Lowest Date, and Number of days with temperature 32° or lower, 40° or higher, 50° or higher, 60° or higher.

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

There was also some sleet mixed with the snow, and the combination of low visibility and slippery highways caused a number of traffic mishaps.

During this period barnlots were mostly knee-deep in mud, making conditions unfavorable for livestock. Plowing, planting, manure hauling, and other outdoor operations, were almost impossible, and oat seeding for grain was practically abandoned, with about three-fourths of the intended acreage rather indifferently seeded.

Following the low readings of the 5th, the temperature began to rise, and by the 10th readings were generally normal or higher. Thereafter temperatures remained above normal during the remainder of the month except that in some areas readings fell to near or slightly below normal on the 26th. In the central and eastern portions of the State the highest barometer readings occurred on the 10th, but in the western districts the highest was on the 27th.

From the 10th until the close of the month Maritime Tropic air masses were predominant in causing weather changes. From the 15th to the 25th the main frontal zone between Tropic and Polar air masses either crossed over parts of Iowa or lay to the east and north in such positions that Iowa weather was affected. The front moved to Missouri on the 26th and finally disappeared from the synoptic chart on the 28th. However, the air remained quite unstable and scattered showers continued, although they were lighter and covered smaller areas than in the preceding 10 days. Thunderstorms were recorded in some part of Iowa daily from May 15 to 31 inclusive.

Discussion of attendant hail, wind and tornado damage, erosion loss, excessively heavy rainfall and floods, appears under separate headings in this publication, and these articles should be consulted for further information.

Farmers worked tractors day and night whenever possible, in an effort to prepare seed beds and plant corn and soybeans. The soil was waterlogged and the plowed ground baked to brick-like-hardness between showers. At mid-month only about 10% of the corn had been planted, 38% below normal for that date, and 10 days later than normal for the amount planted. On the 21st, 41% had been planted, 31% less than normal, or 11 days late. Again on the 28th, 60% had been completed, but this was 28% less than normal, and 10 days late. Planting continued late during the first part of June, progress in replanting and new planting being offset by losses of growing corn because of flooding, erosion and silting.

Corn that was planted germinated rapidly and made good growth. Oats, barley and flax likewise made good growth, and pastures and grasses were excellent. In general, all vegetation, including weeds, was luxuriant. At the end of the month alfalfa was about ready for first cutting, and red clover was beginning to bloom. In some areas only about half of the intended potato acreage had been planted. Victory gardens were reduced about one-fourth by wet weather, and many were very weedy. Fruit spraying was mostly ineffective because of the excessive moisture. During the last part of the month young animals and livestock generally, were in good condition.

Judged by records of other years, warm weather is likely to continue through June, which in turn is an indication that summer temperatures will be sufficiently high to mature the corn crop without serious loss by autumn frosts.

Soybean planting had scarcely made a beginning in more than half the State. Only 13% had been done by May 28, and most of this was in the Raccoon and upper Des Moines valleys, where rainy days had been less frequent and corn planting mostly completed. However, subsequent heavy downpours and floods occurred over these areas in June.

S.E.D.

TEMPERATURE

The average Iowa May temperature obtained from the averages of nine districts of nearly equal area, which in turn were derived from the averages of 119 temperature observing stations, was 64.6°. This was 4.4° above the all-time May average, equaled the tenth warmest May of record, and was 7.1° warmer

than May, 1943. The station and district averages were all above the adopted normals and increased rather uniformly from north to south. The average of the three northern districts was 63°, and of the three southern districts 66°. The highest station average was 68.2° at Keokuk, while the lowest was 61.7° at Sibley and Decorah. The highest observed was 95° at Glenwood on the 15th, while the lowest was 23° at Onawa on the 6th. The average number of degree days at the first order stations was 147, or slightly less than normal. For the State as a whole, there was an average of one day with a maximum reading of 90° or higher, and two with freezing or lower.

PRECIPITATION

As was the case with the temperature averages, the average May precipitation for the State was obtained from the averages of nine districts of about equal area, which in turn were based on the measured totals of 122 stations. The value so obtained amounted to 6.13 inches, or 2.06 inches above the all-time May average, and the 11th wettest during the 73 years of record. Precipitation was above normal at nearly all stations, the principal exceptions being in small areas in the southeast and west central districts. The greatest district average was 9.32 inches in the central section, and the least 4.70 inches in the southeast. The greatest station total was 14.65 inches at State Center, but a number of others received more than 10 inches. It was driest at the Ottumwa river station, where only 2.96 inches fell. The greatest 24-hour fall was 5.74 inches at Ames on the 18th-19th. The average number of days with measurable precipitation was 15, 50% more than normal.

SNOWFALL

The average snowfall amounted to 0.3 inch, most of it mixed with rain or melting as it fell, on the 4th, 5th and 6th. At many stations the ground did not become entirely covered at any time, and in other cases it melted soon after falling before measurements could be made. The greatest fall was 3.0 inches at Northwood, while at about half of the stations there was only a trace, and in some cases none.

MISCELLANEOUS PHENOMENA

- Aurora: None.
Corona: 1st, 25th, 29th.
Fog, heavy: 8th, 9th, 10th, 14th, 18th, 19th, 21st, 22d, 23d, 25th, 30th.
Fog, light: 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.
Frost, killing: 4th, 5th, 6th.
Hail, light: 2d, 3d, 10th, 11th, 12th, 13th, 15th, 18th, 19th, 20th, 21st, 22d, 25th.
Hail, heavy: 17th.
Halo, lunar: 1st, 28th.
Halo, solar: 10th, 23d, 25th, 31st.
Sleet: 4th, 5th.
Thunderstorms: 1st, 2d, 3d, 5th, 8th, 10th, 11th, 12th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.
Tornado: 2d, 18th, 19th.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR MAY, 1944 (24 hours ending 6:30 p.m.)

Table with columns for Station, Data, and Day of Month (1-31). Rows include Ames, Cherokee, Clarinda, and Ia. City with sub-rows for Evaporation and Wind Movement.

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.





DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF MAY, 1944—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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.

THE SPRING OF 1944

All of the three spring months, March, April and May, were unusually wet and the combined average total precipitation was the second greatest of record for the season. But the average temperature of March and April was unseasonably low, while May was warm, with the result that the seasonal average was only slightly below normal.

The average temperature of 46.6° was 1.2° below the 72-year spring average. There have been 44 warmer and 26 colder springs, and one was equally warm. March was the 14th coldest of record and April the 11th coldest of record, but May equaled the 10th warmest of record. During March the temperature was below normal continuously except for a few days at the beginning of the month and for short periods centering about the 10th and 23d. Likewise, during April, short, warm periods from the 5th to the 10th, the 22d-23d, and at the close of the month, interrupted otherwise continual subnormal temperature. On the other hand, except for a period from the 3d to the 10th, May temperatures were almost constantly above normal.

Freezing temperatures on the 4th, 5th and 6th of May marked the last killing frosts in spring. Because of the previous cold and the general lateness of the season, no vegetation was damaged by frost.

There were no unusual extremes of temperature although on some dates individual stations reported temperatures near record lows. The highest observed was 95° at Glenwood on May 15, while the lowest was -7° on March 9 at Delaware (near). The average number of days with 90° or higher was 1 in May, and with maximum of 32° or lower, 8 in March. Days with minimum temperature of 32° or lower averaged 40, or 27

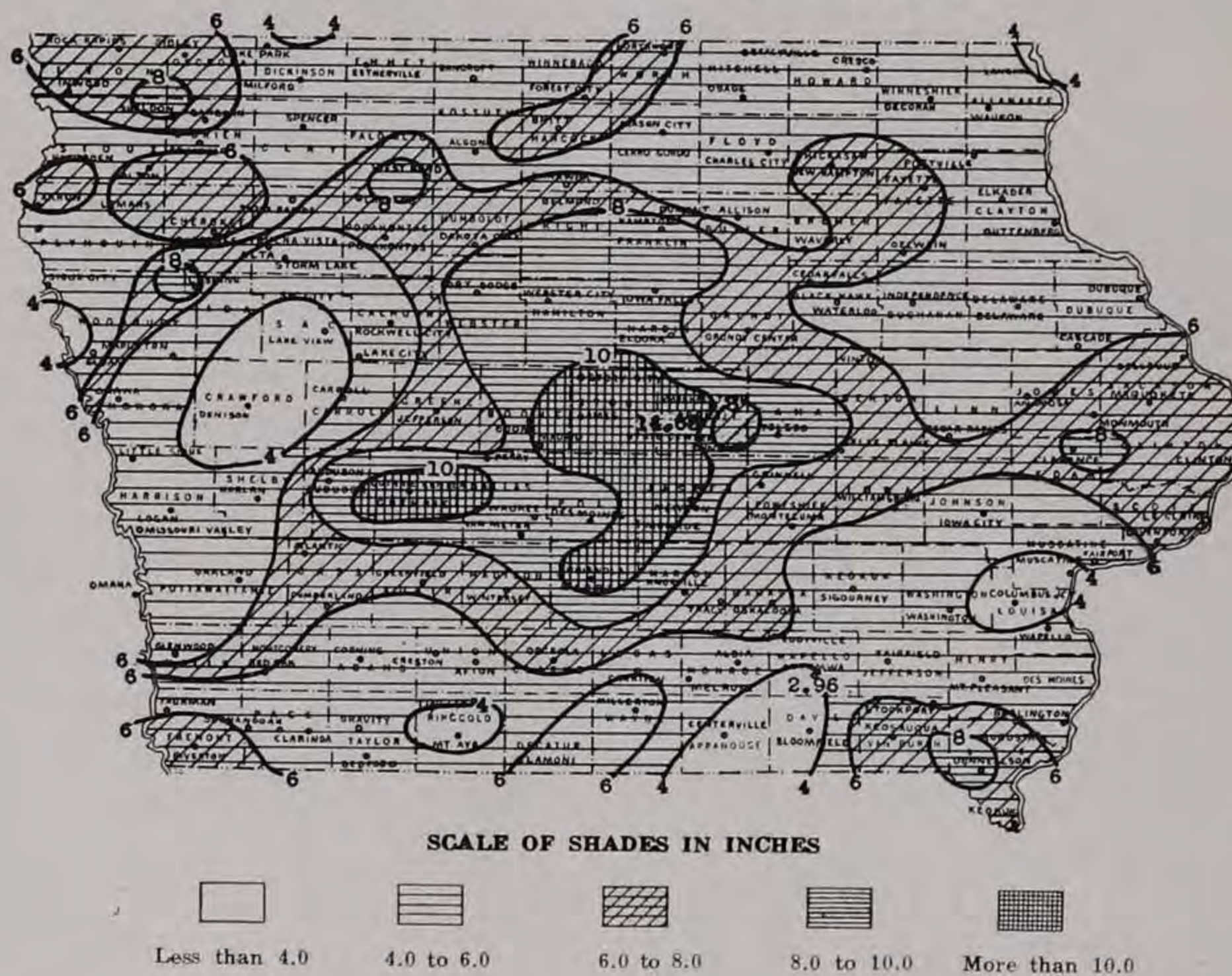
in March, 11 in April, and 2 in May. The average number of days with 0° or lower was one in March. Heating requirements were 11% above normal, and this excess practically nullified the fuel saving that had been brought about during the winter months by unseasonable warmth and dryness. For the entire heating season fuel consumption averaged close to the normal.

Precipitation was above normal in all three months, the amounts increasing with advance of the season and with the increased influx of greater quantities of moist, tropical air. The seasonal average total of 13.25 inches was 4.44 inches more than normal, and was the second greatest spring amount of record, exceeded only by 15.74 inches in 1892. In 1903 the spring total was 12.91 inches, and besides these there have been only 14 other springs with average precipitation of 10 inches or more. There were 12.4 inches of snow, most of it falling during March, but some as late as May 6.

The average number of days with measurable precipitation was 40, the greatest number of record. The previous record was 34 in 1927. The number of clear days, 24, equaled the least number of record in 1892, and the number of cloudy days, 40, was 2 less than the greatest number of record, 42, in 1892. The average relative humidity was about 10% above normal, while sunshine was 11% below.

The frequent showers delayed all farm work and caused a reduction in the acreage of oats as well as greatly delaying preparation of soil for corn and soybeans and planting of these crops. The state of agricultural operations as spring merged into summer is discussed in the general summary for May. The heavy rains also occasioned floods in May and continuation of wet weather caused a recurrence of high water in June. Since reports of these phenomena appear in connection with the May summary, no special treatment is given in these paragraphs.

TOTAL PRECIPITATION, MAY, 1944



IOWA STORMS, MAY, 1944

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Cedar Co., near Clarence	2	6:00 p. m.	Tornado	1/32	S to N				\$ 50	Three funnels cloud observed in air at same time. One dipped to earth, uprooted trees, overturned hog-house, broke windows and caused other scattered damage on 3 farms, south and east of Clarence.
Dubuque Co., Dubuque; Jones Co.	3	Night, 3d-4th	Wind							Trees, awnings and signs blown down by high wind at Dubuque. Shingles blown off roofs in Jones Co.
O'Brien Co., Sanborn and Sheldon; Ida Co., near Cushing	10-11		Rain, hail, lightning							About 3 1/4 in. rain fell in 15 hours at Sanborn and Sheldon. Some hail at Sheldon, where a church tower was struck by lightning and a horse killed by lightning; basements flooded; Floyd river out of banks. Severe thunderstorm at Cushing; much erosion.
Hamilton Co., Blairsburg Twp.	14	8:15 p. m.	Wind, hail, flood	Narrow	WNW to ESE	3/4			600	Wind damaged buildings \$600; scattered hail and flood damage.
Polk Co., Des Moines	15	Afternoon	Lightning							Three houses struck by lightning during thunderstorm; light damage.
Cass Co., Victoria Twp.	15	5:00-6:00 p. m.	Hail	4	N to S	3/8				Considerable hail in area 3 to 4 mi. square; relatively small damage.
Cass Co., Grant Twp.	17	8:00 p. m.	Hail, wind, flood			1				Five head livestock killed; several thousand dollars flood damage.
Woodbury Co., Sioux City, Hornick	18	About 2:30 p. m.	Hail, lightning			1 1/8				Heavy hail caused great damage to windows, roofs, auto tops, and especially to greenhouses in the southern and eastern portions of Sioux City, centering in Morningside. About 40,000 square feet of glass were broken in one greenhouse. Lightning struck house causing \$275 damage. Scattered hail damage occurred south of Sioux City towards Hornick, where windows were broken. This was part of widespread local storms over northwest Iowa.
Monona Co., Sherman, Belvidere, Center and Maple Twps., near Blencoe, Turin, Castana and Mapleton	18	2:30 p. m.	Tornado, hail, flood	1/2	SW to NE	1 1/2		1	\$75,000	A tornado that caused great destruction in Nebraska near Tekamah, apparently crossed the Missouri river and entered Iowa in Sherman Twp., in the southwest corner of Monona County. Passing south of Blencoe it traveled in a northeasterly direction, cutting across the Little Sioux river south of Turin and then continuing in a northeasterly direction parallel to and a few miles east of the Maple river past Castana. Most of the damage occurred in rural areas but there was considerable damage to steel grain tanks and to roofs, electric light and telephone wires and other property in Castana. Fred Neison, age 10, received a fractured ankle, and Mrs. Ted Lee suffered a heart attack. The total length of the storm's track in Iowa was about 15 miles. Heavy hail fell at scattered points near Mapleton and northwest of that town an estimated 5 inches of rain fell, causing considerable soil washing and erosion. Train service was interrupted by flooding.
Woodbury Co., Correctionville, Cushing; Cherokee Co.	18	4:00 p. m.	Tornado, hail	1/8	SW to NE	1 1/2		4	20,000	A tornado developed a short distance south of Highway 20, striking a farm at a point about 3 miles west of Correctionville. A barn demolished by the storm was blown against an electric power line, tearing it down and interrupting service in Correctionville for a short time. Proceeding in a general northeasterly direction the storm caused considerable damage on 4 additional farms in Woodbury Co., and then crossed into Cherokee Co., wrecking all buildings except the house on a farm about a mile south of Washta, on Highway 31. At this point, Stanley Moore, age 9, suffered severe cuts and bruises, and Mrs. Moore, and 2 other children, also received slight injuries. The path of the storm was about 9 miles long. It was not directly associated with the hailstorm in the western part of Woodbury Co., but was another separate development in the general storm pattern. Hail that was locally damaging and heavy, washing rains that flooded creeks and lowlands, fell in scattered sections of Cherokee Co.
Ida Co., west portion, especially Maple Twp.	18	Afternoon	Tornado, hail, flood	1/16	SW to NE	1 1/2			10,000	Severe thunderstorms, attended by heavy rain and hail, fell in scattered areas over western third of county. A short distance from Cushing, 4.20 inches of rain fell between 2 p. m. and 6:30 p. m. flooding highways and flooding basements in Cushing. This was probably associated with the Correctionville tornado. Heavy hail in Battle and Maple twps. were part of the secondary developments of the Monona Co. tornado. A separate small tornado developed in southeast Battle twp., causing damage to buildings on one farm.
Crawford Co., Goodrich, Milford, Stockholm Twps.; towns of Deloit and Kiron. Sac Co., Wheeler Twp., southwest of Odebolt; Richland, Jackson, Cedar Twps.	18	4:15 p. m.	Tornado, hail, flood	1/2	SW to NE	1			200,000	Beginning in the southwest corner of Goodrich Twp., a tornado traveled northeast to a point northwest of Deloit, then proceeded almost due north, passing east of Kiron and into the southwest corner of Sac Co., where the storm seemed to increase in intensity in Wheeler Twp., southwest of Odebolt, before lifting. Some vestiges of "twister" damage occurred in the extreme south part of Richland Twp., Sac Co., northeast of where the funnel cloud disappeared; heavy hail caused damage in scattered areas, breaking glass and beating down crops. While the tornado was proceeding north in the west part of Stockholm Twp., Crawford Co., heavy hail fell along a parallel path several miles to the west in Otter Creek Twp. The path of the tornado itself was about 18 miles long but the later "twister" in Pocahontas Co. was almost certainly a redevelopment of this storm, as shown by the areas of heavy hail connecting the two

IOWA STORMS, MAY, 1944—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Pocahontas Co., Cedar, Grant Twps., Fonda	18	5:30 p. m.	Tornado, hail	1/2	SW to NE	1 1/2			125,000	tornadoes. About 30 farms were more or less seriously damaged by the tornado, about two-thirds of which were in Crawford Co. Destructive hail was also reported near Charter Oak, Schleswig and Odebolt, and it was reported that 4 inches of rain fell at the latter place. There was much flooding and erosion. An electric clock in one wrecked farm home stopped at 4:25 p. m. Electric power and telephone services were hampered. The tornado described above redeveloped in the southwest corner of Pocahontas Co. The first damage occurred at the fairgrounds in the southwest part of Fonda. The storm traveled in a general ENE direction causing some damage in the southeast part of town, then lifted and struck a farm in the open country about 1 mile east of Fonda on Highway 5. It then traveled northeastward for about 10 miles, damaging buildings on every farm in its path, numbering about 25. The storm disappeared in Grant Twp. about 12 miles from where it redeveloped at Fonda. The overall length of its path from its inception in Crawford Co. to its final disappearance, was about 60 miles. Many basements were flooded in Fonda by heavy rain that accompanied the tornado and by a second downpour an hour later. Outside the main storm track many windows were broken by hail and minor damage was done to homes and trees by a straight blow wind.
Calhoun Co., north portion	18	5:30 p. m.	Wind, hail, flood							Severe thunderstorms with some hail and heavy rain caused damage in the northern tier of townships. There was much flooding, especially in the northwest corner, near the point where the tornado described above redeveloped at Fonda.
Greene Co., Dawson and Paton Twps., town of Paton; Webster Co., south-central and southeast portions, Lanyon; Hamilton Co., Webster, Freedom Twps., Homer and Stratford	18	7:00 p. m.	Tornado, wind, hail, flood	1	SW to NE	1			70,000	A tornado formed along the extreme southern part of the boundary between Dawson and Paton twps., and moving northeast past the town of Paton it caused damage on 3 farms. Continuing into Webster Co., the "twister" caused further damage near Lanyon, after which it apparently lifted for a time. Striking again in Webster Twp., the tornado moved into Hamilton Co., passed Homer, and disappeared about 4 miles southwest of Webster City. At Webster City, 3.12 inches of rain fell between 8 p. m. and 11 p. m. Scattered flood and hail damage along the tornado path and in adjacent areas amounted to several thousand dollars. The overall length of the entire path was about 30 miles. The storm path in Webster Co. was rather irregular. It was reported that a farmer named Rouse, driving along a road with his family, had his car blown off the road but that the occupants sustained only cuts and bruises.
Dallas Co., Lincoln, Adams, Linn, Washington Twps.	18	9:30 p. m.	Tornado, hail, flood	Narrow	SW to NE				2,000	A small tornado caused relatively light damage along a path about 5 miles long in Linn, Lincoln and Washington Twps. No details are available. Heavy hail fell in the southwest corner of the county, preceding development of the "twister," and there was scattered hail damage in other sections with much flood in the north part of county. Wind caused some loss in Adams Twp.
Polk Co., Story Co., Union, Indian Creek, Collins, New Albany Twps.; Marshall Co., Washington Twp.	18	10:30 p. m.	Tornado, wind, hail, flood	1/2	SW to NE	2	2	11	125,000	Thundershowers were general throughout Polk Co. with excessively heavy downpours of rain in the north portion. At Des Moines, 1.80 inches fell but amounts were much heavier over the watersheds of Four Mile, Beaver and Walnut creeks and over the Skunk river and its tributary creeks in Story Co. In the north portion of Des Moines trees were blown down or branches broken off by strong winds. North of the city on the Polk-Story Co. boundary, a tornado developed and traveled northeastward for a distance of about 15 miles, causing great destruction, killing 2 persons and injuring 12 others. The dead were Merrill Hoyt, farmer, and West Mohler, age 12, killed when their respective homes were demolished. The injured included Mrs. Hoyt and 3 year old daughter, Mrs. Russell Mishler, Mr. and Mrs. George Rupp and daughter, Mrs. Edna Mohler and grandson, Dick, and Mr. and Mrs. V. H. McKinney. The greatest destruction occurred in a 2-mile long area, west and north of Maxwell, where 4 farm homes, together with most other surrounding buildings, were completely destroyed. It was here that the 2 fatal and most of the other injuries occurred. In this same area one person reported the tornado as being a bright ball of fire that exploded. It has not been possible to obtain additional details needed to determine whether this was a case of ball lightning, an unusual electrical phenomena associated with the storm or an optical illusion. The storm passed through the Maxwell cemetery overturning tombstones and uprooting trees. In its path the tornado destroyed 9 houses and damaged about 20 others, as well as destroying or damaging many other buildings. The tornado lifted in New Albany Twp. almost midway between Colo and Collins. At Ames, due northeast of the Dallas Co. tornado, 4.54 inches of rain fell during the night. Almost 25 miles east of Ames and about 6 miles northeast of where the Maxwell tornado lifted, 4.35 inches of rain fell at State Center, while still farther east at Marshalltown, 2.87 inches were reported. In Washington Twp., of Marshall Co., 2 barns were wrecked and several other buildings unroofed, about 10 miles east of where the Maxwell storm ended. It may be that as the funnel cloud dis-

IOWA STORMS, MAY, 1944—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons Injured	Estimated value of damage	Remarks
										sipated, the entire storm turned sharply eastward and that the Marshall Co. damage was a redevelopment of the tornado. In northeast Polk Co., south of Maxwell, a barn was damaged and there were scattered reports of damage to trees and wires. This presents an alternative theory that an embryonic, undeveloped tornado followed a path parallel and southeast of the main storm. The heaviest rain seemed to parallel the tornado track to the northwest. These heavy downpours caused Indian Creek to overflow at Maxwell and throughout the area washed out bridges, culverts and road grades and hindered rescue work, while all communication by telephone was disrupted. There were many scattered local reports of heavy hail. In some areas it was almost impossible to segregate the storm damage from that caused by floods. At Fernald, 6 miles north of Nevada a Rock Island passenger train was derailed by a washout, severely injuring the engineer and a postal employee working in the mail car. Many other trains were rerouted or delayed because of washouts and flooded tracks. Many basements and much low ground were flooded at Ames, Marshalltown and in smaller towns.
Cass Co., Noble Twp.; Fremont Co.; Warren Co., northwest corner	18									Scattered light wind damage in Fremont Co., no details. Cass Co., 7 p.m. wind caused \$1500 loss in area 1 by 3½ miles. Northwest corner of Warren Co., \$5,000 flood loss about midnight; also \$4,000 loss due to wind. No details of these storms were received.
Fayette Co., Wapello Co.	18		Lightning							Horse blinded by lightning east of Sumner, Fayette Co.; house damaged by lightning at Ottumwa.
Jasper Co., Story Co.	19	10:30 a. m.					2			As an indirect result of the Maxwell tornado, Frank Maxwell, age 42, a farmer, drowned while attempting to rescue cattle from flood waters of Indian Creek, north of Mingo. Leonard Elliott died of a heart attack east of Ames while similarly engaged in rounding up livestock.
Pocahontas Co., Marshall, Swan Lake twps., town of Laurens; Cummins, Sherman twps., town of Ware	19	5:30 p. m. to 6:30 p. m.	Tornado	2	SW to NE W to E N to S	2			\$100,000	A tornado that developed along the Buena Vista-Pocahontas Co. boundary at 5:30 p. m. followed a very freakish path that presents an unusual problem for analysis. The storm was apparently born in Buena Vista Co. a short distance southeast of Albert City, but there was no damage reported until it reached Pocahontas Co. Reports of observers differ widely and are rather confusing but from the trail of damage that was left by the storm, the following seems to be its true life history: The storm traveled about 5 miles along an irregular path toward the east-northeast to the northern edge of Marshall Twp., and about 2 miles from the eastern border. At one point it remained over the same farm from 4 to 8 minutes and then moved northeast for about one-half mile to the point where it broke up. A few minutes later a new funnel appeared about a mile to the eastward. This funnel traveled a little more than a mile east of the Sherman Twp. line and then turned abruptly south for a distance of about 3 miles, where it disappeared after starting to turn to the westward. When the tornado reformed it appears that 2 secondary funnels developed and traveled a short distance into Washington and Swan Lake Twps. respectively, but caused little damage. One observer stated 2 tornadoes crossed each other's paths, and another that 2 funnels collided, after which the storm broke up. Probably the spectators' points of view gave different perspectives to the same phenomena. It seems certain, however, that at first there was one funnel visible and at another time there were at least 3. It also seems certain that there was one main storm track and that this track was shaped like a crude, reverse question mark, lying horizontally with the open end of the hook to the south. There was only minor damage outside this main path but the main funnel caused widespread destruction in the open country between Laurens and Ware. The storm moved so slowly that many persons were able to drive to one of these towns for safety after the storm was observed. A separate storm caused damage on 4 farms south of Havelock but no details of its path could be obtained. It is presumed to have been an independent tornado. Also see details of Barnum-Ft. Dodge storm.
Pocahontas Co., Lincoln Twp., Westview	19	7:30 p. m.	Tornado	¼	NW to SE				50,000	A tornado wrecked 2 grain elevators and damaged other property. This may have been a redevelopment of one of the tornadoes mentioned above, or it may have been an independent storm. The storm moved towards the southeast but its path was short.
Webster Co., Johnson, Douglas, Cooper, Wauknosa twps., Barnum to Ft. Dodge; Otho twp., Sumner	19	7:30 p. m.	Tornado, hail	½	SW to NE W to E NW to SE		1	14	200,000	A tornado originated a short distance southeast of Barnum and traveled northeastward for about 2 miles to Highway 5, where it suddenly headed due east, at the same time developing into a storm of great intensity and vicious destructiveness. It followed along Highway 5 for about 4½ miles until within 2 miles of Ft. Dodge, where it lifted. However, on reaching the city limits the funnel cloud again descended and headed southeast along the Des Moines river. After causing considerable damage at the Ft. Dodge Country Club and tearing out trees on the west bank of the river, the tornado crossed the stream and wrecked the third story of a mill. At this point the storm divided, one portion heading east along Central Avenue in the business district,

## IOWA STORMS, MAY, 1944—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
										and the other proceeding southeast along the east bank of the Des Moines river, in a residential area. Both forks of the storm caused considerable damage along their respective paths for about 1 mile, after which only minor straight wind damage was noted. It is possible that instead of the storm dividing as it reached Ft. Dodge, an entirely separate storm developed and their paths almost joined. Mr. and Mrs. Y. N. Tollefson were driving towards Ft. Dodge and upon observing the "twister" near Barnum, stopped their car until the storm had proceeded up the road ahead of them. However, when they proceeded toward town they soon ran into strong winds and turned back to their previous parking place. Here they saw a second funnel form to the south of Ft. Dodge and travel north and apparently "blow" itself out over town. The trails of destruction do not indicate any south or north movement, but a heavy hailstorm did occur south towards Sumner, and the funnel cloud may not have reached the ground. Low visibility, or the first funnel, may have hidden development of other "secondaries." Note the similar behavior of this storm and the one in Pocahontas Co. John Collingsworth, 17, was killed when the tornado picked up the car in which he was riding along the highway, his body being found 200 feet north. His companions, Richard Taylor, Fred Faine, Alan Evenson and Pat Wiewel, were injured. Others injured at Ft. Dodge were Guy Hanson, Vito Amanzio, and Mrs. Ernest Peterson. Mrs. Joe Winninger was injured when her home was wrecked. A half dozen others required medical attention, and there were also others who suffered only minor cuts and bruises. About 17 houses were destroyed and 60 damaged, and about 60 other farm buildings were demolished and an equal number damaged. Electric and communication services were hard hit and telephone service to surrounding communities was cut off for some time. Thousands of trees were uprooted or suffered from branches being torn away. Crops were pounded by hail and many fields were flooded. At this time heavy rain and hail fell in Otho Twp. southeast along the Des Moines river.
Webster Co., Colfax Twp., Duncombe	19	Night	Tornado							Four buildings were wrecked on a farm about 8 miles east of the Ft. Dodge tornadoes and 4 miles north of Duncombe. This was probably a redevelopment of the Ft. Dodge storm, or it may have been the funnel observed moving north, apparently towards that city, but in reality to the eastward.
Johnson Co., Big Grove, Newport, Penn and Graham Twps.	19	8:00 p. m.	Wind, flood, hail			1			20,000	Hail and wind with severe thunderstorms caused loss of about \$10,000 each. Much more damage caused by flooding rains and river flood. Four inches of rain were reported to have fallen in an hour.
Hamilton Co., Kamrar	19	Night	Tornado							A tornado was reported to have wrecked a barn; no details available; may have been redevelopment of Ft. Dodge storm.
Guthrie Co., Grant and Thompson Twps., Adair and Casey; Adair Co., Summit, Walnut, Grove and Harrison Twps.; Howe and Arbor Hill; Orient Twp.	19-20	Night	Rain, flood							Heavy downpours the night of the 19th-20th over central and southern Guthrie county, and over northern Adair county, flooded basements in towns, caused streams to overflow and washed out culverts and bridges besides causing great erosion loss and damaging highways. At Guthrie Center 4.80 inches of rain fell in 24 hours and at Casey an estimated 6 inches fell. 21 bridges washed out in Guthrie Co. The excessive rain over the headwaters of the Middle River caused the stream to overflow and flood areas at Howe and Arbor Hill. At the latter point some houses were moved from their foundations. Flooded highways and washed-out bridges halted traffic. In Orient Twp. hail damaged buildings \$5,000 and crops \$5,000. Seven cars of the Rock Island R. R., Rocky Mountain Rocket were derailed a mile and a half west of Casey, tying up traffic for 3 days.
Madison Co., Penn and Jackson Twps.	19	10:30 p. m.	Wind, hail						\$20,000	Correspondents report wind damage amounting to \$10,000 each in Penn and Jackson Twps., but furnished no details.
Chickasaw Co., Nashua; Bremer Co., Horton, Waverly, Readlyn and Sumner; Fayette Co., Fairbank	19	Night	Wind, hail, flood, tornado, lightning						25,000	Scattered severe thunderstorms occasioned damage in the three-county area. West of Nashua wind damaged buildings and several bridges were out in the area. Light wind damage occurred from Waverly to Readlyn with some indication of twisting action at Waverly. Bridges were washed out near Horton with at least 8 bridges and 8 culverts rendered unsafe in Bremer Co. The worst damage occurred in a 5-mile strip west of Sumner in Bremer Co., where buildings were damaged or wrecked and trees blown down on 6 farms. This may have been a true tornado but full details are not available. Hail caused crop damage near Fairbank and lightning set fire and burned down a house and barn in Fayette Co. northwest of Sumner.
Buchanan Co., Independence	19	Night	Lightning						2,500	Home damaged by lightning.
Tama Co., Chelsea	20		Flood				2			Frances Hrabak, 11, and Veronica Flynn, 9, were drowned when swept away by flood waters, while wading in a water-covered street.
Black Hawk Co., Waterloo	20		Flood				2			Walter Gallery and his son Walter, Jr., 12, drowned in Cedar River when control of a motor boat was lost, and the launch was swept over a dam.

IOWA STORMS, MAY, 1944—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons Injured	Estimated value of damage	Remarks
Clay Co., Spencer	21		Flood				1			Gary Jensen, 7, drowned in flooded Little Sioux river.
Dubuque Co., Dubuque	26		Flood				1			Wilfred P. Weber drowned in Mississippi River.
Cass Co., Anita	25	6:00 a. m.	Lightning						5,000	Lightning set fire, destroyed building.
Polk Co., Des Moines	25	7:39 p. m.	Thundersquall, tornado (?)	1/5					5,000	A thundersquall, attended by high, gusty winds caused scattered damage along a path about 300 yards wide and 2 miles long but with greatest destruction in an area 3 blocks wide and 10 long. A sign blown from atop a building crushed 3 automobiles on the west side. The thundersquall moved almost due east with a pronounced roll cloud at the front. This cloud dipped to tree level at the east end of the State Capitol grounds and from E. 12th to E. 22d Street the wind broke off large branches of most trees and uprooted others along E. Walnut street and on both sides of that street for about 150 yards. Several houses were damaged by falling limbs, telephone and light wires were down, and traffic halted. There were no signs of "explosive" action and all damage seemed to have been caused by a straight wind associated with the turbulent roll cloud. However, several persons in the storm area insisted that there was a pendant funnel cloud that moved directly eastward, and therefore the storm is classed as an embryonic or incipient tornado. The writer viewed the storm from a point about one mile north of the damage area, but the bottom of the roll cloud was hidden by trees and no funnel was observed. In recent years two similar squalls at Des Moines have preceded development of true tornadoes east of the city.
Pottawattamie Co., Hardin Twp.	30	2:30 p. m.	Hail	1		1/2				Hail fell along path 1 mile wide and 7 long, damaging crops slightly.

S. E. DECKER

NOTES ON TORNADOES OF MAY 18th AND 19th, 1944

(By S. E. DECKER, Assistant Meteorologist)

On May 18, barometric pressure was low over the Dakotas and high over the Lake region. At 1:30 p.m. a stationary front extended from the low pressure area southeastward into Iowa. By 7:30 p.m. the front had moved northeastward and almost bisected the State, extending from Lyon County, in the northwest, to Lee County, in the southeast. To the north, Maritime Tropic air overlay Continental Polar air while to the south of the front Maritime Tropic air prevailed. Farther west advancing Maritime Polar air was changing to Continental Tropical air. The tornadoes apparently formed in the Maritime Tropical air mass in back of the warm front, and moved northeastward either in the rear of, or across the warm front. The afternoon storms in western Iowa, and the evening "twisters" in central Iowa, all seemed to have moved northeast, then east and then northeast again. The funnel clouds lifted or the storms varied in intensity as these changes in direction occurred. Radiosonde observations at Omaha showed a rather uniform temperature lapse rate and no unusual change in specific humidity. The freezing point was reached at about 12,000 feet. To the north, at St. Paul, there was a steep inversion in the lower levels, and there the freezing level was reached at 10,000 feet. Upper air charts were not unusual, although the entire set-up was favorable for heavy precipitation and some turbulence along the fronts. The tornadoes developed in connection with thunderstorms that produced excessively heavy downpours of rain that in turn caused more damage by flooding and erosion, than was occasioned by the "twisters."

On the 19th, a trough-like area of low pressure covered the great plains. During the day the trough remained in much the same position but the center of lowest pressure which had appeared over the Dakotas was pushed southward as the northern end of the trough "filled" in. At 1:30 p.m. a warm front extended across the State from Lyon to Clinton counties. At 7:30 p.m. the front had been pushed southward, much more to the western part of Iowa than in the eastern. At 7:30 p.m. it showed as a stationary front from Crawford County to Scott, while an occlusion stretched from Lyon to Crawford counties

where it joined the stationary front and then curved south as a cold front to the southwest corner of the State. The 7:30 p.m. surface map was typical of the kind that has been found to be most favorable for development of small tornadoes in Iowa, usually along the east-west front and in advance of the new cold front moving in from the west. In this case the Pocahontas and Webster County tornadoes moved in a very irregular manner. It is believed that the storms developed in the warm air and moved toward the warm front. But since this front had become stationary, and was being pushed southward, the storms turned eastward when the front was reached and were then pushed southward as the frontal system moved in that direction. As on the preceding date, Maritime Tropic air overran Continental Polar air to the north. On the south side of the front, Superior air overlay a Maritime Tropic mass while a new cold mass of Polar air was advancing from the west. The radiosonde observations at Omaha did not differ greatly from those of the 19th, except that the morning observation showed a temperature inversion at about 3,500 feet. Another sharp inversion was shown in the lower levels at St. Paul in the morning but the evening observation was not available. As on the preceding date, the synoptic conditions were very favorable for heavy precipitation and damaging floods followed torrential downpours.

Details of the individual storms appear in the storm table, but at this point it might be well to stress that damage from hail was relatively very light. There were many reports of heavy falls of hail, but because of the lateness of the season there were no crops except truck and gardens susceptible to damage. Most of the loss reported was to buildings, glass, etc. The same amount of hail at a time when the corn crop was sufficiently advanced might have caused millions of dollars loss. Study of the detailed reports in connection with weather maps affords interesting light on tornado behavior.

A survey by the American Red Cross summarized flood and storm damage in Iowa during May as follows: 47 houses destroyed, \$188,000; 963 houses damaged, \$481,000; 240 barns destroyed, \$600,000; 150 other building destroyed, \$225,000; 1,500 other buildings damaged, \$600,000. This does not include farm machinery and equipment, destroyed or damaged, nor loss of poultry and livestock, nor damage to roads, highways, bridges



and rail lines. State Soil Conservation officials estimated \$154,000,000 worth of top soil was washed away by heavy downpours of rain and flood. Many thousands of acres had to be diverted to other crops or remained idle. Since this source of loss continued into the first half of June, a more complete summary will be given then. It is well to remember that every year with adequate rainfall has a considerable amount of erosion and flood loss to offset the increased agricultural yields which result. Therefore, while loss was greater than usual, the dollar estimate would be sharply lowered when viewed in the light of normal or average erosion loss.

**IOWA FLOODS OF MAY, 1944**

Only 3 or 4 times in Iowa history have floods been so extensive and damaging as in May, 1944. On the Des Moines River the highest water that is accurately known was on May 31, 1903, though it is believed that the high water of 1851 was about as high at Des Moines. At Boone the crest of 24.85, May 22, 1944, is the second highest of record but this stage is subject to correction when an engineer can be sent to check the gage. At Des Moines, 2nd Avenue, the crest of 24.46, May 23, 1944, is the third highest, standing next to 25.21, July 10, 1902. At Tracy the crest, 21.55 feet, May 23, 1944, is the second highest though no records are available in 1902. At Eddyville the crest, 22.8, May 24, 1944, is the second highest of record though no records are available in a number of important floods. At Ottumwa the crest, 17.6, May 24, 1944, is the second highest of record though no records are available for a number of important floods. On the Raccoon River at Van Meter the crest, 18.3, May 21, 1944, is the third highest of record but this reading is subject to correction when an engineer can find time to check the gage. The highest known water at Van Meter is 18.8 feet September 20, 1926.

Along the Des Moines River from Ft. Dodge to Keokuk, well up toward 1,000 families were driven from their homes, and there was much damage to buildings, fences, bridges, highways and railways, and some loss of livestock.

However, the loss of livestock and other movable property was much less than it otherwise might have been, due to the ample advance warnings of the Weather Bureau. The first warnings of bankful stages with some overflow were given at 9 a. m. May 19. A warning of general overflow followed next morning, and on the morning of the 21st a warning of "the highest water in 26 years;" and on the 23d, "every precaution should be taken to protect life and property." Numerous changes in the time and height of the crest forecasts had to be made as 2 or 3 successive crests were caused by scattered local downpours of rain, which, in general, moved down the valleys with the flood. Prompt response to the warnings of the Weather Bureau by the Police Departments at Des Moines and Ottumwa, and the Sheriff of Polk County, in evacuating families and livestock from lowlands, saved lives and property. Also prompt action in constructing or blasting of levees as seemed expedient by the City Engineers and the U. S. Engineers saved much property. The American Red Cross was active all over Iowa wherever there was need and the Iowa Guard and the U. S. Navy were helpful in evacuating families at Ottumwa.

It is impossible at this time to make a comprehensive estimate of total damage, but apparently it will run into the millions of dollars. The breaking of the levee at Riverview Park in Des Moines caused damage in that park and in Birdland Park amounting to \$275,000. Other damages in Des Moines are placed at \$500,000.

Two or three successive rain-floods in the Four-Mile Creek area just east of Des Moines, caused repeated evacuation of scores of families, with much damage to property.

There was considerable damage to lowland pastures and hayland but no large per cent of the total cultivated crops is on the lowlands along the rivers. The greatest damage of all

was by erosion of land and mudding and flooding of crops on relatively high and hillside land.

The estimated damage along the Des Moines River from Ft. Dodge to Ottumwa, is as follows:

1. Tangible property totally or partially destroyed, such as buildings, fences, factories, highways, bridges, railroads, etc., including the damage in Des Moines.....\$ 24,250
  2. *Agricultural losses:*
    - (a) Matured crops ..... 65,280
    - (b) Prospective crops on 143,400 acres..... 758,213
    - (c) Livestock and other movable farm equipment..... 184,260
  3. Suspension of business, including wages of employees..... 36,410
- \$3,791,413
4. Money value of property saved by flood warnings.....\$ 633,250

Similar estimates along the Raccoon River from the headwaters to Des Moines show for the same items, 1, \$178,730; 2(a), \$1,320; 2(b), \$595,757 on 20,429 acres; 2(c), \$1,140; 3, \$100; 4, \$3,500.

There were no drownings except possibly an un-identified man at Ottumwa whose body has not been recovered. There were many thrilling rescues.

Starting with a rainfall of 8.21 inches in 37½ hours at Ames, May 19-20, a destructive flood moved down the Skunk River. Complete statistics are not yet available on the losses. The total so far received is \$2,097,650. There were several reports of cattle saved by warnings but only one estimated the value at \$2,500. Many primary highways and bridges were destroyed and also railway grades, bridges and tracks.

Also, great floods moved down the Cedar-Iowa Rivers and lesser floods down the Mississippi River. On the Iowa-Cedar Rivers the estimates of damage are as follows:

1. Tangible property totally or partially destroyed, such as buildings, fences, factories, highways, bridges, railroads, etc.....\$125,000
2. *Agricultural losses:*
  - (a) Matured crops ..... 5,000
  - (b) Prospective crops on 52,000 acres..... 260,000
  - (c) Livestock and other movable farm equipment..... 50,000
3. Suspension of business, including wages of employees..... 20,000

Total losses.....\$460,000

4. Money value of property saved by flood warnings.....\$525,000

Loss of life, Francis Hraback, 11, at Chelsea, May 22; Veronica Flynn, 11; Walter Gallery and Walter Gallery, Jr., at Waterloo, May 22.

The losses along the Mississippi River were relatively small, totalling only \$60,000, with an estimated saving of property moved through warnings given by the Weather Bureau, of \$50,000.

All of these estimates of damage are subject to revision when the reports of the Red Cross, the United States Engineers, and other organizations, can be brought together and reviewed.

**RANK OF PRINCIPAL FLOODS OF RECORD ON THE DES MOINES RIVER GAGE READINGS CORRECTED TO GAGES IN USE IN MAY, 1944**

Rank	BOONE		DES MOINES 2nd Avenue		TRACY		EDDYVILLE		OTTUMWA	
	Stage	Date	Stage	Date	Stage	Date	Stage	Date	Stage	Date
1	26.9	May 31, 1903	27.3	May 31, 1903	25.0	May 31, 1903	24.8	May 31, 1903	24.8	May 31, 1903
2	24.85	May 22, 1944	25.2	July 10, 1902	21.55	May 23, 1944	22.8	May 24, 1944	17.6	May 24, 1944
3	24.4	April 2, 1933	24.46	May 23, 1944	20.1	June 28, 1935	21.8	Mar. 16, 1937	16.2	Aug. 1, 1915
4	24.1	June 5, 1918	23.4	April 3, 1933	18.8	June 19, 1944	20.5	Feb. 5, 1943	15.7	June 2, 1915
5	23.7	June 15, 1944	23.4	June 17, 1944	18.3	Mar. 16, 1929	20.2	June 19, 1944	15.4	June 28, 1935
6	23.1	Sept. 18, 1938	22.3	July 7, 1918	17.9	Mar. 5, 1937	19.4	July 4, 1935	15.4	June 11, 1917
7	22.0	May 31, 1915	21.8	Mar. 18, 1929	17.2	June 16, 1944	19.2	May 14, 1939	14.4	June 19, 1944
8	20.9	Mar. 16, 1929					17.9	May 17, 1943		

The recent crests at Boone, Van Meter, and possibly others, are subject to correction when engineers can check the accuracy of the river gages.

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV

DES MOINES, IOWA, JUNE, 1944

No. 6

## GENERAL SUMMARY

The month of June, 1944, averaged warm and wet and was marked by frequent heavy local downpours of rain that drowned out crops, eroded soil, and damaged bridges, highways and railroad rights of way. In other words, the weather conditions followed the same pattern as those of May and aggravated the damage caused to industry by floods and storms and to agriculture by water-logged soil, washed-out crops and erosion. But after the middle of the month the excessively heavy falls of rain became much more localized and were mostly confined to the northeast quarter, floods covered smaller areas and became less serious, and in most of the State a period of deficient precipitation set in and continued well past mid-July. In fact, by the end of June a few local areas were already placing emphasis on the need for additional rainfall rather than on too much rain. This reversal of conditions that had existed during the entire planting season caused marked improvement in crop prospects.

It was the 15th warmest June of Iowa record, the mean temperature of 71.7° being 2.0° above the all-time average. The average total precipitation of 5.88 inches was the 18th greatest of record for June, and was 1.19 inches above the 72-year June normal. Despite the excess moisture it was the driest June since 1940. Heating requirements were slightly above normal. There was somewhat more cloudiness and less sunshine than usual, while wind movement and relative humidity were higher than normal. The excess moisture was due to heavier falls than usual since the average number of days with rain was exactly normal and the smallest number since 1940.

At the beginning of the month high barometric pressure covered the southeastern States, while low barometer readings prevailed over the northern Plains. Maritime Tropical air covered Iowa and brought warm and sunny weather to the State to provide the most favorable conditions of the season up to that time for agricultural operations. Such showers as did occur were scattered and relatively unimportant. As the southeastern "high" diminished in strength, low pressure moved eastward from the Dakotas into Minnesota, and Continental Tropical air pushed into Iowa. Showers attended the eastward movement of the cold air, beginning in the northwest on the 3d and extending to all sections on the 4th. Temperatures fell below normal on the 5th and cool weather continued until the 11th. Meanwhile, the first wave of Continental Tropical air was followed by an outbreak of Continental Polar air. The lowest temperatures of the month were recorded on the 6th and 7th.

By evening of the 7th the high pressure area that moved southeastward in connection with the cold air, had drifted to the middle Appalachian region, and Maritime Tropical air had begun to overrun the Polar mass over Iowa. General showers occurred as the moist air was forced to rise above the cold, with heavy downpours in many sections. The entire frontal system was forced south and eastward on the 9th by a fresh out-

## COMPARATIVE DATA FOR JUNE

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	74.5	96	56	4.68					
1874.....	71.4	98	47	5.83					
1875.....	67.5	92	45	7.81					
1876.....	67.6	92	41	4.09					
1877.....	66.9	92	40	6.80					
1878.....	66.7	94	44	6.34					
1879.....	69.4	92	40	5.12					
1880.....	71.0	96	42	4.40					
1881.....	70.4	100	40	7.37					
1882.....	68.1	98	33	7.48					
1883.....	67.6	96	38	6.69					
1884.....	70.2	95	36	3.65					
1885.....	67.9	89	42	5.08					
1886.....	69.3	98	34	1.73					
1887.....	72.1	103	40	2.93					
1888.....	69.4	102	34	2.93					
1889.....	66.7	98	33	4.75					
1890.....	72.2	106	39	6.67		11	12	10	8
1891.....	69.1	99	37	5.39		11	8	10	12
1892.....	63.2	102	42	5.19		10	12	11	7
1893.....	71.2	100	40	3.91		8	15	11	4
1894.....	73.2	104	34	2.67		7	16	10	4
1895.....	69.7	102	34	4.32		10	11	11	8
1896.....	69.1	100	40	3.11		9	12	13	5
1897.....	69.1	103	29	3.81		10	10	12	8
1898.....	71.4	99	42	4.72		9	13	10	7
1899.....	70.7	100	42	5.04		10	12	13	5
1900.....	69.7	102	38	3.98		5	17	10	3
1901.....	72.3	106	30	3.71		9	15	11	4
1902.....	65.2	97	32	7.16		14	8	11	11
1903.....	64.6	96	30	2.86		10	13	10	7
1904.....	67.1	94	35	3.45		7	13	10	7
1905.....	69.9	100	36	5.53		10	12	11	7
1906.....	67.9	99	37	3.92		8	15	10	5
1907.....	66.5	98	36	5.35		11	14	9	7
1908.....	67.1	94	35	5.66		13	12	10	8
1909.....	69.1	96	40	6.41		13	12	10	8
1910.....	69.5	105	33	1.99		7	18	7	5
1911.....	75.7	108	36	1.82		5	20	8	2
1912.....	66.2	101	34	2.74		7	15	9	6
1913.....	71.5	102	33	3.31		7	19	8	3
1914.....	72.2	101	40	5.57		13	12	14	4
1915.....	65.1	91	31	4.16		11	12	12	6
1916.....	64.5	96	38	3.71		10	13	11	6
1917.....	66.0	100	32	6.65		12	13	10	7
1918.....	70.8	104	38	5.29		11	16	10	4
1919.....	71.9	98	41	6.13		13	12	12	6
1920.....	70.7	99	40	3.56		9	16	10	4
1921.....	74.7	100	40	3.76		9	16	10	4
1922.....	72.2	104	38	1.82		6	19	8	3
1923.....	70.9	100	40	4.93		12	14	10	6
1924.....	66.8	96	35	8.10		14	11	14	5
1925.....	70.4	98	38	6.64		12	15	9	6
1926.....	66.2	105	32	4.52		8	16	9	5
1927.....	66.4	101	35	2.42		9	16	7	7
1928.....	64.5	88	31	5.38		12	10	10	10
1929.....	67.6	99	38	3.08		9	14	9	7
1930.....	69.0	101	37	5.83		10	16	10	4
1931.....	75.0	106	36	3.73		9	18	8	4
1932.....	72.0	99	48	5.17		11	12	12	6
1933.....	77.8	109	34	1.64		4	21	7	2
1934.....	77.2	111	43	3.49		9	16	11	3
1935.....	65.9	94	33	7.00		13	9	13	8
1936.....	70.1	108	37	2.85		8	17	9	4
1937.....	69.0	108	36	3.80		9	13	12	5
1938.....	69.2	102	38	4.67		11	14	11	5
1939.....	71.4	100	41	5.32		12	12	11	7
1940.....	71.3	102	42	3.56		8	15	11	4
1941.....	70.0	98	41	6.20		12	12	8	10
1942.....	69.7	99	34	5.93		12	9	13	8
1943.....	71.6	101	37	6.16		14	13	10	7
1944.....	71.7	101	38	5.88		10	12	11	7
Period.....	69.7	111	29	4.69		10	14	10	6

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

break of cold Polar air, and precipitation over Iowa ceased. The respite was short as the crest of the high pressure area attending the cold air moved to the Lake region, and precipitation began in the southwest quadrant of the "high" the night of the 10th. As the overrunning moist Tropical air was lifted, the



CLIMATOLOGICAL DATA FOR JUNE, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, feet, Length of record, years, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. Includes districts like Central District, East Central Dist., Southwest District, South Central Dist., and Southeast District.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed.

State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated. † Trace or 0.005 inch or less. ‡ Data interpolated. § Partly interpolated. †† And other dates. ‡‡ Received too late to be included in means and summaries. ††† Best available used for stations not equipped with recorders.





DAILY PRECIPITATION FOR JUNE, 1944—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>Southeast District (Continued)</i>																																			
Donnellson <sup>2</sup>	Des Moines						.01	.45	.35	T.		.33						.56			.04	.17													1.91
Eddyville <sup>2</sup>	Des Moines				.25	.05		.75	2.60		T.		.54			T.			.21		T.	T.												4.40	
Fairfield	Skunk				.07		.05	1.63	.62			.16	.10			.10		.78			.10	.09												3.70	
Keokuk <sup>1</sup> †	Mississippi				T.		.03	.25	.71			.28	.05		.13	T.		.12				.18					.69	.01		T.			2.45		
Keokuk LD 19 <sup>2</sup>	Mississippi							T.	.60	.31		.37	.08			.09					.10												2.39		
Keosauqua	Des Moines				.04			.80	.65			.16	.21			.08		.80	.05		.02	.14											2.95		
Keosauqua (riv.) <sup>2</sup>	Des Moines				T.			1.30	.08			.30				.10		1.27			.25	.10											3.40		
Mt. Pleasant	Skunk							.80	1.15			.17				.65		1.17			.35	.48											4.57		
Oskaloosa	Des Moines				.22		.10	2.80	.33		.55	.46						1.02			.01	.08											5.57		
Ottumwa†	Des Moines				.15			3.58	.46			.14	T.	T.		.20		.79			.68	.03											6.03		
Ottumwa (river) <sup>2</sup>	Des Moines	.16						.51	3.10			.07			.01	.15		1.38			.75												6.13		
Sigourney <sup>2</sup>	Skunk				.24			1.00	2.24		T.	.10				.23		.50			T.	.02											4.33		
Stockport	Skunk				T.	.03		T.	1.08	.65		.59				.06		.81			.03	.21											3.46		
Wapello <sup>2</sup>	Iowa				T.			T.	.20	1.20	.02	.29	.25			.55	.35			.67	.26			.05			1.05						4.89		
Washington†	Skunk				T.			1.55	1.57		T.	.03	.07	2.00		.48		.85		.03	T.	.01											6.67		

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- <sup>1</sup> Midnight to midnight.
- <sup>2</sup> Measured in the morning; for the preceding 24-hours.
- T Trace or 0.005 inch or less.
- \* Included in next measurement. \*\*Incomplete
- † Recording gage.
- ‡ Windshield on gage.
- § Data interpolated.
- ¶ Partly interpolated

SUPPLEMENTAL TABLE, JUNE, 1944

STATIONS	COUNTIES	Elevation, feet	Length of record, years	Precipitation, in inches				No. of Days				Prevailing direction of wind	
				Total	Departure from the normal	Greatest in 24 hours <sup>4</sup>	Date	Total snowfall (unmelted)	With precipitation .01 inch or more	Clear	Partly cloudy		Cloudy
Akron	Plymouth	1,153	18	9.02	+ 5.02	3.74	3-4	0	11	17	5	8	S
Cmbrld. 4 1/4 NW	Cass	1,225	46	5.59	+ 0.97	1.83	28	0	11	15	6	9	S.
Dumont 3 1/4 NW	Butler	998	10	4.52	- 0.08	1.16	12	0	10	9	16	5	SW.
Dunbar 2 NE	Marshall	1,010	10	6.29	+ 2.29	2.08	16	0	12	13	11	6	SW.
Emerson 5 NE	M'tg'mery			8.31	+ 3.46	2.62	27-28	0	12	15	7	8	S.
Kanawha 1/4 S.	Hancock	1,183		3.68	- 0.87	0.91	4	0	7	10	10	10	SW.
Lake View	Sac	1,239	6	6.41	+ 2.11	1.69	7-8	0	8	12	9	9	S.
Melrose	Monroe	871	16	4.45	- 0.20	2.80	7-8	0	8	11	14	5	SW.
Sloan	Woodbury	1,071		5.64	+ 1.39	1.50	9	0	8				

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

<sup>4</sup>Best available used for stations not equipped with recorders.

Figures and letters following stations indicate distance in miles and direction from the city P.O. unless otherwise noted.

PRESSURE, WIND, HUMIDITY AND SUNSHINE AND DEGREES DAYS, June, 1944

Stations	Sea-level pressure, extremes—inches		Wind†				Relative Humidity				Degree Days			
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.		12:30 P. M.	6:30 P. M.	
Burlington	30.35	30	29.64	3	10.7	¶67	nw.	25	81	81	55	59	63	20
Charles City	30.41	29	29.53	5	7.1	¶27	se.	11					66	57
Davenport	30.37	30	29.63	3	10.0	¶54	sw.	14	79	80	60	59	60	20
Des Moines	30.39	29	29.49	3	10.6	¶29	se.	11	80	84	62	62	62	34
Dubuque	30.39	30	29.60	23	5.6	¶23	nw.	12	83	83	65	68	63	40
Sioux City	30.42	29	29.31	3	11.8	¶38	s.	3	78	84	61	58	71	53
Omaha, Nebr.	30.43	29	29.39	3	12.8	¶39	s.	22	78	80	61	59	51	35
State	30.43	29	29.31	3	9.8	¶67	nw.	25	80	82	61	61	62	43
Normals and Records	30.59	10	29.04	5	8.1	¶07	nw.	26	78	56	60	69	69	33
		1913	1880					1916						

†True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

§Sioux City      \*Davenport      ¶Omaha      ¶Interpolated

SOIL TEMPERATURES AT AMES, IOWA, JUNE, 1944

Temperature	4 feet above ground	At Depth in Soil of—					
		1 inch	6 inches	12 inches	24 inches	48 inches	72 inches
Average 7 a. m.	64.3	67.5	70.4	70.4	65.1		
Average 12 noon	75.2	75.0	71.0	69.9	65.3		
Average 7 p. m.	76.6	79.6	76.6	71.2	65.4	58.5 55.3	
Highest Date	97 25†	90 1†	87 26	80* 26	71 27	62 28† 58 27†	
Lowest Date	45 6†	55 6	59 8†	60* 8†	60 9†	56 1† 53 1†	
Number of days with temperature							
50° or higher	30	30	30	30	30	30	
60° or higher	30	29	30	30	30	11 0	
90° or higher	8	4	0	0	0	0 0	

† And other dates.  
 \* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour. Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

front between the warm and cold masses became aligned in an east-west direction and then moved northward. The night of the 10th-11th, 4.71 inches fell at Des Moines, and on the night of the 11th-12th, 6.51 inches fell at Forest City, 6.46 at Britt, 4.29 at Algona, and 4.53 at Mason City. Many other stations reported downpours of from 2 to 4 inches in 24 hours during this period. The predominating Tropical air caused above normal temperature readings from the 12th through the 17th. The southward movement of cold air into northern Iowa was attended by heavy showers in the eastern districts, and by tornadoes in Sioux County on the 16th. However, the cold air ceased to move south and only scattered showers fell the following day. Moderate rains attended the eastward movement of a cold front on the 18th, and this was followed by subnormal temperatures and dry weather on the 19th and 20th.

The eastward movement of a barometric disturbance along an east-west front over Iowa on the 22d caused showers in all except the northwest fourth of the state, with up to over 3 inches of rain in parts of the northeast district.

On the night of the 25th-26th, following the highest temperatures of the month, a warm front developed over eastern Iowa as warm, moist, Tropical air followed rapidly after an area of high barometric pressure moving eastward over the Lake region and Ohio Valley. Convergence of the moist air caused heavy showers and damaging floods over four east-central counties. Clarence reported 7.55 inches, Anamosa 3.74, and Monmouth 5.29 inches, while a "tin can" measurement at Oxford Junction showed over 10 inches. A new mass of cold air moving eastward on the 27th-28th caused scattered showers along its front. Heavy showers fell in the southwest part of the State on the 28th-29th in the rear quadrant of a high pressure area that attended the cool air mass. As usual, detailed reports of local storms are contained in tabular form elsewhere in this publication.

The battle of farmers to get crops planted and growing in the face of adverse weather conditions, was finally won during the last part of June. As of June 4, only 86% of the intended corn acreage had been planted, 11% less than normal for that date, or 8 days later than usual for that percentage. Most of the acreage that had been lost by erosion or flooding had been replanted. A week later only 94% had been planted, or 6% less than normal, and 11 days late. During the week ending the 20th nearly as much early planting was lost by flood and erosion as was newly seeded. Some planting continued on up to the close of the month, at which time progress ranged from just up to a considerable amount "laid by," too tall to cultivate. The Department of Agriculture report for July 1 indicated a total corn acreage of 11,346,000, 5% greater than in 1943. The prospective yield on July 1 was 511 million bushels, or 20% smaller than the 1943 crop. This amounts to 45 bushels per acre. It is almost certain that later favorable weather will swell the prospective yield considerably. On July 1, 1943, the estimated Iowa corn yield was 46 bushels per acre, but the actual harvest amounted to 59.0 bushels. Most fields were clean of weeds.

Soybean planting continued throughout the month. By July 1 some beans were a foot high, others just up, and in some south central counties ungerminated seed lay in a dry seed bed.

The first cuttings of alfalfa were made early in the month, and cutting continued intermittently between showers. A very good crop would have been realized if conditions had been favorable but much of the hay was damaged by rain and wet ground. Bluegrass stripping for seed yielded only about half the usual crop and the quality was only fair.

Oats fared poorly and at the close of the month, some was ripening prematurely on short straw, some had been lodged by winds and floods, and some was in the milk stage, with well filled heads. Oats, rye and wheat acreage was smaller than usual, with poorer yields indicated. Other hay crops and pastures were generally excellent. During the last week of the month many acres that had been previously flooded dried sufficiently to permit planting of millet, buckwheat, sorghum and other catch crops. Clover and alfalfa were being cut, with good yields.

A total yield of 5,642,000 tons of tame hay, 13% greater than in 1943, was indicated by the Department of Agriculture. Flaxseed acreage was cut two-thirds because of adverse weather and prospective yield was placed at 1,098,000 bushels for 1944 compared with 3,828,000 bushels in 1943.

Strawberries were a short crop because of too much moisture. Victory gardens and truck crops were damaged by the wet weather but improved rapidly during the last half of the month.

Such warm weather as prevailed in May and June is usually followed by summer temperatures averaging above normal, with the bulk of the corn crop maturing in time to be safe from damage by frost. If this trend is followed in 1944 there is reason for hope that the important corn and soybean crops will overcome the handicap of a late start and will mature without any important loss from frost.

S. E. D.

**TEMPERATURE**

The average Iowa June temperature was 71.7°, or 2.0° above the average of the entire 72 years of June records. As usual, both the mean temperature and the average precipitation for the State were derived from the average of nine districts, of almost equal area, and were based on the reports of well distributed first order and cooperative stations; 119 temperature and 122 precipitation records were used in computing the various district averages. The district temperature averages ranged from 70.2° in the northwest to 73.9° in the southeast. The highest station average was 76.1° at Keokuk, and the lowest was 68.6° at Sibley and Decorah. The highest observed was 101° at Logan and Onawa on the 25th. Readings of 100° were reported from Audubon, Harlan, Little Sioux, Missouri Valley, Sioux City, Shenandoah, Thurman and Omaha, on the same date, and at Shenandoah and Monroe on the 26th. The lowest observed was 38° at Sibley on the 7th. The average number of days with 90° or higher was 7.

**PRECIPITATION**

The average precipitation amounted to 5.88 inches, or 1.19 more than the all-time normal. The heaviest amounts occurred in the west central and east central districts, where the average amounted to 6.94 inches. In the south central and southeast districts the averages were less than normal. The greatest total was 11.93 inches at Clarence, followed by 10.04 inches at Forest City. The least amount, 1.56 inches, was reported from Blockton. The greatest 24-hour fall was 7.55 inches at Clarence on the 25th-26th. There were numerous other heavy falls exceeding 4 inches in 24 hours. The average number of days with measurable precipitation was 10.

**MISCELLANEOUS PHENOMENA**

*Aurora:* None.

*Fog:* heavy: 9th, 15th.

*Fog:* light: 1st, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 20th, 21st, 22d, 23d, 24th, 27th, 30th.

*Frost:* 6th.

*Hail:* light: 1st, 2d, 3d, 4th, 5th, 12th, 13th, 15th, 16th, 17th, 18th, 22d, 25th, 26th, 27th.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR JUNE, 1944 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames	Evaporation.....	.356	.345	.332	.307	.245	.193	.209	.068	.009	.071	.209	.142	.242	.302	.342	.266	.417	.238	.274	.263	.134	.285	.310	.361	.363	.471	.388	.....	.176	.274	.....	7.854†
	Wind Movement...	91	91	116	148	140	103	71	74	74	47	81	70	107	57	95	107	113	130	83	62	65	65	77	42	114	160	211	73	22	33	.....	2,722
Cherokee	Evaporation.....	.342	.346	.151	.301	.210	.174	.169	.138	.020	.085	.096	.....	.145	.286	.320	.208	.338	.433	.266	.273	.151	.270	.236	.422	.291	.292	.539	.350	.146	.292	.....	7.535†
	Wind Movement...	80	80	93	110	181	119	96	49	47	40	84	38	69	84	58	19	109	123	84	66	42	19	84	85	60	78	177	70	36	36	.....	2,316
Clarinda	Evaporation.....	.313	.416	.237	.413	.578	.321	.003	.....	.027	.080	.210	.151	.401	.290	.360	.342	.432	.166	.299	.149	.195	.349	.462	.189	.384	.424	.460	.167	.057	.202	.....	8.356†
	Wind Movement...	143	166	184	178	181	126	41	79	31	11	80	91	128	68	124	127	182	106	81	56	104	181	111	46	127	185	216	67	16	71	.....	3,307
Ia. City	Evaporation.....	.269	.320	.375	.324	.228	.174	.168	.047	.074	.094	.096	.192	.211	.175	.310	.302	.313	.223	.157	.173	.108	.223	.308	.231	.285	.268	.306	.289	.227	.216	.....	6.686
	Wind Movement...	65	61	105	131	78	83	23	30	38	31	38	46	74	23	52	72	49	54	61	36	39	51	62	16	46	76	75	34	32	24	.....	1,605

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JUNE, 1944

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes Maximum and Minimum temperature values for each day and a monthly mean.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JUNE, 1944—Continued

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day and a final Mean value.

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.

Hail: moderate: 5th, 15th, 17th  
 Hail: heavy: 22d, 26th.  
 Halo, Lunar: None.  
 Halo: Solar: 6th, 12th, 14th, 15th, 29th, 30th.  
 Thunderstorms: 1st, 2d, 3d, 4th, 5th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 20th, 21st, 22d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.  
 Tornado: 16th.  
 Duststorms: 3d.

**FLOODS IN IOWA, JUNE, 1944**

*FLOOD IN THE DES MOINES AND RACCOON RIVERS  
 JUNE 9-23, 1944*

The unusual flood of May, 1944, on the Des Moines and Raccoon Rivers had scarcely subsided when heavy rains set in over the lower Raccoon and middle and lower Des Moines Valleys on the afternoon of June 7, or during the following night. The rains continued for several days and moved to the upper valleys where they culminated in excessive deluges over the headwaters of both streams on June 12, decreased on the 13th, and ceased by the 14th.

This movement of heavy rain areas up the valleys resulted first in 2 or 3 early crests in the lower valleys followed by a later main crest that came from the headwaters of both streams. The two main crests reached the Scott Street river gage in Des Moines just below the mouth of the Raccoon almost at the same time. This will serve as a guide in forecasting such occurrences in the future. The crest of both streams were very high. At Jefferson, on the North Raccoon River, the crest, 16.21 feet at 8:30 p.m., June 14, is the highest known water at that place, and 0.83 foot higher than the crest of May 22, 1944. An average rainfall of 2.11 inches in the drainage basin above Jefferson

in the 24 hours ending 7:00 a.m. June 12 came with the Raccoon already nearly out of banks.

At Fort Dodge the crest on the Des Moines River was reached at 11:00 a.m. June 14. This crest was 16 inches lower than the crest of May 21. While the rainfall accumulated for several days above Ft. Dodge, the thing that pulled the trigger on this flood was the rainfall in the 48 hours ending the morning of June 12, which averaged 2.78 inches. In about 2 days the resulting crest passed Ft. Dodge. At Boone, the crest, 23.72 feet at 6:45 p.m. June 15, was the fifth highest stage of record.

The Raccoon crest made the run from Jefferson to Scott Street in Des Moines in 60 hours, while the Des Moines River crest made the run from Ft. Dodge to Scott Street in 69 hours.

The prospect of two such crests uniting at Scott Street was a strong temptation to forecast a very high crest at Scott Street and below, but after a deliberate weighing of the facts, the Scott Street crest was forecast at 17 feet as the highest possible, with a little safety margin, by Saturday noon, the 17th. The actual crest was 16.49 at 8:00 a.m. Saturday. Heavy rains Friday forenoon just north of Des Moines brought the crest at 2d Avenue, on the Des Moines River, up to 23.40 feet at 5:40 a.m. Saturday, on a forecast of 23.0 Saturday morning. Considerable rain in the Des Moines Valley below Des Moines as the crest moved down, caused higher crests than early forecasts. Generally, a second or third crest, following an earlier crest, flattens out greatly.

Below Des Moines, the Des Moines River was out of banks continuously 16 days, June 8-23.

*DAMAGE*

Recovery from the May flood had not proceeded far, when the June flood came. The June flood lacked from 1 to 3 feet of being as high as the May flood, except in the upper reaches of

**TOTAL PRECIPITATION, JUNE, 1944**

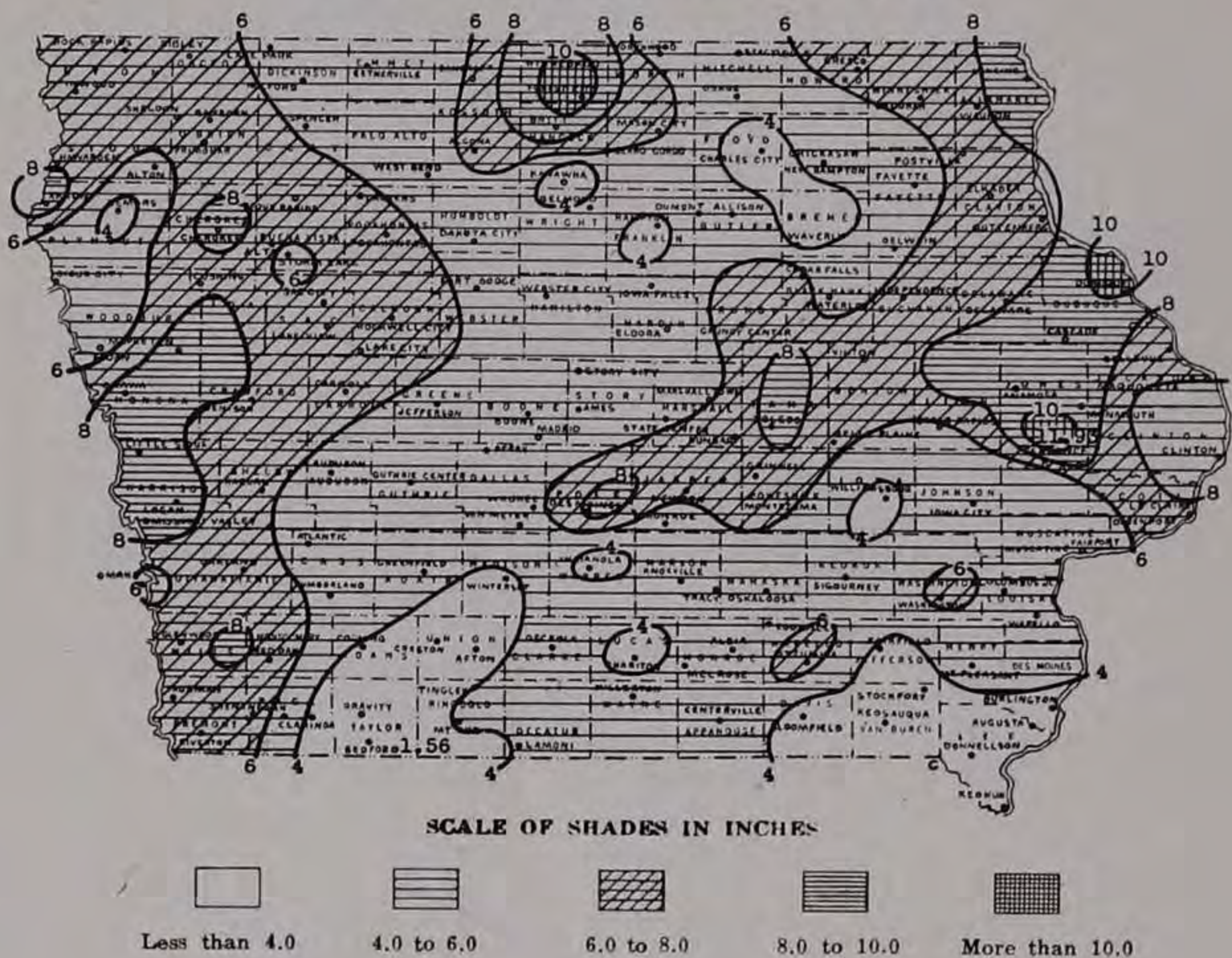


Figure 1

the Raccoon River, where the June flood was the higher, 0.83 foot higher at Jefferson. The damage done by the June flood was more in the nature of delay in recovery rather than actual loss of property. This is such an intangible thing no attempt has been made to estimate it. If the June flood had not been preceded by the May flood, it would almost surely have caused at least \$1,000,000 damage.

**FLOOD ON FLOYD AND BIG SIOUX RIVERS**

During the first part of June heavy rainfall in the Floyd River Valley caused rather serious flood conditions above Sioux City, both on the main Floyd River and the west branch. At and above Merrill, Iowa, the runoff from the west branch was rapid, but slower moving waters in the main Floyd prolonged the period of high water below Merrill to above Sioux City. No definite data of actual damages caused by the overflow can be ascertained. Rainfall over much of the area was not only heavy but frequent and much of the damage on low ground was caused by the over-abundance of rain rather than the overflow. However, it is estimated that damage was moderate in extent.

At James, Iowa, a stage of 19.22 feet was recorded on June 16. This is the highest recorded stage at James since the establishment of the station about five years ago. Damage in Sioux City was confined to flooding a few basements and gardens in the Springdale area.

In the Big Sioux River overflow was moderate and damage was generally light. The overflow was confined almost entirely to the area from below Sioux Falls, South Dakota, to above Sioux City.

The rank of the principal floods of record in the Des Moines River was shown in a table published on page 56 of Climatological Data for May, 1944. A similar table showing the rank of the principal floods of record on the Raccoon and Boone Rivers follows:

**RANK OF PRINCIPAL FLOODS OF RECORD ON THE RACCOON AND BOONE RIVERS**

Rank	RACCOON RIVER						BOONE RIVER	
	JEFFERSON		VAN METER		DES MOINES 18th St.		WEBSTER CITY	
	Stage	Date	Stage	Date	Stage	Date	Stage	Date
1	16.21	June 14, 1944	18.8	Sept. 20, 1926	*18.42	May 31, 1903	19.1	June 10, 1918
2	15.38	May 22, 1944	18.5	May 12, 1929	16.1	May 24, 1944	13.9	June 14, 1944
3			18.3	May 21, 1944	15.0	May 21, 1944	†13.2	June 18, 1932
4			18.26	May 23, 1944	14.6	June 16-17, 1944	11.5	May 20, 1944
5			17.6	Mar. 12, 1939	13.5	June 10, 1917		
6			17.5	May 7, 1917	13.5	Sept. 21, 1926		
7			16.8	June 10, 1917	12.5	Mar. 12, 1929		

\*100 has been subtracted from the original readings to make less figures to handle. These readings are above Waterworks datum, the zero of which is 93.24 feet lower than city datum, which is the zero of all the other gages in the Des Moines area. Therefore, to convert these readings to city datum, add 6.76 feet.  
†On gage at Municipal Light & Power Plant, probably not closely comparable with other stages in this column.

Recent gage readings are subject to correction when engineers can check and correct the gages.  
A similar table for the Des Moines River was published in the report for May, page 56.

**RAIN-FLOOD IN MAQUOKETA AND WAPSIPINICON VALLEYS, JUNE 26-30, 1944.**

Unusually heavy downpours of rain began late on June 25 and ended in the noon hour of June 26 in the Maquoketa and Wapsipinicon Valleys. The heaviest rains were in the south part of Dubuque County and the east portions of Jones and Cedar counties. The heaviest official measurement for a 24-hour period was 7.55 inches at Clarence, but the greatest intensity for a shorter period was at Cascade in the southwest part of Dubuque County, where 5.38 inches fell in 4 hours and 40 min-

utes, or at the rate of 1.15 inches per hour for that duration. However, two unofficial measurements by citizens of Oxford Junction in the southeast corner of Jones County, showed approximately 10 inches. Our official observer, Otto J. Bisinger, living on a farm about 5 miles northwest of Oxford Junction, reported 5.29 inches.

The general erosion, flooding, mudding, destruction of crops on 136,740 acres, and damage or loss of about 145 bridges, amount to an estimated total damage of \$16,956,000 in the four counties of Cedar, Clinton, Jackson and Jones. There was also considerable unestimated damage in the southwest portion of Dubuque County. Loss of top soil of 1 to 2 inches and the creation and deepening of gulleys, ditches and coulees were the largest items of damage. These are almost irreparable. This is one of the most destructive storms in the history of Iowa.

The Maquoketa River at Maquoketa reached a peak stage of 24.7 feet at 4:00 a.m. June 27. The peak discharge, 50,000 cubic feet per second, June 27, was nearly twice the previous maximum of a 30-year record, 27,500 cubic feet per second, March, 1937. Most of the damage in Clinton and Scott counties was along the Maquoketa and Wapsipinicon Rivers, which overflowed from the intense rains upstream and not from heavy, local rains and hillside erosion. There was one loss of life, Ervin Blocker, 12-year old boy, lost his life while playing in Le Clair Park at Davenport near the crest on or near the guard rails, and was swept into the swollen river.

Mr. T. G. Shipman, Official in Charge of the Weather Bureau Office in Davenport, makes the following statement relative to crest stages in the rivers of his district:

"The stage of 13.2 feet at Waterloo on June 17 was the highest stage recorded there since the Weather Bureau records began. The crest stage at Cedar Rapids of 12.4 feet on June 18 is the highest June stage of record. The previous June records were 10.7 feet on June 3, 1915, and June 8, 1918. The stage of 18.55 feet at Clinton on June 28, the stage of 16.5 feet at Davenport on June 29, and the stage of 19.0 feet at Muscatine on June 30 were the highest reported on the Mississippi River since April 23, 1922. The stage of 15.4 feet at Keithsburg, Illinois, on June 29 is the second highest stage on record. The highest stage of record at Keithsburg was 15.5 feet on May 27, 1929. Wapello, Iowa, reported a stage of 14.3 feet on June 30, compared with the June record stage of 14.5 feet on June 9, 1918 (14.7 feet was reported in May, 1944). Maquoketa reported 24.7 feet on June 27, the highest stage of record. Iowa City reported a stage of 16.1 feet on June 19 and a stage of 18.1 feet in May, 1944."

**FLOODS ALONG THE MISSISSIPPI RIVER**

In Iowa along the Mississippi River in the Dubuque district the loss of buildings, fences, highways, bridges, railroads, etc., was estimated at \$17,850 and the loss from suspension of business was estimated at \$37,100, while agricultural losses amounted to only \$2,250, making the total \$57,270. The money value of property saved by flood warnings of the Weather Bureau was estimated at \$55,200.

**MAY FLOOD DAMAGE ESTIMATES REVISED**

Climatological Data for May, 1944, page 56, near the upper right hand corner of the page, should be corrected and revised relative to the flood damage along the Des Moines River from Fort Dodge to Ottumwa as follows:

1. Tangible property totally or partially destroyed, such as buildings, fences, factories, highways, bridges, railroads, etc. .... \$1,406,070
  2. Agricultural losses:
    - (a) Matured crops ..... 65,280
    - (b) Prospective crops on 154,000 acres..... 840,452
    - (c) Livestock and other movable farm equipment..... 200,060
  3. Suspension of business, including wages of employees..... 55,910
- Total loss..... \$2,567,772
4. Money value of property saved by flood warnings..... \$1,222,850

## IOWA STORMS, JUNE, 1944

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Plymouth Co., Akron	3-4		Hail, rain			1½				Heavy rain (3.74 inches) caused erosion and gullyng. Fences washed out and small railroad washout. Some hail with few very large stones but not much damage.
Emmet Co., near Estherville	3-4									Hailstorms on both 3d and 4th injured gardens and corn; damage very spotted.
Crawford Co., Union Twp.	4	5:30 p. m.	Hail, rain		SW to NE	1				Hail damaged gardens and other crops. Heavy rains caused considerable erosion loss.
Shelby Co., Polk, Douglas and Jefferson Twps.	4	6:30 p. m.	Tornado	¼	SW to NE				\$25,000	A tornado wrecked or damaged buildings along a path about 5 miles long and ¼ mile wide; first reported about 3 miles south of Irwin shortly after heavy hail fell to the westward in Crawford Co.
Marshall Co., Liscomb Twp.	4		Wind		NW to SE				50	Wind damaged buildings.
Polk Co., Des Moines	5	Early a. m.	Lightning							Lightning struck house; light damage.
Polk Co., Des Moines	10-11	Night	Rain, flood, lightning						75,000	4.71 inches rain between midnight and 8:30 a. m. flooded streets and overtaxed sewers. Four-Mile Creek overflowed. Some streets and highways were blocked by the storm waters. Much erosion. Two homes struck by lightning. Streets and walks covered with mud. Greatest damage caused by flooded basements. Trains delayed by weakened roadbeds and threatened washouts.
Mills Co., Oak Twp.	11	2:50 p. m.	Tornado	1/16	SSE to NNW	¼			25,000	A tornado developed in Section 35 of Oak Twp., about 2 miles north of Glenwood and traveled along Highway No. 275 in a direction somewhat west of due north for a distance of about 2 miles, passing into Section 26. The storm crossed the highway several times, and damaged buildings on at least 6 farms with great destruction on two. A report that there was also damage near Mineola, about 3 miles north east of the storm's path could not be verified. Torrential rains preceded and followed the "twister."
Plymouth Co., Westfield and Portland Twps., near Akron; Elgin Twp.	11	6:30 p. m.	Tornadoes, hail, rain, Flood	3/16	SW to NE SE to NW				25,000	See storm note No. 1.
Webster Co., Ft. Dodge	11		Lightning							Lightning wrecked a chimney and damaged a church steeple.
Winnebago Co., Forest City; Hancock Co., Britt, Garner; Cerro Gordo Co., Mason City; Kossuth Co., Algona	11-12	Night	Rain, flood							See storm note No. 2.
Crawford Co., Charter Oak	12	Early a. m.								A bridge, weakened by floods, sagged in the middle and stranded a locomotive, tying up railway traffic.
Southwest Counties	12	Early a. m.	Flood							Heavy rains in Nebraska tributaries of the Missouri River caused a sudden flash flood that imperiled many lowland residents. About 2,000 persons in Hamburg moved furniture and other articles to second floors as waters of the Missouri and Nishnabotna rivers entered the town. Several hundred feet of railroad track were lost in the Hamburg area and trains were canceled or delayed throughout southwest Iowa. Levees failed at 8 points between Omaha and Hamburg. See flood articles for further details.
Woodbury Co.	12		Flood				1			Arthur Ludwig, 30, drowned in flood waters 25 miles southeast of Sioux City.
Scott Co., Davenport	12	8:30 a. m.	Wind, rain						25,000	Strong winds, attending a thunderstorm, broke windows in many downtown business houses and damaged trees in much of the residential area. Heavy rain caused sewers to back up, flooding streets and basements.
Dubuque Co., Dubuque; also rural areas	12	Late afternoon	Wind, rain, hail							Heavy rain, amounting to 1.25 inches in 25 minutes, overtaxed storm sewers at Dubuque, flooded streets and basements and damaged gardens. Many trees were blown down, electric and phone service was hampered. Many streets were covered with mud as water receded. Similar damage occurred in other sections of Dubuque Co. Roads were damaged, bridges and culverts washed out. Damage to property in the city of Dubuque from this and subsequent storms in June exceeded \$50,000.
Butler, Bremer, Fayette, Clayton Counties; town of Denver	15-16	Night	Rain, flood, hail							See storm note No. 3.
Osceola Co., Baker Twp.	16	2:00 a. m.	Hail, flood						1,000	Heavy rains were attended by some hail.
Sioux Co., Garfield, Plato, Center, West Branch, Holland and Floyd Twps., Lebanon	16	7:00 p. m. to 8:30 p. m.	Tornadoes	¼ to 2	W to E, N to S, SW to NE		2		1,000,000	See storm note No. 4.
O'Brien Co., Hartley	17	12:15 a. m.	Tornado							See storm note No. 4.
Louisa Co., Wapello (near)	17	7:30 p. m.	Hail							Hail and heavy rain damaged crops south and west of Wapello.
Muscatine Co., Muscatine Airport	18	6:15 p. m.	Lightning							Lightning set fire to shop hangar at airport; the hangar 3 planes, a boat, a truck and machinery were destroyed.
Winnebago Co., Fremont, Burr Oak, Hesper, Canoe, Pleasant, Decorah, Glenwood, Frankville Twps.; Allamakee Co.	22	6:00 p. m.	Hail	3	NW to SE	3			150,000	See storm note No. 5.
Linn, Allamakee, Clayton, Dubuque, Jones, Cedar, Jackson, Clinton and Muscatine Counties	25-26	Night	Rain, flood, hail							See storm note No. 6.

## IOWA STORMS, JUNE, 1944

By S. E. DECKER, Assistant Meteorologist

## STORM NOTE NO. 1

A tornado traveled from southwest to northeast for a distance of about 2 miles along Highway 12 in Sections 12 and 13 in the northwest corner of Westfield Township. The storm crossed the highway several times and caused damage on 4 or 5 farms. At the same time there was some damage in the extreme southwest portion of Johnson Township and southeastward to the path of the storm in Westfield Township. It seems that either two separate tornadoes developed within a few minutes and a few miles of each other or else that only one tornado formed originally, but that it split into two sections just south of Akron, so that the path formed a Y, with one branch moving toward the northwest. This latter theory seems probable as the storm formed in the same frontal zone that caused the Mills County tornado. Some hail damage occurred in Elgin Township, about 20 miles east of the tornado area. Heavy rain occurred at the time of the storm, flooding Highway 12 in several places and causing the Big Sioux River to overflow. Rainfall amounting to 3.55 inches was measured at Akron, with estimates of 4 inches in surrounding areas. Damage estimate is for tornado only.

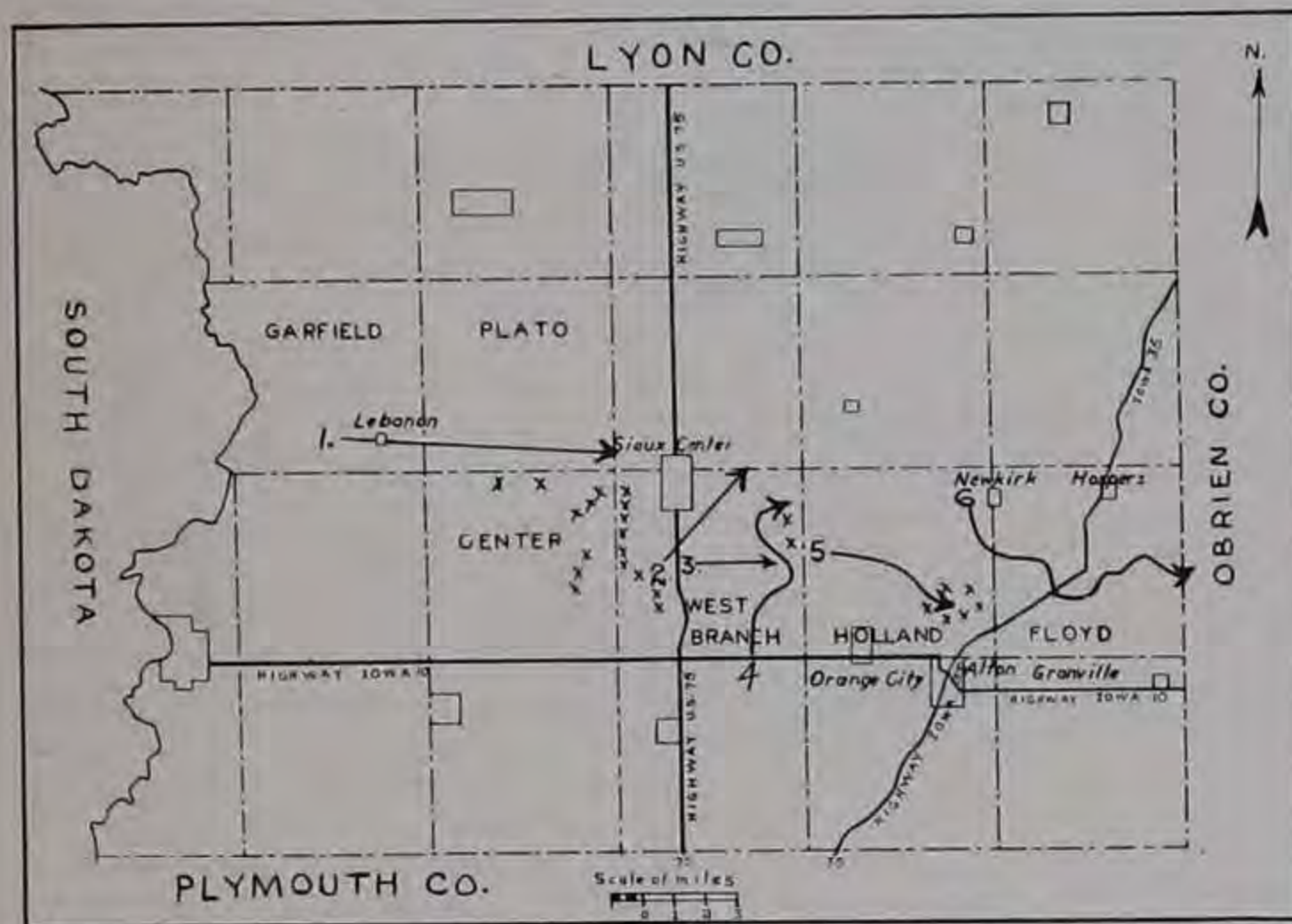


Figure 2 above shows the centers of paths of tornado funnels across Sioux County on June 16. Width of the paths vary from  $\frac{1}{4}$  to 2 miles wide. There is some doubt as to the accuracy of path No. 2. The X's indicate points where damage occurred but from which definite information concerning the storms could not be obtained. In some cases it is known that secondary funnels developed in connection with the main storm, and it may be that the damage indicated by X's was the result of the secondary funnels or of irregular movements of tracks otherwise shown.

## STORM NOTE NO. 2

Excessive heavy rains, amounting to 6.51 inches at Forest City, 6.26 at Britt and an estimated 5 to 7 inches at Garner the night of the 11th-12th, caused small streams to overflow. Many bridges were washed out in Hancock County and thousands of acres were flooded. At Mason City, two score families were evacuated by boat as flood waters of Willow Creek and Winnebago River covered wide lowland areas, downstream from the heavy rain. Rains in Kossuth County over a period of several days caused floods that blocked some roads, washed out small bridges and damaged property at Wesley, Titonka and LuVerne. Several homes in southeast Algona were surrounded by flood waters. Telephone service was interrupted in a few areas. The effect of the rain on river stages is discussed in a summary of flood damage.

## STORM NOTE NO. 3

Excessively heavy rains washed fields and caused flash floods. In Bremer County roads and highways were badly damaged with hundreds of bridges and culverts washed out. Loss to Bremer County roads estimated at \$75,000. At Denver a number of people were evacuated and there was considerable loss of merchandise when a small creek flooded homes and business establishments. The water rose 2 feet in 15 minutes. A railroad bridge was washed out between Clarksville and Waverly, delaying all trains. Some tracks were washed out near Readlyn. Loss in Butler and Bremer counties estimated at \$125,000. At Oelwein, Fayette County, 4 bridges were washed out and basements were flooded. North of Oelwein a 19-car freight train was derailed because of flood-weakened roadbed. A cloudburst was reported at Garber, Clayton County, and flood damage from Maquoketa River at Manchester, Delaware County. In Butler and Bremer counties, heavy hail fell with the rain damaging corn. Flood loss on larger streams is summarized elsewhere in this report.

## STORM NOTE NO. 4

A group of small tornadoes traveled across Sioux County from west to east causing terrific destruction of farm buildings, trees, fences, wires, etc., killed livestock and poultry and left such tangled trails of destruction that it has been impossible to piece together the complete picture of what occurred. Insofar as possible a narrative description of the individual funnel clouds will be given, but in summarizing the damage, the phenomena have been treated as if there had been only one well-defined tornado, as there was in fact only one definite center of frontal activity to produce the storms. See Figure 2 for tornado paths in Sioux County. The tornado first struck near Beresford, South Dakota, then lifted and traveled eastward across the Missouri River into Iowa where it hit the small town of Lebanon, about 11 miles west of Sioux Center. Every house was damaged or destroyed and the store and church were demolished. This funnel traveled eastward for a distance of about 8 miles across the southern parts of Garfield and Plato Townships and destroyed buildings on at least 8 farms. The second tornado followed a path several miles long from southwest to northeast, beginning about 2 miles south of Sioux Center and ending 2 miles east of the town. Information on this storm is not clear. There were some reports of "hot" rain as the funnel broke up. The third storm began in the middle of West Branch Township and traveled almost due east for several miles where its trail became lost in the tracks of other tornadoes that developed farther to the east. In the eastern edge of West Branch Township, storm No. 4 moved northeastward for about 2 miles, then northwest for about the same distance and then headed northeast again for a short distance before disappearing. The fifth funnel formed in the same area as where No. 4 disappeared and was probably a secondary development of that storm. It traveled in a southeasterly direction for about 5 miles across Holland Township and its path widened and became diffuse as it disappeared. At one point it remained nearly stationary for some time, whirling in one spot over an open field but just as it seemed to be dissipating, it moved eastward and increased in destructiveness. The sixth tornado, originating west of Newkirk and ending north of Granville and southeast of Hoppers, was the most violent and destructive, behaved most erratically and was most interesting for the purpose of studying the life history of such storms. Storm No. 6 originated in the northeast portion of Holland Township and at the first farm where damage occurred it seems to have remained nearly stationary for from 10 to 20 minutes. Inhabitants of the farm who took refuge in the basement, went outdoors when the storm was thought to have passed but upon seeing another funnel to the south returned to the shelter. All buildings except the house were wrecked on this farm. A neighbor described the storm as a "circle within a circle with a canopy over it." Moving into Floyd Township the tornado traveled southeast for about three miles then made a "U turn," first going south, then east, then north and then heading back towards the east. The slow movement of the storm was further emphasized by reports that it remained whirling in the same position over at least 2 other farms for periods of 10 and 5 minutes respectively. At this latter point the tornado picked up all of the farm buildings and whirled them aloft for 5 minutes before the storm again began to move and threw the debris out in all directions. Foundation stones were polished white. The funnel seemed to bore into the earth and left a 4-foot rim at one spot. Ten dead horses were found on this farm, 6 of them having been carried from other farms. At two other farms, two separate funnels hit within a few seconds of each other. It would have been easily possible for storm No. 3 to have continued as Nos. 5 and 6 and be crossed at right angles by storm No. 4. Or storms 4, 5, and 6 might have been one long irregular chain with embryonic secondary developments at times. The width of the destructive paths varied from 500 feet to one-half mile, and outside the main tracks there was considerable light scattered damage. At one farm untouched by the storms and a quarter of a mile south of the path of destruction, a dead horse fell from the clouds. After the destructive force was spent at the east border of Sioux County, the storm headed due northeast. A new tornado struck at Hartley in the northeast corner of O'Brien County at 12:15 a.m. of the 17th, wrecking a steeple and belfry of a church and causing other damage. No further property damage was reported but a school report card from a Newkirk school was found at Estherville about 70 miles to the northeast of where it was picked up by the tornado. Space does not permit quoting of other eye witness accounts. However, from Alton it appeared that a large, low-hanging black cloud had remained motionless for almost an hour before it began to move and developed into the Floyd Township tornado. James Balkema, whose farm was first struck by this storm which remained over the farm for nearly 20 minutes, was quoted as follows: "The sky had been noisy since 4 o'clock. It was making sort of moaning sound. About half an hour before the storm struck there were some low floating clouds from the northeast which looked like they were traveling 250 miles an hour. Above them were clouds going in the opposite direction. Every once in a while they would merge and swirl and then separate. When the tornado clouds started to form about 8 o'clock, we went into the basement." It was at this farm that the storm was described as "a circle within a circle." Others also mentioned the "moaning" sound of high winds aloft. It was shortly before 7 p.m. that

Lebanon was struck and after 8:30 p.m. when the storms disappeared at the eastern edge of the county. The storms therefore traveled less than 30 miles in an hour and a half, or at a progressive rate of less than 20 miles per hour. The slow movement of the storms and previous local indications enabled practically all residents of the area to reach places of safety by going to storm cellars or by driving away from the storm's path. From Hospers to Hartley is only about 20 miles, yet the storm that struck Hartley occurred 3½ hours after destruction ended in Sioux County. All of the funnels traveled slowly but the last Sioux County storm resembled a tropical cyclone in its slow erratic movement and frequent halts. An unusual factor was the absence of excessively heavy rains in the near vicinity of the tornadoes. Red Cross officials estimated 31 homes were destroyed, 35 others damaged, 300 other buildings destroyed and 336 damaged. Two persons were injured but not seriously. The cost of plain lumber for rebuilding was estimated at \$320,000. Labor was expected to cost as much, or a total of \$640,000. The value of destroyed crops, fences, furniture, machinery, livestock and poultry, finishing materials and accessories for buildings and of trees, windbreaks, etc., brought the total loss to over a million dollars. Far to the northeast, over central Wisconsin, straight-blow winds, hail and one small tornado caused great damage along the same front between warm and cold air masses.

#### STORM NOTE NO. 5

Heavy hail fell in an area about 20 miles long and 3 miles wide in Canoe Creek Valley, in Winneshiek County, and damaged roofs and autotops, broke windows, killed and injured poultry and livestock. Trees were riddled and crops beaten into the ground by hailstones as large as baseballs. Wind uprooted trees, broke off branches and wrecked a number of buildings. Hail also occurred in scattered sections in townships adjacent to the area along Canoe Creek. There was some damage in Allamakee County where the storm continued on in a southeasterly direction north of Waukon and past Waterville and Harpers Ferry into Wisconsin, blowing down hundreds of trees and damaging some buildings. At least one large barn was wrecked. In Wisconsin the storm developed into a tornado in Lafayette County, killed 7 persons, and injured 60 and then crossed into Illinois. Previous to this, heavy hail fell just north of the Iowa border near Albert Lea, Minnesota. All of these storms occurred along an east-west front between warm and cold air masses in the east quadrant of a low pressure area. The following evening (23d), a series of destructive tornadoes occurred in the rapidly narrowing warm sector of the same low pressure area as it reached West Virginia and western Pennsylvania. In that locality the release of destructive energy by convergence of the various air masses was intensified by the forced ascent of the air upslope in the foothills of the Allegheny Mountains, and about 90 persons were killed by the resultant violent storms.

#### STORM NOTE NO. 6

Severe local thunderstorms brought torrential downpours of rain, high wind and hail to all of the counties named in the table with loss of millions of dollars. The center of the storm, or at least the area of heaviest rain, covered the southeast corner of Jones County and northeast corner of Cedar County. At Clarence, 7.55 inches of rain fell in 22 hours, at Monmouth 5.02 inches in 13½ hours, and at Cascade, 5.38 inches in 4 hours and 40 minutes. Two unofficial "tin can" measurements in southeast Jones County amounted to 10 inches. Throughout the area, highways and railroad grades were damaged, culverts and bridges washed out, traffic was halted, basements filled with water when sewers failed to carry the storm load, and streets and highways were covered with a deposit of slimy mud. Erosion damage was enormous. All small streams went out of banks and many small towns were wholly or partially flooded forcing many persons to evacuate their homes. Flood stages were also reached on the larger streams and a detailed summary of floods on the Maquoketa, Wapsipinicon and Cedar rivers appears in the general report of flood damage. Among the smaller towns where small creeks caused flood damage to business and residence property, or where traffic was halted by water running over highways in nearby areas, were Wyoming, Monmouth, Viola, Stanwood, Oxford Junction, Cascade, Oxford Mills, Clarence, Lowden, Hurstville and others. A flash flood at Decorah caused \$12,000 loss. High winds blew down communication and power lines throughout the area with heaviest damage near Waukon, McGregor, Marquette, Dubuque, Viola, Muscatine, Clinton, Wilton Junction, and West Liberty. Similarly, heavy hail fell at scattered points but details of the damage were lost in the greater destruction caused by too much water in too short a time. Heaviest hail loss seems to have occurred in a triangular area from Rossville, northeast to Waukon and Waterville, and southeast from Rossville to Marquette and McGregor. Wind damage in Muscatine County amounted to over \$10,000 in Wilton Township, and the same amount in Moscow Township. In Moscow Township hail also caused loss of \$8,000. At Clinton and Dubuque wind and lightning damaged power and communication lines. At Muscatine a dock and boathouse were damaged by wind-driven flood water and boats were torn loose from the dock. Similar damage by lightning, wind, hail and flood occurred throughout the area but damage was spotted and details lacking, making it impossible to list each area individually. Crop acreage destroyed probably exceeded 50,000 acres.

S. E. D.

#### THE GREAT HAIL SEASON OF 1943

A very complete tabulation of hail damage to crops in Iowa, by counties and townships, was published in Climatological Data for July, 1943, pp. 90-96, and a 16-year summary and discussion appeared in Climatological Data for June, 1939, pp. 50 and 51. It was thought that the tabulation for the 20-year period ending with 1942 would make just about a complete picture of the hail possibilities in Iowa, but by the time this report was printed hail devastation had occurred that far surpassed any recorded in the 20 years preceding.

The total State damage reported by assessors in 1943 was \$13,232,824. The greatest in the preceding 20 years was \$7,975,686 in 1925. The loss in 1943 was 65.9% greater than in 1925. The greatest county loss in 1943 was \$1,025,162, in Cherokee County. The greatest county loss in the preceding 20 years was \$1,076,280 in Sioux County in 1929. The greatest township damage in 1943 was \$545,739 in Colfax Township, Boone County. The largest damage in this township in the preceding 20 years was \$1,185 in 1937. The largest township damage in Iowa in the preceding 20 years was \$319,325 in Seventy-Six Township, Washington County, in 1924. This enormous, unprecedented hail loss in Colfax Township, Boone County, in 1943, raises its 21-year average to \$24,178, though no hail damage was reported in 17 of the 21 years and the average for 20 years was only \$100 per year; and this 21-year average of \$24,178 places this township at the top of the list in Iowa. Heretofore, Garfield Township, Plymouth County, stood at the top with a 20-year average of \$18,191, and with hail damage in 11 out of 20 years. Strangely enough, this township reported no hail damage in 1943.

The accompanying map, (Fig. 3), shows the damage in dollars for each county in the State in 1943, and the composite map, (Fig. 4), shows the average in each county for 20 years ending with 1942. It will be observed that the overtowering damage in 1943 followed fairly well the zoning pattern of damage on the 20-year map, in that the heaviest concentration of damage was in the northwest counties and virtual immunity from damage was noticeable in the south central counties.

The addition of the 1943 damage raises the State average annual damage to \$3,575,245. In 7 counties the damage of 1943 exceeded a half million dollars, and Emmet County should probably be added because with an area three-fourths of a standard county, its loss was \$492,865.

While this was being prepared, the first advance reports began coming in concerning appalling and unprecedented hail and other storm loss to crops, livestock and buildings in Sioux, O'Brien and Osceola counties on July 14, 1944. The loss in Floyd Township, O'Brien County, and in the adjoining township on the north, which is Gilman Township, in Osceola County, will run close to \$1,000,000 in each township. As yet it cannot be said how much of this was due to hail and how much to wind and beating rain. There was also serious damage in other townships in these counties, and in other northwest Iowa counties on that date.

In spite of the unprecedented losses of 1943, the distribution pattern of hail losses in Iowa was not appreciably changed, nor is the pattern likely to be much changed by the addition of data. Nor will the addition of 20 more years of data greatly change the county averages, but the smaller the unit area, the longer it will take to establish satisfactory averages. It would probably take 100 years to attain satisfactory township averages. Since corn is the principal crop at risk and the yield has been greatly increased by the use of hybrid seed, and the price of corn per bushel has also greatly increased, the total value has nearly doubled in the last 5 years, and this has caused a distinct uptrend in hail losses, irrespective of the frequency and intensity of hailstorms measured as meteorological phenomena.

#### ERRATA

Report for March, 1944. Page 22, Grundy Center, number of days with 0.01 inch or more published 7, should be 8. Page 23, Anamosa, number of days clear published 9, should be 10, days cloudy published 16, should be 15. Clinton, number of days with 0.01 inch or more precipitation published 15, should be 16. Clarinda (Erosion), number of days with precipitation published 12, should be 14. Osceola, date of highest temperature published 23<sup>+</sup>, should be 10<sup>+</sup>. Stockport, total snowfall published 5.0, should be 6.0. Page 25, Clinton, 5th, published blank, should be \*. Blockton SCS, 27th published blank, should be T. Clarinda (Erosion), precipitation 11th published 0.12, should be 0.11; 16th published blank, should be 0.01; 17th published 0.09 should be 0.02; 18th published blank, should be 0.07. Page 26, Melrose, number of days clear published 8, should be 7; number of cloudy days published 13 should be 14.

Report for April, 1944. Page 32, Cedar Falls, number of days with precipitation published 11, should be 10. Decorah, date of greatest precipitation published 24, should be 23-24. Page 33, Monmouth, mean temperature published 44.8, should be 44.9; departure published -3.4, should be -3.3. Mt. Ayr, total precipitation published 5.57, should be 5.47; departure published +2.61, should be +2.51. Page 35, Iowa City, precipitation on 12 published blank, should be T. Mt. Ayr, total precipitation published 5.57, should be 5.47.

\* This published ok. no errata needed



Fig. 3. Hail damage to Iowa crops in 1943, \$13,232,824, was the greatest in 21 years. The damage in dollars is shown in each county. Cherokee County was in the lead with \$1,025,162, though not the greatest county loss of record.

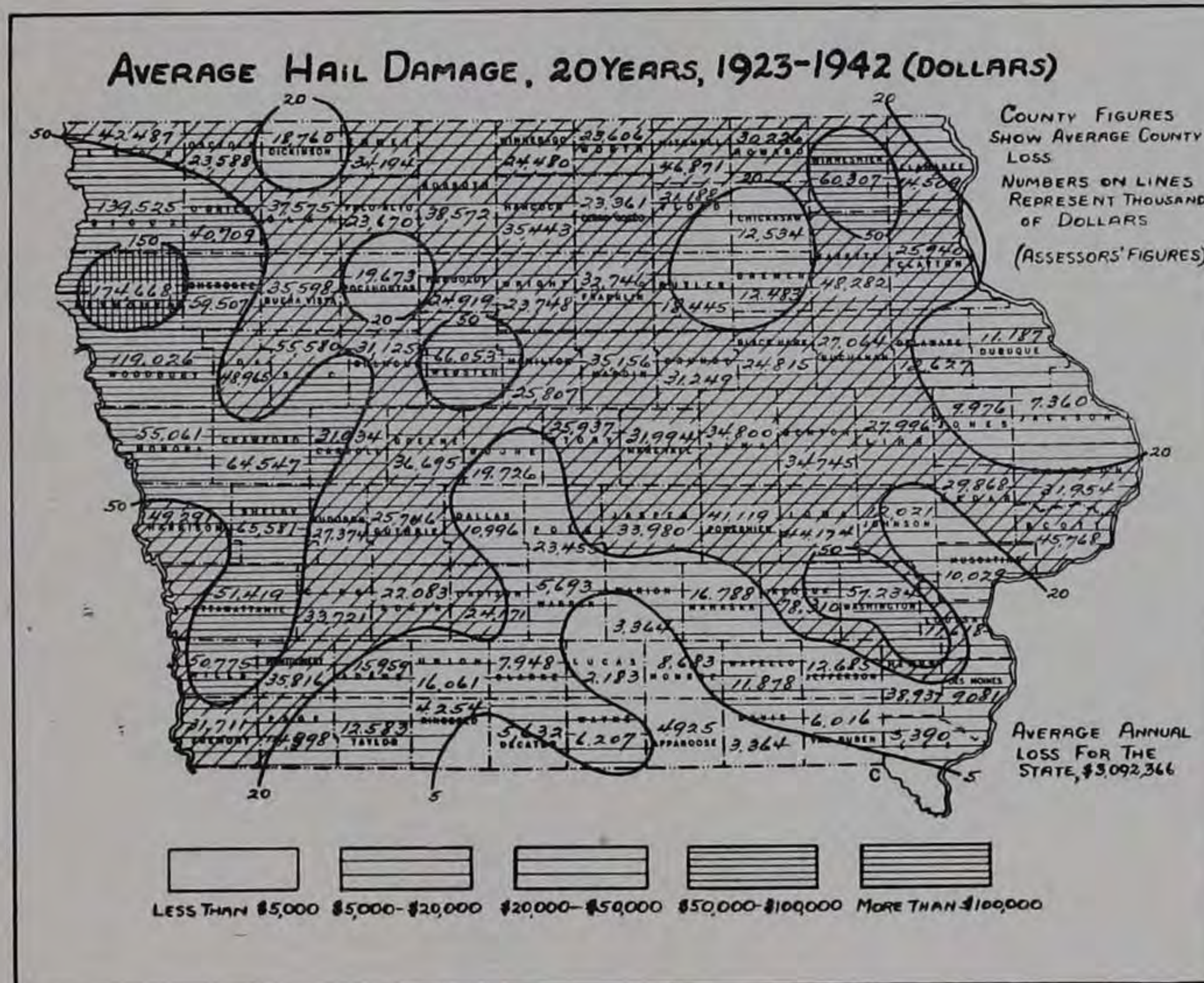


Fig. 4. Average hail damage in Iowa, 20 years, 1923-1942, is shown in dollars in each county. The 20-year average for the State is \$3,092,366, which is raised to \$3,575,245 by the unprecedented damage in 1943.



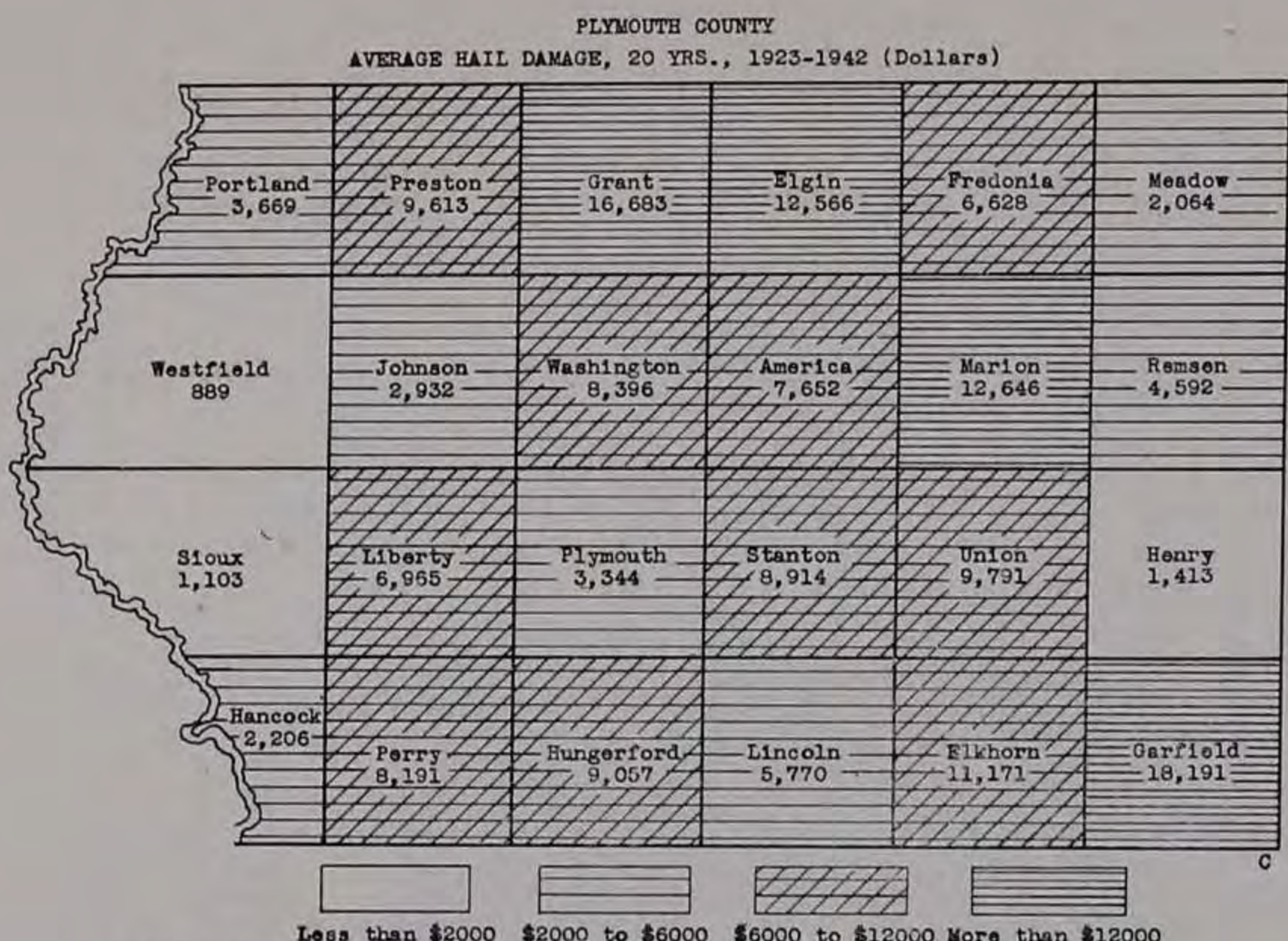


Fig. 7. Average hail damage, 20 years, 1923-1942, in Plymouth County, the greatest county average in Iowa, \$174,668. The relatively light loss in this county in 1943, slightly reduces this average.

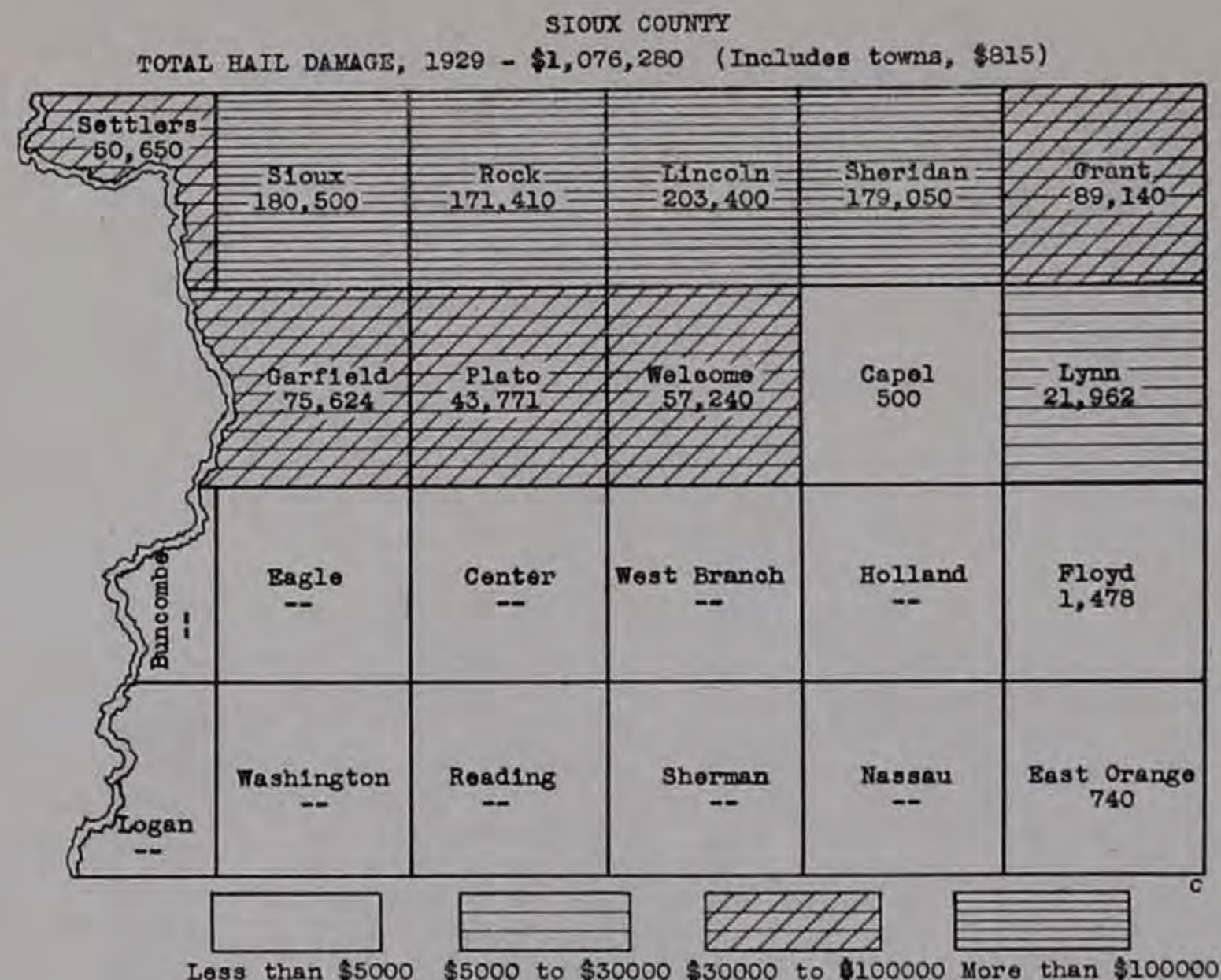


Fig. 5. Greatest damage in any county in Iowa in a single year during the 21-year period, 1923-1942, is \$1,076,280, in Sioux County in 1929, shown above.

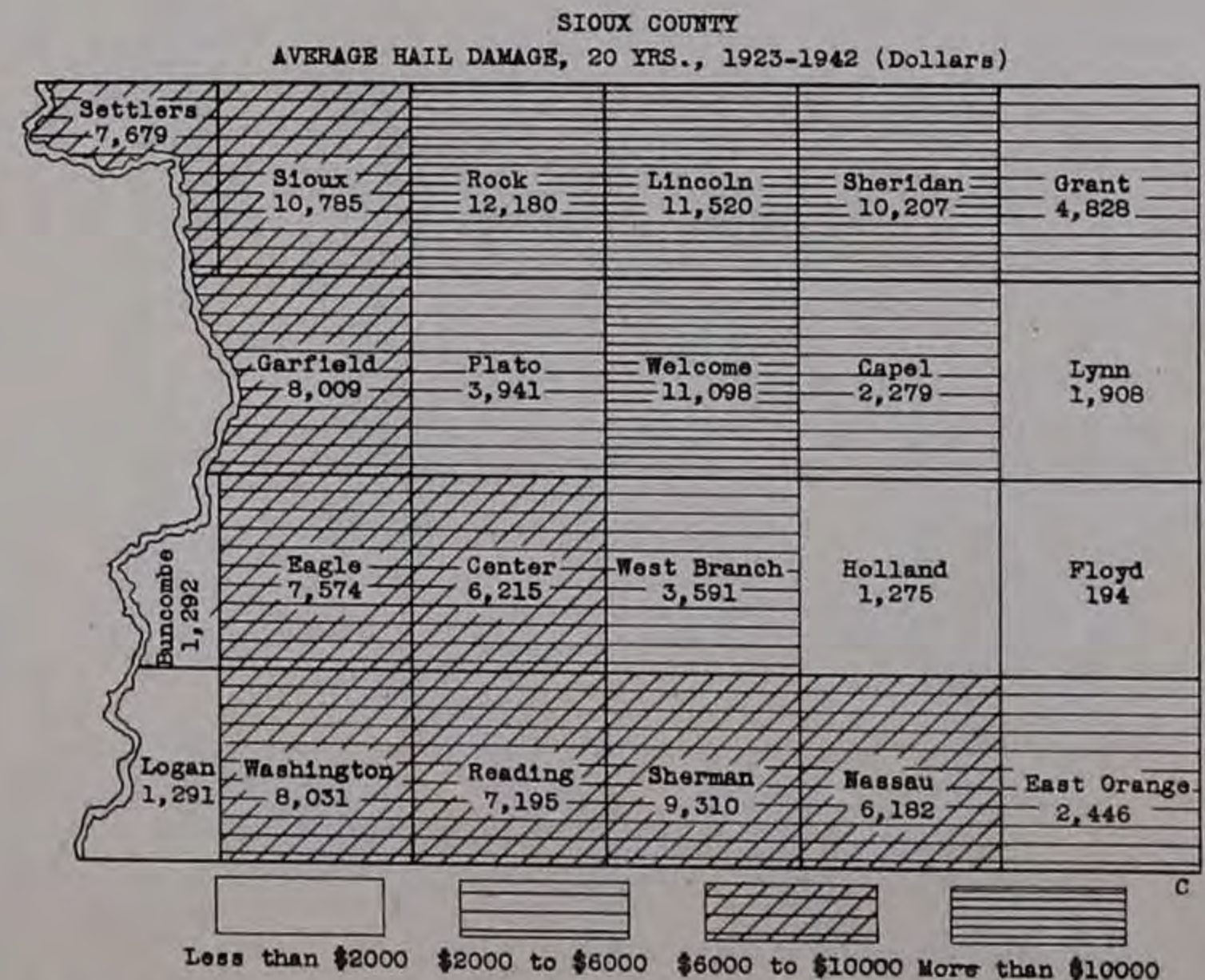


Fig. 8. Average hail damage, 20 years, 1923-1942, in Sioux County, \$139,525. The great loss of 1943, \$527,713, raises the 21-year average to \$158,010, second only to Plymouth County, and might equal or exceed Plymouth County if the relative areas of the 2 counties were considered.

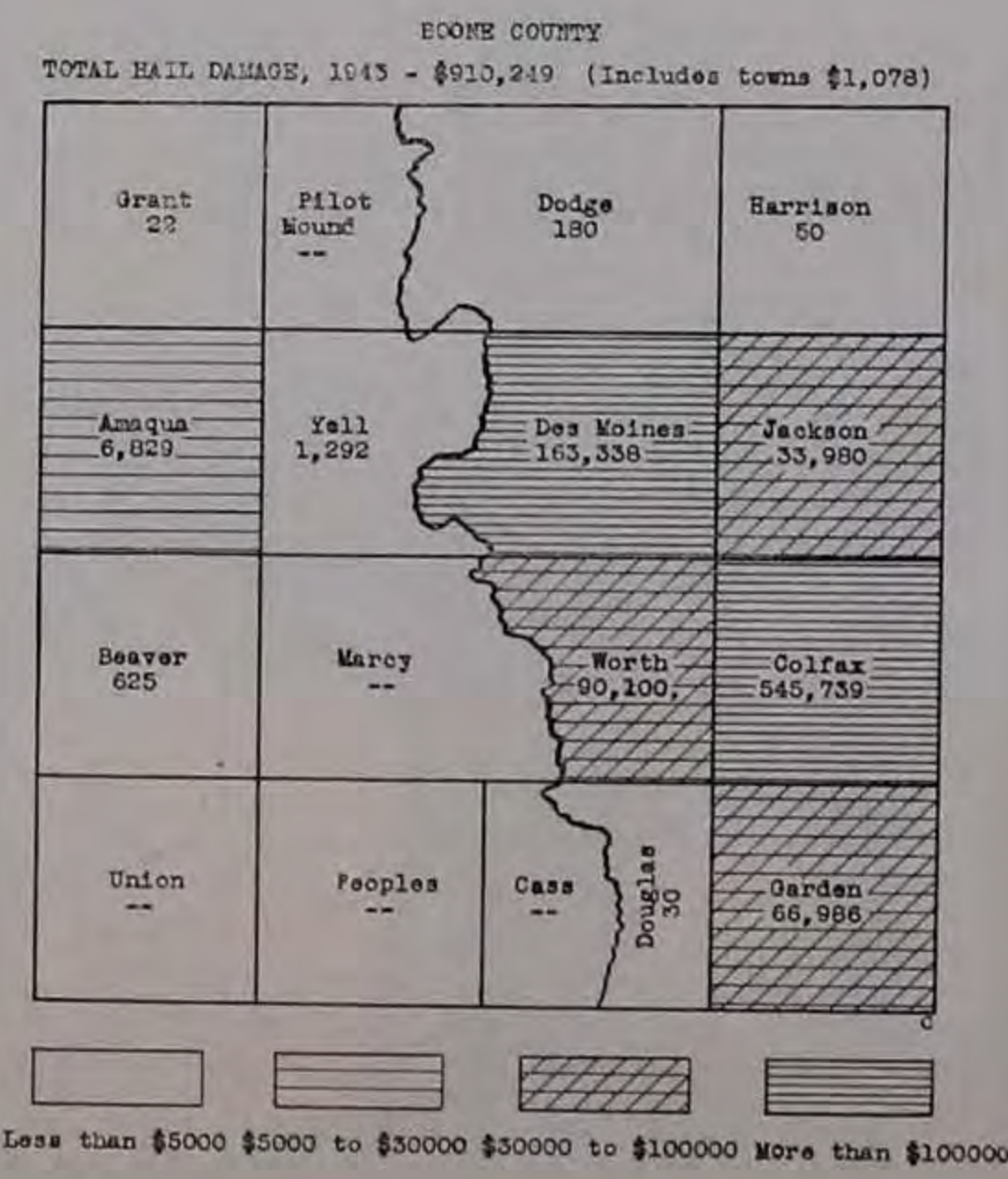


Fig. 6. Hail damage in Boone County, 1943, \$910,249; Colfax Township, \$545,739, the greatest township damage in Iowa in 21 years.

# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

**JUL**

VOL. LV

DES MOINES, IOWA, 1944

No. 7

GENERAL SUMMARY

For the State as a whole, weather conditions in Iowa during July, 1944, were near normal as regards precipitation and rather cool as regards temperature.

The average temperature of 72.6° was 2.8° lower than in 1943, 2.0° below the all-time July average, and was the lowest July average in 20 years, or since 1924. Curiously enough, July temperatures were below normal at 20-year intervals as far back as records are available, and in the years 1884, 1904 and 1924 were lower than in the current year. In other years ending in 4, that is, 1874, 1894, 1914 and 1934, July temperatures were considerably above normal. Altogether there have been 58 warmer, 12 cooler and one equally cool July in the entire 72-year period of record.

The precipitation was irregularly distributed both as to time and area. In a rather general way the amounts were heaviest in the north-west and northeast sections, with lightest falls in the south central and southeast districts. However, in some areas where amounts were above normal, most of the rain came in one or two falls, while in other sections where the total fall was deficient, the showers were well spaced throughout the month. Because there were no periods of prolonged high temperature, crops generally withstood the dry weather rather well, but at the end of the month there was need for moderate to heavy rains over most of the eastern and southern portions of the State. Extremes of temperature and rates of rainfall were well within record limits.

Cloudiness, sunshine, wind movements and relative humidity, were close to the July normals. However, the average number of rainy days was 2 more than normal. As usual, there were many local, destructive storms. These are discussed separately in the usual storm report.

The U. S. Geological Survey reported that stream flow over the State continued well above normal, especially in the western part, where it remained excessive. The July flow of the Big Sioux River was about 9 times the normal, and the highest of record for July. The Iowa River discharged a volume of water 3 times the July normal. In general, however, there was a gradual decline in river stages during the month, so that by the 31st they were approaching normal levels.

The first 10 days of the month were relatively warm, with some stations reporting the monthly maximum readings on the 2d or 10th. Maritime Tropic air that overran a surface layer of Continental Polar air, caused showers over much of the eastern two-thirds of the State on the 2d, beginning in some sections on the night of the 1st. A cold front between a new air mass advancing from the northwest and the air masses already covering the State, became stationary over western Iowa on the 3d, and remained in practically the same position for 24 hours before reversing its motion and moving northwestward as a warm front during the daylight hours of the 4th. This caused a few scattered showers in the northwest portion and was followed by additional showers in the same section on the 5th. A new cold air mass moved eastward over South Dakota on the 6th, but became stationary over western Iowa that night, and was followed by temporary frontolysis on the 7th. The frontal area remained practically stationary from midnight of the 6th until it was overrun and wiped out by a new cold front moving in from the west during the early evening of the 7th. This new outbreak traveled across the State over night and reached the Mississippi River on the morning of the 8th. Showers occurred in connection with these frontal developments and movements, beginning in the northwest section on the 6th and ending in the eastern districts on the 8th. Heavy showers just north of Sioux City on the night of the 6th caused a disastrous flooding of Perry Creek in that city, as described in the storm report. Showers again occurred in all sections but were heaviest and most general in the northern districts on the 9th, 10th and 11th, as warm Tropical air first overran the cold mass at the surface and was then finally displaced by an outbreak of cold Polar air that swept into Iowa on the 11th.

COMPARATIVE DATA FOR JULY

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	74.0	96	54	2.78					
1874.....	77.8	101	56	3.04					
1875.....	72.8	97	56	6.05					
1876.....	74.2	95	54	6.15					
1877.....	74.0	97	54	2.35					
1878.....	76.5	104	52	5.13					
1879.....	76.0	102	55	2.20					
1880.....	73.8	98	48	4.16					
1881.....	75.9	100	50	5.33					
1882.....	69.1	94	46	3.66					
1883.....	72.9	100	46	5.14					
1884.....	71.0	96	50	5.41					
1885.....	74.6	102	48	4.73					
1886.....	76.2	104	48	0.50					
1887.....	77.0	105	45	2.85					
1888.....	75.8	103	38	4.31					
1889.....	72.6	102	40	4.00					
1890.....	75.2	110	45	2.04					
1891.....	68.5	99	41	4.22		8	13	13	5
1892.....	73.0	104	38	5.29		9	16	10	5
1893.....	75.0	102	47	3.33		7	19	10	2
1894.....	76.4	109	39	0.63		3	22	8	1
1895.....	72.1	104	35	3.40		7	15	12	4
1896.....	73.6	104	42	6.90		9	14	11	6
1897.....	75.6	106	42	3.26		6	18	10	3
1898.....	73.4	102	42	2.98		7	19	9	3
1899.....	73.1	101	38	3.07		7	16	10	5
1900.....	73.4	102	37	6.15		9	16	10	5
1901.....	82.4	113	46	2.34		5	21	9	1
1902.....	73.1	99	41	8.67		13	14	10	7
1903.....	72.9	100	40	4.83		9	17	9	5
1904.....	70.6	100	38	4.41		10	16	9	6
1905.....	70.6	102	40	2.91		9	14	10	7
1906.....	70.9	102	42	3.04		8	18	10	3
1907.....	73.7	102	41	7.27		13	16	11	4
1908.....	73.0	100	42	3.66		8	16	10	5
1909.....	72.3	102	46	4.77		10	15	8	8
1910.....	74.5	108	43	1.86		7	19	8	4
1911.....	75.5	111	38	2.27		7	18	10	3
1912.....	74.6	103	38	3.71		10	17	10	4
1913.....	76.1	108	45	1.82		5	21	8	2
1914.....	76.6	109	43	2.27		5	20	8	3
1915.....	69.5	92	40	8.32		14	10	12	9
1916.....	79.7	105	48	1.78		5	23	7	1
1917.....	74.3	106	38	2.27		7	21	8	2
1918.....	73.1	105	40	3.17		8	19	8	4
1919.....	77.4	104	41	2.86		6	22	8	1
1920.....	72.3	102	45	4.22		9	19	9	3
1921.....	77.9	104	41	2.53		7	19	9	3
1922.....	71.5	98	40	6.31		11	14	12	5
1923.....	76.5	102	47	1.75		5	19	9	3
1924.....	70.2	99	41	3.67		9	16	11	4
1925.....	74.1	105	40	2.66		8	19	10	2
1926.....	74.8	109	38	3.72		10	15	10	6
1927.....	72.9	102	45	1.96		7	18	10	3
1928.....	73.9	98	43	4.43		8	18	10	3
1929.....	74.1	98	43	4.31		9	16	10	5
1930.....	77.9	112	40	1.49		4	21	8	2
1931.....	77.2	109	42	2.72		6	20	8	3
1932.....	75.8	106	40	3.12		7	20	8	3
1933.....	76.1	105	46	3.45		7	19	9	3
1934.....	79.7	118	40	3.85		10	17	10	4
1935.....	79.4	107	51	3.35		7	19	10	2
1936.....	83.4	117	43	0.51		3	23	7	1
1937.....	75.9	107	46	2.63		7	18	10	3
1938.....	76.5	107	48	4.24		10	18	10	3
1939.....	76.2	113	48	3.15		7	19	9	3
1940.....	76.7	110	42	4.57		7	18	10	3
1941.....	75.1	106	45	2.24		7	16	12	3
1942.....	74.3	105	42	4.89		10	16	12	3
1943.....	75.4	98	47	4.56		10	17	12	2
1944.....	72.6	98	42	3.73		10	17	11	3
Period.....	74.6	118	35	3.68		8	18	9	4

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

During the last three weeks of the month unseasonably cool weather prevailed most of the time, with only short periods of above normal temperatures. Highest barometer readings occurred on the 4th and 20th, while the lowest pressures were reported on the 25th and 26th. Showers again occurred over the northern two-thirds of Iowa on the 14th-15th, as a cold front between Maritime Polar and Continental Polar



CLIMATOLOGICAL DATA FOR JULY, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed.

State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated.

† Trace or 0.005 inch or less.

‡ Data interpolated.

§ Partly interpolated.

† And other dates.

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

\* Best available used for stations not equipped with recorders.



DAILY PRECIPITATION FOR JULY, 1944—Continued

Table with columns: Stations, Drainage Basin, Day of Month (1-31), Totals. Rows are grouped by district: Central District, East Central District, Southwest District, South Central District, Southeast District. Includes sub-sections like Skunk, Des Moines, Boone, etc. A handwritten '4.02' is next to the total for Vinton.

## DAILY PRECIPITATION FOR JULY, 1944—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>Southeast District (Continued)</i>																																	
Donnellson <sup>2</sup>	Des Moines	.06						.03				.53	T.											.98		.36	T.	T.					1.96
Eddyville <sup>2</sup>	Des Moines	.20	.70					T.	T.			T.	.46											.67		.18						2.21	
Fairfield	Skunk	.12	.02					T.	.02			.38	.02					.02		.55				.86		.17	.09					2.25	
Keokuk <sup>1</sup> †	Mississippi	.02						T.	T.			1.20						T.	T.	.09	T.			.87		.59	.02	.01		.19		2.99	
Keokuk LD 19 <sup>2</sup>	Mississippi		.01										1.19							.06					.91	T.	.64	.04		.16		3.01	
Keosauqua	Des Moines	.26						T.	T.			.20	.03							.22	T.				.22	.29	.13	T.				1.35	
Keosauqua (riv.) <sup>2</sup>	Des Moines		.14						T.			T.	.10					T.		.67					.15	.36						1.42	
Mt. Pleasant	Skunk	T.	T.								.20									.70				1.00		.12						2.92	
Oskaloosa	Des Moines	T.	.61					.03				.50												.40		.10	T.	.02				1.66	
Ottumwa	Des Moines		.39					T.	.01			T.	.26											1.02		.04	.09					1.81	
Ottumwa (river) <sup>2</sup>	Des Moines	.20	.30					.01				.38												1.44		.14						2.47	
Sigourney <sup>2</sup>	Skunk		.17						.18			.18						T.						.21	.45		.07	.04				1.30	
Stockport	Skunk	.14						T.	T.			.03								.42				.17		.23	.06	T.				1.05	
Wapello <sup>2</sup>	Iowa	.23						T.	T.			.10					T.		.54	.17				1.28		.27	T.					2.59	
Washington	Skunk	.11						T.				1.36						.07	.70					1.19	.05		T.					3.48	

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

<sup>1</sup> Midnight to midnight.

<sup>2</sup> Measured in the morning; for the preceding 24-hours.

T Trace or 0.005 inch or less.

\* Included in next measurement. \*\*Incomplete

† Recording gage.

‡ Windshield on gage.

§ Data interpolated.

¶ Partly interpolated

## SUPPLEMENTAL TABLE, JULY, 1944

STATIONS	COUNTIES	Elevation, feet	Year of record, years	Precipitation, in inches				No. of Days					Prevailing direction of wind
				Total	Departure from the normal	Greatest in 24 hours*	Date	Total snowfall (unmelted)	With precipitation .1 inch or more	Clear	Partly cloudy	Cloudy	
Akron	Plymouth	1,153	18	5.16	+ 2.01	1.32	10	0	8	20	6	5	n. e.
Cmbrld. 4 $\frac{1}{4}$ NW	Cass	1,225	46	3.49	+ 0.23	1.69	24-25	0	8	19	5	5	n. w.
Dumont 3 $\frac{1}{2}$ NW	Butler	998	10	3.90	+ 0.10	1.08	1-2	0	13	13	16	2	n. w.
Dunbar 2NE	Marshall	1,010	10	3.87	+ 0.17	1.16	2	0	12	22	9	0	s. w.
Emerson 5NE	M'tg'mery			4.63	+ 1.08	1.65	25	0	8	17	13	1	s.
Kanawha $\frac{1}{4}$ S.	Hancock	1,183		3.14	- 0.26	0.80	7	0	6	9	16	6	n. w.
Lake View	Sac	1,239	6	5.84	+ 2.29	1.83	6-7	0	10	20	6	5	s. w.
Melrose	Monroe	871	16	2.05	- 1.55	0.73	11	0	8	12	18	1	n. e.
Sloan	Woodbury	1,071		2.98	- 0.52	0.84	16-17	0	8				

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

\*Best available used for stations not equipped with recorders.

Figures and letters following stations indicate distance in miles and direction from the city P.O. unless otherwise noted.

## PRESSURE, WIND, HUMIDITY AND SUNSHINE AND DEGREE DAYS, July, 1944

Stations	Sea-level pressure, extremes— inches				Wind†				Relative Humidity				Degree Days	
	Highest	Date	Lowest	Date	Average hourly velocity	Maximum velocity	Direction	Date	12:30 A. M.	6:30 A. M.	12:30 P. M.	6:30 P. M.		Percentage of sunshine
Burlington	30.25	4	29.56	26	8.3	40	n. w.	23	75	75	44	48	76	0
Charles City	30.25	4	29.57	26	5.3	20	n. e.	1					77	6
Davenport	30.26	4	29.53	26	7.5	33	n. w.	26	79	79	49	52	73	0
Des Moines	30.21	4	29.54	25	8.6	32	n. w.	23	73	78	49	51	76	0
Dubuque	30.25	4	29.49	26	4.6	17	s. w.	23	79	79	51	55	76	1
Sioux City	30.23	20	29.63	26	9.3	35	n.	16	82	84	56	55	81	0
Omaha, Nebr.	30.19	20	29.63	25	9.7	45	s. w.	14	76	81	57	52	72	0
State	30.26	4	29.49	26	7.6	45	s. w.	14	77	79	51	52	76	1
Normals and Records	*30.47	7	§29.20	9	7.3	§73	n.	19	78	82	57	57	76	
		1892	1926					1936						

†True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

§Sioux City \*Davenport †Omaha

## SOIL TEMPERATURES AT AMES, IOWA, JULY, 1944

Temperature	4 feet above ground	At Depth in Soil of—				
		1 inch	6 inches	12 inches	24 inches	48 inches
Average 7 a. m.	62.7	69.1	73.7	74.0	69.3	
Average 12 noon	78.0	78.6	74.3	73.1	69.7	
Average 7 p. m.	78.2	84.4	81.1	75.2	69.7	63.4
Highest Date	92	89	86	78*	71	65
	23	17	24	24	24	30
Lowest Date	48	64	70	70*	68	62
	21	28	3	3	1	1
Number of days with temperature						
50° or higher	31	31	31	31	31	31
60° or higher	31	31	31	31	31	21
90° or higher	1	0	0	0	0	0

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour. Diurnal changes at 24 inches and deeper amount to less than 2°.

Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

air moved eastward. Devastating hailstorms in parts of Iowa attended these developments. Another shower period from the 17th through the 20th marked the development and movement of another frontal series, and was followed by the highest barometer readings of the month.

After some stations recorded the highest temperatures of the month on the 23d, local wind and hailstorms were reported as showers fell over nearly all except the northwest quarter of the State. These resulted from the eastward movement of a low pressure area to the north of Iowa, with the trough-like southern portion of the "low" and frontal lines moving across Iowa. A line of discontinuity in the air masses remained stationary over southern Missouri after the low pressure area moved eastward on the 23d. Subsequently a secondary low pressure area developed over southwest Iowa the night of the 25th in a trough of low pressure extending southward from a primary disturbance north of the Canadian border. As the low pressure center formed and then moved northeastward, and was later followed by a fresh outbreak of cold Polar air, showers occurred in all sections of the State, being most general on the 25th-26th. These were followed by scattered showers in the southwest portion on the 29th and in the northwest on the 31st.

As a whole, the month was favorable for all of Iowa's important crops, except in a few areas where there was excessive hail damage or where the weather became too dry. During the first decade of the month some corn was planted so late that it could be expected to produce only rather poor silage or fodder. On the other hand, some was

more than head high and well tasseled and over half the crop was "laid by." Considerable detasseling of hybrid corn had been done. This work continued during the following three weeks. At the close of the month only the latest corn, amounting to less than one-third of the crop, had not yet tasseled, while the earliest was in the roasting ear stage. Corn borer damage was beginning to be noticeable in a few eastern counties. The cool weather was generally favorable for pollination, but higher temperatures will be needed in August to speed the crop to maturity ahead of the first killing frost.

The U. S. Department of Agriculture reported an increase in the prospective yield per acre of the corn crop of 2 bushels during the month. This indicates a yield of 47 bushels on 11,346,000 acres, or a total crop of 533,262,000 bushels. This total has been exceeded only twice in the years 1942 and 1943, but the indicated average yield per acre is the lowest since 1938. However, favorable weather during the early part of August will probably cause a further upward revision of the estimates unless damaging weather conditions develop in the future. Stands of corn ranged from thin to very good, although more uneven in height than usual.

Production of soybeans was estimated at 35,298,000 bushels compared with over 39 million bushels in 1943. This would be an average yield of 17.5 bushels per acre, or 2 bushels per acre less than a year ago. Considerable late seedings are expected to be cut for hay.

Oats harvest began about the middle of the month and neared completion at the close. The U. S. Department of Agriculture estimated the oat crop at 147,150,000 bushels, compared with over 184,000,000 bushels in 1943. Production of flaxseed was estimated at 1,098,000, compared with 3,828,000 bushels a year ago.

Haying was in progress in some section or other during most of the month. In general, pastures deteriorated, especially in the east and south.

From U. S. Department of Agriculture estimates, tame hay production appeared to be 12% greater than in 1943, with a total yield of 5,561,000 tons. Although some of the early cuttings were damaged by frequent heavy rains, the larger percentage of the crop is of good quality.

Winter wheat was estimated at 2,250,000 bushels, against 2,919,000 bushels in 1943.

Yields of potatoes were disappointing. Victory gardens did well where there was sufficient moisture, but in other areas were disappointing. They were beginning to yield a few tomatoes during the closing days of the month.

Summarizing, the month was generally favorable from the crop standpoint, and while the record breaking yields of the past two years will not be surpassed, it appears that there will be an abundance of food for our armed forces, our allies, and our civilian population, providing prospects in other areas of the country, compared with normal, are at all near those of Iowa.

S. E. D.

TEMPERATURE

The average Iowa temperature for July, obtained from the averages of nine districts of about equal area, which district values were in turn computed from the means of 119 temperature reporting stations, was 72.6°, or 2.0° below the all-time July average, covering 72 years of records. All stations and all districts reported monthly values below the adopted normals. Stations means ranged from 68.4° at Decorah to 76.8° at Keokuk. The district averages ranged from 70.7 in the north central section to 74.6° in the southeast. The highest observed was 98° at Burlington on the 10th and at Monroe on the 23d, while the lowest was 42° at Decorah on the 21st. The average number of days with maximum readings of 90° or higher was 5.

PRECIPITATION

The average July precipitation, derived from the averages of nine districts of almost equal area, and based on measurements at 122 reporting stations, was 3.73 inches, 0.05 inch more than the all-time July

normal. The amounts were unevenly distributed, with the three northern, the west central and the central districts, reporting averages above normal, and the east central and southern districts reporting values below normal. The greatest total was 8.81 inches at Cushing (near), followed by 8.27 inches at Rock Rapids, and 8.16 inches at Cherokee. The least fall was 0.93 inch at Centerville. The average number of days with measurable rain was 10. The greatest 24-hour fall was 3.80 inches at Elkader on the 25th-26th.

MISCELLANEOUS PHENOMENA

Aurora: None.

Fog, heavy: 9th, 11th, 16th, 18th, 25th, 26th.

Fog, light: 1st, 3d, 4th, 5th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 16th, 18th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 28th, 30th, 31st.

Hail, heavy: 14th, 15th.

Hail, light: 1st, 2d, 7th, 14th, 19th, 22d, 23d, 26th, 29th.

Halo, lunar; 3d.

Halo, solar: 8th, 15th, 16th, 17th, 18th, 25th.

Thunderstorms: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 25th, 26th, 27th, 28th, 29th, 31st.

ERRATA

Annual report for 1943, page 160, Alta; August precipitation published \*3.25, should be \*1.90; departure published -0.37, should be -1.72; annual total published 32.12, should be 30.77; departure published +1.10, should be -0.25. Carroll, August precipitation departure from normal published +0.59, should be +0.95. Sioux City, June precipitation departure from normal published -0.92, should be +0.92. Report for May, 1944, page 42, Belmont; number of days with 0.01 inch or more published 14, should be 15; Audubon, date of highest temperature published 14, should be 14†; Little Sioux, highest temperature published 90 on 15†, should be 92 on 19; Iowa Falls, number of days with 0.01 inch or more published 22, should be 21. Page 43, Clarinda Erosion, number of days with 0.01 inch or more published 12, should be 13. Page 56, tabular estimates of flood damage on Des Moines River from Ft. Dodge to Ottumwa, see revised table in June, 1944 Climatological Data, page 67.

JOHN T. RIDLER DIES

Occasionally someone pursues weather observations as a hobby with such determination that the purchase and maintenance of the equipment at the personal expense of the observer is no barrier. Such was the situation with John T. Ridler of Oelwein. Because the Federal and State weather services were so limited by appropriations that they could scarcely maintain one observing station in each county Mr. Ridler purchased the thermometers and rain gage and constructed his own thermometer shelter according to specifications of the Weather Bureau, and set about taking daily weather observations on his own initiative on April 1, 1923. He offered his monthly reports as a public service to his community, State and Nation, and they were published in Climatological Data from that time till his death on February 22, 1944, at the ripe age of 80 years, 6 months and 14 days. His wife preceded him in death on September 7, 1943. He was a patriotic, public-spirited citizen, well known and respected all over northeast Iowa.

In later years more liberal appropriations made it possible to furnish Government replacements for his instruments as needed. He remained faithful to his self-appointed task till the last, through a period of nearly 21 years.

It was several months before a representative of the Weather Bureau could visit Oelwein and arrange for the continuation of observations, but finally the equipment was moved to the fire station where weather observations were resumed by Milo H. Frame, July 24, 1944. The thermometer shelter designed and constructed by Mr. Ridler is still being used.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles FOR JULY, 1944 (24 hours ending 6:30 p. m.))

Station	Data	Day of Month																															Sums
		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	
Ames	{Evaporation.....	.346	.276	.283	.308	.387	.461	.190	.241	.248	.087	.141	.269	.277	.398	.279	.199	.197	.240	.290	.284	.277	.399	.386	.264	.186	.157	.270	.304	.278	.225	.220	8.367
	{Wind Movement...	.63	.97	.61	.35	.84	.139	.78	.60	.50	.24	.37	.55	.20	.89	.56	.18	.68	.22	.42	.41	.31	.79	.132	.34	.40	.71	.87	.64	.37	.27	.35	1.776
Cherokee	{Evaporation.....	.338	.317	.269	.260	.339	.219	.176	.310	.258	.241	.285	.267	.285	.250	.263	.372	.323	.334	.211	.286	.304	.311	.295	.036	.261	.355	.256	.364	.241	.150	8.449†	
	{Wind Movement...	.101	.75	.55	.42	.76	.124	.55	.52	.35	.33	.34	.47	.41	.110	.55	.47	.70	.59	.56	.43	.36	.98	.63	.27	.12	.64	.102	.46	.64	.22	.44	1.788
Clarinda	{Evaporation.....	.226	.314	.347	.224	.472	.306	.247	.228	.257	.166	.121	.259	.248	.285	.246	.163	.184	.267	.375	.376	.168	.304	.226	.360	.016	.238	.254	.466	.204	.312	.296	8.150
	{Wind Movement...	.39	.26	.54	.26	.95	.146	.117	.52	.22	.42	.46	.55	.39	.76	.85	.17	.56	.43	.59	.32	.33	.105	.127	.42	.43	.66	.56	.65	.64	.30	.42	1.800
Ia. City	{Evaporation.....	.242	.226	.241	.222	.309	.335	.206	.104	.220	.198	.103	.251	.215	.303	.304	.169	.166	.194	.364	.307	.214	.279	.295	.197	.165	.205	.241	.290	.245	.167	.210	7.247
	{Wind Movement...	.22	.43	.19	.15	.34	.54	.40	.22	.28	.30	.15	.62	.14	.39	.45	.15	.23	.31	.44	.57	.22	.31	.54	.30	.31	.62	.31	.45	.27	.16	.19	1.020

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JULY, 1944

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest, North Central, Northeast, West Central, and Central. Each station entry includes maximum and minimum temperatures for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF JULY, 1944—Continued

Table with columns for Stations, days 1-31, and Mean. Rows include Central District (Grundy Center, Iowa Falls, Marshalltown, Newton, Perry, Webster City), East Central District (Anamosa, Belle Plaine, Cedar Rapids, Clarence, Clinton, Davenport\*, Iowa City, Maquoketa, Muscatine, Vinton), Southwest District (Atlantic, Bedford, Corning, Glenwood, Greenfield, Oakland, Red Oak, Shenandoah, Thurman, Omaha, Nebr.\*), South Central District (Albia, Centerville, Creston, Indianola, Knoxville, Lamoni, Millerton, Osceola, Winterset), and Southeast District (Bloomfield, Burlington\*, Columbus Jet, Fairfield, Keokuk\*, Keosauqua, Mt. Pleasant, Oskaloosa, Ottumwa, Sigourney, Washington).

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.

**E. H. GEISE DIES**

On June 5, 1935, Mr. E. H. Geise became the cooperative weather observer at Newton, Iowa, where the station was sponsored and equipped by the Newton Chamber of Commerce beginning June 3, 1931. As a weather observer his work was exceptionally good. He was one of the dependable citizens of the town, where he had spent most of his life in business till he retired about 5 years ago. He was born on a farm in Jasper County not far from Newton, on September 19, 1871. His death occurred April 29, 1944 from a heart ailment. He has 2 sons on active duty as commissioned officers in the present war.

Upon his death his wife, Gertrude Parsons Geise, carried on temporarily till some permanent appointment could be made and finally accepted the appointment, so the station continues without moving the instruments, which is always desirable, and in exceptionally good hands.

**ACCIDENTAL DEATH OF S. R. BROWN**

On June 29, 1944, Mr. S. R. Brown, Cooperative Observer at Afton, was killed in an automobile accident. He became the observer about December 1, 1919, so he had served 24 years and nearly 7 months. In business life he was a successful and much respected clothier.

During all his long service as a cooperative observer, scarcely an observation had been missed, and his records were accurate and dependable. He did much to maintain the fine traditions of the station, which extend back to 1894, almost exactly a half century.

Fortunately, Russell Myers, Editor of the Afton Star-Enterprise, found it possible to add the work of cooperative observer to his busy wartime tasks. Only 12 days' observations were missed in the interim.

**SIoux CITY FLOOD, JULY 6-7, 1944**

By S. E. DECKER

On the night of the 6th-7th excessively heavy rains fell over the lower Floyd River and the Perry Creek valleys. Both streams rose sharply and overflowed but the Perry Creek flood caused the greatest damage, which was estimated at about 750,000 dollars in Sioux City. The heaviest rain was concentrated over a very small area. At the Weather Bureau Airport Station, located at Sergeant Bluff, only 1.18 inches fell. At the corner of 31st and Grandview, about half way between the mouth of Perry Creek and the north Sioux City limits, Dr. M. W. Larson reported a fall of 4.80 inches. Less than five miles northeast of this point, 6.98 inches fell at James. Twelve miles farther north 1.82 inches were measured at Merrill.

Perry Creek overflowed along most of its length within the city limits of Sioux City, causing evacuation of hundreds of families and forcing others to move furniture and household articles to the upper stories of their homes. The flooded area was about 45 blocks long, from north to south, and from 12 to 14 blocks wide from east to west in one section, or in other words, about three miles long and from 1 block to three-fourths of a mile wide. Basements and lower floors were flooded and streets and sidewalks were covered with silt and slimy mud.

The U. S. Geological Survey reported 1,000 acres of land were flooded, and that 1,133 residences and 350 business properties were affected. The Red Cross Director in charge of disaster relief, estimated 1,161 families were affected, and that 465 houses and 522 other buildings were damaged, and 10 buildings were destroyed. Gardens and crops were damaged in an area covering eight square miles.

The cost of pumping out flooded basements, cleaning mud and slime from streets, sidewalks and buildings, repairs to lawns, streets, sewers, bridges and buildings, and the loss from interruption of traffic and business, are items that are very difficult to estimate. However, it is believed that the actual loss will be very close to 750,000 dollars. In addition to the flood damage, electrical service in Morningside was interrupted by lightning, and lightning also set fire to a stockyards company shed filled with hay, and was believed to have been responsible for the cave-in of the roof and large sections of the sidewalls of a garage in which large transport trucks were stored.

**IOWA STORMS, JULY, 1944**

By S. E. DECKER, Assistant Meteorologist

**STORM NOTE NO. 1**

At 5 p.m. of July 14 a destructive hailstorm damaged or destroyed crops in a triangular-shaped area from the southeast corner of Lyon County eastward across the southern portion of Osceola County to near Melvin, and from southeast Lyon County southeastward to a point near Primghar in the center of O'Brien County.

The path of greatest destruction was about 15 miles long and three miles wide, stretching from north of Matlock to northwest of Primghar. At Sheldon, in O'Brien County, roofs and auto tops were damaged and hundreds of windows were broken by the hailstones, which ranged up to the size of hen eggs. Similar damage occurred at Sanborn. Outside the path of greatest destruction crop loss ranged from 5% on up to 50%, with the total area affected amounting to about 160 square miles. In adjacent areas a few hailstones fell but caused no damage. Several small buildings were wrecked by wind. The damage was estimated at \$1,500,000.

**STORM NOTE NO. 2**

Shortly after the storm centered in O'Brien County had ended, another hailstorm or series of storms caused considerable loss in Cherokee County, and also in the north central portion of Ida County. In this case there seems to have been a half dozen or more areas in which hail damage to crops ranged from slight to total. The largest of these was shaped something like a horseshoe or a wishbone, and extended west and northwest from the town of Cherokee. Other areas were located around the towns of Larrabee, Aurelia and Quimby, in Cherokee County, and near Holstein, in Ida County. Crops on about 100 square miles were affected, but on the whole damage was much less than in the earlier storm. High winds attending the storm uprooted some trees, broke off branches, blew down wires and damaged buildings. The total loss probably was between \$100,000 and \$150,000.

**STORM NOTE NO. 3**

A series of wind and hailstorms caused considerable damage in Emmet, northern Kossuth, Winnebago and Worth counties, and in the extreme northern portion of Hancock County, about 6:30 p.m. of July 14. Scattered hail fell in the northern and eastern tiers of townships in Emmet County, and in the southeast corner of the county strong winds damaged a house, a barn and several other buildings near Ringsted. Trees and wires were blown down. The wind damage to buildings and crops amounted to \$15,000. Loss from hail was spotted and unestimated.

The greatest loss in this series of storms occurred in the northern part of Kossuth County. A tornado developed in the southeast corner of Swea Township and traveled in an east-southeast direction across the northern part of Ramsey Township and into German Township. Damage by wind and hail was greatest in an area several miles wide, extending from Fenton Township northeast to Ledyard Township, near the town of Lakota. This area crossed the tornado path. In fact, the tornado may have developed as a result of the hail and thunderstorms and moved at almost a right angle to this area of destruction. No information is available to indicate whether secondary tornado funnels developed or not, but there was scattered hail and wind loss in Seneca, Fenton, Burt, Portland, Buffalo, German, Ramsey and Ledyard townships. From 15 to 20 farm houses suffered some damage, 10 or 12 barns were destroyed, about 75 were damaged at least slightly, and probably as many as 100 other structures were damaged or wrecked. One estimate stated 30 carloads of lumber would be needed for rebuilding and repairs. A considerable number of livestock and hundreds of chickens were killed, and many farm implements were damaged. In the area of most complete destruction the loss amounted to about \$125,000, but this does not include a considerable amount of scattered crop loss due to hail. On a countywide basis, 10% of the oats and 5% of the corn crop suffered damage.

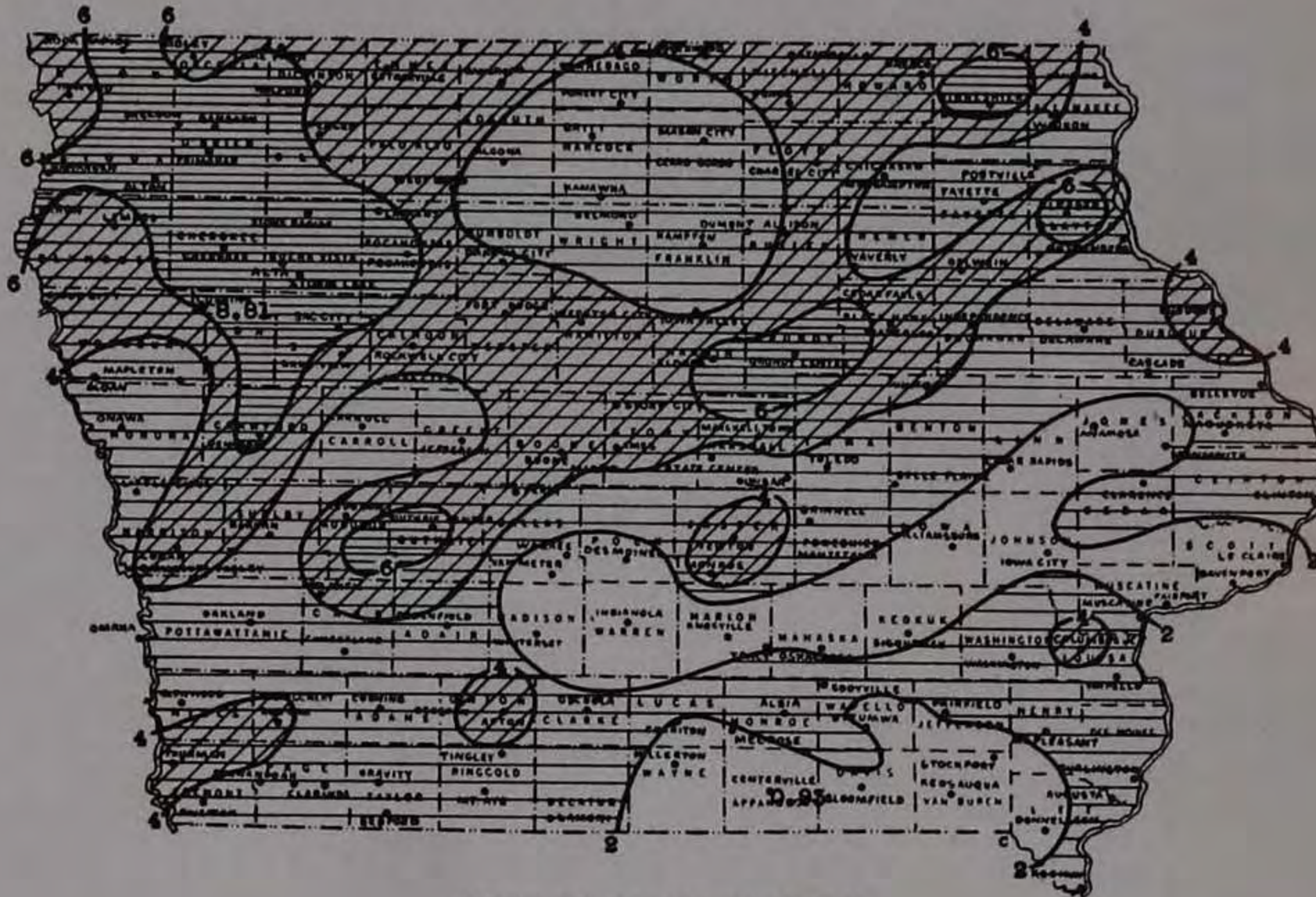
In Winnebago County high wind uprooted trees and damaged barns and outbuildings, while hail damaged crops. The Red Cross reported 7 buildings destroyed and 7 damaged. In Hancock County wind near Woden and Crystal Lake damaged a house and 2 other buildings and destroyed 2 sheds. While definite details of the loss in these two counties is not available, it seems likely that the loss occurred along the boundary of the two and was caused by a continuation or a redevelopment of the Kossuth County tornado. In Worth County corn was blown down and there was minor damage to buildings, while there was a sharp rise in the Shell Rock River due to heavy rains across the State line in Minnesota.

All of these storms on the 14th occurred as a squall line developed in advance of two cold fronts that moved southeastward across Iowa in quick succession. Time has not permitted a detailed study of upper air conditions that prevailed at the time of occurrence.

IOWA STORMS, JULY, 1944

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Allamakee Co., near Waukon	1		Lightning						7,000	Barns and contents burned near Waukon after being struck by lightning.
Woodbury Co., Sioux City	6-7	Night	Rain, flood						750,000	See article listed under "Sioux City Flood, June 6-7, 1944."
Dubuque Co., Dubuque	8	3:00 p. m.	Rain, lightning							A church and residence were struck by lightning. Heavy rains flooded streets, sidewalks and basements, hampered traffic and left a deposit of mud and silt.
Lyon Co., southeast corner Matlock; Sioux Co., northeast corner Boyden; Osceola Co., southwest corner Ashton; O'Brien Co., Floyd, Franklin, Lincoln, Carroll, Summit and Center Twps.; Sheldon, Ritter, Sanborn Hartley, Archer, Primghar; Clay Co., Everly, Spencer	14	5:00 p. m.	Hail		NW to SE	2			1,500,000	See storm Note No. 1
Cherokee Co., Liberty, Sheridan, Rock, Amherst Cherokee, Cedar, Piteher and Willow Twps. Larrabee, Cherokee, Meriden, Quimby and Aurelia; Ida Co., Griggs Twp.	14	6:30 p. m.	Hail			1			125,000	See Storm Note No. 2.
Emmet Co., Lincoln, Iowa Lake, Armstrong Grove and Denmark Twps.; Ringsted; Kosuth Co., northern half, Swea City, Ledyard, Lakota, Fenton, Bancroft, Lone Rock, Tintonka; Winnebago Co. Hancock Co., Woden and Crystal Lake; Worth Co.	14	6:30 p. m.	Hail, wind, tornado		W to E	1		1	150,000	See Storm Note No. 3.
Boone Co., Garden, Marcy Twps.; Union Co., Spaulding and Lincoln Twps.; Polk Co., Des Moines, Camp Dodge; Jasper Co., southern half; Jefferson, Henry, Des Moines, Lee counties	23	4:00 p. m. to 6:00 p. m.	Wind, hail		NW to SE					A series of local wind, rain and hailstorms occurred along a line extending from Boone Co. southeastward to the mouth of the Skunk River, and some damaging hail occurred in the northwest corner of Union Co., in Lincoln and Spaulding Twps., where there was also light wind damage. In Boone Co., crops were damaged in Marcy and Garden Twps. In Polk Co. wind blew down tents at Camp Dodge, and in Des Moines trees and wires were down and several airplanes were damaged. There was considerable spotted hail damage in southern Jasper Co., especially in the vicinity of Prairie City and Reasnor, and northeast of Monroe. Small buildings were blown down and windows were broken and roofs damaged by hail. A barn was damaged and 25 hogs killed by lightning. At Galesburg a church was damaged by wind and hail. Similar spotted hail damage occurred in northern Henry Co. Wind damaged small buildings, uprooted trees or blew down branches, damaged communication and power lines, and interrupted service at Fairfield, Mt. Pleasant, Burlington, Ft. Madison and Denmark (Lee Co.). At Burlington a home was struck and three power transformers were damaged by lightning. Total loss from these and other unreported similar storms might amount to \$35,000. The storms occurred in advance of a cold front aloft.
Adams Co., Colony Twp.; Union Co., Spaulding, Lincoln, Highland, Sand Creek, and Union Twps.	27	2:00 p. m.	Hail	1	NW to SE	1			35,000	Hail fell in an area about 1 mile wide and 30 miles long from west of Williamson in Adams Co., southeastward past Afton in Union Co. The storm path followed the valley of 12-Mile Creek along much of the course. Crops were seriously damaged in some areas. The hail fell in front of a mass of cold air pushing southward over Iowa.
Allamakee Co., near Waukon	27	2:00 p. m.	Hail		W to E					Hail caused some damage to crops in a small area near Waukon.
Harrison Co., Little Sioux Twp.	28	2:00 a. m.	Hail, wind	1	W to E				10,000	Hail damaged crops in an area 6 miles long and 1 mile wide in the southern part of Little Sioux Twp. Wind damage to buildings \$500.

TOTAL PRECIPITATION, JULY, 1944



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, AUGUST, 1944 No. 8

### GENERAL SUMMARY

The month of August, 1944, averaged slightly below normal in temperature and was unusually wet. The first half was rather warm with maximum temperatures of 100° or slightly above at several stations, but the last half of the month was cool with one period of abnormally low temperature. The average of 71.8° was 0.4° below the all-time mean. There have been 39 warmer and 32 cooler Augusts during the period of record.

The average precipitation of 5.88 inches was the heaviest since 1940 and the 7th heaviest of August record. The number of rainy days was 3 more than usual but cloudiness and sunshine were close to the August normals. The average relative humidity was also above normal, especially during the early morning hours. There was less damage from destructive local storms than during the earlier summer months. Stream flow continued high but there were no floods except on the smaller streams where no damage occurred. On the whole, conditions were generally favorable for growing crops although higher temperatures during the latter half would have been of benefit in pushing corn and soybeans toward maturity.

The month began with showers during the night of July 31-August 1 over the western two-thirds of the State. There were a number of local downpours of about two inches and up to 4.15 inches near Mapleton. On the 3d-4th general showers fell in all sections with 24-hour falls exceeding 2 inches at many points and up to 4.22 inches at Centerville. These rains occurred with a trough-like area of low pressure covering sections to the southwest of Iowa and with high pressure over the southeastern states. Another area of high pressure was moving eastward from the North Pacific region. Over Iowa a mass of Superior air lay above Maritime Tropic air at the surface. As the Maritime Polar air associated with the western high pressure area moved eastward, the low pressure trough was "squeezed" between the two "highs." Convergence of the warm air, followed by underrunning of the cold current, brought about the condensation of great quantities of moisture and produced the heavy showers. Temperatures were mostly above normal on the 2d and 3d and near normal during the remainder of the first week.

From the 7th through the 16th, hot summer weather prevailed. At most stations the monthly maximum temperatures occurred on the 9th, 10th, 11th or 13th. There was abundant sunshine and except for showers in the east portion on the 11th, there was practically no precipitation from the 4th to the 13th. This was the best growing period of the entire summer. At Des Moines the maximum temperature of 98°, on the 13th, was the highest of record for that particular date.

The next shower period began in the west portion on the 13th, spread to the remainder of the State and continued through the 17th. During much of this time, fronts extending east and west passed over Iowa while a trough of low pressure extended southwestward from Iowa or from adjacent areas to the west. The rain ended as a mass of Continental

### COMPARATIVE DATA FOR AUGUST

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	75.7	102	54	4.17					
1874.....	74.3	99	55	3.12					
1875.....	68.9	92	41	4.04					
1876.....	73.2	96	46	5.15					
1877.....	71.9	100	53	4.36					
1878.....	74.4	100	50	3.22					
1879.....	72.0	100	42	2.70					
1880.....	72.5	104	41	4.77					
1881.....	76.5	104	48	2.71					
1882.....	71.5	96	43	1.61					
1883.....	69.2	98	42	2.58					
1884.....	68.5	93	44	4.09					
1885.....	66.9	98	40	5.90					
1886.....	74.2	103	34	2.02					
1887.....	70.8	103	34	2.75					
1888.....	70.4	110	40	4.37					
1889.....	71.3	104	37	1.75					
1890.....	68.1	102	34	3.25					
1891.....	69.1	106	34	4.24		8	13	12	6
1892.....	71.4	102	40	2.24		5	18	9	4
1893.....	69.4	101	30	2.32		5	19	9	3
1894.....	74.6	108	38	1.58		4	21	8	2
1895.....	71.9	103	37	4.43		7	17	9	5
1896.....	71.7	104	34	3.52		8	15	11	5
1897.....	68.9	104	35	1.86		6	15	11	5
1898.....	71.2	103	40	3.44		6	17	9	5
1899.....	74.4	100	41	3.68		7	17	10	4
1900.....	77.4	103	44	4.65		6	18	10	3
1901.....	73.8	105	40	1.29		5	20	9	2
1902.....	69.1	98	37	6.58		11	11	11	9
1903.....	69.1	101	41	6.64		11	12	10	9
1904.....	69.1	97	35	3.43		7	17	8	6
1905.....	74.3	104	44	4.05		9	16	9	6
1906.....	74.1	101	33	3.95		9	17	9	5
1907.....	71.1	99	37	4.33		9	17	9	5
1908.....	70.0	101	38	4.77		9	17	9	5
1909.....	76.1	103	33	1.81		5	21	8	2
1910.....	71.9	104	36	3.88		8	15	10	6
1911.....	71.7	107	34	3.32		9	16	10	5
1912.....	71.0	101	40	3.78		10	15	10	6
1913.....	76.6	108	40	2.68		6	17	10	4
1914.....	73.7	103	40	2.19		7	17	10	4
1915.....	65.9	91	30	2.81		8	16	8	7
1916.....	74.0	106	35	2.58		7	18	9	4
1917.....	69.4	102	31	2.29		7	19	8	4
1918.....	76.0	113	38	3.61		8	16	10	5
1919.....	71.5	103	38	2.59		7	19	9	2
1920.....	69.3	98	39	3.35		7	18	8	5
1921.....	72.1	102	37	5.04		8	16	11	4
1922.....	73.8	102	42	3.06		8	19	8	4
1923.....	70.6	102	38	5.42		12	15	9	7
1924.....	71.7	100	40	5.35		10	16	10	5
1925.....	72.4	99	39	3.47		8	18	9	4
1926.....	73.5	103	47	3.80		10	16	10	5
1927.....	67.9	99	35	2.36		8	15	10	6
1928.....	72.7	100	37	6.42		9	19	8	4
1929.....	71.9	102	37	2.44		6	18	9	4
1930.....	74.4	113	41	2.42		8	15	11	5
1931.....	72.6	102	37	3.30		8	16	10	5
1932.....	72.2	100	43	7.10		12	15	9	7
1933.....	70.5	101	41	3.01		8	15	9	7
1934.....	73.4	116	33	2.84		9	15	11	5
1935.....	73.6	107	34	2.42		7	18	10	3
1936.....	79.2	114	46	3.48		8	15	12	4
1937.....	77.8	108	49	3.99		8	19	9	3
1938.....	75.7	105	42	3.82		7	18	9	4
1939.....	70.7	99	38	4.72		10	16	9	6
1940.....	70.7	101	39	6.44		14	10	11	10
1941.....	75.1	103	38	1.94		6	18	10	3
1942.....	72.2	102	34	3.17		7	16	11	4
1943.....	74.0	101	40	5.07		10	13	12	6
1944.....	71.8	102	41	5.88		11	16	8	7
Period.....	72.2	116	30	3.63		8	16	10	5

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

Polar air moved southeastward across the State and caused temperatures to fall below normal. The change to colder was attended by local destructive storms that are described elsewhere in this report. Overrunning Maritime Tropical air caused scattered showers from the 20th to the 23d and brought



CLIMATOLOGICAL DATA FOR AUGUST, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy, Prevailing direction of wind), OBSERVERS. Includes handwritten notes like 'out' and '1200'.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed.

State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated. † And other dates. ‡ Not included in means and summaries. \*Best available used for stations not equipped with recorders.









falls, exceeding 4 inches at a number of stations, were reported from the south central district. Following these rains there was a brief interlude of fair weather after which another series of rain and showers moved across Iowa from west to east attending the passage of a low pressure trough. The rains during the last week, like the ones earlier in the month, were due both to overrunning and convergence of warm Tropical air and to the "lifting" effect of cold Polar air moving in from the west.

Crops made very good progress during the first half of the month. The showers during the first 5 days relieved the incipient drouth that was beginning to effect crops in some sections and the relatively high temperatures caused rapid growth of all vegetation. Moisture was again needed at the time of the general rains from the 13th to the 17th, but the subsequent cool weather slowed down the progress toward maturity of corn and soybeans.

By mid-August the earliest corn had reached the hard dough stage but some that was planted during the last week in June was only beginning to "shoot" ears. Progress continued fairly good during the next week but during the closing days of the month the crop was almost at a standstill. At the end of the month the earliest had large ears, well dented, while the latest, scattered in fields in all sections of the State, was only in the blister or roasting ear stage. Only a very little corn along the northern border had advanced sufficiently to be safe from frost.

The progress of soybeans paralleled that of corn. Some were cut down by hail, or lodged by high winds, and fields were weedier than usual. At the end of August the early beans had an excellent set of pods, but the latest were still blooming profusely and needed warm, sunny weather.

Pastures were improved by the rains early in the month then suffered somewhat from the hot weather and later became rank and luxuriant during the cool, wet weather of the last 2 weeks.

Oat threshing made good progress during the first 2 weeks but where not finished during this period was further delayed during the latter part of the month.

Canning factories generally finished the bean pack about the middle of the month and then started canning sweet corn.

Victory gardens generally improved during the month and yielded abundantly. Tomatoes were rather late but canning began toward the close of the third week.

A great deal of fall plowing was done during the last half of the month and there was time for considerable manure hauling and general repair as the other demands on the farmers' time slackened.

Late cutting of red clover and alfalfa was delayed by rain and some hay was damaged but in general hay yields were heavy and of good quality.

The U. S. Department of Agriculture estimated the total corn crop would amount to 589,992,000 bushels, or about 52 bushels per acre. This amounted to a prospective increase of 5 bushels per acre from August 1 to September 1. It was pointed out, however, that much of the crop remains in danger

of damage by frost. Soybean production was estimated at 37,314,000 bushels, an increase of 1 bushel per acre during August. Final harvesting returns indicated an oat crop of 147,150,000 bushels, or 30.0 bushels per acre. The barley estimate of 285,000 bushels was only 26% of the 1943 yield, and flaxseed production of 671,000 bushels means only 5.5 bushels per acre and is far short of the 1943 yield of 3,828,000 bushels.

The remarkable increase in the estimated yield of corn and soybeans follows closely after the pattern of 1943. Despite storms and floods and prolonged rain during May and early June that delayed planting or made replanting necessary, the near normal temperatures and adequate precipitation, have brought the most important crops to a point where only extremely unfavorable weather and an early killing frost can cause damage. Even such unfavorable conditions will not materially affect either corn or soybeans as a source of food or war material, but will add another problem to the farmer's already great burden. As in the past few years, Iowans have full cause to observe Thanksgiving Day as one of thanks to God and of rejoicing over the wonderful harvest that followed after such a discouraging planting season. S. E. D.

**TEMPERATURE**

The average Iowa August temperature, derived from the averages of nine districts of about equal area and based on the averages of 126 temperature observing stations, was 71.8°. This is 0.4° lower than the all-time August average and was the lowest since 1940. There have been 39 warmer and 32 cooler Augusts in the entire 72-year period of record. The district averages ranged from 70.3° in the northwest to 73.6° in the southeast. However, the greatest deficiency occurred in the southwest where the district average was 1.8° below the adopted normals. In the northeast and east central sections, the district averages were exactly normal. The highest station average was 75.1° at Keokuk and the lowest 69.2° at Osage. The highest observed was 102° at Shenandoah on the 10th, and at Indianola on the 13th, while the lowest temperature reported was 41° at Decorah, on the 25th. Eight stations reported maximum readings of 100° or higher, and the average number of days with 90° or higher was 7.

**PRECIPITATION**

The average Iowa August precipitation amounted to 5.88 inches, or 2.25 inches more than the average of the entire 72 years of August record. The average was obtained from the averages of nine districts of almost equal area and was based on the measured totals of 129 observing stations. There have been only 6 wetter Augusts since records have been kept, but there have been 65 that were drier. The south central district with 7.38 inches, an excess of 3.49 inches, had the greatest district average. The least was 4.17 inches, only 0.34 inch above the adopted normal, in the east central section. The greatest measured total was 8.83 inches at the Atlantic Airport, and 8 other stations reported more than 8 inches. The least was 2.23 inches at Davenport. The greatest 24-hour fall was 4.29 inches at Osceola, on the 25th-26th. The average number of days with measurable amounts of rain was 11.

**DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR AUGUST, 1943 (24 hours ending 6:30 p. m.)**

Station	Data	Day of Month																															Sums
		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	
Ames	Evaporation.....	.143	.253	.271	.....	.133	.221	.268	.306	.291	.417	.358	.306	.331	.261	.172	.179	.295	.247	.341	.065	.131	.125	.251	.238	.089	.000	-.035	.132	.155	.079	.247	6.438†
	Wind Movement...	58	30	48	69	34	15	41	53	66	126	87	36	62	108	7	23	68	30	91	46	28	20	65	36	54	120	55	56	83	88	135	1,838
Cherokee	Evaporation.....	.223	.253	.288	.181	.227	.246	.196	.298	.297	.370	.266	.403	.213	.271	.114	.067	.161	.217	.255	.105	.287	.150	.191	.203	.033	.002	.164	.007	.094	.111	.206	6.189
	Wind Movement...	55	40	49	45	54	7	65	58	70	132	58	76	63	67	38	22	54	19	135	76	30	24	26	39	49	72	53	57	74	84	139	1,830
Clarinda	Evaporation.....	.018	.261	.260	.238	.196	.312	.326	.340	.394	.533	.308	.173	.279	.301	.216	.255	.374	.224	.241	.073	.064	.150	.108	.181	.187	.114	.042	.032	.128	.137	.226	6.691
	Wind Movement...	43	25	56	51	51	11	39	37	75	149	86	26	66	94	72	60	69	24	72	53	22	18	19	34	59	53	72	48	101	92	106	1,783
Ia. City	Evaporation.....	.107	.263	.212	.204	.186	.220	.215	.258	.277	.310	.239	.269	.273	.195	.219	.070	.468	.174	.252	.087	.127	.117	.184	.205	.133	.032	-.031	.102	.157	.059	.189	5.772
	Wind Movement...	14	30	29	47	32	25	19	26	32	48	57	36	22	21	31	19	59	29	35	23	17	10	29	16	21	57	25	42	41	53	51	996

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF AUGUST, 1944

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes Maximum and Minimum temperature values.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF AUGUST, 1944

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each row lists a station and its maximum and minimum temperatures for each day.

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, AUGUST, 1944

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Osceola Co., Wilson Twp.	13	5:00 p. m.	Hail, wind	3	SW to NE	2			\$60,000	Corn and soy beans severely damaged by hail in area 5 miles long and 3 miles wide; lighter damage to north and south. Loss to buildings \$10,000; to crops about \$50,000.
O'Brien Co.	13?		Hail							Corn crop damaged considerably by hail southeast of Primghar. Details of storm and even exact date of occurrence are unknown.
Webster Co.	13		Wind							Barn under construction west of Fort Dodge was wrecked by a windsquall.
Kossuth Co., Greenwood, Ledyard, German twps.; Bancroft and Titonka	13	7:00 p. m.	Wind, hail	3	NW to SE	1/4			50,000	Heavy rain with some hail caused slight damage at Bancroft. Heavy wind loss was sustained in an area about 10 miles long and 3 miles wide, starting about 4 miles north and west of Bancroft and extending southeastward to near Titonka. Wind damage in German Twp. was estimated at \$15,000 to buildings, \$20,000 to crops, and \$1,000 to livestock. Hail damage was spotted and was probably not serious. Some flattened corn may recover. This storm as well as the one in Osceola Co. occurred as a cold front between Maritime Polar and Maritime Tropic air moved southward.
Cerro Gordo Co., Portland Twp.; Floyd Co., Rock Grove, Floyd and Niles Twps.	15	12:30 p. m.	Wind, hail		SW to NE	1/4			20,000	Wind caused damage along a path about 8 miles long from the southwest corner of Portland Twp. in Cerro Gordo Co. past Nora Springs in Floyd Co. Damage also occurred in southeast corner of Portland Twp. East of Floyd, in Floyd Co., corn leaves were shattered by wind and some hail; 2 barns wrecked near Nora Springs and trees, wires, small buildings, etc., were damaged.
Chickasaw Co., Washington Twp.	15	12:50 p. m.	Tornado, wind	1/2	SW to NE				4,000	A small tornado traveled along a path about 5 miles long and only a few hundred feet wide from southwest to northeast across Washington Twp. of Chickasaw Co. Most damage was to small buildings in rural area. Strong winds occurred outside tornado track. Trees blown down and other light damage occurred at Alta Vista. The path of the storm was parallel to the one in Cerro Gordo Co.
Allamakee Co.	15	1:30 p. m.	Wind		SW to NE					Farm buildings damaged and silos and tree branches were blown down in local storms moving across county from southwest to northeast.
Clayton Co., Elkader	15	Noon	Wind					2		Mrs. Wm. Tielbard and son Billy slightly injured by fragments of concrete cornice blown off of postoffice during a thunder and windstorm. This storm and others on the 15th occurred in the warm sector of a barometric disturbance centered over northern Wisconsin and connected by a trough to another "low" over northeastern New Mexico. The surface cold front between Maritime Polar and Maritime Tropical air was from 150 to 200 miles west of the area of local storms.
Marion Co., Knoxville	15	10:30 p. m.	Lightning							Two houses damaged when struck by lightning; 1 barn burned after lightning bolt.
Cerro Gordo Co., Lincoln Twp., Mason City	16	6:00 p. m. to 8:00 p. m.	Hail	1	NW to SE	1			50,000	Hail cut a diagonal path across Lincoln Twp. from northwest to southeast and continued on across Mason City with reduced intensity. Between 700 and 1,000 acres of corn were damaged 50% or more, and another 1,000 acres from 5 to 10 per cent; 700 acres of soybeans were damaged 50% and 100 acres of buckwheat were destroyed. Damage in Mason City was mostly to gardens.
Floyd Co., Rockford, Ulster, Union, Pleasant Grove Twps.	16	8:15 p. m.	Hail, lightning	2	NW to SE	1 1/2			25,000	The Cerro Gordo Co. hailstorm redeveloped near Rockford and followed a curving broad path to the southeast for about 12 miles. The damage seemed to be more widely scattered than in Cerro Gordo Co. A barn burned near Floyd after being struck by lightning.
Fayette Co., Jefferson Twp.	16	9:30 p. m.	Hail	2	NW to SE					Hail broke windows and damaged roofs in an area 6 miles long and 2 miles wide. Crop damage ranged up to 70%; 200 chickens killed. This was a redevelopment of the Cerro Gordo-Floyd county storms.
Delaware Co., Coffins Grove, Prairie, Milo, Delhi and North Fork Twps.	16	10:00 p. m.	Hail, wind	2	NW to SE W to E	1				Hail fell in a strip about 2 miles wide, stretching almost completely across the county. The path extended from northwest to southeast for about 7 miles, then due east for about 18 miles. Crops were damaged with some cornfields entirely stripped of leaves. Windows were broken. North of Hopkinton, near the end of the storm track, farm buildings were blown down. No reliable estimate of damage is available but if as intense in other counties it would be between \$50,000 and \$100,000. This was another link in the chain of hailstorms.

IOWA STORMS, AUGUST, 1944—Continued

County and Township or town	Date	Time	Character of storm	Width path (miles)	Direction	Size of hailstones (diam.) (inches)	Persons killed	Persons injured	Estimated value of damage	Remarks
Benton Co., Urbana, Vinton; Linn Co., Grant, Washington, and Otter Twps.; Center Point, Cedar Rapids	16	11:00 p. m.	Wind, hail, tornado?	1/2	NW to SE W to E	1/2			125,000	Considerable hail damage occurred near Vinton and Urbana and wind blew down a silo and damaged several barns in that area but no definite information about the storms in Benton Co. is available. In Linn Co. there seems to be a trail of hail damage across parts of Grant, Washington and Otter Creek Twps. and at scattered points elsewhere. Many trees were blown down or had branches blown off by high wind. At Center Point electric and telephone service were completely cut off. Many trees were damaged in Cedar Rapids, where there was also interruption of power and telephone service in some sections. Details of damage in rural areas are incomplete but it was estimated wind caused \$15,000 loss to buildings, and hail \$3,000 to windows and roofs. There were several reports that some of the damage was caused by a tornado, but no supporting evidence has been received. This storm was a separate development from those previously discussed, but may have been the start of storms listed below.
Jackson Co., South Fork Twp., Maquoketa	17	12:30 a. m.	Tornado	1/8	WNW to ESE	1/4			25,000	What appears to have been a tornado struck in rural areas northwest of Maquoketa and traveled almost due east across the northern part of that town. In the open country many farm buildings were damaged or destroyed. In Maquoketa 400 trees were uprooted or damaged and 160 telephone circuits, 115 poles and 15 toll lines were out of order. Several homes were damaged by falling branches, and traffic was badly hampered. However, residents believed the storm lifted as it reached the city. This may have been either a redevelopment of the string of hailstorms or of the Linn Co. storms, but it seems more probable that the latter was the case, as the time element favors this belief. It seemed that several storms coming from northwest, west and southwest converged on the city.
Clinton Co., Clinton	17	1:00 a. m.	Wind							Wind damaged trees and electric and telephone wires. All of the storms on the 16th and early 17th apparently occurred along a stationary east-west front as a new cold front aloft moved eastward.
Tama Co., near Toledo	17		Hail							Some hail damage north of Toledo. No details available.
Osoeola Co., Sibley	29		Lightning							Two barns burned after being struck by lightning.

MISCELLANEOUS PHENOMENA

- Aurora*: 27th.
- Fog, heavy*: 2d, 18th, 22d, 23d, 24th, 25th, 27th, 28th.
- Fog, light*: 1st, 2d, 3d, 5th, 6th, 7th, 8th, 9th, 11th, 12th, 14th, 16th, 17th, 18th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st.
- Hail, light*: 1st, 6th, 8th, 13th, 14th, 16th, 23d.
- Hail, heavy*: 16th.
- Halo, lunar*: None.
- Halo, solar*: None.
- Thunderstorms*: 1st, 3d, 4th, 7th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

THE SUMMER OF 1944

The summer of 1944 was the coldest since 1929 but the average temperature was only 0.1° lower than in 1942 and only 0.2° below the 72-year average of the summer months. There have been 37 warmer, 32 colder and 2 equally cold summers. The average total precipitation amounted to 15.49 inches, or only 0.30 inch less than in 1943. There have been only 7 wetter summers in the 72-year period of record.

Other weather elements conformed to the temperature and precipitation values. The number of days with measurable precipitation was 31, or 5 more than normal, and the 6th greatest number of record. The average number of clear days, 45, was 3 less than usual, while the 30 partly cloudy and 17 cloudy days were 1 and 2 days above normal, respectively. The average per cent of possible sunshine was 69, or 3 per cent less than normal. The average relative humidity was nearly 5% above normal.

It is interesting to note that the average temperature was almost the same as in 1942 and the average total precipitation was only 0.30 inch short of the 1943 amount. In these two preceding years, record-breaking crops of corn were harvested and for the current year another bumper crop seems assured. The mean values of the three years seem to be ideal for large yields of this most important crop. For discussion of crop prospects, consult the monthly summaries.

The numerous destructive local storms as well as floods in May and June are also discussed in the appropriate monthly summaries.

June was rather warm and wet, averaging 2.0° above normal. However, in many sections of the State, the excessively heavy rains that had begun in May came to an end by the end of the second week, permitting farmers to catch up on long delayed planting and other field work. July was cool and relatively dry. The average temperature of 72.6° was 2.0° below normal, offsetting the June excess. Although excessive rains fell in some sections, other areas were quite dry but the moderate temperature reduced crop needs for moisture and prevented damage. Good rains early in August eliminated any danger of drouth and warm, sunny weather during the first half gave all crops a big "boost" toward maturity. The last half of the month was unseasonably cool and wet and resulted in an average monthly temperature of 0.4° below normal.

Favorable conditions will be needed during the autumn months in order that the huge crops of corn and soybeans can be harvested without loss. As in the two preceding years, there is danger that considerable portions of these crops may be caught by frost.

S. E. D.



ERRATA

Report for June, 1944. Page 58; Britt, greatest 24-hour precipitation published 6.46, should be 6.71; Fayette, greatest 24-hour precipitation published 1.73, should be 1.83. Page 59; Greenfield, highest temperature published 95 on 26th, should be 97 on 25th; Red Oak, greatest 24-hour precipitation published 2.26 on 7th-8th, should be 1.99 on 8th; Centerville, greatest 24-hour precipitation published 2.70 on 8th, should be 3.82 on 8th-9th; Chariton, date of greatest precipitation published 8th-9th, should be 8th; Knoxville, date of greatest precipitation published 8th, should be 8th-9th; Bloomfield, minimum temperature published 49 on 6th, should be 48 on 20th. Page 65, Burlington, minimum temperature on 17th published 76, should be 74; mean minimum published 63.2, should be 63.1.

TOTAL PRECIPITATION, AUGUST, 1944



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, SEPTEMBER, 1944 No. 9

## GENERAL SUMMARY

September was a rather dry month with temperatures averaging slightly above the all-time normal. In general it was favorable for agricultural operations, and crops made good progress.

The average temperature of 64.3° was 0.4° above normal and was considerably higher than in the two previous years. There were no unusually large departures from normal and the extremes observed were well within the limits of previous records.

The average precipitation was slightly greater than in 1943 but was only 59% of the all-time average. The amounts were fairly well distributed and even in the drier areas crops did not suffer from lack of moisture.

There was more cloudiness than usual but the average amount of sunshine was only slightly below normal. Relative humidity was rather high, averaging about 5% above the all-time September values.

In contrast to the preceding months, there was very little storm damage. Lightning damaged a farm home near Corning on the 10th, and caused small damage at Dubuque on the 20th. There was also a little scattered hail damage in Fremont County on the 19th.

The unseasonably cool weather that prevailed at the close of August gave way to above normal temperatures the first few days of September. The average readings during the last week in August were similar to those usually experienced during mid-October while the unseasonable warmth of September 2d and 3d was more like that of mid-July. At many points the maximum temperatures of the 2d and 3d were the highest observed during the month. There was a return to cooler weather on the 6th when temperatures again fell to below normal and on the morning of the 7th many of the southern stations recorded the lowest readings of the month. A few scattered showers occurred as the cold air moved into the State. Cool weather then continued until the middle of the month except for one warm day, the 9th. Rain fell in the southern districts on the 8th but the first general precipitation occurred on the 10th in connection with the eastward passage of a cold front. Recurring scattered showers or intermittent rain fell in some section or other on succeeding days until the 13th, as a low pressure center remained nearly stationary near southern Lake Michigan.

The temperature rose above normal on the 15th and remained relatively high during the following week. At many stations in the northwest and west central districts, the monthly maximum readings occurred on the 17th. Showers occurred on the 16th as a low pressure trough and frontal system moved eastward across Iowa and more general rains and showers fell

## COMPARATIVE DATA FOR SEPTEMBER, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	59.1	89	33	2.18					
1874.....	62.8	90	40	6.04					
1875.....	60.6	92	37	5.02					
1876.....	60.4	86	38	6.42					
1877.....	65.4	96	40	1.95					
1878.....	62.9	92	38	3.13					
1879.....	59.3	90	24	2.70					
1880.....	61.1	90	30	4.18					
1881.....	64.5	103	37	7.14					
1882.....	63.4	97	31	0.87					
1883.....	58.5	93	30	2.04					
1884.....	66.5	95	30	5.20					
1885.....	61.7	92	32	3.04					
1886.....	63.0	97	30	4.68					
1887.....	62.1	98	30	6.17					
1888.....	59.9	96	26	1.07					
1889.....	60.7	96	23	2.80					
1890.....	59.5	96	23	2.71					
1891.....	67.3	104	28	1.33		4	20	7	3
1892.....	64.7	99	29	1.53	0	4	16	8	6
1893.....	64.7	102	18	2.34	0	4	20	6	4
1894.....	65.1	100	26	3.57	0	8	15	10	5
1895.....	66.8	103	22	3.03	T.	5	18	8	4
1896.....	58.5	95	22	4.09	0	10	11	9	10
1897.....	70.9	106	26	2.04	0	4	23	5	2
1898.....	65.3	99	29	2.69	0	7	16	9	5
1899.....	62.5	104	15	0.93	0	4	16	9	5
1900.....	64.4	99	26	4.98	T.	9	15	8	7
1901.....	63.3	102	26	4.77	0	9	13	9	8
1902.....	59.1	88	23	4.35	0	9	15	6	9
1903.....	60.8	94	28	3.81	0	10	14	6	10
1904.....	64.0	94	30	2.78	0	7	13	8	9
1905.....	65.8	96	36	3.81	0	8	14	8	8
1906.....	67.2	100	27	4.16	0	8	16	8	6
1907.....	62.8	98	25	2.75	0	8	15	9	6
1908.....	67.9	98	20	1.20	T.	3	21	6	3
1909.....	62.4	94	30	3.58	0	9	14	8	8
1910.....	63.2	99	30	3.59	0	9	14	7	9
1911.....	65.8	103	32	5.12	T.	10	11	9	10
1912.....	62.1	104	24	3.98	T.	11	12	8	10
1913.....	64.5	107	19	3.31	0	9	15	8	7
1914.....	64.5	99	30	7.88	0	10	16	7	7
1915.....	63.7	91	30	6.03	0	11	11	8	11
1916.....	62.5	98	21	3.89	T.	7	17	8	5
1917.....	62.6	97	28	2.90	0	7	15	7	8
1918.....	58.6	93	20	1.87	T.	6	16	8	6
1919.....	67.5	99	33	5.34	0	8	16	6	8
1920.....	66.5	98	24	3.30	0	8	17	8	5
1921.....	67.3	99	31	6.72	0	11	14	8	8
1922.....	67.1	103	31	2.03	0	6	20	6	4
1923.....	64.2	92	28	5.79	0	11	14	8	8
1924.....	59.1	91	25	3.13	0	8	16	7	7
1925.....	69.0	105	32	5.04	0	9	14	10	6
1926.....	63.0	92	18	9.76	T.	14	8	7	15
1927.....	67.4	101	29	4.56	T.	10	15	8	7
1928.....	60.5	93	24	3.08	0	6	19	7	4
1929.....	62.4	98	25	3.74	T.	9	14	7	9
1930.....	66.3	101	25	2.31	0	5	19	7	4
1931.....	71.0	105	35	6.69	0	12	15	8	7
1932.....	62.2	94	27	2.05	T.	5	21	6	3
1933.....	69.4	105	29	4.16	0	8	17	7	6
1934.....	61.0	94	25	5.07	0	12	13	7	10
1935.....	65.0	96	25	3.46	0	8	18	6	6
1936.....	68.0	102	31	7.22	0	11	14	8	8
1937.....	65.9	103	28	1.50	0	4	19	8	3
1938.....	66.8	101	29	5.67	T.	8	16	8	6
1939.....	69.3	107	16	0.82	T.	3	22	6	2
1940.....	65.8	98	27	0.94	0	3	20	7	3
1941.....	66.6	95	26	7.74	0	12	14	8	8
1942.....	61.4	96	18	4.13	0.7	12	11	9	10
1943.....	60.3	94	27	2.18	0	7	15	9	6
1944.....	64.3	94	31	2.25	0	8	12	10	8
Period.....	63.9	107	15	3.78	T.	8	16	7	7

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

from the 18th through the 20th as a front between Maritime Polar air and Maritime Tropic air advanced slowly from the northwest across the State and was attended by the development of a secondary low pressure center. Most stations recorded the heaviest falls of the month during this period.



CLIMATOLOGICAL DATA FOR SEPTEMBER, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed. State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record. Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated. † And other dates. ‡ Not included in means and summaries. § Best available used for stations not equipped with recorders.





DAILY PRECIPITATION FOR SEPTEMBER, 1944—Continued

Table with columns: Stations, Drainage Basin, Day of Month (1-31), Total. Rows include Southeast District (Continued) stations like Donnellson, Eddyville, Fairfield, etc.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- 1 Midnight to midnight.
2 Measured in the morning; for the preceding 24-hours.
T Trace or 0.005 inch or less.
\* Included in next measurement. \*\*Incomplete
† Recording gage.
|| Windshield on gage.
|| Data interpolated.
§ Partly interpolated

SUPPLEMENTAL TABLE, SEPTEMBER, 1944

Table with columns: STATIONS, COUN-TIES, Elevation, Length of record, Precipitation, No. of Days, Prevailing direction of wind. Rows include Akron, Cmbrld. 4 1/4 NW, etc.

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

\*Best available used for stations not equipped with recorders. Figures and letters following stations indicate distance in miles and direction of station from the city post office, unless otherwise indicated.

PRESSURE, WIND, HUMIDITY AND SUNSHINE AND DEGREE DAYS, SEPTEMBER, 1944

Table with columns: Stations, Sea-level pressure, Wind, Relative Humidity, Percentage of sunshine, Degree Days. Rows include Burlington, Charles City, Davenport, etc.

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

\*Sioux City §Des Moines ||Davenport

SOIL TEMPERATURES AT AMES, IOWA, SEPTEMBER, 1944

Table with columns: Temperature, 4 feet above ground, At Depth in Soil of (1, 6, 12, 24, 48, 72 inches). Rows include Average 7 a. m., Average 12 noon, etc.

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

° Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

On the 22d, the temperature again fell below normal and except for a brief warm spell on the 26th-27th, cool weather prevailed until the end of the month. The change to cooler was followed by moderate precipitation, due to warm, moist air from the south overrunning the surface cold air.

As in September of the two preceding years, bumper crops of corn and soybeans were in need of favorable weather to enable them to reach maturity before the occurrence of the first killing frost, and as in 1942 and 1943, this year's crops appear to have won the race. On the 1st of September, only about

10% of the corn was safe from frost, on the 10th, about 24% was safe, on the 17th, 42%, on the 24th, 53%, and on October 1, about 76%. This latter value was about 7% less than normal, or two days later than usual, but favorable weather during early October increased the percentage considerably before frost did occur.

Progress of soybeans was similar to that of corn. About one-third of the crops was safe from frost damage on the 17th, and 49% on the 24th.

There was much fall plowing and late haying during the month. Some red clover seed was hulled. Canneries were packing sweet corn until the end of the month, but tomatoes had been delayed by much cool, wet weather and it seemed likely that a considerable acreage would not mature. Many silos were filled.

The U. S. Department of Agriculture estimated the corn crop would amount to 601,338,000 bushels, second only to the record-breaking crop of 640,740,000 bushels of last year. Soybean production was estimated at 39,332,000 bushels, or about the same as last year. The yields of other crops have already been discussed in previous issues of this publication.

It is interesting to note that in both 1943 and 1944 farmers had great difficulty in planting corn because of frequent rains, floods, wet soil and lack of help. In both years the crop seemed destined to be caught by killing frost before maturity. But, in these years, the two largest corn crops of record have been raised. Just how much the yields are the result of better seed, better farming or of the excessive moisture, is a subject for future study and research.

S.E.D.

TEMPERATURE

The average Iowa temperature for September derived from the averages of nine districts of almost equal area and based on reports from 125 temperature observing stations, was 64.3°. This was 0.4° higher than the all-time September average and 4.0° above the 1943 average. There have been 33 warmer and 38 cooler Septembers during the 72-year period of record. The highest district average was 66.7°, in the southeast, while the lowest was 62.1°, in the northwest and north central sections. The averages were somewhat below the adopted normals in the

western and central districts but were above normal in the eastern third of the State. The highest station mean was 68.4° at the Keokuk Dam, followed by 67.8° at the Keokuk city office. The lowest was 60.7° at Osage, followed by 61.0° at Sanborn and 61.2° at Sibley and Lake Park. The highest observed was 94°, on the 3d, at Fairfield, while the lowest was 31° at Sioux Rapids, on the 24th. Thirty-seven stations reported maximum readings of 90° or higher on at least one day.

PRECIPITATION

The average Iowa September precipitation, computed from the district averages, which in turn were based on the measured totals of 128 stations was 2.25 inches. This was 1.53 inches less than the all-time average, but was 0.07 inch more than in 1943. There have been 54 wetter Septembers but only 17 have been drier during the period for which records are available. It was driest in the west central section with the heaviest falls in the southeast but the averages were below normal in all of the nine districts. The greatest station total was 4.12 inches at Inwood (near), while the least reported was 0.29 inch at Mapleton (near). The greatest 24-hour fall was 2.60 inches at Jefferson, on the 27th-28th. The average number of days with measurable precipitation was 8, the same as the September normal.

MISCELLANEOUS PHENOMENA

Aurora: 20th.

Fog heavy: 3d, 8th, 11th, 12th, 13th, 14th, 15th, 19th, 20th, 21st, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

Fog, light: 1st, 3d, 4th, 5th, 6th, 7th, 8th, 10th, 11th, 12th, 13th, 14th, 15th, 19th, 20th, 21st, 22d, 23d, 24th, 25th, 26th, 27th, 28th, 29th, 30th.

Frost, light: 6th, 29th.

Hail, light: 16th, 19th, 20th.

Halo, lunar: None.

Halo, solar: 5th, 11th, 16th, 25th, 26th.

Thunderstorms: 3d, 5th, 8th, 9th, 10th, 11th, 15th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 26th, 27th, 28th.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR SEPTEMBER, 1944 (24 hours ending 6:30 p. m.)

Station	Data	Day of Month																															Sums
		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	
Ames	Evaporation.....	.191	.258	.149	.270	.160	.225	.187	.205	.213	.084	.064	.092	.047	.059	.151	.159	.205	.229	.128	.068	.192	.060	.004	.121	.151	.154	.049	.154	.116	.097	.....	4.302
	Wind Movement...	.84	.81	.49	.42	.31	.59	.34	.72	.111	.65	.14	.30	.28	.16	.68	.56	.90	.97	.50	.40	.48	.21	.48	.33	.72	.47	.27	.88	.27	.52	.....	1,580
Cherokee	Evaporation.....	.165	.202	.274	.139	.136	.181	.190	.202	.147	.077	.072	.067	.019	.011	.039	.....	.256	.152	.060	.103	.210	.053	.056	.118	.147	.102	.076	.132	.122	.057	.....	3.688†
	Wind Movement...	.53	.46	.38	.56	.51	.55	.54	.69	.77	.75	.29	.64	.20	.22	.60	.53	.125	.66	.48	.54	.44	.29	.47	.51	.102	.54	.47	.42	.31	.87	.....	1,649
Clarinda	Evaporation.....	.273	.363	.100	.197	.180	.166	.281	.237	.125	.140	.081	.122	.121	.244	.061	.138	.324	.078	.143	.121	.167	.088	.049	.070	.082	.139	.055	.092	.097	.068	.....	4.402
	Wind Movement...	.92	.119	.20	.88	.48	.40	.35	.92	.135	.64	.19	.47	.53	.29	.60	.45	.98	.124	.95	.25	.27	.23	.44	.15	.46	.55	.83	.63	.13	.52	.....	1,749
Ia. City...	Evaporation.....	.195	.228	.170	.265	.150	.227	.143	.141	.245	.098	.031	.017	.051	.056	.094	.108	.209	.218	.110	.138	.213	.060	.013	.108	.094	.074	.143	.127	.065	.110	.....	3.901
	Wind Movement...	.70	.49	.36	.33	.27	.60	.19	.22	.72	.28	.9	.11	.24	.13	.24	.39	.64	.57	.32	.52	.41	.14	.5	.23	.26	.28	.47	.60	.19	.33	.....	1,037

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.



DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF SEPTEMBER, 1944

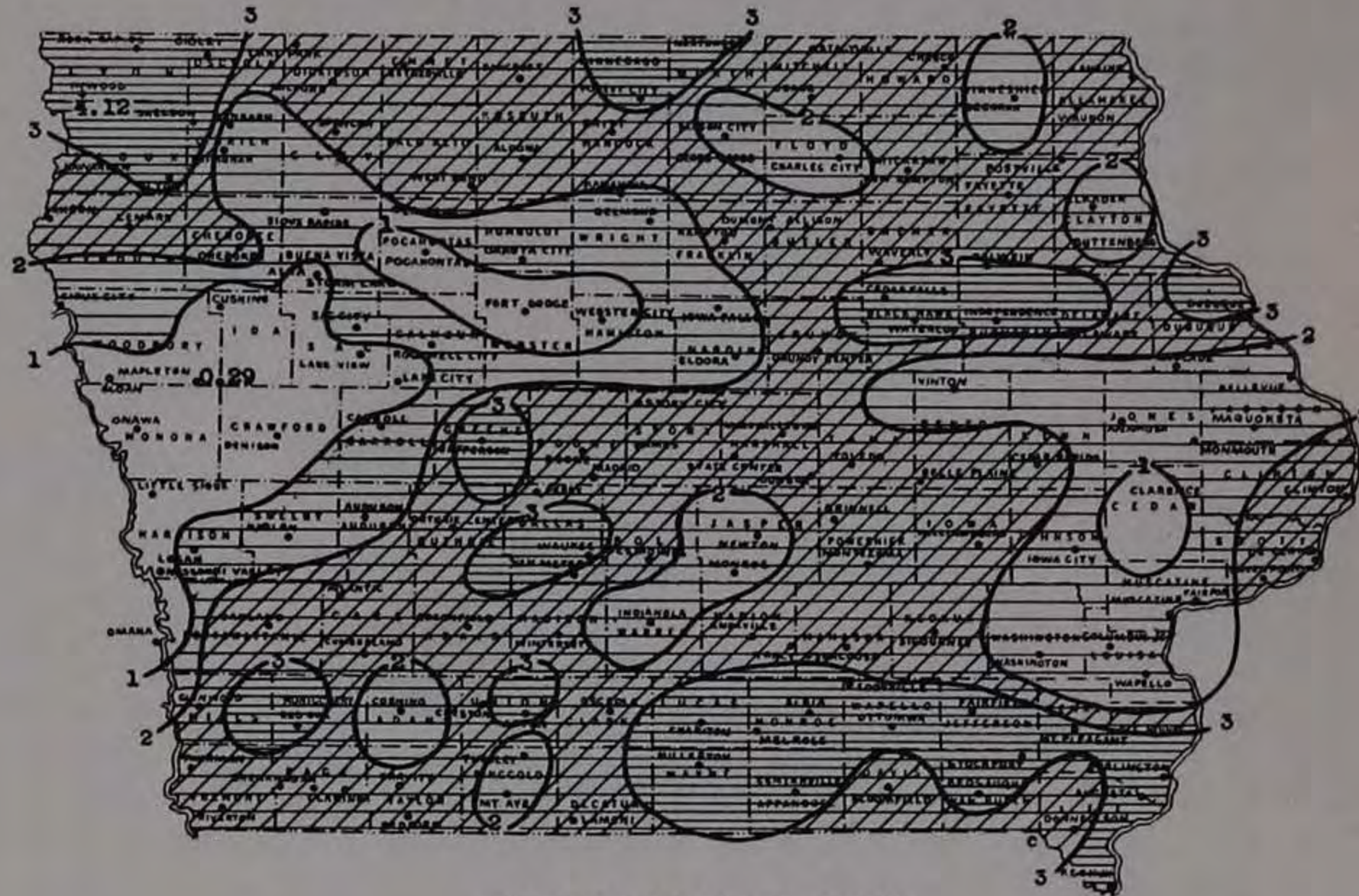
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes Maximum and Minimum temperature values.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF SEPTEMBER, 1944—Continued

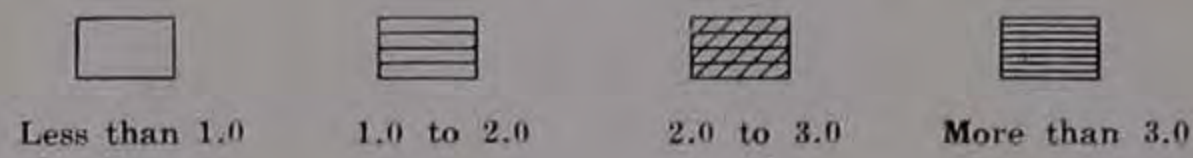
Table with columns for Stations (e.g., Grundy Center, Iowa Falls, Marshalltown, etc.) and rows for days 1 through 31, plus a Mean column. Each station entry includes Maximum and Minimum temperature values.

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.

TOTAL PRECIPITATION, SEPTEMBER, 1944



SCALE OF SHADES IN INCHES



CLIMATOLOGICAL DATA

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, OCTOBER, 1944 No. 10

GENERAL SUMMARY

The pattern of Iowa weather during October, 1944, followed that of the preceding month. Temperature readings averaged somewhat above the all-time normal and higher than in the two preceding years. There have been 24 warmer Octobers since records have been kept, while 47 have been cooler. At many stations maximum temperature readings during the closing days of the month equaled or exceeded previous records for individual dates. However, the temperatures were well within the previous limits of monthly extremes.

The total precipitation amounted to only 1.08 inches, or 1.27 inches less than normal, making this the sixth driest October of record. There was no snow reported during the month. Much of the rain fell during the first 5 days, after which fair weather prevailed most of the time.

Sunshine averaged 14% above the October normal and the average number of clear days, 21, has been exceeded only in 1924, when there were 22. However, several other Octobers also had averages of 21 clear days. Relative humidity readings were near normal, being somewhat high during the early morning and low during the daytime hours.

The first half of the month was rather cool and general frost occurred on the 10th and again on the 12th. Although some tender vegetation escaped frost damage in large areas over the eastern and southern portions of the State, growth of corn, soybeans and truck crops practically ceased after the 12th, despite the fact that the last half of the month was generally as warm or warmer than the first half. Conditions were very favorable for drying corn and soybeans and for combining the latter crop. The corn crop was very wet and would have been helped by lower temperatures during the last half of the month. Cooler weather would have resulted in lower atmospheric vapor pressure and favored rapid drying of the ears.

Showers occurred in all sections during the first 5 days, attending the passage of troughs of low pressure across the State, followed by outbreaks of Continental Polar air. Thunderstorms occurred on the 1st-2d and 4th-5th and the lowest barometer readings of the month occurred on the 5th.

Temperature readings were rather low during the first few days but on the 6th many northeastern stations recorded the highest readings of the month. The flow of cold Polar air that began on the 7th carried temperature readings below normal and occasioned the first widespread heavy frosts of the season on the 10th and 12th. In parts of the southwest quarter of the State, the minimum readings of the 10th were the lowest of the month. Temperatures rose to above normal on the 13th and 14th but this was followed by another short cold period.

COMPARATIVE DATA FOR OCTOBER, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	46.0	76	15	2.64					
1874.....	51.2	84	25	1.52					
1875.....	47.8	77	22	1.36					
1876.....	47.0	78	18	1.16					
1877.....	49.6	93	28	4.45					
1878.....	48.9	85	10	2.73					
1879.....	58.3	90	11	2.19					
1880.....	47.6	83	13	1.90					
1881.....	52.1	86	26	6.42					
1882.....	54.4	86	23	3.97					
1883.....	47.2	88	20	3.37					
1884.....	54.2	86	17	4.20					
1885.....	46.7	80	20	2.62					
1886.....	55.0	88	18	2.51					
1887.....	46.4	86	—3	1.46					
1888.....	47.7	84	22	1.16					
1889.....	47.5	94	12	0.58					
1890.....	49.2	84	15	3.44					
1891.....	50.0	92	19	2.77		6	18	7	6
1892.....	54.5	96	14	1.55	0.0	4	21	6	4
1893.....	52.4	94	10	1.28	0.0	4	16	9	6
1894.....	51.7	90	20	2.67	0.2	8	14	8	9
1895.....	46.0	88	4	0.47	T.	2	19	8	4
1896.....	47.8	88	12	3.13	T.	5	18	6	7
1897.....	56.8	97	12	1.14	0.0	4	17	8	6
1898.....	47.5	88	17	3.56	3.6	8	7	9	15
1899.....	56.7	95	17	1.73	0.0	5	17	8	6
1900.....	50.3	90	21	3.91	0.0	7	16	7	8
1901.....	54.2	88	20	1.98	T.	6	17	7	7
1902.....	53.5	83	20	2.54	T.	5	16	8	7
1903.....	52.2	90	16	1.95	0.0	5	19	6	6
1904.....	53.1	96	16	1.67	T.	6	15	8	8
1905.....	49.2	95	16	3.40	1.6	8	16	6	9
1906.....	50.5	87	7	1.96	0.1	6	14	7	10
1907.....	50.4	85	10	1.50	0.0	5	20	5	6
1908.....	51.1	89	17	3.38	2.6	8	16	6	9
1909.....	49.7	97	10	2.22	T.	6	16	6	9
1910.....	55.2	93	10	0.77	0.1	4	21	4	6
1911.....	48.7	87	14	3.34	0.6	10	12	8	11
1912.....	52.2	92	16	2.98	T.	6	21	3	7
1913.....	49.2	89	—2	3.03	1.2	9	15	8	8
1914.....	55.9	88	14	3.23	T.	9	16	6	9
1915.....	54.4	86	19	1.31	T.	5	19	6	6
1916.....	50.9	92	6	2.00	2.0	8	16	7	8
1917.....	42.9	85	0	1.41	2.2	6	10	11	10
1918.....	55.1	93	21	3.64	0.8	7	13	7	11
1919.....	50.7	89	8	3.02	T.	10	11	8	12
1920.....	57.7	90	11	2.13	T.	6	19	6	6
1921.....	54.6	90	21	1.96	T.	6	17	8	6
1922.....	56.1	96	14	1.81	T.	5	21	4	6
1923.....	48.5	81	10	1.22	1.7	6	18	6	7
1924.....	58.7	89	21	0.87	0.0	4	22	5	4
1925.....	40.2	78	—15	2.91	4.9	10	8	8	15
1926.....	51.2	91	14	1.53	T.	7	13	9	9
1927.....	55.5	91	24	3.25	T.	7	19	5	7
1928.....	54.2	93	17	3.66	0.1	8	15	5	11
1929.....	51.8	84	23	3.10	0.7	9	15	5	11
1930.....	50.7	95	9	2.08	0.4	7	14	7	10
1931.....	56.8	92	28	3.01	T.	10	13	8	10
1932.....	49.6	90	19	1.79	0.3	7	12	8	11
1933.....	50.1	84	17	1.36	T.	5	18	7	6
1934.....	56.6	92	18	1.52	T.	4	21	6	4
1935.....	50.9	89	12	2.76	T.	8	14	8	9
1936.....	50.9	88	10	1.69	T.	6	15	8	8
1937.....	50.3	94	12	2.03	1.5	8	15	7	9
1938.....	59.4	97	20	0.88	0.2	4	21	6	4
1939.....	53.4	95	14	1.48	T.	6	18	7	6
1940.....	57.8	90	22	2.32	0.0	7	18	8	5
1941.....	54.5	84	15	6.11	0.6	14	12	7	12
1942.....	53.1	90	10	1.53	T.	5	18	7	6
1943.....	51.6	87	15	1.66	T.	5	19	4	8
1944.....	53.8	84	18	1.08	0	4	21	4	6
Period.....	51.8	97	—15	2.35	0.5	6	16	7	8

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

During the last 2 weeks the temperature was above normal continuously except for a cool period on the 21st-22d. On the last four days readings were unseasonably high. The monthly maxima generally occurred on the 28th, 30th and 31st, while at most stations the minima of the 20th were the lowest for the



CLIMATOLOGICAL DATA FOR OCTOBER, 1944—Continued

Table with columns: STATIONS, COUNTIES, Elevation, feet, Length of record, years, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed. State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record. Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated. † And other dates. ‡ Not included in means and summaries. § Best available used for stations not equipped with recorders.







DAILY PRECIPITATION FOR OCTOBER, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. Includes sub-section 'Southeast District (Continued)' with stations like Donnellson, Eddyville, etc.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- 1 Midnight to midnight.
2 Measured in the morning; for the preceding 24-hours.
T Trace or 0.005 inch or less.
\* Included in next measurement. \*\*Incomplete
† Recording gage.
|| Windshield on gage.
§ Data interpolated.
¶ Partly interpolated

SUPPLEMENTAL TABLE, OCTOBER, 1944

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Precipitation (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), No. of Days (With precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind.

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

†Best available used for stations not equipped with recorders. Figures and letters following stations indicate distance in miles and direction of station from the city post office, unless otherwise indicated.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, October, 1944

Table with columns: Stations, Sea-level pressure (Highest, Date, Lowest, Date), Wind (Average hourly velocity, Maximum velocity, Direction, Date), Relative Humidity (12:30 A. M., 6:30 A. M., 12:30 P. M., 6:30 P. M., Percentage of sunshine), Degree Days.

† True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

\*Sioux City §Des Moines ||Davenport †And other dates.

SOIL TEMPERATURES AT AMES, IOWA, OCTOBER, 1944

Table with columns: Temperature, 4 feet above ground, At Depth in Soil of— (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Includes rows for Average 7 a. m., Average 12 noon, Average 7 p. m., Highest, Lowest, Number of days with temperature.

† And other dates. \* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour. Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

month. The only precipitation of consequence after the 5th was in the form of scattered showers and thunderstorms in the western half on the 19th-20th and in the eastern half on the 30th-31st.

The month was very favorable from the agricultural standpoint. As in 1943 the month of September found enormous crops of corn and soybeans in danger of being caught by severe frost before maturity. However, the weather during September was favorable and on October 1 about 76% of the corn crop was judged to be safe from frost.

However, on the average date of October 10, when the first killing frost occurred, the Iowa corn crop had an average moisture content of 33.4%, or 4.6% greater than in any other year during the past 17 years that tests have been made by the Weather Division of the Iowa Department of Agriculture. The

next wettest years were 1935 with 28.8%, and 1929 with 28.1%, while last year's average was 27.2%. Practically the entire crop was too wet for cribbing and only one sample out of 369 was dry enough to be classed in a commercial grade.

While a little corn was "snapped" for feed and some was shocked for fodder, there was very little husking done until near the close of the month. During the last week, considerable progress was made in the drier northern and western areas but less than 15% of the husking had been completed by the end of the month.

Cutting and combining of soybeans made very good progress and most of the beans were harvested in the north, and the work was nearing completion in the southern counties by November 1.

Winter wheat was seeded under favorable conditions and much was up to good stands in the south and west. There was a great deal of fall plowing and in many cases soybean fields were plowed immediately after the beans were harvested. Pastures were generally in good condition.

Canning factories put up sweet corn and tomatoes until the occurrence of frost but the tomato pack was short because of earlier unfavorable weather.

The U. S. Department of Agriculture estimated the corn crop at 618,357,000 bushels, the second largest of record, and exceeded only by 640,740,000 bushels in 1943. Soybeans were estimated at 40,340,000, the largest of record and more than a million bushels larger than the previous record of 39,332,000 bushels in 1939.

S.E.D.

TEMPERATURE

The average temperature, computed from the averages of nine districts of almost equal area and based on reports from 124 temperature observing stations was 53.8°. This was 2.0° higher than the average of all the Octobers of record, and 2.2° warmer than October, 1943. There have been 24 warmer and 47 cooler Octobers. It was warmest in the south central district and coolest in the northeast, but the departures from the adopted normals were greatest in the northwest and least in the east central section. The highest station average was 57.8°, at Keokuk, and the lowest, 49.9°, at Decorah. The highest observed was 84° at Missouri Valley and Onawa, on the 31st; the lowest, 18°, at Decorah on the 22d. The average number of days with minimum temperatures of 32° or lower was 5.

PRECIPITATION

The average total precipitation, determined from the averages of nine districts of approximately equal area and based on measured totals at 127 stations, was 1.08 inches, or 1.27 inches less than the all-time average. There have been but 5 drier Octobers during the 72 years for which State records are available. Amounts were greatest in the southeast district and least in the northwest, with only a few scattered stations in the extreme southeast reporting amounts in excess of normal. The heaviest monthly fall of 3.33 inches, was reported from Donnellson with 3.22 inches at Mt. Pleasant. The least total was 0.20 inch at Forest City. The greatest 24-hour fall amounted to 2.25 inches at Burlington, on the 1st-2d. No snow was reported during the month. The average number of days with measurable precipitation was 4, or 2 less than normal.

MISCELLANEOUS PHENOMENA

- Aurora: 14th, 15th.
- Corona: 23d, 24th, 25th, 26th, 27th, 30th, 31st.
- Fog, light: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22d, 23d, 24th, 26th, 27th, 28th, 29th, 30th, 31st.
- Fog, dense: 1st, 2d, 3d, 4th, 5th, 6th, 10th, 11th, 12th, 16th, 17th, 22d, 23d, 26th, 29th, 30th, 31st.
- Frost, killing: 8th, 9th, 10th, 12th, 15th, 16th, 20th.
- Hail: None.
- Halo, lunar: 24th, 26th, 27th, 28th, 30th.
- Halo, solar: 19th, 23d.
- Parhelia: 25th.
- Thunderstorm: 1st, 2d, 4th, 5th, 19th, 20th, 30th, 31st.

ERRATA

- Report for June, 1944. Page 60, Kanawha, precipitation amount on 11th published ....., should be .41; total published 3.27, should be 3.68.
- Report for July, 1944. Page 75, Vinton, total precipitation published 3.32, should be 4.02; departure published -1.38, should be -0.68. Page 76, Cedar Falls, precipitation on 25th published .55, should be 2.55. Page 77, Vinton, total precipitation published 3.32, should be 4.02.
- Report for August, 1944. Page 89, heading, "Days of Month," 1 to 11, printed upside down and in reverse; daily amounts at stations appear in correct chronological order.
- Report for September, 1944. Page 99, Fairfield, number of days with 0.01 inch or more of precipitation published \*2, should be 12.

DAILY EVAPORATION (Inches) AND WIND MOVEMENT (Miles) FOR OCTOBER, 1944 (24 hours ending at 6:30 p. m.)

Station	Data	Day of Month																															Sums
		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	
Ames	Evaporation.....	.082	.028	.018	.011	.046	.117	.183	.119	.110	.103	.127	.130	.120	.156	.128	.095	.146	.084	.113	.032	.109	.117	.137	.140	.162	.117	.142	.135	.108	.147	.093	3.241
	Wind Movement...	61	90	51	51	90	38	64	58	45	27	62	66	55	42	47	16	44	53	64	23	44	63	98	55	66	27	51	75	36	70	53	1,685
Cherokee	Evaporation.....	.092	.006	.003	.007	.054	.134	.203	.115	.085	.081	.103	.144	.103	.110	.055	.144	.140	.098	.077	.034	.074	.096	.148	.124	.118	.101	.126	.152	.108	.101	.120	3.056
	Wind Movement...	79	41	29	34	48	95	111	80	24	117	28	99	41	19	35	23	75	64	37	14	31	100	144	59	51	20	70	73	39	67	57	1,804
Clarinda	Evaporation.....	.044	.017	.008	.012	.061	.158	.214	.184	.034	.131	.112	.127	.128	.113	.133	.094	.192	.139	.134	.002	.044	.149	.156	.114	.122	.140	.131	.118	.122	.022	.155	3.310
	Wind Movement...	37	43	23	29	94	86	63	61	33	41	77	58	66	37	34	13	54	78	26	15	24	27	113	35	25	10	33	31	16	37	53	1,372
Ia. City	Evaporation.....	.040	.034	.020	.007	.113	.092	.188	.073	.097	.053	.101	.095	.105	.117	.093	.079	.099	.098	.117	.061	.111	.108	.086	.094	.142	.117	.091	.097	.077	.065	.099	2.769
	Wind Movement...	22	39	27	21	58	27	51	56	55	21	33	21	29	32	20	11	26	34	40	14	37	39	57	28	46	27	28	28	18	32	44	1,021

For precipitation and temperature data, see tables on other pages of this publication.

†Monthly total evaporation includes interpolation for missing days.

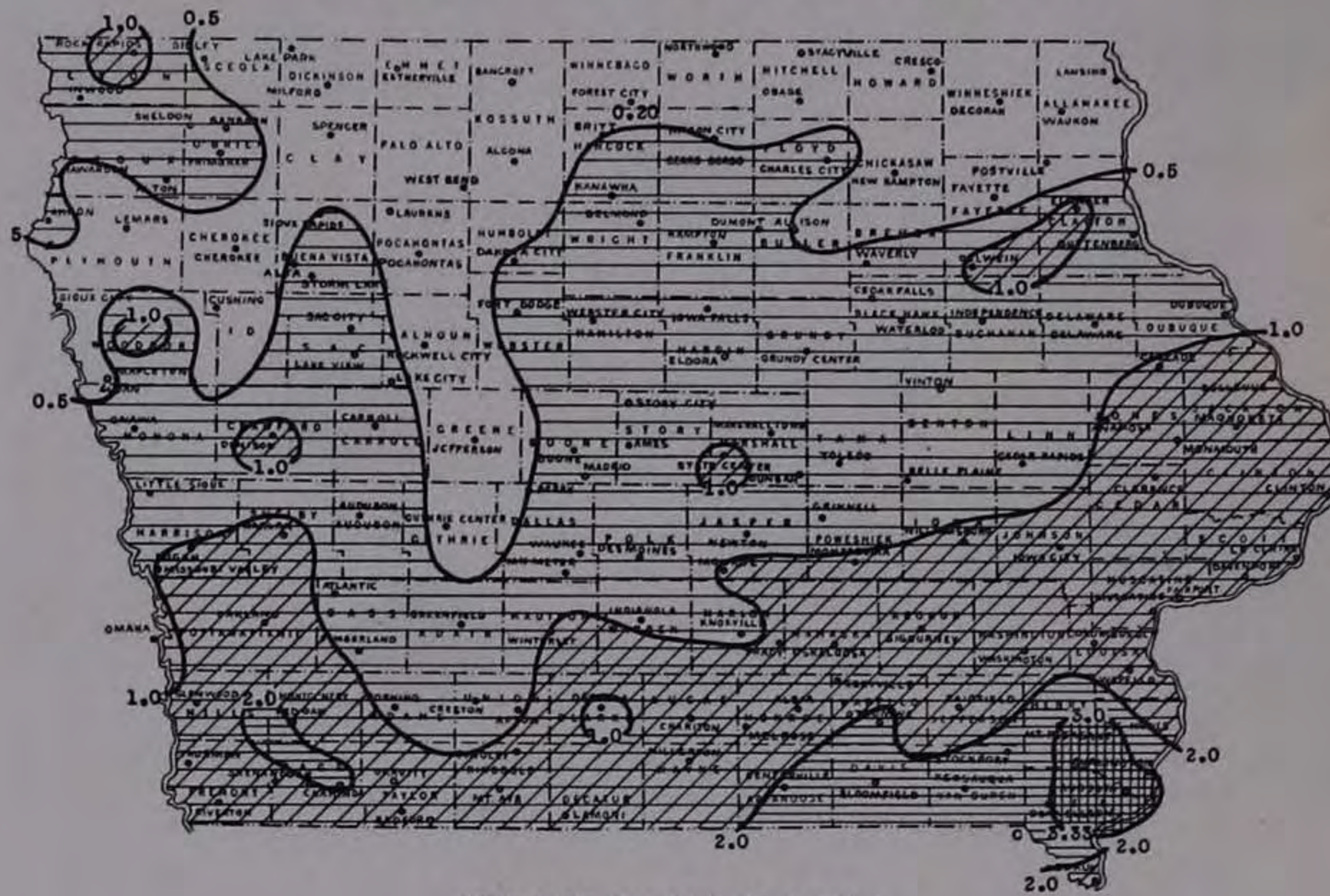


DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF OCTOBER, 1944—Continued

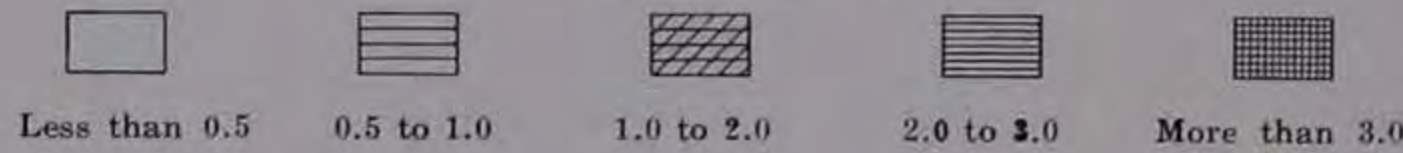
Table with columns for Stations, days 1-31, and Mean. Rows are categorized by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes maximum and minimum temperatures for each day.

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.

TOTAL PRECIPITATION, OCTOBER, 1944



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

**11**

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LV DES MOINES, IOWA, NOVEMBER, 1944 No. 11

## GENERAL SUMMARY

Cloudier weather and warmer than normal temperatures prevailed over the entire State during November, 1944, while precipitation was below normal in all sections of the State except the southeast quadrant which had excessive rainfall. The amounts recorded in the southeast, south and east central sections brought the State average to 0.12 inch above normal despite the deficiencies reported from the other six sections. The average temperature of 40.4° was 4.0° above the 72-year normal, while the average of 20 cloudy days is 10 days higher than the average for 53 previous years. The average number of clear days, 3, is the lowest of record, comparing with a normal of 13 and a previous low of 7 days in 1927. There have been only 6 Novembers since 1900 with less than 10 clear days. Snowfall averaged 2.6 inches over the State, and was normal. No destructive storms occurred during the month and the lowest temperature a reading of zero at Inwood, was reported on the 30th.

The month began with one of the warmest November days of record. Most stations reported temperatures in the 70's for the daytime hours, with some reporting 80. An invasion of cold Polar Continental air sent minimum temperatures below freezing on the 3d in the northern part and over the entire State on the 4th. Heavy rains fell over the southeastern quarter of the State, on the 2d and 3d, with totals generally above an inch. Elsewhere falls were lighter with the northwest section reporting virtually no rain. Rainfall was scattered throughout the State from then until the 25th and 26th when the first general snow of the season fell. Snowfalls of 2 to 3 inches were general in the northern two-thirds of the State and some was reported in all sections.

An invasion of warm Gulf air, on the 12th, gave a period of unusual warmth with temperatures reaching the 70's in all sections and several stations reported the highest temperature of the month on the 13th.

Following the snowstorms of the 25th and 26th, an outbreak of Continental Arctic air brought the first real winter weather with temperatures below freezing generally over the entire State and low readings of zero to 10° above over the northern half and only slightly higher in the southern half reported on the morning of the 30th. Some of the precipitation of the 26th was in the form of freezing rain resulting in dangerous driving conditions on the 27th.

Farm work progressed quite satisfactorily during the month with around 85% of the corn husked, the soybean crop

### COMPARATIVE DATA FOR NOVEMBER, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873	36.2	64	-4	0.72					
1874	32.9	74	-6	2.21					
1875	30.1	60	-16	0.19					
1876	31.3	68	-6	1.70					
1877	33.3	82	-10	1.86					
1878	39.7	72	12	0.63					
1879	36.3	75	4	4.08					
1880	25.3	68	-12	1.29					
1881	34.4	65	-1	2.01					
1882	37.5	76	4	1.71					
1883	36.8	70	-3	1.44					
1884	35.6	68	-15	0.79					
1885	36.4	67	14	0.69					
1886	32.1	75	-4	1.49					
1887	35.1	78	-25	0.85					
1888	37.1	82	0	1.56					
1889	33.0	68	-9	1.44					
1890	38.9	78	-2	1.31					
1891	30.5	84	-24	1.70					
1892	33.3	70	-3	1.10	1.8	4	11	8	11
1893	34.0	86	-13	1.17	4.6	4	16	8	6
1894	32.7	72	-5	0.92	0.4	4	9	11	10
1895	34.3	86	-12	1.51	4.9	6	9	8	13
1896	29.6	82	-15	1.83	2.9	6	9	8	13
1897	34.3	81	-19	0.66	1.2	5	12	8	10
1898	32.2	78	-17	1.50	8.7	6	14	8	8
1899	43.9	86	8	1.20	0.5	5	12	8	10
1900	33.5	79	-6	1.06	3.7	6	12	7	11
1901	35.8	77	2	0.86	2.6	3	18	6	6
1902	41.2	79	4	2.13	1.8	7	9	7	14
1903	34.2	76	-5	0.52	1.1	3	13	8	9
1904	41.0	80	4	0.15	0.5	1	20	6	4
1905	38.4	70	-12	2.84	0.6	5	16	7	7
1906	35.4	76	-5	2.03	4.4	8	9	7	14
1907	36.7	68	-4	1.03	0.9	4	17	6	7
1908	39.3	80	5	1.56	1.4	5	14	7	9
1909	42.4	84	-3	5.39	6.8	10	10	7	13
1910	33.4	76	5	0.34	0.7	3	13	9	8
1911	29.9	79	-8	1.42	1.6	6	11	8	11
1912	40.1	77	6	0.98	T.	2	18	8	4
1913	44.1	78	10	1.18	0.4	6	11	7	12
1914	41.0	80	-4	0.22	T.	2	19	6	5
1915	40.2	83	-5	1.94	1.2	6	11	10	9
1916	37.3	80	-8	1.61	3.6	5	16	6	8
1917	40.7	77	3	0.28	1.4	3	14	6	10
1918	39.9	76	0	2.11	4.4	7	13	5	12
1919	33.6	68	-12	3.40	6.3	8	11	7	12
1920	35.4	71	5	2.18	1.2	8	10	5	15
1921	33.6	70	-5	0.58	3.4	5	10	5	15
1922	42.2	74	11	3.54	0.3	9	11	6	13
1923	40.1	72	9	0.58	1.2	3	16	6	8
1924	38.9	82	0	0.58	0.4	4	15	7	8
1925	36.1	68	-6	0.71	4.0	4	15	6	9
1926	32.6	71	-3	2.10	4.2	7	8	7	15
1927	37.7	81	0	0.87	0.6	5	7	6	17
1928	38.7	70	8	3.83	6.9	9	13	4	13
1929	32.3	66	-12	1.24	2.7	6	13	8	9
1930	41.3	79	-16	2.12	1.1	5	17	6	7
1931	43.9	81	1	5.76	1.6	12	10	5	15
1932	33.2	68	-5	1.55	3.8	4	13	8	9
1933	37.9	83	-7	0.31	1.2	3	13	8	9
1934	41.9	79	11	5.03	7.2	10	12	4	14
1935	34.0	73	-7	2.70	1.8	8	8	5	17
1936	35.5	77	-5	0.66	2.3	4	16	7	7
1937	33.9	82	-17	0.72	5.2	4	15	7	8
1938	37.6	83	-8	2.76	3.1	6	15	8	7
1939	39.9	74	9	0.51	T.	3	17	6	7
1940	33.6	78	-12	2.45	5.0	8	10	6	14
1941	40.0	78	2	1.71	2.6	5	13	5	12
1942	38.8	80	-10	1.76	5.1	8	11	7	12
1943	33.8	72	1	1.01	3.1	4	12	8	10
1944	40.4	81	0	1.73	2.6	8	3	7	20
<b>Period</b>	36.4	86	-25	1.61	2.6	6	13	7	10

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

all harvested and considerable fall plowing done. High moisture content of the corn increased the danger of spoilage in view of the warm weather and may result in further loss in the cribs next spring.

L. R. F.

CLIMATOLOGICAL DATA FOR NOVEMBER, 1944

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.

CLIMATOLOGICAL DATA FOR NOVEMBER, 1944

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures in Degrees Fahrenheit (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation, in inches (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS. The table is divided into several districts: Central, East Central, Southwest, South Central, and Southeast.

Temperature and precipitation normals are based mainly on the averages for 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion will be published as soon as the normals for all months have been completed.

State departures from normal are based on the averages for the entire period of record beginning with 1873 and must necessarily differ slightly from average station departures based on 45 years of record.

Figures and letters following stations indicate distance in miles and direction of station from the City P. O., unless otherwise indicated.

T. Trace or 0.005 inch or less.

‡ Data interpolated.

† Partly interpolated.

‡ And other dates.

† Not included in means and summaries.

\*Best available used for stations not equipped with recorders.







DAILY PRECIPITATION FOR NOVEMBER, 1944—Continued

Table with columns: Stations, Drainage Basin, Day of Month (1-31), Totals. Rows include Southeast District (Continued) stations like Donnellson, Eddyville, Fairfield, etc.

Except as otherwise indicated, amounts are for 24-hours ending late in afternoon.

- 1 Midnight to midnight.
2 Measured in the morning; for the preceding 24-hours.
T Trace or 0.005 inch or less.
\* Included in next measurement.
\*\* Incomplete.
† Recording gage.
‡ Windshield on gage.
§ Data interpolated.
¶ Partly interpolated.

SUPPLEMENTAL TABLE, NOVEMBER, 1944 0.53

Table with columns: STATIONS, COUN-TIES, Elevation, feet, length of record, years, Precipitation, in inches, No. of Days, Prevailing direction of wind. Includes data for Akron, Cmbrld, Dumont, etc.

Rainfall data for river stations, erosion station and other miscellaneous stations appear in the daily precipitation table only.

†And other dates.
‡Best available used for stations not equipped with recorders.
§Figures and letters following stations indicate distance in miles and direction of station from the city post office, unless otherwise indicated.

PRESSURE, WIND, HUMIDITY, SUNSHINE AND DEGREE DAYS, November, 1944

Table with columns: Stations, Sea-level pressure, extremes—inches, Wind†, Relative Humidity, Degree Days. Includes data for Burlington, Charles City, Davenport, etc.

†True velocities obtained from corrected indicated velocities of 4-cup anemometers began January 1, 1932. See Climatological Data, January, 1932, page 7.

\*Sioux City §Des Moines ||Davenport †And other dates.

SOIL TEMPERATURES AT AMES, IOWA, NOVEMBER, 1944

Table with columns: Temperature, 4 feet above ground, At Depth in Soil of— (1 inch, 6 inches, 12 inches, 24 inches, 48 inches, 72 inches). Rows include Average 7 a. m., Average 12 noon, etc.

† And other dates.
\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m.; a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour. Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain.

TEMPERATURE

A mean temperature for the State of 40.4°, was derived from the averages of nine districts of nearly equal area, which in turn were based on the averages of 127 temperature reporting stations.

Inwood reported the lowest temperature in the State, zero on the morning of the 30th, while the highest temperature, 81°, was reported at Fairfield, on the 1st.

Temperatures remained below freezing an average of 4 days during the month, the four days generally being the 27th to the 30th. An average of 13 days had minimum of freezing or below.

## PRECIPITATION

Average precipitation ranged from less than an inch in the north central section to over 3.50 inches in the southeastern section. The State average, computed from the averages of nine districts, which in turn were based on the measured total of 129 stations, was 1.73 inches, or 0.12 inch above normal. Heavy rains occurred at Washington 3.00 inches and at Fairfield, 2.50 inches, on the 3d. Measurable precipitation occurred on an average of 8 days during the month with the southeast section reporting the highest, 11 days, and the northwest section the lowest, 6 days. Washington reported the greatest monthly amount, 5.18 inches, while Clarion, with 0.46 inch, had the least.

## SNOWFALL

Snowfall was heaviest in the west central section, ranging from 9.0 inches in Shelby County to 2.0 inches in Monona County. Over the remainder of the State, falls of from 1 to 4 inches were reported except in the southeastern portion where falls were generally under one inch.

## OTHER ELEMENTS

Degree days were below normal for the State as a whole, averaging 736 for the month against a normal of 784. Of the reporting stations, Sioux City reported the highest total, 833, and Davenport, 670, the lowest. Sunshine percentages were considerably below normal, averaging 23% for the State against a normal of 50%. Des Moines reported the highest percentage, 33, or 40% below normal. Relative humidities were high at all observations, averaging 70% or above at all reporting stations at the noon observation against a normal of 64. Winds were prevailing northwest in all sections although a considerable number of stations reported prevailing southeast winds with a scattering of other directions. Maximum wind velocity, 31 miles an hour, was reported on the 30th by Davenport, from the northwest. Barometric pressure was high over the State through the month, the lowest being reported from Sioux City, 29.42 inches, on the 13th.

## MISCELLANEOUS PHENOMENA

*Aurora*: None.

*Corona*: 3d, 27th.

*Fog*, heavy: 6th, 12th, 14th, 18th, 24th, 26th.

*Fog*, light: 2d, 4th, 5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 22d, 23d, 24th, 25th, 28th, 29th.

*Hail*, light: 13th, 14th.

*Halo*, lunar: 2d, 3d.

*Halo*, solar: 1st.

*Thunderstorms*: 1st, 2d, 3d, 6th, 7th, 8th, 9th, 12th, 13th, 14th.

## ERRATA

Report for September, 1944. Page 98, Sac City, date of minimum temperature published 29, should be 24+. Page 99, Creston, date of greatest precipitation published 20-21, should be 20; Keosauqua, date of minimum temperature published 29, should be 22+. Page 100, Le Mars, total precipitation published 2.32, should be 2.33; Sheldon, precipitation on 9th published .05, should be .07. Page 101, Melrose, precipitation of .15 on 5th, should be on 6th.

## AUTUMN, 1944

Above normal temperatures and below normal precipitation distinguished the fall months of 1944. September temperature averaged 0.4° above normal, October, 2.0°, and November 4.0°. Rainfall was deficient 1.53 inches in September, 1.27 inches in October, and was below normal in November in all except the southeastern quarter of the State, though for the State as a whole, the average was 0.12 inch above normal.

"A fine fall" was the usual remark characterizing the autumn months in Iowa. No destructive storms occurred and weather conditions were generally favorable throughout the period for farm activities which included harvesting one of the biggest corn crops of record. Owing to much late planting of corn, about 10% of the crop was injured by the killing frosts that occurred over the State during the period October 9th to 12th.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF NOVEMBER, 1944

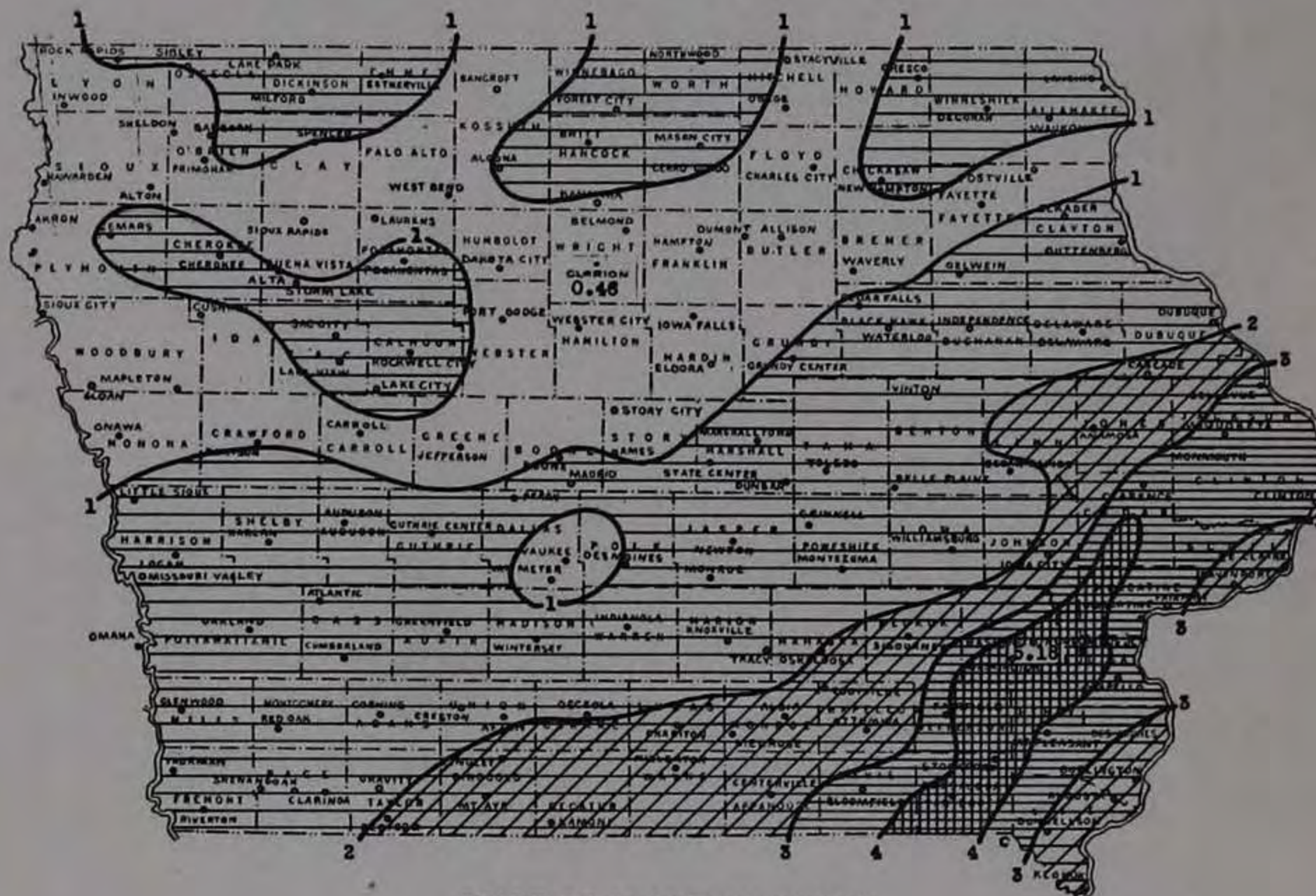
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes maximum and minimum temperature values for each day and a monthly mean.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF NOVEMBER, 1944—Continued

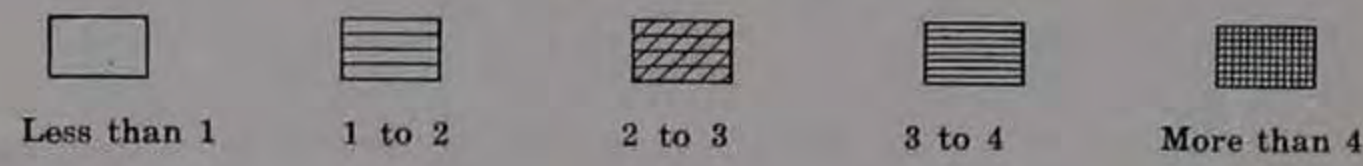
Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District. Each station entry includes Maximum and Minimum temperature values for each day.

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.

TOTAL PRECIPITATION, NOVEMBER, 1944



SCALE OF SHADES IN INCHES



# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with

IOWA DEPARTMENT OF AGRICULTURE

C. D. REED

VOL. LIIV DES MOINES, IOWA, DECEMBER, 1944 No. 12

GENERAL SUMMARY

Below normal temperatures with lots of snow characterized the weather of Iowa during December. Precipitation was only slightly above normal. These conditions were the reverse of December, 1943, which was a warm, dry month. Snow blanketed the State virtually the entire month and as a result frost penetration in the ground has been comparatively shallow despite the intense cold which again was influenced by the snow cover which is favorable to rapid radiation on clear nights, with resulting low temperatures. Owing to the cold and snow, outdoor activities over the State were pretty much at a standstill except for the ice harvest which got off to an early and favorable start with the greatest ice thicknesses in places in years.

The month opened with below normal temperatures as Continental Polar air overspread the State and minimum temperatures of zero to 10° below occurred at most stations in the western two-thirds of the State on the 1st. The Polar air remained for 10 days but temperatures were near normal as cloud cover was rather extensive during this period. Considerable snow fell on the 3d and 4th and again on the 9th and 10th, blanketing the State with a snow cover of from 1 to 10 inches, or more, which remained throughout the month except in the extreme northwest section. A severe cold wave overspread the State on Christmas Day as Continental Arctic air moved in from the north. Temperatures fell rapidly through the night and the lowest readings of the month were reported generally throughout the State on the 26th. Marshalltown had a reading of -25° on that date, and a number of stations reported -20° or lower. Temperatures were generally below normal from the 21st to the 28th with the last three days somewhat more moderate.

L. R. F.

TEMPERATURE

Temperatures over the State, as computed from averages of nine districts of comparable area and 127 observing stations, was 3.6° below the December normal. Sectional averages ranged from 18.1° in the northeast to 23.1° in the southwest. Keokuk reported the highest temperature of the month, 47, on the 4th, and most of the maximum temperatures of the month occurred on this date or the 7th. Minimum temperatures on the 28th were below zero at virtually all stations and maximum temperatures on that date ranged generally below 20° above. Average temperatures were below normal in all districts from about 3 to 6 degrees, except in the northwest where they were just below the section mean.

PRECIPITATION

Average moisture amounts from 130 stations, selected as are those for temperature, gave a total of 1.29 inches for the State, which is 0.11 inch above normal. Sectionally the southeastern part of the State was wettest, and the northwestern

COMPARATIVE DATA FOR DECEMBER, 1944

YEAR	Temperature			Precipitation		Number of days			
	Average	Highest	Lowest	Average	Average snowfall	Precip. .01 in. or more	Clear	Partly cloudy	Cloudy
1873.....	22.6	65	-10	2.51					
1874.....	24.0	60	-18	0.84					
1875.....	30.0	68	-18	2.06					
1876.....	11.9	56	-28	0.24					
1877.....	36.8	65	-11	2.18					
1878.....	17.2	52	-17	0.77					
1879.....	16.1	58	-35	1.40					
1880.....	16.1	55	-25	0.85					
1881.....	33.8	60	-10	1.24					
1882.....	21.0	54	-23	1.57					
1883.....	24.8	62	-24	1.03					
1884.....	16.2	59	-30	2.15					
1885.....	24.6	55	-22	1.45					
1886.....	14.4	55	-32	0.80					
1887.....	20.3	57	-25	2.17					
1888.....	28.6	66	-6	1.46					
1889.....	35.8	69	-2	1.06					
1890.....	28.5	68	-18	0.58					
1891.....	32.3	62	-14	2.41		6	14	9	8
1892.....	18.9	68	-29	1.65	10.9	8	9	8	14
1893.....	22.0	66	-21	1.31	7.6	7	10	9	12
1894.....	30.1	73	-17	0.95	1.3	3	15	6	10
1895.....	25.4	63	-16	1.63	4.1	5	11	9	11
1896.....	30.8	66	-10	0.65	1.6	4	10	8	13
1897.....	18.0	50	-25	1.65	15.9	6	11	7	13
1898.....	18.1	60	-25	0.48	3.9	3	15	8	8
1899.....	22.6	61	-19	1.61	4.3	5	12	9	10
1900.....	26.9	63	-10	0.45	2.4	4	13	6	12
1901.....	20.5	64	-31	0.93	5.4	6	10	9	12
1902.....	20.1	59	-20	2.23	12.9	8	9	6	16
1903.....	19.6	58	-27	0.41	3.7	4	11	9	11
1904.....	23.4	67	-19	1.44	12.3	5	12	7	12
1905.....	27.0	62	-11	0.52	4.2	3	19	6	6
1906.....	25.7	65	-9	1.43	1.4	6	11	7	13
1907.....	28.8	62	-9	1.00	4.7	5	10	7	14
1908.....	27.2	67	-17	0.57	3.8	3	15	8	8
1909.....	15.1	60	-26	2.18	13.7	11	10	5	16
1910.....	23.4	57	-14	0.37	3.0	3	15	7	9
1911.....	27.9	60	-24	2.57	12.6	7	13	6	12
1912.....	29.2	64	-13	0.74	1.1	3	18	7	6
1913.....	32.0	65	-13	1.02	1.3	4	15	5	11
1914.....	15.7	63	-31	1.30	11.1	9	10	6	15
1915.....	25.0	56	-10	0.69	4.6	5	11	8	12
1916.....	18.7	67	-25	1.04	6.7	6	15	8	8
1917.....	14.5	62	-40	0.56	6.7	6	10	9	12
1918.....	32.7	68	-7	1.30	5.1	8	9	8	14
1919.....	15.0	52	-36	0.54	5.8	4	11	7	13
1920.....	26.4	65	-26	1.16	7.4	5	10	8	13
1921.....	28.2	69	-22	1.02	2.9	4	14	9	8
1922.....	24.0	65	-25	0.37	2.2	3	16	7	8
1923.....	33.5	68	-21	0.76	4.4	4	14	6	11
1924.....	15.4	62	-33	1.79	8.1	8	12	6	13
1925.....	21.0	64	-25	1.30	10.6	5	12	8	11
1926.....	21.9	58	-21	1.06	5.7	4	10	7	14
1927.....	18.7	59	-22	1.04	4.4	5	13	8	10
1928.....	28.7	57	-15	0.89	2.3	5	12	7	12
1929.....	24.8	65	-13	0.39	3.8	5	12	6	13
1930.....	26.7	65	-10	0.57	3.0	4	12	6	13
1931.....	34.1	61	3	2.48	5.7	8	11	4	16
1932.....	21.9	64	-27	1.44	5.5	5	14	7	10
1933.....	27.1	69	-30	1.05	2.8	5	11	8	12
1934.....	21.5	48	-17	0.57	5.5	5	7	7	17
1935.....	22.4	59	-19	0.95	7.6	8	9	6	16
1936.....	28.7	65	-16	1.55	5.1	5	11	7	13
1937.....	22.8	59	-11	0.74	5.4	6	9	8	14
1938.....	26.3	56	-15	0.71	4.7	5	12	8	11
1939.....	32.4	74	-9	0.62	4.2	4	15	8	8
1940.....	28.4	68	-32	1.36	10.0	6	8	6	17
1941.....	32.1	67	-15	1.91	9.5	7	10	7	14
1942.....	20.3	53	-20	1.59	6.5	7	8	7	16
1943.....	26.2	65	-13	0.52	1.1	2	17	7	7
1944.....	20.6	47	-25	1.29	10.2	7	10	9	12
Period.....	24.2	74	-40	1.18	5.9	5	12	7	12

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

driest. Totals ranged from a trace at Rock Rapids to 3.21 inches at Melrose, the only station to report more than 3 inches. Much of the northwest section received less than a half inch, while the south central and southeast sections averaged about 2 inches.



CLIMATOLOGICAL DATA FOR DECEMBER, 1944

Table with columns: STATIONS, COUNTIES, Elevation, Length of record, Temperatures (Mean, Departure from normal, Highest, Date, Lowest, Date), Precipitation (Total, Departure from normal, Greatest in 24 hours, Date, Total snowfall), Number of days (Precipitation, Clear, Partly cloudy, Cloudy), Prevailing direction of wind, OBSERVERS.





DAILY PRECIPITATION FOR DECEMBER, 1944—Continued

Table with columns for Stations, Drainage Basin, Day of Month (1-31), and Totals. It lists precipitation data for various locations across Iowa and Missouri, categorized into Central, East Central, Southwest, South Central, and Southeast districts.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF DECEMBER, 1944

Table with columns for Stations, days 1-31, and Mean. Rows are grouped by district: Northwest District, North Central District, Northeast District, West Central District, and Central District. Each station entry includes maximum and minimum temperatures for each day.

DAILY MAXIMUM AND MINIMUM TEMPERATURES FOR THE MONTH OF DECEMBER, 1944—Continued

Table with columns for Stations, days 1-31, and Mean. Rows include Central District (Continued), East Central District, Southwest District, South Central District, and Southeast District, listing various Iowa locations 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.



ERRATA

Report for November, 1944. Page 122, Davenport, highest barometric pressure on 5th published 30.43, should be 30.42; lowest published 29.56, should be 29.58. Page 125, Bedford, minimum temperature on 4th published 27, should be 49; Corning, maximum temperature on 4th published 49, should be 27.

*This errata wrong, 49 is correct temperature & is published ok.*

MISCELLANEOUS PHENOMENA

- Fog, light: 1st, 2d, 3d, 4th, 5th, 6th, 7th, 9th, 12th, 14th, 18th, 23d, 24th, 26th, 27th, 29th, 30th, 31st.
- Fog, heavy: 1st, 4th, 5th, 6th, 7th, 29th, 30th, 31st.
- Glaze: 2d, 3d, 4th, 5th, 6th, 7th, 29th, 30th, 31st.
- Halo, lunar: 19th, 26th.
- Sleet: 2d, 3d, 4th, 5th, 15th, 30th.
- Wind, high: 15th.

TOTAL PRECIPITATION, DECEMBER, 1944





# CLIMATOLOGICAL DATA

11

IOWA SECTION

In co-operation with Weather Division

IOWA DEPARTMENT OF AGRICULTURE

H. C. S. THOM, *Director*

LYLE R. FLETCHER, *Editor*

VOL. LV

DES MOINES, IOWA, ANNUAL, 1944

No. 13

GENERAL SUMMARY

Weather conditions were generally favorable to man's activities in Iowa in 1944. With the exception of several severe local storms and rather general floods in May and June, very little damage resulted from weather conditions, which were quite favorable during the growing season for agriculture, although backward conditions prevailed in the spring.

Above normal rainfall during the crop season and favorable temperature distribution gave Iowa a bumper corn crop and heavy production in soybeans, hay crops, pasture and home gardens. The heavy rains and floods of May and June delayed spring planting, washed out many fields already planted, and resulted in serious erosion damage, but despite the lack of help, farmers by working far into the night, were able to plant a record acreage. Owing to the lateness of the planting season considerable anxiety existed during late summer over the possibility of frost damage, but only about 10% of the corn was injured by the general killing frosts which came from the 9th to the 12th of October. High moisture content of the corn has caused some alarm because of danger of spoilage this spring.

Temperatures were normal or above over virtually the entire State; only a few counties in the southwestern part of the State having slightly below normal readings. Departures were within 2.0° or less in all sections, and extreme temperatures were well within the range for the State. Readings of -20 or lower were reported at scattered stations in the northern and western parts of the State once or twice during the year, and temperatures above 100 were rare in the northern half and infrequent in the southern half. The growing season was about 157 days, the last killing frost occurring on May 6,

(on the 5th in the southeast section), and the first in the fall October 9 or 10.

Favorable distribution but excessive amounts of precipitation occurred, particularly during the early crop season. Above normal rain occurred again in August and helped pastures and garden crops. Heavy snows occurred in December to make the year one of the wettest of record. Excess precipitation was reported everywhere except in a narrow belt extending from Wright east to Fayette counties, and including parts of Franklin, Butler, Floyd, Mitchell, Chickasaw and Bremer counties.

Amounts of 12 to 15 inches more than normal occurred at scattered stations in all but the northeast quarter of the State. State Center reported the greatest annual amount, 49.77 inches, and Sioux City the least, 27.12 inches, although Sloan, an unofficial reporting station, had a smaller amount. State Center's rainfall was 17.18 inches above normal, while Sioux City was 1.58 inches above. Snowfall was close to normal for the year as a result of heavy falls in December.

SYNOPSIS BY MONTHS

Unseasonably warm weather characterized January, 1944. The mean temperature of 30.1° was the third highest of record and was 11.4° above the average. Precipitation was normal due to heavy rains on the 26th and 27th but the average snowfall of 0.8 inch was the lowest on record. One of the high readings of record for Iowa in January was reported from Missouri Valley on the 25th, when 70° was reached. This was the highest since 1928 when 70° was reported but was exceeded in 1909 with 72° at Keokuk on the 23d. (A reading of 76° reported from Glenwood on January 29, 1892, is so much out of line with readings elsewhere that it may be considered doubtful.) Many stations in the State set new daily high records. Sixteen stations, mostly in northwest Iowa, had record mean temperatures and monthly maximum temperature records were broken at more than 30 stations. Many stations in southern Iowa reported no measurable snowfall for the first time in history. Thunderstorms were reported on the 26th and 27th.

February weather was a continuation of that experienced in January although somewhat cooler. Temperatures were 4.2° above the 72-year average, while precipitation was normal.

TABLE I—MONTHLY STATE DATA FOR 1944

Month	Barometric pressure inches (sea level)				Temperature degrees, F.				Relative humidity, per cent				Precipitation, inches				Average number of days			Average sunshine		Wind			
	Highest	Date	Lowest	Date	Average	Departure from 72-yr. average	Highest	Lowest	12:30 a. m.*	6:30 a. m.*	12:30 p. m.*	6:30 p. m.*	Average	Departure from 72-yr. average	Greatest	Least	Average snowfall	With .01 inch or more precipitation	Clear	Partly cloudy	Cloudy	Per cent of possible	Departure from normal	Average hourly velocity	Prevailing direction
January	30.76	7	29.53	24	30.1	+11.4	70	-15	80	84	64	67	1.06	-0.03	2.24	0.15	0.8	2	16	9	6	62	+11	8.7	sw
February	30.73	12	29.19	26	26.7	+4.2	68	-30	81	86	70	73	1.10	+0.02	2.42	0.41	6.7	6	11	9	62	+6	9.1	nw	
March	30.58	9	29.26	6	30.3	-4.2	67	-7	82	84	71	73	2.58	+0.85	5.20	0.57	11.9	12	7	8	16	50	-8	11.4	nw
April	30.56	28	29.15	14	45.0	-5.9	78	14	81	86	65	65	4.55	+1.83	8.62	1.58	0.4	13	8	7	15	43	-15	10.4	ne
May	30.41	10	29.42	3	64.6	+4.4	95	23	82	86	62	62	6.13	+2.06	14.65	2.96	0.3	15	9	13	9	54	-8	8.8	se
June	30.43	29	29.31	3	71.7	+2.0	101	38	80	82	61	61	5.88	+1.19	11.93	1.56	0	10	12	11	7	62	-7	9.8	s
July	30.26	4	29.49	26	72.6	-2.0	98	42	77	79	51	52	3.73	+0.05	8.81	0.93	0	10	17	11	3	76	0	7.6	s
August	30.32	18	29.58	30	71.8	-0.4	102	41	82	86	60	62	5.88	+2.25	8.83	2.23	0	11	16	8	7	69	-1	8.0	se
September	30.42	23	29.57	1	64.3	+0.4	94	31	85	89	61	69	2.25	-1.53	4.12	0.29	0	8	12	10	8	62	+1	7.4	s
October	30.65	15	29.68	5	53.8	+2.0	84	18	78	85	51	60	1.08	-1.27	3.33	0.20	0	4	21	4	6	73	+14	7.4	nw
November	30.57	30	29.42	13	40.4	+4.0	81	0	83	86	74	78	1.73	+0.12	5.18	0.46	2.6	8	3	7	20	23	-27	9.6	nw
December	30.77	2	29.71	15	20.6	-3.6	47	-25	85	86	72	79	1.29	+0.11	3.21	T.	10.2	7	10	9	12	43	-2	9.1	nw
YEAR	30.77	Dec. 2	29.15	April 14	49.3	+1.2	102	-30	81	85	64	67	37.26	+5.65	14.65	T.	32.9	106	142	106	118	57	-3	8.9	nw
Averages and records	31.09	Jan. 25 1905	28.68	Jan. 3 1906	48.1	.....	118	-47	.....	80	59	65	31.61	.....	19.80	0.00	30.0	87	167	98	100	60	.....	8.6	nw

\*Central standard time.

The State average temperature was 26.7° against January's 30.1°, and was not in such great contrast to the normal as the preceding month. Fairfield reported the maximum temperature, 68° on the 25th, and Hawarden the lowest, -30° on the 12th. Precipitation fell mostly in the last two decades of the month, with the heaviest fall around a half inch occurring on the 25th and 26th. Snowfall was exactly average at 6.7 inches. Thunderstorms and hail were reported on the 25th and 26th.

Wet, cloudy, cold, disagreeable weather, occurred in March and delayed early spring outdoor activities. The mean temperature of 30.3° was about the same as January and the heating requirements were as great or more so. It was the coldest March since 1932 but the low reading of -7° at Delaware on the 9th was 12° higher than the low reading of March, 1943. The high reading of 67° at Muscatine on the 24th was the lowest since 1931. Precipitation was almost an inch above normal and the snowfall of 11.9 inches has been exceeded by only three years, the last time in 1923. Gray snow fell on the 7th at many points over the State. The Editor observed the unusual phenomena walking on the college campus at Ames. It was the result of dust in the air from a duststorm to the west settling on the snowflakes while they floated toward the earth.

A continuation of the cold, cloudy, wet, disagreeable weather of March, occurred during the greater part of April, with temperatures nearly 4° below normal and precipitation about 2 inches above the mean. The highest reading for the month was 78° at Keosauqua on the 30th, and the low was 14 at Onawa on the 5th. It was the lowest maximum reading since 1875 although equaled in 1920. Much lower minimum temperatures have been recorded, however. The unfavorable weather adversely affected farm operations and the delay eliminated the planting of much acreage planned for oats. Snowfall was light but precipitation occurred almost every day from the 6th on and was especially excessive in the southern third of the State.

May was warmer than usual, reversing the trend of the previous spring months, but precipitation again was 2 inches above the average. A number of destructive storms occurred during the month and the damage by wind, hail, flood, lightning and heavy rain, amounted to many millions of dollars. The State lost more than \$150,000,000 of top soil by excessive erosion. Destructive floods occurred along the Des Moines, Raccoon and Skunk rivers, resulting in serious damage and the loss of several lives. Tornadoes occurred at widely scattered points over the State, killing several and injuring many and destroying several million dollars worth of property. A total of 8.21 inches of rain fell on the 18th and 19th at Ames, and the precipitation for the month at State Center was 14.65 inches. The last killing frost occurred on the 6th but owing to the previous cold spring weather little damage was done.

June weather was a repetition of May with many severe rainstorms, floods, tornadoes, hail and electrical storms. Destructive floods occurred again along the Des Moines and Raccoon rivers and also along the Floyd, Big Sioux, Maquoketa, Wapsipinicon and Mississippi rivers. Several severe tornadoes occurred in Sioux County on the 16th. Temperature was 2° above normal, which aided crop growth for those fields which were planted and not washed out. Precipitation for the State was an inch above normal with the excess mostly in the first part of the month. A total of 7.55 inches fell at Clarence on the 25th-26th.

Temperatures in July were below normal and precipitation average in 1944. No readings of 100° or higher were reported for the State, and the cool weather during the last half of the month aroused fears that the many crops planted late because of adverse weather would be caught by frost. The month had its usual quota of destructive storms, and floods developed along the Floyd River and Perry Creek at Sioux City.

August was unusually wet, the State average being more than 2 inches above normal, and exceeded only three times in 40 years. Temperatures were about normal and the high of 102° was close to the median. Damage from local storms was of minor importance, and although stream flow remained high in the State, no destructive floods occurred.

September was warm and dry and crops in general made good progress toward maturity. Cloudiness was greater than usual but plenty of sunshine occurred to push the crops along. Storm damage was slight. Temperatures ranged from around freezing to 94° above, and heating requirements were small.

Warm, sunny weather gave October a temperature average 2° above normal but precipitation was an inch deficient. The month closed with an unusual warm spell that gave the highest readings at most stations from the 28th to the 31st. The month was favorable for agriculture but vegetative growth ceased over the State in the period from the 8th to the 12th when general killing frosts occurred. Considerable fog was reported over the State, much of it heavy.

Cloudy, warm, dry weather, continued through November, and gave Iowa one of the nicest autumns on record. Some gloom was cast by the unusually cloudy month, which had a State average of 20 cloudy days. Record high temperatures occurred at many stations on the opening day and the lowest readings occurred generally on the 30th. Snowfall was normal.

December closed out the year by giving Iowa considerable stormy weather. Temperatures were well below normal, snowfall was far above normal, and a cold wave swept in Christmas night to give readings of -20° or lower at many points in the State. Normal precipitation occurred.

#### WARM SEASON PRECIPITATION

Positive departures from normal were reported by all districts for warm season precipitation in 1944. The northwest district average was 9.09 inches above normal, while the east central section was lowest with 3.45 inches positive departure. The precipitation was unusually well distributed through the growing season and much of the dry weather came at periods which were not critical as far as affecting plant growth.

—LYLE R. FLETCHER.

#### REED RETIRES.

The year 1944 brought to a close one of the eventful careers of the U. S. Weather Bureau. On Saturday, December 2, at noon, Mr. Charles Dana Reed, a native of Carroll County, retired as Section Director for Iowa after 28 years and after 45 years of Government service. Mr. Reed succeeded George M. Chappel as Section Director in 1918, and during the ensuing years his name became as familiar to Iowans as possibly any name in the local history of the State. Mr. Reed's retirement was officially effective on February 28 but the interim was accounted for by accumulated annual leave. Mr. Reed has accepted appointment as Research Professor in Agronomy at the Iowa State College at Ames, where he plans to continue his study of the effect of weather on crops. He is now residing in Ames. He was succeeded as Section Director by H. C. Thom of Washington, D. C.

#### RESEARCH UNIT ESTABLISHED

Research in climate and crop weather was initiated at Iowa State College during the year. During the fall of 1943 six students of weather from Latin-American countries matriculated at Ames, expenses arranged for by the State Department. In January the Editor, Mr. Fletcher, came from Washington to Ames to lecture on climate to these students and to investigate a rainfall station density network in collaboration with the Statistical Laboratory of the college. The Ames project is under the supervision of the Des Moines office, and Mr. Thom divides his time between the two offices.

STORMS OF 1944

By S. E. DECKER

The near average temperature and above normal precipitation that were so instrumental in producing Iowa's bumper crops in 1944 were also the occasion for widespread storms and floods that hampered farmers in the big job of food production and caused much inconvenience and loss.

Detailed summaries of most destructive storms have already appeared in the appropriate monthly editions of Climatological Data and complete statistics of hail loss will not be available until well on toward the middle of 1945. Likewise final figures of the damage caused by floods await harmonizing of reports from many agencies. Nevertheless, a brief resume of the destruction caused by weather phenomena may be of interest.

Damage caused by hail was unusually difficult to estimate because of the fact that in nearly all cases it was attended by loss from wind and flood and the proportion directly chargeable to any one cause could not be easily segregated from the others. Many hailstorms occurred in areas where crops had already been "flooded" out or in some cases before delayed planting had occurred. Estimates based on reports of insurance companies and other agencies and from answers to direct questionnaires placed the amount at around \$7,000,000, which is more than twice the normal amount but only a little more than half that of the record hail damage year of 1943.

Floods occurred on both the Missouri and Mississippi rivers as well as on most interior streams. The Des Moines, Raccoon and Skunk rivers reached the highest stages since 1903. But the greatest loss occurred on smaller streams following excessively heavy downpours of rain that turned large sections of farm land into small lakes or flooded basements and overtaxed sewers in cities. Among such downpours were the heavy rains in central Iowa on May 18th-20th, when Ames, Marshalltown, Guthrie Center, Howe, Arbor Hill and other communities were affected, and washed out tracks caused train wrecks near Fernald and Casey.

Similar floods occurred in southwest counties and also near Dubuque on June 12. On June 25th-26th, millions of dollars of loss occurred in east central counties as the result of torrential rains and floods. The towns of Wyoming, Monmouth, Viola, Stanwood, Oxford Junction, Cascade, Oxford Mills, Clarence, Lowden and Hurstville were among those affected. Larger streams also overflowed and the Cedar, Maquoketa and Wapsipinicon rivers were at high stages. On July 6th-7th, large sections of Sioux City suffered damage totalling three-quarters of a million dollars as Perry Creek overflowed following excessive rains. About 1,200 residences and 350 business properties and 1,161 families were affected.

As usual, tornado and windstorms took the spotlight because of their spectacular nature but while they caused considerable damage the combined loss from wind and tornadoes was much less than that from floods and hail. Although there was some wind damage on April 21, the first funnel cloud of the season was observed on May 2.

On May 18 numerous destructive tornadoes occurred. The first developed in Nebraska and crossed the Missouri River into Monona County, Iowa, about 2:30 p. m. The storm was attended by some hail and locally heavy rain.

The second of this series formed in Woodbury County about 4 p. m. and crossed into Cherokee County. Another storm, probably a secondary development of one of those already mentioned, struck in Ida County.

Still another "twister" developed in western Iowa in Crawford County, moved into Sac County and disappeared only to redevelop in Pocahontas County. The loss from this storm in the two counties was over \$325,000 while the earlier ones caused about \$100,000 damage.

TABLE II—COMPARATIVE DATA FOR THE STATE—ANNUAL

Year	Temperature				Precipitation in Inches				
	Average Annual	Highest	Date	Lowest	Date	Average Annual	Greatest annual	Least annual	Average snowfall
1873	46.1	102	August 31	-38	.....	33.92	41.04	23.34	.....
1874	47.7	101	July 5	-24	January 24	30.76	39.76	25.43	.....
1875	43.3	97	July 16	-31	January 14	35.83	48.42	28.55	.....
1876	45.9	96	August 24	-28	December 9	36.65	53.57	19.92	.....
1877	48.4	100	.....	-31	January 8	35.16	49.82	22.52	.....
1878	50.0	104	.....	-13	January 6	34.53	42.08	20.92	.....
1879	48.0	102	.....	-35	December 25	28.23	46.71	16.49	.....
1880	47.9	104	.....	-25	December 27	30.95	51.10	14.90	.....
1881	47.5	104	.....	-40	January 9	44.16	56.81	34.02	.....
1882	48.4	98	.....	-23	December 7	33.40	50.30	17.71	.....
1883	44.8	100	.....	-38	.....	34.54	46.15	18.00	.....
1884	46.0	96	.....	-38	January 5	35.59	46.60	23.35	.....
1885	44.7	102	July 30	-42	January 28	32.23	44.89	17.91	.....
1886	46.4	103	July 13	-34	February 4	24.71	35.48	15.55	.....
1887	46.6	105	July 29	-34	January 7	26.31	38.61	12.30	.....
1888	45.3	110	August 2	-43	January 15	31.44	41.17	20.60	.....
1889	48.0	104	August 30	-28	February 23	24.95	37.61	13.66	.....
1890	47.5	110	July 13†	-27	January 22	29.48	45.45	16.54	.....
1891	47.3	106	August 9	-31	February 4	32.90	49.05	23.48	.....
1892	46.6	104	July 11	-38	January 19	36.58	48.77	24.78	34.2
1893	45.7	102	July 13†	-36	January 14	27.59	33.27	19.19	37.2
1894	49.7	109	July 26	-37	January 25	21.94	29.81	15.65	19.2
1895	47.2	104	May 28	-33	February 1	26.77	35.25	18.57	26.0
1896	48.6	104	July 3	-20	January 4	37.23	51.60	28.68	22.6
1897	47.8	106	July 23†	-30	January 25	26.98	36.18	20.21	38.8
1898	47.7	103	August 20	-25	December 31	31.34	55.47	19.51	40.3
1899	47.3	104	Sept. 6	-40	February 11	28.68	42.06	21.79	23.4
1900	49.3	103	August 3	-27	February 15	35.05	47.33	25.05	25.8
1901	49.0	113	July 22	-31	December 15	24.41	37.69	16.35	38.5
1902	47.7	98	July 30	-31	January 27	43.82	58.80	20.14	28.0
1903	47.2	101	August 24	-27	December 13	35.39	50.53	26.41	19.4
1904	46.3	100	July 17	-32	January 27	28.51	38.93	19.34	29.2
1905	47.2	104	August 11	-41	February 2†	36.56	52.26	24.66	38.3
1906	48.4	102	July 21	-32	February 10	31.60	44.34	20.63	32.8
1907	47.4	102	July 5	-31	February 5	31.61	43.00	19.93	24.0
1908	49.4	101	August 3	-18	January 29	35.09	49.98	24.11	22.7
1909	47.4	103	August 15†	-26	February 15†	40.01	53.48	37.20	49.0
1910	48.6	108	July 16	-35	January 7	19.89	27.99	12.11	23.4
1911	49.5	111	July 3†	-35	January 3	31.37	46.77	19.74	35.3
1912	46.3	104	Sept. 8	-47	January 12	28.65	33.13	15.25	38.0
1913	49.7	108	July 16†	-25	January 8	29.95	45.18	20.31	25.4
1914	49.1	109	July 12	-31	December 26	31.93	44.11	23.30	27.5
1915	47.8	99	May 14	-32	January 28	39.53	51.15	27.29	31.3
1916	47.2	106	August 4	-34	January 13	28.90	46.34	22.48	29.5
1917	44.8	106	July 30	-40	December 29	27.81	36.00	20.78	31.6
1918	49.2	113	August 4	-36	February 4	32.78	47.53	25.03	33.6
1919	48.6	104	July 30†	-36	December 10	36.76	48.16	26.88	26.6
1920	48.2	102	July 23	-26	January 4†	31.75	44.00	20.95	21.7
1921	52.2	104	July 11†	-22	December 25	32.03	46.47	20.44	20.7
1922	50.2	104	June 23	-29	January 6	29.98	44.20	19.08	13.5
1923	49.0	102	July 22†	-23	February 3†	29.50	37.47	21.36	36.3
1924	46.4	100	August 21†	-36	January 5	31.39	43.85	19.41	37.2
1925	48.8	105	July 1†	-25	December 29	28.24	45.53	13.77	29.2
1926	48.3	109	July 19†	-22	January 28	33.07	48.36	22.35	27.8
1927	48.8	102	July 11	-27	January 15	29.35	47.54	18.75	17.9
1928	49.4	100	August 1	-20	January 2	35.96	47.81	24.67	22.5
1929	46.4	102	August 22	-35	February 20	30.20	44.24	20.57	41.8
1930	50.2	113	August 3†	-37	January 22	26.10	35.65	16.15	23.6
1931	53.2	109	July 28	-15	January 21	35.37	49.23	18.20	23.7
1932	48.2	106	July 27	-27	December 16	32.28	48.17	22.67	38.5
1933	50.8	109	June 10	-31	February 8	24.94	35.79	17.28	18.4
1934	51.5	118	July 20	-25	February 27	26.85	37.47	16.77	27.2
1935	48.6	107	July 28	-30	January 23	33.16	52.73	20.79	24.0
1936	48.6	117	July 25	-35	February 16	26.00	33.97	13.83	48.9
1937	47.5	108	June 24†	-30	January 10†	27.60	36.13	17.86	35.8
1938	51.2	107	July 11	-25	January 10	36.29	47.63	25.69	24.9
1939	51.1	113	July 12	-23	February 11	25.16	35.92	14.56	34.1
1940	47.9	110	July 25	-32	December 3	30.66	43.38	20.78	46.4
1941	51.1	106	July 24†	-18	February 19	36.84	49.61	24.00	31.9
1942	48.9	105	July 17	-36	January 4	32.63	46.16	19.28	32.3
1943	47.9	101	June 27†	-31	January 19	31.20	46.45	16.40	26.1
1944	49.3	102	Aug. 10†	-30	February 12	37.26	49.77	26.67	32.9
Period	48.1	118	July 20, 1934	-47	January 12, 1912	31.61	58.80	12.11	30.0

†And other dates.

About 7 p. m. of this same date (May 18), a tornado caused loss of \$70,000 as it tore through sections of Greene, Webster and Hamilton counties. A small "twister" also hit parts of Dallas County.

The final tornado of the 18th was associated with the intense, heavy, flood-producing rains in central Iowa. Starting in the northeast corner of Polk County, it continued into Story County causing damage estimated at \$125,000.

On May 19 another tornado struck Pocahontas County, this one causing \$100,000 damage. The storm followed a rather irregular path and several secondary funnels developed. In fact there was probably more than one storm with the paths intertwined. A redevelopment of the storm caused \$50,000 loss in the eastern part of the County.

The most destructive storm of the day was one that traveled eastward along Highway 5 in Webster County and struck Fort



CLIMATOLOGICAL DATA FOR YEAR 1944—Continued

Table with columns for STATIONS, COUNTIES, Elevation, Temperature (Average, Highest, Date, Lowest, Date), Precipitation (Total, Greatest Monthly, Month, Least Monthly, Month, Total snowfall), and Number of Days (Precipitation .01 in. or more, Clear, Partly cloudy, Cloudy, Prevailing direction of wind).

† And other dates.
‡ Not an official weather bureau station
\* Data interpolated
§ Partly interpolated.

TABLE IV—MEAN MONTHLY AND ANNUAL TEMPERATURES WITH DEPARTURES FROM THE NORMAL, FOR 1944

Table with columns for STATIONS, months (January-December), and Annual. Each month has two columns: Temp. and Dep. (Departure from Normal). Rows are grouped by district: Northwest, North Central, Northeast, West Central, and Central.

MEAN MONTHLY AND ANNUAL TEMPERATURES WITH DEPARTURES FROM THE NORMAL, FOR 1944—Continued

Table with columns for Stations, months (January-December), and Annual, each with Temperature and Departure (Temp. and Dep.) sub-columns. Stations listed include East Central District (Anamosa, Belle Plaine, etc.), Southwest District (Atlantic, Bedford, etc.), South Central District (Afton, Albia, etc.), and Southeast District (Bloomfield, Burlington, etc.).

\* Interpolated.
§ Partly interpolated.

Dodge causing \$200,000 loss. This storm also split into two parts as it struck Fort Dodge. Other less destructive storms occurred in Hamilton and Chickasaw counties and in the eastern part of Webster County. The tornadoes of May 19 were also attended by other examples of Nature in a destructive mood as lightning, hail, flood and straight winds contributed their share toward increasing the damage.
The most noteworthy single storm of the year was a tornado, or series of tornadoes, in Sioux County on June 16. While there was only one true center of action, there were at least six, and probably several more, separate funnels, traveling along irregular paths that crossed each other and in some cases the tracks of individual funnels almost made complete loops.

and grinding uprooted trees and wrecked homes into splinters. This storm originated in South Dakota, lifted as it crossed the Missouri River but redeveloped near Lebanon, in Sioux County, Iowa. Damage amounted to a million dollars. Other tornadoes had previously occurred in June, on the 4th, in Shelby County, with loss of \$25,000, and on the 11th, in Mills and Plymouth counties, with damage of about \$25,000 in each.
Incipient tornadoes caused some loss in Boone and Polk counties on July 23 and there was a small storm in Chickasaw County, on August 15. The last storm of the year that seems to have been definitely a tornado was one that caused about \$25,000 loss in Jackson County shortly after midnight of August 17. Earlier in the night, wind, hail and rain caused \$125,000 loss in Benton and Linn counties with some evidence of twisting action.





MONTHLY AND ANNUAL PRECIPITATION WITH DEPARTURES FROM THE NORMAL, FOR 1944—Continued

Table with columns for Stations, Months (January-December), and Annual. Rows include various Iowa locations such as Monroe, Newton, Perry, State Center, Toledo, etc., showing precipitation and departure values.

\* Interpolated. § Partly interpolated.

TABLE VI—SUPPLEMENTARY PRECIPITATION TABLE

Recording rain gages are maintained at the stations listed in this table by the Hydrologic Service of the Weather Bureau, in cooperation with the U. S. Engineers. Recording gages are also maintained at other stations, as indicated in the footnote to the precipitation table in Monthly Climatological Data.

Table with 17 columns: Station, County, Latitude, Longitude, Jan., Feb., Mar., April, May, June, July, Aug., Sept., Oct., Nov., Dec., Annual. Rows include Mississippi Drainage Basin (Alburnett to Wheatland) and Missouri Drainage Basin (Allerton to Wallin).

\*Interpolated.

TABLE VII—DATES OF KILLING FROST, 1944

Burlington, Charles City, Davenport, Des Moines, Dubuque, Keokuk and Omaha, excluded from averages because of city influence.

Table with 12 columns: 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. Rows are organized by district: Northwest, West Central, Southwest, North Central, Central, South Central, Northeast, East Central, Southeast.

† Date of last temperature of 32° or lower in the Spring, or first temperature of 32° in the autumn, (as the case may be).

TABLE VIII—SOIL TEMPERATURES, AMES, IOWA, 1944

Table with columns for months (Jan-Dec) and years (1944, 1943, 1942, 1941, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, 1920, 1919, 1918, 1917, 1916, 1915, 1914, 1913, 1912, 1911, 1910, 1909, 1908, 1907, 1906, 1905, 1904, 1903, 1902, 1901, 1900). Rows include Average 7 a. m., Average 12 noon, Average 7 p. m., Highest, Lowest, Date, Number of days with temperature, and various temperature ranges (0° or lower, 24° or lower, 32° or lower, 40° or higher, 50° or higher, 60° or higher, 90° or higher).

† And other dates.

\* This is the highest and lowest of all readings at the 12-inch depth at 7 a. m., noon and 7 p. m., a diurnal maximum about 1° higher than 7 a. m. or 7 p. m. readings probably occurs about midnight but no readings are taken at that hour.

‡ Diurnal changes at 24 inches and deeper amount to less than 2°. Soil, when not frozen, is cultivated to depth of 2 inches after each important rain. See discussion, Annual Climatological Data, 1943, page 155.

\*\* Record for part of Month only—18th to 30th.

TABLE IX—AVERAGE AIR TEMPERATURE AND RELATIVE HUMIDITY AT AMES, IOWA, 1944

(For certain hours, 4 feet above the ground.)

Table with columns for months (Jan-Dec) and years (1944, 1943, 1942, 1941, 1940, 1939, 1938, 1937, 1936, 1935, 1934, 1933, 1932, 1931, 1930, 1929, 1928, 1927, 1926, 1925, 1924, 1923, 1922, 1921, 1920, 1919, 1918, 1917, 1916, 1915, 1914, 1913, 1912, 1911, 1910, 1909, 1908, 1907, 1906, 1905, 1904, 1903, 1902, 1901, 1900). Rows include Temperature (7 a. m., 12 noon, 7 p. m.), Highest, Lowest, Date, Number of days with temperature, and Relative humidity (7 a. m., 12 noon, 7 p. m.).

† And other dates.

TABLE X—EVAPORATION (Inches), WIND MOVEMENT (Miles), Average TEMPERATURE (F°), AND TOTAL PRECIPITATION (Inches), APRIL TO OCTOBER, 1944, IOWA

Table with columns for months (April-Oct) and Period. Rows include Ames, Cherokee, Clarinda, Iowa City. Data includes Evaporation, Wind movement, Average temperature, Total precipitation.

† Monthly total evaporation includes interpolation for missing days.

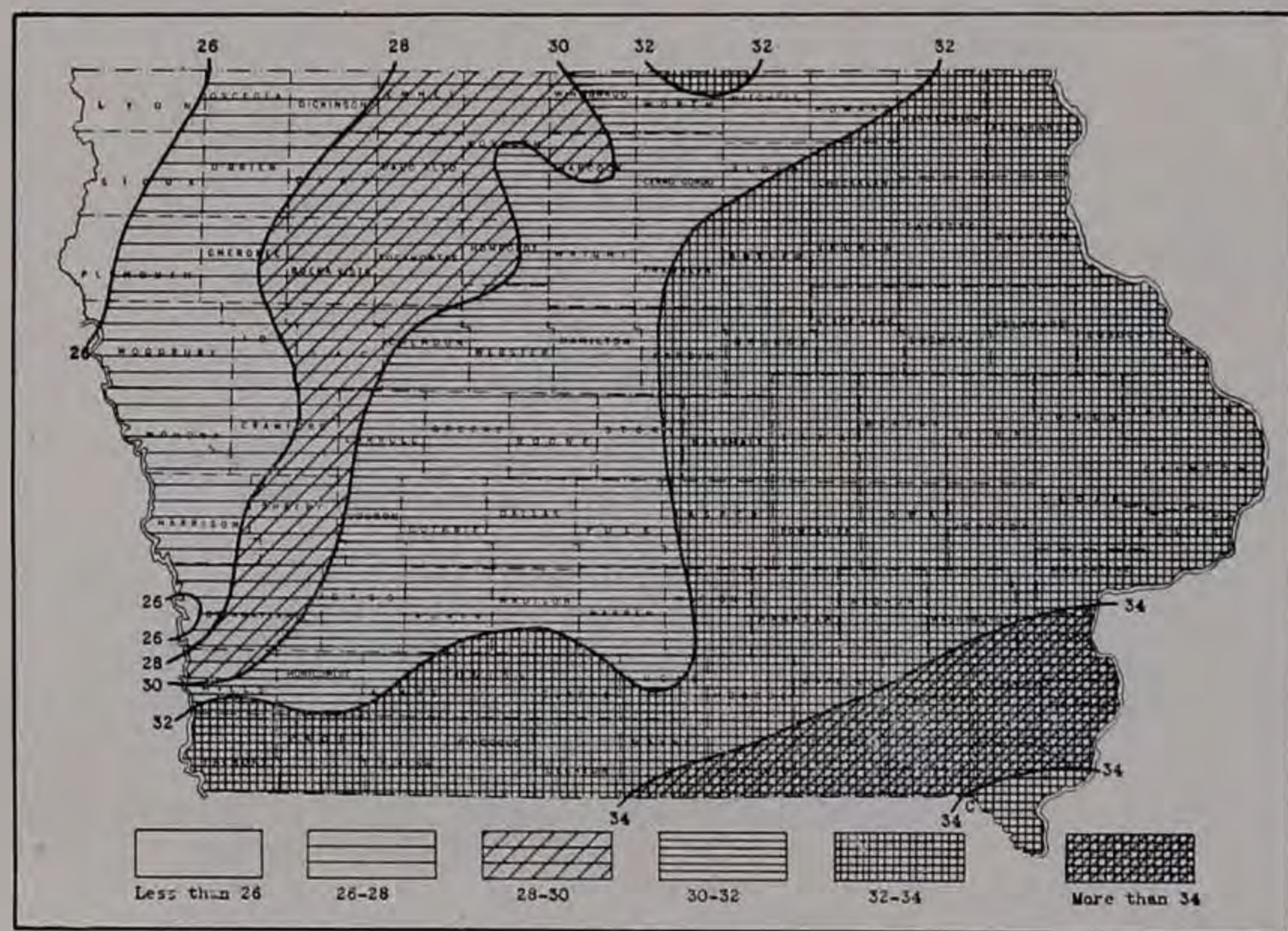


Figure I—Normal annual precipitation (inches). State average, 31.52 inches.

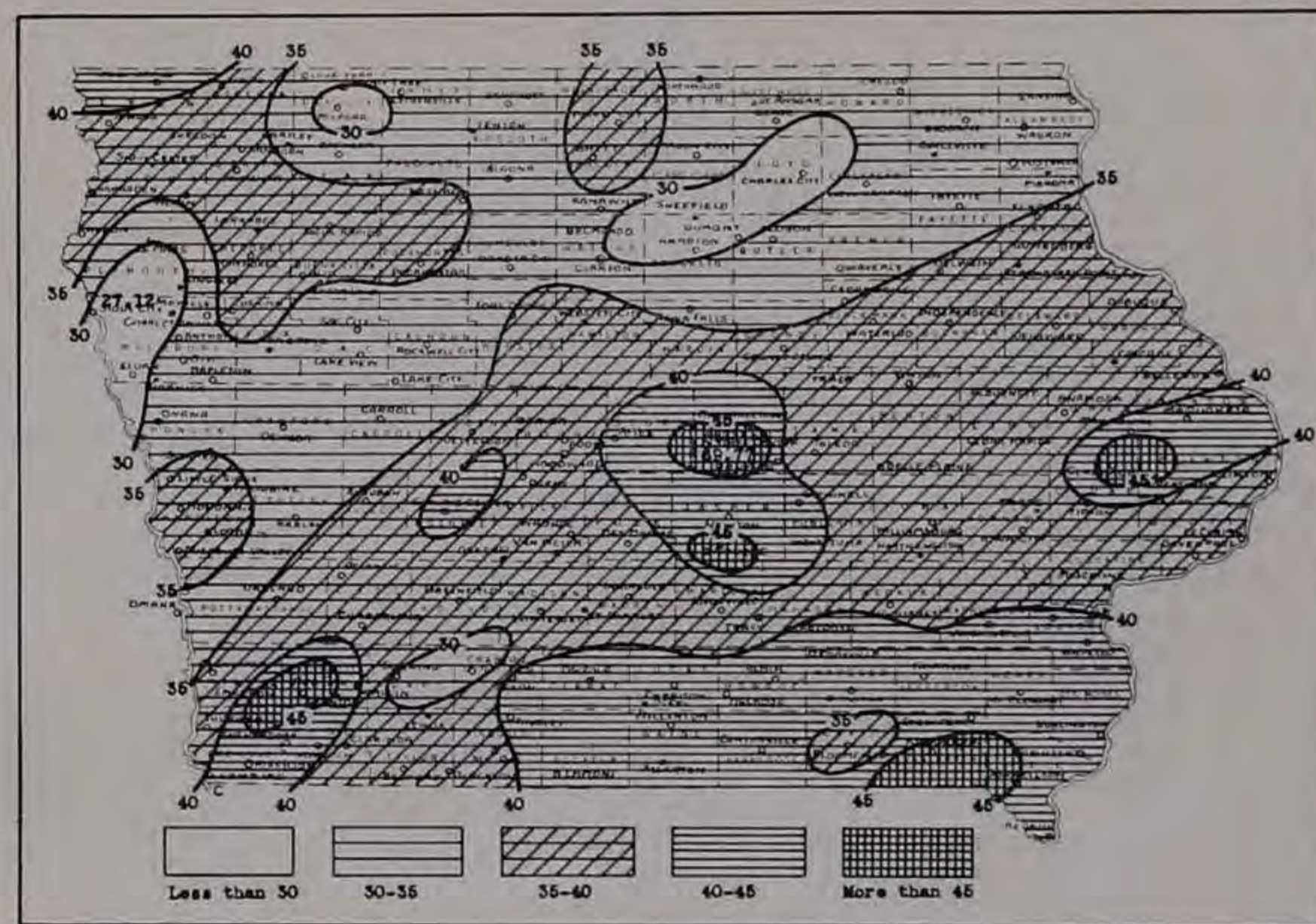


Figure II—Total precipitation, year 1944 (inches). State average, 37.26 inches.

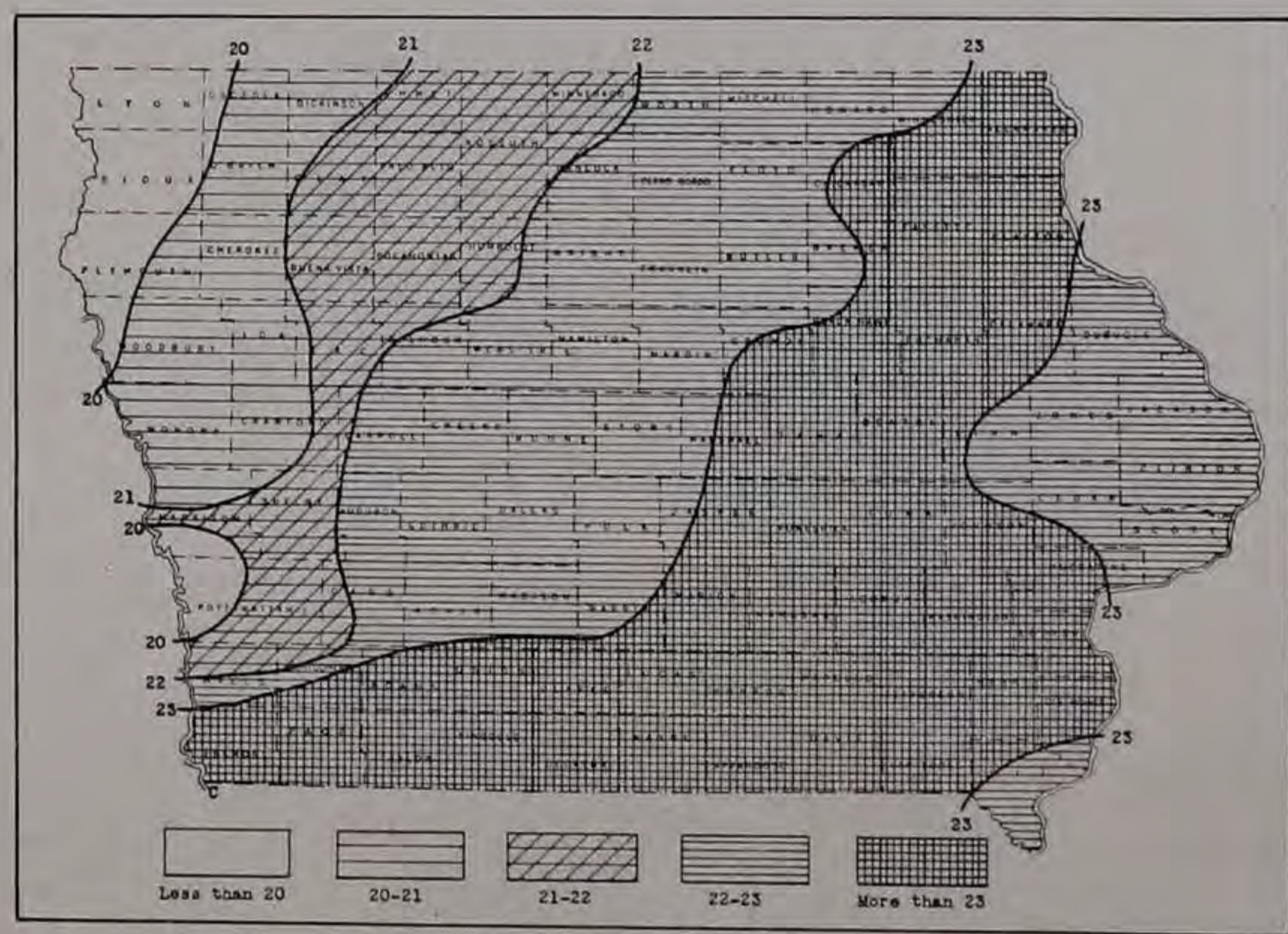


Figure III—Normal crop season rainfall (inches), April to September, inclusive. State average, 22.49 inches.

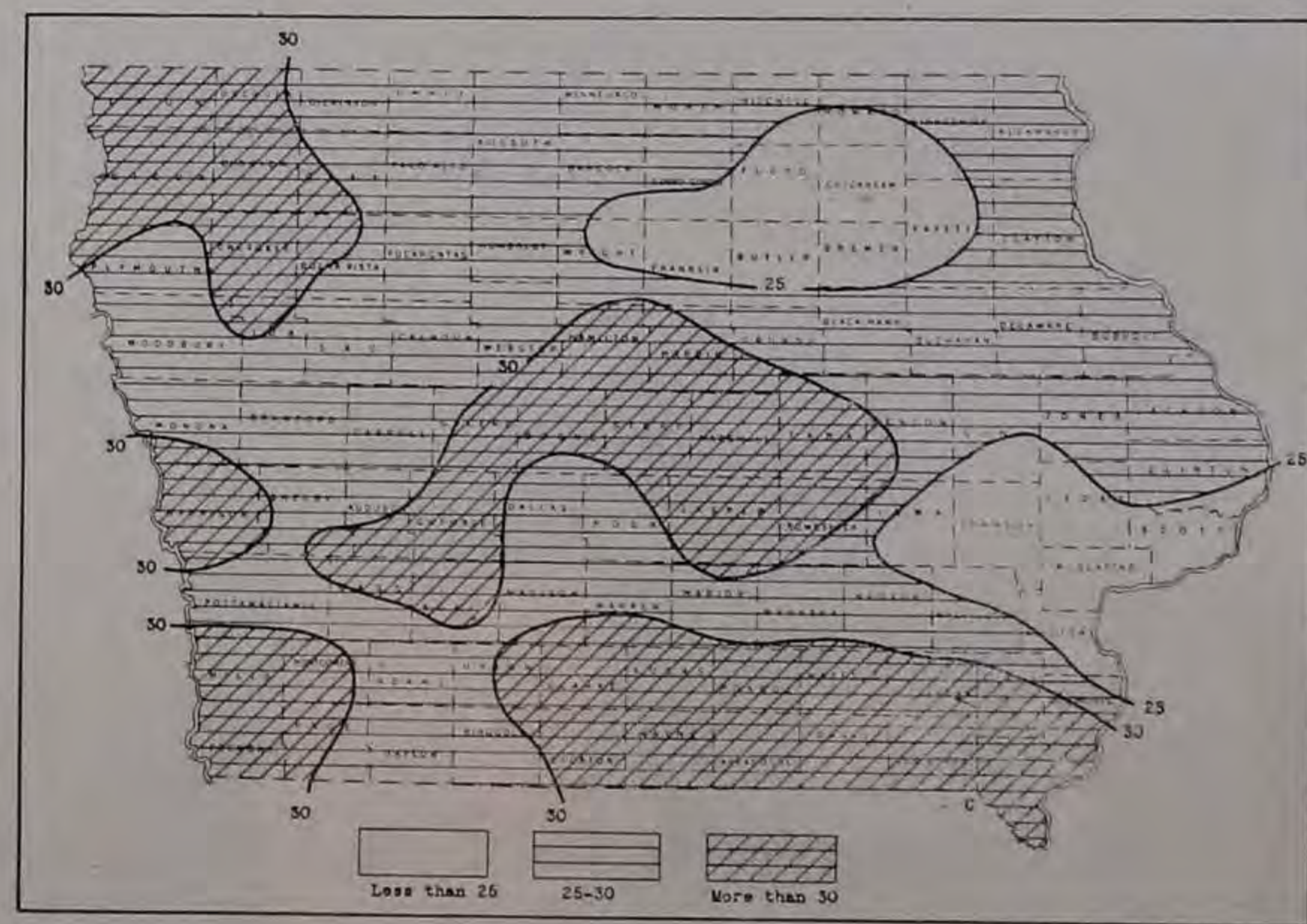


Figure IV—Total crop season rainfall (inches), 1944, April to September, inclusive. State average, 28.36 inches.

TABLE XI—WARM SEASON PRECIPITATION, 1944  
APRIL TO SEPTEMBER, INCLUSIVE

Table with 6 columns: Station, Amount, Station, Amount, Station, Amount. It lists precipitation amounts for various districts (Northwest, West Central, Southwest, North Central, Central, East Central, Southeast, South Central) across Iowa and Nebraska.

\*Not included in District Average.

TABLE XII—MAXIMUM AMOUNTS OF PRECIPITATION IN 1944

For all storms when at some time during the storm rain fell at the excessive rate of 0.01 inch per minute plus 0.20 inches, including all intervals of 5 minutes to 180 minutes, though at some intervals during the storm rain fell at less than the excessive rate.

Table with 13 columns: Stations and Dates, 5, 10, 15, 20, 30, 45, 60, 80, 100, 120, 180. It shows the maximum precipitation in inches at various intervals for different stations and dates in 1944.

MAXIMUM AMOUNTS OF PRECIPITATION IN 1944—Continued

Table with 14 columns: Stations and Dates, 5, 10, 15, 20, 30, 45, 60, 80, 100, 120, 180. This section continues the data from Table XII, providing maximum precipitation amounts at 5-minute intervals for numerous stations throughout Iowa and Nebraska.

TABLE XIII—DRIEST PERIODS OF THE YEAR, 1944

Table with columns for STATIONS, Longest period during the CROP SEASON, about April to September, with total precipitation for the period— (1.00 inch or less, 0.25 inch or less, None or traces), and a second identical set of columns.

† And other dates.

TABLE XIV—MISCELLANEOUS DATA

Main data table with columns for STATIONS, Temperature (Maximum/Minimum), Precipitation (0.01 in. or more, 0.25 in. or more, 1.00 in. or more), Snow covered ground (Max. Accumulated depth, Date, Total days 0.1 inch or more), and Number of days with— (Temperature, Precipitation, Snow covered ground).

† And other dates. § Interpolated.



Figure V—Location of weather stations in Iowa with symbols indicating type of observations.

G. I. H.



TEMPERATURE NORMALS

Effective January, 1944

PREPARED UNDER THE DIRECTION OF CHARLES D. REED, SENIOR METEOROLOGIST (Retired)

Temperature and precipitation normals are based mainly on the averages of 45 years, 1899-1943. For stations having less than 45 years of record, interpolations were made from isothermal and isohyetal maps, though consideration was given the averages for whatever period was available. A full discussion of the methods used in arriving at the temperature and precipitation normals which follow will be published in the January, 1945, issue of Climatological Data, Iowa Section.

Table with columns for Stations, Jan., Feb., Mar., April, May, June, July, Aug., Sept., Oct., Nov., Dec., Year. It lists temperature normals for various Iowa districts including Northwest, North Central, Northeast, West Central, Central, East Central, and Southwest.

\*Not included in District Average.

PRECIPITATION NORMALS

Table with columns for Stations, months (Jan-Dec), and Year, containing precipitation data for various Iowa districts including Northwest, North Central, Northeast, West Central, Central, East Central, and Southwest.

\*Not included in District Average.

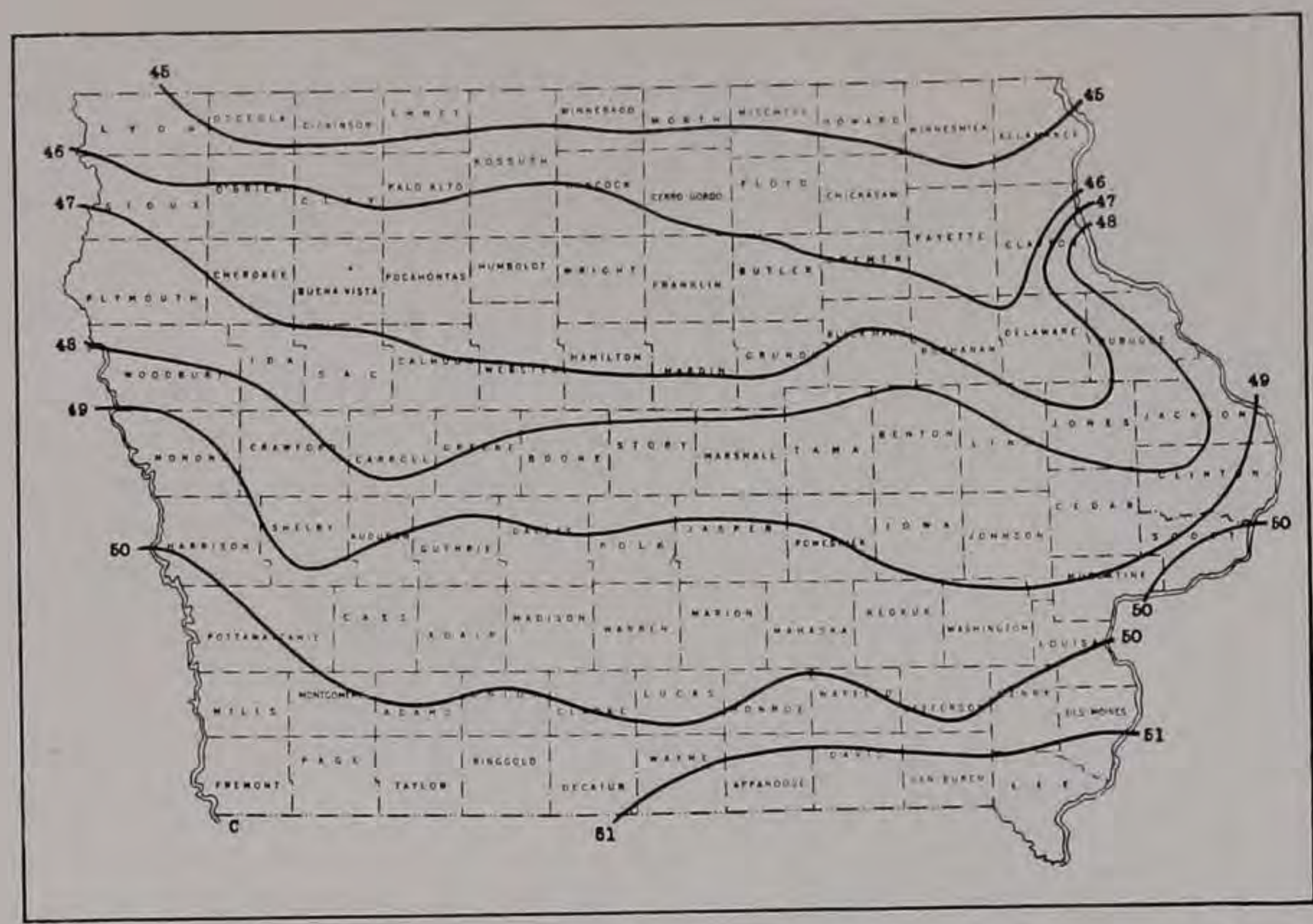


Figure VI—Normal annual temperature, (°F). State average 48.1°.

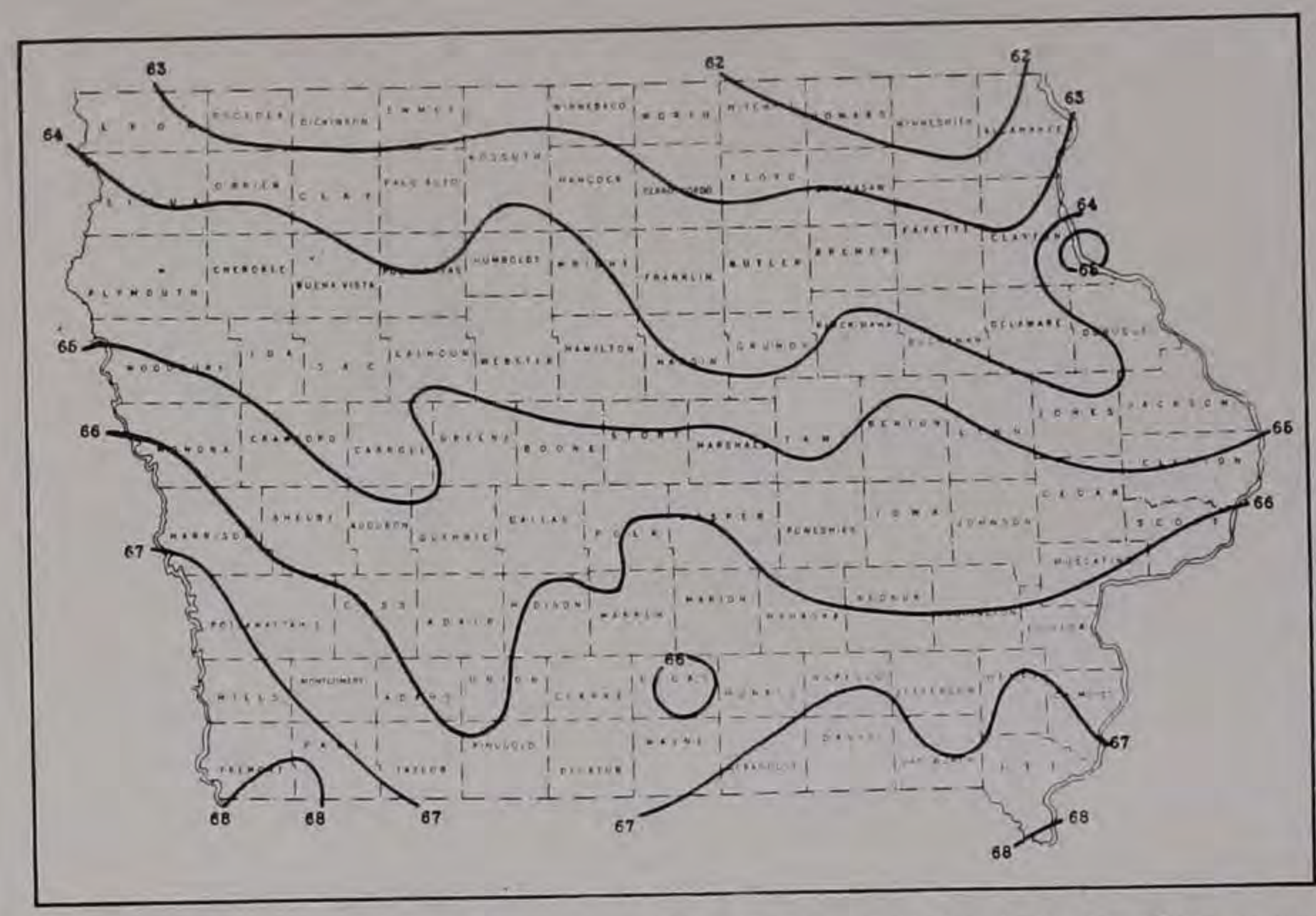


Figure VII—Normal crop season temperature, (°F), April to September, inclusive. State average 65.2°.

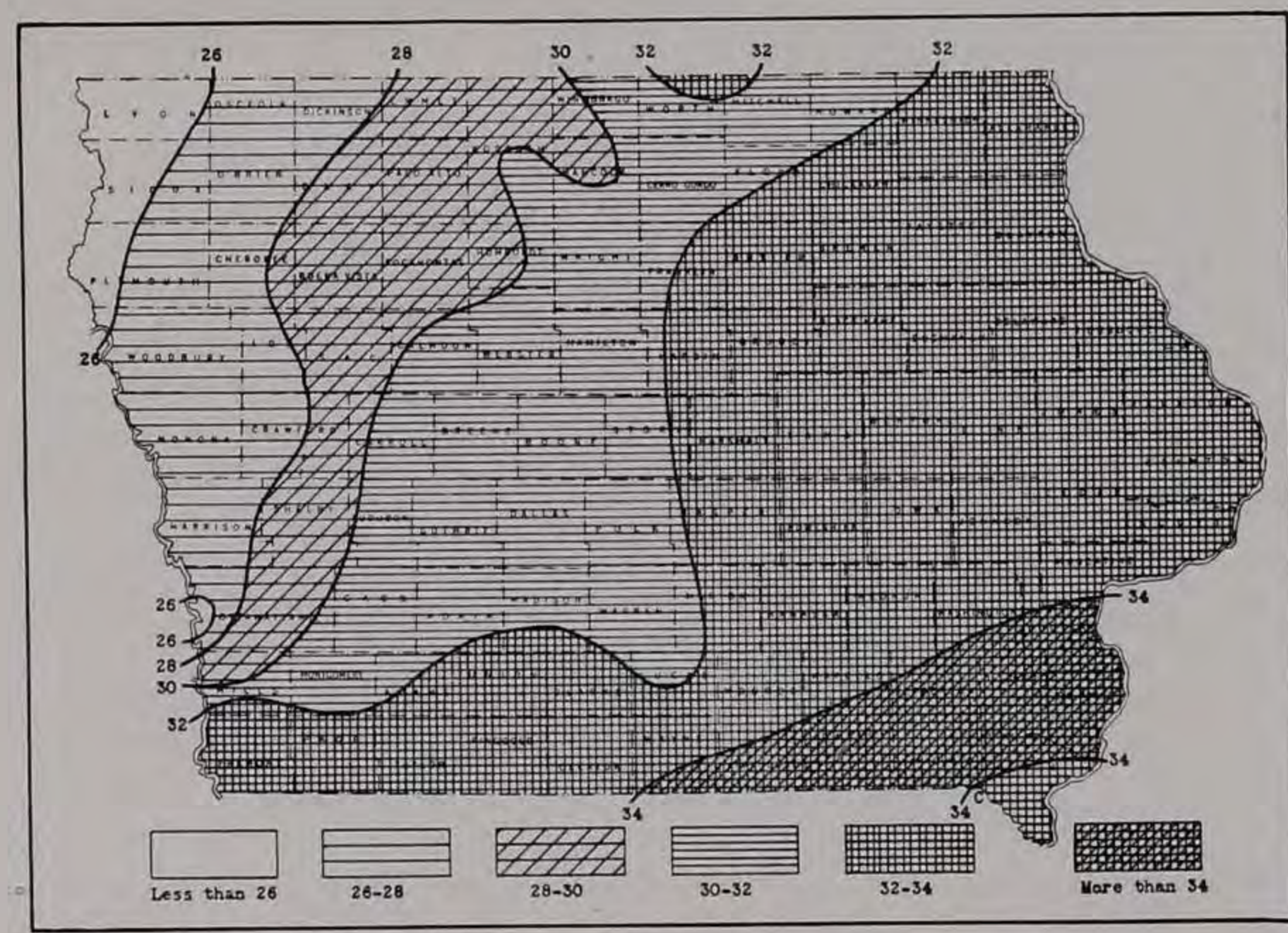


Figure VIII—Normal annual precipitation (inches). State average 31.52 inches.

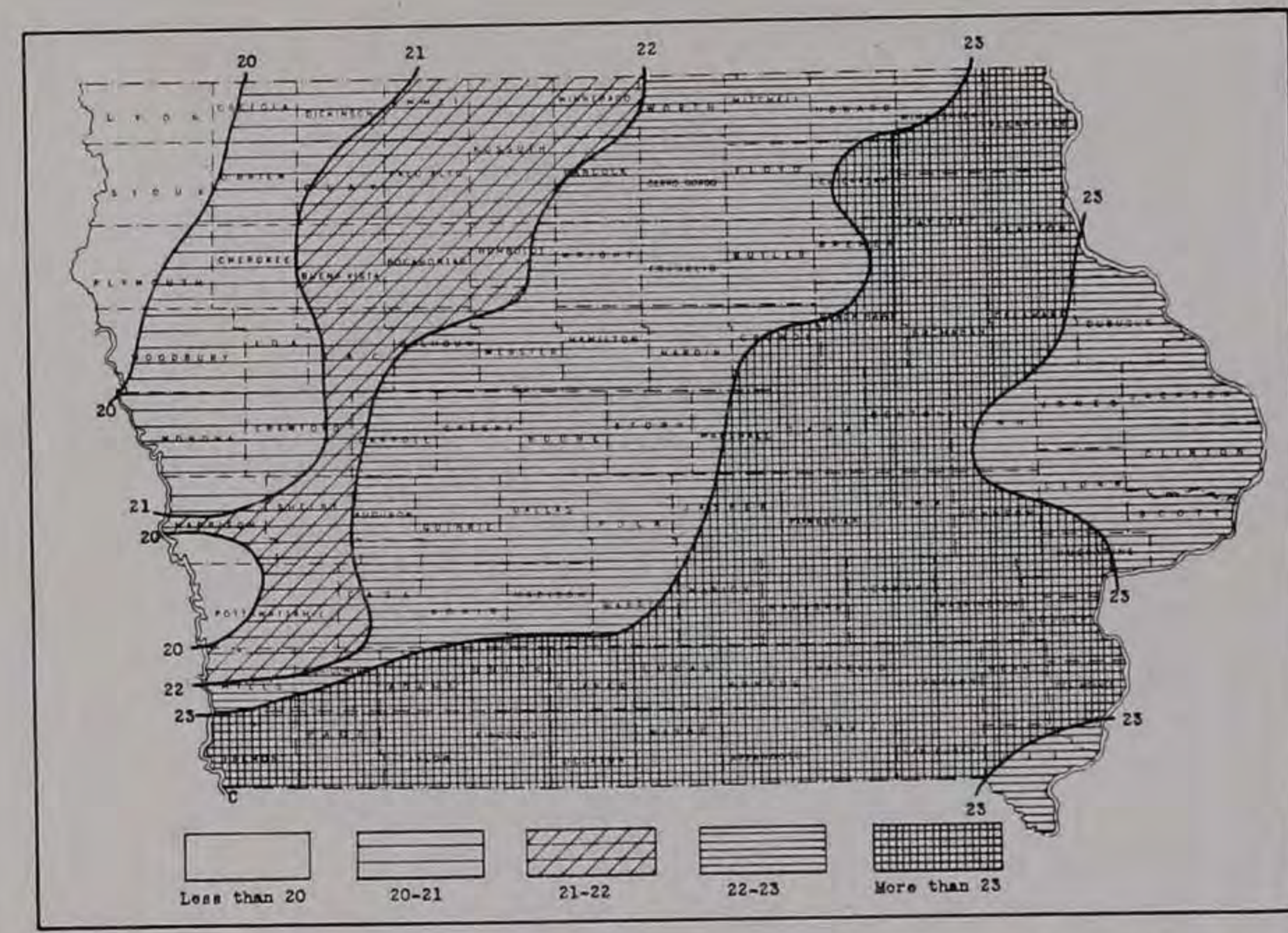


Figure IX—Normal crop season rainfall (inches), April to September, inclusive. State average 22.49 inches.

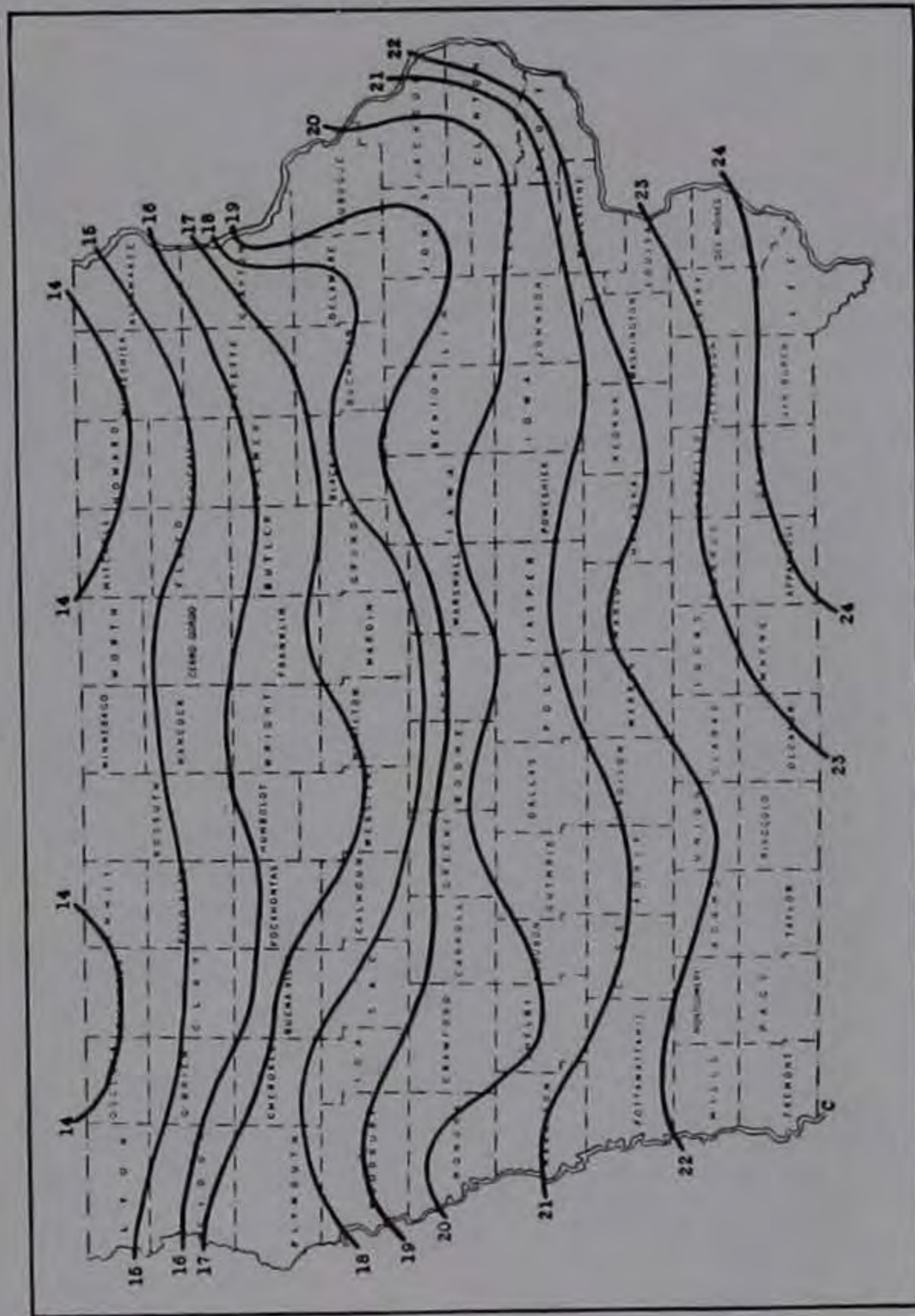


Figure X—January normal temperature. State average, 18.6°. January is usually Iowa's coldest month.

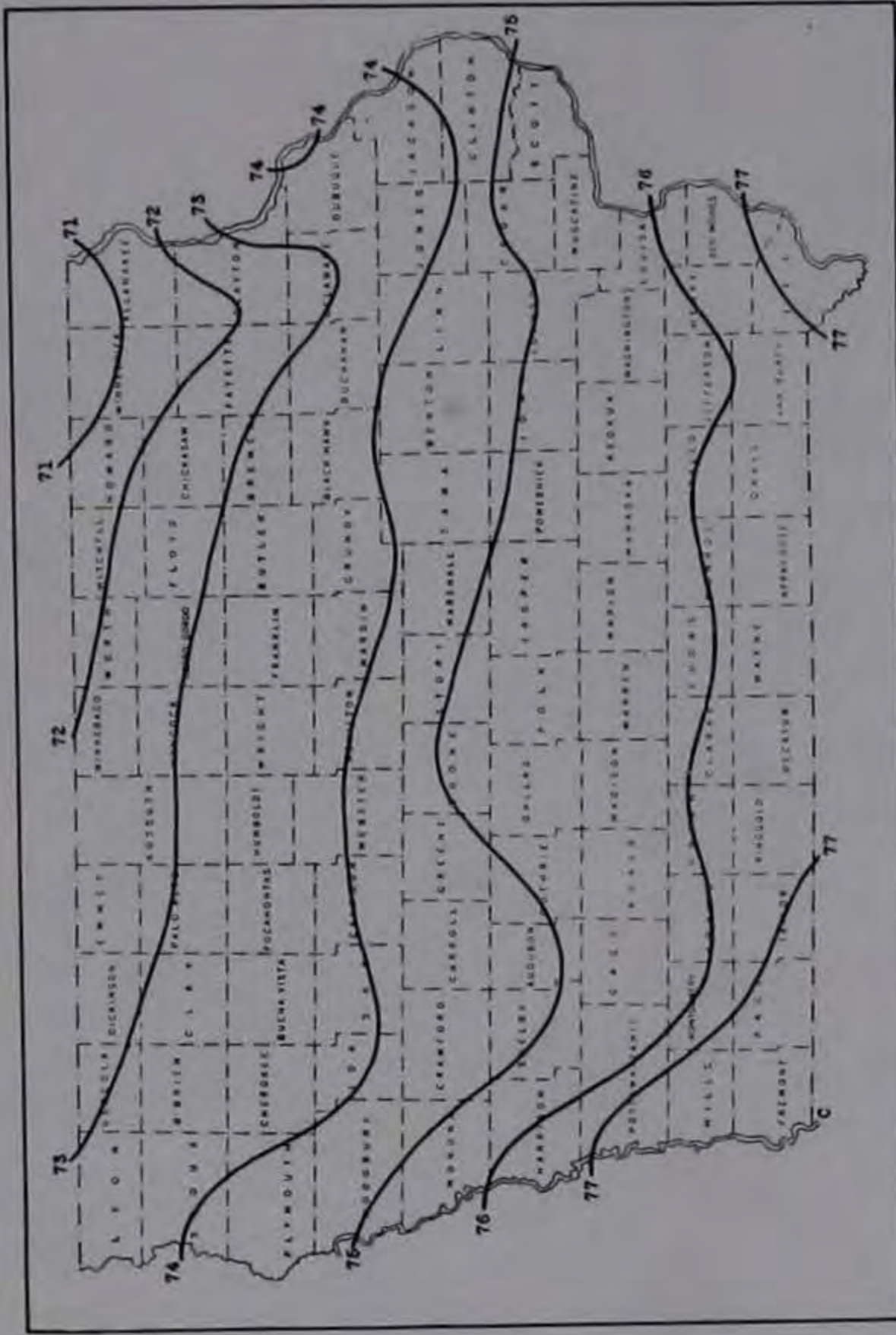


Figure XI—July normal temperature. State average, 74.7°. July is usually Iowa's warmest month.

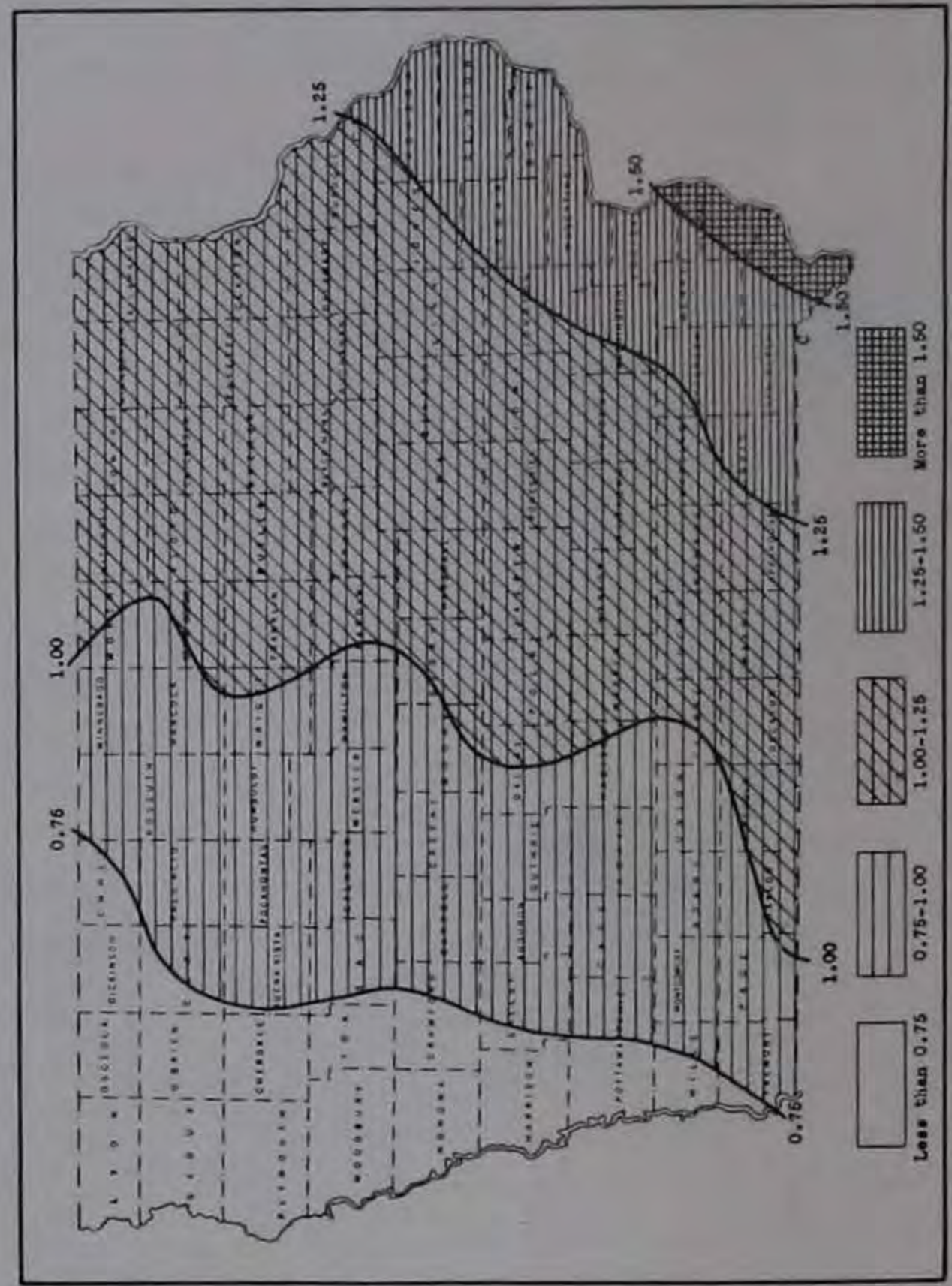


Figure XII—January normal precipitation. State average 1.09 inches. January is usually Iowa's driest month.

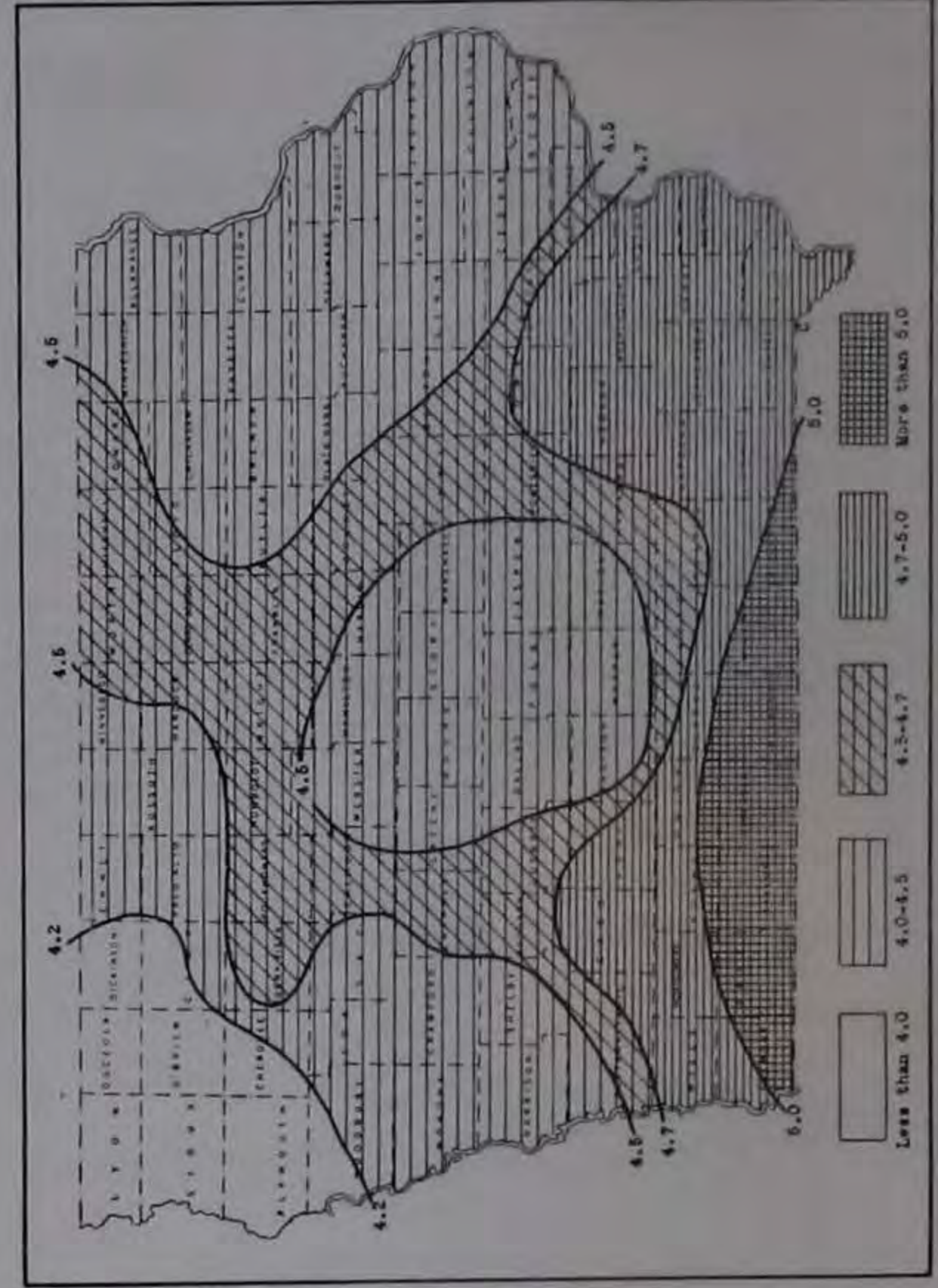


Figure XIII—June normal precipitation. State average, 4.67 inches. June is usually Iowa's wettest month.

1950-1951  
1952-1953

