TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during June, 1927*

TEMPERATURE (° C.)

Altitude, m. s. l. (meters)	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)		*Washington, D. C. (7 meters)
	Mean	Departure from 9-year mean	Mean	Departure from 7-year mean	Mean	Departure from 10-year mean	Mean	Departure from 9-year mean	Mean	Departure from 9-year mean	Mean
Surface	23.5	−1.5	23.5	−2.8	16.8	−2.1	25.6	−0.5	19.0	−3.4	24.2
250	23.4	−1.5	23.2	−2.7			24.7	−0.4	18.7	−3.4	22.6
500	22.0	−1.0	20.7	−2.5	16.4	−2.1	22.6	−0.5	16.3	−3.1	19.9
750	20.7	−0.8	19.2	−2.2	15.0	−1.9	21.2	−0.4	15.0	−2.5	18.2
1,000	19.6	−0.6	18.2	−1.7	14.1	−1.4	20.2	−0.2	13.7	−2.2	16.7
1,250	18.5	−0.4	17.3	−0.9	13.0	−1.2	19.1	−0.1	12.5	−1.9	15.1
1,500	17.2	−0.3	16.1	−0.4	12.0	−0.9	18.0	0.0	11.5	−1.5	13.5
2,000	15.0	+0.3	13.0	−0.1	9.1	−1.0	15.2	−0.5	9.3	−1.1	10.8
2,500	12.2	+0.3	9.9	0.0	6.3	−1.0	12.8	−0.3	6.5	−1.1	8.5
3,000	10.0	+1.1	7.2	+0.4	3.9	−0.6	9.9	−0.6	3.8	−1.0	6.5
3,500	6.4	+0.7	3.6	+0.1	1.1	−0.5	6.5	−1.2	1.2	−0.9	
4,000	3.4	+0.8	0.2	−0.5	−1.6	−0.4	3.1	−1.9	−1.4	−1.0	
4,500					−4.2	+0.1	0.1	−1.9	−5.4	−2.1	
5,000									−9.2	−2.1	

RELATIVE HUMIDITY (%)

Altitude, m. s. l. (meters)	Broken Arrow, Mean	Departure	Due West, Mean	Departure	Ellendale, Mean	Departure	Groesbeck, Mean	Departure	Royal Center, Mean	Departure	Washington, Mean
Surface	77	+5	70	+8	75	+5	80	+6	70	+6	62
250	77	+5	70	+8			82	+7	70	+6	65
500	73	+1	73	+8	75	+6	86	+9	73	+8	66
750	72	0	72	+6	73	+6	86	+10	72	+6	62
1,000	70	−1	73	+6	69	+3	79	+7	70	+4	62
1,250	68	−1	75	+7	68	+3	74	+6	68	+2	60
1,500	66	−1	77	+8	65	+2	70	+6	63	−1	56
2,000	57	−5	78	+8	64	+3	65	+9	57	−3	57
2,500	53	−3	75	+6	69	+10	54	+2	54	+1	44
3,000	47	−5	70	+4	61	+6	52	+3	51	+2	40
3,500	53	+1	62	−2	58	+7	54	+7	44	+2	
4,000	62	+10	68	+10	55	+8	62	+15	40	+6	
4,500					45	0	70	+19	45	+11	
5,000									55	+11	

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during June, 1927*—Continued

VAPOR PRESSURE (*mb.*)

Altitude, m. s. l. (meters)	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)		*Washington, D. C. (7 meters)
	Mean	Departure from 9-year mean	Mean	Departure from 7-year mean	Mean	Departure from 10-year mean	Mean	Departure from 9-year mean	Mean	Departure from 9-year mean	Mean
Surface	22.04	−0.57	20.12	−0.72	14.79	−0.71	25.98	+1.39	15.74	−1.88	19.33
250	21.79	−0.61	19.81	−0.70			25.33	+1.60	15.57	−1.77	17.68
500	19.06	−0.96	18.07	−0.28	14.33	−0.69	23.35	+1.64	13.96	−1.14	15.75
750	17.15	−0.91	16.21	−0.54	12.71	−0.47	21.45	+1.77	12.74	−1.03	13.43
1,000	15.42	−0.98	15.38	−0.13	11.23	−0.64	18.44	+1.24	11.32	−1.32	12.33
1,250	13.95	−0.73	14.80	+0.46	10.14	−0.57	15.97	+0.91	10.15	−1.43	10.86
1,500	12.52	−0.53	13.93	+0.77	8.96	−0.56	13.95	+0.84	8.63	−1.71	9.33
2,000	9.24	−0.73	11.68	+0.92	7.41	−0.31	10.64	+0.69	6.33	−1.61	7.79
2,500	7.23	−0.12	9.14	+0.66	6.61	+0.25	7.25	−0.60	5.04	−0.58	4.82
3,000	5.71	+0.16	7.09	+0.47	5.05	+0.14	5.49	−0.80	3.96	−0.19	3.90
3,500	5.23	+0.79	5.00	−0.09	4.21	+0.30	4.42	−0.73	2.82	+0.07	
4,000	5.06	+1.44	4.27	+0.53	3.68	+0.49	3.84	−0.51	2.23	+0.53	
4,500					2.88	+0.37	3.21	−0.65	1.90	+0.62	
5,000									1.81	+0.62	

* Naval air station.

WEATHER IN THE UNITED STATES

GENERAL CONDITIONS

The weather of the current June was similar to that of June, 1926, to the extent that both were cool east of the Rocky Mountains. The explanation of the cool weather may be found in the distribution and movement of HIGHS and LOWS. To what extent this is conditioned upon world-wide pressure distribution is not at present apparent. Atmospheric pressure was unusually low over the northeast Pacific; it was also low over western Europe, except Spain and Italy, and high from Spitzbergen and Iceland to the Azores. In the United States it was high east of the Rocky Mountains and there was a decided increase from the previous month as may be seen from the insets on Charts I and II of this REVIEW.—*A. J. H.*

CYCLONES AND ANTICYCLONES

Six HIGHS and 13 LOWS were plotted during June. This is the least number for any month so far this year. A minimum number would be expected during June or July, since the temperature contrast between Pole and Equator is likewise at a minimum, with a corresponding reduction of air interchange.

Low No. XI showed an unusual movement. It was first noted on June 28 as the pinched-off lower end of a trough in the Atlantic near latitude 40° N., longitude 55° W; and with high pressure building up to the north and east, it was forced southwestward to Bermuda on the evening of the 30th. From Bermuda it moved slowly northwest to the New England coast during the first few days of July.—*W. P. Day.*

THE WEATHER ELEMENTS

By P. C. DAY

PRESSURE AND WINDS

The distribution of pressure during the month favored continued cool weather over nearly all central and northern districts from the Rocky Mountains eastward, where the preceding month had likewise been cool, and general coolness extended into most southern districts also, where in some sections monthly temperatures had been continuously above normal since January. It also favored frequent precipitation over many southern districts where the State averages were mainly in excess of the normal.

June opened with general low pressure over the Southwest, and by the morning of the 3d a well-defined cyclone was central over the eastern portions of Kansas and Oklahoma, and considerable precipitation had occurred over the central valleys, and from the middle Mississippi Valley eastward to the Atlantic coast where secondary lows had developed. By the morning of the 4th the main storm center had advanced to the lower Lakes and important rains had fallen from the lower Missouri Valley eastward to the Appalachian Mountains, continuing during the following 24 hours to New England and the lower St. Lawrence Valley.

Rain again set in on the 5th and 6th over the southern Plains and local thundershowers prevailed over the Southeast for several days following. At the same time a moderate cyclone passed along the northern border from western Montana to New England, attended by rather general but mostly light precipitation.

About the 12th rains overspread the middle Plains, extending eastward into the middle Mississippi and lower Ohio Valleys, with heavy falls in portions of Iowa and Illinois. By the morning of the 13th showery conditions had extended into the Southeastern States and local heavy rains continued in portions of the middle Mississippi Valley and near-by areas. Rains continued over much of the same territory during the 14th and 15th, with heavy falls in portions of Texas and locally in the States to the eastward and northeastward.

On the morning of the 17th a moderate cyclone was central over eastern Kansas, and heavy precipitation had occurred within the preceding 24 hours in portions of east Texas and locally at a few points in the Gulf States. During the following two days this depression moved to the Atlantic coast, but with generally diminishing energy. Immediately following this depression thunderstorms overspread a large area from the northern Plains southeastward to Florida, and by the morning of the 21st showers had occurred in the central valleys from the Gulf of Mexico to Canada, with heavy falls locally in the Mississippi Valley region. During the following 48 hours this rain area moved northeast of the Great Lakes, but more or less rain occurred in connection with it over most eastern districts.

The last week of the month was without important cyclonic development and local showers were confined to small areas.

Anticyclonic conditions were most pronounced over the central Eastern States, where the average sea-level pressure was the highest save over a small area along the north Pacific coast.

Storms of various kinds were distributed in the usual way during the month, but were confined for the first few days chiefly to the middle and southern Plains States. Later in the month they were less frequent and not restricted so generally to a particular area. Tornadoes were infrequent and generally unimportant, with little or no attending loss of life. Hailstorms, on the other hand, were frequent, occurred over wide areas and in all portions of the month, and caused heavy damage, chiefly to crops.

The usual details of the more severe storms of the month appear in the table at the end of this section.

TEMPERATURE

The most notable feature of the temperature distribution was the persistence of cool weather over most districts from the Rocky Mountains eastward. This resulted mostly from low day temperatures, as was the case in the preceding month over the northern half of the country, and persisting so constantly, week after week, gave promise until near the close of being the coldest June of record over a large number of the Central and Northern States from the Rocky Mountains to the Great Lakes and Ohio Valley. An unusually warm wave during the last few days prevented this, however, but the month will stand as near the coldest of record in much of the territory referred to above, and in the case of one station at least, Louisville, Ky., it was the actual coldest June in more than half a century.

The month as a whole had few important variations in temperature. In fact on only two occasions were the 24-hour changes, 8 a. m. to 8 a. m., equal to 20°, and these occurred only over limited areas.

The first week continued warmer than normal over the southern districts from New Mexico eastward, where temperatures had generally been above normal for a considerable period, and the week was moderately warm in the far Northwest also. Over the northern and central districts from the Rocky Mountains eastward this week continued distinctly subnormal, as was the case during much of the preceding month. The second week, though moderately warm for the first few days, continued cool as a whole over much of the same area, and coolness penetrated into much of the South, while in the far Northwest the week continued moderately warm.

The third week continued cool in the main over the eastern two-thirds of the country, particularly in the central valleys and most eastern districts, the departures ranging from −6° to −9° per day, except along the immediate Gulf coast and over the Florida peninsula, where temperature averages were normal or slightly higher. In the far West the week continued moderately warm.

The week covering the period, June 21 to 28, continued cool generally over the eastern half of the country, and small areas over the far West had average temperatures slightly lower than normal, though in most Plateau and Rocky Mountain regions this week was moderately warm. The last three days of June had a sharp reversal of temperature over most districts from the Great Plains eastward and a warm wave of considerable strength prevailed at the close.

Despite the general coolness of June from the Rocky Mountains eastward, there were occasional periods with maximum temperatures above 100° over the greater part of this area at some time during the month. From the 1st to 5th local readings of 100° or slightly higher were reported from the Gulf States; about the 9th and 10th the highest temperatures of the month, slightly less than 100°, occurred over the Northeastern States; from the 21st to 26th the highest temperatures, generally above 100°, were reported in the districts from the Rocky Mountains westward, while the last three days were the warmest from the Dakotas eastward and southeastward to the Great Lakes and Ohio Valley, when maximum temperatures were usually slightly above 100°.

Although a cold month over much of the country the temperatures were in no case as low as had been previously observed in June, and only over the more northern districts and in the high mountains were they injuriously low.

The departures of the mean temperature for the month from the normal are graphically shown on Chart III of this issue.

PRECIPITATION

Over all Southern States from the Atlantic to the Pacific, except in southern Florida, the precipitation for June was well distributed and generous, being mainly above normal, Arkansas having nearly two and a half inches in excess. There was also a general excess in the southern part of the central section from Utah to Kentucky and Tennessee, with some State averages materially in excess of the normal, and locally, particularly in Colorado and Kansas, there were unusually frequent and heavy falls during the first three weeks. In portions of Florida one of the worst droughts of record was mainly terminated, though in the southern portions it was only partly relieved and large monthly deficiencies still existed at the end.

In practically all the northern tier of States June precipitation was deficient, but usually not to a serious extent. In the tier from South Dakota and Nebraska eastward there were extensive deficiencies, particularly in Iowa,

where locally in the central portion it was the driest June of record. Deficiencies were large in portions of the Lake region also, and locally in near-by areas. In the far West precipitation was light as usual, though locally in southern Washington, northern Oregon, and near-by portions of Idaho there were some heavy falls.

SNOWFALL

Traces of snow were reported at a few northern points and locally as far south as Kansas. In western Montana and northern Wyoming measurable amounts fell at a few exposed points. In the high Sierra of California there were local falls ranging up to 20 inches. Elsewhere in the mountain districts the falls were usually no more than traces.

RELATIVE HUMIDITY

Despite the general low temperatures, the percentages of relative humidity were distinctly less than normal in the Great Lakes region and to a less extent to the westward as far as the Dakotas, also over the Atlantic Coast States from Virginia to New England.

In other portions of the country the percentages were mainly above normal, and distinctly so in the Rocky Mountain region and over most of the Southeastern States except Florida, where the percentages were generally less than normal.

SEVERE LOCAL STORMS, JUNE, 1927

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path, yards [1]	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Westville, Okla., and vicinity.	1	2 p. m.	4 mi.		$360,000	Heavy hail	Damage chiefly to crops; property damage considerable.	Official, U. S. Weather Bureau.
White City, Kans.	1	2:45-3 p. m.	3,520			do	Wheat flattened; roofs pierced; poultry and small animals killed; path 16 miles long.	Do.
Ashland County, Wis.	1	4 p. m.				do	Considerable minor damage reported	Do.
Payne County, Okla. (south central).	1	4:30 and 6 p. m.	3 mi.		28,000	Two hailstorms	Crop losses heavy; minor property damage; path about 8 miles.	Do.
Stroud, Okla., and vicinity.	1	5 p. m.	1,760		200,000	Wind, hail, and rain.	A number of houses demolished, many damaged; heavy losses in oil fields; plate-glass windows broken; trees torn; 3 persons injured.	Do. Times Record (Fort Smith, Ark.).
Avery and Kendrick, Okla. (vicinity of).	1	5-5:30 p. m.	10 mi.			Heavy hail	Severe crop injury; other minor damage	Official, U. S. Weather Bureau.
Between Knox City and Munday, Tex.	1	5-8 p. m.	6 mi.		220,000	do	Thousands of acres of crops ruined, necessitating replanting; buildings damaged.	Do.
Limon, Colo.	1	6 p. m.	15 mi.		350,000	do	All damage reported was to crops	Do.
Tillman County, Okla. (western).	1	7-8 p. m.	4 mi.		122,000	do	Extensive crop damage over path 10 miles long.	Do.
Grady County, Okla. (northern).	1	8 p. m.	3 mi.		84,500	do	Severe crop loss; minor damage to property; path 15 miles long.	Do.
Norman, Okla., and vicinity.	1	9 p. m.	5 mi.		20,000	do	Damage principally to crops over path 10 miles long.	Do.
Ketchings Mills and Monetta, S. C.	1	P. m.			1,000	Hail	Crops injured	Do.
Hamilton, Kearny, and Finney Counties, Kans.	2	12.30 a. m.	3 mi.		60,000	Heavy hail	Wheat and barley damaged over path 60 miles long.	Do.
Barton, Pawnee, and Stafford Counties, Kans.	2	1-3 a. m.	30 mi.		2,000,000	do	Thousands of acres of wheat destroyed; minor damage to buildings.	Do.
Ross County, Ohio (eastern).	2	1-3 a. m.			15,000	do	Storm very destructive to crops and gardens	Do.
Dodge City, Kans.	2	1.40 a. m.	400		200,000	Violent wind	25 buildings unroofed, 50 others damaged	Do.
Ford County, Kans.	2	2 a. m.	7 mi.			Heavy hail	Chief damage to wheat	Do.
Miles to Venita, Okla.	2	7 a. m.	4 mi.		100,000	do	Heavy crop and property damage over path 14 miles long.	Do.
Tecumseh, Okla. (near)	2	2 p. m.				do	Character of damage not reported	Do.
Denver, Colo.	2	5:26 p. m.	5-7 mi.		500,000	do	Severe damage to greenhouses, skylights, and truck gardens; 4 persons injured.	Do.
Branchville, S. C. (near)	2	5:30 p. m.		2		Thunderstorm	4 persons injured	Do.
Cheyenne County, Kans.	2	7 p. m.	3,520			Heavy hail	Wheat badly damaged	Do.
Rockport, Ind., and vicinity.	2	8-9 p. m.				Wind	Heavy crop loss; some damage to windows, roofs, and trees.	Evansville Journal (Ind.).
Dundy County, Nebr.	2	9:30 p. m.	3 mi.			Heavy hail	Considerable damage to crops, gardens, and roofs.	Official, U. S. Weather Bureau.
Washita County, Okla. (southern).	2	9-10 p. m.	3 mi.		100,000	do	Severe damage to crops; poultry, rabbits and small livestock killed.	Do.
Holt County, Nebr. (eastern).	2	11 p. m.	3,520			do	Rye, alfalfa, and gardens injured over path 50 miles long.	Do.
Canadian County, Okla. (southeastern).	2		3 mi.			do	Crops a total loss in center of storm; other minor property damage.	Do.
Gotebo, Okla. (north of)	2	P. m.	½-10 mi.			do	Severe damage, estimate not obtainable	Do.
Seminole, Okla. (near)	2				5,000	do	Some damage in oil fields	Do.
Cheyenne, Rawlins and Decatur Counties, Kans.	2-3	10:30 p.m. 1 a. m.	4-20 mi.		500,000	do	Damage chiefly to wheat and barley over path 100 miles long.	Do.
Rooks and Osborne Counties, Kans.	3	4-5 a. m.	1-10 mi.		200,000	do	About 57 square miles devastated	Do.
Boone and Callaway Counties, Mo.	3	5-6 a. m.		2		Thunderstorm and wind.	Damage confined to trees, outhouses, telephone and telegraph wires.	Do.
Cloud County, Kans.	3	5-6 a. m.	3 mi.		240,000	do	Extensive crop damage over large area	Do.
Hannibal, Mo., and vicinity.	3	1:22 p. m.			100,000	Wind and hail	Numerous buildings damaged; overhead wire systems impaired.	Do.
Saline County, Kans.	3	3:30-4 p. m.	3-4 mi.		50,000	Heavy hail	Wheat damaged over path 30 miles long	Do.
Atchison and Doniphan Counties, Kans.	3	4:30 p m.	3 mi.		25,000	do	Growing crops damaged.	Do.
Herington, Kans.	3	4:30 p. m.	3 mi.		110,000	do	10,000 acres of wheat ruined; heavy damage to buildings.	Do.
Topeka, Kans. (near)	3	4.40 p. m.	33		400	Small tornado	Damage confined to small buildings and trees over a path 5½ miles long.	Do.
Perrytown, Tex. (near)	3	6 p. m.				Heavy hail	Storm reported very destructive to crops and buildings.	Do.
Auburn, Kans.	3	6.30 p. m.	90		1,000	Double tornado	2 parallel paths less than 2 miles long	Do.
Fulton, La Salle, Macoupin, Marshall, Peoria, Pike, Sangamon, Schuyler, and Tazewell Counties, Ill.	3	P. m.				Wind, rain, and hail.	Extensive damage to crops, buildings, orchards; heavy damage to basements and railroad beds by flooding.	Do.

[1] "Mi." signifies miles instead of yards.