

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

North Atlantic.—The Atlantic Ice Patrol reports that ice conditions in the north Atlantic are worse than they have been for many years, large numbers of icebergs being scattered over a wide area.¹

British Isles.—The month was again one of widespread deficiency of rainfall, less than half the average falling everywhere except in the north and west of Scotland and in Queens County. * * *

The general rainfall for June, expressed as a percentage of the average, was: England and Wales, 17; Scotland, 40; Ireland, 24.¹—[Cf. this REVIEW, p. 353.]

France.—The prolonged dry spell in France, following an unusually dry winter, is causing anxiety as to crops and cattle.¹

Switzerland.—Switzerland has also experienced a hot, dry month, the rivers being 6 feet lower than usual, but falls of snow at altitudes above 4,500 feet have been reported.¹

British Honduras.—The Belize district of British Honduras was suffering from severe drought, but floods following a heavy storm were reported from San Salvador on the 11th.¹

Egypt.—Serious floods following heavy rainfall have affected the cotton and wheat crops in the northeastern part of the Egyptian delta.¹

India.—The Indian monsoon broke later than usual this year, but by the 22d of the month it was extending normally, with excess of rain in some regions.¹

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¹ *The Meteorological Magazine*, July, 1921, pp. 171-172.

DETAILS OF THE WEATHER OF THE MONTH IN THE UNITED STATES.

GENERAL CONDITIONS.

By A. J. HENRY.

In general, high temperature over the greater portion of the United States, which has now featured the weather since September, 1920, continued during the month and was associated with a growing deficit in precipitation, more particularly from the east Gulf States northward to the border. The only extensive area with precipitation above normal was in the States of Texas, New Mexico, and Colorado. The prominent phenomena, temporary in character, were the disastrous flood in the Arkansas and Fountain Rivers in the vicinity of Pueblo, Colo.; the large discharge of the lower Colorado River at Yuma, Ariz.; and the tropical storm which after pursuing an unusual path dissipated over northern Texas on the 24th.

The usual details follow:

CYCLONES AND ANTICYCLONES.

By W. P. DAY, Observer.

Low-pressure areas were generally unimportant and few could be identified from day to day as distinct disturbances. The one exception, and also the feature of the month, was the hurricane (No. VII on the chart), which struck the Texas coast on the afternoon of the 22d. Though of small diameter this storm had all the characteristics of the type and the pressure gradients, as the storm passed inland indicated a very low barometer reading at the center. Houston, Tex., which was some distance east of the storm center as it passed northward, reported a minimum barometer reading of 29.37 inches and a 60-mile gale and this after the storm had moved fully 75 miles inland from Matagorda Bay, Tex. High-pressure areas were but weakly developed. The hurricane mentioned above, and another low-pressure area of tropical origin, are not included in the tables below.

Lows.	Al-ber-ta.	North Pac-if-ic.	South Pac-if-ic.	North-ern Rocky Moun-tain.	Colo-rado.	Tex-as.	East Gulf.	South Atlan-tic.	Cent-ral.	Total.
June, 1921.....	3.0	.....	.....	.....	3.0	.....	.....	1.0	.....	7.0
Average number, 1892-1912, inclu-sive.....	3.3	0.8	0.4	0.7	1.2	0.4	0.2	0.3	1.1	8.4

HIGHS.	North Pacific.	South Pacific.	Alberta.	Plateau and Rocky Mountain Region.	Hudson Bay.	Total.
June, 1921.....	2.0	.....	2.0	1.0	1.0	6.0
Average number, 1892-1912, inclu-sive.....	1.7	0.6	1.9	0.9	0.5	5.6

THE WEATHER ELEMENTS.

By P. C. DAY, Climatologist and Chief of Division.

[Weather Bureau, Washington, Aug. 1, 1921.]

PRESSURE AND WINDS.

The pressure distribution for the month as a whole was not materially different from that usual for June, except that the monthly averages were slightly higher than normal from the lake region and Ohio Valley westward to the Rocky Mountains, and usually lower than normal along the Atlantic and Pacific coasts and generally over the southern districts.

An important high pressure area central over the upper Lakes at the beginning of the month drifted eastward to the Atlantic coast within the following day or two. This was quickly followed by a second one that entered the northwestern districts on the morning of the 3d, which, like the one preceding, advanced slowly eastward along the northern border, reaching the Atlantic Coast by the end of the first week, where it gradually drifted southward and finally merged with the general high-pressure area normal at that period of the year over the Southeastern States and the adjacent portions of the Middle Atlantic. No other important high areas developed during the month, although pressure remained relatively high over the Southeastern States during much of the month with a resultant drift of the warm air of that region northward and northwestward.

Low areas, as is usually the case during the warmer months of the year, were without material force and pursued indefinite courses.

Under the influence of a moderate decrease of pressure from southern to northern districts, between the Rocky Mountains and the Atlantic coast, the general drift of the atmosphere was in the same direction and warm southerly winds prevailed over nearly all districts from

the Gulf of Mexico and Rio Grande Valley to the Canadian boundary. They were likewise southerly over much of the Rocky Mountains and locally in the Plateau region. On the Pacific coast the winds were mostly from points between the Northwest and Southwest.

High winds were notably absent over large areas. Local high winds occurred in connection with thunderstorms, but these usually covered but small areas. A list of the most important storms of this character follows near the end of this section.

TEMPERATURE.

June, 1921, was a month of unusually small variations in temperature; this being particularly in evidence over the great central valleys and northern districts, where, after the first few days, the temperature remained persistently high throughout the month.

Under the influence of fairly high barometric pressure over the Great Lakes and eastward to New England, the first week had temperatures below normal over the northern districts from the Dakotas eastward, and along the Atlantic coast. This period was likewise cooler than normal over most of the Rocky Mountain and Plateau regions. In the Ohio and lower Mississippi Valleys, and over the west Gulf States and portions of the southern Plains the first week was mainly warmer than normal and over a considerable area in the far Northwest similar conditions prevailed.

With the passage eastward of the high-pressure area, referred to above, pressure became low over the interior districts while over the Southeastern States and the adjacent ocean the summer type of high pressure began to develop. Under this combination warm weather set in over the greater part of the country, and the second week was warmer than normal in all districts save in the southern Plains and adjacent Southwest. In the plateau region the week was one of unusual warmth and it was nearly as warm over all northern and central districts to the eastward.

The pressure distribution favored the combination of warm weather over the central valleys during the third week of the month, but lower temperatures prevailed in the more Northeastern States and decidedly cooler weather prevailed from the Rocky Mountains westward.

During the final decade of the month temperature continued high over all portions of the country, save in the region between the lower Mississippi Valley and the Rocky Mountains, where the influence of lower pressure attending the tropical hurricane that entered the west Gulf district early in the decade favored northerly winds and cooler weather, the average temperature for the period ranging from 3° to 6° below normal.

For the month, as a whole, weather warmer than normal prevailed to an unusual extent. In eastern Tennessee and portions of adjacent States the daily temperatures were above normal continuously throughout the month, and over many other interior sections there were frequently only a few days near the beginning of the month that were cooler than normal. In portions of the upper lake region and thence westward to the middle Missouri Valley it was the warmest June in the history of the Weather Bureau.

The tendency to an excess of warmth during the present year continued during June undiminished over the interior portions of the country, in fact this condition extends back in certain localities beyond the beginning of the year, notably in portions of Illinois where for 10 consecutive months the mean temperatures have aver-

aged higher than normal by substantial amounts, the average excess for the entire period amounting in some cases to more than 5° per day, exceeding any previous period of continued warmth in 50 years or more.

Over a small area embracing western Texas, the greater part of New Mexico, and portions of Utah and Colorado, the average temperature for the month was below the normal. Elsewhere the averages were practically everywhere above.

Maximum temperature of 100° or higher were reported at some period during the month from all the States save New England and New York, the highest reported 120° occurring in southern California. Although high temperatures prevailed continuously for longer periods than usual during June in many localities, they were in few if any cases higher than have occurred in the same month of other years.

Occasional hot winds were reported from the Great Plains region; the most notable occurring in the vicinity of Ardmore on the night of the 28th-29th. A self-recording thermometer at the experiment farm showed a rise of 12°, from 80° to 92°, between 11 p. m. and midnight. No such high night temperature had ever been observed previously at that place.

The lowest temperatures were usually observed during the first week of the month, although in portions of the plateau region the coldest weather of the month was about the 15th to 18th, where light frosts occurred at numerous points at the lower elevations, and temperatures as low as 20° were reported from the higher and more exposed localities.

Freezing weather occurred early in the month at points in all the northern border States and temperatures as low as 20° were reported from several mountain States of the West.

PRECIPITATION.

The rainfall during the month was on the whole poorly distributed through the several weeks and exhibited the usual variations at near-by points common to the period of greatest thunderstorm activity. Such precipitation as occurred was mostly associated with thundershowers, often falling heavily for short periods, causing excessive run-off, and damage to fields and crops.

Early in the month heavy rains occurred over the eastern slopes of the central Rocky Mountains, particularly in eastern Colorado and northern New Mexico. Falls of 2 inches in 24 hours were common, and totals of 10 inches or more in the period from the 3d to 7th were authoritatively reported from several places. The fall was notably heavy in the region embracing the headwaters of the Arkansas, above Pueblo, Colo., and caused one of the worst floods ever known at that place, resulting in large loss of life and immense damage to property. A full account of this storm appears in this REVIEW as a contribution by the River and Flood Division. (Cf. pp. 366-367.)

In addition to the area referred to above, the rainfall during the first week extended over much of the Plains region from the central portion of Texas and New Mexico northward into western Nebraska and eastern Wyoming, the amounts over large areas ranging from 2 to 4 inches or more. In other districts precipitation during the first week was mostly light and no appreciable amounts occurred over many. The second week had substantial rains somewhat to eastward of the area of heavy rains referred to above and extending generally from the Rio Grande Valley, and west Gulf States northward into Wisconsin and Minnesota. Over districts to

eastward of the Mississippi River there was usually little effective rainfall and practically none from the western Plains region to the Pacific coast.

The third week of the month had good rains over much of the great spring wheat district and there was considerable precipitation for a week in summer over the far Northwest. Good rains occurred over a rather narrow area from the panhandle of Texas northeastward to Lake Superior, and beneficial showers occurred locally in Illinois and portions of adjacent States, and showers were rather general in the upper Ohio Valley, the northern portions of the Gulf States, and locally in the South Atlantic Coast States.

The final decade of the month had liberal rains from eastern and central Texas northward into the upper Mississippi Valley, and thence into the region of the Great Lakes, resulting mostly from the tropical storm that entered eastern Texas early in the decade and moved slowly northward. Local showers were reported from points in the east Gulf and South Atlantic States and showers were widespread over eastern districts as the month closed. In the western Great Plains and thence to the Pacific coast little precipitation occurred during the last decade, and the need of more moisture was beginning to be seriously felt over large areas at the close of the month.

From the Mississippi River eastward the monthly precipitation was nearly everywhere less than normal, the deficiency being particularly large in the east Gulf and South Atlantic States. There was also usually less than normal in the region from the Rocky Mountains westward. From the Mississippi River westward to the Rocky Mountains, and to the southward of Iowa and Nebraska, the precipitation was nearly everywhere greater than the amounts usually received in June, the excesses being unusually large in Oklahoma, Texas, and New Mexico.

SNOWFALL.

Traces of snow were reported on different dates locally in the mountain regions of the West. In northern Nevada unusually heavy snow occurred on the 16th. At Winnemucca that reaching the ground melted mostly as it fell, but the accumulation on vegetation was sufficient to bend and break trees and their branches. In the higher elevations the depth on the ground and damage to trees and vegetation was much greater.

HUMIDITY.

In the central and southern Rocky Mountain States and thence eastward to the Mississippi River, the heavy rainfall during the month is clearly indicated by the high percentages of relative humidity, the excess amounting to 20 per cent or more in some cases. Over most other sections of the country there was a general deficiency, which was quite pronounced over the east Gulf and Atlantic Coast States.

SEVERE LOCAL STORMS.

In order to save space an effort has been made to condense the reports on severe local storms into a table as below. Much of the information it is desired to give is not available and time does not permit obtaining the data by correspondence. The authority for the several items in the table is given on the right.

It is obvious that the tabulation does not include all of the severe local storms which occurred during the month, but merely those which have so far come to the attention of the Bureau.

More complete tables will appear later in the Annual Report of the Chief of Weather Bureau.

Place.	Date.	Time.	Width of path.	Loss of life.	Value of property destroyed.	Character of storm.	Remarks.	Authority.
Pueblo, Colo. (near)	2		Yards. 2,640		\$9,000	Hail		Official U. S. Weather Bureau.
East Las Vegas, N. Mex.	3					do.	Much poultry and small live stock killed	Washington (D. C.) Star.
Abilene, Tex. (7 miles NW. of)	7		1,760		1,500	Small tornado		Official U. S. Weather Bureau.
Sangamon County, Ill.	14	p. m.		1		Electrical	Much damage from lightning and floods	Springfield State Journal.
Vance County, N. C.	14	p. m.	5,280			Hail and rain	Crops and vegetation destroyed	Henderson Daily Despatch.
Ellendale, N. Dak. (15 miles E.-SE. of)	18	2:30 p. m.				Tornado	Number houses and buildings destroyed	Official U. S. Weather Bureau.
St. Louis, Mo.	20			2		Electrical	Damage to buildings, trees, etc.	St. Louis Post-Despatch.
Outagamie and Shawano Counties, Wis.	20				30,000	Tornado		Milwaukee Daily Journal.
Detroit, Mich.	21					Electrical	Cloud-burst	Detroit Free Press and Detroit Journal.
Do.	22			1		do.	One death by lightning	Detroit Free Press.
Cass County, Tex.	23	p. m.			200,000	Tornado		Dallas Morning News.
Barnesboro, Pa.	23	p. m.			(?)	Wind	Theater destroyed	New York Sun.
Lewiston, Idaho (SW. of)	23				500,000	Hail	Loss to fruit interests	Official U. S. Weather Bureau.
Walla Walla, Wash.	23					Hail and wind		Do.
Washington County, Md.	26					Wind and rain		Washington (D. C.) Post.
Arlington, Va.	26					Electrical	Lightning struck Navy radio tower	New York Times.
Gillette, Wyo.	27	10 p. m.	2,640			Hail	Crops, vegetation, and windows suffered	Sheridan Post.
Trenton, N. J.	27-28					Thunderstorm		New York Herald and New York Tribune.
New York City	28	p. m.				Rain and hail	Damage to truck farms on Staten and Long Islands.	New York Herald.
Davidson, N. C.	28	p. m.				Wind	Buildings and trees blown down; other damage.	Charlotte Observer.
Laurel, Del.	28					do.	Lightning struck barn, killed horse and shocked several people.	New York Times.
Greenwich, Conn.	29	p. m.			30,000	Electrical		Do.