

began on the 19th. Lowest barometer 29.36 inches at 4 p. m. on the 19th; position 50° 54' N., 20° 44' W. End of gale on the 20th. Highest force of wind 10; shifts of wind SW.-W.-NW.

During the next 24 hours this depression remained nearly stationary, gradually filling in, as on the 21st. The American S. S. *Munra* was the only vessel to report winds of gale force. Her storm log is as follows: "Gale began on the 19th. Lowest barometer 29.59 inches at 4 a. m. on the 19th; position 48° 16' N., 18° 00' W. End of gale on the 21st. Highest force of wind, 8; shifts of wind, SW.-W." From the 22d to the 27th moderate conditions prevailed with the Azores HIGH well developed during the greater part of the period. On the 22d and 23d fog occurred off the Banks of Newfoundland and from the

24th to the 27th over the middle section of the southern steamer routes. On the 28th there was a LOW of considerable extent central somewhere near latitude 55° N., longitude 22° W. (see Chart XII); it was impossible, however, to locate it accurately on account of lack of observations up to date. The storm log from the Danish S. S. *Arkansas* is as follows: "Gale began on the 27th. Lowest barometer 29.40 inches at midnight on the 27th; position, 53° 30' N., 28° 55' W. End of gale on the 28th. Highest force of wind 10; shifts of wind W.-WNW." This disturbance apparently moved but little during the next 24 hours, decreasing in intensity, and on the 30th only light to moderate winds were reported, with fog in mid-ocean.

### NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

*British Isles.*—" \* \* \* conspicuous events were the frequent thunderstorms which occurred between the 10th and 20th, and the almost entire absence of any very hot days.

"For the first time in 1920, the total monthly rainfall was generally deficient over the British Isles, exceeding the average only in small isolated areas, particularly in the south of England and Wales. \* \* \*

"The general rainfall expressed as a percentage of the average was: England and Wales, 99; Scotland, 65; Ireland, 78. \* \* \*

"In London (Camden Square) the mean temperature was 61.5° F., or 1.3° F. above the average. \* \* \*"<sup>1</sup>

*Mediterranean region.*—"Very high temperatures were experienced [during the middle and latter half of the month]. \* \* \*"<sup>1</sup>

*India.*—"In India the southwest monsoon set in on June 2 in Malabar and penetrated inland a few days later. It was weak at first in most parts (except Burma, Assam, and Central India)."<sup>1</sup>

*Africa.*—"The monsoon appears to have set in vigorously in Africa, for sudden rises of the Nile at Roseires and Mongalla have brought the water to its normal level."<sup>1</sup>

*Australia.*—"In Australia copious rains have continued to fall, and there is now a prospect of abundant herbage for stock. In the possible wheat belt of New South Wales the rain has enabled an unusually large acreage to be brought into cultivation. At the close of the month snow fell for the first time on record at Albany, in the interior of West Australia (latitude 35° south), probably in the rear of an Antarctic reversed V depression."<sup>1</sup>

<sup>1</sup> The Meteorological Magazine, July, 1920, pp. 133, 136.

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

#### CYCLONES AND ANTICYCLONES.

By R. HANSON WEIGHTMAN, Meteorologist.

*Cyclones.*—Alberta LOWS were by far the most numerous and secondaries were infrequent. The table shows the number of LOWS by types.

#### LOWS.

	Alberta.	North Pacific.	South Pacific.	Northern Rocky Mountain.	Colorado.	Texas.	East Gulf.	South Atlantic.	Central.	Total.
June, 1920.....	7.0	1.0	0.0	1.0	1.0	0.0	1.0	1.0	1.0	13.0
Average number 1892-1912.....	3.3	0.8	0.4	0.8	1.2	0.4	0.2	0.3	1.1	8.4

*Anticyclones.*—The number of HIGHS was slightly below the average. The number of HIGHS by types is shown in the table.

#### HIGHS.

	North Pacific.	South Pacific.	Al-ber-ta.	Plateau and Rocky Mountain region.	Hudson Bay.	Total.
June, 1920.....	2.0	0.0	3.0	0.0	0.0	5.0
Average number 1892-1912.....	1.6	0.6	1.9	0.9	0.5	5.5

#### THE WEATHER ELEMENTS.

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

[Weather Bureau, Washington, Aug. 2, 1920.]

#### PRESSURE AND WINDS.

The pressure during June exhibited the stagnant condition usual to the warmer months of the year, and the cyclonic and anticyclonic movements were in the main but poorly defined (See Charts II and III). As is usual in June, pressure was moderately high over the south-eastern districts and in the far Northwest (See Chart VII), but this distribution varied materially during the month. The first week had rather low pressure with rain over much of the East and Southeast, particularly near the Atlantic coast, high pressure prevailing at the same time in the Central Valleys and far western districts. The high pressure drifted slowly into the more eastern States overspreading the Southeast during the latter part of the first and the early part of the second decades. At the same time there was a general reduction in pressure over the interior portions of the country where temperatures had very generally risen to or above the normal for the season.

During the latter part of the second decade pressure increased in the far Northwest and there was a change to lower barometer readings over the Gulf and Atlantic coast districts with local storm areas and very general precipitation in the districts from the Mississippi Valley eastward. During the greater part of the last decade the HIGH over the North Pacific coast was maintained but

with somewhat diminished size, and the usual summer HIGH over the southeastern States was gradually re-established, so that at the end of the month pressure had assumed the usual warm season type, moderately high over the relatively cool, coast districts and low over the heated interior.

Southerly winds were mostly in evidence during the month from the Great Plains eastward, while from the Rocky Mountains westward to the Pacific they were largely from the west, modified greatly, however, by local topography.

#### TEMPERATURE.

The month was without unusual temperature extremes, as a whole.

The first week was generally cool in all parts of the country, save from the middle and southern Plateau regions westward to the Pacific. A pronounced change occurred during the second week and this period had temperatures decidedly higher than normal over all portions of the country from the Rocky Mountains eastward, except in the southern Plains and West Gulf regions, where cool weather for the season continued. In the lower Missouri and upper Mississippi Valleys the week was from 6° to 12° warmer than the average. West of the Rocky Mountains the weather continued cool.

The third week of the month was distinctly cool, on the average, in all parts of the country, save in the extreme southern States and over California and portions of the adjoining States. During the latter part of the month moderate rises to temperatures above normal were experienced over considerable areas from western Texas and eastern New Mexico northeastward to the Great Plains.

On the whole (as shown on Chart IV) the average temperature for the month showed no marked departure from the normal.

The highest temperatures of the month were experienced over the northeastern States on the 1st and 2d where a maximum temperature of 100° F. was recorded in New England. Over the remaining districts east of the Rocky Mountains, the highest temperatures were observed from the 10th to 15th, except locally the 16th or 17th, or later dates. In the Rocky Mountain region the highest temperatures were generally observed about the 8th, while to the westward they occurred from the 18th to 22d when some of the highest temperatures ever experienced in June were reported. In the Great Valley of California, the intense heat caused local injury to fruit, particularly grapes, which were badly sunburned.

The lowest temperatures of the month occurred very generally during the first few days and almost wholly within the first week, the principal exception being over portions of the Southwest where they were delayed until the 20th or later.

Freezing temperatures were reported very generally over the northern tier of States, and at exposed points throughout the mountain States. A temperature as low as 10° F. was observed in Wyoming, and readings below 20° were quite common in other mountain districts. No previous low records were broken, however, and on account of the generally backward condition of vegetation in these districts, no widespread frost damage occurred.

#### PRECIPITATION.

The first week of the month brought generous and, in some cases, heavy rains over much of the territory

extending from the West Gulf States northeastward to southern New England, and more or less liberal amounts were received in most other districts to eastward of the Mississippi River, in portions of the Dakotas, the Southern Plains, and the North Pacific Coast. The rainfall along the coast of northern California was unusually heavy for the period of the year, and brought great relief from the dry conditions that had existed for so long in that region.

During the second week the rain fell in the more northern districts, as a rule, although fairly good rains were reported in portions of western Texas and eastern New Mexico, and rather heavy falls for the season were again received in the extreme Northwest.

Rains were well distributed during the third week over most southern districts from the Great Plains eastward, except in portions of Georgia and Florida, and along the Atlantic coast from the Carolinas northward, in the Appalachian Mountains, the Great Lake region, and in the upper Missouri Valley. During this week but little rain fell over the central corn belt States and there was little or none over practically all the country from the eastern foothills of the Rockies to the Pacific.

The last week of the month brought sufficient rains over the areas drained by the upper Mississippi and northern and eastern tributaries of the Missouri, also in the southern Rocky Mountains and over much of Texas and the immediate Gulf and south Atlantic coasts. In the more central districts from the middle Mississippi Valley eastward to the Atlantic coast, only small areas had appreciable rain, and it was lacking entirely over considerable portions of the cotton, corn, and winter wheat sections. West of the Rockies there was beneficial rain in a few isolated districts only.

The total precipitation for the month showed a considerable deficiency, when compared with the normal, over the middle Plains and thence eastward to the lower Ohio Valley, and in the extreme southeastern States. In portions of Illinois and surrounding States there was little precipitation after the first week and at a few points the precipitation was the least ever recorded in June. From the Dakotas eastward to New England, and over the upper Ohio, and the Middle Atlantic States the precipitation was in many cases well above the normal; in fact, portions of southern New England had, with possibly one or two exceptions, the greatest rainfall for June in fifty years or more.

The southern States from Alabama westward had monthly amounts slightly above normal and similar conditions prevailed along the Pacific coast and in Colorado.

As is frequently the case in summer, the distribution of precipitation was quite irregular, due largely to heavy thunderstorms over small areas. Some of the most prominent are noted in Minnesota, South Dakota, and Texas, where the totals ranged from more than 10 inches to less than 1 inch. Also in the western mountain and Pacific coast States, where local amounts ranged from none or a trace to 6 or 8 inches and even 12 inches or more.

#### RELATIVE HUMIDITY.

Taking the country as a whole, the relative humidity was below normal generally, but especially in the East Gulf and South Atlantic States and the middle Mississippi Valley. Small areas of pronounced excess, however, occurred in South Dakota and in portions of Arizona, New Mexico, and western Texas.