

From the 22d to the 28th the general weather conditions were not far from normal, and a number of reports were received from widely scattered positions in the steamer lanes denoting more or less heavy weather at different times during that period.

On the 29th St. Johns, Newfoundland, was the center of a Low (see Chart XII) that afterwards developed into an unusually severe disturbance, as shown on Charts XIII and XIV for October 30 and 31, respectively. The observer on the Norwegian S. S. *Harald* stated in the storm log: "Gale began on the 29th. Lowest barometer, 28.98 inches at 2 p. m. on the 29th; position 47° 53' N., 50° 00' W. End of gale on the 31st; highest force of wind 12." The observer on the British S. S. *Régina* reports as follows: "Gale began on the 29th. Lowest barometer 29.00 inches at 8 a. m. on the 30th; position 46° 14' N., 44° 00' W. End of gale on the 31st; highest force of wind, 10." On the 30th the storm area extended from the coast of Newfoundland to the thirtieth meridian, and from the thirty-ninth to the fiftieth parallels. By the 31st this area had contracted somewhat, although very heavy northwest gales accompanied by rain and snow were reported from a limited region in the southwest quadrant of the Low, which was on that day central near latitude 51°, longitude 42°.

Fog was apparently unusually rare during the month, as in only one 5-degree square was it reported on more than one day.

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

### BRITISH ISLES.

One of the chief features (one might perhaps describe it as the ruling factor) in the weather of a very remarkable month, was the almost complete absence of the mild and humid southwesterly winds which prevail with so much energy in an ordinary October. \* \* \*

The general rainfall expressed as a percentage of the average was: England and Wales, 59; Scotland, 57;

Ireland, 42; British Isles, 55. Taken generally the month was probably one of the driest Octobers of which there is any record.<sup>1</sup>

In London (Camden Square) the month was dull and cold. The rainfall was the lowest for October in the 62 years' record with the single exception of October, 1897. Mean temperature, 45.7°, or 4.4° below the average, and the lowest for October since 1892.—*Symons's Meteorological Mag.*, London, Nov., 1919, p. 121.

### HEAT WAVE DECREASES WINE PRODUCTION IN MADEIRA.

[Consul W. L. Jenkins, Funchal, Madeira, Sept. 27, 1919.]

In the middle of August the estimate for this year's wine production in Madeira was 11,000 pipes, or 1,452,000 gallons. From August 21 to 28, however, the island was almost "smothered" by what is locally called a "Leste." This means a wind from the east, which, coming as it does from the Sahara Desert, is extremely warm and is often accompanied by small particles of sand. During this period the minimum temperature in the shade was 70° F. and the maximum 101°. The temperature in the sun was as high as 135°. The grapes dried up rapidly, and although many of them were just about ready to be picked at that time, present estimates place this year's wine production at only 7,000 pipes, or 924,000 gallons, representing a depreciation of nearly 40 per cent on the previous estimate.—*Commerce Reports 718, Nov. 5, 1919.*

### FLOODS IN EASTERN SPAIN.

According to statements in the *Times*, London, of October 2 and 4, 1919, heavy floods have occurred throughout eastern Spain following abnormal rainfall and hail. In Valencia it is stated the ricefields were inundated to a depth of many feet and the harvest ruined. The damage caused by the water is estimated to exceed \$2,000,000, and over 100 people have been drowned. Thirty villages and the port of Cartagena were isolated and it was necessary to send a Spanish warship with provisions and military engineers to Cartagena where the road and rail communications were cut.—*Quart. Jour. Roy. Met'l Soc., London, Oct., 1919, p. 352.*

<sup>1</sup> Cf. *Nature* (London), Nov. 20, 1919, p. —.

## DETAILS OF WEATHER OF THE UNITED STATES.

### CYCLONES AND ANTICYCLONES.

By A. J. HENRY.

*Cyclones.*—Eight principal and a number of secondary cyclones have been plotted on Chart III. The great majority of the cyclones appeared as rather ill-defined barometric depressions over the Canadian Northwest, only two of which, however, can be clearly traced across the continent. As a result cyclonic control of the weather was pronounced in the Northwest, but not elsewhere, probably by reason of the extension of high pressure over southeastern United States.

*Anticyclones.*—Twelve anticyclones, eight of which appeared in the Canadian Northwest and four on the Pacific coast, have been plotted on Chart II. Seven reached the Atlantic and the remainder dissipated over the continent. No anticyclone penetrated below the 37th parallel. It is interesting to note that none of the North Pacific anticyclones passed across the continent except in a single instance and that was probably due to merging with an Alberta anticyclone in the lower lake region. The dominant control of the weather during the month was anticyclonic except below the 37th parallel.

### THE WEATHER ELEMENTS.

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

[Dated: Weather Bureau, Washington, Dec. 1, 1919.]

#### PRESSURE AND WINDS.

The distribution of the mean atmospheric pressure over the United States and Canada, and the prevailing direction of the winds for October, 1919, are graphically shown on Chart VII, while the means at the several stations, with the departures from the normal, are shown in Tables I and III.

#### PRESSURE.

The first few days of the month were without notable pressure variations save that barometer readings were generally higher than average over both the Atlantic and Pacific coast districts, and below average in the interior portions of the country. Near the end of the first decade, however, pressure had risen to well above normal over New England and the Canadian Maritime Provinces, had fallen decidedly in the Middle West and was high and rising in the Canadian Northwest.

By the beginning of the second decade, the first type of winter weather had set in over the northwestern States with high pressure, local snows and freezing temperatures in the northern Plains and Rocky Mountain regions. The high pressure moved slowly southeastward but the attending winter weather was greatly modified with its advance, and temperatures soon returned to near the normal in nearly all districts.

During the first half of the second decade pressure again reverted to the type prevailing during the early part of the month, high on the east and west coasts, and low over the interior districts attended by more or less cloudy and rainy weather. The latter half of the decade had high pressure with generally cool and clear weather in most central and western districts, but to the eastward, particularly in the southeastern States, lower pressure and unseasonably warm weather prevailed. The greater part of the last decade of the month had high pressure in the northwestern section and to some extent over New England and the eastern Canadian Provinces, while in the South and Southwest pressure was frequently low, attended by cloudy, rainy weather.

For the month as a whole the pressure averaged above normal throughout the northern districts, over most southeastern States, and generally in the Pacific coast districts, and over practically all portions of Canada. From the middle Gulf States and central Mississippi Valley westward to Arizona and Utah the average monthly pressure was below normal. The excess in pressure was fairly large over portions of the Missouri Valley, and along the Atlantic coast from Florida to the Canadian Maritime Provinces, and the deficiency moderate in the southern Mountain and Plains regions.

High pressure along the Atlantic coast and over the southeastern districts favored warm east to south winds over much of the country east of the Mississippi, and south winds were dominant over the central and southern Great Plains, despite the somewhat higher pressure to the northward. In the Missouri Valley northerly winds were frequent, while over the far western districts they were variable but mostly with westerly components.

#### TEMPERATURE.

The early part of the month had temperatures well above the seasonal average over nearly all districts from the Rocky Mountains eastward. In fact, the highest temperatures for the month and in many sections, particularly in the more southeastern districts, the highest temperatures ever observed in October, were recorded during the first few days of the month. During this period temperatures were as a rule below normal in the far West. By the middle of the first decade cooler weather had overspread the central valleys, and extended over the more northern districts to the Atlantic coast by the end of the decade. At the same time high temperatures continued in the southeastern States and another cold area had overspread the Northwest with temperatures near zero at points in the northern Rocky Mountains and freezing weather as far south as Kansas. This cold area extended well southward over the Plains region and thence northeastward to the Great Lakes and New England, but no material change occurred in the districts east of the Mississippi and south of the Ohio Rivers where warm weather still continued.

The greater part of the second decade was without marked temperature changes over any considerable areas. Warm weather for the season prevailed very generally over southern and the more eastern districts, while temperatures decidedly cooler than the average prevailed over much of the Northwest.

Early in the last decade of the month severe winter weather overspread the Canadian Northwest and the adjacent portions of the United States. This cold weather advanced slowly eastward during the latter part of the month, giving the lowest temperatures of the month over all northern districts and generally in the Plains region and to westward of the Rocky Mountains. In the southeastern States warm weather for the period of the year continued throughout the decade.

As a whole the month presented remarkable extremes over unusually large areas. In the southern and southeastern States, particularly near the Gulf and south Atlantic coasts, the month was by far the warmest October in 50 years or more, in some cases the means for the month being more than 5° higher than any previous October mean. This is the more remarkable when it is considered that the usual range between months of the same name in these regions for different years is rarely more than a few degrees. At points near the middle Gulf coast the temperature was above normal every day in the month and it is reported that peach trees were in full bloom at the close.

While the southern States were experiencing nearly midsummer conditions, severe winter weather was the rule in portions of the Northwest. In the northern Plains and thence westward and southwestward to the Pacific coast the month as a whole was one of the severest on record for October. In portions of Wyoming and Montana the month was the severest for October in the known history of the States. Heavy snows occurred, and remained unmelted throughout the greater part of the month, the average temperature was from 10 to 12° F. below the normal and in some cases more than 5° F. lower than the lowest previous October record. The deep snow-covering prevented range feeding, and stock was suffering at the end of the month.

#### PRECIPITATION.

During the early days of October rain fell in most northern districts from the Atlantic to the Pacific, extending southward over the central Plateau region. By the middle of the first decade rainfall was general in the Southwest, the west Gulf region, and from the Mississippi Valley eastward, the falls being heavy in portions of Texas, Oklahoma, and the Mississippi Valley. The latter part of the decade was marked by some snow in the Rocky Mountain regions and by rainfall over most interior sections to the eastward, the falls being heavy at points in the southern Plains. During the early part of the second decade there was local heavy precipitation in the west Gulf States and more or less rain in most sections east of the Mississippi River, also in the central and southern Rocky Mountains and parts of the far Northwest. About the middle of the month and the succeeding few days, widespread and moderate-to-heavy rains fell throughout most central, southern, and eastern districts. Toward the latter part of the second decade precipitation occurred in the Northwest, also in the Southeast and some north-central districts, and unusually heavy snows fell in the northern Rocky Mountain region and adjacent parts of the Great Plains.

At the beginning of the third decade fair weather was the rule in the East, South, and Southwest, but the next few days were marked by precipitation in the northwestern border States and in the South and East. About the middle of the decade rain or snow was general from the middle Mississippi and Ohio Valleys northward and north-eastward. During the latter part of the month rather widespread precipitation occurred in the sections east of the Rockies, except some middle and south Atlantic States, with heavy falls in parts of the central valleys and the Lake region.

October, 1919, as a whole, was one of unusually heavy precipitation from the west Gulf States and Oklahoma northeastward to the Great Lakes, where monthly amounts ranged from 5 to 15 inches or more, frequently far in excess of any previous October record. These amounts were as a rule the results not of abnormally heavy rains on particular dates, but of an unusual number of days with moderate falls. The days with rain in many cases, particularly in the Mississippi Valley, were far in excess of the usual October number. In portions of Texas where October is usually a dry month, cloudy or rainy weather was almost continuous.

In southern Florida there was much less rain than usual and there was a very general deficiency in several southeastern sections. West of the Rocky Mountains precipitation was nearly everywhere less than normal, but particularly so in the far Northwest.

SNOWFALL.

Usually heavy and frequent snows for October were reported from many of the mountain districts of the West, and there were likewise heavy falls for so early in the season over the northern border States from Lake Superior westward. From Colorado and Utah northward snows were reported early in the month but the principal falls occurred near the end of the second and early in the last decade of the month, after which the ground remained snow covered in large areas until the end of the month. Considerable snow was reported in the high mountains of California and small amounts occurred in northern New England. The total fall for the month, particularly in Wyoming and Montana, was frequently from 2 to nearly 4 feet.

RELATIVE HUMIDITY.

The conditions during the month were favorable for high relative humidity throughout the entire country, save along the Pacific coast and locally at a few points in Florida and along the northern border. Over the great central valleys, where cloudy, rainy weather prevailed during the greater part of the month, the relative humidity values were far above normal, and like conditions pre-

vailed in portions of the northern Plateau, Mountain, and Plains region where cold weather and a snow-covering prevailed so persistently.

LOCAL STORMS.

Few reports of high winds have been received and damage from storms was slight. About the 28th, high winds occurred over the lower Lakes and to the eastward, especially in New York State. At Buffalo the wind attained a velocity of nearly 80 miles per hour—the highest of record in October at that place.

Average accumulated departures for October, 1919.

Districts.	Temperature.			Precipitation.			Cloudiness.		Relative humidity.	
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
New England.....	51.8	+1.6	+15.9	3.33	-0.30	+1.91	7.1	+1.7	80	+ 2
Middle Atlantic.....	61.2	+5.5	+24.9	2.89	-0.30	-2.79	6.6	+1.9	82	+ 6
South Atlantic.....	73.2	+9.6	+15.6	2.26	-1.40	-5.70	5.5	+1.5	86	+ 9
Florida Peninsula.....	80.7	+3.9	+ 1.0	2.60	-3.70	+2.70	4.8	+0.2	77	- 2
East Gulf.....	75.5	+9.3	+10.6	4.64	+1.80	+5.76	6.0	+2.2	85	+12
West Gulf.....	71.1	+4.5	- 3.0	9.25	+6.50	+9.65	7.2	+3.5	88	+16
Ohio Valley and Tennessee.....	63.9	+7.4	+19.5	7.19	+4.60	+2.20	7.1	+2.7	82	+10
Lower Lakes.....	56.3	+4.0	+22.7	4.20	+1.20	+1.70	6.5	+0.7	79	+ 5
Upper Lakes.....	49.1	+1.5	+31.2	3.70	+0.90	-2.60	8.0	+2.0	80	+ 2
North Dakota.....	33.7	-8.8	+20.4	1.12	-0.10	-2.45	5.5	+0.3	74	+ 2
Upper Mississippi Valley.....	54.0	+1.2	+22.6	4.20	+1.90	+1.90	6.3	+1.8	81	+ 8
Missouri Valley.....	50.3	-2.4	+20.7	3.23	+1.30	-2.97	6.5	+2.4	76	+10
Northern slope.....	26.7	-8.1	+17.8	2.13	+1.20	-2.30	5.7	+1.4	73	+ 9
Middle slope.....	52.9	-2.6	+ 8.4	2.13	+0.60	-3.93	5.6	+2.1	72	+11
Southern slope.....	63.8	+1.4	- 9.5	1.72	-0.20	+0.20	6.4	+2.7	76	+12
Southern Plateau.....	60.0	+2.9	+ 8.9	0.64	+0.10	+1.29	2.6	+0.4	51	+ 7
Middle Plateau.....	44.4	-6.1	+ 8.9	0.86	0.00	-2.30	3.4	+0.1	54	+ 4
Northern Plateau.....	44.8	-4.6	+10.1	1.20	0.00	-2.70	5.3	+1.2	64	+ 3
North Pacific.....	49.0	-2.8	+ 7.4	2.10	-1.80	-6.60	6.6	+0.2	83	- 0
Middle Pacific.....	57.6	-0.8	+ 6.2	0.42	-1.00	-2.80	2.3	-1.5	82	- 5
South Pacific.....	62.0	-0.8	+ 4.3	0.50	-0.30	-3.70	2.0	-1.1	62	- 5

Winds of 50 mi./hr. (22.4 m./sec.), or more, during October, 1919.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
Alpena, Mich.....	28	60	nw.	Pensacola, Fla.....	29	50	se.
Buffalo, N. Y.....	28	78	w.	Pocatello, Idaho....	8	52	sw.
Do.....	31	52	sw.	Point Reyes Light, Calif.....	2	52	nw.
Canton, N. Y.....	28	60	w.	Do.....	8	59	nw.
Cleveland, Ohio.....	28	56	w.	Do.....	28	52	nw.
Columbus, Ohio.....	28	50	w.	Do.....	28	73	nw.
Corpus Christi, Tex	16	56	n.	Do.....	30	66	nw.
Erie, Pa.....	28	50	w.	St. Louis, Mo.....	8	50	s.
New York, N. Y....	28	63	w.	Syracuse, N. Y.....	28	54	w.
North Head, Wash.	28	52	s.				
Do.....	31	60	s.				