was in the Irish Channel. End of gale, p. m. of 28th. Highest force of wind, 55 miles an hour. Shift of wind on 28th, W. to WNW. It was in this gale that three American mine sweepers and one naval tug were wrecked near the coast of France with considerable loss of life." (See account of snowstorm in British Isles, below.)

On the 29th the Dutch steamship *Maasdijk* reported a southeasterly gale of over 50 miles an hour near latitude 37°, longitude 48°, although a number of other vessels not far from that locality encountered winds of only moderate force.

NOTES ON WEATHER IN OTHER PARTS OF THE WORLD.

BRITISH ISLES.

April was the fourth month in succession with the mean temperature over the country generally appreciably below normal. The distribution of rainfall was irregular. The general rainfall expressed as a percentage of the normal was: England and Wales, 124; Scotland, 138; Ireland, 72.—*Symons's Meteorological Magazine, May, 1919, p. 45.*

A snowstorm of unusual severity for so late in the season occurred generally over the British Isles on Sunday, April 27, and in the southeast of England the storm was particularly severe. On the morning of Sunday a subsidiary disturbance was developing over the northern portion of the kingdom, and it afterwards moved southward and eastward, over England, the parent disturbance being centered over Denmark. By the evening the subsidiary had assumed more serious proportions than the primary to the northeastward, and was now centered over London and the southeast of England. Snow or hail fell in all districts of the United Kingdom. A region of high barometer extended from Iceland to the Azores which caused strong northerly winds in the rear of the disturbance, and gale force was reached in all districts, while at Holyhead the wind force attained the velocity of 70 miles per hour during Sunday night. In London snow commenced at about 1 p. m. after somewhat heavy rain, and it thoroughly covered the ground by 3 p. m. The depth of snow by the early morning of April 28 in the north of London was 12 to 15 inches and the total precipitation in the 24 hours was 1.6 inches at Camden Square and 1.7 inches at Hampstead. The snowfall occasioned much dislocation of the telegraph and telephone services, and the rapid melting of the snow caused floods in many parts. Temperature on April 27 was abnormally low for so late in the season, the thermometer in London during the afternoon standing at about freezing point. Agriculturists and fruit-growers have suffered somewhat badly.—*Nature (London), May 1, 1919, p. 171.*

DETAILS OF THE WEATHER IN THE UNITED STATES, APRIL, 1919.

CYCLONES AND ANTICYCLONES.

By A. J. HENRY, Meteorologist.

Cyclones.—Six principal, and the same number of secondary, cyclones have been plotted on Chart III. None of these was severe in character and the movement was in no wise exceptional. A majority of the secondaries developed over the southern plateau and Rocky Mountain region and their movement to the northeastward over the great interior valleys was attended by abundant precipitation.

Anticyclones.—Nine anticyclones, the majority of which first appeared over Saskatchewan, have been plotted on Chart II. The general direction of movement was toward the southeast.

THE WEATHER ELEMENTS.

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

[Dated: Weather Bureau, Washington, June 2, 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 April, 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 was decidedly low over the central valleys during the latter part of the first decade, and moderately low about the middle of the second decade over most central and eastern districts where rains were widespread and heavy. During the early part of the third decade pressure was unusually high over the Dakotas and thence southeastward to the lake region, but otherwise the variations were small, this being particularly true in the district west of the Rocky Mountains.

The average pressure for the month was above normal in practically all portions of the United States, except in the far Southwest, where it was slightly below. In Canada, the region of the Great Lakes and portions of the far western Provinces had monthly averages slightly below normal; however, in no case was the departure from the seasonal average greater than 0.10 inch.

The distribution of atmospheric pressure favored southerly winds in most sections from the Rock Mountains eastward, except near the Canadian border, where they were frequently from the North. West of the Rocky Mountains the winds were variable but frequently between Northwest and Southwest points.

TEMPERATURE.

April opened with unseasonably cold weather from the Mississippi Valley eastward, the line of freezing temperature extending as far south as the northern portion of the east Gulf States; and light frosts occurred in the interior of Florida. In the far West the weather was moderately warm for the season. Slowly rising temperature followed in the East, so that by the middle of the first decade moderately warm weather prevailed in nearly all districts. During the latter part of the decade decidedly lower temperature overspread the Central Plains States, but, otherwise, moderately warm weather continued.

The first half of the second decade was marked by generally mild weather in most sections, continuing until about the middle, when warmer weather obtained in the Ohio Valley and Tennessee, and in the far West, particularly in portions of California and Arizona, but considerably lower temperature overspread the Plains States and central Rocky Mountain districts. During the following few days colder weather overspread most eastern districts, while west of the Rockies the temperature continued, as a rule, above the normal. However, by the end of the decade temperatures had risen to somewhat above the seasonal average in most sections of the country.

At the beginning of the third decade the temperature was considerably lower in the Northeastern and Middle Atlantic States, and the weather was warmer over the upper Mississippi Valley and upper Lakes region, and generally mild weather prevailed elsewhere. About the 23d a condition of high pressure and unseasonably low temperature moved from Canada into the border States between the upper Missouri Valley and Lakes region, and during the following three or four days there were sharp falls in temperature over all districts to the southeastward. Freezing temperatures extended to southward of the Ohio River and killing frosts were general in the region indicated, as well as to the southward as far as northern Georgia and western North Carolina. A general warming up followed, the temperature rising above normal in most eastern districts, while it continued moderate west of the Rocky Mountains, and the month closed with seasonable temperatures in practically all districts.

The month as a whole was slightly cooler than the average over the central and southern Great Plains, most of the Gulf States, and in the extreme Northeast. Elsewhere the monthly means were normal or slightly above. The largest departures from the normal occurred in the far Northwest and far Southwest, where they averaged from +3° to +5° a day. In portions of the Southern Plateau region April was the first month with average temperature above normal since October, 1918.

PRECIPITATION.

At the beginning of the month generally fair weather prevailed in most sections. But by the middle of the first decade light showers had occurred in most districts east of the Rocky Mountains. Showery weather obtained during the next few days from the Great Lakes westward to the Pacific and southward to Oklahoma and northern Texas, and during the latter part of the decade precipitation overspread practically all districts east of the Rocky Mountains, the amounts being rather heavy in portions of New Mexico, Oklahoma, Kansas, and locally in the Mississippi Valley, and southeastern and middle Atlantic coast States. Fair weather prevailed in most districts during the early part of the second decade, but about the middle precipitation occurred in practically all districts east of the Mississippi River and as far west as the central Rocky Mountains southwest to central Texas. During the remainder of the decade fair weather prevailed except for light rains locally in the upper Mississippi and Ohio valleys, the Lake region, and the Pacific coast districts.

Early in the third decade local rains occurred in the upper Mississippi and Ohio valleys and northern Plains States, and about the middle rain or snow fell from the central and upper Mississippi Valley eastward, the amounts being moderately heavy at points in northern Ohio and western New York. During the latter part of the decade light rains occurred over most sections from the Mississippi Valley to the Rocky Mountains, and extended later to the Ohio Valley, New York, and New England, but fair weather prevailed in the Southeast and west of the Rocky Mountains. The month closed with generally showery weather in the central and western Gulf States, the Mississippi Valley, Tennessee, North Carolina, Virginia, and the northeastern Canadian Provinces; elsewhere fair weather prevailed.

For the month as a whole precipitation was well distributed over the great agricultural districts, and while not greatly above the normal, the number of days with rain was large over the central valleys, and considerable delay in preparation of the soil for spring planting resulted. In the Southwest, particularly in eastern and northern New Mexico and the adjoining portions of Texas, Oklahoma, and Colorado, the precipitation was unusually heavy, a large part falling as snow during the early part of the month. From the middle and northern Rocky Mountain districts westward to the Pacific the precipitation was nearly everywhere deficient, particularly over the middle Pacific coast section.

The region of heaviest precipitation was along the middle Gulf Coast, where locally the totals for the month exceeded 10 inches, with some unusually heavy falls in short periods. At Pensacola, Fla., on the 10th there was a fall of nearly 9 inches in less than 12 hours. Over considerable areas from northeastern New Mexico to the central portions of Minnesota and Wisconsin the monthly falls ranged from 4 to 6 inches, and similar amounts were reported from portions of the North Pacific Coast.

In Iowa more precipitation fell and more days were rainy in the period, February 1 to April 30, than in any other similar period in the 30 years since statewide records have been compiled, 9.53 inches falling on 28 days, or 3.75 inches, and 9 days, above the respective normals. The precipitation is 165 per cent of the normal. The year 1897 has held the record heretofore, with 8.63 inches and 24 rainy days.

SNOWFALL.

There was generally less snow in the Western States than usual in April, except over the eastern slopes of the Rocky Mountains, where, from Wyoming and South Dakota to the Pan Handle of Texas and central New Mexico, the amounts were unusually large, most of which occurred from the 6th to the 9th, when real winter weather prevailed. During this period heavy snows fell over the western portions of the Plains States, accompanied by high winds and near-blizzard conditions. The drifting snow greatly hampered train and wire communications, delayed farming operations, and was severe on young stock. Over the foothills the snow depth ranged frequently from 6 to 12 inches or more, while in the high elevations of New Mexico the fall amounted to several feet. Over Arizona the comparatively warm weather carried off most of the snow from the mountains, but without any material rise in the streams. The stored water available for irrigation was therefore not materially increased, and the outlook for a sufficient supply of water for irrigation is unfavorable.

RELATIVE HUMIDITY.

For the month as a whole the relative humidity was lower than the seasonal average in most sections east of the Mississippi and south of the Ohio rivers and in the northern and central districts to westward of the Rocky Mountains. From New Mexico and western Texas northward to the Canadian border and northeastward to the Lake region and New England, the relative humidity was above normal. The excesses over the Great Plains were unusually large, ranging locally from 10 to 20 per cent, while the deficiencies in portions of the east Gulf States, and locally in the far West, were nearly as great.

SEVERE STORMS.

Despite the presence of atmospheric pressure and temperature distribution favorable for severe local storms, the month was comparatively free from these visitations. On the 6th three small tornadoes formed in eastern Nebraska. (See pp. 234–236, above.) On the 8th small tornadoes were reported locally in west-central Texas, but without material property loss. In Iowa a small tornado occurred in Clinton County on the afternoon of the 23d, but this was likewise without much property loss.

Average accumulated departures for April, 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.
	°F.	°F.	°F.	In.	In.	In.	P. Ct.		P. Ct.	
New England	43.4	−0.2	+12.5	2.47	−0.60	+1.50	6.7	+1.1	74	0
Middle Atlantic	51.2	+0.5	+12.4	2.86	−0.20	−0.90	5.7	+0.4	66	− 2
South Atlantic	61.9	+0.7	+ 4.8	1.93	−1.40	−3.40	4.0	−0.2	67	− 4
Florida Peninsula	73.0	−0.6	− 1.2	2.20	+0.30	+3.00	4.1	+0.4	70	− [illegible]
East Gulf	64.2	−0.4	+ 0.1	4.94	+0.90	+3.20	3.9	−1.1	67	− 5
West Gulf	65.5	−0.4	− 0.5	2.64	−0.90	−1.40	4.6	−0.5	72	− 1
Ohio Valley and Tennessee	54.8	+0.2	+ 7.5	3.02	−0.60	−2.50	6.2	+0.8	66	0
Lower Lakes	44.6	−0.6	+12.8	3.84	+1.50	−0.70	7.0	+1.2	73	+ 2
Upper Lakes	41.9	+1.1	+17.5	2.90	+0.60	−0.40	6.5	+0.8	76	+ 3
North Dakota	42.9	+2.2	+16.0	1.51	−0.40	−0.40	5.6	+0.4	70	+ [illegible]
Upper Mississippi Valley	51.0	+0.5	+15.6	3.21	+0.30	−0.40	6.6	+1.3	70	+ 2
Missouri Valley	50.3	−0.2	+16.7	3.30	+0.40	0.00	6.4	+1.1	71	+ 7
Northern slope	45.3	+2.5	+12.7	1.17	−0.40	−1.10	5.3	+0.2	60	0
Middle slope	52.8	−1.0	− 6.0	3.30	−1.10	−1.00	6.2	+1.5	68	+10
Southern slope	61.6	−0.8	− 3.8	2.86	+1.20	+2.80	4.0	−0.4	63	+10
Southern Plateau	59.7	+1.9	− 7.3	0.56	+0.20	−0.10	3.3	+0.5	40	+ [illegible]
Middle Plateau	50.7	+1.8	+ 0.8	0.69	−0.50	−1.60	4.9	+0.8	47	− 1
Northern Plateau	50.8	+1.8	+ 9.2	1.16	−0.20	−0.20	5.9	+0.6	55	− [illegible]
North Pacific	50.2	+1.2	+ 5.1	3.64	+0.40	+2.80	6.4	+0.2	77	+
Middle Pacific	55.0	+1.4	− 0.9	0.82	−1.30	−0.60	4.7	+0.5	69	−
South Pacific	59.8	+1.3	+ 2.4	0.16	−0.80	−3.30	4.1	+0.3	71	+

Winds of 50 mis./hr. (22.4 m./sec.), or over, during April, 1919.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
Alpena, Mich	16	52	ne.	North Head, Wash.	9	62	se.
Block Island, R. I.	25	56	w.	Do	17	55	s.
Buffalo, N. Y.	25	52	w.	Do	18	54	s.
Cheyenne, Wyo.	5	52	w.	Do	19	60	se.
Do	13	54	w.	Oklahoma, Okla.	9	58	w.
Do	14	50	nw.	Pensacola, Fla.	10	50	se.
Dallas, Tex	4	51	nw.	Pierre, S. Dak.	5	58	nw.
Drexel, Nebr.	7	54	s.	Point Reyes Light, Calif.	5	65	nw.
Do	22	70	w.	Do	6	54	nw.
Duluth, Minn.	7	57	ne.	Do	7	55	nw.
Ellendale, N. Dak.	5	54	w.	Do	13	51	nw.
Do	7	50	ne.	Providence, R. I.	25	55	w.
El Paso, Tex.	6	54	w.	Pueblo, Colo.	6	50	w.
Erie, Pa.	16	52	se.	St. Louis, Mo.	7	50	s.
Green Bay, Wis.	7	60	ne.	Salt Lake City, Utah	5	50	nw.
Hatteras, N. C.	24	50	n.	Sandusky, Ohio	10	58	sw.
Independence, Calif.	5	54	w.	Do	23	52	n.
Do	13	60	nw.	Sandy Hook, N. J.	11	61	s.
Modena, Utah	5	54	sw.	Seattle, Wash.	19	50	sw.
Do	13	57	sw.	Tatoosh Island, Wash	10	52	sw.
Mount Tamalpais, Calif.	5	66	nw.	Do	15	54	e.
Do	6	68	nw.	Do	19	54	s.
New York, N. Y.	24	62	nw.	Toledo, Ohio	10	52	s.
Do	25	61	nw.	Tonopah, Nev.	5	53	w.
Do	26	53	nw.	Wichita, Kans.	7	52	w.
North Head, Wash.	3	56	se.	Do	19	50	sw.
Do	5	54	nw.				