

SECTION VII.—WEATHER AND DATA FOR THE MONTH.

THE WEATHER OF THE MONTH.

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

[Dated: Weather Bureau, Washington, Feb. 3, 1916.]

PRESSURE.

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

For the month as a whole the mean barometric pressure was below the normal over most of the country. The only sections showing positive departures were the upper Lake region, the interior of the northern portion of the Pacific States, and the central Florida Peninsula. The positive departures were generally small, the greatest values appearing in the northern portion of the upper Lake region. On the other hand, the negative departures were quite marked in New England and the Canadian Provinces to the eastward.

The month opened with relatively high pressure throughout most sections, except in the upper Lake region and along the Pacific coast, where it was near or slightly below the normal. High pressure continued for about a week over most sections, except along the northern and southern borders, where it was relatively low most of the time. From the latter part of the first week until near the end of the fourth week a succession of rather extensive and well-defined low and high pressure areas followed each other across the country, with rather sluggish movement at times.

During the latter part of the month rather marked low pressure prevailed throughout most southern sections, while in the northern districts pressure was generally high. However, the month closed with relatively low pressure in the extreme southwest, northwest, and northeast sections of the country, while elsewhere high pressure obtained.

The distribution of the highs and lows was generally favorable for northwesterly and westerly winds in the New England and Middle Atlantic States, the Lake region, the upper Mississippi and the Missouri Valleys, southerly and southeasterly in the Central and West Gulf States and the lower Mississippi Valley. Elsewhere variable winds prevailed.

TEMPERATURE.

The month opened with cool weather prevailing in the Eastern and Southern States and with a decided fall in temperature in the Rocky Mountain districts, but relatively warm weather obtained in the West Gulf region and the great central valleys. During the following day or two there was a slight warming up in the more eastern districts, but at the same time cooler weather obtained in the great central valleys, which by the middle of the first decade had overspread all districts to the eastward of the Mississippi River, and in the meantime temperatures had risen materially in Plateau and Rocky Mountain districts. There were no important or widespread

temperature changes during the last half of the first decade, but by the beginning of the second considerably warmer weather had set in over the Southwest, which advanced during the next few days into the East Gulf and South Atlantic districts. At the same time a high-pressure area, with much colder weather, advanced into the northern Plains region and temperature readings of -10°F . were reported from points in those districts. This cold area moved rapidly eastward, but with decreasing intensity, and by the middle of the month considerably warmer weather was again in evidence over the Plains States and the central valleys to the eastward. During the last half of the second decade temperature changes were frequent in most districts east of the Rocky Mountains, warm and cold spells succeeding each other rather rapidly, but there were no pronounced or widespread abnormal temperature conditions, while to the westward of the mountains cold weather predominated.

At the beginning of the third decade temperatures had fallen considerably in the southern Rocky Mountain districts and West Gulf States, but at the same time a warm area was advancing from the Northwest. It moved southeastward during the following few days, and by the 23d there was a general warming up in most eastern districts. Near the middle of the decade decidedly cooler weather had again advanced into the Plains region and West Gulf States and by the 26th considerably lower temperatures obtained in most districts to the eastward of the Mississippi. During the last few days of the month temperature changes were rather frequent but not unusually large, and the areas affected were comparatively small. The month closed, with abnormally low temperatures in New England and the interior of New York, and likewise over the Northwest and generally west of the Rocky Mountains, -16° being reported from Northfield, Vt., and -24° at Lander, Wyo., on the morning of the 31st.

Day temperatures.—Much cloudy weather over eastern districts resulted in only moderately high day temperatures despite the general absence of any severe cold. At a few points they were as high as any previously recorded in December, especially in the far Northwest on the 8th, over the middle Plains region on the 22d, and along the Virginia coast on the 29th. Over the northern districts from the Dakotas eastward the maximum temperatures did not rise much above 40° , and at some places they were below that point.

Night temperatures.—Over all districts from the Rocky Mountains eastward the night temperatures were moderately high; in fact, at no points did the extremes closely approach the low readings of some previous years. Similar conditions prevailed in the far West also until near the end of the month, when a cold area overspread the northern portions, and minimum temperatures on the mornings of the 30th and 31st were as low as, or lower than, any previous December record in some districts.

Monthly averages.—Over nearly all districts from the Mississippi River eastward the monthly means were near or slightly below normal, while to the westward they were above normal, save for a small area in the Plateau region. The excesses were generally small, however, except in the Missouri Valley and the eastern portions of the Plains region, where they ranged from $+3$ to $+6$ degrees.

PRECIPITATION.

High pressure dominated weather conditions in most districts during the first few days of the month and consequently only local precipitation occurred, although there was heavy snowfall along the eastern end of Lake Ontario on the 3d and 4th, and considerable precipitation occurred in the far western districts, beginning about the 2d.

On the 6th and 7th low pressure obtained in the west Gulf region, attended by heavy rainfall in portions of Texas, while at the same time a storm of considerable severity moved along the northern border, but it was attended by comparatively light precipitation.

The first general and important storm of the month moved from the eastern slope of the Rocky Mountains on the 9th to the New England coast by the 14th, accompanied by general precipitation in nearly all districts from the middle Plains region to the Atlantic coast and New England, with heavy snows in portions of the Appalachian Mountains and North Atlantic States. This storm reached New England with greatly increased intensity, attended by shifting gales on the coast and high winds, snow, and sleet in the interior of the northeastern States, the snowfall being unusually heavy from central Pennsylvania northeastward to New England, nearly 3 feet occurring at points in New York.

Closely following the above-mentioned storm, another low-pressure area appeared in the far Southwest about the 15th, and during the last half of the second decade storm movement was rapid over eastern districts, with general precipitation and heavy local rainfalls in the Gulf States.

From the 19th to the 23d high pressure prevailed over most districts with resultant generally fair weather, except that local heavy rain or snow occurred in portions of the Southeastern States about the 20th, the snowfall being unusually heavy in the eastern portion of the Carolinas, the fall at Wilmington, N. C., from 8 p. m. of the 20th to 8 a. m. of the 21st being about 7 inches, the heaviest of record for December. However, about the 23d a depression developed in the central Rocky Mountain region, moving southeastward to Oklahoma by the following day, and thence northeastward to New England by the 26th, with greatly increased intensity. This storm was attended by rains and snows over most sections from the Plains region eastward, and by heavy snows locally from Missouri northeastward to lower Michigan, and by high winds along the Atlantic coast. Closely following this storm another low pressure area appeared in the Southwest about the 27th, advancing eastward to the west Gulf by the following day. Thence it moved rapidly northeastward to New England, attended by general, and in some cases heavy rains in the southern districts, and by rain, sleet, or snow from the Ohio Valley and Lake region eastward. At the same time rains occurred in the Pacific Coast States and quite general snows in the Rocky Mountain and Plateau districts, the snowfall being unusually heavy at elevated points in northern Arizona.

The month closed with an extensive area of high pressure overlying the country to the eastward of the Rocky Mountains, and with generally fair weather prevailing in eastern districts, but low pressure obtained in the far Southwest, which was causing rains and snows in the southern portions of the Plateau and Rocky Mountain regions, and local rains in the southern Plains States and west Gulf districts.

Snowfall.—Some heavy falls of snow occurred in portions of New York, Pennsylvania, and the New England States, but elsewhere east of the Rocky Mountains the amounts as a rule were light. In the far western mountains moderate to heavy falls appear to have occurred in

portions of Washington, Oregon, California, and Arizona, while elsewhere on the western slope of the Rockies the amounts were generally moderate to light.

GENERAL SUMMARY.

While severe storms prevailed over the northeastern districts about the 13th and 26th, other portions of the country were remarkably free from the adverse conditions that frequently prevail during December, and on the whole the weather was favorable for the usual growth of winter crops and the pursuit of such outdoor work as is commonly performed during a winter month.

In the corn and winter wheat-growing regions favorable weather permitted the gathering of the greater part of the corn crop, although in Kansas much still remained un-gathered. Winter wheat was very generally reported in good condition, and some protection was afforded by a slight snow cover at the period of coldest weather. The surface soil was becoming very dry in portions of Oklahoma, and wheat was suffering to some extent, but in most other districts the soil contained sufficient moisture for the present needs of that crop.

In the southern districts the weather was mostly favorable, little damage occurred from cold in the winter trucking sections, and fall-sown oats and other grains were in good condition.

On the great stock ranges of the West the absence of any material snow cover for lengthy periods permitted of continued winter grazing, save in some northern districts where on account of late growth the grass was not matured when freezing weather occurred, and in the far Northwest where drought in the fall and considerable snow cover later rendered much feeding necessary. As a rule, stock of almost every kind was reported in good condition not only on the ranges but on the farms of the central and eastern districts.

Over the North Atlantic States severe storms with high winds caused serious damage along the coast, while inland heavy snows and high winds interfered greatly with transportation and overhead wire communication. Sleet storms in the Ohio Valley caused delay in transportation and damage to overhead wires and trees, and heavy rains in portions of the southern Appalachian Mountain region caused local freshets.

Average accumulated departures for December, 1915.

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.....	30.5	+1.2	+15.4	4.05	+0.70	-4.90	6.6	+0.5	78	+3.0
Middle Atlantic.....	34.0	-1.2	+10.0	3.64	-0.50	-2.50	6.6	+0.5	78	+3.0
South Atlantic.....	45.2	-1.9	+ 5.5	2.66	-1.00	-8.30	4.4	-0.7	77	+1.0
Florida Peninsula.....	64.1	-1.7	+ 5.3	2.18	+0.20	-8.50	4.4	-0.4	77	+1.0
East Gulf.....	49.6	+0.4	+ 7.9	5.54	+1.00	+0.40	5.3	+0.0	77	+1.0
West Gulf.....	51.0	+2.8	+ 4.3	3.04	+0.20	-4.30	5.3	+0.1	77	+1.0
Ohio Valley and Tennessee.....	35.6	-1.2	- 0.2	5.78	+2.40	+0.20	7.3	+1.2	78	+3.0
Lower Lake.....	28.1	-1.0	+ 0.5	2.97	+0.10	-1.30	8.2	+0.5	77	+2.0
Upper Lake.....	24.8	+0.3	+10.0	1.34	-0.80	-2.90	7.2	+0.5	77	+2.0
North Dakota.....	16.0	+5.0	+23.1	0.62	0.00	-0.50	6.4	+1.0	78	+3.0
Upper Mississippi Valley.....	28.0	+0.6	+ 6.3	1.72	-0.70	+6.20	6.7	+0.9	81	+3.0
Missouri Valley.....	30.3	+3.4	+ 0.5	1.05	0.00	+7.50	5.0	+0.5	77	+2.0
Northern slope.....	25.8	+2.1	+ 7.7	0.94	+0.10	-1.50	4.5	+0.8	77	+2.0
Middle slope.....	35.8	+2.8	- 1.0	0.39	-0.40	+7.10	4.5	+0.4	68	+2.0
Southern slope.....	46.4	+2.8	-16.1	0.86	+0.30	+0.60	3.6	+1.1	69	+2.0
Southern Plateau.....	44.1	+0.7	+ 0.8	1.11	+0.10	-1.50	3.4	+0.2	54	+3.0
Middle Plateau.....	31.0	+0.7	+ 0.8	1.58	-0.20	-0.20	2.0	+1.1	70	+0.0
Northern Plateau.....	23.2	+0.6	+16.3	1.58	-0.20	-0.20	2.0	+1.2	75	+1.0
North Pacific.....	42.2	+0.6	+22.2	10.21	+2.30	+4.10	8.3	+0.5	85	+5.0
Middle Pacific.....	48.3	+0.2	+ 7.3	5.35	+0.30	+2.40	5.5	+0.4	77	+1.0
South Pacific.....	53.0	+0.6	+14.3	2.87	+0.70	+3.20	4.2	-0.1	69	+0.0

LOCAL STORMS DURING DECEMBER.

The following notes of severe storms have been extracted from the report of the section director, Vicksburg, Miss.:

On December 17, 1915, a series of severe local storms or tornadoes passed over parts of Clark, Lauderdale, and Kemper Counties. The storms appeared at all points between 4 and 5 a. m. and were accompanied by inky black clouds of the usual pendant formation, frequent electrical discharges, very high wind velocities, and heavy rains followed. The paths of the storms ranged from 50 to 800 yards in width. There were 6 deaths, about 75 persons were injured, and property loss estimated at \$200,000. Every building in the vicinity of Preston, Kemper County, was demolished.

THE TORNADO OF DECEMBER 17, 1915, IN EASTERN MISSISSIPPI.

By DON McNEAL, Assistant Observer.

[Dated: Weather Bureau, Meridian, Miss., Jan. 7, 1916.]

In concurrence with the passing of a cyclonic area over Mississippi during the night of December 16 and the early morning of the 17th a severe local storm was experienced over Clark, Lauderdale, and Kemper Counties in eastern Mississippi. The depression, appearing over northeastern Mississippi and central Tennessee, as based on the 8 a. m. reports of December 17, appeared to be a secondary center of the storm then moving eastward over the Great Lakes, and served to outline a well-defined and characteristic V-shaped depression over the southern States.

Thunder was heard at the Meridian station during the early morning, but no unusual phenomena were observed. The storm first appeared in violence as a tornado near Shubuta, in the southern portion of Clark County. From here it moved north and northeastward in a zigzag and erratic manner, and with decreasing violence as it approached the more uneven topography of Lauderdale County. It appeared to have spent itself at this point, but later reappeared with extreme violence near Daleville, in the northern portion of the county. It then continued in intensity, and again moved northeastward in a broken and uneven course across the swampy and heavily forested areas of that section, leaving destruction in its wake throughout a path ranging in width from 50 to 800 yards. It was last observed in the vicinity of Geiger, Ala., which place marks the end of the path of serious damage.

This tornado appeared between 4 and 5 a. m. at all places throughout its course, so that observations of the meteorological elements were incomplete and lacking in detail. All observers agree, however, that the clouds were inky black; that there were frequent electrical discharges which, in some instances, were observed as converging to a common center; that the disturbance passed at an extreme velocity, and that the usual pendant-formed cloud was present. No hail was reported from any point along the path of the storm, but in every case heavy rains followed immediately as the high winds subsided.

Throughout its path, buildings were unroofed or completely demolished, and heavy timber was uprooted and strewn about in a heterogeneous manner with other debris. At Preston, practically the entire town was

destroyed, and many persons were injured, although no deaths are reported. Five miles east of Scooba, where the storm seems to have developed its greatest violence, many peculiar incidents are related in connection with it. Here limbs are said to have been torn from one side of pine trees, while on the other side the limbs and branches were left intact; one side of the roof of a barn was torn completely off, while the other side remained undamaged; one oak tree 4 feet in diameter was uprooted and carried 16 feet and then left resting with the top pointing toward the southwest. Another oak tree 30 inches in diameter was severely twisted at a point 4 feet above the ground and left standing in this condition. One instance is related where it is said that a negro woman was picked from her bed and dashed to death, while a 4-month-old child lying by her side remained unhurt. In another house, where all windows and doors were blown out, a quart of canned fruit, in a glass container, was lifted from the mantelpiece and deposited on the floor undamaged. A negro child was said to have been carried a distance of 300 feet by the wind and lodged in a tree, where it was found, after the storm had passed, in a dying condition.

Authentic reports place the number of deaths resulting from this storm at 6—all negroes—while the number of persons injured will probably reach 75. Property loss, including damage to timber, is estimated at \$200,000.

Maximum wind velocities, December, 1915.

Station.	Date.	Velocity.	Direction.	Station.	Date.	Velocity.	Direction.
		<i>Mis./hr</i>				<i>Mis./hr</i>	
Block Island, R. I.	10	34	nw.	Norfolk, Va.	18	55	sw.
Do.	13	63	ne.	Do.	25	53	w.
Do.	14	60	w.	Do.	26	50	w.
Do.	18	56	nw.	Do.	29	53	sw.
Do.	20	85	w.	North Head, Wash.	2	52	se.
Do.	29	67	ne.	Do.	4	72	se.
Boston, Mass.	13	52	ne.	Do.	5	70	s.
Buffalo, N. Y.	13	52	w.	Do.	7	72	se.
Do.	23	54	w.	Do.	8	68	se.
Do.	24	50	w.	Do.	19	78	se.
Do.	25	54	w.	Do.	20	76	se.
Charlotte, N. C.	25	50	sw.	Do.	21	63	s.
Do.	29	58	sw.	Do.	24	54	s.
Charlottesville, Tenn.	29	59	sw.	Do.	27	54	s.
Cheyenne, Wyo.	14	58	w.	Do.	28	73	nw.
Do.	20	70	w.	Do.	28	70	sw.
Do.	21	66	w.	Pensacola, Fla.	3	60	s.
Do.	22	72	w.	Point Reyes Light, Cal.	9	52	nw.
Do.	25	56	w.	Do.	12	65	s.
Columbus, Ohio.	23	50	w.	Do.	13	67	s.
Eastport, Me.	14	63	ne.	Do.	14	52	nw.
El Paso, Tex.	26	51	w.	Do.	15	67	nw.
Do.	31	54	sw.	Do.	25	62	nw.
Eric, Pa.	17	52	se.	Do.	28	68	nw.
Fort Worth, Tex.	24	50	nw.	Do.	28	54	nw.
Hartford, Conn.	26	58	nw.	Portland, Me.	14	52	w.
Hatteras, N. C.	18	52	sw.	Providence, R. I.	15	52	w.
Do.	25	52	sw.	Do.	18	50	w.
Do.	26	66	w.	Do.	26	62	nw.
Key West, Fla.	20	56	n.	Do.	26	50	sw.
Lexington, Ky.	29	56	sw.	Do.	26	50	se.
Mt. Tamalpais, Cal.	3	38	sw.	Sand Key, Fla.	11	66	nw.
Do.	4	37	nw.	Do.	9	52	nw.
Do.	8	50	nw.	Sandy Hook, N. J.	10	55	nw.
Do.	9	62	nw.	Do.	13	61	nw.
Do.	13	54	sw.	Do.	14	55	w.
Do.	25	54	nw.	Do.	18	50	nw.
Do.	26	37	n.	Do.	26	76	w.
Do.	28	67	nw.	Do.	29	59	no.
Do.	29	53	nw.	Do.	25	52	sw.
Mobile, Ala.	28	50	sw.	Savannah, Ga.	19	57	sw.
Nantucket, Mass.	13	72	e.	Seattle, Wash.	21	52	sw.
Do.	14	72	sw.	Do.	2	52	sw.
Do.	26	72	sw.	Tatoosh Island, Wash.	4	52	s.
Do.	29	60	ne.	Do.	5	68	s.
Do.	29	53	sw.	Do.	7	64	s.
Nashville, Tenn.	29	61	nw.	Do.	8	61	s.
New Haven, Conn.	20	61	nw.	Do.	19	60	sw.
New York, N. Y.	9	54	nw.	Do.	20	74	sw.
Do.	10	64	nw.	Do.	21	60	sw.
Do.	13	66	n.	Do.	21	60	sw.
Do.	14	64	nw.	Do.	27	60	sw.
Do.	18	64	nw.	Do.	28	58	sw.
Do.	25	62	s.	Do.	28	64	sw.
Do.	26	90	nw.	Trenton, N. J.	26	64	sw.
				Wichita, Kans.	19	52	n.