

## WEATHER, FORECASTS, AND WARNINGS FOR THE MONTH.

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The month was unusually stormy over the North Atlantic steamship routes; barometric depressions of marked intensity passing eastward from the Canadian Maritime Provinces on the 3d, 10th, 15th, 21st, 23d, 28th, and 30th. Marked depressions appeared in the region of Iceland on the 1st, 3d, and 10th; at other times during the month the pressure in that region was near or above the normal, the excess in pressure being decided from the 12th to 29th, inclusive. The high-pressure area over the middle latitudes of the Atlantic Ocean was well defined until the 16th, after which date it was unimportant. Barometric readings reported from northern Europe were above the normal during the greater part of the month, but over southern Europe they were near or below the normal after the 12th. A well-defined storm area passed southeastward over the North Sea to Central Europe on the 13th to 15th, and thence eastward, maintaining its identity in its course to eastern Siberia. Another disturbance passed eastward across southern Europe from the 17th to 22d, and a third storm of great intensity followed this, beginning over extreme southwestern Europe on the 25th. This latter disturbance caused snow and gales over Central Europe and the British Isles and destructive winds on the Mediterranean Sea. The pressure fluctuations over Alaska were pronounced, high areas appearing from the 1st to 4th, 13th to 16th, 20th to 22d, and 29th to 31st, and well-defined depressions appearing on the 10th to 12th, 17th to 20th, and 23d to 28th.

In the United States the temperature averaged much above the normal, except in the Atlantic States from South Carolina to New England, and in the upper Ohio Valley and the Lower Lake region. The departure from the average temperature for this month was  $+6^{\circ}$  to  $+12^{\circ}$  over the Plains States and the Rocky Mountain regions. Well-distributed precipitation occurred east of the Mississippi River and in the southern Plains States, California, and the southern Plateau and southern Rocky Mountain regions.

Rains continued in California at the opening of the month, and there were rains on the 1st in the Gulf and South Atlantic States, and rains and snows in the middle Mississippi Valley, Kentucky, Tennessee, and the mountain regions of the South Atlantic States, attending the eastward movement of a disturbance of minor intensity across the Gulf States. Temperatures were low at the beginning of the month, and on the 2d general frosts occurred in the interior of Texas and Louisiana and freezing temperatures were recorded in Tennessee and Arkansas. Frosts occurred in the East Gulf and South Atlantic States as far south as extreme northern Florida on the morning of the 3d and again on the 4th. The disturbance above referred to passed off the South Atlantic coast the night of the 1st, when another widespread depression was passing across the Great Lakes, causing westerly gales and snow furies in that region. Rains continued in the Pacific States during the 2d and 3d and on the 4th were general west of the Rocky Mountains, on which date an extensive area of low barometric pressure prevailed in that region. Southeast storm warnings were ordered for the California coast on the 3d, and high winds followed in the region covered by the warnings during the afternoon and night of the 3d. Warnings were continued on the California coast from the 4th to 6th, and were ordered for

the North Pacific coast on the 7th. The disturbance in this region caused general rains west of the Rocky Mountains on these dates and on the 7th and 8th they were heavy in parts of California.

The following weekly forecast was issued Sunday, March 5, 1911:

The indications are that the coming week will be one of moderate temperature with considerable cloudiness and well-distributed precipitation over much of the country. The principal disturbance to cross the United States during the week is now off the north Pacific coast, whence it will move eastward, crossing the Middle West Tuesday and Wednesday and the Eastern States by Wednesday or Wednesday night; this disturbance will be preceded by rising temperature and be accompanied by general precipitation. It will be followed by a change to colder weather in Northern and Central States from the Rocky Mountains to the Atlantic coast during the latter part of the week.

On the 4th a depression formed in the extreme Northwest and advanced to the northern Plains States on the 5th, whence it moved east by south and reached the Middle Atlantic States on the 6th, attended by general snows from the Great Lakes eastward to New England and rains in the Ohio Valley, Tennessee, and the Middle Atlantic States. On the morning of the 6th, when the disturbance was centered over Maryland, northeast storm warnings were displayed on the New England coast from Portland, Me., to Bridgeport, Conn. The highest wind velocity reported was 52 miles an hour at Nantucket the night of the 6th. The pressure increased decidedly during the night of the 6th and the temperature fell rapidly in the Middle Atlantic and New England States, readings below zero being reported from extreme northern New York and northern New England. A disturbance of moderate intensity moved to Missouri on the 7th from the middle Rocky Mountain region, advanced thence in a due east course and passed off the North Carolina coast on the 8th. This disturbance caused moderately heavy snows in the Upper Ohio Valley and the Middle Atlantic States, except New York, and rains and thunderstorms in the Middle Mississippi and Lower Ohio Valleys and the northern portions of the Gulf States. Storm warnings were ordered for the Middle Atlantic coast the afternoon of the 7th, the display being followed by strong northeast winds, and snow off the coast from Cape Cod to Hatteras. Following the disturbance that passed off the Middle Atlantic coast on the 8th, the pressure increased rapidly in the Eastern States and the temperature was below normal in these districts, freezing weather occurring during the night of the 9th as far south as North Carolina and frost southward to Augusta, Ga. A fall in pressure set in over the Northwest on the 8th, and on the 9th a depression developed over the Upper Mississippi Valley. On the 10th it passed to sea off the New England coast and was followed by northwest gales from Delaware Breakwater to Cape Cod.

Storm warnings were displayed in advance of the occurrence of these winds, the highest of which was 52 miles an hour at New York the afternoon of the 10th. Rains occurred in connection with this disturbance in the Middle Atlantic and New England States, the Upper Ohio Valley, and the Lake Region.

A prolonged series of rains in the Pacific States ended on the 10th, when an area of high barometric pressure moved inland from the Pacific Ocean. This high advanced eastward, preceded by an extensive area of low

pressure attended by rains. It caused considerably colder weather on the 11th in the Plateau and Rocky Mountain regions, on the 12th in the Plains States and the Central Valleys, and on the 13th in the Gulf and Atlantic States; on the last-named date freezing temperature occurred as far south as the Texas Panhandle and Oklahoma.

The following weekly forecast was issued March 12, 1911:

Temperatures during the coming week will be near or above the normal, preceded, however, by a change to lower temperature Monday and Tuesday in Eastern and Southern States. The weather during the week will be generally fair in Southern States, the western Plateau region, and California. A disturbance that is now over southern Alaska will appear on the north Pacific coast Monday or Monday night, cross the Middle West Tuesday night or Wednesday, and the Eastern States about Thursday; this disturbance will be attended by rains in the North Pacific States and rains or snows in Northern and Middle States from the Rocky Mountains to the Atlantic coast. A change to colder weather will overspread the Northwestern States the latter part of the week.

A disturbance of moderate intensity that appeared over southern Alaska on the 11th crossed the Northwestern States on the 13th, the Great Lakes on the 14th, and reached the New England States on the evening of the 15th, being preceded by a disturbance that moved up the Atlantic coast on the 13th and 14th. These disturbances apparently united over New England on the 15th and formed a storm of marked intensity with barometric reading near 29 inches at Eastport, Me., the morning of the 16th. This disturbance was attended by precipitation in the form of rain and snow in the region of the Great Lakes, the upper Ohio Valley, and the Middle Atlantic and New England States. On the 15th and 16th shifting gales prevailed on the Atlantic coast from Cape Hatteras to Eastport and on the former date over the Great Lakes and the upper Ohio Valley. Storm warnings were displayed on the Atlantic coast from Sandy Hook to Portland the evening of the 14th, and on the morning of the 15th were extended northward to Eastport and southward to Cape Hatteras. On the 14th warnings of high winds were sent to ports on the Great Lakes. The storm in the region where warnings were displayed was probably the severest of the winter; winds of 50 miles an hour occurred at a number of points and equaled 60 miles an hour at Block Island on the 16th. Immediately following this disturbance the barometric pressure increased rapidly and a widespread cold wave covered the upper Mississippi Valley, the Lake region, the Ohio Valley, Tennessee, northern portions of the Gulf States, and the Atlantic States as far south as the interior of South Carolina, warnings of which were issued on the 15th and 16th. Frosts occurred on the 17th as far south as northern Florida, and there were freezing temperatures and frosts in the Carolinas, Georgia, and Alabama, warnings of which were issued in ample time to insure protection where available.

The following weekly forecast was issued March 19, 1911:

The indications are that the coming week will be one of average temperature and well-distributed precipitation over the greater part of the country. Abnormally low barometric pressure over the Pacific Ocean is indicative of a period of unsettled weather and general rains in the Pacific States and the western plateau region. The principal disturbance to cross the United States during the week will appear on the Pacific coast Monday or Tuesday, pass eastward over the Middle West about Wednesday, and reach the Atlantic States Thursday. This disturbance will be preceded by rising temperature, attended by unsettled weather, with snows in northern and rains in middle and southern districts, and be followed by a change to considerably colder weather.

A fall in pressure set in over the Northwestern States on the 18th, and on the 19th the center of the disturbance

was over the Great Lakes, whence it moved eastward and apparently united with a secondary disturbance that developed during the night off the Middle Atlantic coast. This disturbance produced general precipitation throughout the Eastern and Southern States, and was followed by moderately high winds off the Middle Atlantic coast. Another disturbance developed in the far Northwest on the 20th, crossed the Middle West on the 22d, and reached the New England coast on the 23d. This storm was attended by shifting gales on the Atlantic coast on the 22d and 23d and over the Great Lakes on the former date. Storm warnings were displayed on the Atlantic coast well in advance of the occurrence of these winds. The highest velocities recorded were 68 miles at Block Island and 60 miles at New York City the night of the 22d. Following this depression the pressure increased rapidly and much colder weather overspread the Mississippi Valley and the Eastern States on the afternoon of the 22d and on the 23d. On the 24th frosts occurred as far south as northern Georgia.

A well-defined storm area passed to British Columbia from the North Pacific Ocean on the 23d and was attended by unsettled weather and rains west of the Rocky Mountain Divide and moderately high winds on the North Pacific coast on the 23d and 24th. On the 25th this depression covered the Rocky Mountain region. A marked area of high barometric pressure passing off the Middle Atlantic coast caused strong northeast winds on the South Atlantic and East Gulf coasts. Advisory warnings were issued for the Florida coast on the 24th, and on the morning of the 25th warnings were ordered on the Atlantic coast from Charleston to Miami and on the Gulf coast from Key West to Pensacola. The highest velocity reported was 52 miles an hour at Pensacola and winds of lesser velocity prevailed in the remaining region where warnings were displayed. On the 26th the western storm was central over the middle Missouri Valley, on which date rains fell throughout the greater part of the country east of the Rocky Mountains and snow fell in the Northern Plains States. On this date cold-wave warnings were issued for Michigan, the upper Mississippi and lower Missouri Valleys, and warnings of freezing temperature were sent to Oklahoma, northwestern Arkansas, and southern Missouri.

The following weekly forecast was issued March 26, 1911:

The week beginning Monday, the 27th, will give temperatures below the seasonal average over the greater part of the country east, and relatively high temperatures west, of the Rocky Mountains. The week will open with general rains in the Eastern States and snows in the region of the Great Lakes, attending the eastward movement of a storm area that was over the Missouri Valley Sunday morning. This disturbance will be followed by a change to colder weather which will overspread the Middle West Sunday night and Monday and the Eastern States Monday night and Tuesday. The next important disturbance to cross the United States will appear in the Northwest Tuesday or Wednesday, cross the Middle West Wednesday or Thursday, and reach the Atlantic States the latter part of the week. It will be preceded by a change to warmer weather and attended by rains in the North Pacific States and in the region from the Mississippi Valley to the Atlantic coast. A change to colder will appear in the Northwest Friday.

The storm that was central in the Missouri Valley on the 26th moved directly eastward; on the 27th its center was over Lake Michigan, and on the 28th over Maine, where the barometric pressure was 29.12 inches. This disturbance produced westerly gales and snows on the Great Lakes and in the upper Mississippi and Ohio Valleys on the 27th. On this date and on the 28th shifting winds were reported from Atlantic coast stations from Cape Hatteras to Nova Scotia, warnings of which were issued and distributed well in advance of their

occurrence. Cold-wave warnings were extended to the Ohio Valley and the Lower Lake region on the 27th and on the 28th were sent to points in northern New England. A general fall in pressure set in over the Rocky Mountain region on the 27th, and at 8 a. m. of the 28th a disturbance appeared over Kansas, which moved directly eastward to Tennessee on the 29th, and thence north-eastward to New England on the 30th, where the pressure fell to below 29 inches. Their disturbance was attended by high shifting winds on the Atlantic coast, warnings of which were ordered well in advance of their occurrence, and general snows over the Northern States from the Mississippi Valley to New England and moderate rains elsewhere east of the Mississippi River during the 29th and 30th.

A marked increase in pressure began over the interior of Alaska on the 29th, and on the 30th the pressure reported at Nome was above 30.50 inches.

*Average temperatures and departures from the normal.*

Districts.	Number of stations.	Average temperatures for the current month.	Departures. Current month.	Accumulated since Jan. 1.	Average since Jan. 1.
New England.....	12	31.2	-1.7	- 0.9	-0.3
Middle Atlantic.....	15	38.7	-1.1	+ 2.0	+ .7
South Atlantic.....	10	53.9	.0	+ 8.3	+2.7
Florida Peninsula*.....	8	67.9	+1.6	+ 9.1	+3.0
East Gulf.....	11	60.3	+3.0	+15.3	+5.1
West Gulf.....	10	61.7	+4.4	+18.9	+6.3
Ohio Valley and Tennessee.....	13	44.8	+ .4	+11.0	+3.9
Lower Lakes.....	10	31.6	- .7	+ 5.0	+1.7
Upper Lakes.....	12	30.9	+3.7	+11.1	+3.7
North Dakota*.....	9	30.0	+9.2	+ 3.4	+ .8
Upper Mississippi Valley.....	14	40.8	+4.8	+14.5	+4.8
Missouri Valley.....	12	43.6	+7.5	+18.1	+6.0
Northern slope.....	9	38.6	+7.8	+ 7.7	+2.6
Middle slope.....	6	48.2	+5.8	+10.0	+5.3
Southern slope*.....	8	57.6	+5.0	+16.9	+5.6
Southern Plateau*.....	10	54.4	+3.1	+ 6.0	+2.0
Middle Plateau*.....	10	41.6	+3.2	+ 7.7	+2.6
Northern Plateau*.....	11	42.6	+4.2	+ 3.1	+ .7
North Pacific.....	7	45.5	+1.3	- 1.8	- .6
Middle Pacific.....	5	54.0	+1.5	- 1.1	- .4
South Pacific.....	4	58.7	+2.7	+ 2.7	+ .9

\* Regular Weather Bureau and selected cooperative stations.

*Average precipitation and departures from the normal.*

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
New England.....	11	3.53	92	-0.3	-1.8
Middle Atlantic.....	15	2.67	73	-1.0	-2.3
South Atlantic.....	10	2.70	64	-1.5	-6.8
Florida Peninsula*.....	8	2.04	67	-1.0	-5.8
East Gulf.....	11	2.79	48	-3.0	-7.0
West Gulf.....	10	2.58	84	- .5	-3.4
Ohio Valley and Tennessee.....	13	2.57	57	-1.9	-2.9
Lower Lakes.....	10	2.07	78	- .6	- .6
Upper Lakes.....	12	1.37	63	- .8	-1.0
North Dakota*.....	9	.25	24	- .8	+ .1
Upper Mississippi Valley.....	15	1.35	55	-1.1	- .8
Missouri Valley.....	12	.83	43	-1.1	- .0
Northern slope.....	9	.37	35	- .7	- .3
Middle slope.....	6	.39	19	-1.2	- .2
Southern slope*.....	8	.56	44	- .7	+ .5
Southern Plateau*.....	11	1.25	132	+ .3	+1.2
Middle Plateau*.....	11	1.13	85	- .9	+1.0
Northern Plateau*.....	11	.49	35	- .2	-1.0
North Pacific.....	7	1.37	28	-3.6	-6.9
Middle Pacific.....	7	4.05	100	- .0	+4.9
South Pacific.....	4	5.32	203	+2.7	+8.1

\* Regular Weather Bureau and selected cooperative stations.

*Average relative humidity and departures from the normal.*

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	70	- 5	Missouri Valley.....	58	-14
Middle Atlantic.....	68	- 4	Northern slope.....	59	- 8
South Atlantic.....	69	- 6	Middle slope.....	54	- 6
Florida Peninsula.....	79	+ 2	Southern slope.....	56	+ 1
East Gulf.....	66	- 7	Southern Plateau.....	54	+18
West Gulf.....	66	- 6	Middle Plateau.....	59	+ 3
Ohio Valley and Tennessee.....	66	- 5	Northern Plateau.....	57	- 9
Lower Lakes.....	71	- 5	North Pacific.....	77	+ 2
Upper Lakes.....	73	- 6	Middle Pacific.....	76	+ 2
North Dakota.....	77	- 1	South Pacific.....	76	+ 5
Upper Mississippi Valley.....	64	- 9			

*Average cloudiness and departures from the normal.*

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England.....	5.1	-0.6	Missouri Valley.....	4.2	-1.5
Middle Atlantic.....	5.2	- .5	Northern slope.....	4.1	-1.3
South Atlantic.....	4.4	- .5	Middle slope.....	4.1	- .5
Florida Peninsula.....	3.5	- .3	Southern slope.....	4.0	+ .2
East Gulf.....	4.2	- .8	Southern Plateau.....	3.9	+ .2
West Gulf.....	5.0	- .1	Middle Plateau.....	4.9	- .1
Ohio Valley and Tennessee.....	5.5	- .5	Northern Plateau.....	3.8	-2.2
Lower Lakes.....	5.9	- .7	North Pacific.....	5.3	-1.3
Upper Lakes.....	5.7	- .3	Middle Pacific.....	5.5	+ .1
North Dakota.....	4.1	-1.5	South Pacific.....	6.1	+ .3
Upper Mississippi Valley.....	4.9	- .8			

*Maximum wind velocities.*

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Atlanta, Ga.....	30	54	sw.	Mount Weather, Va..	30	62	w.
Block Island, R. I.....	15	52	nw.	Do.....	31	62	nw.
Do.....	16	70	nw.	Nantucket, Mass.....	16	54	w.
Do.....	23	66	w.	New York, N. Y.....	10	50	nw.
Buffalo, N. Y.....	1	62	sw.	Do.....	15	50	nw.
Do.....	15	52	nw.	Do.....	16	59	nw.
Do.....	20	54	nw.	Do.....	20	55	nw.
Do.....	27	52	w.	Do.....	22	55	nw.
Do.....	28	54	w.	Do.....	23	59	nw.
Burlington, Vt.....	12	4	s.	North Head, Wash...	3	50	se.
Cape Henry, Va.....	15	56	nw.	Do.....	4	52	se.
Cheyenne, Wyo.....	8	50	w.	Do.....	23	72	se.
Cleveland, Ohio.....	15	54	nw.	Pensacola, Fla.....	26	53	e.
Do.....	27	59	sw.	Pierre, S. Dak.....	26	58	n.
Detroit, Mich.....	27	51	w.	Do.....	29	50	nw.
Dodge, Kans.....	26	53	nw.	Pittsburg, Pa.....	10	52	nw.
Duluth, Minn.....	15	50	nw.	Do.....	15	50	nw.
Fort Smith, Ark.....	28	54	nw.	Do.....	18	50	w.
Hatteras, N. C.....	8	67	n.	Do.....	27	51	sw.
Do.....	13	50	nw.	Point Reyes Light, Cal	3	61	se.
Lexington, Ky.....	27	50	sw.	Do.....	4	76	s.
Lincoln, Nebr.....	26	50	nw.	Do.....	5	60	s.
Do.....	29	50	nw.	Do.....	6	73	s.
Memphis, Tenn.....	29	52	w.	Do.....	24	76	nw.
Minneapolis, Minn.....	14	51	nw.	Do.....	25	68	nw.
Do.....	15	54	nw.	Providence, R. I.....	16	52	nw.
Mount Tamalpais, Cal.	3	51	se.	Rapid City, S. Dak...	8	51	sw.
Do.....	5	54	sw.	St. Paul, Minn.....	14	59	nw.
Do.....	6	54	sw.	Do.....	15	60	nw.
Do.....	7	66	sw.	Savannah, Ga.....	30	54	w.
Do.....	24	58	nw.	Sioux City, Iowa.....	29	56	nw.
Mount Weather, Va..	10	71	nw.	Southeast Farallon, Cal	4	56	s.
Do.....	15	80	w.	Do.....	4	56	s.
Do.....	16	68	nw.	Do.....	24	56	nw.
Do.....	20	54	w.	Do.....	25	52	nw.
Do.....	21	50	nw.	Syracuse, N. Y.....	16	50	w.
Do.....	22	56	nw.	Tatoosh Island, Wash.	23	56	w.
Do.....	23	66	nw.	Toledo, Ohio.....	27	57	sw.
Do.....	27	72	w.	Washington, D. C.....	15	50	nw.
Do.....	28	68	w.	Wichita, Kans.....	26	50	nw.