of reports heard, lasting from 8:07 to 8:25 p. m. There was a slight trace of dust noticed falling at Basseterre, slightly more in Nevis, especially on the southeastern side about 15 miles from here, while in Montserrat enough fell to give a white appearance to the landscape. The dust cloud could be seen to the southeast and south, especially on the 2d of September. On the 3d of September the sunrise effect was very striking as the sun shone through the clouds of dust. There seem to have been an unusual number of days with light haze, but whether this was the effect of the dust clouds or the effect of aqueous vapor it is hard to decide. I am of the opinion that it was a combination of the two.

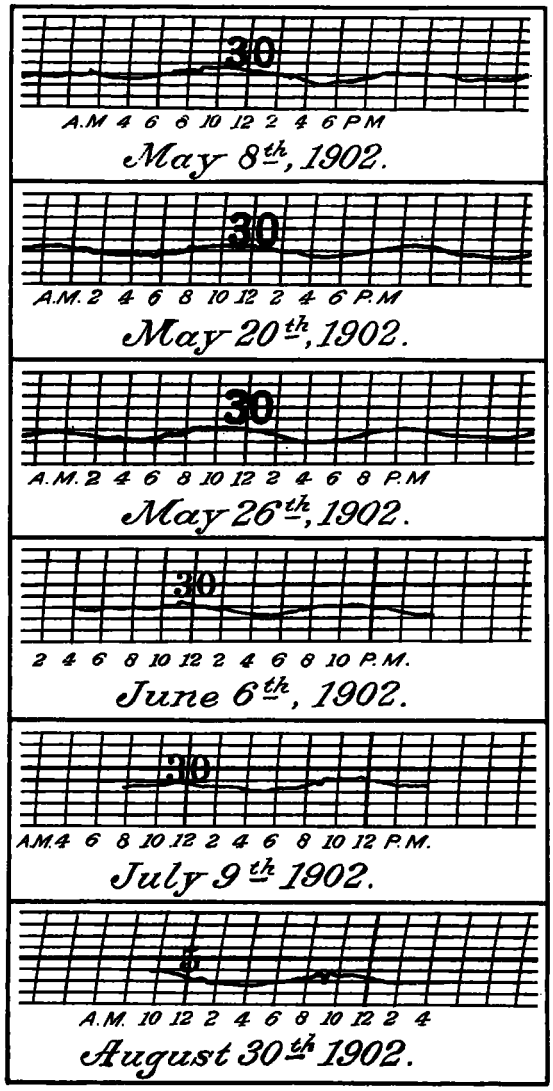

FIG. 1.

I have noticed that while the entire "hurricane season" has been marked by an almost entire absence of decided disturbances to the eastward, the direction of the upper clouds, when visible, has been continually shifting either to the northward or to the southward, usually the latter. The direction would swing around to about south-southeast and then return to normal. This has been repeated continually throughout the summer, occasionally varied by a swing through the northern quadrant.

It would appear as though there were some obstacle to the eastward which prevented the upper currents from flowing from that direction; may this not have been caused by the two columns of heated air rising from the scenes of the eruptions keeping the usual heated air layers stirred up and preventing the heated air from suddenly rising and thus starting a cyclonic disturbance?

I have also noticed that last summer (1901) the mercurial column in the sunshine recorder would often extend itself into the upper bulb, while this summer it has barely reached the contact wires on a great many days, especially in May, June, and July; even on clear days when no haze was visible this effect would be noticed.

I have the honor to enclose copies of the barograph sheets which were kindly loaned me by Mr. W. H. Porter, of Dominica, for the purpose of copying for the use of the Bureau. (See fig. 1.)

They are prints from photographic negatives taken from the original sheets on the days of the greatest eruptions and show quite distinctly the wave effect in the atmosphere.

San Juan.—Mr. E. C. Thompson, Section Director, San Juan, Porto Rico, W. I., reports that with the rainfalls of September 1 and 2 there fell an appreciable quantity of fine volcanic ashes at several stations on the island. One observer filtered 25 cuartillos of rain water and obtained about 5 gramos of ashes. This is supposed to have come from the eruption of August 30 on Martinique.

Turks Island.—Mr. D. Budge, General Station Superintendent for the Halifax and Bermuda Cable Company, at Halifax, N. S., writes: "Our agent at Turks Island reports that from the 29th of August to the 1st of September a heavy mist or haze has been observable around the island; it was so heavy on the 31st of August that the surrounding islands could barely be seen. The days were sunshiny and extremely hot. From what I hear it seems to be an unusual phenomenon here, and I report it as it may be of interest in view of the present volcanic eruptions in the West Indies."

Guatemala.—According to newspaper reports an eruption of the volcano Santa Maria in Guatemala began and continued until October 31 or later. This was a repetition of the eruptions in the same neighborhood in April and May. On October 26 there was a sudden and violent eruption of the volcano of Isalco 20 miles from Acajutla on the coast of San Salvador, after that volcano had been quiet for six months, but this eruption was short lived, whereas the flames, smoke, and ashes from Santa Maria produced widespread destruction. Santa Maria is between Retalhulen and Quezeltenango and in the neighborhood of the towns of San Felige, Mazatenango, and Quezeltenango; its latitude is north 15° and longitude west 92°. Mount Pelee, on Martinique, is in latitude north 14° 50′ and longitude 61° 20′ west. The latter is, therefore, nearly 2,000 miles east of Santa Maria. The smoke and ashes from Santa Maria spread northwestward over Guatemala and Mexico, while those from Pelee and Soufrière spread first southwest, with the lower northeast trades, then easterly with the upper winds and again southwest as they descended into the lower trade.

ROBERT RUBENSON.

We regret to announce the death of Prof. Dr. Robert Rubenson, Director of the Central Meteorological Institute of Sweden on October 14, 1902, after a long illness. Professor Rubenson was born April 10, 1829, and was the author of many works on the climatology of Sweden. Among his earliest memoirs was his investigation of the polarization of blue sky light, and one of his latest was the complete record of ancient observations of auroras in Sweden.

CORRIGENDA.

In September Review for 1902, page 447, column 2, lines 26 and 29 from bottom for "day" read "hour." Line 22 from bottom for "2" read "20." Line 21 from bottom for "1500" read "150."

THE WEATHER OF THE MONTH.

By W. B. STOCKMAN, Forecast Official, in charge of Division of Records and Meteorological Data.

CHARACTERISTICS OF THE WEATHER FOR OCTOBER.

The temperature was above normal in daily values of + 0.2° to + 3.4° in all of the geographical districts except the south Pacific, where the departure averaged 0.5° per day below normal.

The precipitation was in excess of the normal in the Atlantic and east Gulf States, North Dakota, and the middle slope and middle and south Pacific districts; in the remaining districts it was slightly deficient.

In the south Atlantic, Florida Peninsula, and southern slope districts the relative humidity was normal; below normal in New England, upper Lake, Plateau, and north Pacific districts, and above normal elsewhere.

The cloudiness was above the average in New England, south Atlantic, Florida Peninsula, east Gulf, lower Lake, middle slope,

and the Pacific districts; normal in the Ohio Valley and Tennessee, upper Mississippi Valley, and southern Plateau, and below the average in the remaining districts.

The pressure was above the normal in the Middle Atlantic, South Atlantic, and Gulf States, Ohio Valley and Tennessee, North Dakota, the slopes and middle and southern plateaus generally, and southern California.

PRESSURE.

The distribution of monthly mean pressure is shown graphically on Chart VI and the numerical values are given in Tables I and VI.

The mean barometer was highest from Arkansas and Louisiana eastward over the Gulf and South Atlantic States and northeastward over the Ohio Valley and Tennessee, lower lakes, Middle Atlantic States, and southern New England to the Atlantic Ocean; the crest, with readings slightly higher than 30.10 inches, overlying West Virginia and the mountain districts of Virginia, North Carolina, Tennessee, and Kentucky. The mean barometer was lowest over southeastern California and the extreme southwestern States, with a minimum reading of 29.85 at Yuma. The pressure diminished from that of September, 1902, in northeastern New York, New England, southern Florida, Washington, and western Oregon, with a maximum departure of —.10 inch in northeastern Maine; elsewhere it increased, and generally with higher values than in the districts where it had diminished, the greatest increases being over south-central Wyoming and thence southward.

TEMPERATURE OF THE AIR.

The distribution of monthly mean surface temperature, as deduced from the records of about 1,000 stations, is shown on Chart VI.

The average temperature for the several geographic districts and the departures from the normal values are shown in the following table:

Average temperatures and departures from normal.

Districts.	Number of stations.	Average temperatures for the current month.	Departures for the current month.	Accumulated departures since January 1.	Average departures since January 1.
		°	°	°	°
New England	8	51.1	+1.1	+ 3.8	+0.4
Middle Atlantic	12	57.7	+1.9	— 2.4	—0.2
South Atlantic	10	66.6	+2.6	— 5.0	—0.5
Florida Peninsula*	8	75.6	+2.6	— 0.2	0.0
East Gulf	9	67.2	+0.4	+ 0.8	+0.1
West Gulf	7	68.4	+1.3	+ 5.4	+0.5
Ohio Valley and Tennessee	11	59.5	+2.5	— 4.8	—0.5
Lower Lake	8	52.2	+0.9	— 1.8	—0.2
Upper Lake	10	48.5	+1.6	+11.2	+1.1
North Dakota*	8	44.0	+0.2	+12.5	+1.2
Upper Mississippi Valley	11	56.0	+3.3	+ 2.4	+0.2
Missouri Valley	11	55.8	+3.2	+ 6.5	+0.6
Northern Slope	7	49.5	+3.4	+12.7	+1.3
Middle Slope	6	58.2	+2.9	+ 9.2	+0.9
Southern Slope*	6	64.9	+3.2	+10.6	+1.1
Southern Plateau*	13	59.8	+1.6	— 0.7	—0.1
Middle Plateau*	9	49.4	+1.1	+ 1.8	+0.2
Northern Plateau*	12	51.5	+3.4	+ 5.4	+0.5
North Pacific	7	53.9	+2.1	+ 3.9	+0.4
Middle Pacific	5	59.2	+0.9	+ 0.6	+0.1
South Pacific	4	63.0	—0.5	— 4.2	—0.4

*Regular and selected voluntary stations.

The trend of the isotherms of mean temperature differed from that of October, 1901, principally as follows: That of 50° lay somewhat to the southward and eastward, and most decidedly so over the Northern Slope; that of 75° lay considerably to the northward over the Florida Peninsula; that of 80° now appears in extreme southern Florida, but did not appear in October, 1901.

The isotherms of maximum temperature differed from those of October, 1901, principally as follows: that of 90° embraced a more extensive region; that of 100° embraced a much smaller region than in 1901.

The isotherms of minimum temperature lay decidedly to the south of their position in October, 1901.

At regular Weather Bureau stations, temperatures were everywhere above normal, except in small areas on the middle Gulf coast, in central California and on the coast of southern California. On the other hand the voluntary stations show the temperature to have been about normal in Texas, Mississippi, Minnesota, and Alabama, and below normal in Oklahoma, Arkansas, Michigan, and South Carolina. These variations are most likely due to the use of averages based upon fewer years of record at many of the voluntary stations. The greatest departures from the mean daily normals were in Kansas, Nebraska, the Dakotas, Iowa, and Missouri, where they ranged from +2° to +3°.

In Canada.—Prof. R. F. Stupart says:

The temperature was above the average from the Pacific coast to the western margin of the Lake Superior district by an amount varying from 0° to 4°. In the extreme eastern portion of Quebec and throughout the Maritime Provinces it was also above the average, and likewise to an amount varying from 0° to 4°. Elsewhere it was below the average, except over the western half of Lake Ontario and in the Niagara peninsula where there was a small positive departure. The chief negative departure, amounting to 3°, occurred between Lake Superior and the Ottawa Valley.

PRECIPITATION.

The precipitation was in excess of the normal generally in the Atlantic and Gulf States and west-central California, and in parts of the Missouri and upper Mississippi valleys, and middle slope regions, the greatest departure being over western Virginia where it amounted to over +6.0 inches. Where the precipitation was below the normal the changes were not particularly marked, except in scattered localities.

Some stations in Montana report the least precipitation in any October since the beginning of observations. In Pennsylvania the precipitation was unevenly distributed, being heavy in the southeastern part; and for the State as a whole it was the greatest in six years.

Snows occurred in North Carolina on the 28th; in the mountain districts of Idaho; in scattered localities and generally light in New York; on the 14th in parts of Pennsylvania, and throughout the State on the 28th and 29th; in scattered localities in North Dakota near the middle of the month, in amounts of from trace to 4 inches, and which melted rapidly.

Average precipitation and departure from the normal.

Districts.	Number of stations.	Average.		Departure.	
		Current month.	Percentage of normal.	Current month.	Accumulated since Jan. 1.
		Inches.		*Inches.*	*Inches.*
New England	8	4.43	116	+0.6	— 1.4
Middle Atlantic	12	5.29	161	+2.0	— 0.9
South Atlantic	10	4.11	105	—0.2	—11.7
Florida Peninsula*	8	7.21	150	+2.4	+ 0.3
East Gulf	9	3.75	132	+0.9	— 9.7
West Gulf	7	2.56	90	—0.3	— 7.0
Ohio Valley and Tennessee	11	2.09	81	—0.5	— 7.6
Lower Lake	8	2.40	77	—0.7	+ 0.4
Upper Lake	10	2.34	77	—0.7	— 2.8
North Dakota*	8	1.41	140	+0.4	+ 1.2
Upper Mississippi Valley	11	2.10	88	—0.3	+ 1.5
Missouri Valley	11	1.70	89	—0.2	+ 0.9
Northern Slope	7	0.53	64	—0.3	+ 0.2
Middle Slope	6	1.78	113	+0.2	+ 2.9
Southern Slope*	6	1.50	79	—0.4	+ 2.8
Southern Plateau*	13	0.21	30	—0.5	— 1.9
Middle Plateau*	8	0.32	35	—0.6	— 2.2
Northern Plateau*	12	0.58	45	—0.7	— 1.7
North Pacific	7	2.92	59	—2.0	0.0
Middle Pacific	5	2.57	145	+0.8	+ 1.5
South Pacific	4	0.72	116	+0.1	— 0.4

*Regular and selected voluntary stations.

In Canada.—Professor Stupart says:

The precipitation was above the average throughout Ontario and Quebec, except in a few isolated localities in the former province where there was a slight deficiency. Elsewhere in Canada it was below the average except very locally in Alberta and New Brunswick, the negative departures being very marked. In the Northwest Territories and Manitoba the precipitation for the month was extremely light, Winnipeg recording the largest amount, namely, one inch and two-tenths. Qu'Appelle had none, and Battleford, Prince Albert, and Swift Current one-tenth of an inch only. The deficiency in British Columbia varied from half an inch to several inches, while it was from half an inch to two inches over the greater portion of the Maritime Provinces. The chief positive departures occurred in eartern Ontario and over Quebec, where in some places the excess was over an inch.

HAIL.

The following are the dates on which hail fell in the respective States:

Arizona, 29. Arkansas, 12. California, 21, 22, 23, 24. Colorado, 10, 12. Connecticut, 9, 17. Idaho, 10, 28. Indiana, 12, 13, 16, 18, 20. Indian Territory, 12. Iowa, 1, 12, 13, 17, 18, 21, 25, 26, 27. Kansas, 3, 11, 12. Kentucky, 28, 29. Louisiana, 13. Maine, 26, 28, 29. Massachusetts, 12. Michigan, 7, 12, 14, 22, 26, 27, 28. Minnesota, 13, 21, 24, 25, 26, 27, 31. Missouri, 12, 17. Nebraska, 25. New Hampshire, 9, 22, 29. New Jersey, 18, 29, 30. New Mexico, 30. New York, 9, 14, 18, 19, 20, 21, 24, 28, 29, 30, 31. North Dakota, 9, 24, 25, 29. Ohio, 5, 13, 16, 17, 18, 22, 28, 29, 30. Oregon, 31. Pennsylvania, 13, 14, 17, 28, 30. South Dakota, 25. Tennessee, 13. Texas, 2, 19. Utah, 24. Virginia, 11. Washington, 31. Wisconsin, 14, 21, 27. Wyoming, 11, 18.

SLEET.

The following are the dates on which sleet fell in the respective States:

Colorado, 2, 11, 12, 22, 25, 30. Idaho, 25. Indiana, 12. Iowa, 13, 27. Kentucky, 28. Maine, 9, 25, 26, 29. Massachusetts, 26, 29. Michigan, 13, 14, 24, 27, 28. Minnesota, 12, 13, 24, 27. Montana, 12, 25. Nevada, 24. New York, 8, 17, 29, 30. North Dakota, 1, 12. Ohio, 14, 28, 29, 30. Pennsylvania, 14, 15, 17, 28, 29. Tennessee, 28. Wisconsin, 13, 14, 21, 22, 24, 25, 27. Wyoming, 12, 23, 24, 25, 31.

HUMIDITY.

The averages by districts appear in the subjoined table:

Average relative humidity and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
	%			%	
New England	76	− 2	Missouri Valley	68	+ 3
Middle Atlantic	77	+ 3	Northern Slope	65	+ 7
South Atlantic	77	0	Middle Slope	65	+ 7
Florida Peninsula	80	0	Southern Slope	62	0
East Gulf	74	+ 2	Southern Plateau	37	− 8
West Gulf	75	+ 4	Middle Plateau	43	− 2
Ohio Valley and Tennessee	75	+ 5	Northern Plateau	60	− 2
Lower Lake	77	+ 4	North Pacific	82	− 3
Upper Lake	76	− 1	Middle Pacific	72	+ 1
North Dakota	72	+ 2	South Pacific	74	+ 5
Upper Mississippi Valley	73	+ 3			

SUNSHINE AND CLOUDINESS.

The distribution of sunshine is graphically shown on Chart VII, and the numerical values of average daylight cloudiness, both for individual stations and by geographical districts, appear in Table I.

The averages for the various districts, with departures from the normal, are shown in the table below:

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.6	+ 0.1	Missouri Valley	3.7	− 0.2
Middle Atlantic	4.6	− 0.2	Northern Slope	3.9	− 0.3
South Atlantic	4.2	+ 0.2	Middle Slope	3.6	+ 0.5
Florida Peninsula	5.4	+ 0.7	Southern Slope	2.6	− 0.2
East Gulf	4.4	+ 0.8	Southern Plateau	2.0	0.0
West Gulf	3.3	− 0.3	Middle Plateau	3.0	− 0.2
Ohio Valley and Tennessee	4.5	0.0	Northern Plateau	4.3	− 0.8
Lower Lake	6.2	+ 0.4	North Pacific	6.1	+ 0.2
Upper Lake	6.0	− 0.1	Middle Pacific	4.5	+ 1.3
North Dakota	4.7	− 0.4	South Pacific	3.6	+ 0.6
Upper Mississippi Valley	4.4	0.0			

WIND.

The maximum wind velocity at each Weather Bureau station for a period of five minutes is given in Table I, which also gives the altitude of Weather Bureau anemometers above ground.

Following are the velocities of 50 miles and over per hour registered during the month:

Maximum wind velocities.

Stations.	Date.	Velocity.	Direction.	Stations.	Date.	Velocity.	Direction.
Block Island, R. I	12	52	ne.	Mount Tamalpais, Cal	31	56	nw.
Buffalo, N. Y	13	62	w.	New Haven, Conn	12	57	ne.
Do	15	53	w.	New York, N. Y	29	52	nw.
Do	22	66	sw.	North Head, Wash	27	51	se.
Do	30	52	sw.	Do	29	50	se.
Cape Henry, Va	28	50	nw.	Port Reyes Light, Cal	16	50	nw.
Chicago, Ill	4	50	e.	Do	21	60	se.
Do	12	58	s.	Do	22	65	se.
Eastport, Me	28	50	s.	Do	23	58	se.
Minneapolis, Minn	30	58	nw.	Do	31	50	nw.
Mount Tamalpais, Cal	23	56	sw.	Syracuse, N. Y	26	54	s.
Do	24	50	sw.				

ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IV, which shows the number of stations from which meteorological reports were received, and the number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

Thunderstorms.—Reports of 1,800 thunderstorms were received during the current month as against 1,218 in 1901 and 2,641 during the preceding month.

The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 12th, 183; 13th, 149; 26th, 137.

Reports were most numerous from: New York, 183; Iowa, 136; Michigan, 126; Ohio, 114.

Auroras.—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz: 13th to 21st.

In Canada: Thunderstorms were reported as follows: Grand Manan, 31; Yarmouth, 12, 19, 20, 31; Charlottetown, 8; Father Point, 6, 7, 19; Quebec, 6, 19; Ottawa, 6; Toronto, 5, 18, 24; White River, 26; Port Stanley, 5, 18, 23, 26; Parry Sound, 24, 26; Port Arthur, 10. An aurora was reported from Father Point on the 23d, and one from Minnedosa on the 31st.