Mr. P. M. Beal at Colonia Guabairo, estates distant respectively eight and ten miles from Cienfuegos, show a sequence of weather changes in general similar to that at Havana, but the lowest barometer readings were recorded on the afternoon or evening of the 15th, and the wind backed to southwest by the morning of the 16th. The precipitation is given in the following table:

Precipitation, in inches, October 10–22.

Date.	Cienfuegos.	Central Soledad.	Colonia Guabairo.	Havana.
October 10	T.	.....	.....	.33
October 11	0.42	0.78	0.40	0.45
October 12	0.71	0.45	0.37	0.15
October 13	0.32	1.02	0.55	0
October 14	0.20	0.03	0.03	0.56
October 15	T.	0.08	0.11	0.30
October 16	1.39	2.20	3.13	0.74
October 17	2.19	0.76	1.10	0
October 18	1.83	1.50	2.72	0.67
October 19	0.96	1.47	.....	0.60
October 20	0.14	.....	.....	0.38
October 21	0.99	.....	.....	0.02
October 22	0.36	.....	.....	0

The daily precipitation at Cienfuegos and Havana is the total for the twenty-four hours ending at 8 p. m. The hour at which precipitation was measured at the other places is not stated, and the four columns may not be strictly comparable as regards time. Mr. Hughes states that there are several rain gages on different parts of the estate, and that all of them measured different quantities each day, showing that the rain fell in squalls of unequal intensity. On October 21 a shower at an out station measured 3.35 inches in less than an hour.

The Havana Post of October 22 records the experience of the Peninsular & Occidental steamship *Martinique*, which left Havana for Miami, Fla., at 4 p. m. on the 14th and arrived at Key West thirty-three hours later, being delayed in crossing the Gulf by the storm. Between Key West and Miami the ship encountered extremely high winds and seas, and put into Hawk's Channel for shelter, where, on the 16th, the wind was estimated at 50 miles per hour, increasing to 75 miles. "Every room that had a window open was filled with dozens of little birds, while the deck was littered with dead ones that struck the houses and masts in their flight through the darkness, pushed ahead by the fierce storm."—*F. O. S.*

THE DECHEVRENS ANEMOMETER. COLD WAVES.

In the MONTHLY WEATHER REVIEW for March of this year Rev. Marc Dechevrens describes his anemometer for the measurement of the vertical component of the wind, and notes by Professors Abbe and Marvin are added. In a recent letter Father Dechevrens replies to these comments and also refers briefly to his theory of cold waves. A translation of some portions of the letter follows:

I have never attempted to disguise the difficulties inherent in this kind of observations. I had previously expected in China to be able to elevate the windmill on a tower 33 meters high, made for the purpose. Once established at Jersey, I did not rest until I had erected another tower, both higher and more slender, in order to continue my researches on the vertical component of the wind.

I may say that all the precautions enumerated by Professor Marvin have been taken in order to insure the verticality of the principal support, which is a strong tube of steel, ten centimeters in diameter, absolutely inflexible, and also the verticality of the axis of the windmill on its horizontal arm. As regards the latter, I have not been able to do away with an inclination of the axis of eight minutes, but all the hourly velocities have received a corresponding correction.

The movements of this windmill are very complex and curious. I think that one should be very cautious in attributing them to causes other than movements of atmospheric currents. It is a phenomenon that one must observe for himself and under the best conditions. Unfortunately no observatory has been willing, like myself, to undergo the considerable expense of a suitable installation.

Allow me to add some reflections on the subject of your correspondence with Professor Stupart in the MONTHLY WEATHER REVIEW for March, 1904; the primary and principal cause of cold waves. Already, in 1898, on the occasion of the cold wave of November 26, discussed at length and with charts in the MONTHLY WEATHER REVIEW, I was convinced that these cold waves of the United States proceed from the same cause as our cold waves in Europe. Both accompany anticyclones, or follow cyclones, or more often still appear between two centers of low pressure. Professor Stupart is no longer willing to regard radiation as a sufficient cause for such cold, and he now repeats what I said in 1886 and what I have not ceased to say since: some other cause than radiation is needed to explain this phenomenon. In my belief, the only truly efficacious, truly adequate cause of these great cold waves is the dispersion of aerial masses, which descend in the high pressures and expand over two gradients in the directions of the two centers of depression. Consider the chart of November 26, 1898. You will see there a complete sheet of winds from the southeast and south, whose direction is toward Montana, where the temperature is 20° F. at the center of a low; and another sheet of winds from the northwest, whose direction is toward another low over Lake Erie, with a temperature of 28° F. The dividing line between these two systems of winds is over an area of high pressure with a temperature of about —10° F. Impossible that such a fall in temperature should be due to radiation, especially that the fall should have been greater in the wind from the south, to which one attributes a temperature naturally higher than in the wind from the north.

The cold waves, therefore, are no more confined to polar currents than are the warm waves to equatorial currents. Cold will always be found associated with currents of dispersion, and heat with currents of concentration.

If to this idea of horizontal winds of dispersion and concentration is added another conception, to which I gave equal emphasis in 1886, the conception of two superposed eddies forming together the cyclone, and two others forming together the anticyclone, we may thus most simply explain the distribution, so curious, of temperature along the axes of cyclones and anticyclones, such as has been revealed to us by observations on mountains, and more recently and more completely by balloons.

CORRIGENDA.

MONTHLY WEATHER REVIEW for August, 1904, p. 371, column 1, table, insert "p. m." after the figures expressing time: eighth line below table, strike out "counting from 0^h at midnight to 24 hours."

THE WEATEER OF THE MONTH.

By Mr. WM. B. STOCKMAN, Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VIII and the average values and departures from normal are shown in Tables I and VI.

The mean pressure for the month was high over the region from Kansas and the Indian Territory northeastward to the Atlantic Ocean in the latitude of New Jersey, and eastward to east-central North Carolina, with the crest over the mountain regions of West Virginia, southwestern Virginia, and eastern Kentucky. Another area of high mean pressure occurred over portions of the northern and middle Plateau regions.

The mean pressure was low over the Florida Peninsula, and portions of the southern Plateau region. The minimum mean reading was reported at Key West, Fla.

The mean pressure was above the normal in all regions, except the Forida Peninsula, extreme northern California, western Oregon, and southern and western Washington.

The greatest excess in mean pressure occurred in portions of the Plateau and slope regions, and over the central districts from the middle slope region eastward to the Atlantic Ocean over southern Pennsylvania and to eastern North Carolina. The greatest deficiency in mean pressure occurred over southern Florida.

The mean pressure decreased from that of September, 1904, over southeastern North Carolina, eastern South Carolina, the southern portions of Georgia, Alabama, and Mississippi, southeastern Louisiana, Florida, eastern New York, New England, western Washington. west-central Minnesota, eastern and northern South Dakota, and the southern portion of North Dakota. In all other districts there was an increase.

The greatest increase in mean pressure occurred over the middle Plateau region, where it amounted to +.10 inch; and the greatest diminution over southern Florida where the changes ranged from —.11 to —.14 inch.

TEMPERATURE OF THE AIR.

The distribution of maximum, minimum, and average surface temperatures is graphically shown by the lines on Chart V.

The mean temperature was below the normal in the Atlantic States north of central South Carolina, except east-central North Carolina, in the lower Lake region, eastern portion of the upper Lake region, the upper Rio Grande Valley, New Mexico, Arizona except the south-central portion, the southern portions of Utah and Nevada, and eastern California. In all other districts the mean temperature was above the normal. In the region from Louisiana and eastern Texas northward to the British Possessions and in the northern slope and eastern portion of the northern Plateau regions the excess was marked, with a daily average of + 5.2° to + 5.7° in north-central South Dakota, southwestern North Dakota, and east-central Montana. The greatest deficiencies ranged from — 2.0° to — 3.7° and occurred in northeastern Virginia, District of Columbia, eastern Maryland, Delaware, southern New Jersey, central New York, Connecticut, western Massachusetts, the southern portions of Maine, New Hampshire, and Vermont, and north-central Arizona.

The average temperatures 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	48.1	— 2.1	—19.6	— 2.0
Middle Atlantic	12	53.8	— 1.7	—18.4	— 1.8
South Atlantic	10	63.1	0.0	—10.8	— 1.1
Florida Peninsula*	8	74.7	+ 1.8	+ 3.1	+ 0.3
East Gulf	9	67.8	+ 2.0	— 2.3	— 0.2
West Gulf	7	69.3	+ 2.2	+ 6.9	+ 0.7
Ohio Valley and Tennessee	11	62.0	+ 0.4	—14.1	— 1.4
Lower Lake	8	50.0	— 1.3	—22.6	— 2.3
Upper Lake	10	47.3	+ 0.4	—22.7	— 2.3
North Dakota*	8	47.6	+ 4.0	—18.2	— 1.8
Upper Mississippi Valley	11	54.4	+ 1.7	—19.8	— 2.0
Missouri Valley	11	55.9	+ 3.3	— 5.4	— 0.5
Northern Slope	7	49.7	+ 3.7	+ 7.7	+ 0.8
Middle Slope	6	57.7	+ 2.4	+ 7.3	+ 0.7
Southern Slope*	6	63.4	+ 1.7	+12.1	+ 1.2
Southern Plateau*	13	57.1	— 0.7	+ 2.4	+ 0.2
Middle Plateau*	8	48.2	— 0.6	+ 3.1	+ 0.3
Northern Plateau*	12	50.9	+ 2.6	+21.0	+ 2.1
North Pacific	7	53.8	+ 2.4	+ 2.4	+ 0.2
Middle Pacific	5	60.1	+ 2.0	+ 5.6	+ 0.6
South Pacific	4	65.4	+ 1.9	+10.2	+ 1.0

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Prof. R. F. Stupart says:

The mean of October temperature was higher than the average over western and northwestern Canada from the Pacific coast to the eastern limits of Manitoba, and it was just average or below in Ontario, Quebec, and the Maritime Provinces. The positive departure was almost uniformly 3° or 4° from Winnipeg westward to the mountains, and 1° to 3° in British Columbia. The largest negative departures were 3° or 4° in the more central portions of Ontario, while in other parts of that province and in Quebec and the Maritime Provinces the departure was very generally from 1° to 2° lower than the average.

By geographic districts, the mean temperature was normal in the South Atlantic States; below normal in the New England and Middle Atlantic States, lower Lake and southern and middle Plateau regions; and above normal in the remaining districts.

The mean temperature for the month was lower by 1° than any October since the establishment of the station at Elkins, W. Va., and Richmond, Va.; by 2° at Modena, Utah; and by 3° at Scranton, Pa., and Syracuse, N. Y., all of which are stations having but a few years' record. At Taylor, Tex., the mean for the month was 5° warmer than any previous October mean since the establishment of the station, in November, 1901.

Maximum temperatures of 90°, or higher, occurred generally in the Gulf States, southern and eastern Georgia, western South Carolina, central portions of North Carolina and Virginia, Oklahoma and Indian Territories, southwestern Kansas, southern and western Arizona, and southern California, and of 100°, or higher, in western Arizona and southeastern California.

The maximum for the month was higher by 1° than any reported in October since the establishment of the station at San Diego, Cal., Walla Walla, Wash., and Yankton, S. Dak.; 2° at Meridian, Miss.; 3° at New Orleans, La., and Tampa, Fla.; and 4° at Jupiter, Fla.

Freezing temperatures generally occurred as far south as the northern portions of the Gulf States, southern portion of New Mexico, and central Arizona, and westward to near the coast of Washington and Oregon, and to central California.

Minimum temperatures 1° lower than any previously recorded in October were reported from Eastport and Portland, Me., and Richmond, Va.; 2° at Binghamton, N. Y.; and 3° at Block Island, R. I., and Elkins, W. Va.

PRECIPITATION.

The distribution of total monthly precipitation is shown on Chart III.

The total precipitation for the month was above the average in eastern and central Florida, southeastern South Carolina, northeastern West Virginia, northern Maryland, central New York, upper Michigan, Wisconsin generally, Minnesota, northwestern Iowa, northeastern Nebraska, South Dakota except the south-central portion, southern North Dakota, west-central and southwestern Idaho, eastern and southern Oregon, western Nevada, northern California, New Mexico and the Rio Grande Valley. In all other districts the total amount of precipitation was below the normal. On the eastern coast of Florida the excess in precipitation ranged from +6.5 to +11.8 inches.

By geographic districts the total precipitation was below the average in New England, the middle and South Atlantic and Gulf States, Ohio Valley and Tennessee, Lake Regions, North Dakota, upper Mississippi and Missouri valleys, and the middle and southern slope, northern Pateau, and north Pacific regions; and above the average in all other districts.

The total precipitation for the month was the lowest recorded during any October since the establishment of station at Asheville and Hatteras, N. C., Evansville, Ind., Louisville, Ky., Knoxville, Tenn., Montgomery, Ala., Savannah, Ga., Springfield, Ill., Pueblo, Colo., Oklahoma, Okla., and Port Crescent and North Head, Wash.; and the greatest on record during October at Fort Worth, Tex., Fresno, Cal., Houghton, Mich., and Jupiter, Fla.

HAIL.

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

Arizona, 4, 5, 27. Arkansas, 5. California, 9, 11, 14. Colorado, 9. Connecticut, 23. Idaho, 6, 8, 9, 16, 18. Illinois, 5, 7, 10, 20–22. Indiana, 21, 22. Iowa, 4, 5, 22. Kansas, 4, 18, 19. Kentucky, 21, 22. Maine, 12–14, 27. Maryland, 23. Massachusetts, 12. Michigan, 8, 10, 20–23, 25, 26, 28. Minnesota, 3. Montana, 7, 9. Nebraska, 12, 18, 19. Nevada, 5, 6, 8, 10–12. New Hampshire, 6, 12. New Mexico, 6, 7, 29. New York, 1, 2, 12, 13, 22, 23, 26, 27. North Dakota, 15. Ohio, 21–24. Oregon, 8, 16. Pennsylvania, 3, 11, 22, 23, 26. South Dakota, 8, 10. Tennessee, 5. Texas, 18, 30. Utah, 5, 6, 8, 9, 17. Vermont, 11, 12. Washington, 16. West Virginia, 23. Wisconsin, 7, 8, 21, 22. Wyoming, 9.

SLEET.

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

Colorado, 6, 18. Illinois, 21, 22, 27. Indiana, 22, 23. Iowa, 21, 22. Kansas, 18. Kentucky 21. Maine, 12, 13. Massachusetts, 10, 12, 27. Michigan, 2, 5, 20–23, 25. Minnesota, 16, 20, 21, 24, 25. Montana, 17. Nevada, 8, 15. New Hampshire, 12. New Mexico, 28–30. New York, 12, 23, 24, 26. North Dakota, 6. Ohio, 21–23, 27. Pennsylvania, 22, 23, 26. South Dakota, 4. Texas, 25. Utah, 12, 15, 17. Vermont, 1, 6–8, 14. Virginia, 23. Washington, 15. West Virginia, 21, 23. Wisconsin, 26.

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	1.84	47	−2.1	− 2.8
Middle Atlantic	12	2.34	72	−0.9	− 7.8
South Atlantic	10	2.47	66	−1.3	−12.0
Florida Peninsula*	8	7.24	150	+2.4	− 0.9
East Gulf	9	0.29	11	−2.4	−15.5
West Gulf	7	1.24	44	−1.6	− 6.5
Ohio Valley and Tennessee	11	0.86	34	−1.7	− 9.6
Lower Lake	8	2.08	68	−1.0	+ 1.2
Upper Lake	10	2.89	97	−0.1	− 1.8
North Dakota*	8	0.88	81	−0.2	+ 0.3
Upper Mississippi Valley	11	1.88	76	−0.6	− 0.3
Missouri Valley	11	1.11	55	−0.9	+ 0.2
Northern Slope	7	0.89	113	+0.1	0.0
Middle Slope	6	0.51	32	−1.1	+ 2.4
Southern Slope*	6	0.50	25	−1.5	− 0.4
Southern Plateau*	13	1.25	147	+0.4	+ 0.2
Middle Plateau*	8	0.98	126	+0.2	+ 2.8
Northern Plateau*	12	1.06	84	−0.2	− 0.8
North Pacific	7	2.64	58	−1.9	− 4.2
Middle Pacific	5	3.00	176	+1.3	+ 8.8
South Pacific	4	1.27	190	+0.6	+ 1.4

*Regular Weather Bureau and selected voluntary stations.

In Canada.—Professor Stupart says:

A little over an inch of rain fell during the month in Alberta and about half that amount in other parts of the Territories. In Manitoba the fall was somewhat greater, being one and a half inches at Winnipeg and more farther east. In British Columbia the fall was very generally less than average. In Ontario the distribution of rain was very irregular; in New Ontario, including Algoma and Rainy River districts, the average was exceeded, as it also was in a district including the higher lands east of Lake Huron, while in other portions of the Province it was deficient and especially so in the portion extending from the eastern half of Lake Ontario north to the Ottawa. In Quebec and the Maritime Provinces there were no important differences from average.

CLEAR SKY AND CLOUDINESS.

The cloudiness was normal in the upper Mississippi Valley and southern Plateau region; above the normal in the Florida Peninsula, Lake region, North Dakota, Missouri Valley, and the middle and southern slope and Pacific regions; and below the normal in the remaining districts.

The distribution of clear sky is graphically shown on Chart IV, and the numerical values of average daylight cloudiness, both for individual stations and by geographic districts, appear in Table I.

Average cloudiness and departures from the normal.

Districts.	Average.	Departure from the normal.	Districts.	Average.	Departure from the normal.
New England	5.2	− 0.3	Missouri Valley	4.0	+ 0.1
Middle Atlantic	3.5	− 1.3	Northern Slope	3.7	− 0.5
South Atlantic	3.1	− 0.9	Middle Slope	3.3	+ 0.2
Florida Peninsula	4.9	+ 0.2	Southern Slope	4.8	+ 2.0
East Gulf	2.1	− 1.5	Southern Plateau	2.0	0.0
West Gulf	3.3	− 0.3	Middle Plateau	2.5	− 0.7
Ohio Valley and Tennessee	3.5	− 1.0	Northern Plateau	3.9	− 1.2
Lower Lake	6.1	+ 0.3	North Pacific	6.9	+ 1.0
Upper Lake	6.7	+ 0.6	Middle Pacific	4.4	+ 1.2
North Dakota	5.2	+ 0.1	South Pacific	2.9	− 0.1
Upper Mississippi Valley	4.4	0.0			

HUMIDITY.

The relative humidity was normal in the Missouri Valley; below the average in New England, the Middle Atlantic, South Atlantic, and Gulf States, Ohio Valley and Tennessee, and lower Lake, and north and south Pacific regions; and above the average in the remaining districts.

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	73	− 6	Missouri Valley	67	0
Middle Atlantic	70	− 6	Northern Slope	66	+ 6
South Atlantic	71	− 7	Middle Slope	65	+ 6
Florida Peninsula	81	+ 1	Southern Slope	68	+ 5
East Gulf	65	− 8	Southern Plateau	48	+ 6
West Gulf	68	− 4	Middle Plateau	57	+13
Ohio Valley and Tennessee	68	− 3	Northern Plateau	64	+ 1
Lower Lake	73	− 1	North Pacific	82	− 2
Upper Lake	81	+ 3	Middle Pacific	76	+ 4
North Dakota	75	+ 3	South Pacific	67	− 3
Upper Mississippi Valley	74	+ 3			

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	57	ne.	Point Reyes Light, Cal.	9	56	s.
Do	13	50	ne.	Do	10	56	s.
Do	21	56	se.	Do	11	69	s.
Boston, Mass	21	50	s.	Do	16	51	nw.
Chicago, Ill	4	53	sw.	Portland, Me	21	51	se.
Hatteras, N. C.	21	52	s.	Sand Key, Fla	15	50	ne.
Jupiter, Fla.	16	52	e.	Sioux City, Iowa	16	51	s.
Do	17	68	e.	Do	19	51	nw.
Lexington, Ky	21	50	nw.	Do	21	52	nw.
Lincoln, Nebr	19	50	nw.	Southeast Farallon, Cal.	11	50	s.
Modena, Utah	11	50	w.	Tatoosh Island, Wash	15	52	s.
New Haven, Conn	21	62	se.	Do	18	56	sw.
New York, N. Y.	1	54	w.	Do	21	55	e.
Do	21	56	se.	Do	24	50	e.
North Head, Wash	10	60	se.	Do	25	52	e.
Do	15	61	se.	Do	29	52	e.
Do	29	54	se.	Do	30	50	sw.
Do	30	80	se.				

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 1227 thunderstorms were received during the current month as against 1770 in 1903 and 3900 during the preceding month. The dates on which the number of reports of thunderstorms for the whole country was most numerous were: 5th, 173; 10th, 125; 4th, 105; 8th, 100. Reports were most numerous from: Iowa, 112; Ohio, 93; Wisconsin, 90.

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 dates of full moon, viz, October 20 to 28, inclusive.

In Canada: Thunderstorms were reported from St. Johns, N. B., 26; St. John, N. F., 2; Grand Manan, 1; Toronto, 10; Port Stanley, 10, 21, 22; Saugeen, 21; Winnipeg, 17; Banff, 3; New Westminster, 9; Hamilton, Bermuda, 27, 29, 30.

Auroras were reported from Grand Manan, Charlottetown, Father Point, and Kingston, 7; Quebec, 6, 7, 13; Montreal, 6. Parry Sound, 6, 13; Minnedosa, 6, 7; Swift Current, 13; Edmonton, 7, 8, 29; Prince Albert, 6, 7, 21.