

REPORT
OF THE
Maryland State Weather Service

(Including Maryland and Delaware),

FOR THE MONTH OF

OCTOBER, 1891.

No. 6.

ISSUED UNDER THE AUSPICES OF
**THE JOHNS HOPKINS UNIVERSITY,
THE MARYLAND AGRICULTURAL COLLEGE,
AND
THE U. S. DEPARTMENT OF AGRICULTURE,
WEATHER BUREAU.**

**CENTRAL OFFICE
AT THE
JOHNS HOPKINS UNIVERSITY,
BALTIMORE, MD.**

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U. S. Department of Agriculture, Weather Bureau.

Since its organization, six months ago, the Maryland State Weather Service has considerably extended its work. The number of reporting stations has been largely increased; weather-crop bulletins, made up from reports of correspondents in nearly all sections of Maryland and Delaware, were issued during the growing season, and several weather signal display stations have been established. Considerable interest has been manifested by the various institutions of learning in Maryland, a number of them having established meteorological stations, and it is to be hoped that this interest in the study of weather and climate will be deemed worthy of extension.

The prosperity of a state is, without doubt, largely dependent upon its climate, and that this fact is realized in every section of the country is shown in that now, every state and territory, with the sole exception of Idaho, is covered by a weather service. Even Oklahoma has organized its local weather bureau. Each state, by exhibiting the superiority of its climate, through its weather service, is striving to promote immigration.

No doubt that sufficient interest will be taken to keep our own service abreast, at least, of those elsewhere established, is entertained. This is evidenced from the increasing number of stations, the heartiness of the co-workers of the service, the approbation of prominent citizens, and the unqualified approval and generous encouragement of the press.

The printing of October's report has been considerably delayed owing to the late receipt of information which permits an increase in its size. It is presumed that there will be no occasion for subsequent delays. To provide, each time, for an early issue of the Monthly Report, it is urged that observers forward their forms as early as possible succeeding the close of the month for which the forms are the record.

The meteorological station at Summit Hall, Montgomery County, has been closed, owing to the death of the observer, the venerable John T. De Sellum. Though nearly 81 years of age, he continued the many and arduous duties he had imposed upon himself, to within a few days of his decease. His report for September was forwarded, complete in every detail.

By his death the State Weather Service loses one of its most esteemed and valued observers.

Study of the Weather for the Month.

The fine weather which prevailed in Maryland and Delaware during the first four days of October, was due to a persistent area of high pressure which gradually settled southward from New England over the Atlantic coast States, finally losing its identity, on the 4th, in northern Georgia and Alabama. A peculiarity of this area was its warmth. From the 2nd to the 5th, the average daily excess in temperature (over the normal) was 10° ; however, a glance westward on the weather maps shows that there was no inversion of the laws of cold and warm waves. The weather in the east was cold compared to that associated with the area of low pressure then moving northeast from the middle slope of the Rocky Mountains. This "low" passed east over northern Canada on the 2nd and 3d, and the southerly winds induced, favored a rise in temperature over a large section of the country east of the Mississippi. The fact, also, that the "high," instead of advancing quickly (without time to acquire a high temperature) from a high to a low latitude, came very slowly over a section of country, warm from an over-heating of 15 days during the last half of September, still further accounts for the excess in temperature.

On the morning of the 4th, a storm—a secondary of the one above described—formed over Michigan. It moved northeast, uniting over eastern New England, on the 5th, with a cyclone from the tropics. The high temperature on the morning of the 5th was due to the combined influence of these storms, and the light local rains which fell on the afternoon of that day resulted from the rapid drop in temperature succeeding their passage.

The cloudy weather and rain of the 6th, 7th, and 8th was caused, in the beginning, by the rapid cooling of a warm, saturated atmosphere, consequent upon the encroachment from the north of an area of high pressure with its lower temperature, and later, by a storm from the Middle Mississippi Valley and a cyclone from the Florida coast. The union of these two depressions is shown on the 6 p. m. map of the 7th. A long area of low pressure stretches along the Atlantic coast from New England to Florida, and rain is falling throughout its entire extent. The temperature remained below the normal during the rains of the 6th and 7th, on account of the cold air flowing from the area of high pressure then over Canada, the flow southward being aided by the indraught of the coast cyclone. The conjoined storms left the Middle Atlantic coast on the 8th, and fair weather immediately succeeded.

On October 8th, at 8 p. m., an extensive area of high pressure was central over Nebraska, its influence extending from ocean to ocean. The temperature remained below the normal. The fair weather would probably have continued to the 19th, but for the encroachment from the Atlantic of another tropical cyclone. As the "high" advanced towards the Atlantic, with a storm of slight intensity upon its northern margin—too far away to directly influence the weather of Maryland and Delaware—the cyclone

made its advent upon the Florida coast. The result, as shown on the 8 a. m. weather map of the 10th, was that the northern portion of the "high" elongated eastward and became wedge shaped; the Florida storm advanced along the coast, and rain fell on the 12th and 13th with a northeast wind and a temperature 15° below the normal in Maryland and Delaware. The "high," surging downwards, lost its identity on the 10th, its northern portion becoming merged with a similar area to the northward. This latter area reached the New England coast on the 12th, and the low temperature of that day was due to the flow of air from it to the cyclone then off the Middle Atlantic coast.

From the 14th to 18th the weather was fair. A storm of slight intensity from the northwest passed over the Lakes and down the St. Lawrence Valley during the 14th and 15th, but an area of high pressure from the southward crowded it so far north that the "low" passed without causing rain in Maryland and Delaware, though considerable fell in Pennsylvania and New Jersey. The approaching "high" kept the temperature below the normal, and on the 17th, when the "high" was central over Maryland, the mean temperature of the day was 8° below the normal.

As the "high," with its accompaniment of fine weather, receded to the eastward, its place was taken by a storm of considerable severity. This storm was central in the Pacific, off the coast of Washington, on the 14th instant. It moved northeast to the chain of lakes in southern British America, thence southeast to the Great Lakes. On the morning of the 18th it was central just east of Lake Superior. From this point, however, it did not follow the usual path down the St. Lawrence Valley. It had developed into a V-shaped depression, the apex of which extended into Tennessee, and the rain was quite heavy in the Ohio Valley. These phenomena united to cause a southern movement of the storm. It moved south to Lake Erie, recurved slightly to westward and then moved southeast over Ohio, Pennsylvania, and Maryland, to the coast. After reaching the coast it curved sharply northwest, the night of the 19th, pursuing a northerly course to the St. Lawrence Valley, which it reached on the 21st. Its subsequent course was down the St. Lawrence Valley to the sea. This storm was the cause of the heavy rains in Maryland and Delaware on the 19th, and of the lighter rains on the 20th. It was the most severe of those storms which crossed the country during the month. The most remarkable phenomenon connected with it was the development of a secondary over Maryland on the night of the 21st. At 8 p. m., of the 21st, there were indications of a slight disturbance in southern Ohio, but the appearance on the following morning's map, of a full grown cyclone on the Middle Atlantic coast, was rather surprising. This secondary was the cause of the rain which fell on the 22d.

Two areas of high barometer from the west gave fair weather, with a relatively low temperature, from the 23d to 26th, when rain was caused by a storm from the northwest. This storm followed quite closely the track of the one from the Pacific, described in the above paragraph, until it reached the point just east of Lake Superior. Thence its course was southeast to the Maine coast. This storm, on account of its northern path, caused a rise in temperature to above the normal on the 26th, but the "high" following, quickly caused it to drop again on the 28th, to a mean, 12° below the normal. To this "high," which was a well marked anti-cyclone, was due the fair weather which endured during the remainder of the month.

The temperature on the last two days of the month was raised above the normal by the antecedent warm wave of a storm approaching from the northwest.

Meteorological Stations reporting to the Director of the Maryland State Weather Service.

<i>Stations of Observation.</i>	<i>Observer.</i>
Agricultural College.....	Wm. H. Zimmerman, A. M.
Annapolis.....	Walter Hay, M. D.
Baltimore.....	{ G. N. Wilson. W. D. White. A. T. Brewer.
Barron Creek Springs.....	A. E. Acworth.
Bryantown.....	B. M. Edelen, Jr.
Charlotte Hall.....	R. W. Silvester.
Cumberland.....	Howard Shriver.
Cumberland.....	E. T. Shriver.
Darlington.....	A. F. Galbreath.
Dover, Del.....	Jno. S. Jester.
Drum Point.....	Alex. de Barrill.
Easton.....	G. W. Minnick.
Emmitsburg.....	J. A. Mitchell, M. A.
Frederick.....	McClintock Young.
Jewell.....	Jos. Plummer.
Kirkwood, Del.....	W. C. L. Carnagy.
Leonardtwn.....	G. W. Joy.
McDonogh.....	G. M. Carvill.
New Market.....	H. H. Hopkins, M. D.
Norfolk, Va.....	A. J. Davis.
Princess Anne.....	B. O. Bird.
Taneytown.....	C. W. Weaver, M. D.
Upper Marlboro'.....	Frederick Sasscer.
Washington, D. C.....	S. W. Beall.
Woodstock.....	T. J. A. Freeman, S. J.

<i>Crop Reporting Stations.</i>	<i>Correspondent.</i>
Barron Creek Springs.....	A. E. Acworth.
Berlin.....	Wash. Hanley.
Bristol.....	E. O. Welch.
Catonsville.....	A. L. Crosby.
Chaneyville.....	J. F. Talbott.
Chaptico.....	Geo. R. Garner.
Chestertown.....	H. Brown.
Cumberland.....	Howard Shriver.
Darlington.....	A. F. Galbreath.

Denton.....	F. C. Ramsdell.
Drum Point.....	Alex. de Barrill.
Ellicott City.....	Clarence Oldfield.
Fallston.....	G. G. Curtis, A. M.
Frostburg.....	C. J. Conner.
Frederick.....	McC. Young.
Greensboro.....	S. W. West.
Hagerstown.....	T. J. C. Williams.
Hampstead.....	H. H. Stansbury.
Havre de Grace.....	W. S. McCombs.
Keedysville.....	J. A. Miller.
Kirkwood, Del.....	W. C. L. Carnagy.
Mechanicstown.....	J. J. Henshaw.
Middletown.....	G. C. Rhoderick, Jr.
Milford, Del.....	J. T. Foulk.
New Market.....	H. H. Hopkins, M. D.
Pope's Creek.....	Fred. Richmond.
Princess Anne.....	B. O. Bird.
Rutland.....	Benj. Watkins.
Salisbury.....	Lemuel Malone.
St. Leonard's.....	N. D. S. Parran.
St. Michael's.....	W. Willis.
Taneytown.....	C. W. Weaver, M. D.
Trappe.....	Percival Mullikin.
Westminster.....	Uriah Bixler.
West River.....	James Cheston, Jr.
White Plains.....	W. Hicks.

Stations displaying Weather Signals.

Displaymen.

Annapolis.....	Wm. M. Abbott.
Bel Air.....	N. N. Nock.
Bradshaw.....	B. F. Taylor.
Darlington.....	A. F. Galbreath.
Dickerson.....	W. H. Dickerson.
Emmitsburg.....	J. A. Mitchell, M. A.
Frostburg.....	C. J. Conner.
Greensboro.....	Plummer & Plummer.
Hagerstown.....	R. J. Hamilton.
Hancock.....	F. Lee Carl.
Havre de Grace.....	W. S. McCombs.
Lonaconing.....	J. J. Robinson.
Middletown.....	G. C. Rhoderick, Jr.
Milford, Del.....	J. Y. Foulk.
Oakland.....	J. M. Litzinger.
Odenton.....	C. W. Claggett.
Salisbury.....	L. W. Gunby.
Seaford, Del.....	Hugh Martin, M. D.
Snow Hill.....	Purnell & Vincent.
St. Michael's.....	E. M. Jefferson.
Taneytown.....	C. W. Weaver, M. D.
Westminster.....	W. S. Myer & Bro.
Wilmington, Del.....	Wm. Lawton.

MONTHLY SUMMARY, MARYLAND AND DELAWARE, OCTOBER, 1891.

Temperature (degrees).—Mean monthly, 53.3. Highest monthly mean, 56.1, at Cumberland (H. Shriver). Lowest monthly mean, 50.5, at Darlington. Highest temperature, 86, at Mt. St. Mary's on the 3d. Lowest temperature, 27, at McDonogh on the 29th. Greatest local monthly range, 57, at Mt. St. Mary's. Least local monthly range, 36, at Jewell. Mean monthly range, 51.5. Mean maximum, 62.5. Mean minimum, 45.2.

Precipitation (in inches).—Average, 2.77. Greatest amount, 4.83, at Barron Creek Springs. Least amount, 1.79, at Frederick.

Wind.—Prevailing direction, northwest.

Thunderstorms.—At Baltimore, on the 26th; at Cumberland (H. Shriver), on the 26th; at Darlington, on the 26th; at Frederick, on the 26th; at Mt. St. Mary's, on the 26th; at New Market, on the 26th; at Taneytown, on the 26th; at Woodstock, on the 19th and 26th.

Halos.—At Barron Creek Springs, on the 31st, and at Cumberland (H. Shriver), on the 28th.

Hail.—At Barron Creek Springs, on the 11th; at Cumberland (H. Shriver), on the 12th and 26th; at Mt. St. Mary's, on the 26th; at New Market, on the 12th; at Woodstock, on the 12th.

Frost.—At Barron Creek Springs, on the 16th, 17th and 28th; at Cumberland (H. Shriver), on the 29th; at Darlington, on the 15th, 16th, 25th, 28th, 29th, 30th and 31st; at Dover, on the 16th, 17th, 18th, 25th, 29th; at Frederick, on the 17th, 18th, 25th and 29th; at Jewell, on the 16th, 17th and 29th; at Mt. St. Mary's, on the 17th, 28th and 29th; at New Market, on the 17th, 25th and 29th; at Woodstock, on the 16th, 17th, 25th and 29th.

Meteors.—At Mt. St. Mary's, on the 16th and 29th, and at Woodstock, on the 23d.

Polar Bands.—At Baltimore, on the 31st, and at Cumberland (H. Shriver), on the 18th, 28th and 31st.

Average number of cloudless days, 14; partly cloudy days, 8; cloudy days, 9; rainy days (.01 of an inch or more), 8.

Local verification of weather and temperature signals for October, reported by displaymen:

Weather,	85.7 per cent.
Temperature,	96.0 " "
Average,	90.8 " "

NOTES BY OBSERVERS.

Barron Creek Springs.—3rd, heavy fog forming between 6 and 7 a. m., lasting till 9.30 a. m. 4th, light fog between 6 and 7 a. m. 5th, fog till 8.30 a. m. Rainbow partial at 5.30 p. m. 8th, drouth of September broken. 11th, hail at 2 p. m. 13th, some snow at 2 p. m. 14th, high tide in Barron Creek, $2\frac{1}{2}$ to 3 ft. above ordinary at 3 p. m. 16th, smoky from 7 to 9 a. m. Considerable frost. 17th, heavy white frost. Smoky. 18th, leather winged bat seen at 6 p. m. 19th, considerable fog at 6 a. m. 20th, rainbow N. to N. W. at 11 p. m. 22d, one of heaviest blows of season from 3 to 6 p. m. 29th, killing frost with ice to 12 noon.

Cumberland.—12th, rain began about 3 p. m., mingled with hail. 15th, colored disk round moon. 18th, polar bands N. W. to S. E. 19th, 5 p. m., rainbow. 26th, wind blew like a hurricane; most of storm seemed to go N. E. up mountain from the Narrows and on the far North Side. Electric discharges were abundant and splendid. A tenth of the heavens was a cobweb of tangled lines of lightning. Vertical streaks also of unusual magnitude. Thunder heavy. 28th, N. E. polar bands. 29th, heavy white frost. Indian summer. Haze varying from light to medium. The month has been fine in all respects.

New Market.—3d, slightly foggy. 7th, foggy. 12th, a little hail fell with beginning of rain at 2 p. m. 17th, first frost. 24th, hazy about horizon, all day. 25th, frost. 26th, foggy. Rain at 6 p. m., accompanied by wind, thunder and lightning. 27th, high temperature of 26th caused a rapid falling of leaves by stimulating development of buds. 29th, heavy frost. First ice.

Woodstock.—3d, foggy morning. Heavy dew. Same 4th and 5th. 6th, light shower between 2 and 2.30 p. m. 7th, drizzling rain all day. 12th, hail and rain began falling at 12.15. 15th, foggy in morning. Clearing. 16th, light hoar frost. First seen. 17th, heavy frost last night. 18th, foggy. Clearing. 19th, heavy rain. Distant thunder and lightning in S. W. 23d, meteor of about 6 seconds duration seen in S. E. about 7.30 p. m. At angle of 55° to 45° . 25th, heavy frost last night. Hazy. 26th, foggy. Clearing. About 6.15 p. m., fearful lightning storm arose whilst heavens were covered with stars towards South. Remarkable for vividness of flashes which extended from N. to S. W. Ended at 7.20 p. m. Wind N. 29th, heavy frost. 31st, foggy. Clearing.

MONTHLY SUMMARY OF REPORTS, OCTOBER, 1891.

STATIONS.	COUNTIES.	Altitude above sea in feet.	Latitude.	Longitude.	† BAROMETER.				TEMPERATURE.								Total precipitation.	Clear days.	Fair days.	Cloudy days.	Number of rainy days (.01 or more.)	Prevailing Wind.	OBSERVERS' NAMES.		
					Monthly mean.	Maximum.		Minimum.		Monthly mean.	Mean of maxi- mum.	Mean of mini- mum.	Maxim.		Minim.									Monthly range.	
						Height.	Date.	Height.	Date.				Degrees.	Date.	Degrees.	Date.									
Baltimore.....	.....	179	39° 17'	76° 36'	30.111	30.539	29	29.696	5	54.8°	62.7°	46.8°	85	3	33	29	52°	2.76	14	8	9	9	N.W.	G. N. Wilson, W. D. White, A. T. Brewer, H. D. Steuart, Albert E. Acworth.
Barron Cr'k } Springs.....	Wicomico.....	25	38° 30'	75° 39'	...	...	...	...	...	55.8°	64.1°	46.6°	84	5	30	29	54°	4.88	4	7	11	11	N.W.	
Cumberland... Cumberland... Darlington.... Dover..... Frederick..... Jewell..... Kirkwood..... McDonogh.... Mt. St. Mary's New Market... Taneytown.... Woodstock } College.....	Alleghany Alleghany Harford..... Kent, Del..... Frederick..... Anne Arundel New Castle, } Del.....	700 700 300 535 720 500 ... 392	39° 39' 39° 39' 39° 39' 39° 23' 39° 41' 39° 23' ... 39° 20'	78° 45' 78° 45' 76° 14' 76° 44' 77° 21' 77° 18' ... 76° 49'	30.107 30.126 30.151 30.158 ... 30.081	30.493 30.456 30.551 30.481 ... 30.447	12 29 29 12 ... 29	29.772 29.816 29.861 29.851 ... 29.707	25 5 26 5 ... 5	56.1° 51.5° 50.5° 54.2° 54.2° 54.6° 54.3° 51.7° 52.3° 50.9° 51.2°	66.0° 59.5° 60.8° 62.9° 63.6° 60.4° 62.7° 62.8°	47.1° 43.9° 43.6° 47.0° 45.8° 44.0° 43.3° 43.6°	85 80 83 82 85 74 82 80 86 80 79	5 3 4 4 4 3 4 3 3 3 3 3	33 29 29 29 32 30 38 32 29 29 31 29	29 29 29 29 29 30 29 29 29 29 29 29	52° 51° 55° 53° 53° 36° 50° 53° 57° 49° 50°	2.39 2.21 ... 3.17 1.79 4.00 ... 2.20 2.68 2.12 2.73 2.90	15 17 ... 20 8 14 12	7 4 16 3 11 7 9	9 10 ... 8 5 ... 10 10	8 7 5 12 7 5	9 7 ... 11 5 ... 7 5		N.W. N.W. N.W. ... N.W. N.W. N. N.W.	H. Shriver. E. T. Shriver. A. F. Galbreath. Jno. S. Jester. McClintock Young. Jos. Plummer. W. C. L. Carnagy. G. M. Carvill. A. F. Dorley. H. H. Hopkins, M.D. C. W. Weaver, M.D. T. J. A. Freeman, S.J. A. J. Davis. S. W. Beall.
*Averages.....	.....	.....	.....	.....	30.122	.....	.....	.....	.....	53.3°	62.5°	45.2°	.....	.....	.....	.....	51.5	2.77	13.3	7.8	9.3	7.8	.....	.....

* Excluding Norfolk.

† Readings reduced to sea level.

DAILY PRECIPITATION

For October, 1891.

Date.	Baltimore.	Barron Creek Springs.	Cumberland.	Cumberland.	Dover.	Frederick.	Jewell.	McDonogh.	Mt. St. Mary's.	New Market.	Taneytown.	Woodstock College.
1	...	...	...	...	...	...	...	...	...	...	...	...
2	...	...	...	...	...	F	...	...	...	...	...	...
3	...	...	...	...	...	...	...	...	...	...	...	...
4	...	...	...	...	...	...	...	...	...	...	...	...
5	T	.04	...	...	...	...	...	...	...	F	...	...
6	T	.38	...	.84	...	T	...	.06	.02	...	...	T
7	.26	...	1.12	.40	...	.41	1.00	.24	...	.58	.55	.20
8	.04	1.66	...	...	.69	.01	...	...	.69	...	...	...
9	...	...	.25	...	...	...	...	...	...	...	...	...
10	...	...	...	...	...	...	F	...	...	...	...	...
11	T	.23	...	...	.04	...	...	.08	...	...	...	...
12	.17	...	.10	.07	...	.05	...	.12	...	.10	...	T
13	.02	.47	...	...	.21	T	.50	...	.26	.05	.26	.15
14	...	...	...	...	...	...	...	...	...	...	...	...
15	...	...	...	...	...	...	...	...	...	...	...	...
16	...	...	...	...	...	...	...	...	...	...	...	...
17	...	...	...	...	...	...	...	...	...	...	...	...
18	...	...	...	...	...	...	...	...	...	...	...	...
19	.92	...	.40	.42	...	.68	1.50	1.70	.94	.38	1.25	1.60
20	.04	1.49	...	...	1.34	.03	...	...	...	...	...	T
21	T	...	...	.25	...	.05	...	...	.12	...	...	...
22	1.06	.47	.25	.05	.68	.31	1.00	...	.39	.58	.45	.65
23	...	...	...	...	...	...	...	...	...	...	...	...
24	...	...	...	...	...	...	...	...	...	...	...	...
25	...	...	...	...	...	...	...	...	...	...	...	...
26	.06	...	.25	.18	...	.08	T	...	...	.43	.22	.30
27	.19	...	...	...	.21	.17	...	...	.26	...	...	...
28	...	.09	...	...	...	...	...	...	...	...	...	...
29	...	...	...	...	...	...	...	...	...	...	...	...
30	...	...	...	...	...	...	...	...	...	...	...	...
31	...	...	.02	...	...	...	...	...	...	...	...	...
Month...	2.76	4.83	2.39	2.21	3.17	1.79	4.00	2.20	2.68	2.12	2.73	2.90

METEOROLOGICAL SUMMARY

FOR THE MONTH OF OCTOBER, 1817 TO 1822, FROM OBSERVATIONS TAKEN NEAR BALTIMORE

BY LEWIS BRANTZ, Esq.

JOHN MURPHY & CO., PRINTERS, BALTIMORE.

	TEMPERATURE.					Rainfall. (Inches.)	Fair Days.	Rainy Days.	Cloudy Days.	PREVAILING WINDS.					
	Mean.	Highest.	Date.	Lowest.	Date.					N. W. Quarter.	N. E. Quarter.	S. E. Quarter.	S. W. Quarter.	Calm.	
1817	52.2	70	5	30	29	1.8	18	5	8	6	6	5	6	3 N., 2 1 S., 2 E.	
1818	51.6	74	17	30	23	3.1	24	2	5	9	6	9	6		1
1819	51.8	78	6	25	26	.7	27	3	1	17	0	7	7		
1820	50.0	79	4	26	27	7.8	21	4	6	10	7	9	2	3	
1821	54.0	79	3	32	20	3.4	24	2	5	11	7	6	7		
1822	59.3	80	20	34	26	2.5	21	4	6	8	6	9	8		
Sums.	318.9	Highest.	Date.	Lowest.	Date.	19.3	135	20	31	61	32	45	36		
Means.	53.2	80	{ 20 1822	25	{ 26 1819	3.2	22.5	3.3	5.2	10.2	5.3	7.5	6.0		