U. S. DEPARTMENT OF AGRICULTURE.

REPORT FOR JUNE, 1897.

VIRGINIA SECTION

OF THE

CLIMATE AND CROP SERVICE

OF THE

WEATHER BUREAU,

IN COOPERATION WITH THE

VIRGINIA STATE BOARD OF AGRICULTURE.

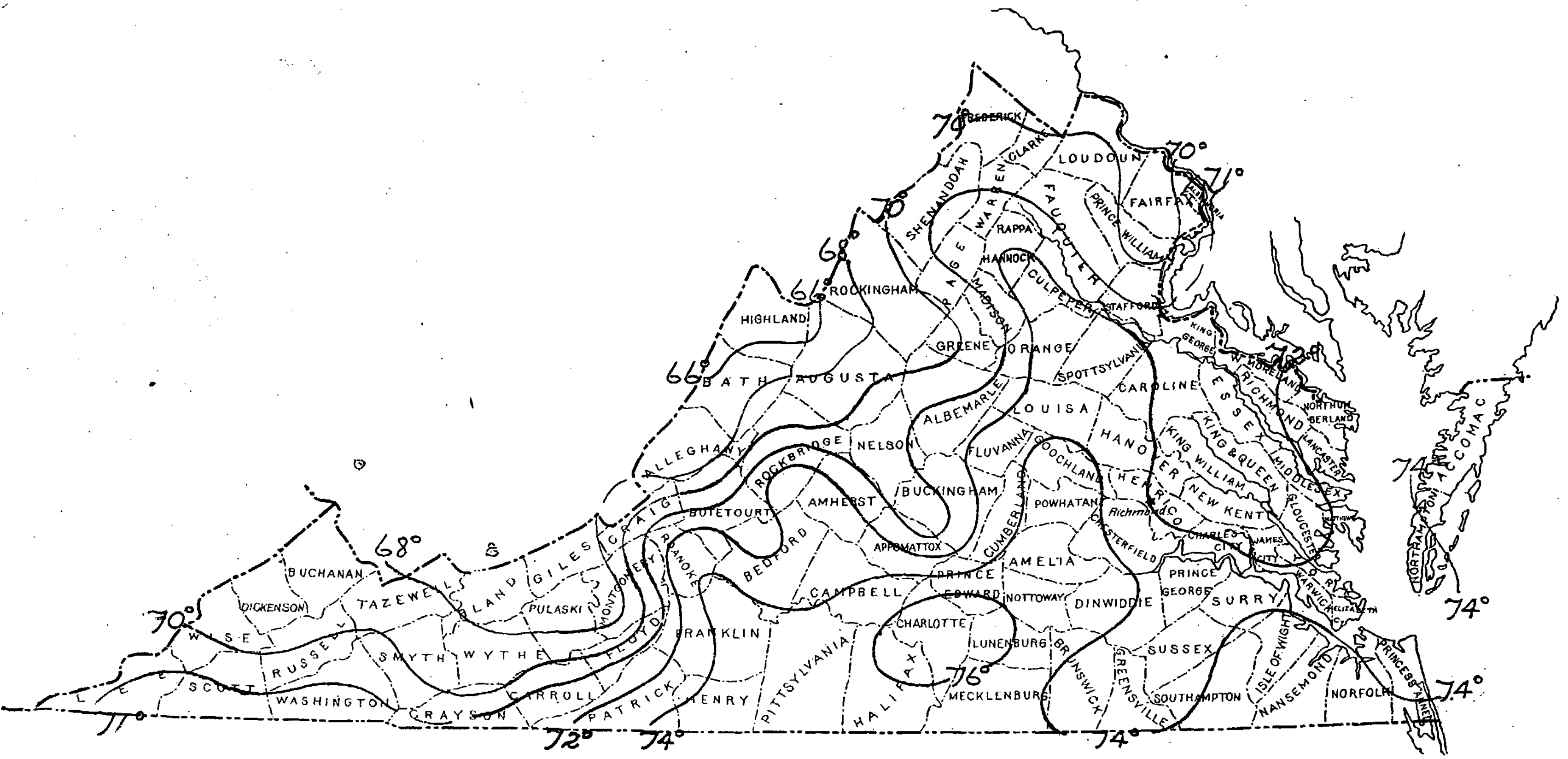
PREPARED UNDER THE DIRECTION OF
WILLIS L. MOORE,
CHIEF OF BUREAU.

BY

EDWARD A. EVANS
SECTION DIRECTOR,
RICHMOND, VA.

1862 1889

MONTHLY MEAN TEMPERATURE FOR JUNE, 1897.



U. S. DEPARTMENT OF AGRICULTURE,

CLIMATE AND CROP SERVICE

OF THE

WEATHER BUREAU.

Central Office, Washington, D. C. — **WILLIS L. MOORE, Chief.**

VIRGINIA SECTION,

E. A. EVANS, Section Director,
RICHMOND, VA.

VOL. VII. RICHMOND, VA. No. 6.

JUNE CROP CONDITION.

The progress of the crops during June was rather slow owing to two causes.

1st. Unusually cool weather in all portions of the state during the first fifteen days, and

2nd. Local droughty conditions, especially in the Tidewater section. The growth of corn and tobacco was much retarded. The former came through the month in a very backward state, being uneven, and short in stalk; but the latter, under the warmer and showery weather of the last decade, gained in condition. Farm work was vigorously pushed all the month. Harvesting of winter wheat began in the Tidewater and southern counties of the middle section during the first week, and was general throughout the month. Threshing followed with excellent results, the yield being reported the "best in years," by many correspondents. Some winter oats were cut, and spring oats headed well, but were generally quite short in straw. Haying was prosecuted but was rather below the average in quantity. All trucks made good progress, also garden stuff.

THE FIRST ATTEMPT TO MEASURE WIND FORCE.

Meteorological observers, especially those who have studied the development of anemometry, will recall the fact that the most simple and direct measurement of the velocity of the wind is made by observing the speed of light bodies, such as feathers or soap bubbles carried along by it. The first piece of apparatus applied to the measurement of the wind was the pendulous plate anemometer introduced by the Royal Society about 1665 on the recommendation of Sir Christopher Wren, Robert Hooke, and others, who constituted a committee on meteorological observations. This instrument gave a measurement of the effect of moving air on a resisting plate from which the velocity can perhaps be calculated. In using this and almost all other apparatus which measure some definite effect of the wind it is assumed that the wind blows upon the apparatus long enough to bring its moving parts into a steady condition, either of motion or of resistance, so that we measure the maximum effect that a given wind is capable of producing. Prof. C. F. Marvin has called our attention to the fact that meteorology owes another ingenious method to Sir Isaac Newton. This eminent philosopher was for many years engrossed in the study of forces; he it was who first saw that the proper method of measuring and comparing forces among themselves is to measure the amount of energy that each force when acting continuously can communicate in a unit of time to a unit of mass of freely moving matter. It seems to have occurred to him to apply this idea to the resistance of the wind. When a body is falling freely through the air the resisting force of the air sometimes erroneously called friction is brought into play; this resistance can be expressed by the amount of retardation experienced by a falling body whose mass and resisting area are, respectively, unity. Newton also applied this same idea to an ingenious method of determining the relative strength of the various winds. His experiments in this line are narrated at page 15 of Sir David Brewster's Memoir of the Life, Writings, and Discoveries of Sir Isaac Newton, whence we take the following:

> It was about this time, also, that he seems to have paid some attention to the subject of the resistance of fluids, to which his experiments with water wheels would naturally lead him. Mr. Conduit, apparently on the authority of Mrs. Vincent, informs us that even when he was occupied with his paper kites, he was endeavoring to find out the proper form of a body which would experience the least resistance when moving in a fluid. Sir Isaac, himself, told Mr. Conduit that one of the earliest scientific experiments which he made was in 1658, on the day of the great storm [September 3] when Cromwell died, and when he himself had just entered into his sixteenth year. In order to determine the force of the gale he jumped first in the direction in which the wind blew, and then in opposition to the wind; and after measuring the length of the leap in both directions, and comparing it with the length to which he could jump in a perfectly calm day, he was enabled to compute the force of the storm. Sir Isaac added, that when his companions seemed surprised at his saying that any particular wind was a foot stronger than any he had known before, he carried them to the place where he had made the experiment, and showed them the measures and marks of his several leaps. This method of jumping to a conclusion, or reaching it *per saltum*, was not the one which our philosopher afterward used. Had he, like Coulomb, employed a shred of paper instead of his own person, and observed the time it took to fly through a given distance, he would have obtained a better substitute for an anemometer.

The reader will perceive that provided one jumps with the same force first with and then against the wind he may take half the difference of the two distances as being the effect of the wind in carrying him along while he is in the air. The wind acts upon him continuously during this brief interval just as gravity acts continuously upon any falling body. If, indeed, the observer simply jumps vertically upward or, still better, if he lets an inanimate spherical ball fall vertically downward and observes the amount of horizontal movement he has a direct measure of the force or pressure whence he may calculate the velocity of the wind. There are several reasons why such calculated velocities are rather rough compared with the results given by other methods, but it is certainly of the highest interest to find that Sir Isaac Newton in his boyhood, and before he could have known anything of Galileo's works, devised this simple method of estimating the energy and velocity of the wind.

ATMOSPHERIC PRESSURE.

——o——

The mean monthly air pressure as deduced from the U. S. Weather Bureau Stations at Lynchburg, Norfolk and Washington, D. C., was 29.99 inches; highest 30.29 inches, at Norfolk and Washington, D. C., on the 2nd; lowest 29.71 inches, at Washington, D. C., on the 13th; range 0.58 of an inch.

TEMPERATURE. (DEG. F)

——o——

Tidewater Virginia.—Highest monthly mean, 77.6, at Doswell; lowest monthly mean, 71.6, at Warsaw; maximum temperature, 100, at Doswell, on the 16th and 30th; minimum temperature, 36, at Petersburg on the 21st; greatest daily range 39, at Petersburg.

Middle Virginia.—Highest monthly mean, 80.2, at Maidens; lowest monthly mean, 70.4, at Leesburg; maximum temperature, 103, at Farmville on the 25th; minimum temperature, 30, at Guinea, on the 2d; greatest daily range, 44, at Leesburg.

The Great Valley. — Highest monthly mean, 74.8, at Goshen; lowest monthly mean, 67.4, at Blacksburg; maximum temperature, 96, at Woodstock on the 30th; minimum temperature, 37, at Burke's Garden, on the 22nd; greatest daily range, 44, at Big Stone Gap and Dale Enterprise.

For the state.—Average of the monthly mean temperatures, 71.7; average of the maximum temperatures, 94; average of the minimum temperatures, 45; average of the greatest daily range, 34.

June was marked by considerable cool weather, especially during the first decade when the temperatures ranged decidedly below the normal, and for a few days during the last decade when the minimum for the month was recorded at several stations. The dates on which the maximum temperatures for the month were recorded were in almost every instance the 16th and the 30th. The extreme range of temperature for the state was 73 degrees. A heated period prevailed generally at the middle and close of the month, during which temperatures between 90 and 103 degrees were recorded. The average temperature, 71.7, was 2.0 below the normal. Crop growth was considerably retarded during the first half of the month, corn and tobacco feeling the effect of the cool weather the most. Wheat was too far advanced to be damaged, but winter and spring oats suffered some.

PRECIPITATION.

——o——

Tidewater Virginia.—Greatest monthly precipitation, 4.14 inches, at Warsaw; least monthly, 0.71 inches, at Spottsville, greatest amount in any twenty-four consecutive hours, 2.51 inches, at Ashland, on the 4-5th.

Middle Virginia.—Greatest monthly precipitation, 11.56 inches, at Guinea; least monthly, 0.99 of an inch, at Callaville; greatest amount in any twenty-four consecutive hours, 5.10 inches, at Guinea, on the 17th.

The Great Valley.—Greatest monthly precipitation, 5.83 inches, at Marion; least monthly, 1.31 inches, at Salem; greatest amount in any twenty-four consecutive hours, 3.00 inches, at Marion, on the 18th.

For the state.—Average total precipitation, 3.18 inches.

The average total precipitation for the State, 3.18 inches, was 0.50 of an inch below the normal for the month.

By sections Tidewater Virginia was 1.35 inches below the normal; middle Virginia, 0.23 of an inch below, and the Great Valley, 0.31 of an inch below.

The rainfall was fairly well distributed during the month, and hence no drought of any consequence prevailed. Local extreme deficiences and excesses were reported from Callaville and Spottsville, in the southeast portion of the State, and Guinea, in the east central portion, respectively. The total monthly amount of this latter station is largely in excess of the average quantity for June, and appears to have fallen during three rainstorms of unusual severity. Sufficient rain for crop purposes obtained in nearly all counties, and but for the deficiency in temperature their growth would probably have been normal.

The average number of days on which 0.01 of an inch or more of rain or snow fell, was 8 in Tidewater Virginia; 7 in Middle Virginia, and 8 in the Great Valley. Average for the State, 8.

Wind.—The prevailing direction of the wind in the different sections was as follows: Tidewater Virginia SW.; Middle Virginia, SW.; the Great Valley, W. Prevailing direction for the State, SW.

Weather.—Tidewater Virginia, average number of clear days 9; partly cloudy, 10; cloudy, 11. Middle Virginia, average number of clear days, 15; partly cloudy, 10; cloudy, 5. The Great Valley, average number of clear days, 12; partly cloudy, 14; cloudy, 4. For the State, average number of clear days, 13; partly cloudy, 11; cloudy, 6.

NOTES AND COMMENTS.

——o——

Voluntary observers, who have not already done so, are requested to return to this office their old copy of "Instructions to Voluntary Observers," edition of 1892. These instructions are now obsolete, and have been called in by direction of the Chief of the Weather Bureau.

In all entries of precipitation it is very desirable that the times of beginning and ending should be given, if possible. This information, though not so important as the amount of precipitation occurring, is still very necessary and greatly increases the value of each report. Observers omitting these entries are invited to make them.

Reports from Stanleyton not received.

Climatological Data for June, 1897.

Stations.	Counties.	Elevation, feet.	Length of, record, years.	Temperature, in degrees Fahrenheit.							Precipitation, in inches.					Sky.			Prevailing direction of wind.	Observers.
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall (unmelted.)	Number of rainy days.	Number clear days.	Number partly cloudy days.	Number cloudy days.		
Tidewater Virginia.																				
Ashland	Hanover	220	5	72.2	—0.2	96	30	46	2	35	3.64	+0.22	2.51	....	9	5	16	9	ne.	E. L. C. Scott.
Birdsnest (1).	Northampton	40	28	73.5	—1.0	94	30	60	7	....	3.25	+0.41	1.10	....	8	5	10	15	sw ne	C. R. Moore.
Cape Henry	Princess Anne	17	22	73.3	+0.2	96	30	60	8 22	27	2.09	—1.86	0.75	....	11	4	10	16	se.	U. S. Weather Bureau.
Doswell	Hanover	134	0	77.6	......	100	16 30	48	11	27	1.65	....	1.00	....	5	8	2	20	w.	C. W. Butterworth.
Hampton	Elizabeth City	3	9	74.0	—1.1	93	16 30	58	2	23	2.43	—2.81	1.50	....	8	6	10	14	sw.	C. L. Goodrich.
Norfolk.	Norfolk.	3	25	74.0	+0.5	96	16 30	58	2	25	1.98	—2.25	0.64	....	13	7	9	14	se.	U. S. Weather Bureau.
Petersburg	Dinwiddie	11	9	73.6	—2.0	98	16	36	21	39	2.19	—1.55	0.80	....	8	13	8	9	ne sw	Prof. Jas. M. Colson.
Richmond (near)	Henrico.	96	21	72.5	—2.7	99	16 30	45	1 2	36	......	....	....	....	....	24	0	6	nwsw	Capt. J. C. Shafer.
Spottsville	Surry	15	7	73.9	—0.9	98	16 25 30	47	22	36	0.71	—2.43	0.28	....	7	16	7	7	sw.	B. W. Jones.
Sunbeam	Southampton	60	2	73.9	—1.9	97	30	49	22	30	1.23	—3.62	0.48	....	5	9	16	5	w.	Dr. W. H. Daughtry.
Warsaw b	Richmond	200	3	71.6	—2.4	95	30	48	2	37	4.14	+1.24	2.05	....	5	1	24	3	n.	C. H. Constable.
Middle Virginia.																				
Alexandria	Alexandria	35	37	71.0	—3.0	94	30	43	1	33	3.43	+1.04	1.50	....	10	5	22	3	nw.	H. C. Slaymaker
Barboursville	Orange		0	70.6	......	94	16	45	2	33	3.63	....	1.07	....	15	14	13	3	sw.	Dr. Thos. H. Ellis.
Bedford City.	Bedford	900	6	72.1	—0.8	96	16 30	45	1	36	3.68	+0.83	1.87	....	8	14	14	2	w.	J. T. Davidson.
Bon Air	Chesterfield	130	2	73.9	—1.0	101	16 30	46	2	36	2.11	—1.51	0.97	....	9	10	8	12	ne.	Wm. H. Pleasants.
Buckingham	Buckingham.	550	3	71.4	—1.8	97	30	43	1	35	1.90	—0.48	1.05	....	6	18	8	4	sw.	Dr. W. E. Pratt.
Callaville	Brunswick	570	2	73.2	—0.5	96	30	47	2	32	0.99	—2.14	0.36	....	8	12	15	3	nw.	F. M. Gage.
Farmville.	Prince Edward.			76.2	......	103	25	45	2	40	3.85	....	3.00	....	4	23	2	5	ne.	Jno. R. Martin.
Fredericksburg	Spottsylvania		1	71.9	—1.4	97	30	46	2	32	3.63	+0.13	1.52	....	8	20	4	6	se.	E. C. Rowe.
Gordonsville.	Orange	47	0	73.4	......	89	30	57	2	16	1.80	....	1.00	....	3	20	0	10	s.	H. S. Smithers.
Guinea	Caroline		0	......	......	....	....	30	2	....	11.56	+8.30	5.10	....	3	15	13	2	sw.	M. A. Nunn.
Leesburg	Loudoun	100		70.4	......	102	30	38	7	44	2.34	....	0.72	....	5	21	7	2	w.	C. A. English
Lynchburg.	Campbell		17	73.1	—1.1	96	16	49	2	32	2.70	—0.76	1.40	....	16	10	12	8	ne.	U. S. Weather Bureau.
Maidens b	Goochland	525	1	80.2	+2.1	100	16 25 30	58	8	22	1.75	....	0.52	....	7	12	7	9	e.	J. R. Hopkins.
Manassas	Prince William	185	2	70.5	—0.9	94	30	41	2	36	7.19	+1.42	2.14	....	8	14	14	2	se.	Thos. H. Lion.
Quantico.	Prince William	317	7	70.5	—0.5	95	30	41	2	37	......	....	....	....	....	17	7	6	s.	E. V. King.
Rocky Mount	Franklin		0	74.6	+0.4	96	16	48	22	34	1.09	—1.72	0.50	....	3	11	17	2	......	J. H. Binford.
Stanardsville	Greene	1150	2	69.7	—2.1	93	15 16 30	45	2	36	3.51	+0.25	1.22	....	4	....	....	....	......	W. N. Parrott.
Warrenton	Fauquier	560	6	71.0	......	93	30	51	2	23	3.54	....	0.81	....	9	14	12	4	sw.	J. T. Preston.
The Great Valley.																				
Big Stone Gap	Wise	1966	6	69.0	—0.1	90	15 16 30	38	1	44	3.62	—0.01	1.30	....	8	13	9	8	......	John W. Fox. Sr.
Blacksburg	Montgomery	2100	7	67.4	—0.6	90	29 30	39	1	36	2.34	+0.13	0.88	....	7	13	12	5	w.	Prof. W. B. Alwood.
Bristol.	Sullivan, Tenn.	1676	2	71.0	+0.1	89	2 28	50	21	28	4.07	+0.14	0.83	....	10	15	13	2	......	J. Bunting. Jr.
Burke's Garden	Tazewell		0	67.6	+1.3	87	12	37	22	38	3.80	—1.50	0.82	....	12	10	15	5	w.	C. H. Greever.
Christiansburg	Montgomery	2160	9	......	......	....	....	....	....	....	2.04	....	0.70	....	....	....	....	....	......	H. D. Walters.
Clifton Forge	Allegheny	1047	2	68.4	......	94	30	40	2	36	3.83	....	1.20	....	12	15	13	2	sw.	T. P. Halloran.
Dale Enterprise	Rockingham	1350	10	69.2	—2.1	95	15	40	1	44	2.88	—1.30	1.31	....	12	13	12	5	s.	L. J. Heatwole.
Goshen	Rockbridge	1590	1	74.8	+2.3	92	30	50	22	30	4.75	—1.22	1.00	....	6	24	4	2	w.	J. B. Wood.
Graham's Forge	Wythe		3	69.0	—.06	89	30	42	22	33	4.14	+0.47	1.66	....	7	8	20	2	sw.	David Graham.
Hot Springs	Bath	2195	4	72.8	+5.2	91	15 29 30	50	1 2	31	3.52	—0.14	1.01	....	6	8	20	2	......	A. M. Stimson.
Lexington	Rockbridge	946	23	69.9	—0.4	91	16	44	12	38	3.33	—0.21	0.93	....	13	9	15	6	se.	Prof. H. C. Campbell.
Marion	Smyth	2124	8	69.9	+0.1	89	30	43	1	34	5.83	+0.30	3.00	....	9	9	15	6	......	A. T. Lincoln.
Monterey	Highland	3008	2	64.7	—1.1	89	29	40	1 2	34	3.25	—0.85	1.30	....	9	....	....	..	w.	Jos. Jones.
Salem	Roanoke	1200	6	73.2	+0.6	93	16 30	48	2	31	1.31	—1.60	0.36	....	6	....	....	....	sw.	Prof. S. C. Wells.
Saltville	Smyth	1739	2	69.9	+0.1	88	15 16 30	41	1	43	4.07	—0.38	1.19	...	8	....	....	....	......	C. M. Perry.
Stanleyton	Page	1064	0	......	......	....	....	....	....	....	......	....	....	....	....	....	....	....	......	A. K. Grim.
Staunton.	Augusta	1380	6	70.0	—0.6	94	30	42	2	36	2.18	—2.03	0.48	...	8	9	19	2	w.	W. C. Hedrick.
Stephens City	Frederick.		4	70.2	—2.2	89	16 23 25	40	2	40	4.16	—0.38	1.32	....	9	15	12	3	w.	W. B. Steele.
Sword's Creek	Russell.		0	70.3	......	89	15	44	2	35	2.99	....	0.65	....	8	10	5	15	......	J. H. Steele.
Woodstock	Shenandoah	927	0	70.9	......	96	30	45	1	30	3.37	....	0.78	....	9	3	26	1	w.	H. F. Miley.
Wytheville.	Wythe	2370	25	69.2	+1.0	88	29	41	1	34	1.98	—2.43	0.62	....	11	17	8	5	w.	Dr. P. B. Green.

† Estimated. ‡ Incomplete. tr. trace, or less than 0.01 of an inch. (1) Means from 7 am, 2 and 9 + 9 pm. observations. Letters following name of station indicate number of days missing from the report, as b = 2 days, etc.

Note—Estimated and incomplete data not considered in means.

MISCELLANEOUS PHENOMENA.

Meteors: Spottsville, 21; Dale Enterprise, 26.

Earthquakes: Fredericksburg, 8, 28; Staunton, Lexington, Graham's Forge, 28; Wytheville, 4, 5, 28; Blacksburg, 29.

Fogs: Bon Air, Woodstock, 18; Spottsville, 19; Fredericksburg, 5; Stanardsville, 18, 19; Hot Springs, 29.

Hail: Fredericksburg, 9; Stephens City, 16, 20; Doswell, 13; Birdsnest, 20; Clifton Forge, 13; Graham's Forge, 4; Marion, 17; Wytheville, 12.

Halos, Solar: Spottsville, 2, 13.

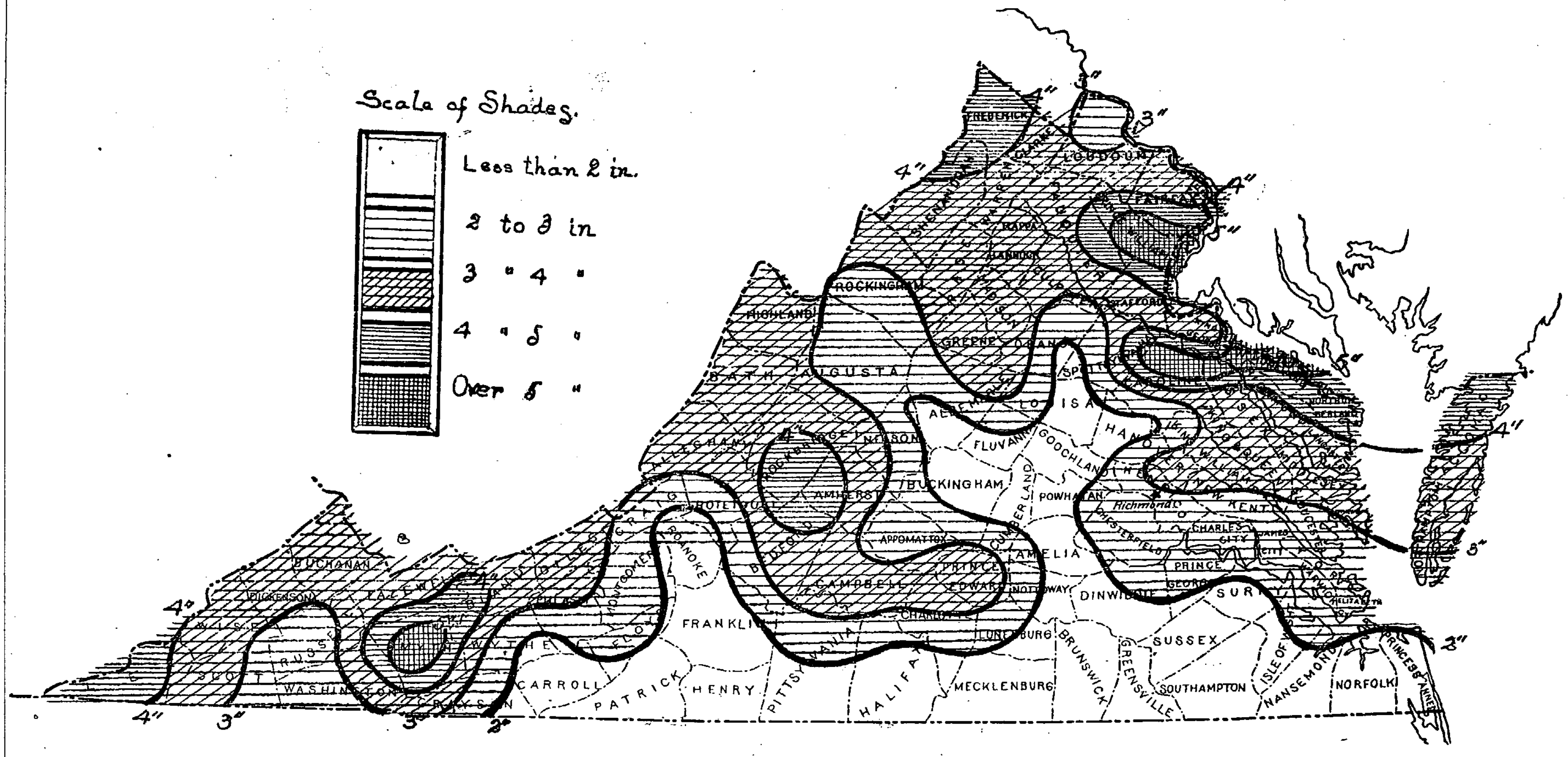
Thunder storms: Bon Air, 12, 13, 16, 17, 20; Ashland, 4, 13; Woodstock, 3, 4, 13, 16, 19, 20, 24; Dale Enterprise, 3, 4, 12, 13, 16, 19, 24; Salem, Hot Springs, 19; Bedford City, 13, 19; Fredericksburg, 4, 16; Stephens City, 3, 8, 13, 15, 16, 19, 26; Barboursville, 3, 4, 13, 16, 19, 24, 25, 26; Doswell, 13; Burke's Garden, 3, 4, 12, 18, 20; Staunton, 3, 4, 13, 16, 19, 26; Alexandria, 3, 4, 13, 16, 19, 20; Lexington, 3, 4, 12, 13, 18, 20; Sword's Creek, 16, 17; Graham's Forge, 3, 4, 12, 17, 19, 20; Marion, 17; Warrenton, 3, 4, 13, 18; Wytheville, 4, 12, 19, 20.

Daily Maximum and Mininum temperatures for June, 1897.

Stations.	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30		31		Monthly Mean.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
TIDEWATER VA.																																																																
Ashland	75	57	77	46	85	62	90	67	76	64	83	59	65	60	64	57	75	58	77	60	83	54	88	68	82	62	83	67	94	59	95	69	91	69	85	70	82	60	86	67	72	60	78	49	76	65	92	65	91	68	78	65	78	63	75	63	88	67	96	75	..	..	82.0	62.5
Cape Henry	71	60	80	62	84	62	92	68	75	64	72	65	65	62	67	61	70	60	75	60	76	65	85	67	90	68	84	69	94	67	90	69	80	69	74	67	77	67	87	77	72	65	74	60	79	63	89	70	90	71	82	70	75	69	78	68	82	72	96	75	..	..	80.1	66.5
Doswell	80	65	84	61	80	71	86	71	68	62	80	53	74	62	80	65	81	64	79	70	70	48	81	69	90	74	90	65	92	74	100	75	90	80	91	70	95	74	82	80	85	74	90	76	87	75	95	80	90	85	83	77	70	59	85	65	90	79	100	85	..	..	84.9	70.3
Hampton	74	62	72	58	82	64	86	70	73	70	77	68	65	62	71	62	74	64	77	64	78	62	88	69	86	66	82	68	87	69	93	70	82	73	76	73	80	64	87	67	74	68	79	60	82	65	89	70	91	72	82	74	76	70	79	69	85	70	93	76	..	..	80.7	67.3
Norfolk	76	64	74	58	84	62	88	68	75	66	76	61	68	60	71	60	73	63	79	63	80	63	91	66	88	68	83	68	91	66	96	71	91	70	79	67	82	65	87	70	72	62	76	59	81	62	90	70	94	70	86	71	79	68	81	68	86	72	96	76	..	..	82.5	65.9
Petersburg	78	58	80	45	88	60	92	70	73	65	83	68	78	60	68	59	78	58	83	61	84	54	92	68	91	64	87	63	95	60	98	70	92	69	85	70	88	59	90	60	75	36	81	50	91	60	93	64	95	65	86	65	80	65	81	66	84	70	97	68	..	..	85.5	61.7
Richmond (near)	78	45	78	45	85	50	80	50	90	55	82	60	80	60	66	60	75	59	75	60	80	55	90	55	89	60	85	60	95	59	99	70	91	71	83	65	90	61	90	68	78	61	80	49	83	60	85	63	96	66	85	65	85	65	85	66	93	68	99	70	..	..	85.0	60.0
Spottsville	80	57	79	57	87	58	90	68	73	67	81	63	64	62	70	60	75	60	83	59	85	52	92	64	90	58	89	64	94	58	98	69	92	70	83	68	87	57	90	67	79	59	82	47	83	59	93	66	98	68	88	67	80	67	82	65	92	70	98	76	..	..	85.2	62.7
Sunbeam	78	68	77	50	79	58	82	68	75	62	73	62	70	61	66	60	74	61	81	59	81	55	90	65	80	64	81	69	90	65	94	70	93	69	91	71	83	69	88	69	83	65	79	49	82	65	90	68	94	69	89	71	81	68	79	67	91	70	97	76	..	..	83.0	64.8
Warsaw ‡	76	57	77	48	88	51	90	65	75	61	79	60	78	56	66	58	75	58	76	58	81	54	88	65	86	64	83	63	93	60	91	63	82	69	76	64	85	58	89	65	72	56	80	51	82	53	91	65	92	68	..	..	..	..	80	60	90	65	95	75	..	..	82.7	60.4
MIDDLE VA.																																																																
Alexandria	76	43	75	61	86	66	89	61	76	56	80	60	63	56	60	57	73	54	75	53	80	65	86	59	87	60	84	62	89	64	88	69	81	63	77	60	84	85	85	65	73	58	79	62	85	65	88	67	91	68	81	60	75	56	74	64	88	72	94	70	..	..	80.7	61.4
Barboursville	75	50	75	45	85	62	88	69	72	61	79	57	67	60	61	56	75	57	77	56	81	53	85	59	87	60	83	63	92	59	94	64	84	67	77	67	84	84	88	68	76	55	80	50	83	61	89	66	91	70	76	66	70	59	70	62	85	61	93	68	..	..	80.8	60.5
Bedford City	79	45	82	50	87	59	86	58	80	56	83	57	75	54	67	53	82	49	82	50	89	59	89	58	94	61	90	54	94	60	96	63	91	64	91	65	90	82	86	54	80	47	82	50	87	59	91	66	94	66	91	60	82	61	74	64	94	65	96	73	..	..	86.1	58.1
Bon Air	80	57	82	46	89	61	94	70	75	62	82	58	65	60	66	57	77	58	82	61	85	55	91	62	89	62	87	66	95	59	101	68	89	69	83	69	89	60	92	66	88	60	85	50	76	61	93	64	98	67	86	67	78	62	80	64	92	68	101	74	..	..	85.7	62.1
Buckingham	78	43	79	45	85	56	89	61	74	57	79	60	70	58	63	58	77	58	78	52	82	55	87	59	90	62	84	66	91	58	95	66	90	66	85	65	85	67	89	66	75	47	79	49	81	64	93	64	94	64	83	65	75	64	71	63	89	69	97	72	..	..	82.9	60.0
Callaville	77	58	75	47	85	65	87	70	72	67	79	62	66	62	68	59	75	59	79	61	82	52	90	66	89	63	83	63	90	58	95	71	93	72	87	78	89	66	85	70	71	59	79	49	78	62	89	67	92	66	89	69	84	68	80	65	91	71	96	78	..	..	83.1	63.4
Farmville	85	55	85	45	85	60	87	65	80	60	85	55	85	60	82	57	83	55	85	56	89	58	90	65	92	67	90	68	90	60	92	70	95	70	90	68	92	65	92	66	95	60	94	65	90	64	100	65	103	68	98	65	85	65	89	63	90	66	93	72	..	..	89.7	62.6
Fredericksburg	75	55	78	46	87	63	88	70	79	65	77	59	64	62	62	60	72	60	74	60	77	57	85	67	80	63	83	65	88	60	89	67	83	70	81	67	82	62	89	69	79	65	77	52	79	63	88	67	91	70	81	69	78	62	73	63	87	68	97	69	..	..	80.8	63.0
Gordonsville	65	58	72	57	78	67	81	70	72	63	70	60	73	62	74	65	73	63	77	63	78	62	80	70	85	73	85	75	88	76	80	75	80	70	80	72	80	70	83	72	79	65	79	69	80	71	83	75	88	75	78	72	73	67	72	65	85	70	89	75	..	..	78.7	68.2
Guinea ‡	80	36	85	30	79	36	83	43	80	37	85	45	79	48	83	47	80	50	83	52	85	48	88	54	80	52	83	55	89	58	90	55	83	59	..	57	..	50	..	52	..	56	..	60	..	54	..	55	..	58	..	54	..	53	..	60	..	55	..	61	..	..	....	51.0
Leesburg	76	44	83	39	88	54	92	66	91	61	86	52	64	38	62	50	72	52	78	54	83	49	82	48	91	55	92	58	95	61	94	60	78	64	82	57	86	58	90	52	92	48	92	56	88	52	99	65	84	64	84	58	76	54	84	58	90	68	102	70	..	..	85.2	55.5
Lynchburg	76	53	77	49	84	67	87	66	77	64	79	61	69	60	65	57	79	58	81	56	85	55	84	66	90	62	88	66	92	60	96	67	90	68	89	70	85	67	86	67	77	60	78	53	84	62	90	66	93	69	87	67	74	66	72	63	91	69	94	74	..	..	83.3	62.9
Maidens‡	80	76	82	74	86	76	86	80	78	74	80	76	66	64	68	58	76	64	80	76	88	76	88	82	86	84	86	84	92	82	100	86	..	..	..	..	90	70	92	76	86	72	86	72	78	72	96	82	100	88	85	84	76	68	76	62	94	74	100	78	..	..	85.0	75.5
Manassas	72	49	77	41	87	60	88	67	75	62	81	55	68	61	63	54	83	56	80	54	88	50	89	63	86	64	82	55	90	57	90	62	80	67	77	62	80	59	86	64	75	54	82	49	84	59	87	64	90	67	79	66	75	57	80	55	91	66	94	72	..	..	82.0	59.0
Quantico	72	50	77	41	88	56	88	64	74	62	79	60	67	52	60	55	72	58	75	53	80	50	87	63	85	56	84	64	93	56	89	60	84	69	78	64	83	60	85	65	88	57	79	47	86	63	90	67	93	65	81	69	75	61	75	55	90	63	95	73	..	..	81.7	59.3
Rocky Mount	80	55	80	50	85	65	86	67	77	60	79	60	77	59	65	59	80	60	82	55	85	54	87	68	90	65	90	70	93	60	96	66	89	68	90	74	92	70	89	67	82	60	82	48	89	65	90	66	95	72	92	72	80	68	75	65	92	69	95	75	..	..	85.5	63.7
Smithville	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....
Stanardsville	72	46	76	45	85	57	85	60	75	57	79	54	66	57	67	53	75	54	77	51	81	52	85	59	87	58	83	60	93	57	93	63	85	63	80	63	82	60	86	65	74	49	78	48	83	56	89	65	93	67	80	63	74	63	73	64	87	63	93	73	..	..	81.2	58.2
Warrenton	72	56	70	51	83	62	84	64	74	62	78	64	63	60	65	56	63	57	74	58	78	67	80	66	84	65	81	66	90	67	90	70	86	70	74	65	83	72	85	66	71	59	72	57	78	62	84	68	90	75	72	60	74	58	73	63	86	68	93	76	..	..	78.3	63.7
GREAT VALLEY.																																																																
Big Stone Gap	78	38	87	43	85	55	80	58	75	46	82	43	74	54	74	54	78	48	82	46	88	48	88	54	87	56	88	62	90	52	90	54	88	60	82	60	88	57	86	60	74	52	78	42	84	55	87	61	87	59	85	62	86	56	88	59	90	62	90	62	..	..	84.0	53.9
Blacksburg	71	39	73	49	80	46	79	55	80	54	73	49	66	55	65	54	74	53	73	44	82	46	78	59	85	60	83	49	86	54	87	60	84	62	83	61	89	60	81	51	72	56	73	40	83	50	86	57	87	60	85	56	82	63	82	62	90	66	90	71	..	..	80.1	54.7
Bristol	74	54	89	61	84	62	81	56	74	52	81	57	80	59	78	56	78	51	80	53	83	59	85	59	85	64	87	59	87	65	87	61	87	61	83	55	80	54	74	54	73	50	76	60	83	62	86	61	87	65	85	64	86	66	89	65	87	67	88	67	..	..	82.6	59.3
Burke's Garden	70	38	77	52	80	64	77	60	70	50	78	52	68	61	69	56	71	57	75	45	81	46	77	66	80	66	80	67	86	48	84	50	80	65	78	63	82	64	75	59	71	51	74	37	80	61	79	66	85	64	78	65	81	59	85	63	83	60	83	70	..	..	77.7	57.5
Clifton Forge	69	43	75	40	90	58	68	62	60	60	78	59	60	55	64	59	59	59	60	45	82	46	70	60	80	56	75	61	92	68	80	58	90	65	86	62	88	67	88	72	85	52	72	44	91	55	91	65	90	64	85	76	74	62	72	67	89	63	94	72	..	..	77.6	68.4
Dale Enterprise	74	40	80	44	86	55	84	56	82	55	83	52	68	58	64	52	77	51	82	42	87	43	85	57	86	52	86	56	95	51	94	58	85	60	80	58	85	60	86	65	81	46	82	42	86	53	90	60	93	58	88	58	83	56	93	55	93	65	92	64	..	..	84.3	54.0
Goshen	78	66	80	67	84	66	87	68	80	62	84	64	78	66	77	64	79	67	79	69	84	67	85	64	87	65	86	68	90	70	88	70	90	72	88	76	84	70	76	60	74	54	76	50	80	56	84	64	90	68	90	60	86	72	88	70	90	68	92	70	..	..	83.8	65.8
Graham's Forge	71	43	76	43	82	64	78	60	71	57	74	58	69	59	68	58	75	58	77	59	81	49	83	57	85	57	84	66	84	52	86	56	84	63	81	66	88	60	81	61	72	52	74	42	81	56	83	59	86	66	86	62	81	60	81	67	85	65	89	67	..	..	79.9	58.1
Hot Springs	72	50	79	50	85	70	85	67	80	65	80	57	79	62	70	63	79	56	80	52	84	57	80	65	89	65	85	62	91	60	90	63	83	66	87	66	89	65	84	70	77	58	80	51	85	62	84	65	90	67	85	67	79	65	83	68	91	67	91	73	..	..	83.2	62.5
Lexington ‡	74	44	76	44	85	64	81	63	..	..	79	59	69	57	66	59	77	59	79	47	83	45	77	59	86	55	81	61	88	54	91	60	85	66	86	64	85	66	82	64	73	54	77	48	82	59	85	65	89	66	82	63	74	64	78	64	87	64	89	72	..	..	80.9	58.9
Marion ‡	73	43	80	50	85	61	82	62	75	57	..	..	78	50	..	..	77	57	77	49	83	49	84	53	..	..	85	59	88	64	87	57	84	64	80	64	85	63	..	..	80	52	77	45	80	58	84	60	85	63	84	54	83	61	86	66	88	64	89	65	..	..	82.3	57.5
Monterey	60	40	70	40	78	60	74	60	74	50	74	50	72	54	74	50	68	52	72	42	76	44	77	67	78	60	72	60	84	50	84	54	84	60	76	60	80	60	70	50	70	46	76	42	80	52	80	60	78	54	80	54	68	50	78	58	89	55	88	66	..	..	76.1	53.3
Salem	78	50	76	48	82	67	85	67	77	62	77	59	75	58	66	58	79	60	79	50	85	54	82	68	89	67	88	65	90	64	93	65	89	70	89	75	90	70	85	68	78	59	78	50	87	62	89	67	92	72	80	72	78	64	77	62	90	67	93	73	..	..	83.2	63.1
Saltville	75	41	85	42	83	57	79	63	75	56	78	49	74	56	76	58	76	58	78	52	85	49	83	54	86	59	86	70	88	54	88	56	83	63	82	65	84	64	81	62	73	55	76	45	82	60	84	63	85	64	84	67	87	60	87	65	86	64	88	66	..	..	81.9	57.9
Stanleyton	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	....	....
Staunton	74	44	78	42	81	59	85	63	76	60	78	58	65	57	62	54	76	56	78	50	82	48	81	63	88	60	85	61	90	56	93	65	87	65	81	65	86	64	80	64	74	50	80	46	84	58	88	64	92	64	83	65	73	61	81	61	89	61	94	72	..	..	81.5	58.5
Stephens City	69	49	80	40	86	62	84	64	79	57	82	52	67	54	61	53	77	54	77	52	82	52	85	63	78	58	84	59	88	60	89	58	82	64	83	60	87	51	80	57	75	50	83	49	89	59	86	63	89	66	83	60	81	58	83	60	88	60	†76	73	..	..	81.1	59.2
Sword's Creek	74	45	75	44	85	66	79	64	75	53	80	48	74	58	73	58	76	57	79	50	85	52	84	58	85	58	84	67	89	54	88	55	80	65	80	65	85	60	80	60	72	55	82	60	85	62	84	66	81	67	83	60	84	64	87	64	88	70	81	76	..	..	81.7	59.4
Woodstock	75	45	78	55	82	61	83	60	79	56	77	59	78	58	65	59	80	54	82	58	80	60	88	59	75	60	82	60	87	60	87	66	78	63	78	62	86	64	79	53	77	50	82	52	86	66	86	65	94	65	86	60	87	61	88	63	86	68	96	70	..	..	82.2	59.7
Wytheville	73	44	79	45	83	65	71	62	73	56	74	50	65	58	67	58	73	58	75	49	82	50	79	63	82	62	83	67	86	54	86	61	81	66	84	65	84	64	78	61	72	52	77	45	82	57	82	62	86	64	81	66	82	61	86	67	88	66	87	71	..	..	79.4	59.0

‡ Incomplete. † Estimated.

TOTAL PRECIPITATION FOR JUNE, 1897.



Daily Precipitation for June, 1897.

Stations.	Day of Month.																															Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
TIDEWATER VIRGINIA.																																
Ashland	....	....	....	1.95	.56	....	....	.06	....	.19	....	....	.04	....	....	....	.28	....	....	tr	....	....	.30	.12	....	....	....	.14	....	....	....	3.64
Birdsnest	....	....	....	....	....	....	tr	1.10	.20	....	....	tr	.20	.30	....	.30	....	.20	....	....	.80	....	....	.15	tr	....	....	....	tr	....	....	3.25
Cape Henry	....	....	....	....	.40	.05	.45	.30	....	....	....	.30	.05	.01	....	....	.03	....	....	.05	tr	....	....	.33	.12	....	....	....	....	....	....	2.09
Doswell †	....	....	....	....	.40	....	....	1.10	....	....	....	....	....	.07	....	....	.03	....	....	....	....	....	.15	....	....	tr	....	tr	....	....	....	1.65
Hampton	....	....	....	tr	....	.02	....	.33	....	....	....	.04	.22	....	....	....	.18	....	....	.12	....	....	....	1.50	....	....	....	....	....	.02	....	2.43
Norfolk	....	....	....	tr	.32	.06	tr	.33	.04	....	....	.26	.64	.01	....	....	0.4	.01	....	.04	.01	....	tr	tr	.07	....	....	....	.15	tr	....	1.98
Petersburg	....	....	....	....	.14	....	tr	.03	....	....	.10	....	.04	....	....	....	tr	....	.18	.49	....	....	.41	.80	....	....	....	....	....	....	....	2.19
Spottsville	....	....	....	....	tr	....	tr	.06	....	....	....	tr	.09	....	....	....	.02	....	.01	.28	....	....	tr	.22	.03	....	....	....	....	....	....	0.71
Sunbeam	....	....	....	tr	.07	.23	....	.36	....	....	....	.48	....	....	....	....	.09	....	....	....	....	....	tr	tr	....	....	....	....	....	....	....	1.23
Warsaw	....	....	....	....	2.05	....	....	....	....	....	....	....	....	.15	....	.28	....	1.63	....	tr	....	....	.03	tr	....	....	....	tr	....	....	....	4.14
MIDDLE VIRGINIA.																																
Alexandria	....	....	.05	.84	.06	....	....	.10	....	....	....	....	.32	....	.11	.09	1.41	....	.29	tr	....	....	....	.16	....	tr	....	....	tr	....	....	3.43
Barboursville	.01	....	tr	.67	.40	....	.03	.06	.03	.07	....	....	.04	....	tr	.45	.31	....	.01	tr	....	....	....	.70	.07	.68	....	.10	....	tr	....	3.63
Bedford City	....	....	.15	.40	....	....	tr	....	....	....	....	tr	.60	....	....	.13	....	.35	1.87	tr	....	....	.13	....	....	....	....	.05	....	....	....	3.68
Bon Air	....	....	....	....	.97	....	....	.04	tr	....	....	....	....	tr	....	....	.17	.21	.10	....	.11	....	.29	.10	.12	tr	....	....	....	....	....	2.11
Buckingham	....	....	tr	1.05	....	....	.07	tr	.20	....	....	....	.20	....	....	tr	tr	.25	.13	tr	....	....	....	....	tr	tr	tr	tr	tr	....	....	1.90
Callaville	....	....	....	.02	.23	....	....	.03	....	....	....	....	tr	.04	....	....	....	.14	....	.36	....	....	.07	....	....	....	....	.10	....	....	....	0.99
Danville	....	....	....	.11	.62	....	....	.04	....	.30	....	tr	....	....	....	....	.05	.05	....	.20	....	tr	....	.06	.19	....	.26	.20	....	....	....	2.08
Farmville	....	....	....	3.00	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.10	....	....	.25	.50	....	....	....	....	....	....	....	3.85
Fredericksburg	....	....	....	1.52	.08	....	....	.15	....	.12	....	tr	.23	....	tr	.56	.92	....	tr	tr	....	....	....	tr	....	tr	....	.05	....	....	....	3.63
Guinea	....	....	....	....	....	....	....	....	....	....	....	....	3.58	....	....	2.88	5.10	....	....	....	....	....	....	....	....	....	....	....	....	....	....	11.56
Leesburg	....	....	.72	.11	....	....	....	....	....	....	....	....	.29	....	.52	....	....	....	.70	....	....	....	....	....	....	....	....	....	....	....	....	2.34
Lynchburg	....	....	.14	.33	.04	....	tr	.02	.12	....	....	tr	.18	.10	....	....	.02	.13	1.31	.09	....	....	.01	.07	....	.05	....	.08	....	.01	....	2.70
Maidens	....	....	....	.41	....	....	....	.04	....	....	....	....	.09	....	....	....	....	....	....	.52	....	....	.15	....	.45	....	.09	....	....	....	....	1.75
Manassas	....	....	.39	1.67	....	....	....	.69	....	....	....	....	.17	....	....	.87	.99	....	.27	....	....	....	....	2.14	....	....	....	....	....	....	....	7.19
Rocky Mount	....	....	tr	.50	tr	....	.27	tr	tr	....	....	tr	....	....	....	....	tr	tr	.32	tr	....	....	....	tr	....	....	tr	tr	tr	tr	....	1.09
Stanardsville	....	....	.82	1.22	1.02	....	....	....	....	....	....	....	....	....	....	....	.45	....	tr	....	....	....	....	....	....	....	....	....	....	....	....	3.51
Warrenton	....	....	.73	.76	.29	....	....	.39	....	....	....	....	.52	....	....	.81	....	.04	....	....	....	....	....	....	....	....	....	....	....	....	....	3.54
THE GREAT VALLEY.																																
Big Stone Gap	....	....	tr	.34	....	....	1.30	tr	....	....	....	.07	....	....	....	tr	1.17	.18	....	.20	....	....	....	.32	....	....	....	....	....	.04	....	3.62
Blacksburg	....	....	.54	.88	.23	....	.32	....	....	....	....	....	....	....	....	.03	....	....	....	.04	....	....	....	....	.30	....	....	....	....	....	....	2.34
Bristol	....	....	.30	.83	....	tr	.56	tr	....	....	....	.15	....	....	....	.52	.23	....	....	.73	....	tr	.15	.28	tr	tr	....	....	....	.32	....	4.07
Burke's Garden	....	....	....	.70	....	....	.82	.39	.03	....	....	.37	....	....	....	....	.38	.36	.05	.52	....	....	tr	.12	....	....	....	....	....	.06	....	3.80
Christiansburg	....	....	....	.24	.70	....	.30	....	....	....	....	....	.45	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.35	....	2.04
Clifton Forge	....	.05	.03	.25	....	....	.12	.07	....	....	....	....	.91	....	....	.35	1.20	....	.20	.20	....	....	....	.16	....	....	....	....	.29	....	....	3.83
Dale Enterprise	....	....	.45	1.31	....	....	....	.12	....	....	....	....	.03	....	....	.41	.01	.25	.08	.18	....	....	.01	....	....	....	....	....	.01	.02	....	2.88
Goshen †	....	....	....	....	....	....	....	....	....	....	....	....	1.00	....	....	1.00	....	....	.50	.50	....	....	....	....	....	1.00	....	....	.75	....	....	4.75
Graham's Forge	....	....	.56	1.66	....	....	.28	.94	.03	....	....	tr	....	....	....	....	.14	....	....	.53	....	....	....	....	....	....	....	....	....	....	....	4.14
Hot Springs	....	....	....	.68	....	....	....	.15	....	....	....	....	.30	....	....	1.01	....	....	.46	....	....	....	....	tr	....	....	....	....	.92	....	....	3.52
Lexington	....	....	.09	.34	.11	....	....	.04	....	....	tr	tr	.55	.38	....	....	.20	.05	.60	.37	....	....	....	.28	....	.06	....	....	....	.26	....	3.33
Marion	....	....	....	.65	....	....	.58	.34	....	....	....	.01	tr	....	....	....	....	3.00	.22	.88	....	....	.15	tr	tr	tr	....	....	tr	tr	....	5.83
Monterey	....	....	.25	.20	....	....	....	tr	....	....	tr	.05	1.30	....	....	tr	.10	.05	.75	.25	....	....	....	....	....	....	....	....	....	.30	....	3.25
Salem	....	....	.17	.33	....	....	.15	.07	....	....	....	tr	....	....	....	tr	....	....	.36	.23	....	....	tr	....	....	....	....	tr	....	....	....	1.31
Saltville	....	....	....	.84	....	....	.73	.37	....	....	....	tr	....	....	....	....	1.19	.20	.10	.39	....	....	tr	tr	....	....	....	....	....	.25	....	4.07
Stanleyton	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Staunton	....	....	.48	.40	tr	....	tr	.32	tr	....	....	....	.24	....	....	....	.17	....	tr	.26	.05	....	....	....	....	.26	....	....	tr	tr	....	2.18
Stephens City	....	tr	.53	.78	....	....	tr	.18	tr	....	....	....	.16	....	tr	1.01	.31	....	.63	.23	....	....	....	.33	....	....	....	....	....	....	....	4.16
Sword's Creek	....	....	....	.04	....	....	.50	....	....	....	.20	....	....	....	.35	.65	.35	....	tr	.50	....	....	.40	....	....	....	....	....	....	tr	....	2.99
Woodstock	....	tr	.60	.68	....	....	tr	.09	....	....	....	....	.78	....	....	.33	.29	tr	.23	.18	....	....	....	.19	tr	....	....	....	....	tr	....	3.37
Wytheville	....	....	.02	tr	....	tr	.62	.36	.02	....	....	.35	....	....	....	....	.22	,02	.01	.29	....	....	.04	....	....	.03	....	tr	tr	....	....	1.98

† Rainfall estimated. ‡ Incomplete. tr. Trace, or less than .01 of an inch.