

OCT 25 1897

U. S. DEPARTMENT OF AGRICULTURE.

REPORT FOR SEPTEMBER, 1897.

VIRGINIA SECTION

OF THE

CLIMATE AND CROP SERVICE

OF THE

WEATHER BUREAU.

PUBLISHED BY AUTHORITY OF THE SECRETARY OF AGRICULTURE.

UNDER DIRECTION OF

WILLIS L. MOORE

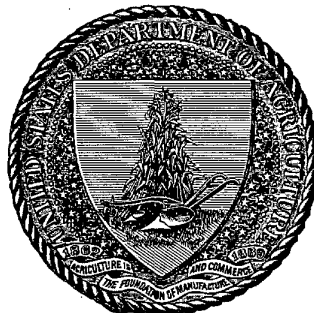
CHIEF OF WEATHER BUREAU

BY

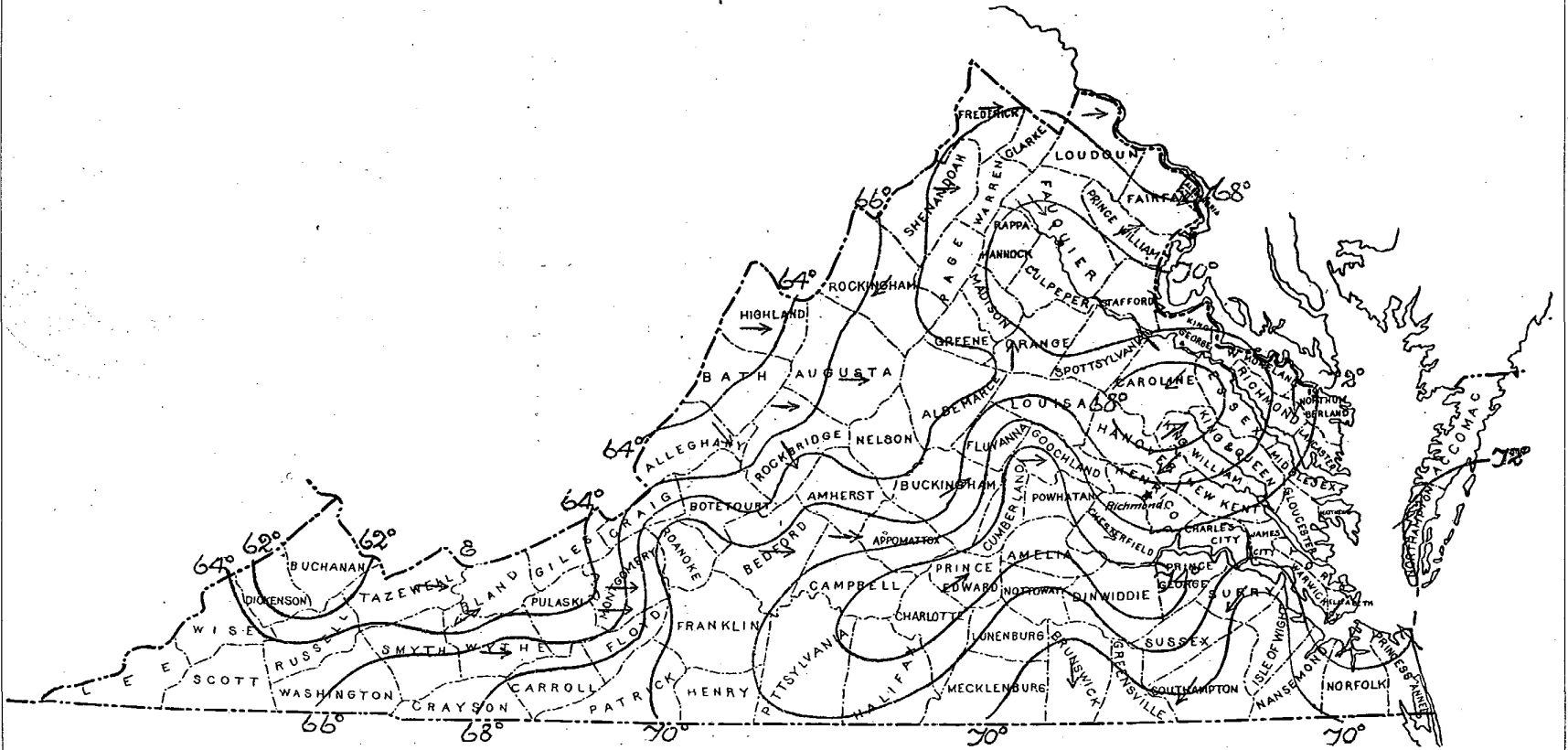
EDWARD A. EVANS

SECTION DIRECTOR.

RICHMOND, VA.



MONTHLY MEAN TEMPERATURE AND PREVAILING WIND DIRECTION FOR SEPTEMBER, 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.

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No. 9.

SEPTEMBER CROP CONDITIONS.

The progress of crops and farm work (except fodder pulling and saving of tobacco) was very seriously interfered with during September by an unusually long continued period of high temperature, and an intensely droughty condition. Indeed, in this latter respect, the month was without a parallel for any September so far as shown by our records. Infrequent and very light showers were the rule, except on the 22d-23d, when fairly good rainfalls occurred generally over the State, and this condition combined with the hot weather of the first and second decades, was productive of a steady decline in late corn and tobacco, peanuts, pastures and turnips, while the soil hardened to such an extent that fall plowing was impossible. Some little seeding, principally German clover, was done early in the month, but, with this exception, there was practically no seeding done. Fodder pulling and cutting, curing and housing of tobacco progressed under favorable circumstances all the month, and a large crop of fodder was secured in excellent condition. Tobacco stood the drought and heat better than any of the other late crops and quite a large crop was saved. Cotton also came through the month fairly well. The showers of the 22d-23d refreshed vegetation somewhat; enabled a little fall plowing to be done, and was beneficial to pastures.

Light frosts in the western half of the State towards the close of the month did some slight damage to late tobacco, gardens and vines.

HOMOGENEITY AND UNIFORMITY.

As uniformity at many stations over a large area is quite as important as uniformity at one station for many years, therefore, it would be eminently proper for those who have maintained such long records to consider whether—while still keeping up their integrity—they can not also do something additional that will make it possible to compare their own observations with those of distant stations without introducing discrepancies due to methods and instruments.

The most important sources of discrepancy may be enumerated as follows:

Temperature.—(A). A difference of a few feet in the height of thermometers above ground causes an apparent difference in the extreme temperatures at any two stations. (B). A difference in the style of exposure of a thermometer, one being hung on the north side of a house, too close to the wall; another swinging freely in the shade of a tree; a third put within a shelter of double lattice-work, where the wind has not the freest access; all these exposures will necessarily pro-

duce differences in recorded temperatures. (C) Unless thermometers are purchased of the best makers—and such are rather expensive—they are very apt to differ among themselves one or more degrees, F., even when stirred about together in a basin of water, the differences due to inclosures and instruments should be applied to the records before any study of climate is contemplated. (D). The differences in the immediate surroundings of two stations due to their being on hills or plains, in valleys or in the shadow of a mountain, or in a forest, will produce local peculiarities that are characteristic of very limited areas, and that must be duly considered in studying the peculiarities of climatic records; this question of special local climates, even in the narrowest possible sense of the word local, interests the botanist and agriculturist, because slight differences become appreciable in the growth of the plant.

Precipitation.—The records of rainfall show even wider variations, both absolutely and relatively, than do the records of temperature. The differences in temperature between two neighboring thermometers are paralleled by the differences in the catch of two local rain gauges. On the average of many years it is found that a rain gauge about a hundred feet above the ground will only catch 65 per cent of the rainfall caught by one at the ground, and it has been shown that this is simply due to the more active and violent action of the wind at the mouth of the upper gauge, since as soon as a gauge is shielded from the wind its record becomes the same whether it is one foot or a hundred feet above ground. For the same reason, gauges at or near the ground catch less in proportion as they are located in windy or sheltered spots; thus, in a set of fourteen gauges observed by Dr. Hellmann, near Berlin, in a region over which the average rainfall for the year must have been practically identical, some showed deviations of 14 per cent, which at first seemed to be due to the influence of forests, but were soon found to be simply the irregularities of the deficiencies in the catch of the rain gauge, being in fact in the nature of an error in the catch, due to the strength of the wind at the mouth of the gauge.

These paragraphs suffice to illustrate the extreme importance and difficulty of obtaining true temperatures and true rainfalls and the necessity of bearing in mind the uncertainties of our methods of observation and the incongruity of our data when we attempt to study minute peculiarities of climate.

It is hardly to be expected that the majority of the voluntary observers would care to devote that labor and thought to the subject which specialists in hygiene and climatology delight in, therefore the Weather Bureau avoids every appearance of imposing upon the voluntary observer, strictly so-called, the labor that many "special observers" willingly undergo for the sake of advancing the inquiries in which they are personally interested. It must, however, be recognized that every voluntary observer has, by the very fact that he voluntarily keeps a record, shown that he has some special interest in some part, if not the whole, of climatology. Therefore to each one we may say: keep your record so that it shall be satisfactory to yourself in regard to the particular questions in which you are personally interested.

Extract, June, 1897, Weather Review.

ATMOSPHERIC PRESSURE.

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The mean monthly air pressure as deduced from the U. S. Weather Bureau Stations at Lynchburg, Norfolk and Washington, D. C., was 30.17 inches; highest 30.44 inches, at Lynchburg, on the 28th; lowest 29.89 inches, at Washington, D. C., on the 23d; range 0.55 of an inch.

TEMPERATURE. (DEG. F)

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TIDEWATER VIRGINIA.—Highest monthly mean, 73.6, at Petersburg; lowest monthly mean, 68.1, at Doswell; maximum temperature, 99, at Petersburg, on the 11th; minimum temperature, 35, at Doswell, on the 29th; greatest daily range, 50, at Petersburg.

MIDDLE VIRGINIA.—Highest monthly mean, 75.3, at Maidens; lowest monthly mean, 68.2, at Alexandria; maximum temperature, 102, at Nottoway C. H., on the 10th; minimum temperature, 35, at Buckingham, on the 28th and 29th, and at Leesburg, on the 30th; greatest daily range, 48, at Nottoway C. H.

THE GREAT VALLEY.—Highest monthly mean, 72.4, at Salem; lowest monthly mean, 60.9, at Dwale; maximum temperature, 98, at Stephens City, on the 10th, Woodstock, on the 11th and 13th, and Dale Enterprise, on the 16th; minimum temperature, 26, at Goshen, on the 22d; greatest daily range, 49, at Dale Enterprise.

FOR THE STATE.—Average of the monthly mean temperatures, 68.8; average of the maximum temperatures, 95; average of the minimum temperatures, 38; average of the greatest daily range, 39.

The month of September was characterized by a heated period of unusual duration. It opened with moderately high temperatures which steadily increased until the 9th between which date and the 16th the maximums were generally recorded in all sections. During the last half of the second decade the temperature though still high declined steadily and by the 21st decidedly cool weather prevailed which lasted without intermission until the close of the month. The lowest temperatures were all observed during this period. The comparison of the monthly mean with the eleven-year normal shows an excess of only 1.0 degrees and this is due entirely to the cool weather of the last ten days of the month. In respect to extremes the high temperature was not without precedent, being exceeded by those recorded during September, 1895.

PRECIPITATION.

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TIDEWATER VIRGINIA.—Greatest monthly precipitation, 2.03 inches, at Spottsville; least monthly, 0.32 of an inch at Cape Henry; greatest amount in any twenty-four consecutive hours, 1.21 inches, at Petersburg, on the 16th and 17th.

MIDDLE VIRGINIA.—Greatest monthly precipitation, 1.67 inches, at Callville; least monthly, trace, at Farmville; great-

est amount in any twenty-four consecutive hours, 1.02 inches, at Rocky Mount, on the 23d.

THE GREAT VALLEY.—Greatest monthly precipitation, 2.56 inches, at Salem; least monthly, 0.30 of an inch, at Sword's Creek; greatest amount in any twenty-four consecutive hours, 2.30 inches, at Salem; on the 22d and 23d.

FOR THE STATE.—Average total precipitation, 1.01 inches.

The average total precipitation for the State, 1.01 inches, was 3.46 inches below the normal for the month.

By sections Tidewater Virginia was 3.41 inches below the normal; Middle Virginia, 3.58 inches below, and the Great Valley, 3.38 inches below.

Perhaps the most noteworthy feature of the month was the large deficiency in precipitation. This is without parallel so far as any record at hand shows. The nearest approach to it was in the year 1884, when the average for the State was 1.24 inches. There were only three dates on which precipitation occurred which was in any respect general and of the total amounts recorded at the various stations, by far the greatest portion fell on one date the 22d.

The heat and intense drought played havoc with the crops, especially late corn, tobacco and turnips and baked the ground to such an extent that plowing for fall seeding became impossible. The yield of late corn was very much reduced by these adverse conditions, but tobacco stood the drought fairly well and the whole crop was better than the average in quantity.

The water supply throughout the agricultural communities in the Middle and Tidewater districts was much diminished and in some localities almost entirely cut off; many small creeks and branches disappeared and the flow of all the large streams and rivers was lessened to a marked extent.

The average number of days on which 0.01 of an inch or more of rain or snow fell, was 4 in Tidewater Virginia; 2 in Middle Virginia, and 2 in the Great Valley. Average for the State, 2.

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

WEATHER.—Tidewater Virginia, average number of clear days, 20; partly cloudy, 6; cloudy, 4. Middle Virginia, average number of clear days, 24; partly cloudy, 4; cloudy, 2. The Great Valley, average number of clear days, 24; partly cloudy, 4; cloudy, 2. For the State, average number of clear days, 22; partly cloudy, 5; cloudy, 3.

NOTES AND COMMENTS.

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All voluntary observers are invited to examine the published reports each month and see if the data, as entered, correspond with their retained forms. If not, please check and if any error is discovered advise this office.

Climatological Data for September, 1897.

Stations.	Counties.	Elevation, feet.	Length of record, years.	TEMPERATURE, IN DEGREES FAHRENHEIT.						PRECIPITATION, IN INCHES.				SKY.				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.	Prevailing direction of wind.
TIDEWATER VIRGINIA.																				
Ashland	Hanover	220	5	69.2	-0.6	97	11	38	29	41	0.80	-2.94	0.75	2	17	8	5	ne.	E. L. C. Scott.	
Birdsnest (r)	Northampton	40	28	71.8	+1.0	96	9	50	28	29	0.65	-3.26	0.20	6	18	8	4	sw.	C. R. Moore.	
Cape Henry	Princess Anne	17	22	72.3	+0.3	94	9	52	30	26	0.32	-2.11	0.22	4	17	8	5	se.	U. S. Weather Bureau.	
Doswell	Hanover	134	0	68.1	-0.1	97	11	13	35	29	0.70	-2.77	0.70	1	20	8	5	sw.	C. W. Butterworth.	
Hampton	Elizabeth City	3	9	73.1	+2.3	92	13	52	29	22	0.78	-2.58	0.64	3	18	4	4	ne.	C. L. Goodrich.	
Norfolk	Norfolk	3	25	72.3	+1.0	95	11	49	29	25	2.01	-2.55	0.78	6	22	4	4	ne.	U. S. Weather Bureau.	
Petersburg	Dinwiddie	11	9	73.6	+2.4	99	11	38	29	50	1.69	-2.74	1.21	3	21	2	7	ne.	Prof. Jas. M. Colson.	
Richmond (near)	Surry	96	21	70.4	+1.0	95	11	37	29	41	2.03	-1.64	1.02	4	24	2	4	ne.	Capt. J. C. Shafer.	
Spottsville	Henrico	60	2	70.2	+0.5	94	14	39	29	35	1.92	-1.60	0.41	5	21	6	2	ne.	B. W. Jones.	
Sunbeam	Southampton	60	2	70.2	+0.5	94	14	39	29	35	1.92	-1.60	0.41	5	21	6	2	ne.	Dr. W. H. Daughtry.	
Warsaw	Richmond	200	3	69.8	0.0	95	2	41	27	31	0.54	-1.92	0.52	2	19	9	3	n.	C. H. Constable.	
MIDDLE VIRGINIA.																				
Alexandria	Alexandria	35	37	68.2	-0.4	95	11	42	20	27	28	1.53	-0.50	0.56	3	23	4	3	ne.	H. C. Slaymaker.
Barboursville	Orange	0	0	68.4	+0.2	100	11	39	29	37	0.80	-2.80	0.78	2	22	5	3	sw.	Dr. Thos. H. Ellis.	
Bedford City (i)	Bedford	900	6	70.4	+1.2	95	11	14	21	28	4.6	1.00	-2.58	0.89	2	23	5	3	w.	J. T. Davidson.
Bon Air	Chesterfield	130	2	72.2	0.0	101	11	43	28	29	3.9	0.85	-3.25	0.28	4	23	4	3	nw.	Wm. H. Pleasants.
Buckingham	Buckingham	550	3	68.9	+0.1	100	14	35	28	29	5.5	1.06	-3.44	0.77	3	24	3	3	sw	Dr. W. E. Pratt.
Callville	Brunswick	570	0	69.4	+1.1	94	14	39	28	32	1.67	-0.93	1.01	3	21	6	1	sw.	F. M. Gage.	
Farmville	Prince Edward	47	0	74.2	+0.3	94	9	41	29	39	0.68	-1.95	0.68	1	26	1	3	se.	Jno. R. Martin.	
Fredericksburg	Spottsylvania	100	0	70.2	0.0	94	14	38	29	35	0.47	-1.21	0.27	2	19	6	5	n.	E. C. Rowe.	
Gordonsville	Orange	40	0	70.2	0.0	94	14	38	29	35	0.47	-1.21	0.27	2	19	6	5	n.	H. S. Smithers.	
Guinea	Caroline	100	0	70.2	0.0	94	14	38	29	35	0.47	-1.21	0.27	2	19	6	5	n.	M. A. Nunn.	
Leesburg	Loudoun	0	0	70.2	0.0	94	14	38	29	35	0.47	-1.21	0.27	2	19	6	5	n.	C. A. English.	
Lynchburg	Campbell	525	17	70.7	+1.8	99	14	40	29	44	1.12	-2.69	0.93	3	23	5	2	e.	U. S. Weather Bureau.	
Maidens	Goochland	185	1	75.3	+2.5	96	10	11	29	30	0.60	-0.35	0.35	2	25	2	3	e.	J. R. Hopkins.	
Manassas	Prince William	317	2	69.2	-0.4	96	10	11	28	44	0.80	-0.64	0.80	1	23	5	2	sw.	Thos. H. Lion.	
Nottoway C. H.	Nottoway	7	7	71.4	-0.8	102	10	36	29	48	0.75	-3.08	0.51	4	2	2	2	sw.	George Dunn.	
Quantico	Prince William	33	0	70.4	0.0	91	8	9	13	48	0.86	-1.56	0.77	3	26	2	2	sw.	E. V. King.	
Rocky Mount	Franklin	1150	2	71.2	-1.0	96	14	40	29	38	1.02	-1.45	1.02	1	17	12	1	sw.	J. H. Binford.	
Stanardsville	Greene	560	2	69.0	-0.1	96	10	38	28	41	0.65	-2.84	0.65	1	17	12	1	sw.	W. N. Parrott.	
Warrenton	Fauquier	0	0	70.4	0.0	91	8	9	13	48	0.86	-1.56	0.77	3	26	2	2	sw.	J. T. Preston.	
THE GREAT VALLEY.																				
Big Stone Gap	Wise	1966	6	64.8	-0.6	91	16	34	21	44	0.99	-1.26	0.88	2	25	3	2	sw.	John W. Fox. Sr.	
Blacksburg	Montgomery	2100	7	64.0	-0.5	93	16	30	22	30	51	1.19	-1.07	1.19	1	20	10	0	w.	Prof. W. B. Alwood.
Bristol	Sullivan, Tenn.	1676	2	66.0	-0.9	90	16	36	20	41	0.66	-0.63	0.48	2	28	1	1	sw.	J. Bunting, Jr.	
Burke's Garden	Tazewell	0	0	70.0	+5.0	87	15	46	20	22	1.15	-1.93	0.75	3	24	4	2	w.	C. H. Greever.	
Christiansburg	Montgomery	2160	9	65.4	-0.6	96	16	34	22	46	0.46	-3.06	0.46	1	28	0	2	nw.	H. D. Walters.	
Clifton Forge	Allegheny	1047	2	65.4	-0.6	96	16	34	22	46	0.46	-3.06	0.46	1	28	0	2	nw.	T. P. Halloran.	
Dale Enterprise	Rockingham	1350	10	66.0	-2.6	98	16	30	22	49	0.43	-3.58	0.43	1	21	8	1	ne.	L. J. Heatwole.	
Dwale	Dickenson	0	0	60.9	-0.8	86	13	14	21	22	21	0.70	-0.50	0.50	3	25	2	3	sw.	Frank M. Beverly.
Goshen	Rockbridge	1590	1	54.5	-3.2	96	16	26	22	48	1.60	-1.57	1.50	2	27	1	2	w.	J. B. Wood.	
Graham's Forge (a)	Wythe	3	3	63.2	-2.1	91	16	31	30	46	0.92	-0.32	0.92	1	21	8	1	sw.	David Graham.	
Hot Springs	Wythe	2195	4	64.1	-0.0	91	16	32	21	41	0.63	-2.84	0.50	3	23	6	1	sw.	A. M. Stinson.	
Lexington (a)	Rockbridge	946	23	67.0	+0.7	97	14	32	29	48	1.09	-2.38	0.60	3	21	8	1	nw.	Prof. H. C. Campbell.	
Marion (g)	Smyth	2124	8	65.5	-0.3	90	15	34	22	42	1.35	-1.29	0.70	3	19	7	4	sw.	A. T. Lincoln.	
Monterey*	Highland	3008	2	62.8	-0.4	88	16	34	28	29	30	4.20	-1.90	0.90	3	26	2	2	w.	Joe. Jones.
Salem	Roanoke	1200	6	72.4	+0.5	97	16	39	22	35	2.50	-1.30	2.30	4	2	2	2	w.	Prof. S. C. Wells.	
Stanleyton	Page	1064	0	67.2	-1.4	96	16	32	22	44	0.73	-3.35	0.73	1	26	3	1	e.	A. K. Grim.	
Staunton	Augusta	1380	6	68.4	-0.5	98	10	35	22	41	1.43	-2.42	1.32	2	21	6	3	w.	W. C. Hedrick.	
Stephens City	Frederick	4	4	64.0	-0.5	91	12	15	24	40	0.30	-0.30	0.30	1	28	0	2	sw.	W. B. Steele.	
Sword's Creek	Russell	0	0	67.9	+0.7	97	14	32	29	48	1.09	-2.38	0.60	3	21	8	1	sw.	J. H. Steele.	
Woodstock	Shenandoah	820	0	67.9	+1.0	98	11	13	21	44	1.38	-3.23	0.96	4	15	14	1	w.	H. F. Miley.	
Wytheville	Wythe	2370	25	56.8	-1.5	93	16	37	30	41	0.92	-1.56	0.77	3	26	2	2	w.	Dr. P. B. Green.	

† Estimated. ‡ Incomplete. tr, trace, or less than 0.01 of an inch. (i) 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. * Received too late to be considered in averages.

MISCELLANEOUS PHENOMENA.

Thunderstorms: Spottsville, Graham's Forge, Staunton, Woodstock, 1; Callville, 2; Bristol, 1, 16; Alexandria, Hot Springs, 16.

Fogs, Dense: Spottsville, 2, 3; Burke's Garden, 18, 19; Wytheville, 1, 29.

Fogs, Light: Alexandria, 6, 26; Bon Air, 6, Buckingham, 5, 18; Fredericksburg, Woodstock, 13; Wytheville, 28.

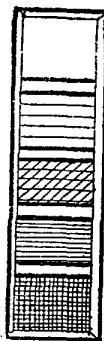
Frosts, Light: Spottsville, Sunbeam, Callville, Nottoway C. H., 29; Fredericksburg, Gordonsville, Woodstock, 21, 28,

29; Dale Enterprise, Manassas, Stanardsville, 28; Warrenton, Blacksburg, Dwale, 21; Barboursville, 21, 22, 28, 29, 30; Buckingham, 27, 28, 29; Lynchburg, 28, 29, 30; Big Stone Gap, 24, 30; Burke's Garden, 21, 24, 29; Clifton Forge, 21, 22, 30; Graham's Forge, 21, 29; Hot Springs, 18, 22; Lexington, 21, 22, 29; Staunton, 20, 21; Woodstock, 21, 28, 29; Wytheville, 21, 24, 29, 30.

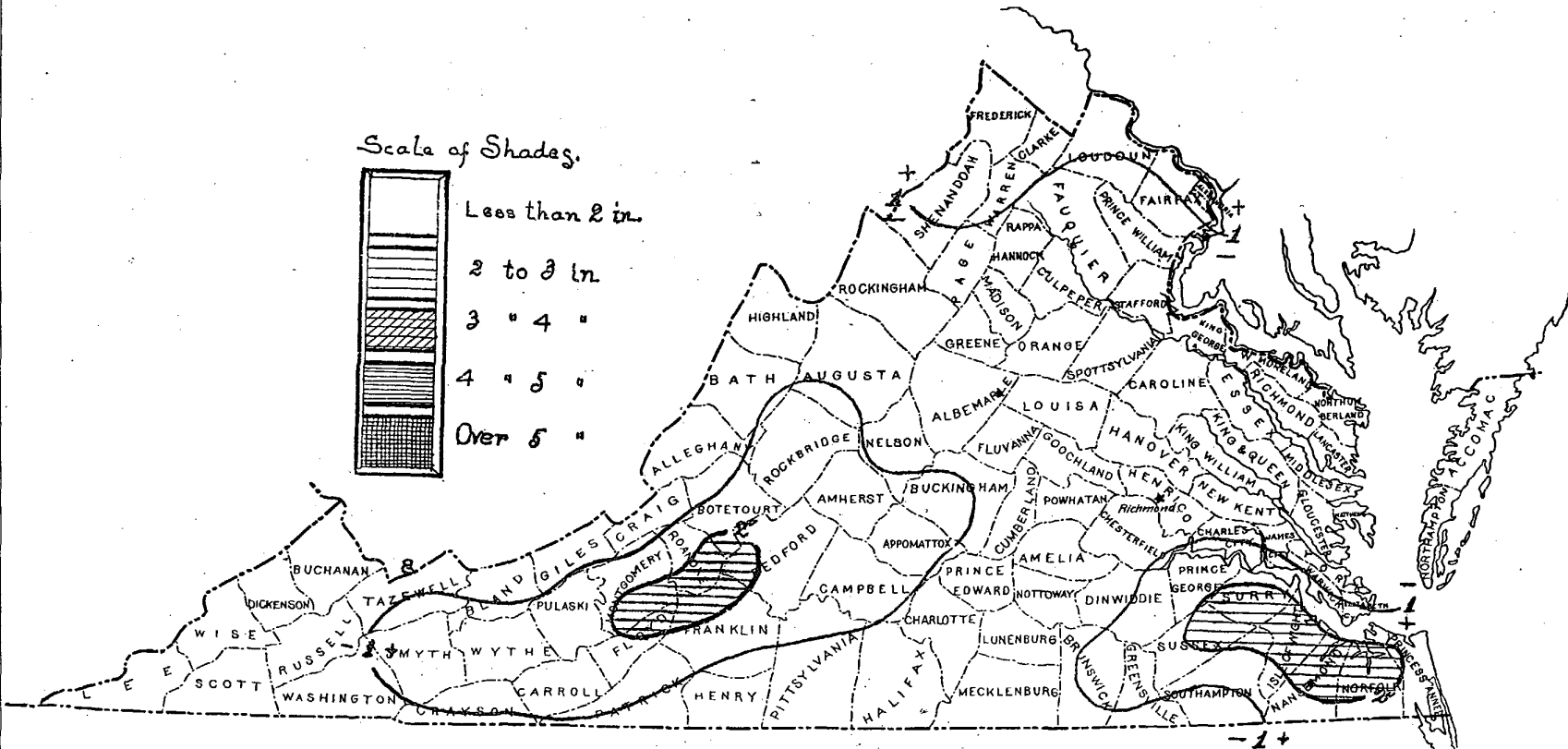
Frosts, Killing: Big Stone Gap, 21, 22; Graham's Forge, 22, 24, 30; Blacksburg, 22, 29, 30; Dale Enterprise, Staunton, 22, 29; Hot Springs, 21; Woodstock, 22; Burke's Garden, 22, 30.

TOTAL PRECIPITATION FOR SEPTEMBER, 1897.

Scale of Shades.



Less than 2 in.
 2 to 3 in.
 3 " 4 "
 4 " 5 "
 Over 5 "



Daily Precipitation for September, 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	tr																.05																				0.80		
Birdsnest	.10																.15																				0.65		
Cape Henry		.05															.05																				0.32		
Doswell																																					0.70		
Hampton		tr	tr														tr	tr																			0.78		
Norfolk	.37	.20	.05														.28																				2.01		
Petersburg																	1.21																				1.69		
Spottsville	1.02	tr															.50																				2.03		
Sunbeam	.29	.10															.41	.04																			1.02		
Warsaw																	.02																				0.54		
MIDDLE VIRGINIA.																																							
Alexandria		tr											tr				.56																				1.53		
Barboursville																	.02																					0.80	
Bedford City	tr																tr																					1.00	
Bon Air	tr																.28																					0.86	
Buckingham		tr															.77																					1.05	
Callville		1.01															.16																					1.67	
Danville																																							
Farmville																		tr																				tr	
Fredericksburg	tr	tr																																				0.68	
Guinea																																						0.47	
Leesburg																	.30																					1.19	
Lynchburg	.19	tr															tr																					1.12	
Maidens																	.25																					0.60	
Manassas																																						0.80	
Nottoway C. H.	.04																.18																					0.75	
Rocky Mount																	tr	tr																				1.02	
Stanardsville																																						0.65	
Warrenton																																							0.86
THE GREAT VALLEY.																																							
Big Stone Gap	tr	.88															.11																					0.99	
Blacksburg																	tr																						1.19
Bristol	.48	tr															.18	tr																				0.66	
Burke's Garden		.30															.10																						1.15
Christiansburg		.04																																					2.13
Clifton Forge																																							0.46
Dale Enterprise																																							0.43
Dwale	.08	.50															.18	tr																					0.76
Goshen																	.10																						1.60
Graham's Forge	tr	tr																																					0.92
Hot Springs																	.03	.10																					0.63
Lexington																	.45	.04																					1.09
Marion		.25															.40																						1.35
Monterey	.10	.20																																					1.20
Salem	.23	.03																																					2.56
Stanleyton																																							
Stanton	tr																																						0.73
Stephens City		tr																																					1.43
Sword's Creek		tr																																					0.30
Woodstock	.20																.09	tr																					1.38
Wytheville		tr																																					0.92

tr. Trace, or less than .01 of an inch.