

## KILLING FROSTS.

**Table of Dates of Last Killing Frost in the Spring and the First Killing Frost in the Autumn.**

Station.	Last killing frost in Spring.	First killing frost in Autumn.	Station.	Last killing frost in Spring.	First killing frost in Autumn.
<b>TIDEWATER VIRGINIA.</b>			<b>MIDDLE VIRGINIA—Continued.</b>		
Ashland .....	Apr. 22	Oct. 16	Lynchburg .....	Apr. 22	Oct. 24
Cape Henry .....	Apr. 4	Nov. 28	Quantico .....	Apr. 21	.....
Drumwiddle .....	Apr. 20	Oct. 4	Rocky Mount .....	Apr. 22	Oct. 15
Hampton .....	Apr. 20	Oct. 31	Saxe .....	Apr. 22	Oct. 16
Newport News(A) .....	Apr. 20	Nov. 15	Stuartsville .....	Apr. 22	.....
Newport News(B) .....	Apr. 20	Nov. 13	Washington .....	Apr. 17	Oct. 7
Norfolk .....	Mar. 29	Nov. 7	<b>THE GREAT VALLEY.</b>		
Petersburg .....	Apr. 22	Oct. 16	Big Stone Gap(A) .....	May 17	Oct. 24
<b>RICHMOND</b> .....	Apr. 20	Oct. 28	Big Stone Gap(B) .....	.....	Oct. 24
Spotsville (near) .....	Apr. 22	Oct. 16	Blacksburg .....	May 16	Oct. 15
Warsaw .....	Apr. 21	Oct. 29	Bristol .....	Apr. 21	Oct. 23
Wilkersons .....	Apr. 20	Oct. 24	Burkes Garden .....	May 11	Sept. 16
Williamsburg .....	Apr. 20	Oct. 17	Dale Enterprise .....	Apr. 22	Sept. 23
<b>MIDDLE VIRGINIA.</b>			Kirk Knob .....	Apr. 21	Nov. 6
Barboursville .....	Apr. 22	Oct. 16	Grahams Forge .....	.....	Oct. 15
Bedford City .....	Apr. 22	Nov. 1	Hot Springs .....	Apr. 21	Oct. 14
Buckingham .....	.....	Oct. 14	Lexington .....	Apr. 22	Oct. 17
Callsville .....	Apr. 22	Oct. 16	Marion .....	Apr. 23	.....
Charlottesville .....	Apr. 22	Oct. 24	McDowell .....	Apr. 22	Oct. 4
Columbia .....	Apr. 22	Oct. 7	Roanoke .....	Apr. 22	Oct. 16
Danville .....	Apr. 21	.....	Staunton .....	Apr. 22	Oct. 7
Farmville .....	Apr. 21	.....	Stephens City .....	Apr. 22	Sept. 23
Fredericksburg .....	Apr. 22	Oct. 8	Woodstock .....	Apr. 22	Sept. 23
Lincoln .....	Apr. 22	Oct. 4	Wytchville (A) .....	Apr. 22	Oct. 15
			Wytchville (B) .....	Apr. 22	Oct. 14

**ERRATA**—Annual Summary, 1903, page 8: Barboursville, December, mean temperature 34.2 should be 34.1, departure -3.8 should be -3.9; Buckingham, December, mean temperature 32.8 should be 33.1, departure -4.6 should be -4.3; Quantico, October, mean temperature omitted should be 61.4, departure omitted should be -4.3; Rocky Mount, September, mean temperature omitted, should be 62.0, departure omitted, should be -7.9; Blacksburg, December, mean temperature 28.5 should be 28.4, departure -6.4 should be -6.5; Staunton, December, mean temperature 31.5 should be 31.6, departure -6.3 should be -6.2; annual, 54.3 should be 54.4, departure -0.7 should be -0.6; Wytchville (B), December, mean temperature 32.7 should be 30.6, departure -2.9 should be -5.0; annual, 53.4 should be 53.2, departure +0.4 should be +0.6. Page 11: Clarksville, January, total precipitation omitted should be 2.84; annual precipitation omitted should be 41.08.

## GENERAL SUMMARY FOR THE YEAR 1904.

**January**—The month was quite decidedly colder than normally, the deficiency in temperature being  $4.4^{\circ}$  daily. There were but two periods, each of which was of short duration, the 1st and 2d and the 20th to 23d, inclusive, in which the weather could be considered as moderate. On all other days the temperature was quite uniformly below normal. As compared with January of other years of record, the mean,  $31.0^{\circ}$ , is found to be the lowest since 1892, excepting the unusually cold January of 1893, when all previous records were broken. The maximum and minimum extremes of temperature were within the record. The precipitation of the month was also deficient, the departure being about three-quarters of an inch below normal. Of the five general storm periods in which the moisture was deposited, three gave precipitation as rain and two as snow. There were several other dates on which either snow or rain fell locally. The general snowstorm of the 28th was heavy in nearly all parts of the State, the maximum amount, 19.0 inches, being recorded at Standardsville, in Greene county. The rivers of the State were at a low stage all the month.

Prevailing wind direction, W.

**February**—This month, like the preceding one, gave temperatures decidedly below the normal, and while the deficiency in this respect was not so great, and there were no unusually low thermometric readings recorded, yet, excepting the 6th to 8th and again on the 24th, the weather was steadily colder than the average. The persistency with which the temperature remained low gave rise to a popular impression that the month was the coldest of the past twenty-five years, but this is not borne out by the records as far back as they are available, as the mean temperature,  $31.8^{\circ}$ , is higher than the February means of the years 1895, 1899 and 1902. Again, the maximum temperature of the current month,  $77^{\circ}$ , is the highest with three exceptions that has occurred in February during the twelve preceding years, while the minimum does not approach the lowest previously reported for the same month. The deficiency in temperature noted,  $3.4^{\circ}$ , was therefore due to a condition moderately but steadily below normal. In respect to precipitation, the month was again deficient, the departure being nearly one and one-fourth inches. General snows prevailed on the 10th–12th and on the 26th, and general rains on the 7th, 9th–11th and 19th–22d. The heaviest snow occurred on the 26th and the heaviest rains on the 19th and 22d. The greatest depth of snowfall reported was 14.0 inches at Spottsville, Surry county. The rivers of the State were at low-water stages all the month.

Prevailing wind direction, W.

**March**—There were no decided temperature changes during the month. Three mild periods occurred during which the maximums recorded ranged from  $60^{\circ}$  to  $75^{\circ}$ , viz., 6th–7th, 18th–20th and 24th–26th. A like number of cool periods prevailed, the dates being 5th–6th, 14th–15th and the 28th–29th. The mean temperature of the month,  $45.7^{\circ}$ , was practically normal. Compared with the same date for March of other years of record it is found to be exceeded six times by from one to six degrees, while it is in excess six times by from one-half to four and one-half degrees. Precipitation was again deficient, the month being the third for the year and the fifth consecutive one having a similar condition. The deficiency was a little in excess of three-quarters of an inch. Although the total amount received was small, it was well distributed throughout the State. Most of the precipitation came as rain. The snowfall was light, and the greatest total reported for the month, 3.0 inches, occurred at Dale Enterprise, Rockingham

county. The heaviest rain generally occurred on the 7th. The run-off from this storm caused a sharp but moderate rise in the James river. No freshet stage was reached, however, and with this exception the water was low throughout the month.

Prevailing wind direction, W.

**April**—The mean temperature,  $51.4^{\circ}$ , was  $2.8^{\circ}$  below the normal. Four mild periods were had during which maximum readings of  $70^{\circ}$  to  $85^{\circ}$  occurred, and similarly, four cool periods, one of which was decided enough to be termed cold, the minimum recorded being  $11^{\circ}$ . In each of these cool periods frost was more or less general, and on two of them, the 4th and 20th, vines, tender vegetation and fruit bloom were killed. During the past twelve years there have been but two months of April having a mean temperature as low, or lower, than the current one. Excepting for local showers on the 1st, 12th, 16th and 18th the precipitation of the month resulted from general storms prevailing on the 6th–10th and the 25th–28th. Some snow fell on the 12th and 14th, but the amounts received were light and occurred mostly at the more elevated stations. The total precipitation for the month, 2.32 inches, was about an inch less than the normal. Low-water stages obtained in all the rivers.

Prevailing wind direction, W.

**May**—The month, though not without precedent, was noteworthy for its variations in temperature. In the first and second decades the weather was remarkably cool, and on the mornings of the 10th, 11th, 16th and 17th killing frosts were recorded at points in the Great Valley division. Early in the last decade a hot, sultry period set in, which lasted until the close of the month, and gave maximum readings of  $85^{\circ}$  to  $95^{\circ}$  in various parts of the State. These values are not high for the month, the record showing that in the past twelve years there have been but two months of May which have had lower maximums. The lowest temperature observed,  $30^{\circ}$ , has been equaled three times and exceeded twice. A deficiency in precipitation of slightly more than one inch occurred in the month, which is the seventh consecutively in which this condition has obtained. Tidewater division had the greatest deficiency occurring and the Great valley the least. The James river remained at a uniformly low stage during the month except for a slight rise on the 20th and 21st, consequent upon the rain of the 18th, which was general and quite heavy in all parts of the State. The number of rainy days was two less than the May average.

Prevailing wind direction, SW.

**June**—Except for a heated spell from the 5th to the 8th and again on the 25th and 26th, there were no special temperature features during the month, and the daily values were in close correspondence with the normal. The coolest weather occurred between the 10th and 14th, when minimum temperatures as low as  $35^{\circ}$  were recorded in the Great Valley division. This record, while low, was not as low as in June of 1894, 1897 and 1902 by from one to five degrees. The absolute maximum temperature,  $98^{\circ}$ , was lower than that of any other June of record except for the years 1896 and 1903. In respect to precipitation the month was in excess of the normal by 1.24 inches—the first month of the year in which this element was not deficient. There were four storm periods, viz., 1st–2d, 7th–10th, 18th–22d and 27th–30th, and the major portion of the rainfall occurring was recorded on these dates. Some heavy 24-hour rains fell, notably on the 15th–16th and 25th–26th. No flood conditions obtained in the James river.

Prevailing wind direction, SW.

**July**—The mean temperature of the month,  $73.5^{\circ}$ , was  $2.8^{\circ}$  lower than normally, notwithstanding that there were two periods of hot weather during which the maximums recorded ranged well up towards  $100^{\circ}$ . The month opened with moderate temperatures, which gradually increased to a heated term of four days' duration, ending the 8th, and this in turn was followed by cooler weather, which lasted without any important changes until the 17th. On this date conditions became hot and sultry, and remained so until the 19th, when they again moderated. The last decade of the month gave seasonable weather. With two exceptions the average temperature for the month was the lowest of any July on record. Precipitation was slightly in excess of the normal and was generally frequent and well distributed except in the Great Valley division, in the central-western portion of which a deficiency occurred. General rains fell on the 8th, 12th, 22d to 25th and 28th, while local showers were recorded on numerous other days. The heaviest rain fell on the 24th. The total amount for the month, 4.83 inches, has been exceeded in July of three other years since 1891, but the greatest amount in any 24 consecutive hours, 4.48 inches, has been exceeded only once for the month since record has been kept. The rivers of the State had no fresher stages during the month.

Prevailing wind direction, SW.

**August**—The month was cooler than normally, the departure being  $-1.6^{\circ}$ . During the first fifteen days nearly normal conditions prevailed, but beginning on the 16th the temperature fell and there was a temporary spell of cool weather that lasted until the 19th, inclusive. During the period 22d to 25th heated weather obtained in all parts of the State and the highest temperatures of the month were generally observed at this time. Thereafter there was a steady decline in the daily values recorded and the month closed cooler than the normal. The maximum occurring,  $96^{\circ}$ , was not as high as the record for the month by  $11^{\circ}$ , the highest previously observed in August being  $107^{\circ}$  in 1900, while the lowest,  $38^{\circ}$ , is  $6^{\circ}$  higher than the lowest previous record for August,  $32^{\circ}$  in 1896. The rainfall occurring was deficient, it lacking three-fourths of an inch as compared with the average. The deficiency, however, was not uniform in all parts of the State, one section, Middle Virginia, being but 0.21 of an inch below the normal, while in Tidewater Virginia and the Great Valley it was 1.06 and 1.20 inches, respectively. There were six days between the 2d and 19th on which general rains were had, while on the remaining days of the month showers, more or less local, occurred. The number of rainy days, therefore, is considerably greater than the average, although the total amount deposited is deficient. The rivers of the State were at the usual mid-summer stages all the month.

Prevailing wind direction, W.

**September**—Nearly normal conditions of temperature obtained over the State during the month, the departure being but  $-0.7^{\circ}$ . The opening days of the month were warm and the high-temperature record was made in the Tidewater and Middle Virginia sections on the 3d or 4th, but in the Great Valley section it was not until the 29th when the absolute maximum values were recorded. Average temperatures prevailed daily from the 5th to 11th, inclusive; the 12th was warmer than normally, and thereafter slightly cooler than the normal, except as noted in the Great Valley section. The cool period was most marked as to area on the 23d, when absolute minimums of  $31^{\circ}$  were observed, but the day having the lowest temperature record was the 16th, when  $28^{\circ}$  was observed in the southwest part of the State. During the prevalence of these cool periods light frosts were reported in all

parts of the State and heavy frost in some localities. The average total precipitation for the State, 2.32 inches, was again below normal, the deficiency being 1.14 inches. Of the various divisions Tidewater had the greatest amount of rain and the Great Valley the least. In the latter section conditions became somewhat droughty towards the end of the month. The various rivers of the State were at low-water stages throughout the month.

Prevailing wind direction, W.

**October**—There were three well-marked temperature periods in the month, the first of which, covering the 1st to 11th, gave a slow increase in temperature; the second, lasting from the 12th to 21st practically, a moderate cool spell culminating on the last-named date in the coolest weather of the month, and the third, 25th to the close of the month, slowly rising temperature. The maximum temperature observed was  $94^{\circ}$  on the 11th and the lowest,  $10^{\circ}$ , on the 24th. The precipitation of the month was considerably below the normal, the deficiency being 2.03 inches, while the average total for the State was but 1.35 inches. With the exception of one storm, that of the 20th-21st, all precipitation was local; it was also infrequent, there being but an average of three rainy days during the month, which is unusually low. Some snow fell at several stations in the Great Valley section on the 22d-23d. Conditions were droughty through the month, especially in the Great Valley division. The rivers of the State were unusually low most of the month.

Prevailing wind direction, NE.

**November**—The mean temperature of the month,  $44.1^{\circ}$ , was  $2.8^{\circ}$  below the normal. From the 1st to the 11th the daily values were nearly normal. On the 12th a period of cold weather set in, which lasted until the 17th. A temporary reaction to warmer then ensued, continuing until the 22d, on which date it again became cold and remained so until the 28th, inclusive. The last two days of the month were warmer than normally. Though a number of stations recorded their lowest temperatures on the 28th and 30th, the lowest for the month,  $3^{\circ}$  below zero, occurred on the 15th. The maximum for the State,  $77^{\circ}$ , was observed on the 2d; both the minimum and the maximum were the lowest on record for the month. Three well-defined periods of precipitation were had, one in each decade, and though most of it fell as rain, there were some snowstorms giving local depths as great as four inches in the great Valley section. The average total amount for the State, 2.12 inches, was 0.43 inch below the normal. Low stages obtained in all the rivers of the State.

Prevailing wind direction, W.

**December**—The month, though having a mean temperature of  $34.4^{\circ}$ , or  $3.4^{\circ}$  below the normal, did not give as low extremes of temperature as have occurred in December of other years of record, notably 1901, when the absolute minimum observed was  $14^{\circ}$  below zero, or  $5^{\circ}$  colder than the current month. The absolute maximum,  $70^{\circ}$ , however, was as low as the lowest of record. In the monthly bulletin for this month it was stated that "Perhaps the most marked feature of the month was the persistency with which the daily maximum readings continued relatively high in the Great Valley division during the prevalence of cold weather in other portions of the State. If the period 10th to 14th be excluded, there was practically no time during the month when the daily maximums observed were as low as on the same days in other sections of the State." This reverses the usual order which gives the lowest maximum readings in the Great Valley division. For the first time since August, inclusive, the monthly precipitation was above normal, the excess being 0.69 inch