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# LOCAL CLIMATOLOGICAL DATA

## ANNUAL SUMMARY WITH COMPARATIVE DATA

### 1969

### RICHMOND, VIRGINIA

#### NARRATIVE CLIMATOLOGICAL SUMMARY

Richmond is located in east-central Virginia at the head of navigation on the James River and along a line separating the Coastal Plains (Tidewater Virginia) from the Piedmont. The Blue Ridge Mountains lie about 90 miles to the west and the Chesapeake Bay 60 miles to the east. Elevations range from a few feet above sea level along the river to a little over 300 feet in parts of the west section of the City.

The climate might be classed as modified continental. Summers are warm and humid and winters generally mild. The mountains to the west act as a partial barrier to outbreaks of cold, continental air in winter, the coldest air being delayed long enough to be modified, then further warmed as it subsides in its approach to Richmond. The open waters of the Chesapeake Bay and Atlantic Ocean contribute to the humid summers and mild winters. The coldest weather normally occurs in late December and in January, when low temperatures usually average in the upper twenties and the high temperatures in the upper forties. Temperatures seldom lower to zero. The record lowest temperature of minus 12° was recorded at the Airport in January 1940. The record high temperature of 107° occurred in August 1918 at Chimborazo Park.

Precipitation is rather uniformly distributed throughout the year. However, dry periods lasting several weeks do occur, especially in autumn when long periods of pleasant, mild weather are most common. There is considerable variability in total monthly amounts from year to year so that no one month can be depended upon to be normal. Snow has been recorded during seven of the twelve months. Falls of 4 inches or more occur on an average of once a year. Snow usually remains on the ground only 1 or 2 days at a time, but on one occasion it remained 21 days

(January 23 to February 13, 1948). Ice storms (freezing rain or glaze) are not uncommon in winter, but they are seldom severe enough to do any considerable damage. A notable exception was the spectacular glaze storm of January 27-28, 1943, when heavy damage was done to trees and overhead transmission lines of all kinds.

The James River reaches tidewater at Richmond where flooding has occurred in every month of the year, most frequently in March (28 times in the past 61 years), and only twice in July. Hurricanes and less severe storms of tropical origin have been responsible for most of the flooding during the summer and early fall months. In recent years, three hurricanes brought more than normal rainfall to Richmond within a 6-week period in 1955. The most noteworthy of these were Hurricanes Connie and Diane that brought heavy rains five days apart, which sent the James River out of its banks at Richmond, during August 18 through August 20.

Damaging storms occur mainly from snow and freezing rain in winter and from hurricanes, tornadoes, and severe thunderstorms at other seasons. Damage may be from wind, flooding, or rain, or from any combination of these. Three tornadoes have been observed in the Richmond area, the latest July 20, 1956. The highest wind recorded has been 68 m.p.h. with a peak gust of 79 m.p.h. at the time of Hurricane Hazel, October 15, 1954.

The dates of the last freeze in spring and of the first in autumn mark the limits of the growing season for most crops. The average growing season is 216 days. May 11, 1966, has been the latest date in spring when a temperature of 32° or lower was recorded; October 5, 1965, has been the earliest date in autumn.

# METEOROLOGICAL DATA FOR THE CURRENT YEAR

Month	Temperature						(Base 65°)	Precipitation						Relative humidity			Wind &						Number of days																			
	Averages			Extremes				Snow, Ice pellets			Resultant			Fastest mile			Sunrise to sunset			Temperatures																						
	Daily maximum	Daily minimum	Monthly highest	Date	Lowest	Date	Total	Greatest in 24 hrs.	Date	Hour	Hour	Hour	Average speed	Direction	Speed	Direction #	Hour	Percent of possible sun	Average sky cover	Percent of possible sun	Cloudy	Partly cloudy	Clear	Heavily fog	Max.	Min.	Average daily solar radiation - langley															
JAN	43.0	24.8	33.9	63	30*	8	6	957	0	2.04	1.37	20-21	T	T	8+	72	76	54	62	33	2.9	8.2	28	NW	1	47	9	4	18	0	0											
FEB	43.8	29.8	36.8	58	5	18	14+	783	0	3.95	1.87	23	T	20+	69	74	57	61	35	6.0	9.7	34	NW	3	43	5	4	19	8	0	0											
MAR	54.1	30.4	42.3	75	29	20	14+	695	0	3.95	1.65	24-25	11.9	7.9	51	31	2.9	8.7	26	W	25+	71	5.0	10	15	6	9	3	2	0												
APR	70.7	44.5	57.6	87	27	28	1	237	21	2.60	0.67	5-6	0.0	0.0	82	84	48	58	5	32	SW	5	69	5.9	7	10	13	10	0	0	0											
MAY	78.5	52.5	65.5	93	30	36	13	66	90	3.32	2.06	19-20	0.0	0.0	81	78	49	58	20	2.1	7.3	33	NW	9	78	4.4	14	10	7	0	0	0										
JUN	85.8	65.5	75.7	98	28	53	4	0	328	4.36	2.87	8-9	0.0	0.0	88	84	58	72	19	2.3	6.9	34	N	18	53	6.7	4	13	13	0	0	0										
JUL	87.3	69.2	78.3	97	1	64	15	0	417	13.90	5.73	22-23	0.0	0.0	91	88	65	80	19	1.1	6.0	31	SW	20	48	7.1	5	11	15	15	1	10	0									
AUG	85.2	64.9	75.1	91	17	54	28	0	321	9.31	2.69	19-20	0.0	0.0	93	91	63	82	20	1.0	5.5	62	S	9	52	5.2	12	6	13	10	5	4	0									
SEP	78.7	57.5	68.1	90	74	43	30	45	147	3.89	2.03	2-3	0.0	0.0	94	94	62	85	06	0.9	5.3	22	S	2	54	6.2	7	10	13	7	0	0	0									
OCT	70.4	46.6	58.5	83	3	27	24	221	26	1.68	1.54	2	0.0	0.0	90	91	55	78	02	1.9	6.5	20	NW	21	52	5.2	12	9	10	4	0	0	0									
NDV	58.0	39.6	46.8	74	3	20	22	541	0	1.87	0.72	19	0.0	0.0	80	88	52	70	30	1.3	6.9	25	W	19+	51	5.9	9	8	13	7	0	0	0									
DEC	44.0	27.0	35.5	59	10	15	21	907	0	5.26	1.61	25-26	1.8	1.8	25	74	79	57	64	32	3.6	7.6	25	NW	4	46	5.8	12	6	13	9	1	1	0								
YEAR	66.6	45.7	56.2	98	JUN.	28	8	JAN.	6	4452	1350	56.33	5.73	22-23	13.7	7.9	JUL.	1-2	82	84	55	69	31	1.0	7.3	34	N	JUN.	18+	57	6.0	106	106	153	108	4	36	23	31	4	100	0

## NORMALS, MEANS, AND EXTREMES

Month	Temperature						Normal heating degree days (Base 65°)	Precipitation						Relative humidity			Wind &						Mean number of days						Average daily solar radiation - langley											
	Normal			Extremes				Snow, Ice pellets			Resultant			Fastest mile			Sunrise to sunset			Precipitation			Mean number of days																	
	Daily maximum	Daily minimum	Monthly	Record highest	Year*	Year		Normal total	Maximum monthly	Year	Year	Maximum monthly	Year	Mean total	Maximum monthly	Year	Year	Mean speed	Pervailing direction	Speed	Direction #	Hour	Percent of possible sun	Mean sky cover	Percent of possible sun	Cloudy	Partly cloudy	Clear	Heavy fog	Max.	Min.									
(a)	(b)	(b)	(b)	40	40	40	(b)	32	32	32	32	32	32	32	32	32	35	35	35	35	21	15	19	19	19	24	24	24	32	32	32	40	40	40	40					
J	48.3	29.0	38.7	80	1950	-12	1940	815	3.46	5.95	1962	1.08	1951	3.31	1962	5.6	28.5	1940	21.6	1940	77	81	57	69	8.1	S	40	52	6.4	9	6	16	10	2	*	3	21	*		
F	50.6	29.2	39.9	83	1932+	-10	1936	703	2.90	5.61	1944	0.98	1968	1.87	1949	3.4	17.1	1967	9.2	1947	74	79	52	63	8.6	S	45	54	6.2	9	6	13	11	1	*	2	19	*		
M	59.1	36.3	47.7	93	1938	11	1960+	546	3.42	5.85	1944	0.94	1966	2.04	1942	3.1	19.7	1960	12.1	1962	74	78	49	59	9.0	W	42	56	6.1	8	9	14	11	1	*	2	22	10		
A	70.4	45.8	58.1	96	1960	26	1964+	219	3.15	5.32	1952	0.64	1963	2.07	1952	0.1	2.0	1940	2.0	1940	75	75	66	57	8.9	S	40	46	6.2	10	13	10	10	1	*	2	21	10		
M	79.3	54.6	67.0	100	1941	31	1956	53	3.72	7.75	1946	0.87	1965	2.30	1956	0.0	0.0	1949	0.0	1956	83	78	49	65	7.9	SSW	45	56	6.2	7	10	13	10	1	*	2	21	10		
J	86.8	63.4	75.1	104	1952	-10	1967	0	3.75	9.24	1936	0.91	1960	4.61	1963	0.0	0.0	1970	0.0	1961	87	81	53	68	7.3	S	52	67	5.9	7	12	11	10	0	0	0	0	0	0	
J	89.6	66.7	78.1	104	1936+	51	1965+	0	5.61	18.87	1945	0.52	1963	5.73	1969	0.0	0.0	1969	0.0	1969	89	85	56	72	6.9	SSW	56	66	6.1	7	12	12	11	0	0	0	3	21	*	
A	86.5	65.4	76.0	102	1953	46	1934	0	5.54	14.10	1955	0.52	1943	8.79	1955	0.0	0.0	1955	0.0	1955	90	88	57	78	6.5	S	54	64	6.0	8	11	14	10	0	0	0	1	19	*	
S	81.8	58.6	70.2	103	1954	37	1963	36	3.65	8.49	1945	0.69	1954	3.82	1955	0.0	0.0	1955	0.0	1955	90	88	56	79	6.8	W	45	56	6.0	10	13	12	10	0	0	0	0	0	0	
O	70.6	46.7	58.7	99	1941	21	1962	214	3.00	8.74	1951	0.30	1963	6.50	1961	T	1	1954	7.1	1954	87	89	52	77	7.0	MNE	68	56	5.0	10	13	12	8	11	1	*	4	22	10	
D	59.9	37.1	48.5	86	1950	10	1939+	495	3.04	7.64	1959	0.36	1963	4.07	1956	0.5	7.9	1953	7.3	1953	80	50	70	7.5	7.5	SW	40	55	5.6	10	13	8	6	1	*	2	21	11		
YR	69.4	46.9	58.1	104	1952+	-12	1940	3865	44.21	18.87	1945	0.30	1963	8.79	1955	15.0	28.8	1940	21.6	1940	82	82	53	69	7.7	S	68	61	6.0	104	106	153	113	4	37	29	43	6	86	1

Means and extremes above are from existing and comparable exposures. Annual extremes have been exceeded at other sites in the locality as follows:

Highest temperature 107 in August 1918; minimum monthly precipitation 0.11 in November 1890 and earlier.

(a) Length of record, years, based on January data. Other months may be for more or fewer years if there have been breaks in the record.

(b) Climatological standard normals (1931-1960). Less than one half.

+ Also on earlier dates, months, or years.

T Trace, an amount too small to measure.

Below zero temperatures are preceded by a minus sign. The prevailing direction for wind in the Normals, Means, and Extremes table is from records through 1963.

‡ ≤ 70° at Alaskan stations.

Solar radiation data are the averages of direct and diffuse radiation on a horizontal surface. The langley denotes one gram calorie per square centimeter.

& Figures instead of letters in a direction column indicate direction in tens of degrees from true North; i.e., 09 - East, 18 - South, 27 - West, 36 - North, and 00 - Calm. Resultant wind is the vector sum of wind directions and speeds divided by the number of observations. If figures appear in the direction column under "Fastest mile" the corresponding speeds are fastest observed 1-minute values.

# To 8 compass points only.

## AVERAGE TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1931	38.3	40.4	41.3	53.6	64.4	72.6	77.8	73.8	73.4	59.8	54.2	41.2	57.6
1932	48.1	46.4	44.3	54.3	63.6	73.8	77.8	76.9	70.0	59.0	49.8	41.2	58.4
1933	44.3	40.3	45.6	56.0	69.1	74.4	75.2	75.7	71.2	57.1	45.0	41.8	58.0
1934	42.6	28.2	42.8	56.3	66.2	76.4	79.7	74.9	71.3	56.3	49.5	38.4	56.9
1935	34.5	38.7	51.9	53.5	62.9	73.6	77.2	75.3	67.6	58.3	51.5	31.6	56.4
1936	31.4	33.7	51.2	53.1	66.5	73.7	79.7	76.5	71.6	59.8	46.3	40.1	57.0
1937	46.0	38.3	43.3	55.3	65.8	76.0	76.8	77.2	66.0	55.0	46.2	38.4	57.0
1938	37.2	43.1	53.6	59.9	64.9	71.6	76.8	78.3	68.4	57.7	49.9	40.3	58.5
1939	41.4	44.8	48.8	56.0	66.9	76.4	75.7	77.1	71.8	59.0	44.8	39.8	58.6
1940	24.2	38.2	43.3	52.4	65.0	74.7	76.0	73.6	66.2	55.8	47.4	42.2	54.9
1941	35.2	34.2	40.8	59.8	66.8	73.0	78.3	75.8	72.2	64.7	48.7	41.9	57.6
#1942	34.2	35.2	48.0	58.8	69.5	75.2	79.4	75.2	71.3	60.8	50.0	37.1	57.9
1943	40.0	41.5	47.0	53.9	69.0	79.2	78.5	78.4	68.4	57.3	47.5	38.6	58.3
1944	38.6	40.4	45.2	56.2	71.6	76.4	77.7	75.4	71.2	57.9	48.2	36.1	57.9
1945	34.2	40.8	58.6	61.4	63.9	75.7	76.2	75.2	73.6	57.8	49.6	33.4	58.4
#1946	38.0	41.7	53.8	57.2	65.8	72.8	75.4	72.6	70.0	60.9	52.9	43.4	58.8
1947	44.6	33.5	40.0	57.5	67.0	72.2	74.8	78.5	70.1	63.7	46.4	38.4	57.2
1948	31.1	39.8	50.8	57.7	66.3	74.4	78.2	75.7	68.6	56.2	52.9	42.0	57.8
1949	45.2	46.5	48.6	55.7	66.0	73.5	78.0	80.1	76.6	67.4	62.5	49.0	59.6
#1950	49.7	40.7	44.4	57.4	65.0	74.2	76.8	75.5	68.2	61.2	47.3	36.1	57.8
1951	40.8	41.3	46.8	56.6	64.6	74.3	78.6	76.0	70.0	61.6	44.7	42.0	58.1
1952	42.4	42.2	46.3	58.1	65.4	77.6	80.4	76.4	69.2	55.2	49.4	39.2	58.5
1953	42.9	43.4	48.3	58.0	71.5	75.2	79.9	77.3	70.0	60.7	48.5	42.5	59.9
1954	38.0	44.9	47.0	61.2	63.0	74.6	78.6	75.8	74.4	62.3	46.1	38.2	58.8
1955	35.8	40.1	50.2	60.8	67.2	70.1	81.3	78.7	70.6	59.5	46.4	34.8	58.0
1956	36.0	43.0	46.3	55.5	65.0	74.7	77.8	76.5	67.9	60.9	47.6	48.9	58.3
1957	35.2	43.3	47.2	61.5	67.8	76.2	78.4	74.6	71.9	54.6	50.3	43.0	58.7
1958	34.6	33.8	42.3	57.5	65.5	71.9	80.2	76.4	69.1	58.7	51.2	33.4	56.2
1959	37.5	41.6	47.3	59.3	69.4	74.8	77.9	70.9	70.6	61.4	47.3	41.6	59.0
1960	38.8	39.3	35.9	61.8	64.9	73.9	76.3	77.5	69.3	57.1	50.1	34.6	56.6
RECORD	38.0	39.6	46.8	58.4	59.6	65.2	74.0	77.7	76.0	69.8	58.7	48.5	57.6
MEAN	47.8	50.0	58.2	62.5	78.1	83.4	88.0	80.1	80.5	70.7	60.0	49.2	58.8
MAX	26.1	28.0	33.4	44.5	54.2	62.0	67.3	65.9	58.9	46.6	36.9	29.0	46.5
MIN													

## TOTAL DEGREE DAYS

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total	
1930-31	0	1	51	345	557	906	825	684	718	330	84	13	4474	
1931-32	0	4	25	194	328	575	496	580	662	319	111	1	3295	
1932-33	0	0	31	209	568	711	637	684	601	265	56	21	3781	
1933-34	1	0	1	249	569	712	716	1024	681	265	74	0	4292	
1934-35	0	9	3	262	443	817	920	1033	403	350	105	0	4052	
1935-36	0	0	40	223	413	1034	933	422	372	60	13	13	4548	
1936-37	0	0	17	199	564	748	590	742	668	283	78	1	3890	
1937-38	0	0	75	321	556	820	876	722	379	204	91	11	3955	
1938-39	0	0	38	228	462	778	724	551	527	288	120	0	3716	
1939-40	3	0	5	250	610	1265	777	673	380	91	3	4842		
1940-41	2	0	74	286	474	875	924	862	595	224	92	13	4021	
1941-42	0	3	13	152	510	691	995	854	529	222	13	0	3982	
#1942-43	0	0	2	52	104	459	849	753	652	578	356	63	0	3886
1943-44	0	0	57	251	532	808	819	710	639	280	17	0	4113	
1944-45	0	2	21	236	476	873	950	670	253	162	67	27	3795	
#1945-46	0	0	3	229	456	986	849	643	350	257	76	11	3860	
1946-47	0	5	21	161	370	669	633	880	770	249	94	9	3566	
1947-48	0	0	81	98	558	822	1049	733	649	250	48	3	4111	
1948-49	0	0	28	279	373	712	615	515	525	295	67	3	3412	
#1949-50	0	0	52	134	478	700	483	673	631	327	85	2	3568	
1950-51	0	0	60	138	538	886	739	660	559	267	76	0	3923	
1951-52	0	0	22	161	608	710	692	655	579	233	58	0	3718	
1952-53	0	1	19	316	460	792	690	598	509	234	7	6	3622	
1953-54	0	0	28	152	488	691	829	556	553	183	151	1	3632	
1954-55	0	0	5	220	561	898	900	450	155	67	67	2	3884	
1955-56	0	0	9	186	555	928	896	631	578	323	107	10	4223	
1956-57	0	3	75	145	519	935	915	600	546	201	63	5	3566	
1957-58	0	0	50	317	434	936	871	696	254	70	6	4308		
1958-59	0	0	24	212	409	973	847	650	542	212	44	10	4072	
1959-60	0	0	36	217	530	717	807	737	894	184	88	2	4122	
1960-61	0	0	24	257	439	936	971	632	461	390	106	7	4223	
1961-62	0	0	27	218	459	860	875	702	623	276	32	0	4072	
1962-63	0	0	73	175	526	891	882	434	218	102	1	4199		
1963-64	0	0	71	197	439	1004	826	801	537	306	74	12	4267	
1964-65	0	0	32	352	402	676	909	726	674	339	17	34	4161	
1965-66	0	6	25	275	498	726	1043	759	538	371	133	27	4401	
1966-67	0	0	47	293	466	833	728	841	560	230	171	17	4196	
1967-68	0	0	64	256	623	708	956	887	416	191	86	0	4187	
1968-69	0	0	0	161	403	864	957	783	695	237	66	0	4166	
1969-70	0	0	45	221	541	907								
RECORD	31.1	27.7	47.5	52.8	63.1	71.4	76.4	76.2	63.4	52.6	42.3	31.7	52.8	
MEAN	40.9	34.0	46.6	58.0	60.7	72.5	76.6	75.5	65.7	55.2	45.8	36.5	52.8	
MAX	44.7	39.4	52.2	59.2	64.7	74.7	78.9	76.9	68.4	58.7	48.5	39.4	52.8	
MIN	26.1	28.0	33.4	44.5	54.2	62.0	67.3	65.9	58.9	46.6	36.9	29.0	46.5	
RECORD	38.0	39.6	46.8	58.4	59.6	65.2	74.0	77.7	76.0	69.8	58.7	48.5	57.6	
MEAN	47.8	50.0	58.2	62.5	78.1	83.4	88.0	80.1	80.5	70.7	60.0	49.2	58.8	
MAX	26.1	28.0	33.4	44.5	54.2	62.0	67.3	65.9	58.9	46.6	36.9	29.0	46.5	
MIN														

## TOTAL SNOWFALL

Season	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	Total
1937-38	0.0	0.0	0.0	0.0	0.0	0.0	0.6	1.5	0.0	0.0	0.0	0.0	2.1
1938-39	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	5.0

# STATION LOCATION

RICHMOND, VIRGINIA

Location	Occupied from	Occupied to	Ailine distance and direction from previous location	Latitude North	Longitude West	Ground at temp- erature site	Elevation above Sea level						Remarks
							Ground						
	Wind instruments	Extreme thermometers	Psychrometer	Telepsychrometer	Tipping bucket rain gage	Weighing rain gage	8" rain gage	Hygrothermometer	Pyranometer	Sea level			
<u>COOPERATIVE</u>													
High elevation in East Richmond	1-1880	2-1893				Est. 150		?					W. H. Pleasants, exact address unknown.
Near Southern RR Bridge	3-1893	3-1895				Est. 35		?					A. J. Duesberry, River Observer, observed temperatures.
Westbrook Farms	4-1895	10-1897	4 mi. N	27° 36'	77° 24'	196		?					Capt. J. C. Shafer, temperatures only.
<u>CITY OFFICE</u>													
State Library Building Capitol Square	9-18-95	5-22-97	4 mi. S	37° 32'	77° 27'	142							Section Center, no observations.
Chamber of Commerce Bldg., Ninth & Main Sts.	5-22-97	5-31-00	3/8 mi. SW	37° 32'	77° 27'	104	107	98	98	89	89		Observational Program begun 10-5-97.
Times Building 10th & Bank Street	5-31-00	6-30-05	1/8 mi. NE	37° 32'	77° 27'	115	92	82	82	76	76		
Mutual Assurance Bldg. 9th and Main Street	6-30-05	1-30-10	1/8 mi. SW			104	154	145	145	138	138		
Weather Bureau Building Chimborazo Park 3301 E Broad Street	1-30-10	7- 1-53	1-1/2 mi. E	37° 32'	77° 25'	162	53	11	11	3	a4	3	Climatological observations were continuous at City Office sites 10-5-97 through 6-30-53. Observational program at Airport 7-1-39 to 9-24-42 and after 4-19-46. a - At this site 9-24-42 to 4-19-46. and after 6-1-50.
<u>AIRPORT STATION</u>													
WB-CAA Building	7-15-25	9-24-42	None	37° 30'	77° 20'	158	#	5	5			3	CAA to 8-3-30. WBAS 8-3-30 to 5-26-35 and 7-14-38 to 9-24-42. # - 40 ft. 8-3-30 to 5-26-35, estimated 40 ft. 5-26-35 to 7-14-38 and estimated 50 ft. to 9-24-42.
Army Hangar (Operations Annex)	9-24-42	4-19-46	1/2 mi. NNW	37° 30'	77° 20'	156	55	5	5			3	AF operation.
Old Airport Administration Building	4-19-46	6- 1-50	1/3 mi. SSE	37° 30'	77° 20'	156	46	5	5			4	WBAS re-opened in airport terminal building (old).
Byrd Field New Terminal Building	6- 1-50	Present	4/5 mi. N	37° 30'	77° 20'	c164	b20	d6	d6	e19	e19	a4	a - Installed 2700 ft. ENE of thermometer site 6-26-59. b - 67 ft. to 1-11-61. c - 162 feet to 6-26-59. d - Discontinued 6-26-59. e - 3 feet to 10-9-69.

Requests for additional information should be directed to the Weather Bureau Office for which this summary was issued.

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