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The Frequency of Potentially Unfavorable Temperature Conditions in St. Louis, Missouri

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THE FREQUENCY OF POTENTIALLY UNFAVORABLE TEMPERATURE CONDITIONS IN ST. LOUIS, MISSOURI

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CENTRAL REGION

Kansas City, Missouri
September, 1973

*Now in Alaskan Region

THE FREQUENCY OF POTENTIALLY UNFAVORABLE TEMPERATURE CONDITIONS IN ST. LOUIS, MISSOURI

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ABSTRACT

The hourly values of temperature, wind chill and temperature-humidity index are examined by months from 17 years of data for St. Louis, Missouri in order to describe the occurrences of potentially unfavorable temperature conditions. Tables and graphs are given which show month and hour of the day the frequency of, according to the season, the temperature-humidity index or the wind chill, and temperatures exceeding various high temperatures or going below various low temperatures.

Introduction

An understanding of the frequency and duration of unfavorable weather conditions is important to those who plan or direct outdoor activities. Some labor unions have clauses in their contracts which require additional pay for working outdoors when temperatures or wind chill index values are below a given value. To determine how much additional pay he will be expected to pay over a period of time, a contractor needs information concerning the frequency of occurrence of conditions below the specified value. The farmer who ships livestock to market knows that when temperature-humidity index values are high, the probability of death-in-transit of his livestock also becomes high. He needs information which will indicate the best time of the day for shipping livestock. The location and number of recreational facilities for sports such as swimming, ice skating, or skiing depend to some degree on the frequency of extremely warm or cold conditions.

This paper examines the hourly values of temperature, wind chill and temperature-humidity index by months for St. Louis, Missouri, in an attempt to describe the occurrences of potentially unfavorable temperature patterns. This tedious task of checking each hourly value of temperature, wind chill, and temperature-humidity index for the 17-year period from 1948 through 1964 was greatly simplified by the use of the computer facilities at the University of Missouri-Columbia.

*Now in the Alaskan Region

Summer Heat.

Burch and DePasquale (1962), reported in their paper that excessively high temperatures (above 96°F) can cause considerable biological strain. Plants, animals and humans attempt to regulate their internal temperatures during hot weather through evaporation of water. In humans, this is called sweating. Water lost through sweating contains considerable essential dissolved salts. Any great loss of water or salt without replacement could cause irreversible harm to the body.

The frequency of occurrence by hour of high temperatures for St. Louis, Missouri is included in Tables 1 through 7. In April and May, temperatures above 90°F seldom occur. In June, July and August, temperatures above 90°F occur on about 30 percent of the days (about 2 days a week), and temperatures above 96°F occur on less than 10 percent of the days.

However, if the relative humidity is also high at the same time the temperature is high, the danger to the health of animals and humans is greatly increased. Hot, humid weather takes its toll in human lives each year. Henschel et al (1968) reported that in a normal year about 180 people in the United States die from summer heat and excessive sun. They concluded that of all the weather hazards, only excessive cold takes a greater toll in deaths in each year. During years with excessively high temperatures and high humidities, they found the number of deaths increased drastically. During the summer of 1966 most of the eastern half of the country sweltered from the humid hot weather. In St. Louis during July, over 280 deaths were blamed on the excessive heat, (Henschel et al, 1968).

The occurrence of high relative humidity with the high temperatures reduces the body's ability to evaporate water. This causes the internal temperature of the body to increase which causes additional strain on the circulatory system, which could lead to death.

One method of relating the combined effects of temperature and atmospheric moisture was developed by J. F. Bonsen of the Office of Climatology, National Weather Service (Thom, 1956). He developed a simple linear equation which defined what Thom called the Discomfort Index (DI). This linear equation is:

$$DI = 0.4\ (Td + Tw) + 15$$

where Td is the dry bulb temperature, and Tw is the simultaneously recorded wet bulb temperature. This Discomfort Index was later renamed the Temperature-Humidity Index (THI).

During the summer months, people begin to feel uncomfortable when the THI exceeds 70. When the THI reaches 75, the majority of people are uncomfortable, and when the THI exceeds 84, the incidences of death rise dramatically. During the spring months, these values are reduced about 4 points because people are not yet used to the hot weather.

The frequency of occurrence by hour of the THI for St. Louis, Missouri is given in Tables 8 through 14. In April, a THI value in excess of 70, (which would be uncomfortable to many people), occurs about 20 percent of the time. By May, this value occurs about 50 percent of the time during the afternoon, but still seldom at night.

In June a THI above 74 occurs more than two-thirds of the time during the day and exceeds 70 one-fourth of the time at night. A THI value over 84 has occurred on rare occasions. July is the hottest month, with THI values over 74 occurring approximately 6 out of 7 days. On half of the July nights the THI seldom drops below 70, thus creating conditions which are uncomfortable for sleeping. THI values in excess of 84 have occurred 8 percent of the time (about 2 days) during July.

August is only a slight improvement over July, with more than 5 days each week exceeding a THI value of 74, and about 1.5 days each month exceeding 84. By September, the occurrence of THI values over 74 drops down to 3 days a week, and on only one out of ten nights does it fail to fall below a value of 70, bringing a return to more pleasant sleeping conditions. By October, THI values above 74 are rare, occurring only on 3 days during the month.

Winter Cold.

Exposure to extreme cold is a major hazard to people who are required to be out of doors. Prolonged exposure to cold results in a reduction in the flow of blood to the skin and extremities which can ultimately lead to frost bite. If skin surfaces cool to 50°F, numbness develops. It has been shown that exposed human flesh will freeze in one hour at -15°F; or, if the wind is blowing at 18 miles-per-hour, and the temperature is +18°F, exposed flesh will freeze in an hour, (Millington 1964).

The frequency by hour of the occurrence of cold temperatures for St. Louis are found in Tables 15 through 21. The first subfreezing temperatures of the season occur during the predawn hours of October. These have never lasted much past sunrise. By November, freezing temperatures occur on one-third of the mornings. About twice a month the temperature drops below 20°F, and on 3 days during the month, the temperatures will fail to climb above the freezing mark.

In December, more than half of the mornings will have subfreezing temperatures. On the average, six mornings during the month will be below 20°F and one morning below 5°F. On a third of the days, the temperature will fail to rise above freezing and usually on one day in the month, it will fail to rise above 15°F.

The coldest month is January, where 5 out of 7 mornings the temperature is below freezing. At least six mornings a month will find the temperature below 15°F, and, on the average, one morning a month will be below 0°F. About half of the time the temperature will fail to rise above freezing during the day.

February is very similar to December during the early morning hours, but slightly warmer during the afternoon. By March the occurrence of subfreezing temperatures are held to about 12 mornings during the month and there are usually only 3 days during the month when the temperature fails to exceed the freezing mark.

In April, freezing temperatures are confined to the nighttime hours, and only rarely do they occur in May.

The ambient temperature is not always the most reliable indicator of how cold a person will feel when working outdoors. Other weather elements such as wind speed and sunshine also enter into how cold one feels.

One method of describing coldness was first proposed by Dr. Paul Sipple in 1939 (see Siple and Passel 1945). The term "wind chill" was used to describe the relative discomfort resulting from the combination of wind and temperature. A wind chill index can be computed by combining a factor for the wind (which increases as the wind increases), with a temperature factore (which increases as the temperature decreases). The resulting value is a guide to how much protection will be needed for the conditions used.

Siple's heat loss equation (see also Falconer) is:

$$H = (\sqrt{100V} + 10.45 - V)(33 - T) \qquad (1)$$

where H equals the total cooling power of the atmosphere in complete shade without regards to evaporation. Expressed in kilogram-calories per square meter per hour, V is the velocity of the wind in meters per second and T is the temperature of the air in degrees Celsius. For a particular value of wind speed V, there is a one-to-one correspondence between heat loss and temperature. For a speed of 2 meters per second (a brisk walking speed), the equation above reduces to:

$$H = 745 - 22.6T_e \qquad (2)$$

where T_e is the equivalent temperature, i.e., that temperature which is an equivalent measure of heat loss for the selected reference wind speed. If we now substitute in equation 1 the value for H from equation 2 and rearrange, we get a wind chill index in terms of equivalent temperature:

$$T_e = \frac{1}{22.6} (\sqrt{100V} + 10.45 - V)(T - 33) + 33 \qquad (3)$$

If a different reference wind speed were selected, equations 2 and 3 would be changed, and the relationship of air temperature and wind speed to equivalent temperature would also change. The wind speed choice is arbitrary, but all choices seen so far are around the 2 m/s or 4 mph level.

The hourly frequency of the above Wind Chill Index (T_e) for St. Louis is given in Tables 22 through 29. The first subzero wind index value occurs in late November. In December, subzero wind chill values occur on 10 mornings, and last into at least 2 afternoons.

During January, wind chill values as cold as -50° have been reported, and subzero wind chill values occur about 2 days a week. On 3 days during the month, the wind chill values remain below zero the entire day.

February wind chill values are similar to December, with about 10 mornings having subzero readings. Because of the blustery weather that usually occurs in March, the wind chill index continues to indicate cold weather. Wind chill indices of -25°F have occurred and subzero readings have occurred every hour of the day.

In April, subzero wind chill values did not occur and by May, wind chill values below 30 are rare.

Duration.

When a weather condition occurs that is detrimental to outdoor activity, the question that is always asked is, "When will it end?" The contractor that needs above freezing temperatures to pour concrete is in a situation similar to that of the electric utility engineer whose system is being overloaded and wants to know when the THI will drop into a more comfortable range.

The answers to these questions are complex. For example, the answer to the question, "when will the temperature go above 32°F?," depends on how far below the 32°F the temperature is, what time of day it is, how much solar radiation is expected, etc. To simpilify the problem for this paper, the temperature and wind chill index were only examined at 6:00 AM CST during the cold months, and the temperature and THI were examined at 3:00 PM CST during the warm months. These times correspond with the hour which is normally the coldest during the winder, or the hottest during the summer. The number of hours necessary for the temperature to exceed 32°F and 15°F was determined for each instance that the temperature was below those values at 6:00 AM CST for each month. A similar procedure was followed for the other elements and the results are shown in Figures 1 through 5.

The probability of the temperature exceeding 32°F if it is below that value at 6:00 AM is shown in Figure 1. For January, there is only a 35 percent chance of the temperature rising above freezing by noon and only a 44 percent chance that the temperature will exceed 32°F at all anytime during the day. In December and February, the 50 percentile is reached between 12:00 and 1:00 PM. While in November and March, this point is reached between 9:00 and 10:00 AM. In October and April, although the number of cases were small, there is a strong indication that after sunrise the temperature rose quickly above the 32°F mark.

Figure 2 uses a threshold value of 15°F instead of the 32°F used in Figure 1. It is interesting to note that the probability of exceeding 15°F during the day is less in December than it is during January. The 50 percentile value varies from 11:00 AM during January to as early as 8:00 AM in November.

The probability of the wind chill index going above zero after 6:00 AM can be found in Figure 3. These curves tend to rise more rapidly during the morning hours than do the temperature curves given in Figures 1 and 2. However, the values shown in the frequency tables seem to indicate that the minimum wind chill value tends to occur slightly later in the morning than the temperature minimum. The 50 percentile value varies from as late as 1:00 PM during January to as early as 10:00 AM in March.

In Figure 4, one sees the probability of the temperature dropping below 90°F. The curves for each month are quite similar. By 8:00 PM in every month the temperature has usually dropped below the 90°F mark.

The information in Figure 5 is more revealing as to the chances of comfortable sleeping weather. This shows the probability of the THI dropping below 75 during the late afternoon and evening. During July and August the THI drops relatively slowly after sundown. There is only a 60 percent chance it will be below 75 by 11:00 P.M. During these two months, one should expect one night during each week that the THI will remain above 75.

REFERENCES

Burch, G. E. and N. DePasquale, 1962: Hot Climates, Man and His Heart, Thomas Brooks, Springfield, Illinois.

Falconer, Raymond, 1968: Wind Chill, A Useful Wintertime Weather Variable, Weatherwise, 21:6 pp 227, 229, 253.

Henschel, A., L. Burton, L. Margolies, and J. E. Smith, 1968: An Analysis of the Heat Deaths in St. Louis During July 1966, H.E.W., Bureau of Disease Prevention, Clearinghouse for Federal Scientific and Technical Information.

Millington, R.A., 1964: Physiological Responses to Cold, Weather 19:11, pp 334-338.

Siple, Paul A. and Charles F. Passel, 1945: Measurements of Dry Atmospheric Cooling in Subfreezing Temperatures, Proceedings of the American Philosophical Society, 89: pp 177-179.

Thom, Earl C. 1957: A New Concept for Cooling Degree-Days, Airconditioning, Heating and Ventilating, American Society of Heating and Air-conditioning Engineers. June 1957

Table 1. Occurrence in percent of temperatures (°F) equal to or above indicated values in April (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	0	0	0	0	0	0	0	0	0	0	2	6	9	12	14	14	13	10	5	2	*	0	0	0
82	0	0	0	0	0	0	0	0	0	0	*	3	5	8	10	9	9	5	3	1	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	1	2	5	6	7	6	3	1	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	3	3	2	*	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	*	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	1	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2. Occurrence in percent of temperatures (°F) equal to or above indicated values in May (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	0	0	0	0	0	0	0	0	1	6	14	20	25	30	34	34	33	29	23	13	8	4	2	1
82	0	0	0	0	0	0	0	0	*	2	8	14	19	23	26	27	25	21	16	7	3	1	0	0
84	0	0	0	0	0	0	0	0	0	1	3	9	13	17	19	19	18	15	10	3	*	0	0	0
86	0	0	0	0	0	0	0	0	0	*	1	4	8	12	13	13	13	9	5	1	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	*	1	3	7	8	8	7	6	2	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	0	*	2	5	4	3	2	*	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	*	*	1	1	1	*	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Occurrence in percent of temperatures (°F) equal to or above indicated values in June (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	10	6	4	4	3	2	4	10	22	35	47	57	63	66	69	71	68	65	57	45	33	26	18	15
82	5	3	2	*	*	*	1	5	13	23	37	46	52	58	59	61	58	54	47	36	24	16	10	7
84	2	1	*	0	0	0	0	2	7	16	27	36	42	48	53	52	47	45	40	27	15	9	6	3
86	1	0	0	0	0	0	0	1	3	9	18	26	32	38	42	41	41	37	29	16	8	5	3	1
88	8	0	0	0	0	0	0	0	1	5	11	18	22	27	31	32	31	27	21	9	5	2	1	*
90	0	0	0	0	0	0	0	0	1	2	5	11	16	20	23	24	23	19	14	5	3	1	0	0
92	0	0	0	0	0	0	0	0	*	1	3	5	9	13	17	17	15	12	7	3	*	0	0	0
94	0	0	0	0	0	0	0	0	0	*	2	3	4	7	9	10	8	6	4	1	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	1	2	2	4	5	6	5	4	2	*	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	*	1	1	2	3	3	3	2	1	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	1	1	1	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	*	1	*	*	*	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*Non-zero but less than 0.5 percent on all tables.

All tables computer generated at University of Missouri-Columbia
Columbia, Missouri

Table 4. Occurrence in percent of temperatures (°F) equal to or above indicated values in July (by hours), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	16	11	9	6	4	3	4	16	32	48	62	70	78	83	85	86	85	83	78	67	49	37	26	22
82	8	6	3	1	1	*	1	7	21	34	50	62	67	73	77	78	77	74	69	49	34	23	17	11
84	4	1	1	*	0	0	0	3	10	25	35	49	57	64	67	68	67	62	55	38	21	14	9	6
86	1	*	0	0	0	0	0	1	5	13	26	34	43	51	54	58	56	49	40	24	13	6	4	3
88	*	0	0	0	0	0	0	0	2	6	15	23	30	40	44	44	43	38	29	13	6	4	2	1
90	0	0	0	0	0	0	0	0	*	3	7	15	22	28	32	33	31	26	18	7	3	1	1	*
92	0	0	0	0	0	0	0	0	*	1	4	7	13	18	21	24	20	18	10	4	1	1	*	0
94	0	0	0	0	0	0	0	0	0	*	2	4	6	10	14	15	13	9	6	2	1	*	*	0
96	0	0	0	0	0	0	0	0	0	*	1	2	3	6	7	8	8	6	3	1	*	0	0	0
98	0	0	0	0	0	0	0	0	0	0	*	1	2	3	4	4	4	3	2	1	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	*	1	1	2	2	2	2	2	1	*	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	*	1	1	1	1	1	1	1	*	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	*	1	1	1	1	1	*	*	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	*	1	1	*	*	*	*	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	*	*	1	*	*	*	*	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*	*	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	*	*	0	0	0	0	0	0

Table 5. Occurrence in percent of temperatures (°F) equal to or above indicated values in August (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	13	9	5	3	2	1	2	7	23	40	57	69	76	80	82	82	80	76	68	52	39	29	20	16
82	5	2	2	1	*	*	*	2	11	28	44	59	67	71	73	74	72	67	58	40	27	18	12	8
84	2	1	*	0	0	0	0	1	5	16	33	45	54	62	64	65	62	56	48	26	16	10	5	3
86	*	0	0	0	0	0	0	0	1	10	21	32	40	49	54	53	52	46	34	16	8	4	2	*
88	0	0	0	0	0	0	0	0	0	5	12	21	30	37	42	41	39	34	23	9	4	2	*	*
90	0	0	0	0	0	0	0	0	0	*	6	14	20	26	31	32	29	24	15	4	1	*	0	0
92	0	0	0	0	0	0	0	0	0	0	1	8	12	16	20	21	20	15	7	2	*	0	0	0
94	0	0	0	0	0	0	0	0	0	0	*	3	6	9	13	16	13	9	3	*	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	*	*	2	4	7	7	7	3	2	*	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	*	1	2	2	3	3	2	1	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	*	1	2	2	1	1	*	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	*	1	1	1	*	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 6. Occurrence in percent of temperatures (°F) equal to or above indicated values in September (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	4	4	2	1	*	0	0	1	5	15	26	34	37	43	47	48	46	40	30	17	13	10	7	5
82	1	1	*	0	0	0	0	0	1	9	19	26	32	36	39	41	38	31	23	13	9	6	4	3
84	*	0	0	0	0	0	0	0	1	4	14	21	26	30	32	33	31	25	17	8	5	3	1	0
86	0	0	0	0	0	0	0	0	*	2	8	15	20	25	27	27	24	20	11	5	3	1	0	0
88	0	0	0	0	0	0	0	0	0	1	3	9	14	18	22	22	19	15	7	3	1	*	0	0
90	0	0	0	0	0	0	0	0	0	1	2	5	9	12	15	15	14	10	4	1	*	0	0	0
92	0	0	0	0	0	0	0	0	0	0	1	3	5	8	9	10	9	5	3	*	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	1	1	3	5	6	6	6	4	1	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	*	1	1	3	3	3	4	1	*	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	*	1	1	2	2	1	1	*	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	*	*	1	1	1	1	*	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 7. Occurrence in percent of temperatures (°F) equal to or above indicated values in October (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
80	0	0	0	0	0	0	0	0	0	1	3	8	14	17	19	19	16	8	2	1	1	*	*	0
82	0	0	0	0	0	0	0	0	0	*	1	4	9	13	14	14	10	3	1	*	*	0	0	0
84	0	0	0	0	0	0	0	0	0	0	1	2	5	8	10	9	5	2	*	*	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	1	1	3	4	4	2	1	*	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	*	1	2	3	2	1	*	0	0	0	0	0	0
90	0	0	0	0	0	0	0	0	0	0	0	*	*	1	2	1	1	0	0	0	0	0	0	0
92	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*	0	0	0	0	0	0	0	0
94	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0
96	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
98	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
102	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
104	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
106	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
108	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 8. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in April (by hour) for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	25	23	20	17	16	15	16	20	27	34	42	46	50	53	55	57	57	55	52	44	38	35	31	28
62	19	16	15	13	11	10	10	15	21	28	35	40	43	47	50	50	50	47	44	37	30	27	25	22
64	13	11	9	8	7	7	7	9	14	22	27	33	37	39	43	44	42	41	35	28	25	21	17	15
66	8	7	6	5	4	3	5	6	10	15	22	25	30	33	35	35	35	33	27	21	17	14	12	9
68	4	3	3	2	1	1	1	4	6	10	15	20	22	25	27	29	27	25	20	15	11	9	6	5
70	2	1	1	0	0	0	0	*	2	5	8	13	16	19	20	22	20	18	14	9	7	5	3	2
72	0	0	0	0	0	0	0	0	*	2	6	8	10	13	15	15	15	13	8	4	2	1	*	*
74	0	0	0	0	0	0	0	0	0	*	2	5	6	7	8	9	8	6	2	*	0	0	0	0
76	0	0	0	0	0	0	0	0	0	0	*	1	1	2	2	3	2	2	*	0	0	0	0	0
78	0	0	0	0	0	0	0	0	0	0	0	0	0	1	*	1	1	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 9. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in May (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	58	53	49	44	42	42	45	59	68	75	82	85	87	89	90	90	90	89	87	84	80	75	70	65
62	48	44	40	36	32	30	36	47	59	68	73	78	82	85	86	87	86	86	84	78	72	65	58	54
64	37	31	28	24	21	21	25	36	47	59	65	71	74	79	80	81	80	79	75	68	59	51	47	43
66	25	21	19	17	14	13	16	24	35	46	57	61	66	70	73	74	72	70	67	57	48	40	36	32
68	16	14	12	11	9	7	9	15	25	35	43	51	56	61	63	64	63	60	56	44	36	30	23	19
70	10	9	6	5	3	3	3	8	16	25	32	38	43	48	51	52	51	47	42	32	24	19	15	13
72	4	3	2	2	1	1	1	3	8	16	22	29	31	35	38	39	39	35	31	21	16	11	9	6
74	1	*	*	*	0	0	*	1	3	8	14	18	22	25	28	28	27	24	20	12	8	5	3	2
76	0	0	0	0	0	0	0	*	1	2	6	11	12	16	16	17	16	13	10	5	2	2	1	0
78	0	0	0	0	0	0	0	0	*	*	1	4	6	8	9	8	7	6	4	1	*	0	0	0
80	0	0	0	0	0	0	0	0	0	*	*	*	1	2	2	2	2	2	*	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*	*	*	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 10. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in June (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	93	90	88	86	83	81	86	91	96	97	98	98	99	99	99	99	100	99	99	98	98	97	95	94
62	88	86	83	80	77	75	81	88	92	95	96	97	98	98	98	99	99	99	98	97	96	94	93	91
64	82	77	73	70	67	65	72	82	87	90	94	96	97	97	97	97	97	97	97	96	93	90	88	85
66	72	65	62	58	55	53	59	72	80	86	89	91	94	94	95	95	95	95	94	93	88	84	79	75
68	58	52	47	44	40	39	45	60	71	77	84	87	89	90	91	92	91	92	90	86	80	75	68	64
70	42	38	32	30	26	25	31	45	58	68	74	79	83	85	85	86	86	85	82	77	68	60	55	49
72	30	25	21	18	16	16	19	32	44	56	62	70	74	76	78	79	77	76	73	66	53	46	42	36
74	19	15	13	11	9	8	11	19	32	41	50	56	62	65	68	70	66	64	58	50	38	32	27	23
76	11	8	5	4	3	3	5	10	19	28	36	45	48	50	53	52	52	49	44	34	27	21	18	15
78	3	2	1	*	*	0	*	4	9	16	25	30	34	38	39	39	37	34	30	22	16	12	8	6
80	*	0	0	0	0	0	0	*	2	6	12	18	20	22	25	25	25	22	20	12	6	4	2	1
82	0	0	0	0	0	0	0	0	0	1	3	6	9	11	13	14	13	10	8	3	1	0	0	0
84	0	0	0	0	0	0	0	0	0	0	*	*	1	3	3	4	3	3	1	0	*	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 11. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in July (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
60	99	98	98	97	96	95	97	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
62	98	97	96	95	93	91	94	98	99	100	100	100	100	100	100	100	100	100	100	100	100	100	99	
64	96	94	92	88	85	83	88	95	98	100	100	100	100	100	100	100	100	100	100	100	99	99	98	
66	91	88	84	80	78	77	80	91	95	98	99	100	99	100	100	100	100	100	99	99	98	96	95	
68	83	77	74	70	68	65	71	83	91	94	96	98	99	99	98	99	99	98	97	95	93	89	86	
70	70	65	60	56	51	47	54	68	81	88	92	94	95	97	97	98	97	97	97	94	89	83	79	
72	54	46	42	36	33	30	35	50	66	77	82	87	91	91	93	93	93	92	91	85	77	71	66	
74	37	31	27	20	17	16	20	34	47	57	68	76	80	84	85	85	84	83	81	74	63	54	47	
76	20	14	12	8	6	3	7	18	32	42	53	61	67	70	72	72	73	71	65	56	44	37	30	
78	7	4	2	1	*	*	1	6	16	26	35	42	49	54	57	58	56	51	47	36	26	18	13	
80	1	1	*	0	0	0	0	2	4	12	20	27	32	38	39	39	38	35	30	19	10	6	5	
82	0	0	0	0	0	0	0	0	1	3	7	11	16	20	22	23	21	19	13	6	3	1	1	
84	0	0	0	0	0	0	0	0	0	1	1	3	4	6	8	8	7	6	4	1	*	*	0	
86	0	0	0	0	0	0	0	0	0	0	0	*	1	1	1	1	1	1	*	*	0	0	0	
88	0	0	0	0	0	0	0	0	0	0	0	0	0	*	0	0	*	0	0	0	0	0	0	

Table 12. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in August (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	97	96	95	93	91	89	90	98	99	100	100	100	100	100	100	100	100	100	100	100	100	99	98	
62	94	92	90	87	85	82	85	94	98	99	99	99	100	100	100	100	100	100	99	99	99	98	96	
64	88	86	83	79	76	75	76	86	95	98	99	99	99	99	100	99	100	100	99	98	98	96	93	90
66	82	78	72	70	68	65	66	79	89	95	98	98	98	98	99	98	99	99	98	96	94	90	88	83
68	72	68	64	59	55	52	54	69	80	89	93	95	96	97	98	98	98	98	97	92	87	83	79	76
70	59	54	50	45	41	38	39	55	68	79	87	90	93	94	94	94	94	93	92	85	79	73	68	62
72	46	40	36	30	28	25	26	36	55	68	77	82	85	87	89	89	88	86	83	75	66	60	53	47
74	28	24	20	16	12	10	11	23	38	52	63	69	75	78	80	82	80	77	72	60	51	43	37	34
76	14	10	7	5	3	2	2	8	21	35	48	57	61	64	67	66	66	62	56	44	36	29	21	17
78	3	2	1	*	*	*	0	2	9	19	29	39	46	51	54	52	51	47	41	26	18	13	8	6
80	0	0	0	0	0	0	0	0	1	8	15	21	27	32	33	34	32	28	20	12	7	3	1	*
82	0	0	0	0	0	0	0	0	*	1	4	8	12	14	18	18	17	13	9	3	1	*	0	0
84	0	0	0	0	0	0	0	0	0	0	*	1	2	3	5	5	5	3	2	*	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	*	*	1	*	*	*	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 13. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in September (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	69	66	63	59	55	52	50	59	74	85	93	96	97	98	98	98	98	97	95	90	85	82	75	70
62	62	59	54	51	46	44	44	53	66	76	88	91	94	96	97	97	96	95	91	82	77	71	68	63
64	52	48	44	40	38	36	35	43	55	69	77	85	88	92	92	94	92	90	83	73	67	64	58	55
66	42	38	35	31	30	28	27	34	46	58	67	75	79	85	87	86	85	81	73	64	57	52	48	44
68	30	28	26	23	21	19	19	26	36	46	57	65	69	74	76	77	75	71	62	52	45	41	38	34
70	23	19	17	15	13	12	12	16	26	37	45	53	58	62	64	65	63	59	52	40	35	31	27	24
72	13	12	10	8	6	5	5	9	18	29	35	41	46	51	52	53	51	48	40	32	26	22	18	14
74	6	5	4	3	1	1	1	2	10	19	28	32	35	40	42	43	41	37	30	20	15	13	10	7
76	3	2	1	1	*	0	0	0	3	10	16	23	26	30	32	32	31	25	19	11	8	5	4	2
78	*	*	0	0	0	0	0	0	0	3	9	14	18	19	22	22	20	16	9	5	2	2	1	*
80	0	0	0	0	0	0	0	0	0	*	2	5	8	11	11	10	9	6	4	2	*	*	0	0
82	0	0	0	0	0	0	0	0	0	0	*	1	2	2	3	3	2	1	*	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0	*	*	0	0	0	*	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 14. Occurrences in percent of the Temperature-humidity Index (THI) equal to or greater than the indicated values in October (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
60	31	28	24	21	20	19	17	21	31	44	55	63	66	69	73	74	72	65	58	52	45	40	37	34
62	23	29	18	16	15	14	13	15	23	33	47	53	59	62	65	65	63	57	51	42	36	32	28	25
64	14	13	12	10	9	8	8	9	15	26	35	46	52	55	57	57	55	49	40	32	27	23	19	16
66	9	8	8	8	7	6	5	7	10	18	28	35	43	46	49	48	46	39	30	22	17	14	11	10
68	6	6	5	5	3	3	2	3	6	11	20	26	32	38	40	39	37	31	20	14	9	7	7	7
70	3	2	2	2	1	1	1	2	3	6	12	19	23	26	29	30	27	20	12	7	6	5	5	4
72	1	1	1	1	1	1	1	1	2	3	6	11	16	20	20	20	18	11	6	4	4	2	2	2
74	*	*	*	0	0	0	0	0	1	2	4	6	8	10	12	13	10	6	3	2	1	*	1	*
76	0	0	0	0	0	0	0	0	0	*	2	3	4	6	6	4	3	2	1	1	*	0	0	0
78	0	0	0	0	0	0	0	0	0	0	*	1	2	3	2	2	1	*	*	0	0	0	0	0
80	0	0	0	0	0	0	0	0	0	0	0	0	*	1	1	*	*	*	0	0	0	0	0	0
82	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
84	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 15. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in October (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	0	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	0	*	*	1	1	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	*	1	1	2	2	3	3	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	*	*

Table 16. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in November (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	*	*	*	0	0	0	0	0	0	0	0	0	0	0	*	*	*	*
6	*	*	*	*	1	1	1	*	*	*	0	0	0	0	0	0	0	0	0	*	*	*	*	*
8	*	*	1	1	1	1	1	1	*	*	*	0	0	0	0	0	*	*	*	*	*	*	*	*
10	*	1	1	1	1	1	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*
12	1	1	1	1	1	1	2	1	1	1	*	*	*	*	*	*	*	*	*	1	1	*	1	1
14	1	1	2	2	2	2	2	2	1	1	1	1	*	*	*	*	*	*	1	1	1	1	1	1
16	2	2	2	2	2	2	2	2	2	1	1	1	1	*	*	*	*	1	1	1	1	1	1	2
18	2	2	3	3	3	3	3	3	2	2	1	1	1	1	*	*	1	1	1	1	1	2	2	3
20	3	3	3	4	4	4	5	4	3	2	2	1	1	1	1	1	1	2	2	2	2	3	3	3
22	5	5	5	5	6	7	6	6	4	3	2	1	1	2	1	1	2	2	2	3	3	3	3	4
24	6	6	6	7	8	9	9	9	7	4	3	2	2	2	2	2	2	2	3	4	4	4	5	5
26	8	9	9	10	11	11	12	12	10	7	5	4	3	3	2	2	3	4	4	5	5	6	7	8
28	11	13	13	14	15	17	17	17	12	10	8	6	5	4	4	4	4	5	6	7	8	9	10	11
30	15	17	18	19	22	22	24	24	16	13	11	8	7	6	5	6	6	7	9	10	11	14	14	15
32	20	22	24	26	28	29	32	31	22	16	13	11	9	8	8	7	8	11	12	14	15	17	18	20

Table 17. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in December (by hour) for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	*	1	1	1	1	1	1	1	1	1	*	0	0	0	0	0	0	0	0	0	0	*	*	*
2	1	1	1	1	2	2	2	2	2	1	1	1	0	0	0	0	0	0	*	*	*	*	*	*
4	2	2	2	3	3	3	3	3	3	2	1	1	1	0	0	0	0	*	1	1	1	1	1	1
6	2	3	3	3	4	4	4	5	4	3	2	1	1	*	0	*	*	1	1	1	2	2	2	2
8	3	3	4	5	5	6	6	6	6	4	3	2	2	1	1	1	1	2	2	2	2	2	2	3
10	4	5	6	6	6	6	7	8	7	5	4	3	3	2	2	2	2	2	2	3	3	3	3	4
12	6	6	6	8	8	9	9	8	8	7	5	4	4	2	2	2	2	3	3	3	4	5	5	5
14	8	8	9	10	10	10	10	11	10	8	7	6	4	4	3	3	3	3	4	5	6	6	8	8
16	10	10	11	11	12	12	13	14	11	9	7	6	5	4	4	4	4	5	6	7	7	8	8	9
18	11	11	13	13	14	15	16	16	15	12	9	8	7	6	5	5	5	7	8	8	9	10	10	11
20	13	15	16	17	18	19	20	19	18	15	11	10	8	7	6	6	7	8	9	10	11	11	12	12
22	16	18	20	21	22	23	24	25	21	19	14	12	10	9	8	8	8	10	10	11	12	13	14	15
24	22	24	24	26	27	29	30	30	27	22	18	16	13	11	10	10	11	13	14	14	15	18	19	20
26	27	29	30	32	34	35	36	36	33	28	24	19	16	15	14	13	14	15	17	20	20	23	24	26
28	34	37	37	39	41	42	42	42	40	34	28	24	21	18	17	16	17	21	23	27	28	30	31	33
30	42	44	45	47	47	50	50	49	46	41	34	29	27	24	21	21	23	28	32	35	36	39	39	41
32	49	52	52	54	55	57	58	58	54	49	41	36	33	29	29	29	31	36	39	41	42	45	47	49

Table 18. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in January (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	1	2	2	2	3	3	3	3	3	2	1	*	*	*	*	*	*	*	1	1	1	1	1	1
2	2	3	3	4	3	5	4	4	4	3	2	1	1	*	*	*	*	*	1	1	1	1	2	2
4	3	4	4	5	5	6	6	6	5	4	3	2	1	1	1	1	1	1	1	1	2	2	3	3
6	4	5	5	6	6	7	8	8	7	5	3	2	2	1	1	1	1	1	2	2	3	3	4	5
8	6	7	7	8	9	9	9	9	7	5	3	2	2	1	1	1	1	2	2	3	4	4	5	5
10	9	9	10	10	11	12	12	12	11	9	7	5	3	3	3	3	3	3	4	5	5	6	7	8
12	10	11	11	12	13	15	15	15	14	11	10	7	4	4	3	3	3	5	5	6	7	8	8	11
14	13	13	15	16	17	18	19	20	18	16	12	10	8	6	5	5	5	6	7	9	10	11	11	12
16	15	17	19	21	22	24	25	25	23	18	15	12	11	8	7	7	7	8	10	11	12	12	13	14
18	19	22	23	25	26	27	28	28	28	27	19	16	13	11	10	10	10	12	13	14	14	16	17	18
20	23	26	27	28	29	29	30	30	29	26	22	19	19	14	12	12	12	14	17	17	19	20	22	23
22	28	30	31	31	32	33	34	34	33	31	27	24	21	17	15	15	15	17	19	22	24	25	26	28
24	34	34	35	37	38	40	40	40	38	34	31	27	24	20	19	19	20	22	24	27	29	30	31	33
26	39	40	41	42	44	45	45	46	45	40	35	31	27	24	23	23	24	26	29	31	34	36	37	38
28	46	48	50	51	52	53	55	54	52	47	42	37	34	29	29	28	28	32	35	38	40	41	44	46
30	54	55	58	60	60	62	63	63	61	54	48	42	39	35	34	34	35	40	43	45	49	51	53	54
32	62	65	65	68	70	70	70	72	70	62	56	51	47	43	42	42	43	46	49	53	56	57	59	61

Table 19. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in February (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	*	1	1	1	1	1	1	1	1	1	*	*	0	0	0	0	0	0	*	*	*	*	*	*
2	1	1	1	1	1	1	2	2	1	1	1	*	*	0	0	0	0	*	*	*	*	*	*	1
4	1	1	1	1	2	2	2	2	2	1	1	*	*	*	*	*	*	*	*	*	*	1	1	1
6	1	2	2	2	2	3	4	4	4	2	1	1	*	*	*	*	*	*	*	1	1	1	1	1
8	2	3	3	4	4	4	4	4	4	3	1	1	1	*	*	*	*	*	1	1	1	1	1	2
10	4	4	4	5	5	5	6	6	6	4	2	1	1	1	*	*	*	1	1	1	1	2	2	3
12	4	5	5	5	6	8	8	9	7	6	4	2	1	1	1	*	1	1	1	1	2	2	4	4
14	6	6	6	8	9	9	9	10	10	7	6	3	2	1	1	1	1	1	2	3	4	5	5	6
16	8	8	9	10	10	11	12	12	11	9	8	5	3	2	2	2	1	2	3	4	5	6	6	6
18	9	10	11	11	13	14	14	14	13	10	8	8	6	3	2	2	2	3	4	6	7	8	8	9
20	12	12	13	15	16	16	17	18	15	13	10	9	8	6	4	4	4	4	6	8	8	9	10	10
22	15	16	18	17	18	19	21	21	18	15	12	10	9	8	6	6	5	6	9	9	10	11	12	13
24	19	20	20	23	24	25	26	26	23	19	15	12	11	9	8	7	7	9	10	11	13	14	15	17
26	24	25	26	28	29	30	32	32	28	23	19	15	13	11	10	9	9	10	13	15	17	18	19	21
28	30	31	33	36	36	38	39	39	35	29	25	19	16	15	13	13	12	14	17	19	21	24	25	28
30	38	40	43	44	45	48	48	48	44	38	31	26	22	19	18	17	17	20	23	26	29	30	33	35
32	46	48	51	52	54	56	58	57	51	43	38	33	29	25	22	23	23	25	30	34	37	40	42	44

Table 20. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in March (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	0	0	0	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	*	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	*	*	*	*	*	1	1	1	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	*	*	1	1	1	1	1	1	*	*	*	0	0	0	0	0	0	0	0	0	0	0	*	*
8	1	1	1	1	1	1	1	1	1	*	*	0	0	0	0	0	0	0	0	0	0	*	*	*
10	1	1	1	1	1	1	1	1	1	*	*	*	0	0	0	0	0	0	0	0	*	*	*	*
12	2	2	2	2	2	2	2	1	1	1	*	*	*	*	*	*	0	*	*	*	*	*	*	*
14	2	2	2	2	2	2	2	2	1	1	*	*	*	*	*	*	*	*	*	*	1	1	1	1
16	2	2	2	2	2	3	2	2	2	1	1	*	*	*	*	*	*	*	*	1	1	1	1	1
18	2	2	3	3	4	5	6	4	4	2	2	1	1	1	1	1	1	1	1	1	1	1	2	2
20	4	4	4	6	6	8	7	6	5	4	2	2	1	1	1	1	1	1	1	1	2	2	2	2
22	5	6	7	8	8	9	9	8	6	5	3	2	2	1	1	1	1	2	2	2	2	2	3	3
24	7	9	10	11	12	12	13	10	8	6	5	3	3	2	2	2	2	2	3	3	3	3	5	5
26	10	13	13	14	17	17	18	16	11	9	7	5	4	3	3	2	2	2	3	4	5	5	6	8
28	16	17	18	20	21	22	23	20	14	11	9	7	6	5	4	3	4	3	5	7	9	9	11	12
30	21	23	25	27	28	30	30	28	21	15	12	10	7	6	6	6	6	6	7	9	12	15	17	17
32	27	31	32	34	37	38	39	35	28	22	17	13	11	10	8	8	8	9	12	14	17	19	21	25

Table 21. Frequency of occurrence in percent of temperatures (°F) equal to or below indicated values in April (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
24	0	0	0	0	*	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
26	0	0	*	0	*	1	1	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
28	0	*	1	1	1	1	1	1	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30	1	2	2	2	2	3	3	1	*	*	0	0	0	0	0	0	0	0	0	0	0	0	*	*
32	2	3	3	4	4	5	5	2	1	1	*	0	0	0	0	0	0	0	0	0	*	*	*	*

Table 22. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in October (by hour) for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	*	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	*	1	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	*	*	1	1	1	1	1	2	1	1	1	*	*	*	0	0	0	0	0	0	0	*	0	0
25	2	2	2	3	3	3	3	4	3	2	2	2	2	1	1	*	*	0	*	*	1	*	1	1
30	5	5	6	6	7	8	8	8	7	5	4	3	3	3	2	2	2	2	2	2	2	2	3	4

Table 23. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in November (by hour) for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	*	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	*	*	*	*	*	0	0	0	*	0	0	0	0	0	0	0	0	0	0	*	0	0	0
-15	1	*	1	1	1	1	1	1	1	1	1	1	*	*	0	*	0	*	*	0	*	*	1	1
-10	1	1	1	1	1	1	1	1	1	1	1	1	*	*	*	*	*	*	*	*	1	1	1	1
- 5	1	1	2	2	2	2	2	2	2	2	1	1	1	1	*	1	1	1	1	1	1	1	1	1
0	3	3	3	3	4	3	4	4	4	4	3	2	2	2	2	1	1	1	1	2	2	2	2	3
5	4	5	5	5	6	6	6	5	6	6	5	4	4	3	3	3	3	3	3	3	3	4	4	5
10	7	7	7	9	8	9	9	10	10	9	9	7	6	5	5	5	5	5	5	5	5	6	6	8
15	11	11	13	13	14	15	15	16	15	15	14	11	10	9	8	7	7	8	8	9	9	9	11	12
20	17	18	20	21	22	23	23	24	25	23	21	16	15	14	13	13	13	13	14	15	15	16	17	18
25	26	28	28	31	31	34	35	37	37	34	30	25	23	22	20	21	19	19	22	21	22	24	25	27
30	37	38	40	41	43	46	47	49	47	45	40	36	30	29	29	27	27	27	29	31	33	36	35	39

Table 24. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in December (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	*	*	0	0	0	*	1	1	1	*	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	*	*	1	*	0	1	1	1	2	1	1	1	*	1	1	*	*	0	0	0	*	1	*	*
-20	1	1	1	1	2	2	2	2	2	2	2	1	1	1	1	*	*	*	*	*	1	1	1	1
-15	2	2	2	3	3	2	3	3	3	3	3	2	3	2	1	1	1	1	1	2	1	2	2	2
-10	3	4	4	4	4	5	5	4	5	5	4	4	4	3	3	2	2	2	1	2	2	3	3	4
- 5	5	6	5	5	7	7	9	8	8	8	7	6	5	4	4	5	4	4	4	4	4	4	5	5
0	9	9	11	11	11	12	12	13	13	13	12	9	9	8	8	6	6	7	7	7	7	8	9	9
5	16	15	16	17	16	18	17	18	19	19	16	13	14	12	11	11	11	10	11	11	11	11	12	15
10	21	23	24	26	24	27	26	27	28	28	24	22	20	17	17	15	17	17	18	19	17	20	21	23
15	34	35	34	34	35	39	38	41	42	41	35	34	29	26	25	25	24	24	27	29	30	3.	34	33
20	46	48	47	48	47	50	53	54	55	53	50	46	44	39	37	36	36	35	37	38	40	44	46	47
25	59	62	60	61	64	63	65	66	66	65	60	57	55	52	49	47	46	48	48	50	53	55	59	59
30	72	71	72	73	74	75	76	78	78	75	71	67	64	61	57	58	56	57	61	64	66	70	70	72

Table 25. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in January (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0
-40	0	0	0	0	*	*	1	1	1	1	*	*	*	*	*	*	*	*	0	*	*	*	*	*
-35	*	1	*	1	1	1	1	1	1	1	1	1	1	*	*	*	*	*	*	0	0	1	1	*
-30	*	1	1	1	2	1	1	1	1	1	1	1	1	*	*	*	*	*	*	1	1	1	1	1
-25	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	2	1
-20	3	3	3	3	3	3	3	4	3	2	3	2	2	2	2	2	2	1	2	1	1	2	2	2
-15	4	5	5	5	5	5	5	6	6	5	4	4	3	3	3	3	2	3	3	3	4	4	4	4
-10	7	8	6	8	7	8	9	8	9	8	7	6	5	4	4	5	5	5	4	5	6	6	6	7
- 5	10	10	10	10	12	12	13	13	13	13	12	10	8	7	7	7	8	7	7	7	9	9	10	10
0	17	15	17	18	19	18	19	21	22	21	18	16	15	13	12	11	13	12	13	13	14	15	16	17
5	23	24	24	26	26	27	30	28	30	29	25	23	20	18	17	16	17	17	17	20	21	21	22	24
10	33	33	33	36	35	37	40	38	39	38	34	31	28	27	24	22	23	24	24	25	27	27	31	33
15	44	47	45	45	48	48	52	52	51	52	46	43	40	36	34	33	33	32	35	37	38	39	42	44
20	57	57	58	57	60	61	62	63	63	63	58	54	49	47	47	45	45	44	46	48	50	53	53	54
25	67	69	69	70	71	70	72	72	73	74	71	65	62	59	57	58	56	55	57	61	65	65	65	66
30	78	78	80	78	78	79	79	82	83	81	80	76	73	69	68	66	67	64	68	73	74	75	78	77

Table 26. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in February (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	*	*	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	*	*	*	*	*	*	*	1	1	*	*	*	0	*	0	*	0	0	0	0	0	0	*	*
-25	1	1	1	1	1	1	1	1	1	1	1	1	*	*	*	*	0	0	*	)	*	*	1	1
-20	1	1	1	1	2	1	2	1	2	2	1	1	1	1	0	1	1	1	*	*	1	1	1	1
-15	1	2	2	2	3	3	3	3	4	3	3	2	1	1	1	1	1	1	1	*	1	1	1	2
-10	3	4	3	4	4	5	6	5	5	5	4	4	3	2	1	1	1	1	2	1	2	2	2	3
- 5	6	5	6	6	7	8	9	9	8	8	6	5	6	4	3	3	2	3	3	3	3	3	3	5
0	10	10	11	12	13	12	13	13	13	13	10	10	8	8	6	7	6	5	6	5	6	8	8	9
5	14	15	15	16	17	16	16	18	19	18	15	13	12	11	9	9	8	9	10	9	10	12	12	13
10	19	21	22	23	24	25	26	27	26	26	23	20	18	16	14	14	14	15	15	16	17	19	18	19
15	30	32	32	35	36	35	38	38	40	39	34	30	26	24	24	23	22	22	24	26	28	30	28	30
20	41	45	46	48	51	49	52	52	53	52	48	42	38	34	35	31	30	31	34	35	39	41	40	43
25	57	60	61	61	65	65	65	65	65	64	60	54	48	46	44	42	43	43	43	48	50	51	53	56
30	71	71	72	73	73	74	75	78	75	75	72	67	63	56	55	54	52	55	55	59	63	65	66	69

Table 27. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in March (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	*	*	*	*	*	*	*	0	*	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	*	*	*	*	1	1	1	*	*	*	*	*	*	*	*	0	0	0	0	0	0	0	0
-15	1	1	1	1	1	1	1	1	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
-10	1	1	1	1	1	2	1	2	2	1	1	*	1	*	*	*	*	*	*	1	*	*	1	1
- 5	2	2	2	2	2	3	3	3	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1
0	4	5	6	4	4	5	6	6	5	5	3	3	2	2	2	2	2	2	2	2	3	3	3	4
5	8	8	9	8	8	8	9	8	9	7	6	6	4	4	3	4	3	4	4	5	5	5	6	6
10	10	12	13	15	14	14	15	16	15	12	10	9	8	7	6	7	6	7	8	8	7	8	9	10
15	18	17	20	23	22	24	25	27	27	22	19	17	15	13	12	11	12	11	12	12	13	14	14	15
20	31	28	31	33	35	36	39	40	38	35	31	28	24	21	21	19	20	19	19	21	21	22	24	25
25	41	42	44	47	48	51	53	54	52	48	41	39	34	33	31	28	29	31	30	31	31	33	36	39
30	55	56	59	61	62	65	64	67	64	62	55	50	45	42	41	40	40	41	41	43	47	47	48	52

Table 28. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in April (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	*	*	0	*	1	0	0	0	0	0	0	0	0	*	0	*	0	0	0	0
10	1	1	1	2	1	1	2	2	2	1	1	*	0	0	0	0	0	*	*	*	0	*	*	*
15	3	3	3	3	4	5	5	5	5	4	2	2	1	1	1	1	1	1	*	1	1	1	1	2
20	6	6	7	8	10	10	10	9	9	7	6	4	3	3	3	4	4	3	3	4	3	4	4	5
25	11	11	12	12	15	16	17	16	14	13	11	9	8	7	7	7	7	6	7	6	7	7	8	8
30	17	18	21	21	23	25	25	25	25	21	18	15	12	11	11	10	11	10	11	12	12	12	14	14

Table 29. Frequency of occurrence in percent of Wind Chill equivalent temperatures (°F) equal to or below the indicated values in May (by hour), for St. Louis, Missouri 1948-1964.

Indicated Value °F	Hour of the Day																							
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
-10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	0	0	0	0	*	*	*	*	*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25	0	0	*	*	1	1	1	1	1	*	1	*	0	0	0	0	0	0	*	0	0	0	0	0
30	1	1	1	2	2	3	4	3	2	2	1	1	*	1	*	*	*	*	*	*	*	*	*	*

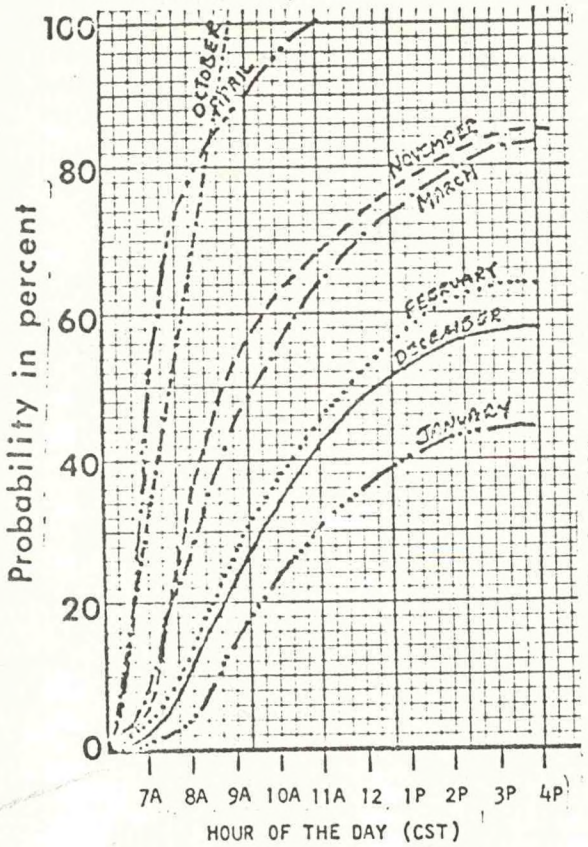

Figure 1. The probability that the temperature will rise above 32°F if it was equal to or below 32°F at 6:00 A.M. CST.

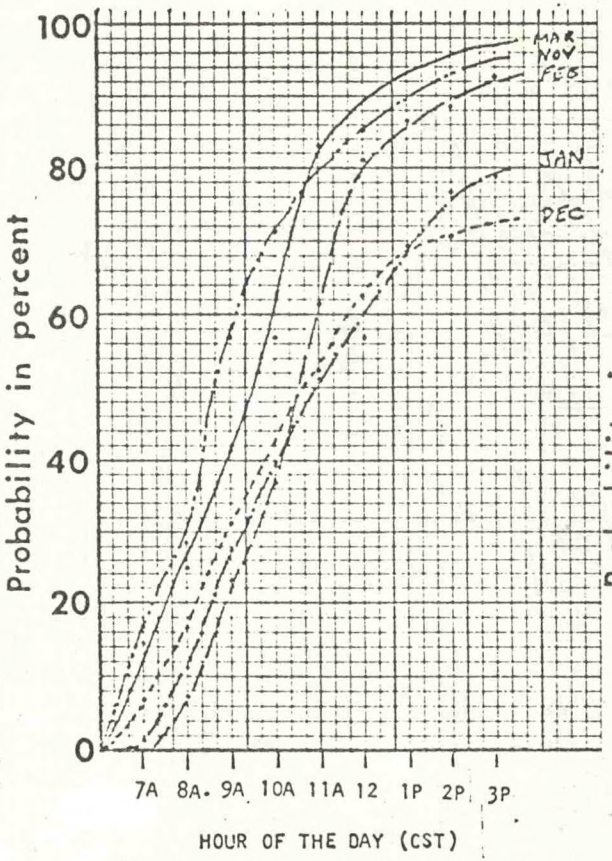

Figure 2. The probability that the temperature will rise above 15°F if it was equal to or less than 15°F at 6:00 a.m. CST.

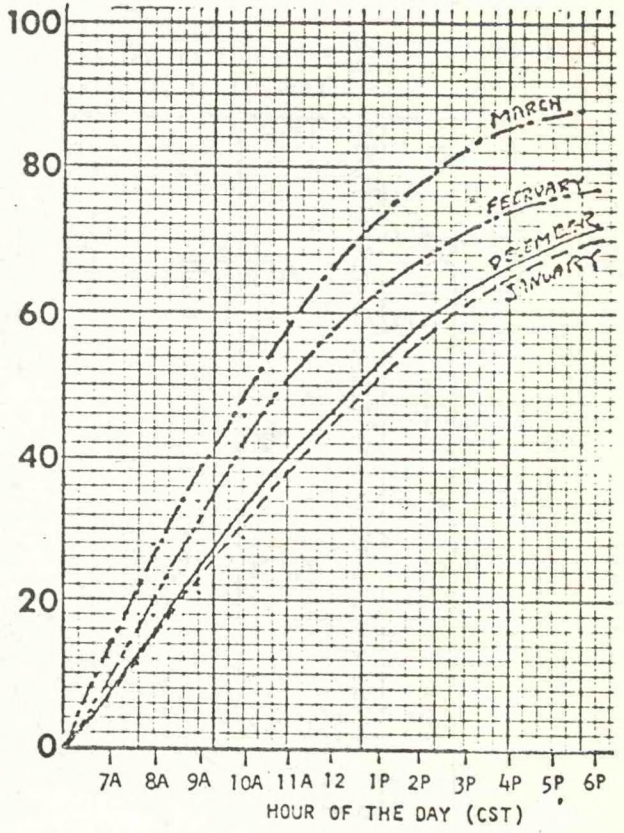

Figure 3. The probability that the Wind Chill value will exceed 0° if it was below a value of 0°at 6:00 a.m. CST.

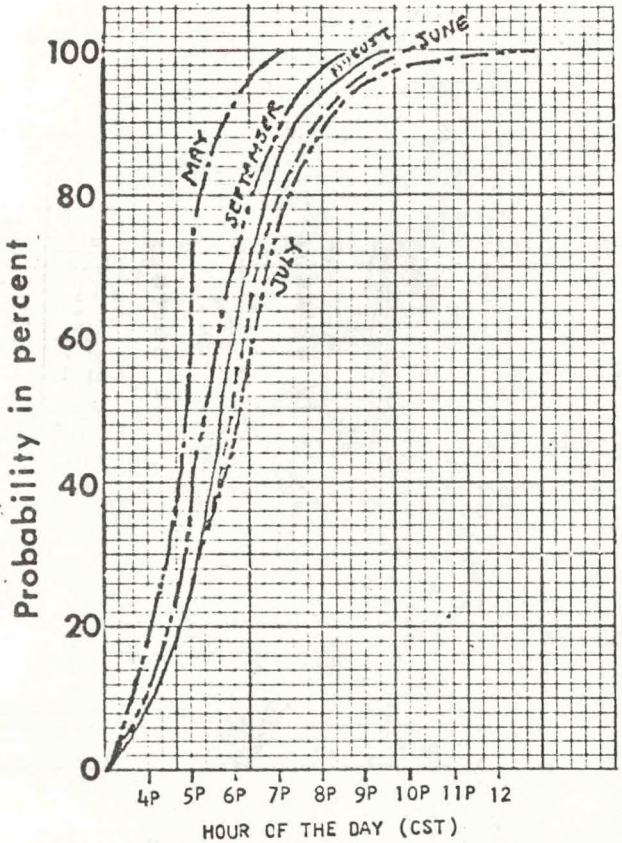

Figure 4. The probability that the temperature will fall below 90°F given that it was equal to or greater than 90°F at 3:00 PM CST.

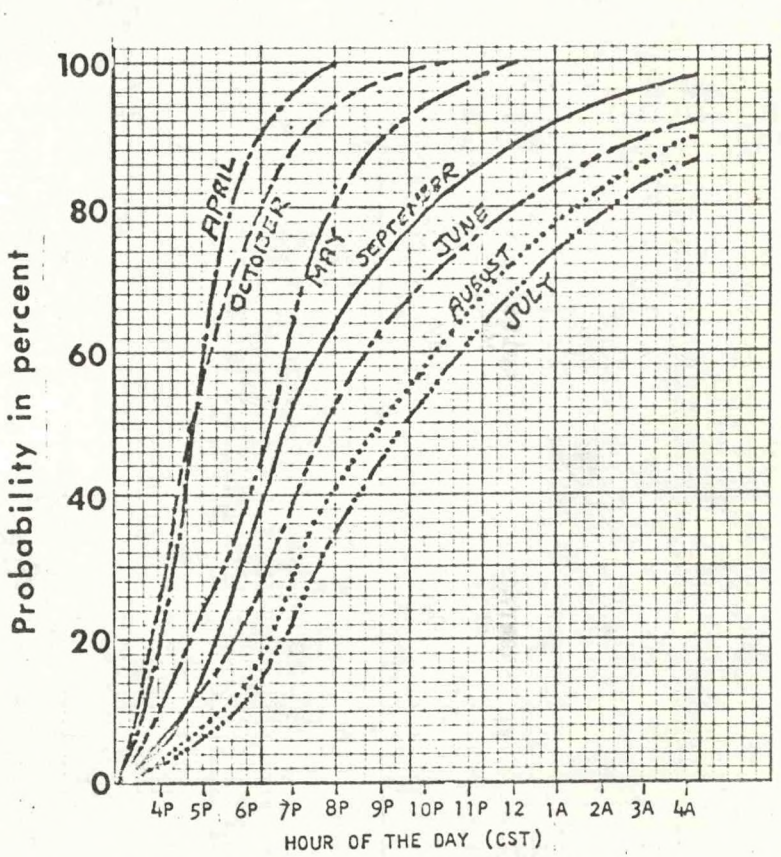

Figure 5. The probability of the THI falling below a value of 75 given that it equalled or exceeded 75 at 3:00 PM CST

(continued from front inside cover)

NWS CR 48 Manual of Great Lakes Ice Forecasting. C. Robert Snider - December 1971 (COM-72-10143)

NWS CR 49 A Preliminary Transport Wind and Mixing Height Climatology St. Louis, Missouri Donald E. Wuerch, Albert J. Courtois, Carl Ewald, Gary Ernst June 1972 (COM-72-10859)

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NWS CR 52 Cold Air Funnels. Jack R. Cooley and Marshall E. Soderberg September 1973