

HOURLY PRECIPITATION AT MEMPHIS, TENN.

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The data used in this paper were taken from the station records at Memphis, Tenn., for the 20-year period, 1907-1926, inclusive. The plan is similar to the ones used by Feldwisch, Ray, and others. The tables and graphs are based on 0.01 inch or more of precipitation per hour. The means and averages were compiled for all months of the year in order to make comparisons by seasons.

The hourly amounts were interpolated for the short periods when the automatic recorder was out of order and for the extreme months when the tipping bucket was removed to prevent damage from freezing. It is believed that the hourly amounts in winter represent the true hourly amounts to a high degree of accuracy, as 75 per cent or more of the winter precipitation is recorded by the tipping bucket. The amount of snowfall at Memphis is small and considerably less than at the more northerly stations. The personal equation should be negligible as

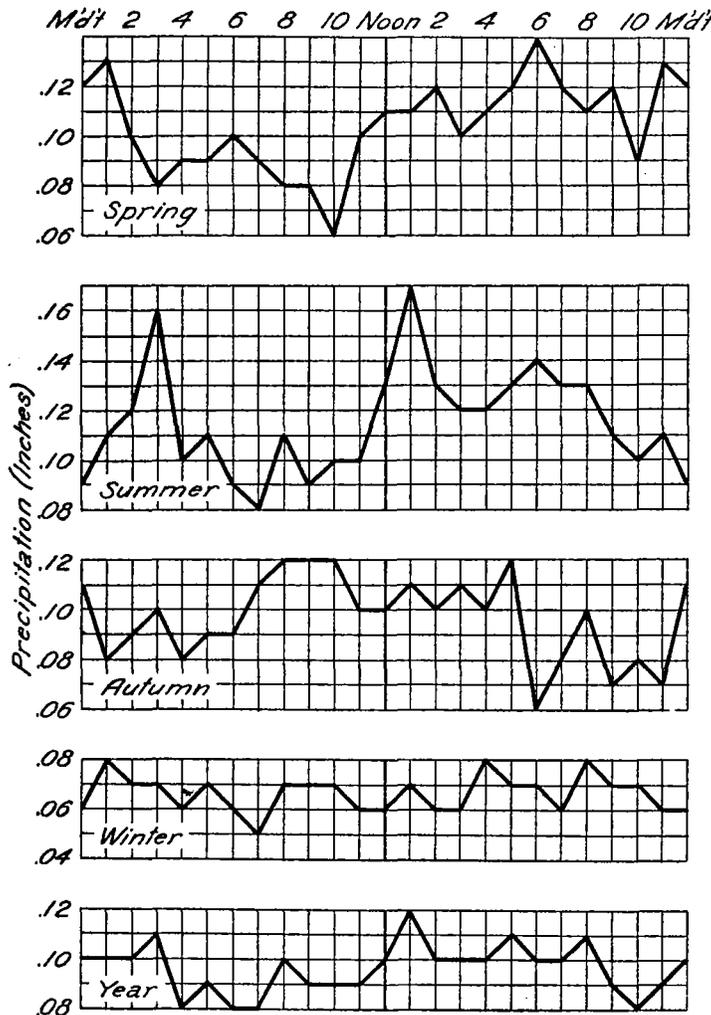


Fig. 1.—Average hourly precipitation at Memphis, Tenn., for the 20-year period, 1907-1926

the records were either prepared or verified by the same observer for practically the entire period.

Department-store sales and football games have been added to the growing list of weather insurance. The insurance companies recognize the fact that the hourly frequency of precipitation is greater during the winter

months than during the summer by charging higher rates for December than July, etc.

Table 1 gives the total hourly precipitation for each hour by months for the 20-year period. Tables 2 and 3 show the average hourly precipitation and hourly fre-

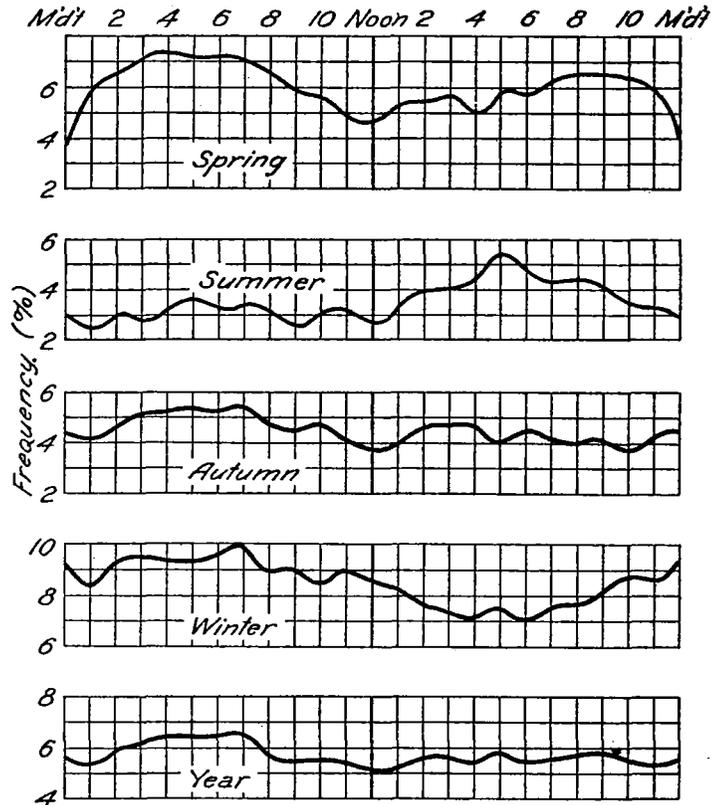


Fig. 2.—Percentage of hourly frequency of precipitation at Memphis, Tenn., for the 20-year period, 1907-1926

quency expressed in percentages. The vertical means in Table 2 were obtained by dividing the total hourly precipitation by the number of hours that 0.01 inch or more occurred; those in Table 3 were obtained by dividing the number of hours in which precipitation occurred by the total number of possible hours; the horizontal means in both tables were found by dividing the respective columns by 12. Table 4 gives the number of thunderstorms at Memphis during the 20-year period in percentages. On days with more than one thunderstorm all were counted.

Figure 1 shows the average hourly precipitation by seasons and the annual mean. Figure 2 shows the hourly frequency of precipitation by seasons and the annual mean.

A study of Tables 2 and 3 shows that the hourly precipitation is greater in summer than in winter but the hourly frequency is greater in winter than in summer. To condense the tables we have the following:

	Average hourly precipitation	Hourly frequency
	Inches	Per cent
Spring.....	0.10	6.1
Summer.....	.12	3.5
Autumn.....	.10	4.5
Winter.....	.06	8.5

From the above it can be readily seen that the average hourly amount of precipitation in summer is twice as much as in winter. Spring and autumn have about the same average with spring being a little greater than autumn. The hourly frequency is greater in spring than in autumn while the frequency in winter is nearly two and one-half times greater than in summer.

Kincer showed that more precipitation occurred during the night than during the daytime. Taking the 12-hour periods ending at 7 a. m. as night and 7 p. m. as daylight hours it is found that there is no marked difference between the two periods for the 20-year record at

Memphis. Using the means in Table 1 we have a total of 37.21 inches for the night hours and 37.02 inches for the daylight hours. The average hourly precipitation for the night hours is 0.09 and daylight hours 0.10 inches. The hourly frequency for the night hours is 5.9 per cent while the daylight hours is 5.4 per cent.

Figure 1 shows that the range of the hourly amounts is greater in spring and summer than in autumn and winter. This is probably due to thundershowers as 48 per cent of the thundershowers occur in summer, 27 per cent in spring, 14 per cent in autumn, and 11 per cent in winter.

TABLE 1.—Total hourly precipitation at Memphis, Tenn., for the 20-year period, 1907 to 1926, inclusive

MONTH	A. M.												P. M.											
	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Mid-night
January	3.36	4.00	3.22	3.51	3.51	3.39	3.54	3.65	4.68	4.54	3.58	4.56	4.57	4.51	3.55	3.70	3.34	2.24	1.98	2.28	2.14	2.52	2.83	2.52
February	3.19	3.75	4.31	3.09	3.58	3.61	2.72	3.12	3.25	2.14	2.71	2.25	2.56	1.85	2.36	3.79	2.65	3.99	3.33	3.83	3.19	3.45	2.63	2.66
March	5.20	3.66	3.61	3.08	2.81	3.58	3.34	3.52	3.75	3.04	4.12	4.19	4.99	4.96	4.50	2.82	2.99	4.82	4.58	4.61	3.26	4.55	4.63	5.28
April	5.58	5.53	4.83	3.97	4.02	3.88	2.74	2.04	1.96	1.60	2.22	2.30	2.40	3.23	3.31	4.27	5.55	5.81	6.94	6.09	6.68	4.77	5.36	5.60
May	3.53	2.85	2.83	4.49	4.62	5.32	4.89	4.03	2.57	1.33	2.33	2.87	3.05	4.05	2.70	2.64	3.66	3.57	2.33	2.25	3.34	1.70	3.66	2.65
June	1.41	1.91	2.31	1.53	2.36	1.34	0.74	0.74	0.89	1.09	1.84	2.84	3.10	4.13	2.42	3.70	4.53	4.18	4.32	2.96	2.94	1.54	1.23	1.42
July	1.29	1.30	2.61	1.99	3.18	1.53	2.28	4.34	1.74	3.55	2.53	2.73	4.50	1.46	2.95	1.20	2.33	4.27	4.17	2.80	1.77	2.01	2.53	1.40
August	2.28	3.20	2.36	2.09	1.96	2.01	1.89	1.76	2.03	1.77	1.36	0.94	3.09	4.17	3.89	6.28	6.31	3.60	2.10	4.62	3.71	2.94	2.79	2.41
September	1.97	2.53	2.28	1.82	2.30	2.10	2.99	4.30	4.44	3.38	1.68	1.83	1.98	2.00	3.75	3.53	3.52	1.13	0.46	1.79	0.86	1.92	0.90	3.38
October	1.89	1.96	3.07	2.42	2.13	2.65	2.92	2.53	2.38	2.92	3.27	2.89	3.44	3.82	2.10	2.43	2.14	1.82	3.63	3.25	1.50	0.95	1.58	3.31
November	2.08	2.94	3.61	3.78	4.84	3.57	4.70	3.17	2.29	3.71	2.13	1.70	2.59	3.14	2.65	2.32	1.70	1.85	2.22	2.23	3.06	2.95	2.92	2.20
December	5.61	3.91	3.99	4.49	4.20	3.04	3.47	3.74	2.90	3.71	4.00	3.17	3.49	2.26	2.00	2.88	3.53	2.83	3.59	4.48	4.28	4.85	4.07	4.59
Mean	3.12	3.12	3.25	3.02	3.29	3.00	3.02	3.08	2.74	2.74	2.65	2.71	3.31	3.30	3.02	3.30	3.52	3.34	3.31	3.43	3.06	2.85	2.93	3.12

TABLE 2.—Average hourly precipitation at Memphis, Tenn., for the 20-year period 1907 to 1926, inclusive

Month	A. M.												P. M.											Mean	
	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11		Mid-night
January	0.07	0.08	0.06	0.06	0.07	0.05	0.05	0.06	0.08	0.08	0.06	0.08	0.08	0.08	0.06	0.06	0.05	0.05	0.06	0.05	0.05	0.06	0.05	0.06	0.05
February	.07	.07	.08	.06	.07	.07	.06	.08	.08	.05	.06	.06	.07	.05	.07	.12	.09	.11	.08	.09	.07	.07	.05	.05	.07
March	.12	.08	.08	.07	.06	.07	.07	.07	.08	.06	.08	.11	.15	.13	.11	.09	.08	.12	.11	.10	.07	.10	.11	.13	.09
April	.14	.12	.10	.06	.10	.11	.08	.06	.07	.06	.10	.09	.08	.12	.09	.13	.14	.15	.15	.14	.16	.10	.13	.13	.11
May	.12	.10	.07	.11	.11	.12	.11	.11	.09	.05	.12	.12	.10	.12	.10	.13	.14	.09	.09	.12	.08	.15	.10	.11	.11
June	.11	.09	.09	.06	.11	.08	.05	.05	.07	.08	.14	.14	.15	.15	.11	.13	.11	.13	.15	.11	.12	.08	.08	.09	.11
July	.10	.07	.17	.10	.13	.07	.10	.20	.09	.13	.11	.15	.17	.07	.13	.07	.12	.14	.15	.14	.08	.07	.13	.08	.12
August	.12	.20	.21	.13	.10	.11	.08	.09	.11	.10	.06	.09	.18	.17	.13	.17	.17	.14	.09	.14	.12	.15	.11	.10	.13
September	.09	.12	.10	.06	.09	.10	.13	.19	.19	.13	.10	.12	.10	.09	.17	.13	.20	.05	.04	.11	.05	.08	.06	.15	.11
October	.08	.07	.10	.08	.08	.08	.09	.08	.10	.10	.11	.09	.14	.13	.07	.09	.09	.06	.14	.12	.08	.05	.05	.12	.09
November	.07	.08	.09	.10	.11	.09	.11	.09	.07	.12	.08	.08	.09	.09	.09	.08	.06	.07	.06	.08	.08	.10	.10	.07	.09
December	.09	.06	.06	.10	.11	.06	.06	.06	.06	.07	.07	.06	.07	.06	.06	.06	.07	.06	.06	.09	.08	.08	.07	.08	.06
Mean	.10	.10	.11	.08	.09	.08	.08	.10	.09	.09	.09	.10	.12	.10	.10	.10	.11	.10	.10	.11	.09	.08	.09	.10	.10

TABLE 3.—Hourly frequency of precipitation at Memphis, Tenn., for the 20-year period 1907-1926, inclusive, in percentage

Month	A. M.												P. M.											Mean	
	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11		Mid-night
January	7.3	7.9	8.1	8.9	8.5	10.0	10.5	10.0	9.5	9.2	10.2	9.4	9.5	9.7	9.0	8.1	8.4	6.9	6.1	6.6	6.8	7.9	7.3	8.7	8.5
February	8.5	9.9	9.2	8.8	8.5	9.0	8.1	7.1	7.6	7.4	7.6	7.3	6.7	6.5	6.0	5.5	5.3	6.4	7.3	7.8	8.5	8.7	8.5	9.9	7.8
March	6.9	7.3	7.3	7.4	7.9	8.2	8.2	8.5	7.9	8.4	7.9	6.1	5.5	6.1	6.6	5.0	6.1	6.5	6.9	7.7	7.7	7.4	6.9	6.8	7.1
April	6.5	7.5	7.7	7.8	6.5	5.7	5.5	5.3	4.8	4.2	3.7	4.3	5.0	4.5	6.2	5.7	6.8	6.7	7.7	7.5	7.5	8.2	6.8	7.2	6.2
May	4.7	4.8	6.1	6.9	6.9	7.3	7.3	6.0	4.8	4.4	3.2	3.9	5.0	5.5	4.2	4.4	4.7	4.2	4.2	4.2	4.4	3.4	4.0	4.2	4.0
June	2.2	3.5	4.2	4.3	3.7	2.8	2.7	2.3	2.0	2.3	2.2	3.5	3.5	4.5	3.7	4.8	7.2	5.2	4.8	4.7	4.2	3.2	2.7	2.5	3.6
July	2.1	2.9	2.4	3.1	3.9	3.7	3.6	3.6	3.2	4.6	3.9	2.9	4.2	3.4	3.6	2.9	3.1	5.0	4.4	3.2	3.4	4.4	3.2	2.7	3.5
August	3.1	2.6	1.8	2.6	3.1	3.1	4.0	3.2	2.9	2.9	3.4	1.6	2.7	4.0	5.0	6.0	6.0	4.2	3.9	5.2	4.8	3.2	4.2	3.7	3.6
September	3.7	3.7	4.0	4.7	4.2	3.5	3.8	3.8	3.8	4.3	2.7	2.7	3.2	3.7	3.7	4.5	3.0	3.8	2.0	2.8	3.2	3.8	2.7	3.7	3.5
October	3.9	4.5	5.2	4.8	4.4	5.6	5.2	5.0	3.9	4.8	5.0	5.2	3.9	4.7	5.2	4.5	3.9	5.3	4.4	4.5	3.2	2.9	5.0	4.4	4.5
November	5.0	6.3	6.5	6.0	7.2	6.5	6.8	5.7	5.8	5.2	4.5	3.7	4.8	5.8	5.2	5.0	5.2	4.5	6.0	4.8	6.0	4.8	5.0	5.3	5.5
December	9.7	10.2	11.1	10.3	10.8	10.2	11.5	9.7	10.0	9.0	9.0	9.0	8.5	6.5	7.1	7.6	8.4	7.7	9.2	8.4	8.9	9.4	10.0	9.4	9.2
Mean	5.3	5.9	6.1	6.3	6.3	6.3	6.4	5.8	5.5	5.6	5.3	5.0	5.2	5.4	5.5	5.3	5.7	5.5	5.6	5.6	5.7	5.6	5.5	5.7	5.7

TABLE 4.—Percentage of thunderstorms at Memphis, Tenn., for the 20-year period, 1907-1926, inclusive

	January	February	March	April	May	June	July	August	September	October	November	December	Annual
	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.	P. ct.
Midnight to 6 a. m.	1	1	2	1	2	2	2	3	1	1	0	0	15
6 a. m. to noon	1	1	2	2	1	2	3	2	2	0	1	1	17
Noon to 6 p. m.	1	1	1	3	4	9	8	9	4	1	1	1	43
6 p. m. to midnight	1	1	3	3	3	3	4	3	1	1	1	1	25
Sums	4	4	8	9	10	16	17	15	8	3	3	3	