

# A note on the intensity of rainfall at Madras

K. R. KRISHNASWAMY

*Meteorological Office, Poona*

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**ABSTRACT.** The note gives the results of an analysis of the rainfall recorded in fifteen-minute periods at Madras from the records of the Casella siphon raingauge during the years 1932 to 1947.

There is rain in Madras both during the southwest monsoon from June to September and during the northeast monsoon from October to January. During the former season, on many of the rainy days there is only a single spell of rainfall and there are very few days when rain falls more than thrice. The spells are generally of short duration,—less than an hour. The rainfall is of low intensity,—under 25 cents per hour, mostly, and there are very few occasions when the intensity exceeds 100 cents per hour. Such heavy rains as do occur have a tendency to do so after about 1500 IST and during the night. The maximum intensity of rainfall during rainy days is also generally attained during these hours. During the northeast monsoon, on a number of days rain occurs more than once. The spells are generally of short duration though a few of them may extend over several hours. The rainfall is of low intensity, but heavy rains occur more frequently than during the period of the southwest monsoon. Heavy rains have a tendency to occur after midnight and before early afternoon.

## 1. Introduction

The note describes the results of an analysis of the recording raingauge charts of Madras during the years 1932 to 1947. The raingauge was installed at the Nungambakkam observatory till September 1943. During that month it was shifted to Meenambakkam, a distance of about 8 miles, approximately south. Three sets of tables have been prepared as follows: (a) One relating to the eleven complete years 1932 to 1942 when the raingauge was at Nungambakkam, (b) one relating to the four complete years 1944 to 1947 when the raingauge was at Meenambakkam and (c) one relating to all the years 1932 to 1947. As data for Meenambakkam has been tabulated for four years only, the differences observed between this and that for Nungambakkam may not be really significant.

The recording raingauge at Madras is of the siphon type. The interval between successive horizontal lines of the daily chart corresponds to a fall of two cents and the interval between successive vertical lines corresponds to a time interval of fifteen minutes. It is thus possible to get from the chart the amounts of rain recorded in successive periods of fifteen minutes correct to one cent. However, it is also possible to estimate by sight the times of beginning and ending

of a spell and for purposes of Tables 1 to 7 which deal with lengths of spells of rain etc., this course has been followed. For the remaining tables dealing with intensities of rainfall, the fifteen-minute period has been taken as a unit and the rain recorded in the period as a whole taken into account.

## 2. Spells of rain

A rainy day has been taken as an interval of 24 hours beginning at each midnight, during which rain was recorded. A spell of rain has been taken as one during which rain fell uninterruptedly. The duration of spells of rain lasting for less than five minutes has been taken as five minutes. Tables 1(a), 1(b) and 1(c) give the number of rainy days and the number of spells of rain during the various calendar months. Tables 2(a), 2(b) and 2(c) give the number of days with different numbers of spells in each of the calendar months. It is seen from these tables that except during the months of the northeast monsoon, *viz.*, October to January, the average number of spells per rainy day is two only. Also, during these months the single spell days account for about 50 to 60 per cent of the rainy days and there are very few days when rain falls more than three times in the same day. During the months of the northeast monsoon, the

average number of spells increases to four and rain falls in a number of spells on each rainy day, the number of single spell days being only of the order of 30 per cent.

Tables 3(a), 3(b) and 3(c) give the number of rainy days and the total duration of rainfall in each month. They also show the average duration of rainfall on a rainy day in successive months; Table 3(c) gives in addition, the standard deviation of the duration also. It is observed from these tables that though in the months of July and August the number of rainy days is the same as that during October and November, the average duration of rainfall is less than half of that during the later months. Tables 5(a), 5(b) and 5(c) show in greater detail the distribution of the rainy days according to duration of rainfall. They give the number of rainy days during which there was rain for less than an hour, between 1 and 2 hours and so on up to between 11 and 12 hours and finally for more than 12 hours. It is seen from these tables that during the months of June, July and August, the period during which the southwest monsoon is generally most active, on more than half the number of rainy days, rain falls for less than an hour. Only in about a fifth of the number of days the duration exceeds two hours and only very rarely there is rain for more than six hours. During September the proportion of rainy days on which there was rain for more than an hour increases and there are quite a number of days,—about one in seven, when rain fell for more than six hours. The increase is more marked in October, and still more so in November, during which month the proportion of days in which rain fell for less than an hour decreases to below forty per cent of the number of days. It also appears that, on about three days in the year, on the average, rain falls for more than twelve hours. Two of these days fall during the months of October and November. In December also, on quite a number of days the rain falls for a number of hours.

### 3. Length of spells of rain

Tables 4(a), 4(b) and 4(c) give the number

of spells in each month and the average duration of each spell. Tables 6(a), 6(b) and 6(c) give the distribution of spells according to their length. The average duration of spells was about an hour during the months September to December and was less than an hour during June to August. However, about more than half the number of spells in all the months June to December were of less than an hour's duration and only one in four of the spells fell for over an hour. Spells of long duration were few and far between, but were comparatively more numerous during the months September to December.

### 4. Intervals between successive spells of rain

Tables 7(a), 7(b) and 7(c) give the intervals between successive spells of rain during the various calendar months. It appears from these tables that the chance of a spell of rain being followed by another is greatest immediately following the spell and decreases with increase in time in all the months. During the months June to September, about a fifth of the spells are followed by another within an hour and about a third are followed by another within two hours. The chances of a spell being followed by another spell within one and two hours increase significantly during the months October to January. The increase is particularly noticeable in the months November and December, when more than half the spells are followed by another within two hours. After a lapse of three hours the chance of an immediate recurrence of rainfall is very small.

These tables, read with Table 3, show another interesting feature. The average number of rainy days during the months July to November was practically the same, being about 12 to 15 days. In July and August the days were fairly spaced out, but in October and November they occurred in groups, only a few of the spells not being followed by another within twentyfour hours. During October and November, rain occurred mostly on consecutive days. Once rain stopped falling for twentyfour hours, there was generally a good "respite" for a

number of days as compared with the months of July and August.

#### 5. Intensity of rainfall

Tables 8(a), 8(b) and 8(c) give the numbers of fifteen-minute periods in which different intensities of rain were recorded. It is seen from these that during the months June to September, the rainfall is generally of a low intensity at Madras. The intensity was less than 10 cents per hour in about two-thirds of the number of periods in which there was rain. In June and July, in nine-tenths of the number of periods the intensity was under 25 cents per hour and the 15-minute periods when the intensity exceeded 100 cents per hour were very rare. In August and September also, rain falls mostly in the form of a drizzle though larger intensities are slightly more frequent. There were a few occasions when the intensity exceeded 200 cents per hour. The northeast monsoon breaks out in October and continues for about three months. During these months, in about a fifth of the 15-minute periods rain fell at a greater rate than 25 cents per hour. There were quite a number when the intensity exceeded 100 cents per hour and occasionally the intensity exceeded 300 cents per hour during these months. The northeast monsoon weakens by January and the proportion of rain of low intensity increases during this month.

Tables 9(a), 9(b) and 9(c) show the distribution of spells of rain according to the maximum intensity attained in each spell. It is seen that in about half the number of spells the maximum intensity was less than 10 cents per hour. The proportion of such spells was somewhat larger than half during the period June to September and in December and less than half in October and November. The maximum intensity was more than 100 cents per hour in about a tenth of the spells occurring during August to November.

Tables 10(a), 10(b) and 10(c) show the times of occurrence of the maximum intensity of rain on rainy days. It is seen that in the month of January the maximum rate of rainfall of the day had occurred more

TABLE 1

Number of rainy days and number of spells of rain

Month	Number of rainy days	Number of spells of rain	Average number of spells per rainy day
(a) 1932 to 1942 (Nungambakkam)			
Jan .. ..	25	67	3
Feb .. ..	16	29	2
Mar .. ..	14	31	2
Apr .. ..	22	48	2
May .. ..	14	21	2
Jun .. ..	108	176	2
Jul .. ..	162	276	2
Aug .. ..	160	274	2
Sep .. ..	124	228	2
Oct .. ..	159	472	3
Nov .. ..	154	540	4
Dec .. ..	97	322	3
(b) 1944-1947 (Meenambakkam)			
Jan .. ..	16	47	3
Feb .. ..	3	6	2
Mar .. ..	14	47	3
Apr .. ..	6	19	3
May .. ..	4	7	2
Jun .. ..	33	66	2
Jul .. ..	61	123	2
Aug .. ..	49	90	2
Sep .. ..	45	87	2
Oct .. ..	55	149	3
Nov .. ..	60	250	4
Dec .. ..	35	156	4
(c) 1932 to 1947			
Jan .. ..	45	134	3
Feb .. ..	19	35	2
Mar .. ..	28	78	3
Apr .. ..	32	73	2
May .. ..	28	81	3
Jun .. ..	145	247	2
Jul .. ..	232	419	2
Aug .. ..	221	389	2
Sep .. ..	185	342	2
Oct .. ..	234	688	3
Nov .. ..	224	836	4
Dec .. ..	139	505	4

frequently during the period midnight to early morning. On about sixty per cent of the days it occurred before 0900 IST. In June, when the southwest monsoon commences, there was a significant shift and on most days the maximum rate of fall for the day occurred after 1500 or before 0300 IST. This feature is observed in the months of July and September also, though in September it occurred outside these hours on a comparatively larger number of occasions. In October, November and December, the frequencies of occurrence were spread throughout the day, though the frequencies relating to the period after 1500 IST are comparatively, somewhat fewer.

On a number of days the maximum intensity of rainfall may be only a few cents per hour and Tables 10 (a), 10(b) and 10 (c) do not therefore show the times of occurrence of heavy rainfall. It was thought that it may be interesting to find when heavy rains had occurred. Tables 11(a), 11(b) and 11(c) show the hours of occurrence of heavy rains. The numbers in these tables give the numbers of fifteen-minute periods during which rain fell at an intensity of 100 cents or more per hour during the different parts of day, in three-hourly periods. It is observed from these tables that heavy rains, though quite rare in June and July, occurred at night before day-

break or only in the evenings. The same feature is observed in August and generally in September also. In October and November, however, heavy rains occurred during all parts of the day, though they were proportionately of more frequent occurrence after midnight, in the morning and in the early afternoon. This feature was even more significant in December, during which month only about 15 per cent of the periods in which heavy rains occurred fell during the interval 1500 to 2400 IST.

6. Figs. 1(a) to 1(g) show the variation of intensity in some spells of rain during the months June to December. Figs. 2 and 3 show the mean amounts of rainfall during the various fifteen-minute intervals in the different months, as obtained from the records for the years 1932 to 1947. The continuous lines on these charts represent the corresponding total number of occasions on which there was rain during the respective fifteen-minute intervals of the day. For the purpose of these curves (Figs. 2 and 3) one division on the vertical scale represents 10 days.

#### 7. Acknowledgment

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TABLE 2(a)

Number of days with different numbers of spells of rain, 1932 to 1942 (Nungambakkam)

Month	Number of spells										
	1	2	3	4	5	6	7	8	9	10	>10
Jan ..	9(36)	7(28)	2 (8)	3(12)	2(8)	—	1(4)	—	1(4)	—	—
Feb ..	8(50)	5(31)	2(13)	—	1(6)	—	—	—	—	—	—
Mar ..	8(57)	3(21)	—	1 (7)	—	1 (7)	1(7)	—	—	—	—
Apr ..	12(55)	6(27)	2(11)	—	—	—	1(5)	—	—	—	1(5)
May ..	11(79)	—	2(14)	1 (7)	—	—	—	—	—	—	—
Jun ..	63(58)	30(28)	7 (6)	7 (6)	1(1)	—	—	—	—	—	—
Jul ..	89(55)	42(26)	19(12)	9 (6)	3(2)	—	—	—	—	—	—
Aug ..	96(60)	30(19)	21(13)	8 (5)	5(3)	—	—	—	—	—	—
Sep ..	67(54)	27(22)	17(14)	10 (8)	1(1)	—	—	1(1)	1(1)	—	—
Oct ..	58(36)	36(23)	21(13)	9 (6)	11(7)	5 (3)	7(4)	6(4)	2(1)	1(1)	3(2)
Nov ..	47(31)	31(20)	19(12)	12 (8)	13(8)	10 (6)	5(3)	6(4)	4(3)	2(1)	5(3)
Dec ..	28(29)	27(28)	6 (6)	6 (6)	8(8)	11(11)	4(4)	4(4)	1(1)	1(1)	1(1)

TABLE 2(b)

Number of days with different numbers of spells of rain, 1944 to 1947 (Meenambakkam)

Month	Number of spells										
	1	2	3	4	5	6	7	8	9	10	>10
Jan ..	4(25)	3(19)	2(13)	4(25)	3(19)	—	—	—	—	—	—
Feb ..	2(66)	—	—	1(33)	—	—	—	—	—	—	—
Mar ..	4(29)	2(14)	3(21)	—	2(14)	1 (7)	2(14)	—	—	—	—
Apr ..	1(17)	1(17)	2(33)	1(17)	—	1(17)	—	—	—	—	—
May ..	2(50)	1(25)	1(25)	—	—	—	—	—	—	—	—
Jun ..	14(42)	9(27)	7(21)	2 (6)	1 (3)	—	—	—	—	—	—
Jul ..	25(41)	16(26)	14(23)	5 (8)	—	1 (2)	—	—	—	—	—
Aug ..	21(43)	20(41)	3 (6)	3 (6)	2 (4)	—	—	—	—	—	—
Sep ..	21(47)	13(29)	7(16)	1 (2)	3 (7)	—	—	—	—	—	—
Oct ..	20(36)	10(18)	12(22)	6(11)	2 (4)	1(2)	1 (2)	1(2)	1(2)	1(2)	—
Nov ..	8(23)	16(27)	9(15)	7(12)	4 (7)	2(3)	4 (7)	3(5)	3(5)	1(2)	3(5)
Dec ..	10(29)	4(11)	5(14)	1 (3)	5(14)	1(3)	2 (6)	2(6)	1(3)	1(3)	3(9)

TABLE 2(c)

Number of days with different numbers of spells of rain, 1932 to 1947

Month	Number of spells										
	1	2	3	4	5	6	7	8	9	10	>10
Jan ..	13(28)	11(24)	5(11)	7(15)	5(11)	—	2 (4)	—	2(4)	—	—
Feb ..	10(53)	5(26)	2(11)	1 (5)	1 (5)	—	—	—	—	—	—
Mar ..	12(43)	5(18)	3(11)	1 (4)	2 (7)	2(7)	3(11)	—	—	—	—
Apr ..	16(50)	7(22)	5(16)	1 (3)	—	1(3)	1 (3)	—	—	—	1(3)
May ..	17(61)	2 (7)	3(11)	3(11)	—	—	—	1(4)	—	—	2(7)
Jun ..	80(54)	40(27)	14(10)	9 (6)	2 (1)	—	—	—	—	—	—
Jul ..	118(51)	60(26)	34(15)	15 (6)	4 (2)	1(—)	—	—	—	—	—
Aug ..	121(55)	54(24)	27(12)	12 (5)	7 (3)	—	—	—	—	—	—
Sep ..	94(51)	49(25)	25(14)	11 (6)	4 (5)	—	1 (1)	1(1)	—	—	—
Oct ..	82(35)	48(21)	37(16)	20 (9)	17 (7)	6(3)	9 (4)	7(3)	3(1)	2(1)	3(1)
Nov ..	55(25)	51(23)	29(13)	19 (8)	19 (8)	13(6)	9 (4)	10(4)	7(3)	3(1)	9(4)
Dec ..	38(27)	33(24)	12 (8)	10 (7)	13 (9)	12(8)	6 (4)	7(5)	2(1)	2(1)	4(3)

(The figures indicated in the brackets are percentage frequencies)

TABLE 3

Number of rainy days and the total duration of rainfall in each month

Month	Number of rainy days	Duration of rainfall (Minutes)	Average duration of rain on a rainy day (Minutes)
(a) 1932 to 1942 (Nungambakkam)			
Jan ..	25	2260	90
Feb ..	16	955	60
Mar ..	14	2660	190
Apr ..	22	3575	163
May ..	14	2070	148
Jun ..	108	9190	85
Jul ..	162	14185	88
Aug ..	160	13705	86
Sep ..	124	15380	124
Oct ..	159	29905	188
Nov ..	154	32560	211
Dec ..	97	18310	189
(b) 1944 to 1947 (Meenambakkam)			
Jan ..	16	2330	146
Feb ..	3	330	110
Mar ..	14	3145	225
Apr ..	6	1385	231
May ..	4	240	60
Jun ..	33	2535	77
Jul ..	61	5630	92
Aug ..	49	6085	124
Sep ..	45	5425	121
Oct ..	55	8165	148
Nov ..	60	16110	269
Dec ..	35	9655	276

(c) 1932 to 1947

Month	Number of rainy days	Duration of rainfall (Minutes)	Average duration of rain on a rainy day (Minutes)	Standard deviation of duration of rain on a rainy day (Minutes)
Jan	45	5665	126	158
Feb	19	1285	68	73
Mar	28	5805	207	284
Apr	32	5390	168	208
May	28	5925	212	334
Jun	145	12075	83	88
Jul	232	20665	89	110
Aug	221	21455	97	104
Sep	185	21495	116	134
Oct	234	43845	187	224
Nov	224	51845	231	255
Dec	139	29190	209	255

TABLE 4

Number of spells of rain and duration of rainfall

Month	Number of spells of rain	Duration of rainfall (Minutes)	Average duration of spell (Minutes)
(a) 1932 to 1942 (Nungambakkam)			
Jan ..	67	2260	34
Feb ..	29	955	33
Mar ..	31	2660	86
Apr ..	48	3575	74
May ..	21	2070	99
Jun ..	176	9190	52
Jul ..	276	14185	51
Aug ..	274	13705	50
Sep ..	228	15380	67
Oct ..	472	29905	63
Nov ..	540	32560	60
Dec ..	322	18310	57
(b) 1944 to 1947 (Meenambakkam)			
Jan ..	47	2330	50
Feb ..	6	330	55
Mar ..	47	3145	67
Apr ..	19	1385	73
May ..	7	240	34
Jun ..	66	2535	38
Jul ..	123	5600	46
Aug ..	90	6085	68
Sep ..	87	5425	62
Oct ..	149	8165	55
Nov ..	250	16110	64
Dec ..	156	9655	62

(c) 1932 to 1947

Month	Number of spells of rain	Duration of rainfall (Minutes)	Average duration of spell (Minutes)	Standard Deviation of length of spell (Minutes)
Jan	134	5665	42	52
Feb	35	1285	37	25
Mar	78	5805	74	110
Apr	73	5390	74	97
May	81	5925	73	154
Jun	247	12075	49	69
Jul	419	20665	49	86
Aug	389	21455	55	77
Sep	342	21495	63	97
Oct	688	43845	64	103
Nov	836	51845	63	108
Dec	505	29190	58	88

TABLE 5 (a)

Number of days with different durations of rainfall, 1932 to 1942 (Nungambakkam)

Month	Duration of rain in hours												
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	17(68)	3(12)	1 (4)	2 (8)	—	1(4)	—	—	—	—	1(4)	—	—
Feb	10(63)	4(25)	2(13)	—	—	—	—	—	—	—	—	—	—
Mar	9(64)	—	—	2(14)	1(7)	—	—	—	—	—	1(7)	—	1(7)
Apr	10(45)	1 (5)	2 (9)	4(18)	2(9)	—	—	2(9)	—	—	—	—	1(5)
May	10(71)	1 (7)	—	1 (7)	—	—	—	1(7)	—	—	—	—	1(7)
Jun	64(59)	22(20)	8 (7)	5 (5)	5(5)	2(2)	1(1)	—	1(1)	—	—	—	—
Jul	96(59)	33(20)	12 (7)	7 (4)	6(4)	1(1)	2(1)	1(1)	3(2)	—	—	—	1(1)
Aug	92(58)	31(19)	12 (8)	11 (7)	4(3)	9(6)	1(1)	—	—	—	—	—	—
Sep	57(46)	23(19)	20(16)	10 (8)	4(3)	1(1)	3(2)	2(2)	—	1(1)	—	1(1)	2(2)
Oct	65(41)	19(12)	15 (9)	14 (9)	9(6)	5(3)	12(8)	7(4)	2(1)	3(2)	2(1)	—	6(4)
Nov	62(40)	23(15)	11 (7)	13 (8)	10(6)	6(4)	6(4)	3(2)	4(3)	2(1)	4(3)	1(1)	9(6)
Dec	43(44)	14(14)	12(12)	3 (3)	3(3)	5(5)	3(3)	3(3)	2(2)	1(1)	3(3)	—	5(5)

TABLE 5 (b)

Number of days with different durations of rainfall, 1944 to 1947 (Meenambakkam)

Month	Duration of rain in hours												
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	4(25)	6(38)	3(19)	—	1(6)	1 (6)	—	—	—	1(6)	—	—	—
Feb	2(66)	—	—	—	—	1(33)	—	—	—	—	—	—	—
Mar	7(50)	2(14)	2(14)	—	—	—	—	—	—	—	1(7)	1(7)	1 (7)
Apr	3(50)	—	1(17)	1(17)	—	—	—	—	—	—	—	—	1(17)
May	2(50)	2(50)	—	—	—	—	—	—	—	—	—	—	—
Jun	19(58)	8(24)	2 (6)	2 (6)	—	2 (6)	—	—	—	—	—	—	—
Jul	31(51)	16(26)	4 (7)	6(10)	1(2)	2 (3)	1(2)	—	—	—	—	—	—
Aug	20(41)	11(22)	8(16)	4 (8)	3(6)	1 (2)	—	—	1(2)	—	—	—	1 (2)
Sep	19(42)	12(27)	5(11)	3 (7)	—	4 (9)	—	—	2(4)	—	—	—	—
Oct	25(46)	8(15)	5 (9)	6(11)	3(5)	3 (5)	1(2)	1(2)	1(2)	1(2)	—	—	1 (2)
Nov	18(30)	6(10)	8(13)	3 (5)	4(7)	6(10)	3(5)	1(2)	1(2)	1(2)	1(2)	2(3)	6(10)
Dec	14(40)	3 (9)	2 (6)	3 (9)	1(3)	1 (3)	2(6)	—	1(3)	—	2(6)	—	6(17)

TABLE 5 (c)

Number of days with different durations of rainfall, 1932 to 1947

Month	Duration of rain in hours												
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	23(51)	9(20)	4 (9)	2 (4)	1(2)	2(4)	1(2)	—	—	1(2)	2(4)	—	—
Feb	12(63)	4(21)	2(11)	—	—	1(5)	—	—	—	—	—	—	—
Mar	16(57)	2 (7)	2 (7)	2 (7)	1(4)	—	—	—	—	—	2(7)	1(4)	2 (7)
Apr	14(44)	3 (9)	3 (9)	6(19)	2(6)	—	—	2 (6)	—	—	—	—	2 (6)
May	17(61)	3(11)	1 (4)	1 (4)	—	1(4)	—	1 (4)	—	—	—	1(4)	3(12)
Jun	86(59)	30(21)	10 (7)	7 (5)	6(4)	4(3)	1(1)	—	1 (1)	—	—	—	—
Jul	132(57)	50(22)	17 (7)	13 (6)	9(4)	3(1)	3(1)	1(—)	3 (1)	—	—	—	1(—)
Aug	117(53)	43(19)	23(10)	16 (7)	7(3)	11(5)	2(1)	—	1(—)	—	—	—	1(—)
Sep	86(46)	39(21)	26(14)	13 (7)	4(2)	5(3)	3(2)	2 (1)	2 (1)	1(1)	—	1(1)	2 (2)
Oct	97(41)	30(13)	22 (9)	20 (9)	13(6)	8(3)	14(6)	8 (3)	5 (2)	5(2)	3(1)	—	9 (3)
Nov	82(37)	28(13)	21 (9)	17 (8)	14(6)	15(7)	9(4)	4 (2)	6 (3)	4(2)	6(3)	3(1)	15 (7)
Dec	57(41)	20(14)	16(12)	6 (4)	5(4)	7(5)	5(4)	3 (2)	3 (2)	1(1)	5(4)	—	11 (8)

(The figures indicated in the brackets are percentage frequencies)

**TABLE 6(a)**  
Number of spells of rain of different durations, 1932 to 1942 (Nungambakkam)

Month	Duration in hours													
	<½	½-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	50(75)	9(14)	4 (6)	2 (3)	2(3)	—	—	—	—	—	—	—	—	—
Feb	16(55)	9(31)	4(14)	—	—	—	—	—	—	—	—	—	—	—
Mar	12(39)	8(26)	4(13)	3(10)	2(6)	—	1 (3)	—	—	—	1 (3)	—	—	—
Apr	23(48)	8(17)	8(17)	2 (4)	4(8)	2(4)	—	—	—	1 (2)	—	—	—	—
May	13(62)	3(14)	2(10)	1 (5)	—	—	—	—	1 (5)	—	—	—	—	1 (5)
Jun	103(59)	30(22)	12 (7)	12 (7)	6(3)	3(2)	—	—	—	—	—	—	1 (1)	—
Jul	182(66)	45(16)	26 (9)	9 (3)	2(1)	6(2)	1(—)	—	1(—)	2 (1)	1(—)	—	—	1(—)
Aug	168(61)	51(19)	24 (8)	11 (4)	10(4)	6(2)	1(—)	3 (1)	—	—	—	—	—	—
Sep	118(52)	47(21)	32(14)	14 (6)	6(3)	2(1)	2 (1)	1(—)	3 (1)	—	—	—	2 (1)	1(—)
Oct	266(56)	84(18)	63(13)	29 (6)	8(2)	4(1)	6 (1)	4 (1)	1(—)	2(—)	1(—)	2(—)	—	2(—)
Nov	333(62)	73(14)	70(13)	23 (4)	10(2)	14(3)	8 (1)	2(—)	2(—)	1(—)	—	—	1(—)	3 (1)
Dec	183(57)	60(19)	48(15)	15 (5)	4(1)	3(1)	2 (1)	2 (1)	1(—)	1(—)	—	1(—)	1(—)	1(—)

**TABLE 6(b)**  
Number of spells of rain of different durations, 1944 to 1947 (Meenambakkam)

Month	Duration in hours													
	<½	½-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	26(55)	12(26)	4 (9)	2 (4)	2(4)	—	1(2)	—	—	—	—	—	—	—
Feb	3(50)	1(17)	1(17)	1(17)	—	—	—	—	—	—	—	—	—	—
Mar	26(55)	10(21)	5(11)	—	2(4)	1(2)	1(2)	1(2)	—	1(2)	—	—	—	—
Apr	10(53)	4(21)	1 (5)	2(11)	—	—	1(5)	1(5)	—	—	—	—	—	—
May	5(71)	—	2(29)	—	—	—	—	—	—	—	—	—	—	—
Jun	45(68)	9(14)	8(12)	3 (5)	—	1(2)	—	—	—	—	—	—	—	—
Jul	72(59)	25(20)	16(13)	5 (4)	2(2)	1(1)	1(1)	1(1)	—	—	—	—	—	—
Aug	50(56)	16(18)	11(12)	—	5(6)	5(6)	2(2)	—	—	1(1)	—	—	—	—
Sep	49(56)	16(18)	11(13)	2 (2)	3(3)	1(1)	4(5)	1(1)	—	—	—	—	—	—
Oct	83(56)	32(21)	23(15)	3 (2)	2(1)	2(1)	2(1)	—	—	—	1(1)	—	—	1 (1)
Nov	137(55)	42(17)	38(15)	12 (5)	9(4)	5(2)	3(1)	—	1(—)	—	2(1)	—	—	1(—)
Dec	85(54)	30(19)	18(12)	10 (6)	6(4)	1(1)	2(1)	1(1)	2 (1)	1(1)	—	—	—	—

**TABLE 6(c)**  
Number of spells of different durations, 1932 to 1947

Month	Duration in hours													
	<½	½-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	>12
Jan	87(65)	23(17)	14(10)	4(3)	5(4)	—	1 (1)	—	—	—	—	—	—	—
Feb	19(54)	10(29)	5(14)	1(3)	—	—	—	—	—	—	—	—	—	—
Mar	38(49)	18(23)	9(12)	3(4)	4(5)	1(1)	2 (3)	1 (1)	—	1 (1)	1 (1)	—	—	—
Apr	36(49)	12(16)	11(15)	4(5)	5(7)	2(3)	1 (1)	1 (1)	—	1 (1)	—	—	—	—
May	45(56)	19(23)	9(11)	3(4)	1(1)	—	—	—	1 (1)	—	—	—	—	—
Jun	151(61)	49(20)	20 (8)	15(6)	6(2)	5(2)	—	—	—	—	—	—	1(—)	—
Jul	270(64)	70(17)	44(11)	14(3)	4(1)	9(2)	2(—)	1(—)	1(—)	2(—)	1(—)	—	—	1(—)
Aug	231(59)	71(18)	38(10)	14(4)	16(4)	11(3)	4 (1)	3 (1)	—	1(—)	—	—	—	—
Sep	187(55)	67(20)	46(13)	16(5)	9(3)	3(1)	6 (2)	2 (1)	3 (1)	—	—	—	2 (1)	1(—)
Oct	387(56)	129(19)	91(13)	34(5)	10(1)	8(1)	11 (2)	4 (1)	3(—)	3(—)	2(—)	2(—)	—	4 (1)
Nov	492(59)	123(15)	117(14)	37(4)	21(2)	20(2)	13 (2)	2(—)	3(—)	1(—)	2(—)	—	1(—)	4(—)
Dec	282(56)	95(19)	72(14)	27(5)	10(2)	4(1)	4 (1)	3 (1)	3 (1)	2(—)	—	1(—)	1(—)	1(—)

(The figures indicated in the brackets are percentage frequencies)



TABLE 7(a)

Interval between successive spells of rain during the various months, 1932 to 1942  
(Nungambakkam)

Month	Interval in hours													
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-24	>24
Jan	17(25)	9(13)	5 (7)	4(6)	3 (4)	3(4)	1(1)	1(1)	—	2(3)	—	1 (1)	5 (7)	8(12)
Feb	5(17)	2 (7)	1 (3)	—	3(10)	—	1(3)	—	—	—	1 (3)	—	3(10)	8(28)
Mar	8(26)	3(10)	3(10)	1(3)	2 (6)	—	—	—	—	1(3)	—	1 (3)	3(10)	3(10)
Apr	18(37)	5(10)	—	1(2)	2 (4)	—	—	—	1(2)	1(2)	—	—	—	11(23)
May	5(23)	2(10)	—	—	—	—	—	—	—	—	1 (5)	—	3(14)	5(23)
Jun	36(20)	17(10)	8 (5)	6(3)	6 (3)	2(1)	3(2)	—	—	2(1)	—	—	28(16)	57(32)
Jul	55(20)	32(12)	19 (7)	4(1)	5 (2)	4(1)	4(1)	2(1)	—	2(1)	2 (1)	3 (1)	47(17)	86(31)
Aug	57(21)	32(12)	20 (7)	6(2)	4 (1)	6(2)	—	2(1)	3(1)	—	2 (1)	1(—)	46(17)	84(31)
Sep	51(22)	22(10)	13 (6)	5(2)	6 (3)	8(3)	3(1)	2(1)	3(1)	4(2)	6 (3)	2 (1)	31(14)	61(27)
Oct	127(27)	88(19)	54(11)	22(5)	14 (3)	11(2)	7(1)	4(1)	8(2)	5(1)	2(—)	6 (1)	51(11)	62(13)
Nov	181(34)	102(19)	57(11)	31(6)	20 (4)	6(1)	9(2)	9(2)	5(1)	8(1)	5 (1)	6 (1)	40 (7)	50 (9)
Dec	96(30)	66(20)	30 (9)	15(5)	11 (3)	12(4)	10(3)	4(1)	4(1)	2(1)	2 (1)	4 (1)	26 (8)	29 (9)

TABLE 7(b)

Interval between successive spells of rain during the various months, 1944 to 1947 (Meenambakkam)

Month	Interval in hours													
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-24	>24
Jan	14(30)	6(13)	3 (6)	2 (4)	4 (9)	1(2)	—	—	2 (4)	1 (2)	2 (4)	1 (2)	4 (9)	3(6)
Feb	—	1(16)	1(16)	—	—	—	—	1(16)	—	—	—	—	1(16)	1(16)
Mar	17(36)	9(19)	3 (6)	1 (2)	1 (2)	1(2)	—	1 (2)	1 (2)	—	—	1 (2)	4 (9)	4(9)
Apr	5(26)	1 (5)	1 (5)	2(11)	2(11)	—	—	—	2(11)	2(11)	—	—	—	1(5)
May	3(43)	—	—	—	—	—	—	—	—	—	—	—	—	3(43)
Jun	23(35)	9(13)	1 (1)	2 (3)	—	—	—	—	—	—	—	—	12(18)	15(23)
Jul	36(29)	8 (7)	6 (5)	9 (7)	5 (4)	—	1(1)	—	—	—	—	—	27(22)	27(22)
Aug	22(24)	12(13)	4 (4)	3 (3)	3 (3)	—	1(1)	—	2 (2)	—	—	1 (1)	17(19)	21(23)
Sep	16(18)	14(16)	3 (3)	4 (5)	1 (1)	—	1(1)	1 (1)	—	2 (2)	2 (2)	2 (2)	11(13)	26(30)
Oct	46(31)	25(10)	11 (7)	10 (7)	4 (3)	3(2)	7(5)	4 (3)	3 (2)	3 (2)	1 (1)	2 (1)	14 (9)	22(15)
Nov	91(37)	55(22)	23 (9)	14 (6)	8 (3)	5(2)	6(2)	2 (1)	2 (1)	3 (1)	1(—)	1(—)	12 (5)	23(9)
Dec	76(49)	23(15)	8 (5)	10 (6)	5 (3)	2(1)	2(1)	2 (1)	4 (3)	1 (1)	2 (1)	—	5 (3)	12(8)

TABLE 7(c)

Interval between successive spells of rain during the various months, 1932 to 1947

Month	Interval in hours													
	<1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-24	>24
Jan	40(30)	20(15)	12 (9)	6(4)	7(5)	4(3)	1(1)	1(1)	2(1)	3 (2)	2 (1)	2(1)	9 (7)	12 (9)
Feb	5(14)	3 (9)	2 (6)	—	3(9)	—	1(3)	1(3)	—	—	1 (3)	—	4(11)	9(26)
Mar	25(32)	12(15)	6 (8)	2(3)	3(4)	1(1)	—	1(1)	1(1)	1 (1)	—	—	2 (3)	7 (9)
Apr	24(33)	6 (8)	1 (1)	4(5)	4(5)	—	—	—	3(4)	3 (4)	—	—	2 (3)	13(18)
May	42(52)	11(14)	1 (1)	1(1)	—	—	2 (2)	—	—	—	1 (1)	—	5 (6)	11(14)
Jun	60(24)	26(11)	9 (4)	8(3)	6(2)	2(1)	3(1)	—	—	2 (1)	—	—	40(16)	75(30)
Jul	96(24)	41 (9)	27 (6)	14(3)	11(3)	4(1)	5(1)	2(—)	—	2(—)	2(—)	3(1)	80(19)	116(28)
Aug	86(22)	44(11)	24 (6)	11(3)	7(2)	6(2)	2(1)	2 (1)	5(1)	1(—)	2 (1)	3(1)	68(17)	112(29)
Sep	72(21)	39(11)	16 (5)	10(3)	8(2)	8(2)	4(1)	3 (1)	3(1)	6 (2)	9 (3)	5(1)	49(14)	94(27)
Oct	188(27)	115(17)	74(11)	34(5)	21(3)	16(2)	17(2)	8 (1)	12(2)	10 (1)	4 (1)	10(1)	76(11)	87(13)
Nov	292(35)	163(19)	85(10)	46(5)	30(4)	12(1)	16(2)	13 (2)	9(1)	11 (1)	7 (1)	7(1)	53 (6)	76 (9)
Dec	180(36)	92(18)	40 (8)	28(6)	18(4)	16(3)	14(3)	6 (1)	8(2)	3 (1)	5 (1)	4(1)	32 (6)	43 (9)

(The figures indicated in the brackets are percentage frequencies)

TABLE 8(a)

Numbers of 15-minute periods in which different intensities of rain were recorded, 1932 to 1942 (Nungambakkam)

Month	Intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	132(72)	40(22)	6 (3)	2(1)	3 (2)	—	—	—
Feb ..	45(59)	13(17)	9(12)	4(5)	2 (3)	3(4)	—	—
Mar ..	131(75)	21(12)	9 (5)	5(3)	2 (1)	6(3)	1 (1)	—
Apr ..	183(67)	59(22)	18 (7)	8(3)	1(—)	5(2)	—	—
May ..	74(52)	44(31)	12 (8)	6(4)	4 (3)	2(1)	—	—
Jun ..	504(74)	96(14)	46 (7)	21(3)	7 (1)	8(1)	—	1(—)
Jul ..	817(77)	134(13)	61 (6)	22(2)	4(—)	8(1)	1(—)	—
Aug ..	674(66)	158(16)	68 (7)	36(4)	20 (2)	38(4)	7 (1)	5(—)
Sep ..	785(70)	217(19)	49 (4)	28(3)	12 (1)	20(2)	6 (1)	1(—)
Oct ..	1282(59)	432(20)	209(10)	67(3)	59 (3)	91(4)	19 (1)	8(—)
Nov ..	1441(60)	493(21)	221 (9)	88(4)	64 (3)	76(3)	11(—)	2(—)
Dec ..	835(62)	259(19)	137(10)	57(4)	14 (1)	46(3)	5(—)	1(—)

TABLE 8(b)

Numbers of 15-minute periods in which different intensities of rain were recorded, 1944 to 1947 (Meenambakkam)

Month	Intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	124(70)	28(16)	12 (7)	6(3)	3(2)	4 (2)	—	—
Feb ..	113(54)	5(21)	1 (4)	—	2(8)	3(13)	—	—
Mar ..	135(57)	53(22)	20 (8)	16(7)	7(3)	6 (3)	—	—
Apr ..	65(64)	14(14)	9 (9)	8(8)	—	5 (5)	1 (1)	—
May ..	11(61)	2(11)	2(11)	1(6)	—	2(11)	—	—
Jun ..	136(69)	38(19)	10 (5)	5(3)	1(1)	7 <sub>4</sub> (4)	1 (1)	—
Jul ..	301(70)	72(17)	35 (8)	8(2)	7(2)	8 <sub>2</sub> (2)	2(—)	—
Aug ..	295(67)	73(17)	31 (7)	11(3)	7(2)	18 (4)	2(—)	1(—)
Sep ..	252(64)	66(17)	25 (6)	11(3)	10(3)	23 (6)	7 (2)	1(—)
Oct ..	351(59)	116(20)	59(10)	22(4)	12(2)	22 (4)	7 (1)	2(—)
Nov ..	634(55)	265(23)	120(10)	52(4)	34(3)	49 (4)	6 (1)	1(—)
Dec ..	372(53)	174(25)	78(11)	35(5)	15(2)	24 (3)	6 (1)	—

TABLE 8(c)

Numbers of 15-minute periods in which different intensities of rain were recorded, 1932 to 1947

Month	Intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	311(71)	82(19)	25 (6)	11(2)	7 (2)	5 (1)	—	—
Feb ..	58(58)	18(18)	10(10)	4(4)	4 (4)	6 (6)	—	—
Mar ..	266(67)	74(18)	29 (7)	21(5)	9 (2)	2(—)	1(—)	—
Apr ..	277(69)	74(18)	27 (7)	16(4)	1(—)	11 (3)	1(—)	—
May ..	241(58)	96(23)	29 (7)	17(4)	11 (3)	19 (5)	2(—)	—
Jun ..	649(72)	143(16)	61 (7)	26(3)	9 (1)	16 (2)	1(—)	1(—)
Jul ..	1162(75)	216(14)	104 (7)	32(2)	11 (1)	20 (1)	3(—)	—
Aug ..	1053(67)	254(16)	109 (7)	47(3)	29 (2)	56 (4)	10 (1)	7(—)
Sep ..	1073(68)	294(19)	78 (5)	41(3)	24 (2)	47 (3)	13 (1)	2(—)
Oct ..	1857(59)	612(19)	307(10)	109(3)	94 (3)	137 (4)	37 (1)	14(—)
Nov ..	2213(58)	809(21)	352 (9)	155(4)	106 (3)	133 (4)	19 (1)	4(—)
Dec ..	1260(59)	451(21)	224(10)	95(4)	33 (2)	72 (3)	11 (1)	1(—)

(The figures indicated in the brackets are percentage frequencies)

TABLE 9(a)  
Numbers of spells of rain with different maximum intensities, 1932 to 1942 (Nungambakkam)

Month	Maximum intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	37(55)	23(34)	2 (3)	2 (3)	3(5)	—	—	—
Feb ..	12(41)	6(21)	4(15)	3(10)	2(7)	2 (7)	—	—
Mar ..	14(45)	4(13)	5(16)	2 (6)	—	5(16)	1 (3)	—
Apr ..	22(46)	8(17)	10(21)	4 (8)	—	4 (8)	—	—
May ..	14(67)	2(10)	1 (5)	1 (5)	1(5)	2(10)	—	—
Jun ..	91(52)	34(19)	25(14)	13(7)	5(3)	6 (3)	1 (1)	1 (1)
Jul ..	163(59)	49(18)	39(14)	15(5)	3(1)	6 (2)	1(—)	—
Aug ..	144(53)	46(17)	33(12)	14(5)	8(3)	22 (8)	3 (1)	4 (1)
Sep ..	115(50)	51(22)	24(11)	16(7)	4(2)	13 (6)	4 (2)	1(—)
Oct ..	206(44)	94(20)	57(12)	28(6)	26(6)	38 (8)	15 (3)	8 (2)
Nov ..	235(43)	126(23)	62(11)	36(7)	31(6)	39 (7)	9 (2)	2(—)
Dec ..	171(53)	69(21)	34(11)	21(7)	4(1)	19 (6)	3 (1)	1(—)

TABLE 9 (b)  
Numbers of spells of rain with different maximum intensities, 1944 to 1947 (Meenambakkam)

Month	Maximum intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	31(66)	7(15)	4 (9)	3 (6)	—	2 (4)	—	—
Feb ..	2(33)	1(16)	1(16)	—	1(16)	1(16)	—	—
Mar ..	22(47)	11(23)	6(13)	3 (6)	2 (4)	3 (6)	—	—
Apr ..	8(42)	4(21)	1 (5)	4(21)	—	1 (5)	1(5)	—
May ..	5(71)	—	1(14)	—	—	1(14)	—	—
Jun ..	36(55)	12(18)	7(11)	5 (8)	—	5 (8)	1(1)	—
Jul ..	62(50)	23(19)	20(16)	7 (6)	6 (5)	4 (3)	1(1)	—
Aug ..	39(43)	23(26)	10(11)	5 (6)	3 (3)	8 (9)	1(1)	1 (1)
Sep ..	42(48)	14(16)	10(11)	3 (3)	—	12(14)	6(7)	—
Oct ..	66(44)	29(19)	19(13)	10 (7)	5 (3)	13 (9)	6(4)	1 (1)
Nov ..	111(44)	50(20)	33(13)	16 (6)	9 (4)	25(10)	5(2)	1(—)
Dec ..	67(43)	28(18)	21(13)	15(10)	6 (4)	16(10)	3(2)	—

TABLE 9 (c)  
Numbers of spells of rain with different maximum intensities, 1932 to 1947

Month	Maximum intensity in cents per hour							
	<10	10—25	25—50	50—75	75—100	100—200	200—300	300—400
Jan ..	76(57)	34(25)	9 (7)	7 (5)	3(2)	3 (2)	—	—
Feb ..	14(40)	7(20)	5(14)	3 (9)	3(9)	3 (9)	—	—
Mar ..	36(46)	15(19)	11(14)	5 (6)	2(3)	8(10)	1 (1)	—
Apr ..	34(47)	13(18)	11(15)	8(11)	6(8)	1 (1)	—	—
May ..	47(58)	15(18)	6 (7)	4 (5)	1(1)	7 (9)	1 (1)	—
Jun ..	129(52)	48(19)	32(13)	18 (7)	5(2)	12(5)	2 (1)	1(—)
Jul ..	234(56)	78(19)	61(15)	24 (6)	9(2)	11(3)	2(—)	—
Aug ..	196(50)	73(19)	48(12)	19 (5)	13(3)	30(8)	4 (1)	6 (2)
Sep ..	169(49)	74(22)	36(11)	20 (6)	5(1)	27(8)	10 (3)	1(—)
Oct ..	304(44)	133(19)	83(12)	41 (6)	38(6)	56(8)	21 (3)	12 (2)
Nov ..	370(44)	183(22)	100(12)	56 (7)	42(5)	65(8)	16 (2)	4(—)
Dec ..	248(50)	107(21)	57(11)	38 (8)	11(2)	37(7)	6 (1)	1(—)

(The figures indicated in the brackets are percentage frequencies)

TABLE 10 (a)

Numbers of days distributed according to the hours of occurrence of maximum intensity of rainfall, 1932 to 1942  
(Nungambakkam)

Month	Hours of occurrence of maximum intensity of rainfall (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan .. ..	8(30)	5(19)	3(11)	3(11)	1 (4)	2 (7)	3(11)	2 (7)
Feb .. ..	2(13)	3(19)	4(25)	2(13)	2(13)	—	2(13)	1 (6)
Mar .. ..	2(14)	2(14)	2(14)	2(14)	4(29)	2(14)	—	—
Apr .. ..	4(17)	2 (9)	6(26)	4(17)	5(22)	1 (4)	1 (4)	—
May .. ..	4(27)	7(47)	1 (7)	—	—	2(14)	1 (7)	—
Jun .. ..	19(17)	6 (5)	2 (2)	—	1 (1)	36(31)	26(23)	25(22)
Jul .. ..	26(15)	11 (6)	4 (2)	3 (2)	5 (3)	35(20)	56(32)	36(22)
Aug .. ..	34(21)	21(13)	10 (6)	2 (1)	2 (1)	31(19)	31(19)	34(21)
Sep .. ..	31(24)	17(13)	15(12)	6 (5)	9 (7)	14(11)	18(14)	19(15)
Oct .. ..	27(16)	26(16)	22(13)	25(15)	21(13)	16(10)	13 (8)	15 (9)
Nov .. ..	29(19)	31(20)	23(15)	21(13)	20(13)	11 (7)	12 (8)	9 (6)
Dec .. ..	9 (9)	17(16)	15(14)	23(21)	10 (9)	3 (3)	16(15)	16(15)

TABLE 10 (b)

Numbers of days distributed according to the hours of occurrence of maximum intensity of rainfall, 1944 to 1947  
(Meenambakkam)

Month	Hours of occurrence of maximum intensity of rainfall (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan .. ..	3(19)	4(25)	3(19)	1(16)	1 (6)	2(13)	—	2(13)
Feb .. ..	—	1(33)	—	—	1(33)	—	1(33)	—
Mar .. ..	1 (7)	—	1 (7)	4(29)	3(21)	3(21)	1 (7)	1 (7)
Apr .. ..	2(29)	2(29)	—	2(29)	1(14)	—	—	—
May .. ..	—	—	2(40)	2(40)	—	1(20)	—	—
Jun .. ..	4(11)	—	2 (6)	—	—	5(14)	15(43)	9(26)
Jul .. ..	15(23)	5 (8)	1 (1)	—	1 (1)	10(15)	19(29)	16(24)
Aug .. ..	11(22)	6(12)	2 (4)	2 (4)	—	8(16)	10(20)	12(24)
Sep .. ..	11(24)	7(15)	3 (7)	3 (7)	5(11)	7(15)	3 (7)	7(15)
Oct .. ..	1(17)	6(10)	8(13)	8(13)	9(15)	3 (5)	9(15)	6(10)
Nov .. ..	6(10)	9(15)	10(16)	8(13)	5 (8)	4 (7)	6(10)	13(21)
Dec .. ..	6(16)	4(11)	7(18)	3 (8)	4(11)	2 (5)	2 (5)	10(26)

TABLE 10 (c)

Numbers of days distributed according to the hours of occurrence of maximum intensity of rainfall, 1932 to 1947

Month	Hours of occurrence of maximum intensity of rainfall (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan .. ..	13(28)	9(19)	6(13)	4 (8)	2 (4)	6(13)	3 (6)	4 (8)
Feb .. ..	2(11)	4(21)	4(21)	2(11)	3(16)	—	3(16)	1 (5)
Mar .. ..	3(11)	2 (7)	3(11)	6(21)	7(25)	5(18)	1 (4)	1 (4)
Apr .. ..	8(23)	5(14)	8(23)	6(17)	6(17)	1 (3)	1 (3)	—
May .. ..	6(20)	9(30)	4(13)	3(10)	—	4(13)	3(10)	1 (3)
Jun .. ..	25(16)	6 (4)	4 (5)	—	1 (1)	42(27)	41(27)	35(23)
Jul .. ..	43(17)	17 (7)	5 (2)	3 (1)	6 (2)	45(18)	78(31)	56(22)
Aug .. ..	47(21)	30(13)	14 (6)	4 (2)	2 (1)	40(18)	43(19)	47(21)
Sep .. ..	43(25)	27(14)	18 (9)	9 (5)	16 (8)	22(11)	22(11)	29(15)
Oct .. ..	42(17)	36(15)	33(13)	35(14)	32(13)	23 (9)	23 (9)	22 (9)
Nov .. ..	37(16)	41(17)	36(15)	29(12)	26(11)	17 (7)	19 (8)	33(14)
Dec .. ..	17(11)	23(14)	24(16)	25(16)	14 (9)	5 (3)	19(12)	27(18)

(The figures indicated in the brackets are percentage frequencies)

TABLE 11 (a)

Numbers of 15-minute periods in which heavy rains (intensity >100 cents per hour) were recorded, distributed according to the time of the day, 1932 to 1942 (Nungambakkam)

Month	Hours (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan	—	—	—	—	—	—	—	—
Feb	—	1(33)	—	—	1(33)	1(33)	—	—
Mar	2(28)	—	1(14)	2(28)	2(28)	—	—	—
Apr	4(66)	—	—	2(33)	—	—	—	—
May	—	1(33)	—	1(33)	1(33)	—	—	—
Jun	1(10)	—	—	—	—	2(20)	2(30)	4(40)
Jul	1(11)	—	—	—	1(11)	1(11)	4(44)	2(22)
Aug	27(53)	4 (8)	—	—	—	4 (8)	6(12)	10(20)
Sep	8(30)	3(11)	1 (4)	—	1 (4)	4(15)	5(19)	5(19)
Oct	23(19)	23(19)	8 (7)	21(18)	15(13)	9 (8)	6 (5)	14(12)
Nov	21(21)	24(24)	13(13)	15(15)	10(10)	1 (1)	5 (5)	13(12)
Dec	9(17)	1(17)	8(15)	12(23)	7(13)	2 (4)	1 (2)	4 (8)

TABLE 11(b)

Numbers of 15-minute periods in which heavy rains (intensity >100 cents per hour) were recorded, distributed according to the time of the day, 1944 to 1947 (Meenambakkam)

Month	Hours (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan	1(25)	—	—	—	—	—	1(25)	2(50)
Feb	1(33)	2(66)	—	—	—	—	—	—
Mar	—	—	1(17)	5 (83)	—	—	—	—
Apr	—	1(17)	—	—	5(83)	—	—	—
May	—	—	—	2(100)	—	—	—	—
Jun	—	—	—	—	—	2(25)	4(50)	2(25)
Jul	5(30)	—	—	—	—	—	3(30)	2(20)
Aug	7(32)	8(36)	2 (9)	—	—	1 (5)	2 (9)	2 (9)
Sep	17(53)	2 (6)	—	—	3 (9)	1 (3)	2 (6)	7(22)
Oct	8(27)	2 (7)	5(16)	5 (16)	3(10)	2 (7)	3(10)	2 (7)
Nov	6(10)	14(22)	8(13)	5 (8)	13(21)	2 (3)	8(13)	7(11)
Dec	3(10)	8(27)	9(30)	2 (7)	2 (7)	—	—	6(20)

TABLE 11(c)

Numbers of 15-minute periods in which heavy rains (intensity >100 cents per hour) were recorded, distributed according to the time of the day, 1932 to 1947

Month	Hours (IST)							
	0-3	3-6	6-9	9-12	12-15	15-18	18-21	21-24
Jan	1(17)	—	—	—	—	2(33)	1(17)	2(33)
Feb	1(17)	3(51)	—	—	1(17)	1(17)	—	—
Mar	2(15)	—	2(15)	7(54)	2(15)	—	—	—
Apr	5(38)	1 (8)	—	2(15)	5(38)	—	—	—
May	1 (5)	5(23)	2 (9)	5(23)	2 (9)	—	7(32)	—
Jun	2(11)	—	—	—	—	4(21)	7(37)	6(32)
Jul	6(26)	4(17)	—	—	1 (4)	1 (4)	7(30)	4(17)
Aug	36(48)	12(16)	2 (3)	—	—	5 (7)	9(12)	13(16)
Sep	25(40)	5 (8)	1 (2)	1 (2)	6(10)	5 (8)	8(13)	12(19)
Oct	38(20)	38(20)	15 (8)	29(15)	24(13)	18 (9)	14 (7)	16 (8)
Nov	27(15)	38(22)	28(16)	21(12)	23(13)	5 (3)	14 (8)	19(11)
Dec	12(14)	17(20)	19(23)	14(17)	9(11)	2 (2)	1 (1)	10(12)

(The figures indicated in the brackets are percentage frequencies)

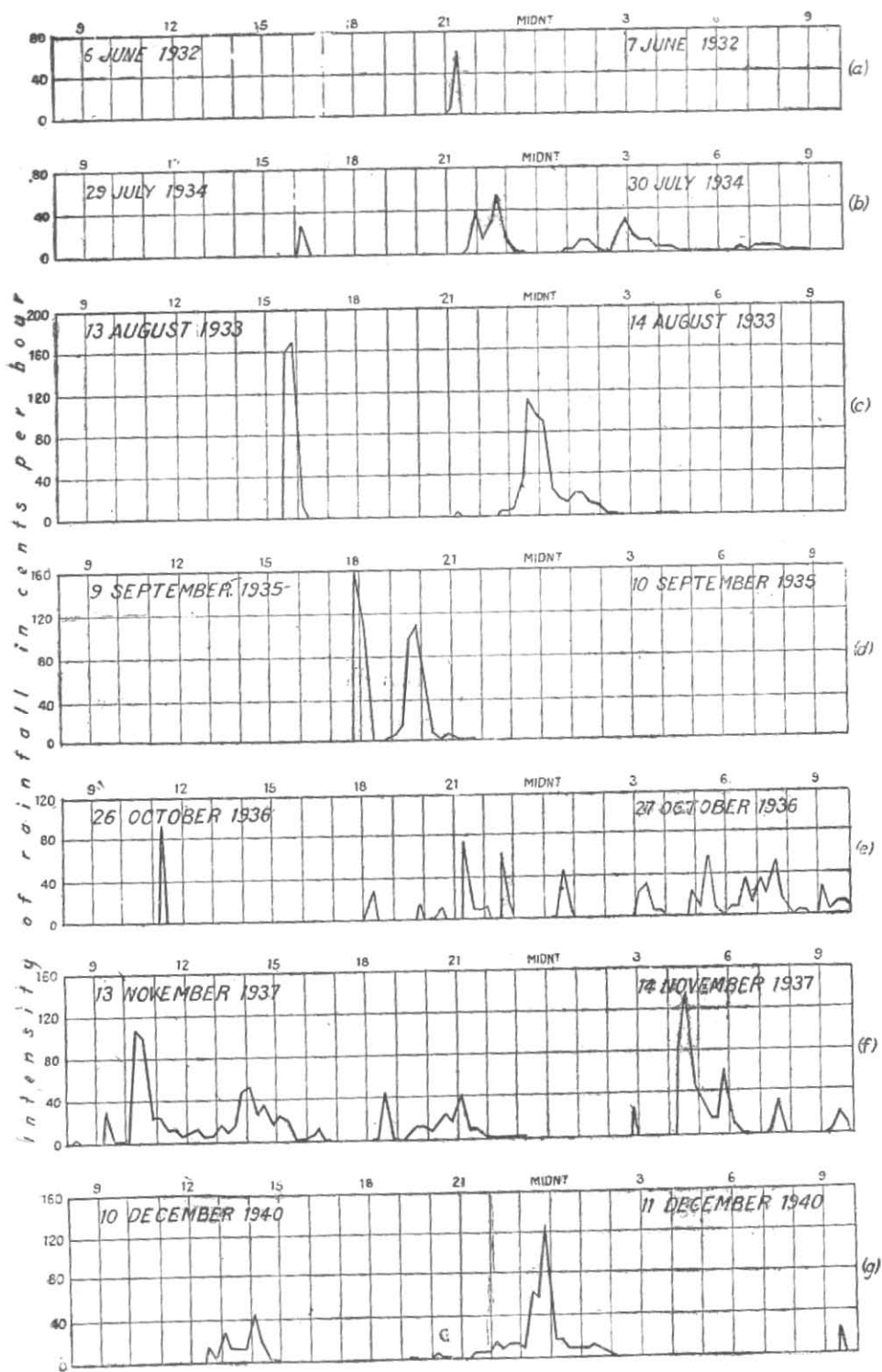


Fig. 1. Variation of intensity in some spells of rain

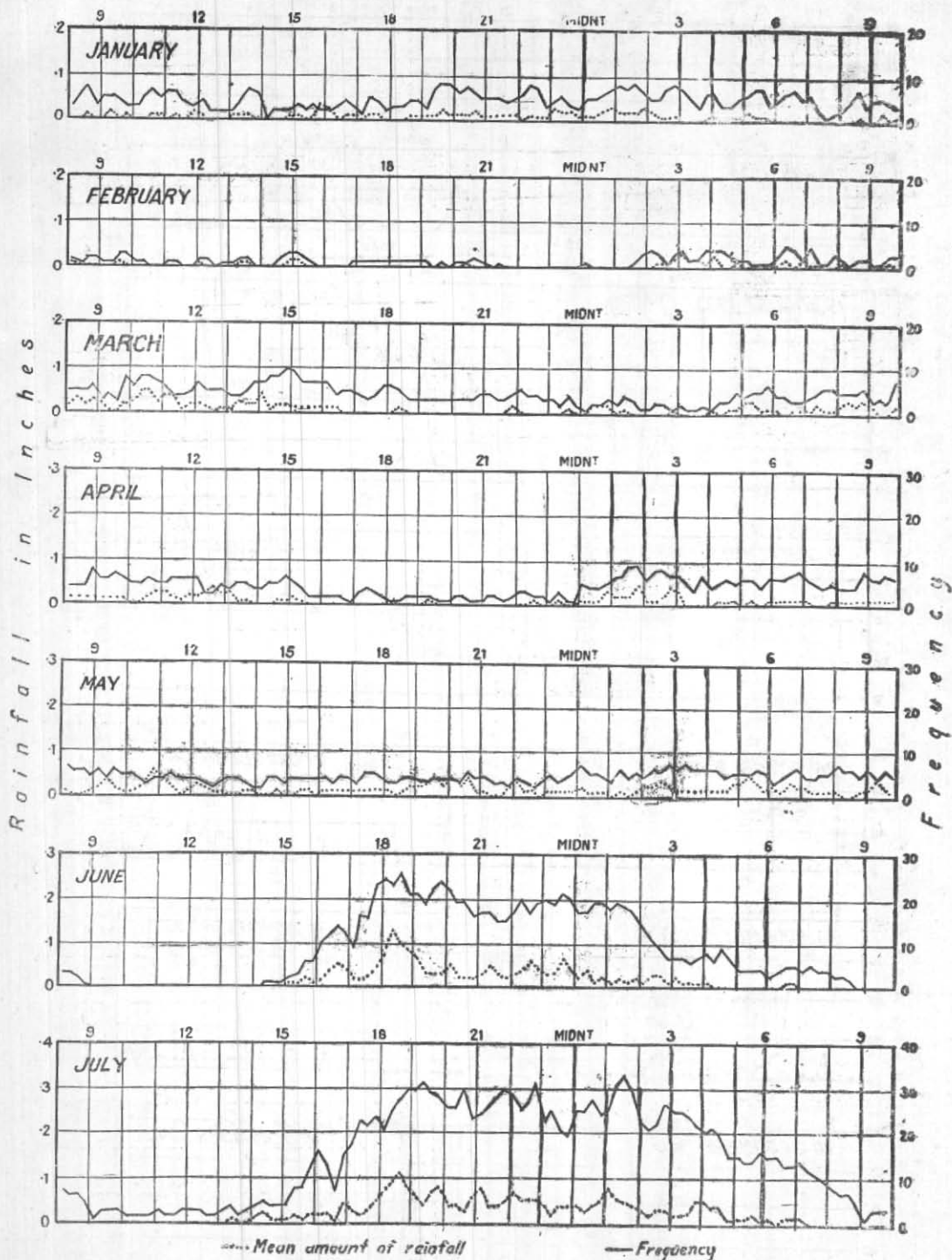


Fig. 2. Mean amounts and frequencies of rainfall during the various 15-minute intervals of the day (1932-1947)

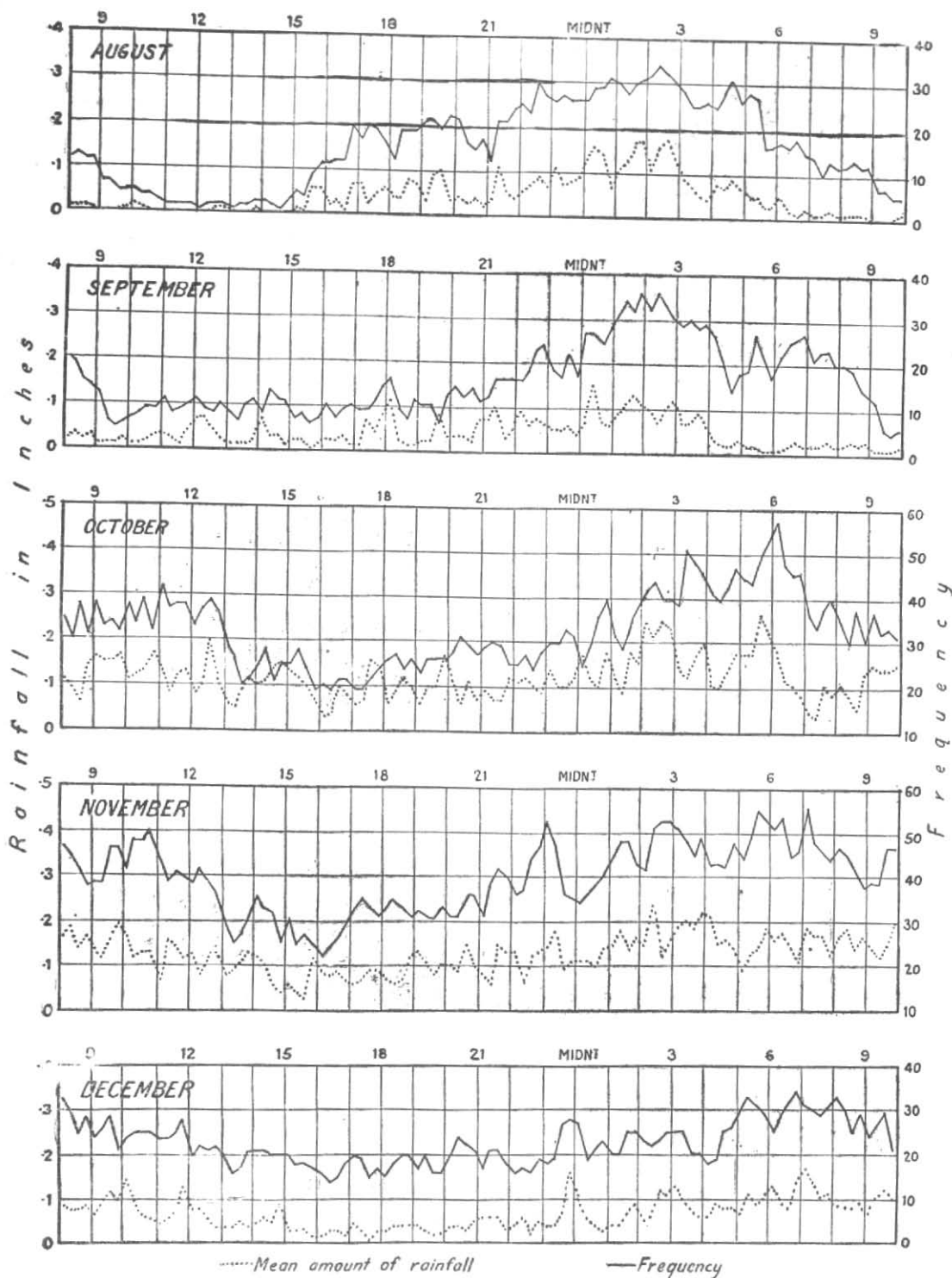


Fig. 3. Mean amounts and frequencies of rainfall during the various 15-minute intervals of the day (1932-1947)