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## THE DIURNAL VARIATION OF RAINFALL AT NAGPUR

Nagpur (Lat.  $21^{\circ}07'N$ , Long.  $79^{\circ}07'E$ ) is situated in the central parts of the country at an elevation of about 1000 ft above mean sea level. From the point of view of rainfall the station has two seasons—the monsoon season from June to September and non-monsoon season from October to May. Nearly 87 per cent of the total annual rainfall occurs in the monsoon season. Much of the rain in this season occurs in association with depressions which form in the Bay of Bengal and move inland westnorthwestwards. In the non-monsoon months the rainfall is mainly due to Western Disturbances at low latitudes, and on rare occasions due to post or pre-monsoon depressions or storms in the Bay or Arabian Sea. The rainfall in this season is generally of a showery type, and is normally accompanied by thunder.

The station is equipped with a natural syphon raingauge which gives automatic records of the rainfall. It is installed at a distance of 6 metres from the ordinary raingauge with its rim at a height of 75 centimetres above ground level. The self-recording raingauge was installed in the year 1946; records for the period 1948 to 1956 have been used in this study. The self-recording as well as the ordinary raingauges were shifted to their present site in April 1954 from another site about 300 metres away. The exposure at the old as well as the present site has been satisfactory. There has been little loss of record, and the amounts recorded by the self-recording raingauge generally compare well with those from the ordinary raingauge. During the period under study the average annual rainfall was about 14 per cent below normal.

The hourly totals of rainfall have been worked out separately for the monsoon and non-monsoon months. These are expressed as percentages of the total for all the twentyfour hours. The diurnal variation of the amount of rainfall in the two seasons is shown in Figs. 1 (a) and 1(b). It is seen that in both the seasons the rainfall is low in the forenoon

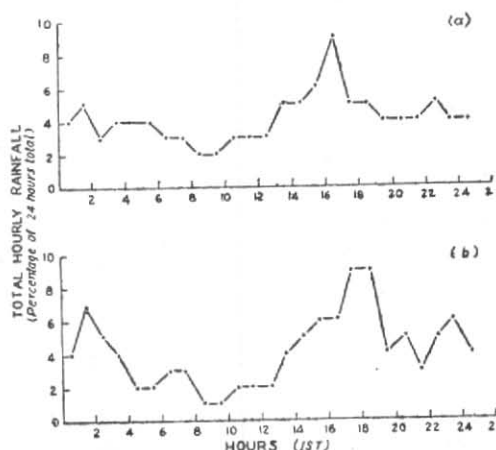


Fig. 1

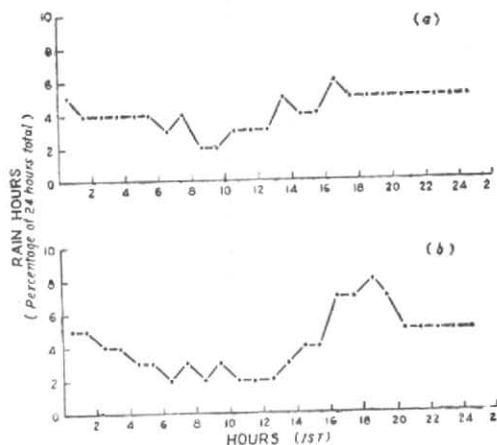


Fig. 2

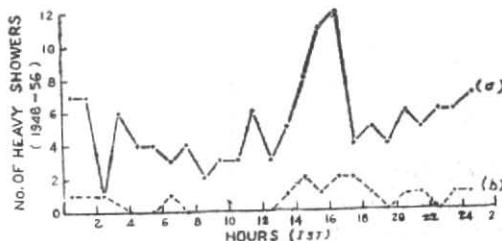


Fig. 3

- (a) Monsoon season (June-September)  
 (b) Non-monsoon months (October-May)

hours and high in the afternoon and night hours. The peak rainfall occurs between 1600 and 1900 IST. There is some suggestion of a secondary maximum between 0100 and 0200 IST, which is more marked in the non-monsoon months. *The curves for both the seasons are practically similar, indicating that ground heating plays a major role in both the seasons.* The secondary maximum after midnight is probably due to the slow drift of thunderstorm cells from the hill range towards the northwest and northeast.

The number of 'rain hours' in each clock hour of the day is worked out separately for the monsoon months and the non-monsoon months. (A 'rain hour' is a clock hour in which rain of 0.3 millimetres or more has occurred). These are expressed as percentages of the total for all the twentyfour hours. The diurnal variation of the 'rain hours' is shown in Figs. 2(a) and 2(b). Here again the peak occurs in the afternoon hours. The diurnal variation is more marked in the non-monsoon months than in the monsoon months.

The diurnal variation of the incidence of heavy showers has also been examined. For this purpose the number of occasions of rainfall of 12.7 millimetres ( $\frac{1}{2}$  inch) in each clock hour has been worked out for the entire period 1948-56. The variation in the two seasons is shown in Fig. 3 (The continuous line is for the monsoon season and the broken line is for the non-monsoon months). The number of occasions in the non-monsoon months is too small to give a clear indication of the diurnal characteristic, but the afternoon and night hours appear to have more favourable chances for the occurrence of heavy showers. This feature is, however, very prominent in the monsoon season in which the peak frequency occurs between 1600 and 1700 IST. This curve also strongly suggests a secondary maximum an hour or so after midnight. There is a sudden dip in the frequency between 0200 and 0300 IST. As the data examined are for 9 years only, it is not possible to say whether this dip is genuine or spurious. During the period

under examination the heaviest fall in a clock hour was 78.0 millimetres (3.07 inches) which occurred between 0300 and 0400 IST in the month of June.

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