Weather

POST-MONSOON SEASON (OCTOBER-DECEMBER 1960)

Chief features—(1) Development of a series of low pressure systems in the south Bay of Bengal, two of which intensified into severe cyclonic storms and hit the East Pakistan coast during October; (2) Long spells of active northeast monsoon conditions along the southeast coast of India leading to excess seasonal rainfall in the Madras State; and (3) Relatively feeble activity of the western disturbances in north India.

The month of September closed with the monsoon lingering over large parts of the country outside northwest India.

A low pressure area formed in the west central Bay of Bengal off the Circars coast on 1 October. Moving northwestwards and entering inland it persisted over the central parts of the country during the first ten days of the month. Under its influence, fairly widespread rain fell in Orissa and coastal Andhra Pradesh early in the month. The marked upper air circulation associated with this low caused flow of moist easterlies upto the Punjab (I) and Himachal Pradesh and a continuance of monsoon conditions there. Fairly widespread rain fell in Uttar Pradesh on 6th and 7th with a number of stations reporting very heavy falls. Mainpuri reported 24 cm of rain on 4th and 15 cm on 6th and Hardoi 24 cm and Bahraich 16 cm of rain on 6th. The persistent heavy rains led to floods in the Gomati, the Ganga and other rivers of Uttar Pradesh. According to press reports large parts of Lucknow city and suburbs got inundated by the waters of the Gomati.

A low pressure area from Burma entered the Andaman Sea and adjoining east central Bay of Bengal on 7 October and concentrated into a depression. Moving in a northerly direction the depression intensified into a severe cyclonic storm which struck the East Pakistan coast near Noakhali on the night of 10—11 October. It then weakened rapidly and broke up over the Assam hills by 13th. This storm caused considerable loss of life and property near Noakhali in East Pakistan (*Indian J. Met. Geophys.*, **12**, 1, p. 144).

After the dissipation of this storm, the monsoon withdrew rapidly from northwest India and was confined to the south Peninsula by 17 October.

In association with an easterly wave, a low pressure area developed over the southwest Bay of Bengal on 22 October. It crossed the extreme south Peninsula by 24th and then moved away westwards across the southeast Arabian Sea. It caused fairly widespread thundershowers in the Madras State on 24th, in Kerala on 24th and 25th and in coastal Mysore on 25th.

In association with another easterly wave a depression developed in the southeast and adjoining southwest Bay of Bengal on 29 October. Moving in a northnortheasterly direction, it intensified into a severe cyclonic storm and struck the East Pakistan coast near Chittagong on the night of 31 October—1 November, aggravating the devastation caused by the earlier storm. (*Indian J. Met. Geophys.*, **12**, 1, p. 144).

A low pressure area developed over the southwest Bay of Bengal on 2 November moved across the south Peninsula and concentrated into a depression over southeast Arabian Sea on the morning of 6th, with centre near Lat. 9°N and Long. 71°E. It

moved in a northwesterly direction, weakened into a low pressure area over the central Arabian Sea by 11th and became unimportant the next day. Another depression developed over the southwest Bay of Bengal with centre near Lat. 10°N and Long. 81½°E on the morning of 10 November. It moved slightly westwards, weakened into a low pressure area over the south Coromandal coast and neighbourhood on 11th and became unimportant by 12th. A third depression developed over the south Bay of Bengal on 18th, with its centre near Lat. 10½°N and Long. 85°E. Moving first northwestwards and then westwards, it crossed coast close to Madras on 20th afternoon and later weakened into a low pressure area which moved away slowly westwards across the southeast Arabian Sea by 25 November.

In association with this series of depressions, the northeast monsoon was active along coastal Madras State throughout the first three weeks of November and also along the south coastal Andhra Pradesh on a few days during this period. Heavy to very heavy rain occurred at one or other of the coastal stations almost every day during this period. A few outstanding amounts of rainfall were—Nagapattinam 16 cm on 1 November, 24 cm on 9th and 19 cm on 15th; Madras 18 cm and Nellore 20 cm on 11th; Cuddalore 24 cm and Vedaranyam 16 cm on 15th. Special mention may also be made of the winds of gale force which blew over the Madras city for a few hours on the afternoon of 20th. Persistent heavy rains in coastal Madras State during November were responsible for disruption of rail and road traffic at several places and for floods in the rivers Cooum, Adyar and Vaigai. According to press reports, the flood level recorded in river Vaigai was the highest during the last four decades. In Madras city heavy damage occurred to buildings and huts. Numerous trees were uprooted in Madras city and suburbs on 20 November and over 20,000 persons were rendered homeless.

A depression formed in the Arabian Sea on 17 November with centre near Lat. 11½°N and Long. 66½°E. Moving mainly in a westerly direction, it intensified into a cyclonic storm by the 19th evening when it was centred near Lat. 13°N and Long. 62°E. It continued to move westwards, weakened and became unimportant by 23 November as it was nearing the Arabian coast.

Another depression developed over the south Bay of Bengal with centre near Lat. 9½°N and Long. 87½°E on 26 November. It moved northwards very slowly upto 30 November and later took a westnorthwesterly course. It was centred near Lat. 13°N and Long. 85°E on the morning of 2 December. It weakened rapidly and entered inland across the south Circars coast as a low pressure wave by 4th morning. In association with this system, local rain occurred in coastal Andhra Pradesh on 3 and 4 December and in Telangana on 4th. Scattered showers also occurred in central parts of the country on 5th and 6th and in Orissa on 7th and 8th. Gopalpur reported 7 cm of rain on 7th and 6 cm on 8th.

Two easterly waves moved across the south Bay of Bengal and the south Peninsula during the first half of December. Another easterly wave in the last week of the month gave rise to a low pressure area over the extreme southwest Bay of Bengal on 28 December. This low pressure area moved in a northerly direction and weakened into a trough of low pressure extending from west central to the adjoining southwest Bay of Bengal off the Circars-north Coromandal coast on 31 December. It became unimportant by 3 January. In association with these systems, there were spells of rainfall in the Madras State during December and the rainfall extended to coastal Andhra Pradesh and coastal Orissa towards the end of December.

The tracks of depressions and storms during the season are given in Fig 1.

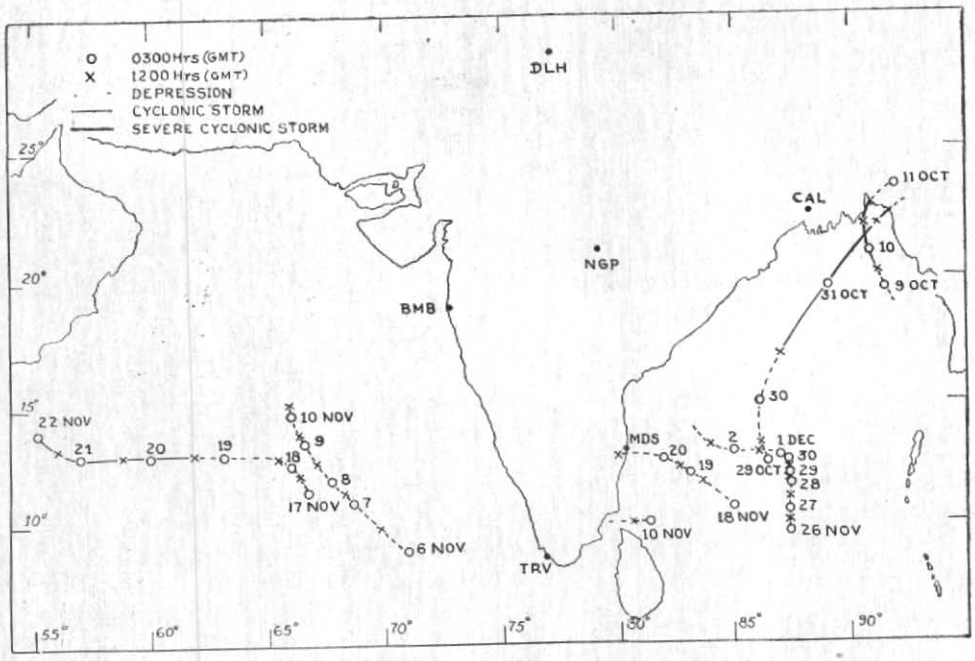

Fig. 1. Tracks of storms and depressions during 1 October to 31 December 1960

Activity of the western disturbances in north India during the season under review was feeble. Five western disturbances moved across the northern parts of the country during the season. The first caused very light rain in Jammu and Kashmir on 22 and 23 November and the second caused light rain or snow in Jammu and Kashmir, Himachal Pradesh and the Punjab-Kumaon hills on 28 and 29 November. The third caused scattered rain or snow in Jammu and Kashmir on 13th and 14th. The fourth was comparatively more active and was associated with local rain or snow in the Punjab hills and Jammu and Kashmir on 16th and fairly widespread rain or snow in Jammu and Kashmir on 17th. Isolated very light rain also occurred in Assam from 20 to 22 December. The fifth western disturbance was again feeble and caused only scattered rain or snow in Jammu and Kashmir on 27 and 28 December. An active western disturbance was approaching the northern parts of the country on 31 December. With its approach, moist air penetrated into northwest India and scattered rain occurred in Rajasthan from 29 to 31 December. Rain or snow was also fairly widespread in the Punjab hills on 30th, in Himachal Pradesh on 30th and 31st and in Jammu and Kashmir on 31st.

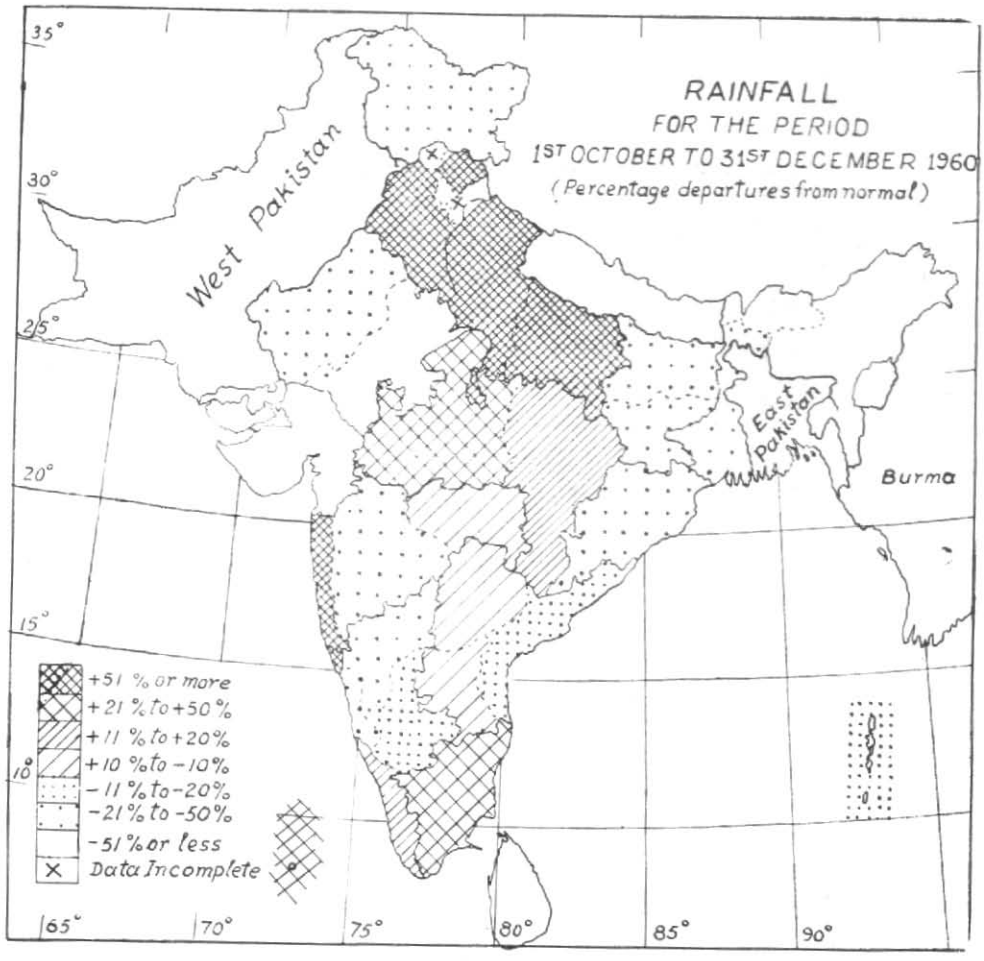

Fig. 2

Night temperatures were generally below normal over northwest India from about the middle of November to the middle of December, being appreciably below normal in Rajasthan and the adjoining Punjab (I) on some days towards the end of November. They were appreciably to markedly above normal in Orissa, southeast Madhya Pradesh, Andhra Pradesh and Marathwada from 4 to 10 December and in northeast India, Uttar Pradesh and east Madhya Pradesh towards the close of December.

The season's rainfall in terms of its departures from normal in various subdivisions of the country is shown in Fig. 2.