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INDIA WEATHER REVIEW, 1958

ANNUAL SUMMARY

PART C

STORMS AND DEPRESSIONS

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# INDIA WEATHER REVIEW, 1958

## ANNUAL SUMMARY

### PART-C

## STORMS & DEPRESSIONS

### I. DEPRESSIONS AND CYCLONIC STORMS

During the year three cyclonic storms and eight depressions formed in the Bay of Bengal and one cyclonic storm and one depression formed in the Arabian Sea. One cyclonic storm formed in the Bay of Bengal weakened after crossing the coast, emerged into the Arabian Sea and again intensified into a cyclonic storm in the Arabian Sea. The dates of activity of the storms and the greatest barometric depths observed or estimated near their centres are given in the following table:

Table I

Locality	Month	Date	Greatest observed or estimated barometric depth.
Bay of Bengal	May	16th - 19th	12 mb
Bay of Bengal	October	22nd - 26th	17 mb
Bay of Bengal	November	5th - 12th	12 mb
Arabian Sea	October	9th - 17th	20 mb
Bay of Bengal ) and Arabian Sea )	November	18th - 29th	12 mb 16 mb

The detailed descriptions of these storms and depressions are followed by an account of western disturbances and the more important local storms and of localities in which winds of force B.F. 9 or more unconnected with cyclonic storms were experienced by ships in the Indian Seas.

#### 1 Depression in the Bay of Bengal— —7th to 9th May—

A trough of low pressure developed in the southwest Bay of Bengal, east of Ceylon in the evening of 4th May. S.S. Ocean Trade ( $5.4^{\circ}\text{N}$ ;  $83.0^{\circ}\text{E}$ ) and S.S. Mappia ( $9.6^{\circ}\text{N}$ ;  $83.2^{\circ}\text{E}$ ) reported westerly winds 10 knots and overcast sky and east-southeasterly winds 10 knots and cloudy sky respectively at 1730 hrs IST of the same day. Trincomalee also reported cloudy skies and 5 knots northnortheasterly winds at the same hour. While the trough of low pressure persisted over the southwest Bay on 5th morning another trough developed over the south Peninsula. Under their combined influence, Ceylon and the Peninsula south of  $13^{\circ}\text{N}$  recorded widespread rainfall that morning. The trough from the Peninsula emerged into the Bay off the Coromandal (Madras) coast by the 6th morning, giving increased rainfall

over the Madras State. The trough off Ceylon was becoming less marked. Shifting slightly northeastwards from the Coromandal coast, the trough concentrated into a depression on the morning of the 7th with its centre near 13.0°N and 83.0°E at 0830 hrs IST. The following observations of 7th are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. IST	Wind		Remarks
	Lat. °N	Long °E		Dir.	Vel. (Kts)	
S.S. Jalausha	12.1	82.8	0530	W	12	Overcast
S.S. Bharatraja	13.9	87.1	1130	SE	10	Cloudy
Madras			0830	NNW	2	Overcast

The depression moved slowly north-northeastwards and was centred near 13.5°N and 83.5°E at 1730 hrs IST of the same day and near 14.5°N and 84.5°E on the morning of 8th. It weakened into a trough the same evening and became unimportant the next day. The lowest pressure inferred at the centre of the depression was 1000 mb on the 7th morning, the departure from normal being -6 mb.

In association with the development of the depression, there was a spell of rainfall or thundershowers in Ceylon and south Peninsula. Isolated heavy rainfall was reported from a few stations on the western side of south Peninsula between 5th and 8th. Mangalore reported 11 cm of rain on 6th and Alleppey 10 cm on 7th.

## 2 Cyclonic storm in the Bay of Bengal— —16th to 19th May—

The southwest monsoon advanced into the north Andaman Sea on the 14th of May. Associated with this, a trough of low pressure developed in central Bay and adjoining south Bay. A low pressure wave apparently moved into east central Bay from lower Burma by the evening of the 15th. Under their combined influence, a depression formed by 0830 hrs IST of the 16th May with centre near Lat. 16.5°N and Long. 88.0°E. S.S. Jalayamuna reported at 0530 hrs IST of 16th at Lat. 17.4°N and Long. 86.6°E northeasterly wind 20 kts. S.S. Fakirjee reported easterly wind 15 kt at Lat. 17.5°N and Long. 88.8°E at 0530 hrs IST of 16th. The cyclonic circulation around the depression was extending upto 5 km. Moving northward, the depression was centred at 1730 hrs IST near Lat. 17.0°N and Long. 88.0°E was intensifying. In the northwest sector of the depression, S.S. Jalayamuna reported northeasterly wind of 30 kt at 1130 hrs IST (Lat. 17.7°N and Long. 86.7°E) and at 1730 hrs IST (Lat. 18.2°N and Long. 86.7°E).

Continuing to move in a northerly direction, the depression intensified into a cyclonic storm and was centred at 0830 hrs IST of 17th near Lat. 18.5°N and Long. 88.0°E. There were several ships' reports of winds of 35 kt or more in the western half. At 0830 hrs IST, there was no present weather of rain along the Orissa coast but Saugor Island was drizzling. Cyclonic circulation reached upto 5 km.

Recurving northeastwards, the cyclonic storm was centred near Lat. 19.5°N and Long. 88.5°E at 1730 hrs IST of the 17th. Winds of 30-35 kt were reported by ships in the eastern sector as well.

Relevant ships' observations of 17th are given below:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Vel. (Kts)	
S.S. City of Guildford	18.8	85.9	0530	N	35	Heavy rain
S.S. City of Guildford	19.4	87.3	1330	NE	40	Heavy rain
S.S. City of Guildford	19.4	87.0	1730	N	30	Rain
S.S. Jalayamuna	19.5	87.3	0530	NE	35	Squall
S.S. Jalayamuna	20.2	87.6	1130	NE	45	Heavy rain
S.S. Clan Stewart	18.1	86.3	1130	NW	35	Showers
S.S. Mapia	19.2	89.7	1130	SE	30	Past weather rain
S.S. Mapia	18.8	90.2	1730	S	35	Slight continuous rain
Sandheads			1730	NE	25	Moderate continuous rain

Moving in a northnortheasterly direction, the cyclonic storm was centred near Lat. 20.5°N and Long. 89.5°E at 0830 hrs IST on the 18th when Sandheads and Sagar Island reported northerly winds 30 knots and northnortheasterly winds 30 knots respectively. The storm crossed East Pakistan coast on the night of 18th and weakened thereafter rapidly. It lay as a shallow depression over lower Assam on the 19th morning. By the next day it weakened further into a trough and moved away northeastwards as a low pressure over Assam.

Chittagong reported at 1730 hrs IST of 18th, a pressure of 993 mb. From this the central pressure may be estimated near 985 mb.

In association with the storm local or scattered thundershowers occurred in Assam, West Bengal and East Pakistan on most days between 16th and 21st May. A very heavy fall of 13 cm was reported from Haflong on 19th.

The noteworthy district averages and particularly heavy falls of that period are given in the table below:

State and District	District average in cm				Particularly heavy falls (cm)
	16	17	18	19	
<b>ASSAM</b>					
Goalpara	4.9	-	-	-	Goalpara 14.8 on 16th.
Darrang	2.2	-	-	-	
Cachar	-	-	2.6	5.2	Dew 10.3 on 19th.
Garo Hills	4.6	-	-	-	Tura 8.1 on 16th.
Khasi and Jaintia Hills )	-	-	-	1.7	
Miso district	-	-	3.2	6.1	Sailsut 8.3, Luanglesh 7.9 on 18th. Sairang 9.5, Sheerkawn 12.2, Kolo-sib 7.8 on 19th.

### 3 Depression in the Arabian Sea— —1st to 2nd July—

Possibly associated with the westward movement of a lower tropospheric trough over east Madhya Pradesh on the 27th, there was a pressure fall of about

2 mb over Gulf of Cambay and adjoining north Maharashtra coast at 1730 hrs IST of 29th June. A low pressure area developed over the Gulf of Cambay and neighbourhood by 30th morning. Associated circulation was up to 2 km but extended to 5 km by evening.

By the morning of the 1st July, the low pressure area concentrated into a depression off the Gujarat coast with centre near Lat. 20°N and Long. 69.5°E at 0830 hrs IST. The circulation extended upto 4.5 km. The pressure departure at Bombay and Veraval were respectively -8.1 and -7.4 mb. Lack of ships' observations made it difficult to trace the movement of the system. At 1730 hrs IST, the depression was centred near Lat. 20.5°N and Long. 68°E. It was apparently in the same position at 0830 hrs IST of 2nd July and weakened into a low pressure area over north Arabian Sea by 1730 hrs IST.

In association with the depression vigorous monsoon conditions were reported by ships in the central Arabian Sea on the 2nd.

#### 4 Depression in the Bay of Bengal— —9th to 12th July—

On the evening of 7th July, there was a fall of pressure of the order of 2-3 mb over Orissa and West Bengal coasts. A cyclonic circulation developed over west central Bay between 1.5 and 5 km a.s.l. On the morning of 8th a low pressure area developed over northwest Bay and adjoining Orissa coast. Associated upper air cyclonic circulation extended upto 4.5 km a.s.l.

On the morning of 9th further fall of pressure along coastal stations of north Orissa and West Bengal was reported. The upper winds in the region of the disturbance also strengthened. Sandheads reported 20 knots westsouthwesterly and moderate continuous drizzle and Sagar Island 16 knots easterly winds at 0830 hrs IST. The low pressure area thus concentrated into a depression on that day with centre near Lat. 21°N; Long. 88°E at 0830 hrs IST.

During the course of the day, the depression moved northwestwards and crossed Orissa coast the same night near Balasore. Moving further northwestwards it lay on the morning of 10th over Bihar Plateau about 50km southwest of Chaibasa. It moved over to northwest Madhya Pradesh on the 11th. Moving westwards thereafter, it weakened and merged into the seasonal trough on the 12th.

In the meantime a well-marked low pressure area developed over east Rajasthan and adjoining west Madhya Pradesh by 10th and shifted over Gujarat on 11th. Under the influence of this low and under the influence of the depression which was moving towards Madhya Pradesh heavy to very heavy falls were reported from a number of stations in Saurashtra, Konkan and in and near Deccan Ghats on the 11th.

According to newspaper reports, the heavy rain and the squalls accompanying it caused dislocation of traffic and disruption of communication at a number of places in the Konkan, Saurashtra and Kutch and Gujarat. A number of deaths due to floods was also reported from these areas. Bombay City itself was cut off from its suburbs for about two days. Breaches in the railway lines between Kalyan and Igatpuri and between Kalyan and Karjat were also reported to have dislocated through train services of the Central Railway.

The noteworthy district averages of exceptionally very heavy falls from 8th July to 12th July as well as the particularly heavy falls of that period are given below:

State and District	District average in cm				Particularly heavy falls (cm)
	9	10	11	12	
<b>GUJARAT STATE</b>					
Salwad	-	5.9	-	-	10th - Chuda 9.8, Wadhwan 9.1
Gohilwad	7.1	4.5	2.6	-	9th - Bhavnagar 14.6, Songad 13.6
					10th - Palitana 7.9
					11th - Palitana 10.7
Sorath	-	7.0	12.5	3.5	10th - Junagad 14.9
					11th - Porbandar 23.2, Veraval 9.3
					12th - Porbandar 10.0
Amreli	4.3	3.3	8.0	-	9th - Dhari 20.8, Gogha 10.9
					10th - Dhari 10.7
					11th - Dwarka 23.5, Kodinar 10.1
Banaskantha	-	4.2	2.4	-	9th - Wadgam 10.1
					10th - Santalpur 10.0
Mehasana	-	3.5	2.1	-	10th - Mehsana 9.1, Sidhapur 9.0
					11th - Sami 7.4
Sabarkantha	12.0	4.2	1.8	-	9th - Idar 35.9, Meghraj 24.0
					Vijayanagar 15.1
					Khedbrahma 12.0
					10th - Vijayanagar 9.0
Ahmedabad	3.9	6.4	-	-	9th - Dhandhuka 9.5
					10th - Ranpur 20.0, Dholera 9.4
Kaira	-	5.1	-	-	9th - Mehmedabad 9.3, Bhadran 8.4
Baroda	10.4	4.3	-	-	9th - Chotaudepur 18.8, Jetpur 17.0, Karjan 12.0
					10th - Dabhoi 9.7
Broach	6.3	3.4	-	-	9th - Vagra 13.0, Jambusar 9.9
					10th - Vagra 17.0, Dehej 9.6
Surat	10.6	8.8	2.9	-	9th - Gandevi 19.3, Sonagadh 18.3, Vellod 17.1, Jalalpur 16.3, Mahuwa 16.0
					10th - Dharampur 23.1, Bulsar 22.4, Gandevi 13.4
					11th - Bulsar 10.4, Pardi 10.2
<b>MAHARASHTRA STATE</b>					
Thana	7.6	11.7	18.0	11.7	9th - Jawahar 30.4, Shahapur 14.8
					10th - Jawahar 30.5, Shahapur 18.2, Vada 17.5, Mokhada 15.3
					11th - Murbad 32.8, Vada 32.0, Thana 25.9, Shahapur 25.8
					12th - Kalyan 31.4, Jawahar 18.2, Mokhada 17.8, Vada 15.7
Kolaba	4.9	8.0	10.6	4.7	9th - Karjat 21.2, Matheran 10.7, Mahad 9.0
					10th - Karjat 22.9, Matheran 18.8, Uran 15.6, Mangan 12.9
					11th - Matheran 32.1, Kalapur 21.8, Panvel 19.9, Pen 12.5
					12th - Matheran 16.0, Panvel 7.1

1	2	3	4	5	6
Ratnagiri	2.6	4.3	3.1	4.8	10th - Chiplun 12.2, Devrukh 8.9 11th - Mandangad 7.8 12th - Sawantwadi 18.5, Kundal 12.1, Devrukh 8.1
West Khandesh	8.7	3.9	-	-	9th - Nandurbar 14.2, Navapur 12.6, Visarwadi 13.1
Dangs	14.7	13.6	4.5	5.9	9th - Waghai 15.3, Ahwa 14.2
Nasik	3.6	7.8	3.2	6.9	9th - Surgana 10.5, Peint 11.4, Igatpuri 10.5 10th - Trimbak 22.9, Igatpuri 22.1, Surgana 22.0 11th - Igatpuri 16.9, Peint 9.6 12th - Trimbak 22.1, Igatpuri 17.8, Peint 13.3
Poona	2.8	4.2	11.5	5.6	9th - Khandala 9.9 10th - Lonavala 14.5 11th - Lonavala 30.9, Khandala 26.6, Junnar 20.9 12th - Velhe 15.2, Lonavala 17.9, Junnar 11.5
North Satara	3.5	3.5	6.8	4.3	9th - Mahabaleshwar 14.3 10th - Mahabaleshwar 15.1 11th - Mahabaleshwar 29.8, Medha 13.7, Panchagani 10.7 12th - Mahabaleshwar 16.3, Panchagani 9.3
Kolhapur	6.1	6.8	7.9	8.5	9th - Chandgad 15.5, Radhanagari 14.0 10th - Ajara 15.9, Radhanagari 11.4, Shahawadi 10.9 11th - Ajara 16.9, Radhanagari 15.4, Chandgad 14.2, Gargoti 10.6 12th - Chandgad 21.6, Radhanagari 17.5, Gangabawada 16.5, Ajara 11.7

##### 5 Depression in the Bay of Bengal— —15th to 17th July—

On the morning of 13th July, the seasonal trough showed an extension into the north Bay of Bengal. Pressure fall of 4 to 5 mb was reported over land areas and adjoining head Bay. An upper air cyclonic circulation also appeared over the area between the levels 1 and 4.5 km a.s.l. The fall of pressure continued the next day over the region and a low pressure area formed over the northwest Bay. The pressure departure was of the order of -7 to -8 mb in that region and there was a general strengthening of the westerlies in the Peninsula in the lower tropospheric levels. By the evening of 15th, the low pressure area concentrated into a depression with its centre close to the coast between Balasore and Contai. It crossed the coast the next day, and lay over Gangetic West Bengal and adjoining Bihar Plateau in the evening with central region about 90 km southeast of Chaibasa at 1730 hrs IST. Moving northwestwards thereafter, it was centred about 50 km south of Jamshedpur on the 17th morning. It weakened and merged with the seasonal low the next day.

In association with this depression, there was widespread rainfall activity over Madhya Pradesh and between 13th and 16th, in Orissa on 16th and West Bengal and Bihar Plateau and the central parts of the country on the 17th and 18th. Raipur recorded an exceptionally heavy rainfall of 51 cm during the period 13th to 16th. According to press reports, the incessant rain led to the flooding of the railway tracks and dislocation of train services in that area.

The noteworthy district averages and particularly heavy falls of that period are given in the table below:

State and District	District average in cm			Particularly heavy falls (cm)
	15	16	17	
<b>MADHYA PRADESH</b>				
Durg	6.4	5.4	2.1	15th - Durg 19.5, Selod 20.9, Bhatagaon 12.8 16th - Selod 15.0, Durg 11.0, Bhatagaon 13.4
Raipur	11.0	9.0	4.7	15th - Lakholi 29.7, Kendri 28.3, Kanki 21.1. 16th - Kanki 23.4, Kondapur 19.5, Bhatagaon 18.4, Rajim 17.6, Khairadatan 14.7 17th - Rajim 16.9, Kanki 8.4, Lakholi 8.6
Bilaspur	3.2	3.4	2.2	15th - Pondilata 10.2 17th - Katghora 9.2
Raigarh	3.7	3.7	2.8	16th - Raigarh 7.3
Bastar	3.1	-	3.8	15th - Kanker 10.4, Keskal 7.8 17th - Antagarh 7.9
Surguja	-	-	4.2	17th - Sitapur 8.8, Ambikapur 7.4
Mandla	-	5.7	-	16th - Dindori 11.6, Bajag 7.2
Rewa	-	3.8	-	16th - Mauganj 8.9
Sidhi	-	2.7	3.0	
Shahdol	-	-	3.4	
Raipur	-	-	-	15th - Manipur 17.8
<b>BIHAR STATE</b>				
Champaran	3.0	-	-	15th - Kesariah 12.3,
Ranchi	-	-	-	
Palamu	-	-	-	15th - Panki 8.4

#### 6 Depression in the Bay of Bengal —29th August to 5th September—

On the 26th August, the seasonal trough of low pressure extended into northwest Bay and coastal stations of Orissa showed a fall of pressure of 2 to 3 mb. A low pressure area formed off Orissa coast on the next morning. The associated cyclonic circulation extended upto 4.5 km a.s.l. In the course of the next two days, the low pressure area became more marked and on the 29th morning it concentrated into a depression near Lat. 19.5°N and Long. 87.5°E at 0830 hrs IST. The pressure departure at the centre of the depression was estimated to be of the order of -8 mb. The following observations are relevant in this connection:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
Sandheads			0830	E	15	
S.S. British Escort	19.5	90.0	0530	S	15	Precipitation within sight
S.S. Jalapadma	16.6	86.3	0530	W	25	Rain
S.S. Jalapadma	17.0	86.5	1130	W	25	Overcast. Rain
Puri			0830	NE	5	Slight intermittent rain

Moving westwards, the depression crossed coast the next morning near Puri and lay over north Orissa near Titlagarh the same evening. On the morning of 31st it was over east Vidarbha with its centre about 160 km to the southeast of Nagpur. Moving northwestwards, thereafter the depression had its centre between Sagar and Hoshangabad on the morning of 1st September and moved to south-east Rajasthan on the morning of 2nd with its centre near Kotah. On the morning of 3rd, the depression was centred near Nagpur in west Rajasthan. It weakened into a low pressure area on the 4th and lay over northwest Rajasthan and adjoining Punjab. It became unimportant the next day.

In association with the depression, the monsoon strengthened in Orissa, the central parts of the country and the northern parts of the Peninsula. Heavy to very heavy falls were reported from a number of stations in Vidarbha and the Konkan on 31st August and 1st September and from Gujarat and southwest Madhya Pradesh on the 2nd. Dahanu recorded an exceptionally heavy fall of 48 cm on 1st September which was the highest rainfall ever recorded for a single day for that station. It was reported that the rain flooded low lying areas and the accompanying high winds uprooted several trees.

According to press reports, the river Godavari and some of its tributaries were in spate and the railway traffic between Kazipet and Nagpur on the Grand Trunk line was dislocated due to heavy rains. It was also reported that the Tapi and other rivers in Surat district were in high floods following heavy rains in Gujarat and that the floods had submerged a part of the Bombay-Ahmedabad road to the north of Surat isolating the city from the surrounding areas.

In association with the depression monsoon also strengthened in Rajasthan, western districts of Punjab and Himachal Pradesh on 2nd and 3rd when fairly widespread rain with scattered heavy falls occurred over these areas.

The following table gives the district averages and the noteworthy amounts of rainfall associated with the depression.

State and District	District average in cm								Particularly heavy falls (cm)
	29	30	31	1	2	3	4	5	
<b>MADHYA PRADESH</b>									
Durg	-	4.1	3.5	-	-	-	-	-	30th - Rajnandgaon 11.0
Raipur	-	4.0	-	-	-	-	-	-	30th - Pindron 8.9, Arang 8.1
Bilaspur	-	2.9	-	-	-	-	-	-	30th - Janjgir 8.1
Bastar	5.1	5.5	-	-	-	-	-	-	29th - Bhopalpatnam 22.2, Bijapur 8.9 30th - Bhopalpatnam 10.7, Keskal 9.7, Antagarh 8.0

State and District	District average in cm					Particularly heavy falls (cm)			
	29	30	31	1	2	3	4	5	
Damoh	-	4.5	-	-	-	-	-	-	-
Mandla	-	2.6	-	-	-	-	-	-	29th - Burhanpur 7.3
Nimar	4.2	-	-	-	-	-	-	-	-
Chhindwara	-	-	-	2.2	2.2	-	-	-	-
Morena	-	-	-	4.4	2.0	-	-	-	1st * Sabalgarh 7.5
Shivapuri	-	-	-	3.1	2.2	-	-	-	-
Guna	-	-	-	4.2	-	-	-	-	-
Rajgarh	-	-	-	3.4	-	-	-	-	-
Shajapur	-	-	-	2.9	-	-	-	-	-
Ujjain	-	-	-	2.1	-	-	-	-	-
Ratlam	-	-	-	7.9	5.2	-	-	-	1st - Ratlam 18.3 2nd - Sailana 14.5, Ratlam 14.2
Mandsaur	-	-	-	1.9	5.0	-	-	-	2nd - Mandsaur 7.5
Dewas	-	-	-	2.6	2.1	-	-	-	-
Indore	-	-	-	4.0	6.4	-	-	-	2nd - Indore 14.5
Nimar (Khargone)	2.4	-	2.0	4.4	6.2	-	-	-	1st - Maheswar 7.8 2nd - Pansemal 25.3, Barwani 7.7
Dhar	-	-	-	4.3	2.0	-	-	-	1st - Dharamपुर 7.9 2nd - Manawar 8.8
Jhabua	7.8	-	-	3.1	7.6	-	-	-	29th - Jhabua 11.2 1st - Alirajpur 12.4
Raisen	-	-	-	4.0	-	-	-	-	1st - Bareilly 9.0
<b>MAHARASHTRA</b>									
Thana	-	-	7.2	8.2	2.7	-	-	-	31st - Umbergaon 12.8, Jawa- har 12.0, Mahim 10.5 1st - Dahanu 48.1, Mahim 12.9 2nd - Jawabar 10.9, Mokhada 10.3
Kolaba	-	3.1	8.0	3.9	-	-	-	1.6	30th - Mhalsa 10.9, Mangaon 9.4 31st - Mahad 24.9, Poladpur 16.9, Sriwardhan 10.0 1st - Matheran 8.2, Pen 7.1
Ratnagiri	-	2.8	6.4	4.1	-	-	-	-	30th - Ratnagiri 8.2 31st - Dapoli 12.2, Harnai 11.5, Chiplun 11.4, Rajapur 10.6 1st - Rajapur 9.6, Khed 9.4
Buldhana	-	-	1.9	5.3	-	-	-	-	31st - Chikhali 8.9, Kham- gaon 8.3 1st - Buldhana 17.0, Dhaman- gaon 8.2
Akola	-	-	2.1	-	-	-	-	-	1st - Mangrulpir 11.8
Amraoti	-	-	-	4.6	-	-	-	-	1st - Badnera 9.2, Dharni 9.0
Yeotmal	3.1	3.0	4.1	5.1	-	-	-	-	29th - Umarkhed 13.5 30th - Pandherkawara 16.3, Wani 12.9 31st - Pandherkawara 15.0, Umarkhed 8.1 1st - Umarkhed 20.1, Pusad 15.7, Pandherkawara 12.3

State and District	District average in cm								Particularly heavy falls (cm)
	29	30	31	1	2	3	4	5	
Wardha	-	-	6.9	3.9	-	-	-	-	31st - Wardha 10.5, Hinganghat 10.3 1st - Hinganghat 7.4
Nagpur	1.9	-	7.8	2.3	-	-	-	-	31st - Ramtek 13.4, Nagpur 10.8, Parseoni 10.2
Bhandara	-	4.5	3.5	2.1	-	-	-	-	30th - Gondia 10.9, Khyrbund 7.4 1st - Paoni 11.1
Chanda	-	3.9	6.0	2.6	-	-	-	-	30th - Mul 8.2, Sironcha 7.9, Gadhchiroli 7.3 31st - Ahiri 25.4, Chanda 16.3, Sironcha 7.3 1st - Nalesar 10.2
<b>GUJARAT STATE</b>									
Sabarkantha	-	-	-	-	2.4	2.5	-	-	3rd - Idar 7.0, Vijayanagar 7.2
Kaira	-	-	-	2.7	6.7	-	-	-	1st - Borsad 13.3, Matar 7.6 2nd - Kaira 10.2, Mehamadabad 15.9, Anand 11.2, Nadia 11.0
Panch Mahals	2.7	-	-	3.7	6.3	-	-	-	29th - Baria 10.1
Baroda	3.4	2.5	-	3.7	8.8	-	-	-	29th - Sinor 7.4 1st - Waghodia 11.7, Karjan 10.0 2nd - Baroda 15.9, Sankheda 12.7, Padra 11.7, Waghodia 11.2
Broach	2.0	-	4.8	7.2	2.3	-	-	-	31st - Jhagadia 30.3, Valia 10.4, Dediapada 9.4 1st - Dediapada 12.2, Sagbara 10.7, Rajpipla 11.4 2nd - Ankleshwar 7.8, Vagra 7.0
Surat	-	1.6	3.4	12.0	5.5	-	-	-	30th - Palsana 8.4 31st - Vyara 22.4, Kim 7.4 1st - Mandvi 31.1, Gandevis 22.6, Valod 16.8, Bardoli 16.5, Chikli 14.4, Mangrol 14.5 2nd - Mandvi 12.3, Songadh 9.6, Dharampur 9.1

7 Depression in the Bay of Bengal—  
—8th to 14th September—

Under the influence of a low pressure wave from the east, moving across central Burma on 6th September, the seasonal trough extended into north Bay and pressures were found to be falling over the stations of East Pakistan. By the evening of the same day, the falling pressure tendency extended to Gangetic West Bengal.

On the morning of 7th, a low pressure area formed over the head Bay with associated cyclonic circulation extending upto 6 km a.s.l. The pressures continued to fall over East Pakistan and Gangetic West Bengal.

On the morning of 8th, the low pressure area over the north Bay concentrated into a depression which was centred at 0830 hrs IST near Lat. 20.5°N and Long. 89.0°E. The following observations are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Havildar	19.8	89.3	0530	W	10	Cloudy
Sandheads			0830	NE	15	Overcast
Sagar Island			0830	ESE	20	Slight drizzle
Chandbali			0830	N	5	Overcast
Akyab			0830	S	10	Moderate continuous Drizzle.

Moving westwards, the depression was near Lat. 20.5°N and Long. 88.0°E at 1730 hrs IST of the same day when Sandheads recorded easterly wind of 20 Kts. Continuing to move westwards, it crossed north Orissa coast near Chandbali by the morning of 9th and was centred at 0830 hrs IST about 50 km to the east of Sambalpur. Moving westnorthwestwards thereafter, it lay over Madhya Pradesh near Seoni on the 10th morning. Later it moved northwest and lay over southeast Rajasthan with its centre near Jhalawar on 11th morning and about 50 km to the south of Jodhpur on the 12th morning. Jodhpur reported 35 knots eastnortheasterly wind between 0.6 and 0.9 km which indicated that the depression had become deep. The deep depression moved to Sind the next morning. The circulation was still quite marked and extended upto 6 kms a.s.l. Bhuj recorded 50-60 knots westerly winds between 0.3 and 0.9 km a.s.l. and Karachi reported 20-30 knots northerly between 0.9 and 2.0 km a.s.l. on the morning of 13th. The estimated pressure departure at the centre of the depression was of the order of -10 mb.

By the morning of 14th, the deep depression moved slightly westwards and was about 50 km east of Hyderabad (Sind). It moved further westward the next day weakened into a low pressure area and became unimportant thereafter.

In association with the depression, the monsoon strengthened over Orissa, Bihar Plateau and central parts of the country and Punjab. Monsoon also strengthened in the north Konkan, Gujarat, Saurashtra, Kutch and Rajasthan between 11th and 13th when very heavy falls of rain were reported from a number of stations in and near Saurashtra and Kutch.

According to press reports, there was flooding of railway tracks in some parts of Saurashtra. The following statement gives district average and noteworthy amounts of rainfall associated with the depression.

State and District	District average in cms.						Particularly heavy falls (cm)
	7	8	9	10	11	12	
<b>GUJARAT STATE</b>							
Rajkot			4.6	3.0	8.1		10th - Gondal 12.1 12th - Rajkot 13.1, Jasdan 9.0
Zalwad				4.9			12th - Wadhwan 9.5

State and District	District average in cm						Particularly heavy falls (cm)
	7	8	9	10	11	12	
Gohilwad				2.6	2.9	1.4	11th - Bhavnagar 5.4
Sorath				2.9	3.9	11.6	10th - Junagad 8.2 11th - Junagad 7.1 12th - Veraval 21.6, Junagad 10.9
Kutch					3.1	6.9	12th - Anjar 12.1, Khawda 9.9, Naliya 9.8
Amreli					4.1	1.9	11th - Kodinar 7.3
Banaskantha						4.6	-
Mehsana						5.6	11th - Kodi 12.4 12th - Vijapur 10.5, Visnagar 7.1
Sabarkantha				3.6	3.2	4.1	10th - Byad 11.3, Malpur 9.6 12th - Malpur 11.3, Byad 7.2
Ahmedabad				2.8	4.7	5.7	11th - Aslali 8.7, Ahmedabad 7.7 12th - Aslali 9.6, Dhandhuka 9.6, Sanand 9.0, Dholka 9.5
Kaira				5.4	5.8	4.0	10th - Kapadvanj 10.3, Balsinor 9.3 11th - Matar 11.9, Savali Tank 8.1 12th - Mehmedabad 10.1, Pinglaj 10.1
Panch Mahals		2.9	4.6	3.6	2.5		9th - Sant 11.9 10th - Jhalod 11.2, Limkheda 11.0, Lunawada 8.2 11th - Baria 11.2, Jhalod 8.0 12th - Bana 9.8
Baroda					2.4	4.8	11th - Karjan 9.5 12th - Padra 10.3, Waghodia 9.2
Broach					5.2	3.0	11th - Amod 11.3, Jumbusar 10.2, Bhalad 9.2 12th - Vagra 15.0, Dehej 7.2
Surat				3.5	2.5	2.1	10th - Bulsar 9.3, Pardi 8.4 11th - Pardi 9.4 12th - Bulsar 12.1
<b>MAHARASHTRA</b>							
Thana				3.8	7.6	6.3	9th - Umbergaon 9.1 10th - Umbergaon 9.4, Jawahar 8.2 11th - Dahanu 16.6, Jawahar 13.0, Vada 11.2 12th - Jawahar 14.7, Dahanu 8.9
Colaba				2.1	3.7	3.0	10th - Matheran 7.1 11th - Matheran 14.2
Amraoti					2.8		11th - Chikhaldia 10.3, Dharni 10.0

1	2	3	4	5	6	7	8
Nagpur				9.0	1.2		10th - Umrar 13.2, Parseoni 14.3, Tharsa 12.9, Ramtek 11.5
Bhandara				11.0			10th - Chorkhamara 19.2, Bhandara 18.3, Bodalkasa 14.5, Deori 13.4, Sakoli 12.7
Chanda				6.1			10th - Ghorjbari 17.3, Garmusi 17.0, Sindhewahi 17.2, Khairee 16.5, Brahmapuri 13.7
<b>MADHYA PRADESH</b>							
Durg			3.1	4.1			10th - Dongargarh 11.3
Raigarh	4.0	2.3	2.6	2.6	2.8		11th - Raigarh 8.5
Balaghat				3.3			10th - Sarathi 7.8, Lanji 7.2
Hoshangabad				4.6	2.9		8th - Makrai 8.0
							10th - Pachmarhi 11.9, Seoni Malwa 10.2, Sohagpur 8.9, Harda 8.4
Narsimhapur			3.1	2.6			11th - Seoni Malwa 9.0
Nimar				6.0			9th - Mohpani 11.4
Betul				6.4	3.3		10th - Mandhata 14.2
Chhindwara				5.3			10th - Chincholi 12.7, Betul 7.2
Bhind	5.9	7.4			2.8		10th - Tamia 11.9, Sausar 9.4
							7th - Lahar 7.9
							8th - Gohad 16.5, Mehgaon 12.5
Morena		3.0					-
Gwalior	10.0						7th - Pichhore 25.5, Gird 7.0
Shivpuri	3.1	4.9					8th - Shivpuri 9.5, Gwalior 8.5
Rajgarh					7.9		11th - Sarangpur 10.8, Khilchipur 9.8
Shajapur				9.1	2.4		10th - Shujalpur 12.3, Shajapur 9.9
							11th - Susner 7.3
Ujjain			3.3		7.1	3.0	9th - Khachrod 7.9
							10th - Tarana 11.2, Badnagar 8.9
Ratlam		4.4		7.7	5.3		8th - Jaora 7.9
							10th - Ratlam 19.1
							11th - Sailana 7.8, Ratlam 19.1
Mandsaur			6.0		3.8	3.6	9th - Mandsaur 12.2, Manasa 11.1, Sitamau 10.1
Dewas				5.9	5.9		10th - Sonkach 13.5
							11th - Kannod 11.4, Dewas 10.0
Indore				3.2	4.4		10th - Manpur 8.1
							11th - Depalpur 7.1
Nimar (Khargone)				4.7			10th - Burwaha 14.0, Maheswar 12.3
Dhar				6.4			10th - Sardarpur 10.4, Dharampuri 9.4

8 Deep depression in the Bay of Bengal—  
—13th to 16th September—

On the morning of 11th September, the pibal observations of central Burma and of Arakan coast indicated that a low pressure wave from east was moving westwards across central Burma. It moved into the north Bay of Bengal and adjoining east central Bay by the morning of 12th. By the evening of the same day, a low pressure area formed over head Bay with associated upper air cyclonic circulation extending to about 6 km a.s.l. On the morning of 13th, it concentrated into a depression with centre near Lat. 21°N and Long. 89°E at 0830 hrs IST.

The following observations were recorded in the morning of 13th.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Aronda Sandheads	21.0	91.3	0530	SSE	20	Overcast
			0830	NW	20	Slight intermittent rain
Sagar Island			0830	NNE	20	Slight intermittent drizzle.

The associated circulation extended upto 4.5 km a.s.l. The depression deepened during the day and by the evening the departure at the centre was of the order of -8 mb. Sandheads and Sagar Island reported northnorthwesterly 25 kts and 35 kts respectively and moderate intermittent rain at 1730 hrs IST. The deep depression had moved northwestwards and was centred at 1730 hrs IST near Lat. 21.5°N and Long. 88.5°E. Continuing to move in the same direction it crossed West Bengal coast near Contai on the morning of 14th and was centred at 0830 hrs IST at about 50 kms westsouthwest of Calcutta. Moving further northwestwards later it lay over southeast Bihar on 15th morning centred at 0830 hrs IST about 50 kms south of Jamui. Thereafter, it weakened into a depression recurved towards northeast and lay over east Bihar on 16th morning centred near Sabour. It weakened further and lay as an extended trough extending from Sub-Himalayan West Bengal to upper Assam on the morning of 17th.

In association with this depression, heavy to very heavy rain was reported from some places in Gangetic West Bengal on 14th and 15th, Bihar Plateau on the 15th and at a few places in Sub-Himalayan West Bengal and upper Assam on 16th and 17th. Some of the noteworthy amounts of rainfall recorded were: Midnapore 31 cm and Contai 24 cm on 14th, Jamshedpur 16 cm on 15th, Cherrapunji 30 cm on 16th and Dhubri 18 cm on 17th. According to press reports several houses were blown away in the coastal regions of West Bengal. Some country boats were sunk at Diamond harbour and paddy fields in the districts of Midnapore and 24 Parganas were submerged. It was also reported that the train service on some sections of southeastern Railway were dislocated due to heavy rains.

The following table gives the district averages and the noteworthy amounts of rainfall of that period.

State and District	District average in cm				Particularly heavy falls (cm)
	13	14	15	16	
<b>ASSAM</b>					
Goalpara			10.6		16th - Runikhata 25.9, Goalpara 22.1, Kachugaon 15.5
Kamrup			2.6		16th - Doomni 9.8, Barduar 7.2
Nowgong			2.1		
Lakhimpur			2.6		
Cachar			3.0	3.6	15th - Badarpur 8.1
Garo Hills			1.7	3.4	
Khasi and Jaintia Hills			9.1	19.0	15th - Mawsynram 23.7, Cherrapunji Police Station 17.9, Jowai 10.2
					16th - Mawsynram 43.2, Cherrapunji Police Station 27.5
<b>BIHAR PLATEAU</b>					
Hazaribagh			6.2	7.7	15th - Petarbar 20.8, Gola 10.2, Talaiya 11.6, Ramgarh 9.5
					16th - Pachamba 19.0, Bokaro 14.8, Dumri 14.4, Tandwa 10.4, Ramgarh 10.0
Palamau			3.3	2.8	15th - Natarhat 9.9
Dhanbad	3.4		7.1	2.9	14th - Nirsa 11.4, Chas 8.3, Dhanbad 8.3
					15th - Topehanchi 20.3, Maithan 13.1, Chandankiary 13.1, Panchbethills 12.9
					16th - Rajdaha 21.5
Singhbhum	2.1		4.8		14th - Baharagora 10.8
					15th - Janshedpur 16.1, Ghatsila 12.7, Chandil 12.0, Baharagora 10.3

9 Deep depression in the Bay of Bengal—

—5th to 8th October—

and

Severe cyclonic storm in the Arabian Sea—

—9th to 17th October—

On the evening of 4th October, a general fall of pressure was observed over Tennasserim coast and Bay Islands. On the morning of next day this fall continued and was of the order of 3 to 5 mb. There was also rainfall activity over the Bay Islands. These indicated that a disturbance was moving into the Andaman Sea from the east. By the evening of the same day, a well marked low pressure area appeared over the south Bay. The following ships observations on 5th are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Caltex Leiden	6.1	88.8	1730	WSW	15	Showers during the previous hour
S.S. Carthage	6.0	89.5	1730	WSW	20	Violent rain showers

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Knots)	
S.S.Isemaru	5.6	91.6	1730	W	25	Squall
S.S.Oxfordshire	5.7	84.3	1730	NW	10	Moderate rain
S.S.Hakubesamaru	11.7	84.3	1730	NNE	15	Overcast
S.S.Jalganga	12.6	89.5	1730	ENE	10	-

These, together with the pressure observations by the ships indicated that the low pressure area was actually intensifying into a depression with central region near Lat. 9.5°N and Long. 88.5°E on 5th evening.

On the morning of 6th, the depression was centred near Lat. 10.5°N and Long. 86°E at 1130 hrs IST.

The following observations are relevant.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Hakubasamaru	11.2	86.6	1130	SE	25	Overcast
S.S.City of Cardiff	14.2	85.7	1130	ENE	25	Intermittent rain/showers
S.S.Jalganga	15.1	85.4	1130	ENE	15	Overcast
Trincomalee			0830	WNW	10	Slight continuous drizzle
S.S.Rajula	7.4	86.7	1130	WSW	10	Precipitation in sight

Moving in a westnorthwesterly direction, the depression was centred near Lat. 11°N and Long. 84.5°E at 1730 hrs IST of 6th when the following observations were recorded:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.City of Cardiff	11.4	84.6	1130	SSW	25	Cloudy
S.S.Bharatveer	15.5	82.6	0530	ENE	25	Squall
S.S.Liverpool	13.5	80.5	1130	E	20	Overcast
Madras			0830	E	5	Slight continuous rain

At 1730 hrs IST of 7th S.S.Jalausha (13.5°N, 82.0°E) reported southerly winds 25 knots and showers during the previous hour. S.S.Jalayamuna (15.1°N; 81.5°E) reported easterly winds 20 knots and overcast skies, while Madras and Nellore reported 5 knots southsouthwesterly and northeasterly winds respectively and overcast skies. The deep depression crossed north Madras coast near 14°N during the night and weakened. It lay about 80 kms to the southeast of Gadag at 0830 hrs IST of 8th. The associated circulation extended upto 6 km a.s.l. The depression moved westnorthwestwards thereafter and emerged into the Arabian Sea by the morning of 9th October and was centred near 16°N and 71°E at 0830 hrs IST as would be evident from the following observations.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Tadetsmaru	15.2	71.6	1130	WSW	20	Rain/showers during previous hour.
S.S. Amra	14.6	69.5	0830	W	20	Overcast
S.S. Amra	15.5	70.4	1130	WSW	20	Precipitation within sight.
S.S. Sundomaru	14.2	72.4	0530	W	20	Rain showers.
S.S. Mackerayne	17.6	69.2	1130	NE	15	Slight continuous drizzle.
Devgarh			0830	SSE	15	Cloudy

Vengurla reported 25-30 kts southerly wind between 0.6 and 0.9 km a.s.l. at 0530 hrs IST of 9th and the upper air charts showed that the circulation was extending to 6 km a.s.l. The estimated pressure departure at the centre of the depression was -10 mb. These facts indicated that depression was probably already deep. Moving in a northwesterly direction, the deep depression was centred near 17.0°N and 70.5°E at 1730 hrs IST of 9th. The field of the depression covered the whole of east Arabian Sea and the adjoining land areas and there was every sign of its intensification.

Continuing to move northwest, the deep depression was centred near 17.5°N and 70°E at 0530 hrs IST on the 10th. By 1130 hrs IST it rapidly intensified into a severe cyclonic storm and was then centred near 18°N and 69.5°E. The 1130 hrs IST reports of S.S. Caltex Leiden (17°N and 68.5°E) and S.S. Indian Commerce (17.5°N and 68.5°E) gave the first indication of the intensification of the deep depression into a severe cyclonic storm. They reported westerly winds 55 and 50 knots respectively and heavy continuous rain.

On the morning of 10th under the influence of the storm, widespread rainfall was reported over Konkan, Maharashtra and coastal Mysore. Rainfall was also fairly widespread over east Madhya Pradesh and Orissa. The equatorial westerlies upto 3.0 km advanced into the Arabian Sea upto 18°N. Winds over the coastal stations of Mysore, Konkan and Gujarat were under the grip of the cyclonic circulation.

The severe cyclonic storm moved northwest and was centred near 18.5°N and 68.5°E at 1730 hrs IST of the same day. The following observations of 10th are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Toamaru	17.2	67.2	1730	NW	20	Slight continuous rain
S.S. Caltex Leiden	17.3	68.0	1730	W	37	Heavy continuous rain
S.S. Indian Commerce	17.5	68.7	1730	WSW	35	Overcast
S.S. Carthage	18.2	71.7	1730	S	25	Heavy rain showers
S.S. Mustali	20.3	68.6	1730	SE	20	-

The pressure at the centre of the storm was estimated to be 988 mb.

S.S.Caltex Leiden reported at 2330 hrs IST of 10th (17.7°N, 67.5°E) 48 kts westnorthwesterly winds and heavy continuous rain. The same ship at 0530 hrs IST of 11th (18.0°N, 67.0°E) reported northnorthwesterly 55 kts and showers during previous hour.

The severe cyclonic storm moved slightly northwards and was centred near 19°N and 68.0°E at 0830 hrs IST of 11th. The storm field practically extended over the central and north Arabian Sea. Winds of Konkan, Gujarat and Sind coasts continued to be in the grip of the storm and widespread rainfall was reported from the belt of the country extending from Saurashtra to Assam and Sub-Himalayan West Bengal.

At 1730 hrs of 11th, the severe cyclonic storm was centred at 19°N and 68°E as would be evident from the available ships observations. Thereafter it moved westnorthwestwards and was probably centred near 19.5°N and 67°E at 0830 hrs of 12th. On the 12th, no observations near the core of the storm were available. However, on the morning of 13th reports from ships near the core was available which showed that the storm had remained severe with a core of hurricane winds. S.S.Vivek located near 19.5°N and 65°E at 0830 hrs IST reported southwest-erly winds of force 9 to 12. S.S.Orna located at 19°N and 64°E at 1030 hrs IST reported southsouthwesterly winds of force 8-9 with heavy continuous rain and visibility nil. The available observations indicated that the severe cyclonic storm was centred near 20°N and 65°E at 0830 hrs IST on 13th. This indicated that the storm had been moving in a westnorthwesterly direction during the past 24 hours. The pressure at the centre was estimated to be 988 mb, the pressure departure being of the order of -20 mb. The 1730 hrs IST observations of Vivek showed that the ship (20.2°N and 64.5°E) was near the centre of the storm. It reported 10 knots and slight intermittent rain while ships a little way from the position both to southwest and east reported winds 25 to 30 knots. The storm centre was near 20.3°N and 64.5°E. On the 14th, the movement of the storm was very little. S.S.Norwegian tanker (20.3°N and 64.5°E) reported at 1730 hrs IST of the same day 50 knots west-southwesterly winds and slight intermittent rain, which indicated that the storm centre was near 20.5°N and 64.5°E.

Thereafter, the storm remained practically stationary and was weakening. The available ships observations on the 16th indicated that the storm had weakened into a deep depression. It weakened further and lay as a trough of low pressure. on the 17th morning and became unimportant by the same evening.

In the early stages of this disturbance when it was a depression locally heavy to very heavy rain was reported from coastal Andhra Pradesh, Madras State, Rayalaseema and coastal and south Mysore. The heavy rainfall caused some breaches over the Railway track between Reningunta and Cuddapah of the southern Railway.

When it developed into a storm in the Arabian Sea, there was an influx of moist air in association with it into Gujarat, Saurashtra and Kutch and the north Konkan during the period and into west Madhya Pradesh, Vidarbha and Maharashtra till the 14th. Fairly widespread or local showers occurred in coastal Mysore, Vidarbha, Gujarat, Saurashtra and Kutch, Maharashtra, west Madhya Pradesh and the Konkan. Scattered showers were also reported from east Rajasthan on a few days.

Some of the relevant observations in the Arabian Sea and neighbourhood during the period 11th-15th October are given below:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
<u>11th October, 1958</u>						
S.S. Indian Merchant	18.0	68.8	0830	WSW	37	Overcast
	18.1	69.3	1130	SSW	37	Overcast
	18.4	70.9	1730	SSW	30	Cloudy
S.S. Mustoli	18.6	69.7	1130	S	25	-
S.S. Caltex Leiden	18.2	66.7	0830	NW	40	Moderate continuous rain
	18.4	66.6	1130	NW	49	Slight continuous rain
	18.2	66.3	1430	NW	56	-
	17.7	66.2	1730	NW	47	Overcast
Diu			0830	SE	25	Overcast
Veraval			0830	E	15	Slight continuous rain
<u>12th October, 1958</u>						
S.S. Caltex Leiden	18.2	65.0	0530	NW	35	Slight continuous rain
S.S. Dumra	19.9	69.9	0530	SSW	20	-
	20.1	68.9	0930	S	15	Cloudy
	20.3	67.5	1730	S	20	Cloudy
S.S. Moaridirch	23.0	63.0	1730	NE	15	-
<u>13th October, 1958</u>						
S.S. Vivek	19.5	65.0	0830	SW	60	Force as reported 9/12 Rain and bad visibility.
S.S. Vanchavelier	19.0	65.0	0830	S	20	Overcast, Visibility nil. Sea mountainous.
S.S. Orona	19.1	64.0	1030	SW	40	Moderate continuous rain
S.S. Moordreoni	21.4	67.5	1130	SE	30	Precipitation in sight.
S.S. Vivek	20.3	64.3	1730	NE	10	Slight intermittent rain.
S.S. Mostankyun	19.3	63.4	1630	NW	35	-
S.S. Br. Talent	20.7	66.3	1730	SSE	25	Moderate to rough breaking sea and slight intermittent rain.
S.S. Orna	18.5	64.5	1730	SW	35	-
<u>14th October, 1958</u>						
S.S. Selve	19.6	64.3	0530	W	10	Slight drizzle.
S.S. Stanvac	22.0	65.7	1130	SE	40	-
S.S. Norwegian Tanker	20.4	64.4	1730	SW	50	Slight intermittent rain.
	19.6	60.6	1730	NW	15	-
S.S. Harminella	19.0	66.7	1630	SW	30	Overcast!
<u>15th October, 1958</u>						
S.S. Harminella	19.2	63.2	0830	WNW	30	Overcast
S.S. Orna	18.7	65.7	0630	SW	20	Overcast
S.S. Edenfield	21.1	63.0	1130	NE	15	-
S.S. Dwarka	21.5	68.4	1130	S	20	Showers during previous hour
S.S. Edenfield	20.6	64.0	1730	NNE	25	-
<u>16th October, 1958</u>						
S.S. Callu Manila	19.6	66.4	0530	SW	30	Slight continuous drizzle
S.S. Callu Manila	20.0	65.1	1130	WNW	25	-
S.S. Callu Manila	20.8	64.0	1730	N	20	-

The following table gives the district averages and noteworthy amounts of rainfall associated with the storm.

State and District	District average (cm)											Particularly heavy falls					
	6	7	8	9	10	11	12	13	14	15	16		17				
<b>MAHARASHTRA</b>																	
Ratnagiri			1.5	1.6	1.9												
Ahmednagar																	14th - Mirajgaon 7.4
Sholapur				2.5													9th - Sholapur 8.3 14th - Sholapur 7.8
<b>KUTCH</b>																	
Gohilwad								2.6	1.8								12th - Songad 10.7
Amreli								1.6									
<b>EAST MADHYA PRADESH</b>																	
Durg					1.5												
Sagar						2.0											
Damoh						1.1											
Nimar						2.3											
Nimar(Khargone)						2.5											
Raisen						2.1	2.2										
Rewa						1.8											10th - Sirmaur 8.8.
Satna							2.8										
Sidhi						2.7											
Shahdol						4.0											10th - Beohari 8.3
<b>MADRAS</b>																	
Chingelpet	8.8									2.7	6.1						7th - Cheyyur 15.5, Meenambakkam 14.4, Tiruval- lur 14.0 16th - Madurantakam 8.5 17th - Satyavedu 12.4, Saidapet 11.0 7th - Wallajah 13.1, Gudiyattam 11.6, Wandiwash 11.6 7th - Merkanam 15.8, Vanur 11.4 17th - Vanur 7.1
North Arcot	8.0									2.9							
South Arcot	4.3									2.5							
The Nilgiris	2.0	2.2															
<b>ANDHRA PRADESH</b>																	
Srikakalum	2.9	6.3	5.7														7th - Pundi 11.4 8th - Tekkali 12.4, Ichapur 8.7 9th - Tekkali 12.1, Bobbili 9.4 7th - Vizianagaram 15.8 8th - Vizianagaram 16.7, Konado 9.4 8th - Biccavole 15.5, Peddapuram 14.0, Kakinada 10.9 9th - Biccavole 10.5, Kothapeta 9.4
Vishakhapatnam	5.7	6.9															
East Godavari	2.5	7.2	4.3							2.6							

1	2	3	4	5	6	7	8	9	10	11	12	13	14
West Godavari	3.2	5.0	3.6										8th - Kovvur 10.9, Tanuku 9.7
Krishna Nellore			2.5									5.2	7th - Rapur 11.0, Ka- vali 10.4, Ta- da 9.5
Anantapur				4.0									17th - Tada 10.2, Ka- vali 9.6
Chittur			5.2										8th - Cuddapah 27.0, Jummal Madugu 18.7, Rayachoti 17.0
Cuddapah			2.6	9.6									7th - Tirupathi 19.0, Chandragiri 17.6
													8th - Cuddapah 27.0, Jum- mal Madugu 18.7, Rayachoti 17.0.

10 Depression in the Bay of Bengal—  
—16th to 21st October—

The seasonal trough of low pressure over the west central Bay became marked on the evening of 14th. The next morning, stations over north Andhra coast showed increased rainfall activity. A cyclonic circulation developed between 3 and 6 kms a.s.l. over the west central Bay and adjoining Andhra coast. By the evening of the same day, the circulation extended to lower levels and was seen upto 0.3 km a.s.l. off Madras and adjoining Andhra coast. On the morning of 16th, the disturbance became well marked and had its central region near 12.5°N and 84.5°E in the west central Bay. The stations of north coastal Andhra Pradesh showed a pressure departures of -2 to -3 mb. The circulation associated with the disturbance was extending to 6 km a.s.l. through above 3 km there was a tilt of the axis of the disturbance to the south.

During the day, the upper winds of Madras backed and strengthened and became northwesterlies to northerlies 30 kts between 0.9 and 2.1 km a.s.l. and northeasterlies 30 knots between 3 and 4.5 km a.s.l. at 1730 hrs IST. These together with the ships observations indicated that the low pressure area was concentrating into a depression with centre near 13.5°N and 84.5°E at 1730 hrs IST of 16th. The following ships observations were relevant.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Wini	12.1	84.3	1730	WSW	17	Slight intermittent rain
S.S.City of Johannesberg	14.5	85.2	1730	E	10	-

The estimated central pressure was of the order of 1001 mb with a departure of -5 mb.

Moving in a westnorthwesterly direction, the depression was centred near 14°N, 83°E at 0830 hrs IST of 17th.

The following observations were recorded.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Bharatrani	12.6	82.7	0530	WSW	20	Overcast
S.S. Jalausha	15.4	81.6	1130	NE	5	-

During the day, the upper winds of Gannavaram veered and became north-easterlies while Madras backed and became mainly westerly upto 0.6 km. The depression was centred near 14.5°N and 82.5°E at 1730 hrs IST of 17th.

On the morning of 18th, the rainfall over the coastal stations of Andhra and Orissa increased. The depression was practically stationary and continued to be near 14.5°N and 82.5°E at 0830 hrs IST. The cyclonic circulation associated with the depression extended to 3 km a.s.l. Moving slowly northwestwards, it was centred near Lat. 15.0°N and 82.0°E at 1730 hrs IST of 19th. Later it moved very slowly northeastwards and was centred near 15.5°N and 82.5°E at 0830 hrs IST of 20th. The following observations of 20th are relevant.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Jalamanjari	17.8	84.8	0530	SSE	15	Showers
S.S. Jaladhari	15.4	85.5	0530	S	15	-
S.S. Jaladhari	16.0	86.0	1130	S	15	-
Masulipatam			0830	NW	5	Drizzle
Kakinada			0830	ENE	5	Thundershowers

Vishakhapatnam and Kakinada reported very heavy falls (29 cm and 22 cm respectively) on the morning of 20th.

The depression showed signs of weakening subsequently. It lay as a low pressure area on the morning of 21st over west central Bay and adjoining north coastal Andhra Pradesh with associated circulation extending upto 4.5 km a.s.l. It became unimportant by 24th.

In association with the depression, there was widespread rain in the coastal districts of Andhra Pradesh from 17th to 20th and of Orissa and West Bengal on the 21st, with locally heavy falls on some days. The rainfall of 19 cm in Vishakhapatnam on the 20th was an all time record. According to paper reports, Vishakhapatnam was practically under knee-deep water and about 20,000 people were rendered homeless. Several railway breaches were reported on the lines connecting Waltair to the different neighbouring towns. A statement showing the district averages and particularly heavy falls is given below:

State and District	District average (cm).					Particularly heavy falls
	16	17	18	19	20 21	
<b>ANDHRA PRADESH</b>						
Srikakulam	3.2	3.1	10.1	8.7		20th - Chipurupalli 18.7, Pundi 17.9, Narasannapetha 12.8 21st - Chipurupalli 21.6, Parvathipur 16.2, Bobbili 13.9

State and District	District average (cm)						Particularly heavy falls
	16	17	18	19	20	21	
Vishakhapatnam			3.1	8.0	16.9	7.5	18th - Waltair 7.8 19th - Malakapuram 33.5, Vizianagaram 23.4, Gajapathinagaram 14.0 20th - Polavaram 35.9, Waltair 29.3, Bhimunipatam 27.3, Chodavaram 19.1, Vizianagaram 17.8 21st - Polavaram 21.3, Srungavarapukota 17.9
East Godavari	2.6	4.0	7.0	14.8	4.7		18th - Mummidivaram 8.3 19th - Coringa 23.4, Pithapuram 16.8, Prathipadu 13.2, Kothapeta 11.3 20th - Biccavole 43.2, Mummidivaram 23.2, Kothapeta 20.8, Amalapuram 20.5, Kakinada 22.2 21st - Biccavole 38.1
West Godavari					2.8		
Cuddapah			2.4				18th - Pallempet 8.0, Kodur 8.0, Rajampet 7.2
Nalgonda				4.1			19th - Nalgonda 10.0, Huzurnagar 9.7
Khammam	2.3	2.3					17th - Poloncha 7.6

11 Cyclonic storm in the Bay of Bengal—  
—22nd to 26th October—

On the morning of 20th October, stations in Tennasserim coast reported fall of pressure. The pressure departure in these stations was of the order of -5 to -6 mb. The upper air observations indicated the existence of a feeble cyclonic circulation over north Andaman Sea and adjoining Tennasserim coast where a low pressure area developed by the evening of the same day.

The fall of pressure extended to upper Burma coast during the next 24 hours and the low pressure area was moving northwards. By the evening of 21st, with the backing of Akyab upper winds and veering of Rangoon upper winds, the low pressure area moved further northwestwards and lay over east central Bay and adjoining northeast Bay.

The low pressure area became more marked on the morning of 22nd and by evening it concentrated into a depression with centre near 19.5°N and 90.5°E at 1730 hrs IST. The following observations are relevant.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Clan Mac Brayne	19.7	89.6	1730	N	25	Heavy intermittent rain
S.S. Mustali						

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
Sandheads			1730	NNW	15	Overcast
Akyab			1730	S	10	Slight continuous drizzle

During the night, upper winds of Calcutta strengthened to 20-30 knots northeasterly between 0.6 to 3.0 km a.s.l. The depression moved northwards and rapidly intensified into a cyclonic storm of small extent on the morning of 23rd, and was centred near 20.5°N and 90.5°E at 0830 hrs IST. The following observations were recorded:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Clan Macbrayne	19.7	89.9	0530	NW	30	Heavy continuous rain
S.S.Eastern Maid	20.4	89.4	0830	NW	30	Moderate continuous rain
St.Valaryencyany	21.9	89.5	0830	E	40	-do-
Sandheads			0830	N	10	Overcast
Sagar Island			0830	NNE	20	-
Barisal			0830	E	2	Moderate continuous rain
Pakistan Prosperity	20.9	88.4	0530	N	25	Overcast
Akyab			0830	S	5	Slight continuous drizzle

The lowest pressure at the centre of the storm was estimated to be 992 mb with a departure of -17 mb. Moving in a northnortheasterly direction during the course of the day, the cyclonic storm was centred near 22°N and 90.5°E at 1730 hrs IST of 23rd. The following observations are relevant in this connection:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.St.Velory	21.9	89.5	1830	WSW	40	Rain during previous hour
S.S.Clan Macoraze	20.5	90.7	1730	SW	25	Moderate intermittent rain
S.S.Hesioni	21.4	91.0	1730	S	30	Heavy intermittent rain
Chittagong			1730	SSE	15	Slight continuous rain

The cyclonic storm crossed East Pakistan coast between Barisal and Noakhali during the night and weakened rapidly into a depression and lay over Assam with its central region near Agartala at 0830 hrs IST of 24th. It weakened further thereafter and moved northeastwards and lay as a low pressure area over northeast Assam on the morning of 25th. It moved away northeastwards later.

In association with the cyclonic storm fairly widespread rain with some heavy falls occurred in East Pakistan, while local rain occurred in Assam. According to press reports, there was dislocation in train services between Dacca and Chittagong as a result of heavy rainfall and gales associated with the cyclonic storm. Many kutcha houses were blown off and large number of trees were uprooted in Bakerganj, Noakhali and Thipperah districts of East Pakistan. Comilla in East Pakistan recorded a very heavy rainfall of 25 cm on 24th.

A statement giving the district average and particularly heavy falls during the period 22nd-26th in Assam is given below.

State and District	District average (cm).					Particularly heavy falls
	22	23	24	25	26	
<u>ASSAM</u>						
Cachar		3.3	3.2	3.7		23rd - Mailakandi 12.6, Karimgang-farm 8.4 24th - Jaffirband 13.2, Dewan 7.5 25th - Mongerkhai 17.2, Hailakandi 7.3
Mikir and north Cachar hills				5.5		25th - Harangajao 8.2, Haflong 8.1
Mizo district	2.2		5.3	3.5		22nd - Kolosib 12.5 24th - Lungleh 9.6, Sialsut 9.6, Sherkawn 7.8 25th - Sairang 8.5

12 Cyclonic storm in the Bay of Bengal—  
—30th October to 12th November—

On the morning of 27th October, a low pressure area was seen moving westwards in the south Bay of Bengal. By the evening of 29th it was just east of Ceylon and Trincomalee recorded a fall of pressure. On the morning of 30th this low pressure area was more marked and had its central region about 200 km to eastnortheast of Trincomalee where a rainfall of 10 cm was recorded. The associated circulation was extending to 2.1 km a.s.l. During the day, winds over Madras strengthened and was 20-25 knots northeasterly to northnortheasterly between 0.3 and 1.5 km a.s.l. By the evening, the low pressure area concentrated into a depression with centre near 9.5°N and 83.5°E at 1730 hrs IST, when Madras and Trincomalee recorded northeasterly 25 kts and westerly winds 15 kts respectively between 0.3 and 1.5 km a.s.l.

The other relevant observations are the following:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
Trincomalee			1730	NW	10	-
S.S. Empire State	9.7	81.7	1730	N	10	-
S.S. Cymaric	6.8	82.8	1730	WNW	10	-
S.S. Clan Mackella	7.0	82.0	1730	WNW	7	-
S.S. Rajula	7.9	89.3	1730	SSE	7	Showers
S.S. Jalaprabha	12.3	87.4	1730	ESE	10	-

The associated circulation extended upto 4.5 km.

Moving northwestwards, the depression was centred near 10°N and 83°E at 0830 hrs IST of 31st. S.S.Rizawani (10.9°N and 80.9°E) reported 20 knots northerly and drizzle at 0730 hrs IST while Jaffna reported northwesterly 10 knots and slight continuous drizzle at 0830 hrs IST. The depression was practically stationary during the day. On the morning of 1st November, the depression was found to have weakened into a well marked low pressure area with central region near 11.5°N and 84.0°E. The circulation associated with the low extended to 3.0 km a.s.l.

The low pressure area was moving slowly northwards till the 5th. On the morning of 6th, Madras winds between 0.3 and 1.5 km a.s.l. backed and the winds of Vishakhapatnam strengthened to 30 knots between the same levels. The low pressure area again concentrated into a shallow depression centred near 15.5°N and 85.5°E at 0830 hrs IST on 6th.

The following observations are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Jagjanani	15.5	86.1	0530	SW	13	Slight intermittent rain
S.S.Jagjanani	16.8	86.7	1130	ESE	18	-do-
S.S.Clan Forbes	14.7	86.6	1130	S	20	Moderate rain showers
S.S.Jagjanani	17.3	86.7	1330	SE	18	-
S.S.Marwane	14.0	85.4	1000	WNW	10	Squall
M.V.Nicobar	12.0	86.6	1130	SW	20	Precipitation within sight reaching ground

The associated circulation extended upto 4.5 km a.s.l. The depression was slowly moving northwards and intensifying at the same time. There were practically no ships' observations in the southern quadrant of the disturbance to fix its centre reliably on the evening of 6th.

During the night, pressures were falling along the West Bengal coast. The depression intensified into a cyclonic storm on the morning of 7th and was apparently centred near 16°N and 86.5°E at 0830 hrs IST. Again ships' observations in the southern and eastern quadrants were practically absent.

The following observations were recorded.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Jagjanani	19.0	87.5	0730	NE	30	Overcast
S.S.Jagjanani	19.1	87.6	0930	ENE	25	Overcast
S.S.Marwane	19.1	86.9	1000	NE	35	Overcast

At 1330 hrs IST S.S.Jagjanani (19.4°N, 87.7°E) reported 30 knots northeasterly winds and slight drizzle and rain. During the day pressures were rapidly

falling along the Burma coast. S.S.Jagjanani (19.8°N, 87.8°E) reported 30 knots northeasterly winds at 1730 hrs IST and overcast skies. Akyab reported at 1730 hrs IST 20 knots easterly winds and Sandoway reported heavy continuous rain at the same time. No upper air observations of Akyab were available at 1730 hrs IST nor were there any ships observations in the southern and eastern quadrants to fix the centre of the storm with reasonable reliability. However, it could be inferred that the cyclonic storm was moving northeastwards. On the morning of 8th, it was apparently centred near 17°N and 88°E.

On the morning of 9th, pressures had risen over the Burma coast. The available upper air observations in that region also showed that the disturbance was weakening at the lower levels. It lay as a deep depression centred at 0830 hrs IST of 9th near 17.5°N and 90.0°E. The following observations are relevant.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Eastern Maid	18.3	90.1	0530	NE	25	Slight intermittent rain
S.S.Subedar	17.7	91.8	0530	S	16	-
S.S.Subedar	18.6	91.0	1130	SE	24	-
S.S.Eastern Maid	17.5	90.3	1130	S	15	Slight intermittent rain

Later the depression remained practically stationary and weakened in situ. By the morning of 10th, it weakened into a trough of low pressure which lay over the east central and adjoining north Bay of Bengal. The trough shifted over the northwest and adjoining west central Bay of Bengal on the 11th, and persisted there till the next day. It became unimportant later.

In association with the early stages of the development of the storm, active northeast monsoon conditions prevailed over coastal Madras State and Ceylon on 30th and 31st of October. Later the northeast monsoon was active in north Madras State and south coastal Andhra Pradesh. Local rain with isolated heavy falls was reported along Arakan coast on 8th and 9th, Akyab recording 13 cm of rain on the 8th. A statement showing the rainfall amounts and district averages during the period is given below:

State and District	District average (cm)												Particularly heavy falls		
	30	31	1	2	3	4	5	6	7	8	9	10		11	12
<u>COASTAL ANDHRA PRADESH</u>															
Srikakulum		1.9													1st - Sompeta 7.6
Nellore						7.9	5.3								4th - Kavalli 24.8, Iskapalli 24.6, Krishnapatnam 18.4
															5th - Sulurpeth 16.7, Nellore 11.8, Gudur 10.8
<u>MADRAS STATE</u>															
Chingleput								3.2							5th - Ponneri 9.6, Covelong 8.7
Madurai															3rd - Madurai 10.5, Tallakulam 9.8

State and District	District average (cm)												Particularly heavy falls		
	30	31	1	2	3	4	5	6	7	8	9	10		11	12
Ramanathpuram			1.6	3.0											3rd - Tirupattur 7.7
Tirunelveli		1.6	1.9												-
Kanyakumari								2.4							-

13 Cyclonic storm in the Bay of Bengal and Arabian Sea  
—15th to 29th November—

On the morning of 15th November, the Bay Islands reported a fall of pressure of 1 to 2 mb. There was also rainfall in the southern Islands. These indicated that a low pressure area had probably moved into the south Andaman Sea from the east. On the morning of the next day, the rainfall was widespread over the south Bay Islands. Kondul recorded 6 cm of rain. By the evening of the same day, the low pressure area became more marked. It had its central region near 4°N and 95°E at 1730 hrs IST when the following observations were recorded:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
Langsa (In Sumatra)			1730	S	20	Showers
S.S.Monomonthshire	5.8	93.3	1730	ENE	20	Overcast
S.S.State of Madras	6.6	93.8	1730	ENE	13	Overcast

By the morning of 17th the low pressure area moved westnorthwestwards. and had its central region near 5°N and 93°E. The upper winds of Port Blair strengthened between 1.5 and 3 km to 25-30 knots easterly. Moving further northwestwards the low pressure area lay near southeast Bay with its central region near 7.5°N and 91.5°E on the 18th morning. The following observations were relevant in this connection:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Sudamaru	6.0	89.7	1130	W	15	Overcast
S.S.Isemaru	5.7	92.3	1130	W	15	Overcast. Drizzle during previous hour.
Car Nicobar			0830	SE	5	Moderate continuous rain
Nancowrie			0830	SSE	5	Moderate intermittent rain

The upper winds over Port Blair had strengthened considerably, and were 30 knots northeasterly between 0.3 and 0.9 km a.s.l. and was 40-50 knots easterly above at 0530 hrs IST of 18th.

By the evening there was further strengthening and veering of Port Blair upper winds. The disturbance concentrated into a depression with centre near 7.5°N and 91.0°E at 1730 hrs IST of 18th. The following observations are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Arendsderk	5.8	88.3	1730	NW	15	Thundershowers during previous hour
S.S. Isemaru	6.0	93.4	1730	SSW	10	Showers
Car Nicobar			1730	E	5	Rain during previous hour
Nancowrie			1730	SSE	15	Overcast
Kondul			1730	E	5	Slight continuous rain

The estimated pressure departure at the centre of the depression was -5 mb.

Moving westnorthwestwards, the depression became deep and was centred at 0830 hrs IST of 19th near 9°N and 87.5°E. The following observations were recorded.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Yoma	11.3	89.1	0530	ESE	20	Past weather rain
S.S. Yoma	10.6	87.6	1130	E	30	Overcast
S.S. Bahadur	9.3	86.1	0730	NE	15	Heavy continuous rain
S.S. Bahadur	8.4	85.0	1130	W	20	Heavy continuous rain
S.S. Adendskerk	5.9	91.5	0530	SW	20	Thunderstorm
S.S. Wonosari	5.6	89.8	0530	SW	15	Precipitation in sight

The deep depression continued to move in a westnorthwesterly direction and was centred at 1730 hrs IST near 9.5°N and 86.0°E as would be evident from the following observations:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Yoma	10.0	86.7	1730	SE	15	Overcast
S.S. Salween	9.5	86.1	1430	W	20	Overcast
S.S. Salween	9.9	86.4	1730	SW	15	Overcast
S.S. Bahadur	8.4	84.3	1530	NW	20	Heavy continuous rain
S.S. Ponai	8.3	82.7	1730	NW	25	Overcast

During the night, pressures began falling rapidly over south Madras coast and the east coast of Ceylon. The upper winds of Madras began strengthening and was 20-30 knots northerly between 0.3 and 0.9 km a.s.l. and was 35 knots northeasterly between 1.5 and 3.0 km a.s.l. by the morning of 20th. The deep depression moved northwest and intensified into a cyclonic storm and was centred near 11°N and 83.5°E at 0830 hrs IST on 20th. Madras and coastal stations south of Madras reported widespread rainfall, with some stations reporting heavy falls. The pressure at the centre of the storm was estimated to be of the order of 996 mb with a departure of the order of -12 mb.

The following observations are relevant in this connection:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Kakasran	11.3	81.3	0530	N	20	-
S.S.Karakorum	10.4	81.5	0830	NNW	20	Slight continuous rain
S.S.Karakorum	9.7	81.7	1130	NW	40	Slight continuous rain
City of Pipon	9.0	83.9	0730	WSW	20	Precipitation within sight
S.S.Yoma	8.2	84.3	0530	SW	20	Slight continuous rain

Colombo winds strengthened to 30 knots northwesterly between 0.3 and 0.9 km a.s.l. at 0530 hrs IST.

By the evening, Madras surface winds strengthened and were northerly 25 knots at 1730 hrs IST. S.S.Jagevak (14.3°N, 81.4°E) reported 25 knots east-northeasterly winds and overcast sky at 1730 hrs IST. S.S.Rajula (12.1°N, 80.3°E) reported northerly winds of 36 knots and moderate continuous rain at 2030 hrs IST. The cyclonic storm moved westnorthwestwards and was centred at 1730 hrs IST near 11.5°N and 82.5°E.

Moving northwestwards thereafter, the cyclonic storm was centred at 0830 hrs IST of 21st about 65 km to the northnortheast of Madras.

The following observations are relevant in this connection.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
Ongole			0830	NE	10	Slight intermittent rain
Madras			0830	WSW	10	Slight continuous rain
S.S.Rajula	12.0	80.8	0530	SW	25	Slight continuous rain
S.S.Rajula	12.5	80.7	0930	SW	25	Slight continuous drizzle
S.S.Jalaputra	13.0	80.6	0830	SW	25	Squall
S.S.Jalasevak	14.6	82.0	0530	SE	30	Cloudy

Madras showed a pressure departure of -12 mb. There was widespread rainfall over the Peninsula south of 15°N and extended northward to coastal stations of Andhra Pradesh.

The storm moved westwards and crossed coast during the day between Madras and Nellore and weakened into a depression. It lay about 50 km south of Cuddapah at 1730 hrs IST of the same day. Moving further inland the depression whose circulation was still extending upto 6 km a.s.l. lay over south Mysore, on the morning of 22nd. Continuing to move westwards the depression emerged into the Arabian Sea near Mangalore on the morning of 23rd. From the following observations its position at 0830 hrs IST was inferred to be near 13°N and 73.5°E.

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	Wind		Remarks
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S.Warship Abtion	13.2	73.4	0530	N	20	Lightning visible

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Steaat Bank Mangalore	13.9	74.1	1130	SE	5	Showers during previous hour
			0830	E	2	Moderate intermittent rain

The circulation associated with the depression extended to 4.5 km a.s.l.

The depression moved northwestwards thereafter. The ships' observations in the field of the depression were meagre on the 24th. From the available observations it would appear that the depression was centred near 13.5°N and 71°E at 0830 hrs IST. The associated circulation was extending upto 6 km a.s.l.

On the morning of 25th, there was a deep stream of southerlies along the entire west coast in association with the depression which had moved further westnorthwestwards. No ships' observations were available to fix the position of the depression reliably. However, from the delineation of the isobars it appeared that the depression which was probably elongated in structure had intensified into a deep depression and was apparently centred near 14.0°N and 69.0°E at 0830 hrs IST of the same day.

Moving westnorthwestwards thereafter, the deep depression was centred near 15°N and 66°E at 0830 hrs IST of 26th. S.S. Cape St. David which was very near the centre of the depression at 0530 hrs IST reported as follows:

"Every indication vessel passed through the centre of the depression at 260530 is amended position 14°54'N, 66°03'E when the corrected bar reading was 29.54". Wind dropped from NE force 7 to calm lasted 45 minutes and then veered to SW/W repeat SW/W force 7 position 260750 14°42'N, 66°12'E course 137 speed 8 knots in corrected bars 29.63 rising wind SW force 6 overcast - Master."

By the evening of the same day, the deep depression moved northwestwards and was centred near 15.5°N and 65.5°E at 1730 hrs IST. The following observations are relevant in this connection:

Name of the Ship/Stn.	Position		Time of Obsn. (IST)	W i n d		R e m a r k s
	Lat. °N	Long °E		Dir.	Speed (Kts)	
S.S. Kohomaru	17.6	66.4	2030	E	15	Overcast
S.S. Cape St. David	14.3	66.5	1730	SW	25	Cloudy
S.S. Clan Maclead	15.3	60.6	1730	N	20	Overcast

The deep depression moving northwards subsequently was intensifying at the same time into a cyclonic storm of small extent. S.S. Captain Kosta (18.6°N, 66.2°E) reported northeasterly winds of 60 knots and squall at 1130 hrs IST of 27th. The same ship at 1730 hrs IST (19.15°N, 65.4°E) reported veering wind southsoutheasterly 25 knots. M.V. Heidberg (19.1°N, 66.2°E) reported "southeasterly winds of force 10/11 and heavy sea and Barometer within one hour 1015-1008." The cyclonic storm which began recurving was probably severe and was centred near 19.5°N and 65.0°E at 1730 hrs IST of 27th. The pressure at the centre of the

storm was estimated to be of the order of 996 mb; the departure being -16 mb. Moving northeastwards thereafter, the severe cyclonic storm rapidly weakened into a deep depression and was centred at 0830 hrs IST on the 28th near 20.5°N and 65.5°E. Weakening further it lay as a trough of low pressure over the northeast Arabian Sea off Gujarat coast on the 29th morning and became unimportant during the course of the next 24 hours.

During the period when the storm was in the Bay of Bengal, the north-east monsoon was strong over the south Peninsula from 20th to 24th when heavy to very heavy falls occurred at some places. According to press reports, low lying areas of the Madras City were flooded rendering about 5,000 families homeless. During the period when the disturbance was in the Arabian Sea as a depression in the initial stages, widespread to fairly widespread rainfall was reported over the west coast. A statement showing district averages and particularly heavy falls is given below:

State and Districts	District average (cm)													Particularly heavy amounts		
	15	16	17	18	19	20	21	22	23	24	25	26	27		28	29
<b>MADRAS STATE</b>																
Chinglepet			1.9	3.9	10.1	7.3			1.7							18th-Covelong 11.9 19th-Saidapet 19.0, Madurantakam 8.9 20th-Athipet 20.4, Ponneri 16.3, Kan- cheepuram 11.2 21st-Meenambakkam 15.5, Ponneri 14.1, Sai- dapet 14.1 20th-Wandiwash 11.8 21st-Vaniyambadi 10.2, Tirupattur 9.4 20th-Karijipadi 12.8, Porto Novo 12.4, Chidambaram 12.0 21st-Vanur 15.1, Gingee 8.9 21st-Kattumavadi 12.0, Papanasam 11.3 22nd-Nagapattinam 19.8, Neidavasal 17.0, Tranquebar 15.4, Nannilam 14.2 20th-Kilaniilai 9.0 21st-Pullambadi 8.6 20th-Thalli 11.4 21st-Sendamangalam 8.3 20th-Kilkundah 11.6 21st-Naduvattum 15.2, Ootacamund 14.3
North Arcot					2.2	5.1	2.1									
South Arcot					6.3	5.2										
Tanjore			2.6	9.9	7.4											
Tiruchirapalli					2.7	4.6										
Salem					2.1	4.4										
The Nilgiris					3.6	3.0										
Kanyakumari					3.1											
<b>ANDHRA PRADESH</b>																
Srikakulam					4.9	4.6	2.5									21st-Tekkali 7.7, Pundi 7.6 22nd-Narasannapeta 12.9, Tikkali 11.8

State and Districts	District average (cm)														Particularly heavy amounts		
	15	16	17	18	19	20	21	22	23	24	25	26	27	28		29	
Vishakhapatnam						4.8	4.7	2.9									21st-Malakapuram 12.2, Yelamanchilli 8.1 22nd-Waltair 8.1 23rd-Polavaram 8.9
East Godavari						6.4	4.8	2.1									21st-Pithapuram 9.7, Mummidivaram 8.3 22nd-Kothapeta 7.9
West Godavari						3.1	2.6	3.4									23rd-Narsapur 7.7
Krishna							2.5	3.4									23rd-Manginapudi 7.7
Guntur							3.2	4.7	2.7								23rd-Rentachintala 30.6, Ponnur 14.0, Repalle 8.4 24th-Rentachintala 23.0
Nellore						4.8											21st-Tada 10.6, Rapur 8.7
Chittur						3.2	1.9										21st-Kalahasti 9.5, Puttur 9.2, Kuppam 8.8 22nd-Puttur 10.5

## II. ACCOUNT OF WESTERN DISTURBANCES DURING 1958

None of the western disturbances that occurred during the year 1958 intensified into a depression. Although a large number of disturbances moved across northern parts of the country, the rainfall was in general rather small. Quite a good number of western disturbances affected northwest India during the southwest monsoon season during which period the rainfall was in excess over Punjab, Himachal Pradesh and Jammu and Kashmir. In the month of January on the other hand, there were not many disturbances with the result the rainfall for that month was deficient in Jammu and Kashmir, Himachal Pradesh and Punjab.

A list of 110 western disturbances that affected the country classified according to the nature of the precipitation caused by them is given in the following table. Description of the more active ones is added.

Nature of precipitation	M o n t h											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Widespread rain	1	-	3	-	-	-	2	1	5	1	-	3
Local rain	4	5	4	3	6	5	1	1	1	1	2	2
Little or no rain	4	4	6	3	4	7	7	5	4	4	4	9
Number of western disturbances in each month	9	9	13	6	10	10	10	7	10	6	6	14

1 Western disturbance during the period 23rd to 30th January—

A western disturbance appeared over the East Persian Gulf on the 23rd of January. It moved eastwards across north Arabian Sea and adjoining Baluchistan and lay as a trough over east Rajasthan and adjoining areas of Madhya Pradesh on the 25th. Under the influence of the trough there was an incursion of moist air into the central parts of the country and the trough extended eastwards as it shifted slowly. On the 28th the trough lay over Madhya Pradesh and adjoining areas of southeast Uttar Pradesh and Bihar Plateau and became markedly active. Shifting further eastwards it lay over east Madhya Pradesh and adjoining areas of southeast Uttar Pradesh, Bihar Plateau and Orissa on the 29th, when cold dry air swept over northwest India, west Uttar Pradesh, west Madhya Pradesh and north Maharashtra. The trough became unimportant on the next day.

In association with this disturbance fairly widespread thundershowers occurred over the region extending from east Madhya Pradesh and east Uttar Pradesh to Sub-Himalayan West Bengal on the 29th. Scattered thundershowers also occurred in west Rajasthan on 25th and in west Madhya Pradesh on 28th and 29th.

2 Western disturbance during the period 19th to 24th December—

A western disturbance appeared over south Baluchistan on the morning of 19th December and extended from northeast Arabian Sea to west Rajasthan. It moved eastnortheastwards and was over west Rajasthan and neighbourhood on the 20th. By the morning of 21st, the disturbance became accentuated as it lay over Punjab. It moved away across Punjab-Kumaon hills by the evening of 22nd and across eastern Tibet on the 23rd. It moved away eastwards thereafter. Under the influence of this disturbance there was a marked incursion of moisture into Rajasthan, Punjab and the northwestern parts of Uttar Pradesh on the 21st. Local to fairly widespread rain or thundershowers were reported from west Rajasthan on the 21st; from Punjab on the 21st and 22nd; from Uttar Pradesh on the 22nd and from Himachal Pradesh on the 22nd and 23rd. Rain or snow was also fairly widespread in Jammu and Kashmir on the 22nd. The movement of the disturbance across eastern Tibet on the 23rd caused scattered showers over northeast Assam on the 23rd and 24th. The chief amounts of rainfall on the 22nd were: Dalhousie 6.3 cm, Nainital 5.5 cm, Srinagar 5.2 cm, Joshimath 4.2 cm and Dehradun and Bilaspur 4 cm each. Heavy snowfall from many places was reported from Jammu and Kashmir, Himachal Pradesh and the Punjab-Kumaon hills.

According to press reports, four people died due to severe cold in Kashmir, where a number of animals were reported to have died in the hills areas. In Srinagar many electric poles and wires fell under the weight of snow thereby causing failure of supply of electricity to some areas. The telephone system was also paralysed. Air service between Delhi and Srinagar remained suspended for four days due to bad weather and heavy snowfall in Kashmir valley. Road transport in the Punjab, Himachal Pradesh and Jammu and Kashmir also remained suspended for many days.

## III. LOCAL STORMS 1958

Sr. No.	Place	Date & Time	Classification of storm	Loss of human life	Remarks
1.	Raipur	26th Feb.	Severe hailstorm	6	6 persons were killed and more than 20 injured in a severe hailstorm which swept here. A large number of huts and Kutcha houses in 10 villages collapsed. Onion and sugarcane crops were also damaged.
2.	Jabalpur	3rd Mar.	Hailstorm	-	Hailstones caused extensive damage to the tiles of houses injuring over 100 persons and killing several heads of cattle.
3.	Allahabad	3rd Mar.	Severe storm	-	A severe storm accompanied by hails and rain, blowing from west to northeast with a velocity of 81 mph uprooted number of trees and telephone, telegraph and electric poles.
4.	Ambala	4th Mar. evening	Severe thunderstorm	-	Moderate thunderstorm with 25 mph (40 kmph) swept most parts of the Punjab State.
5.	Barsi	Reported on 26th Mar.	Thunderstorm	-	A severe thunderstorm with wind speed of about 50 to 60 mph (80 to 96 kmph) hit Barsi and surrounding villages causing damage to mango crops.
6.	Muzaffarpur	7th May night	Hailstorm	-	Hailstorms of the size of eggs to tennis balls hit the city. Big trees were uprooted, roof tops blown off and mango crops affected.
7.	Munirabad	Reported on 10th May.	Gale	-	About two lakhs worth of Govt. property was damaged when gale hit township.
8.	Vishakhapatnam	19th May.	Severe storm	3	3 persons were killed and 20 others injured in a severe storm. Electric wires snapped, communications totally cut off, trees uprooted and many houses collapsed as a result of severe storm.
9.	Delhi	Reported on 23rd May evening	Duststorm	-	A very strong dust-raising wind lashed Delhi and adjoining area with a velocity of 89 kmph.
10.	Ferozabad	Reported on 29th May	Storm	4	Storm which swept Ferozabad killed 4 persons and injured 8 others. Many trees and telegraphic poles were uprooted.

1	2	3	4	5	6
11. Calcutta	6th June night	Squall	-		A 31 mph (49.6 kmph) squall swept over Calcutta, bringing the temperature down remarkably.
12. Sholapur	Reported on 6th June night	Duststorm	6		A furious duststorm killed 6 persons and injured a dozen people. Many houses badly damaged and roads completely blocked due to falling trees.
13. Nagpur	-do-	Heavy storm	1		1 boy was killed and several others were injured during a storm with a velocity of 45 mph (72 kmph). Many trees were uprooted and telegraph, telephone system affected.
14. Patna	6th June evening	Severe duststorm	-		A severe duststorm with heavy downpour blew away many roof tops and uprooted many trees.
15. Madras	8th June evening	Gale and gusty winds	1		Sharp thundershowers accompanied by gusty winds of velocity between 30 mph to 40 mph (48 kmph to 64 kmph) killed a person and injured several people. It caused disturbance to traffic uprooting big trees.
16. Delhi	14th June afternoon	Duststorm	-		Severe duststorm hit the capital with the velocity of 57 mph (81.2 kmph) causing disturbances to traffic and air services.
17. Amritsar	21st June evening	Duststorm	-		A severe duststorm with a velocity of 45 mph (72 kmph) caused disturbance to traffic.
18. Calcutta	17th Sep. night	Severe storm	6		A severe storm accompanied by heavy rain hit Calcutta and east coast damaging railway tracks. Storm blew with a velocity of 40 mph (64 kmph) collapsed several houses and sunk six boats in the sea.
19. Amritsar	20th Oct. night	Violent storm	-		A violent storm with a velocity of 70 mph (112 kmph) lashed Amritsar and neighbouring villages. As a result, telecommunication and water supply was dislocated.
20. Simla	14th Dec. evening	Severe storm	-		A severe storm with wind speed of 90 mph (144 kmph) hit Simla and adjoining hilly areas accompanied by rain.

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## IV. WINDS OF FORCE NINE OR MORE IN THE INDIAN SEAS

Excluding dates of storms and depressions, a description of which has been given, the following reports of winds of force 9 or more by ships in the Indian Seas were received during 1958.

D a t e	Name of the ship	Approximate Position	
		Lat. °N	Long °E
30th June	Glenarchy	9.4	60.3
1st July	Silverbrook	15.0	60.1
2nd July	Silverbrook	14.7	60.5
2nd July	Silverbrook	14.0	60.2
2nd July	Strathnaver	17.1	64.9
3rd July	Strathnaver	16.9	61.7
3rd July	Silverbrook	12.2	60.8
3rd July	Silverbrook	11.6	61.1
3rd July	Indian Skipper	16.5	63.2
3rd July	Strathnaver	16.9	59.8
4th July	Pabian	15.1	54.8
5th July	Sydney	12.8	54.8
15th July	Donegal	8.3	53.2

No ship in the Bay of Bengal reported wind force of 9 B.F. or more unconnected with cyclonic storms during the year 1958.

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# TRACKS OF STORMS AND DEPRESSIONS (IN THE INDIAN SEAS)

1958

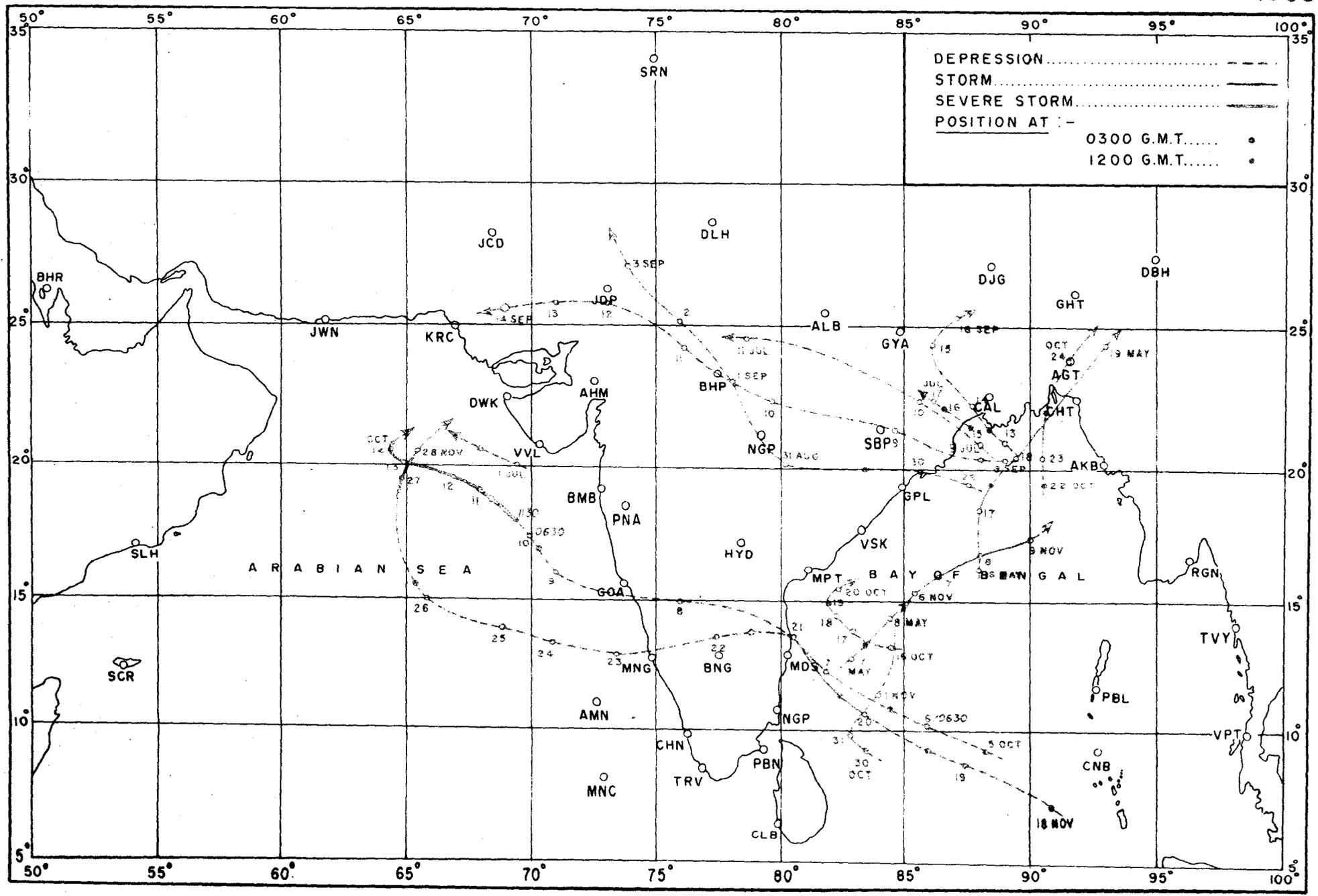


FIG. 1