GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT.

S E I S M O L O G I C A L B U L L E T I N.

FEBRUARY 1949.

Published under the direction of

S. K. BANERJI, D.Sc., F.N.I.

Director General of Observatories.

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I N T R O D U C T I O N

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938 the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948 the data are being published in the present form of a Monthly Seismological Bulletin. With the kind cooperation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, Poona.

TABLE I.
List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation.	Officer-in-charge of Observatory.
Bombay	18°54'N	72°49'E.	6	Deccan Trap	Director.
Calcutta	22°32'N	88°22'E.	(i)7 (ii)6	Alluvium	Director.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N	78°03'E.	682	Gravel	Director.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N	77°28'E	2343	Rock	Director.
New Delhi	28°35'N	77°12'E	207	Massive Quartzite	Dy. Director Gen. of Observatories (I.& S)
Poona	18°32'N.	73°51'E.	560	Deccan-Trap	Dy. Director Gen. of Observatories (C.& G.)

(i) Milne-Shaw. (ii) Omori-Ewing.

TABLE II.
Instruments and their Constants.

Station	Instruments	Compt.	Period in sec.	Static magnification.	Damping Ratio.	Paper speed mm/min.
Bombay	Milne-Shaw	N	12	250	19 : 1	8.0
	Milne-Shaw	E	12	350	13 : 1 (From 1st to 20th.) 17 : 1 (From 21st to 28th.)	8.0
Calcutta	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
	Milne-Shaw	E	12	250	20 : 1	8.0
Colombo	Milne-Shaw	E	12	250	20 : 1	8.0
Dehra Dun.	Omori.	N	30	12	-	-
Hyderabad	Milne-Shaw	E	12	250	20 : 1	8.0
	Milne-Shaw	N	12	250	20 : 1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20 : 1	8.0
Poona	Milne-Shaw	N	12	250	20 : 1	8.0
	Wood-Anderson.	E	4	1100	20 : 1	16.0
	Wood-Anderson	N	2	1900	30 : 1	60.0

DATE	STATION	COMPT.	PHASE	G. M. T.	Δ	REMARKS.
February 1949.				h. m. s.	km.	

1. Epicentre 3°.5 S, 137°E in the New Guinea. 0=18h.15m.50s.(Poona)
2°.5 S, 135°E 0=18h.15.9m.(U.S.C.G.S)
3°.5 S, 137°E 0=18h.15.9m.(B.C.I.S.)

Calcutta	E	eP	18 25 18	6000	Slight
		iS	18 32 53		
		i	18 33 09		
		iSS	18 36 35		
		iSSS	18 38 15		
		L	18 42 05		
		M	18 46 35		
Colombo	E	P	18 25 38	6500	
		S	18 33 36		
		L	18 44 21		
		M	18 48 24		
Hyderabad	N	eP	18 26 04	6566	
		S	18 34 11		
		L	18 43 25		
		M	18 48 22		Per.=12sec.μ=4
Poona	E,N	iP	18 26 32	7188	
	E	iPcP	18 27 10		
		i	18 27 19		
		e	18 27 43		
		iPP	18 28 50		
	E,N	eS	18 35 12		
	E	iPS	18 35 25		
	E,N	i	18 36 37		
	N	SS	18 39 16		
		SSS	18 42 09		
		L_Q	18 42 47		
		LR	18 47 00		
		M	18 51 30		
Bombay.	N,E	eP	18 26 37	7287	Slight.
	E	ePP	18 28 01		
	N,E	eS	18 35 22		
	E	L	18 48 09		
	N	L	18 48 31		
	E	M	19 00 35		Per.=20 secs.u=5
	N	M			Waves not well developed.

2. Epicentre 53°N, 172°.5W near Attu Island, h=200 kms ± 0=17h.41.5m.(U.S.C.G.S.)
52°.7N,172°.2W h=200 kms ± 0=17h.41m.34s. (J.S.A.)

Poona	E	eP	17 53 56	9912	h=200 kms.±
		ePcP	17 54 13		
		ipP	17 54 51		
		e	17 55 07		
		esP	17 55 26		
		iPP	17 56 40		
		iPPP	17 58 33		
	E,N	iS	18 04 24		
		iPS	18 05 43		
		isS	18 05 57		
Bombay.	N	eP	17 54 00	9890	
	N,E	eS	18 04 26		
		isS	18 06 00		

DATE	STATION	COMPT.	PHASE	G. M. T.	△	REMARKS.
				h. m. s.	km.	
February 1949.						
2. (Contd.)	Calcutta.	E	e	17 57 18		Slight.
			iS	18 04 08		
	Kodaikanal	E	e	18 03 -		
	Hyderabad	N	e	18 03 58		
5	Epicentre 30°N, 82°E on the Northwest border of Nepal. 0=08h.55m.18s. (Poona)					
	Dehra Dun	N	iP	08 55 14	225	Direction of first motion South.
			i	08 55 30		
			iS	08 55 44		
			M	08 56 02		
	Calcutta	E	eP	08 57 25	1033	Slight
			iS	08 59 11		
			M	09 01 11		Overlapping of lines.
	Poona	E,N	eP	08 58 35	1512	
		E	e	08 58 39		
			e	08 58 44		
			ePP	08 59 07		
			e	08 59 30		
		E,N	iS	09 01 08		
			i	09 01 22		
			iSS	09 01 32		
			M	09 03 --		
	Hyderabad	N	P	08 58 38	1534	
			eS	09 01 31		
			L_R	09 01 46		
			SS	09 02 12		
			L	09 02 46		
			M	09 04 18		Per.=9 secs. μ=12
	Bombay	E) N)	iP	08 58 45	1622	Moderate
		N,E	L_Q	09 01 15		
			eS	09 01 29		
			SS	09 01 45		
			SSS	09 01 49		
			L_R	09 01 56		
			M	09 03 --		Per.=7 secs. μ=14
	Kodaikanal	E	L	09 06 26		
			Mn	09 07 41		Per.=9secs. μ=37 Phases uncertain.
10	Epicentre 16°S 173°W, 0=21h.56.6m. (U.S.C G.S.) 13°S, 176°.2W, 0=21h.56m.45s. (J.S.A.) 15°S, 173°W, 0=21h.56.6m. (B.C.I.S.)					
	Bombay	N,E	e	22 16 58		Slight
		E	M	23 10 34		Per.=15 secs. μ=2
	Kodaikanal	E	e	22 20 30		Distant. Phases not clear.
	Poona	N	M	23 04 46		
	Hyderabad	N.	S(?)	18 05 44		

DATE	STATION	COMPT.	PHASE	G. M. T. h. m. s.	△ km.	REMARKS.
February 1949						
13.	Poona	E	i	08 31 22		
		E	e	08 31 58		
		E,N	i(M)?	08 32 20		
13.	Epicentre: 33°.2S, 177°.5W, 0=18h.24.3m. (U.S.C.G.S.)					
				33°.2S, 178°.3W, h=100 km ±, 0=18h.24m.28s. (J.S.A.)		
	Kodaikanal	E	P(?)	18 38 43	12000	Great
			PP	18 43 23		
			SKS	18 49 23		
			PS	18 52 43		
			SS	18 58 48		
			Mn	19 22 --		Per.=28 Sec. μ=136
	Calcutta	E	ePP	18 41 50	11720	
			ePPP	18 44 19		
			iSKKS	18 49 03		
			iPPS	18 52 10		
			iSS	18 57 29		
			iSSS	19 11 44		
			L	19 14 44		
			M	19 23 04		
	Colombo	E	P	18 41 52		
			S	18 49 00		
			L	18 57 12		
			M	19 19 22		
	Bombay	E	e	18 42 32	12835	Moderate.
			ePP	18 44 10		
		N	e	18 44 30		
		N,E	eSKS	18 49 47		
		E	ePS	18 53 44		
		N	i	18 55 51		
		E	e	18 56 00		
		N	e	19 00 04		
		E	eSS	19 01 28		
			L	19 17 00		
			M	19 27 06		Per.=26 secs. μ=16
		N	M	19 33 31		Per.=20 secs. μ=7
	Hyderabad	N	ePP	18 43 22	12275	Lines overlapping
			SKS	18 49 26		
			PS	18 53 04		
	Poona	E,N	PKP	18 44 13	12780	
			PP	18 44 22		
			PPP	18 46 41		
			SKS_1	18 49 41		
			SKS_2	18 50 00		
			$SKKS_1$	18 50 44		
			PS	18 53 47		
			PPS	18 54 39		
		N	M	19 25 --		Per.= 26 secs. μ=13
14.	Calcutta	E	iS?	16 47 34		Slight, Near.
14.	Epicentre 16°.5N, 121°.5E in the Phillipines. 0=18h.42m.02s. (Poona)					
				16°N, 123°E, 0=18h.42.1m.(B.C.I.S.)		
	Calcutta	E	eP	18 48 45	4445	
			PP	18 49 51		
			PPP	18 50 17		
			iS	18 53 51		

DATE	STATION	COMPT.	PHASE	G. M. T. h. m. s.	Δ km.	REMARKS.
February 1949. 14.(Con.)	Calcutta	E	L_Q	18 55 03		
			SSS	18 55 20		
			L_R	18 56 27		
			M	18 59 15		Per. 23 secs. μ=34
	Colombo	E	P	18 49 49	4368	
			S	18 55 51		
			L	19 04 51		
			M	19 07 36		
	Hyderabad	N	eP	18 50 04	4177	
			S	18 55 54		
			SS	18 59 05		
		--	L	19 01 23		
			M	19 04 32		Per.=15 secs. μ=6
	Kodaikanal	E	iP	18 50 10	4847	
			PP	18 51 58		
			S	18 56 40		
			Mn	19 06 50		Per.=20 secs. μ=133
	Poona	E	P	18 50 23	4990	
			i	18 50 32		
			PP	18 52 18		
		E,N	S	18 57 04		
			PS	18 57 11		
		E	M	19 11 --		
		N	M	19 12 --		
	Bombay	N,E	eP	18 50 33	5055	Moderate
		E	PP	18 52 23		
		N,E	iS	18 57 15		
			L	19 04 21		
		E	M	19 11 11		Per.=19 secs. μ=17
16.	Calcutta	E	e	11 50 17		Slight. Distant.
			e	12 00 39		
	Bombay	E	e	11 54 15		
		N	e	11 54 25		
		N,E	e	12 01 41		
	Kodaikanal	E	e	11 59 40		Tremor. Other phases lost due to tilt.
19.	Bombay	N	e	01 15 00		
			e	01 20 35		
		E	Phase movements not clear.			
	Kodaikanal	E	e	01 44 --		
21.	Bombay	N	e	16 46 20		Feeble.
		N,E	e	16 48 31		
		E	M	16 55 20		Per.=13 secs. μ=2
		N	M	16 55 30		Per.=10 secs. μ=1
	Calcutta	E	e	16 47 06		Tremor.
	Poona	N	M	16 55 00		
23.	Bombay	N	e	09 41 12		Feeble
		E	e	09 44 --		
		E	M	09 56 36		Per.=13 secs. μ=1
	Hyderabad	N	M	09 54 10		Per.=12 secs. μ=3

23. Epicentre- 42°.5N, 83°E, 0=16h.08m.10s. (Poona)
39°.5N, 85°E, 0=16h.07.9m. (U.S.C.G.S.)
40°N, 84°.5E, 0=16h.08m.03s. (J.S.A.)
42°.5N, 84°E, 0=16h.08.2m. (B.C.I.S.)

DATE	STATION	COMPT.	PHASE	G. M. T. h. m. s.	Δ km.	REMARKS.
Feb.1949.						
23.	Dehra Dun	N	iP	16 10 45	1288	Direction of first motion South.
			eS	16 12 21		
			eL	16 14 06?		
			M_1	16 16 48?		
	Calcutta	E	iP	16 12 39	2280	Great.First movement East.
			iPP	16 13 01		
			iS	16 16 21		
	Hyderabad	N	P	16 13 32	2800	Great
			PP	16 13 58		
			PcP	16 17 07		
			S	16 17 54		
			SS	16 18 45		
			M	16 22 05		Per.=12 secs. μ =500
	Poona	E,N	iP	16 13 34	2824	Great
		N	PP	16 14 07		
		E,N	iS	16 17 34		
		N	L_Q	16 18 44		
			SSS	16 19 15		
			L_R	16 19 56		
			M	16 22 06		
			ScS	16 24 14		
			Mn	16 26 20		Per.=10 secs. μ=447
		E	Mn	16 25 50		Per.=11 secs. μ=587
	Bombay	N	iP)	16 13 35	2835	Very great.
		E	eP)			
		N	iPP	16 14 19		
		N,E	iS	16 17 59		
			iSS	16 18 59		
			L	16 20 07		
		N	M	16 25 -		Per.=19 secs. μ=747
		E	M	16 25 -		Per.=17 secs. μ=626
	Kodaikanal	E	eP	16 14 59	3310	Great.
			S	16 19 55		
			M	16 28 --		Per.=12 secs. μ=548
	Colombo	E	P	16 15 19		
			S	16 20 42		
			L	16 27 20		
			M	16 31 -		
24.	Bombay	E	e	02 23 07		Feeble
		N	i	02 28 03		
			i	02 30 37		
24.	Bombay	N	e	04 13 00		Feeble.
24.	Bombay	N,E	e	05 16 00		
		N	M	05 23 49		Per.=7 secs. μ=1
24.	Bombay	N	eP	05 33 26	2845	Slight.
		N,E	eS	05 37 51		
		N	L	05 40 29		
		E	M	05 44 36		Per.=12 secs. μ=4
		N	M	05 46 48		Per.9 secs. μ=4
	Hyderabad	N	S	05 37 48		
			M	05 44 22		Per.11 secs. μ=8
	Poona	N	M	05 44 30		
24.	Bombay	E	e	07 32 36		
	Hyderabad	N	M	07 39 02		Per.=12 secs. μ=3

DATE	STATION	COMPT.	PHASE	G. M. T.	Δ	REMARKS.
Feb.1949.				h. m. s.	km.	
24.	Hyderabad	N	M	10 28 50		Per.=10 secs. μ=3
24.	Bombay	N	e	13 50 00		
			M	13 51 31		Per.=7 secs. μ=1
	Hyderabad	N	M	14 14 31		Per.=10 secs. μ=2
	Poona	N	M	14 15 --		
24.	Epicentre	30°.5N, 68°E, 0=23h.02m.16s. (Poona)				
		30°¾N, 69°¼E, 0=23h.02m.20s. (B.C.I.S.)				
	Bombay	N	eP	23 05 08	1510	Moderate. Loss of record in E.Compt.
			iS	23 07 08		
			L	23 08 42		
			M	23 09 10		Per.=7 secs. μ=20
	Poona	N	P	23 05 15	1456	
			S	23 07 40		
			M	23 09 19		
	Hyderabad	N	P	23 05 56	1820	
			S	23 08 55		
			M	23 10 38		Per.=9 secs. μ=65
	Calcutta	E	iP	23 06 43	2155	Moderate. First movement East.
			iS	23 10 13		
			iSS	23 10 38		
	Dehra Dun	N	eP	23 07 04?		
			L	23 07 48		
			iS	23 08 18		
			M_1	23 09 12?		
	Kodaikanal	E	iP	23 07 13	2480	Moderate.
			iS	23 11 10		
			Mn	23 15 13		Per.=7 secs. μ=43
	Colombo	E	e	23 07 51		
			e	23 16 11		
26.	Bombay	N,E	e	00 27 55		Feeble
26.	Calcutta	E	e	04 10 24		Slight. Distant
			e	04 17 24		
			Mn	04 37 36		
26.	Calcutta	E	e	16 01 36		Slight, Distant.
			Mn	16 13 00		
26.	Calcutta	E	e	17 10 20		Tremor
28.	Epicentre,	58°S, 27°W, 0=00h.12.8m. (U.S.C.G.S.)				
		59°S, 37°W, 0=00h.13.6m. (J.S.A.)				
		56°½S, 29°½W, 0=00h.13.1m (B.C.I.S.)				
	Bombay	N,E	e	00 32 33		
		N	i	00 38 09		
		N,E	e	00 42 09		
		E	L	00 55 09		
		N	L	00 55 16		
		E	M	01 18 06		Per.=16 secs. μ=5
	Poona	E	e	00 32 42		
	Calcutta	E	e	00 34 24		Slight. Distant.
			e	00 44 22		
			Mn	01 18 55		
	Kodaikanal	E	e	00 41 40		Phases not clear.
	Hyderabad	N	S	00 42 28		
			M	01 07 55		Per.=17 secs. μ=9

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Director General of Observatories.

I N T R O D U C T I O N.

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Calcutta	22°32'N.	88°22'E.	(i) 7 (ii) 6	Alluvium	Director.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E.	682	Gravel	Director.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	Director.
New Delhi	28°35'N.	77°12'E.	207	Massive Quarsizites	Deputy Director General of Observatories (I.& S.)
P o o n a	18°32'N.	73°51'E.	560	Deccan Trap	Deputy Director General of Observatories (C.& G.)

Table 2.

The instruments and their constants.

Station	Instrument	Component	Period in sec.	Static Magnification.	Damping Ratio	Paper speed mm./min.
Bombay	Milne-Shaw	N	12	250	20:1	8
		E	12	350	20:1	8
Calcutta	Milne-Shaw	E	12	250	20:1	8
			(from 1.3.1949 to 28.3.1949)			
		E	12	350	5:1	8
			(from 29.3.1949 to 31.3.1949)			
Hyderabad	Milne-Shaw	N	12	250	20:1	8
		E	12	250	20:1	8
Kodaikanal	Milne-Shaw	E	10	250	20:1	8
New Delhi	Milne-Shaw	N	12	289	20:1	8
P o o n a	Milne-Shaw	N	12	250	20:1	8
	W o o d Anderson	E	4	1100	20:1	16

Date	Station	Compt.	Phase	G.M.T. h.m.s.	Δ Km.	Remarks
March 1949.						
1	Poona	E	e	20 19 30		
			e	20 26 08		
			e	20 29 15		
	Calcutta	E	e	20 20 36		Slight, near.
			i	20 23 26		
2	Bombay	E	e	07 14 27		Feeble
2	(Felt at Mahabaleshwar and slight damage to old structures)					
	Poona	E	ePg	15 33 27		
			eP*	15 33 31		
			iSg	15 33 33		
			iS*	15 33 35		
3	Poona	E	e	04 47 24		
			e	04 49 33		
			i	04 51 45		
			i	04 56 15		
	Bombay	N,E	e	04 47 30		Very feeble
			e	04 55 02		
3	Bombay	N	e	06 48 40		Feeble
		E	e	06 55 45		
4	(Epicentre 4°S. 103°E. in Sumatra. h = 125 km. ± 0 = 01 h.17 m.07s.					
	Kodaikanal	E	iP	01 22 59	3255	Moderate
			i	01 23 29		
			iS	01 27 52		
			SS	01 28 56		
			L	01 30 51		
			Mn	01 33 35		per.= 15 sec., μ = 34.
	Calcutta	E	eP	01 23 04	2900	Slight.
			iS	01 27 40		
			i	01 28 28		
			iSS	01 28 50		
	Poona	E,N	iP	01 23 56		
			ipP	01 25 23		
			isP	01 25 40		
			iPP	01 25 59		
			iPcP	01 26 40		
			iS	01 29 32		
			Lq	01 34 25		
			Lr	01 37 50		
	Bombay	E..	P			Lost while changing the record.
		N	eP	01 24 08	4110	Moderate.
			ePP	01 26 33		
		N	eS	01 29 54		
		E	iS			
4	(Epicentre 37°N. 70°E.in Hindukush. h = 200 kms. ± 0 = 10 h. 19 m. 21 s.)					

Felt severely over North of North-West Frontier Province, East Kashmir, and with varying intensities over rest of North-West Frontier Province and Kashmir, the Punjab, Central India upto Jaipur, Simla hills and west United Provinces. Damage to building reported from Rawalpindi, Peshawar, some buildings at Lahore and cracks to even very strong buildings at Srinagar. No other report of damage in Western Pakistan or elsewhere is so far available.

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Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
March 1949.						
4	Poona	E,N	iP	10 23 23		First great movement about 4 cm. as measured to South. Amplitudes as measured on trance are :- sP = 7.8 cm. S = 8.5 cm. > M waves M = 8.0 cm. Period of M waves 6 to 8 sec.
		E	pP	10 24 03		
		N	isP	10 24 32		
		N,E	i	10 25 12		
			iS	10 26 38		
	Bombay	E,N	iP	10 23 22	2145	Great. Movement of S,L and M in E component cannot be identified due to very quick movements. Record too faint for identification of other phases.
		N	iS	10 26 51		
		N	M (Per.= 13 sec. μ = 230)	11 04 --		
	Calcutta	E	iP	10 23 54	2190	Very great. First movement West. Record too faint for identification of other phases.
			iS	10 27 28		
	Kodaikanal	E	iP	10 24 54	3110	--Great.
			sP	10 26 06		
			PcP	10 27 54		
			iS	10 29 36		
			L	10 33 08		
			M	10 35 22		(Per.= 11 sec. μ = 28)
4	Calcutta	E	e	15 31 38		
			e	15 35 28		
			Mn	15 41 28		
	Bombay	N,E	eP	15 37 00		
		E	M	15 43 40		Per.= 11 s. μ = 11.
		N	M	15 44 03		Per.= 8 s. μ = 18.
	Kodaikanal	E	e	15 44 46		
6	(Epicentre 40°N. 89°E. in China. 0 = 11 h. 29 m. 05 s.)					
	Poona	N,E	eP	11 33 25	2790	
			eS	11 37 46		
			i	11 37 56		
		E	i	11 38 25		
			i	11 38 41		
			i	11 39 13		
			L	11 44 --		
	Hyderabad	N	p	11 33 25	2890	
			S	11 37 53		
			M	11 44 23		Per.= 12 s. μ = 3.
	Bombay	N	eP	11 33 26	2790	Slight. Movement feeble in E-Component.
		N,E	eS	11 37 47		
		N	M	11 44 43		Per.= 10 s. μ = 2.
	Calcutta	E	eS	11 36 20		
			Mn	11 46 40		
6	Bombay	N	e	16 40 56		Feeble, Tremors.
		E	e	16 46 00		
	Calcutta	E	e	16 52 30		
			Mn	16 59 08		
8	Poona	E	e	17 20 13		
			e	17 21 20		

3 ...

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks.
March 1949.						
9	Bombay	N	eP	04 26 06	2300	Very feeble.
		N,E	eS	04 30 16		
	Poona	E	eP	04 26 15	2565	Slight.
			eS	04 30 19		
			L	04 34 --		
	Hyderabad	N	P	04 26 25	2900	
			S	04 30 54		
			M	04 36 08		Per.= 9 sec. μ = 2.
	Calcutta	E	e	04 30 26		
	Kodaikanal	E	e	04 34 22		
9	Poona	E	P	05 35 30		
			e	05 36 15		
			e	05 39 20		
			L	05 43 --		
	Bombay	N,E	e	05 35 33		
		N	M	05 45 18		Per.= 8 sec. μ = 1.
	Hyderabad	N	S	05 35 34		
			M	05 42 00		Per.= 9 sec. μ = 2.
	Kodaikanal	E	e	05 42 00		
10	Poona	E	eP(?)	18 24 56		Slight.
		E	eS(?)	18 27 30		
			L	18 28 30		
			M	18 29 --		
10	Calcutta	E	e	23 58 25		Slight, Near.
			i	00 00 15		
11	New Delhi	N	eP(?)	19 25 50		Slight, Near.
			iS	19 26 20		
	Poona	E	eP(?)	19 29 23		
			e	19 29 37		
			e	19 31 18		
11	New Delhi	N	e	19 59 32		
			e	20 02 24		
	Bombay	N,E	e	20 05 05		Very feeble.
11	Epicentre near 30°N., 94°E. in Tibet. O = 20h. 27m. 25s. (Poona).					
	Calcutta	E	eP	20 30 08		
			iS	20 32 16		
			iS*	20 33 34		
	Hyderabad	N	e	20 32 16		
			M	20 39 06		
	Poona	E,N	eP	20 32 31	2530	
			i	20 32 41		
			iS	20 36 32		
			Lq	20 38 30		
			LR	20 40 15		
			M	20 41 --		
	Bombay	N,E	eP	20 32 40	2510	Slight.
		N,E	eS	20 36 39		
		N	L	20 38 35		
			eL	20 38 45		
		E	eM	20 40 07		Per.= 8 sec. μ = 4.
		N	M	20 42 22		Per.= 9 sec. μ = 5.
	New Delhi	N	e(S)	20 33 31		Slight.
			i	20 34 41		Probably M.
	Kodaikanal	E	S	20 37 56		

Date	Station.	Compt.	Phase.	G. M. T. h. m. s.	Δ Km.	Remarks.
March 1949.						
11	Epicentre same as 20h. 27m.				0 = 22h. 28m. 03s. (Poona.)	
	Calcutta	E	eP	22 30 38		
			iS	22 32 42		
			S*	22 33 26		
			S	22 34 03		
			L	22 34 19		
			M	22 35 25		
			Mn	22 37 48	Per.= 10 sec.	μ = 52.
	Hyderabad	N	P	22 32 58	2460	
			PcP	22 36 44		
			S	22 36 53		
			SS	22 37 20		
			M	22 41 35	Per.= 13 sec.	μ = 5.
	Poona	E,N	iP	22 33 32	2665	
		E	i	22 34 19		
		E	i	22 34 38		
		E,N	iS	22 37 45		
		E	i	22 37 54		
		[illegible]	e	22 38 48		
		[illegible]	e	22 39 10		
		[illegible]	L	22 44 30		
	Kodaikanal	E	eP	22 33 41		
			eS	22 38 12		
	Bombay	N,E	eP	22 33 42	2835	Slight.
		N	eS	22 38 06		
		E	L	22 41 08		
		N	M	22 43 06	Per.= 7 sec.	μ = 4.
		E	M	22 43 55	Per.= 10 sec.	μ = 2.
	New Delhi	N	eS	22 35 58		Slight.
			iSS	22 36 11		
			iM	22 38 23		
13	Calcutta	E	e	09 43 25		
	Hyderabad	N	M	09 47 12	Per.= 11 sec.	μ = 3.
	Poona	E	e	09 47 45		
			e	09 50 42		
	Bombay	N,E	e	09 48 00		Slight.
		N	M	09 49 36	Per.= 8 sec.	μ= 2.
		E	M	09 49 41	Per.= 11 sec.	μ= 2.
13	Calcutta	E	e	12 43 33		Tremor.
			e	12 48 28		
	Poona	E	e	12 49 22		
			i	12 49 30		
13	Calcutta	E	e	19 04 14		Slight, Distant.
			e	19 13 49		
16	Epicentre 5°.5S., 152°E. in Pacific, near New Britain Islands; Based on Brisbane, Sibka and Indian data.				0 = 22h. 15m. 10s. (Poona).	
	5°.3S., 151°.3E.,				0 = 22h. 15m. 12s.(J.S.A.)	
	6°S., 151°.5E.,				0 = 22h. 15.1m(U.S.C.G.S.)	
	Calcutta	E	eP	22 26 08	7120	
			iS	22 34 53		
			iPS	22 35 22		
			M	22 51 38		
			Mn	22 53 18	Per.= 20 sec.	μ = 46.

Date	Station.	Compt.	Phase.	G. M. T. h. m. s.	Δ Km.	Remarks.
March 1949.						
16 (Contd.)	Hyderabad	N	eP	22 26 55	8370	
			PP	22 29 37		
			SS	22 41 21		
			L	22 48 39		
			M	22 56 02	Per.= 18 sec.	μ = 10.
	Kodaikanal	E	iP	22 26 56	8265	
			iS	22 36 32		
			SS	22 41 24		
			L	22 51 43		
			M	22 56 44	Per.= 17 sec.	μ = 6.
	Poona	E,N	eP	22 27 16	8945	
		E	i	22 27 46		
		E	ePP?	22 30 20		
		N	iS	22 37 25		
			i	22 38 55		
			$PKKS_1$	22 48 47		
			LR	22 51 --		
			$SKKS_2$	22 52 39		
			M	22 58 --		
	New Delhi	N	eP	22 27 21	9090	Slight.
			e	22 27 45		
			iS	22 37 27		
			iPS	22 38 05		
			i	22 38 50		
			i	22 44 00		
			i	22 48 30		
	Bombay	N,E	eP	22 27 27	8845	
		N,E	ePP	22 30 36		
		E	iS	22 37 31		
		N	eS	22 37 38		
			SS	22 43 22		
		E	SS	22 43 29		
			L	22 47 15		
		N	L	22 49 15		
			M	23 00 39	Per.= 21 sec.	μ = 9.
		E	M	23 00 41	Per.= 24 sec.	μ = 14.
17	Epicentre 11°S., 149°E., near New Guinea Islands in Pacific Ocean.				0 = 21h. 05m. 10s. (Poona).	
	Calcutta	E	eP	21 16 08	7120	Moderate.
			eS	21 25 22		
			iSS	21 29 46		
			M	21 41 42		
	Kodaikanal	E	iP	21 16 54	8265	
			iS	21 26 30		
			PS	21 26 25		
			SS	21 31 22		
			L	21 41 41		
			M	21 47 42	Per.= 23 sec.	μ = 10.
	New Delhi	N	eP	21 17 13	9090	Slight.
			iS	21 27 29		
			iPS	21 28 04		
			i	21 28 58		
			i	21 32 14		
			i	21 38 28		

Date.	Station.	Compt.	Phase.	G. M. T. h. m. s.	Δ Km.	Remarks.
March 1949.						
17 (Contd.)	Poona	E	iP	21 17 19		
		N	eP	21 17 19		
		N,E	eS	21 27 22		
		N	iPS	21 27 58		
		N	iSS	21 32 30		
		N	LQ	21 38 17		
		N	M_1	21 46 --		
		N	M_2	21 48 --		
	Bombay	N,E	eP	21 17 24	8935	Moderate.
		E	PP	21 20 33		
		N,E	eS	21 27 32		
		E	PS	21 27 51		
		N	SS	21 33 03		
		E	SS	21 33 17		
		N	L	21 37 02		
		E	L	21 37 08		
		E	M	21 46 50	Per.= 31 sec.	μ = 21.
		N	M	21 50 39	Per.= 25 sec.	μ = 11.
17	Calcutta	E	eP	21 54 32	790	Slight.
			iS	21 55 54		
	Poona	E	eP	21 57 05	2555	Slight, Near.
		E	PP?	21 57 30		
			eS	22 01 06		
			i	22 02 36		
			M	22 04 --		
19	Calcutta	E	eP	17 26 32	7120	Slight.
			iS	17 35 16		
19	New Delhi	N	eP	18 27 32	5890	Slight.
			iS	18 35 01		
			e	18 37 06		
			i	18 37 41		
			iSSS	18 40 31		
	Poona	E	iP	18 28 25		Slight, Distant.
			i	18 29 22		
			iS?	18 36 36		
			L	18 42 --		
	Bombay	N,E	iP	18 28 29		
		E	e	18 29 24		
		N	i	18 29 24		
		N,E	eS	18 35 37		
		N	M	18 42 44	Per.= 9 sec.	μ = 2.
23	Bombay	N	e	06 36 00		Feeble.
		E	e	06 48 05		
		E	e	06 57 25		
23	New Delhi	N	i	13 56 56		Slight, Very near.
			i	13 57 27		
			i	13 57 42		
	Poona	E	e	14 02 19		Slight.
			e	14 02 30		
			i	14 02 46		
24	Bombay	N	e	21 15 08		
		E	e	21 23 34		
	Calcutta	E	e	21 17 31		Slight.
		E	e	21 22 33		
			e	21 28 33		
			Mn	21 56 11		

Date.	Station.	Compt.	Phase.	G. M. T. h. m. s.	△ Km.	Remarks.
March 1949.						
27 (Contd.)	New Delhi	E	eP	06 43 45	5820	Moderate.
			iS	06 51 11		
			iSSS	06 55 54		
			L	06 59 24		
			M	07 03 25		
27	Bombay	E	e	11 57 30		Very feeble.
		N,E	e	12 07 57		
27	Calcutta	E	e	20 42 07		-
			e	20 47 17		
	Kodaikanal	E	e	20 42 17		
	Bombay	N	e	20 43 23		Feeble.
		E	e	20 43 31		
28	Calcutta	E	e	12 57 17		Slight.
			e	12 58 31		
			i	13 02 13		
			Mn	13 17 09		
	Hyderabad	N	eP	12 58 21	4460	
			S	13 04 27		
			SS	13 07 35		
			M	13 14 47	Per.= 15 sec.	μ = 4.
	Poona	E	eP	12 58 49	4900	Slight.
			i	12 59 06		
			i	12 59 33		
			iS	13 05 22		
			L	13 09 --		
	Bombay	N,E	eP	12 59 00		
		N	eS	13 05 40		
		E	iS	13 05 43		
			L	13 12 06		
			M	13 20 36	Per.= 17 sec.	μ = 4.
	New Delhi	N	iS	13 04 47	5550	Slight.
			iSS	13 08 07		
			i	13 08 27		
			M	13 18 02		-
30	Kodaikanal	E	e	15 06 37		Slight.
	Calcutta	E	e	15 06 40		Slight, Distant.
			e	15 14 45		
	Bombay	N,E	eP	15 07 18		Slight, Distant.
	New Delhi	N	e	15 14 37		Slight, Distant.
			e	15 19 37		
			e	15 33 29		
			e	15 46 14		
	Hyderabad	N	M	15 57 08	Per.= 15 sec.	μ = 3.
30	New Delhi	N	i	21 16 34		Slight, Near.
			i	21 17 39		

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SUPPLEMENT - Data for Colombo.

Station	Instrument	Component	Period in sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Colombo	Milne-Shaw	E	12	250	20:1	8.0

Date	Compt.	Phase.	G. M. T. h. m. s.	△ Km.	Remarks
MARCH 1949.					
4	E	P	01 22 20	2715	
		S	01 26 40		
		L	01 29 50		
		M	01 31 30		
4	E	P	10 25 20	3665(?)	
		S	10 30 --		
		L	10 31 20		
		M	10 (36) --		
16	E	P	22 26 41	7780	Trace faint.
		S	22 35 51		
		L	22 53 --		
		M	23 00 46		
17	E	P	21 16 22	8280	Indistinct.
		S	21 25 57		
		L	21 41 --		
		M	21 44 57		
27	E	P	06 42 42	5000	
		S	06 49 22		
		L	06 58 22		
		M	07 01 22		
28	E	P	12 58 10	4500	Trace overlapping.
		S	13 04 20		
		L	13 12 --		
		M	13 15 50		
30	E	P	15 05 --		
		S	15 15 22		
		L	15 41 .		
		M	15 49 02		
APRIL 1949.					
13	E	P	20 17 06		
		S	-- -- --		
		L	20 32 43		
		M	20 02 06		
20	E	P	03 48 21		
		L	04 34 21		
		M	04 49 51		
23	E	P	11 23 29	5360	
		S	11 30 29		
		L	11 36 24		
		M	11 43 39		

Date	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
APRIL 1949.					
24	E	P	04 28 23	4335	
		S	04 34 25		
		L	04 37 48		
		M	04 43 33		
25	E	P	14 14 41		
		L	15 09 --		
		M	15 18 44		
30	E	P	01 31 44	4720	
		S	01 38 17		
		L	01 44 22		
		M	01 53 47		Trace overlapping
MAY 1949.					
e 3	E	P	06 08 06	8780	
		S	06 18 03		
		L	06 37 56		
		M	06 42 21		
9	E	P	13 40 05	10665	
		S	13 41 20		
		L	13 44 05		
		M	13 44 42		
12	E	P	10 22 25		
		L	10 28 05		
		M	10 10 22		
16	E	P	04 40 21	4830	
		S	04 46 51		
		L	04 53 31		
		M	05 03 08		Trace overlapping
25	E	P	08 37 53	1780	
		S	08 40 58		
		L	08 43 02		
		M	08 45 22		

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Station	Instrument	Compt.	Period in sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
New Delhi	Milne-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	N	4	922	20:1	16.0
	Wood-Anderson	E	2	1474	30:1	60.0
	Omori-Ewing	E	30	30	---	12.0

Date	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
JUNE 1949.					
1	E	eP	22 54 22	1000	Slight
	N,E	iS	22 56 03		
5	E	e	04 52 15		Slight, Near.
	..	iS	04 53 30		
5	E	e	17 06 16		Slight, Near.
		iS	17 07 39		
5	N,E	eP	18 41 50	910	Slight.
	E	eS	18 43 22		
	N,E	i	18 43 30		
	N	i	18 43 34		
	E	i	18 43 37		
7	E	e	08 23 04		Slight, Near.
	..	i	08 23 56		
9	E	e	21 22 18		Slight. Near.
		e	21 23 48		
10	E	eP	09 28 20	950	Slight.
		eS	09 29 57		
12	N	iP	18 10 57	2150	Slight.
	E	iP	18 10 58		
	N	iPP	18 11 05		
	E	iPP	18 11 06		
	N,E	iS	18 14 26		
	E	SS	18 14 51		
14	N	iP	00 26 34	2820	Slight.
		iS	00 30 57		
		iSS	00 31 36		
		i	00 32 39		
15	N	iP	09 47 12	2210	Slight
		iS	09 50 48		
		iSS	09 51 21		
		M	09 53 59		
17	E	eP	20 02 45	970	Slight.
	N	eP	20 02 46		
	E	iS	20 04 23		
	N	iS	20 04 24		
	N	i	20 04 29		
21	E	eP(?)	03 12 18	470 (?)	Slight. Record faint
		iS	03 13 06		

Date	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JUNE 1949.					
24	N	iP	22 46 48	4790	Slight, Direction of first motion south and East.
	E	iP	22 46 51		
	N,E	iS	22 53 14		
	E	i	22 53 20		
	N	SS	22 56 02		
		ScS	22 56 55		
		M	23 03 08		
26	N,E	eP	08 50 40	5890	Slight.
	N	iS	08 58 07		
	E	eS	08 58 10		
	N	ScS	09 00 26		
		M	09 11 21		
30	N	i	09 37 01		Slight. Local.

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GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

SEISMOLOGICAL BULLETIN.

APRIL 1949.

Published under the direction of

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Director General of Observatories.

I N T R O D U C T I O N.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory.
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	Director.
Calcutta	22°32'N.	88°22'E.	(i) 7 (ii) 6	Alluvium	Director.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	Director.
New Delhi	28°35'N.	77°12'E.	207	Massive Quarsizites	Deputy Director General of Observatories (I.& S).
P o o n a	18°32'N.	73°51'E.	560	Deccan Trap	Dy. Director General of Observatories (C.& G.)

TABLE II.

The instruments and their constants.

Station	Instrument	Component	Period in sec.	Static Magnification.	Damping Ratio	Paper speed mm./min.
Bombay	Milne-Shaw	N	12	250	19:1	8
		E	12	350	20:1	8
Calcutta	Milne-Shaw	E	6	250	7:1	8
		(from 1.4.49 to 11.4.49)				
		E	6	350	5:1	8
		(from 12.4.49 to 30.4.49)				
Hyderabad	Milne-Shaw	N	12	250	20:1	8
		E	12	250	20:1	8
Kodaikanal	Milne-Shaw	E	10	250	20:1	8
New Delhi	Milne-Shaw	N	12	247	20:1	8
	Wood-Anderson	N	4	922	20:1	16
	Wood-Anderson	E	2	1474	30:1	60
P o o n a	Milne-Shaw	N	12	250	20:1	8
	Wood-Anderson	E	4	1100	20:1	16
	Wood-Anderson	N	2	1200	30:1	60

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949.						
1	Poona	E.	eP (?)	08 55 58		Slight, Distant
			eS (?)	09 03 32		
	Hyderabad	N.	S	09 02 36		
			L	09 09 41		
			M	09 13 48		Per. = 15 sec. u = 3.
	Bombay	N, E.	e	09 03 46		
2	Poona	E	e	06 20 46		Tremor.
			e	06 21 05		
2	Poona	E	e	10 29 13		Tremor.
				10 29 28		
3	Poona	E	eP	06 44 40		Slight, Distant Probably deep.
			epP	06 45 15		
			eS (?)	06 52 22		
			esS(?)	06 53 30		
	Bombay	E	eP (?)	06 45 02	5955 (?)	Slight.
		N,E	eS(?)	06 52 35		
	Hyderabad	N.	eP	06 45 12	4620	
		N	S	06 51 28		
		N	M	07 05 57		Per.=16 sec. u = 5.
	Calcutta	E	e	06 45 22		Slight, Distant
			e	06 49 36		
3	Poona	E	e	19 16 35		Tremor.
			e	19 17 08		
4	Kodaikanal	E	e	03 47 00		
4	New Delhi	E	e	07 50 59		Slight, Near.
			i	07 51 21		
			i	07 51 42		
			i	07 52 03		
	Poona	E	e	07 56 40		Slight, Tremor.
			e	07 57 33		
4	Calcutta	E	e	17 46 21		Tremor.
			e	17 48 35		
5	New Delhi	E	eP	06 23 22	1010	Slight
		N	eP	06 23 24		
		E	i	06 23 36		
		N	i	06 23 42		
		E	iS	06 25 04		
		N	iS	06 25 05		
		E	i	06 25 07		
		N	i	06 25 17		
		N	i	06 25 15		
5	Epicentre 43°.0'N. 131° 0'E. (U.S.C.G.S.) h = 570 Km. ± 0 = 09 h. 27 m. 08 s. (Poona).					
	Calcutta	E	eP	09 33 56		Slight, Deep.
			e	09 35 46		
			iS	09 39 28		
	New Delhi	N,E	iP	09 34 38	4320	Slight, Deep
		E	i	09 35 03		
		N	i	09 35 15		
		E	i	09 35 25		
		N	ipP	09 36 23		
		E	pP	09 36 24		
		N,E	isP	09 37 20		
		N,E	iS	09 40 36		

3....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949.						
5 Contd.	New Delhi	N	iSS	09 43 24		
		E	eSS	09 43 28		
	Hyderabad	N	P	09 35 20		
			PP	09 37 10		
			S	09 41 52		
			SS	09 45 05		
			M	09 53 18		Per.=11 sec. u = 4.
	Kodakanal	E	e	09 35 30		
	Poona	E	iP	09 35 34		Slight. h = 570 km.±
		N	eP	09 35 36		
		E	i	09 36 38		
		N	i	09 36 40		
		E	ipP	09 37 29		
		N	epP	09 37 26		
		N,E	isP	09 38 30		
		N.	iS	09 42 22		
		E	iS	09 42 23		
		E	i	09 44 15		
		N,E	isS	09 45 30		
	Bombay	N	iP	09 35 41	5255	Slight, Deep.
		E	eP			
		N,E	ipP	09 37 26		
			isP	09 38 28		
			iS	09 42 34		
			isS	09 45 45		
		N	M	09 49 40		Per.= 13 sec. u = 3.
		E	M	09 49 41		Per.= 11 sec. u = 2.
6	Poona	E	eP	15 32 54		Slight, Probably deep
			e	15 33 21		
			e	15 35 16		
			e	15 35 44		
			eS(?)	15 40 30		
			e	15 42 33		
	Bombay	E	e	15 32 59		
		N,E	e	15 40 33		
	Hyderabad	N	S	15 39 18		
			L	15 45 55		
			M	15 50 34		Per.=9 sec. u = 2.
7	Bombay	N,E	e	07 33 -		Surface waves
	Hyderabad	N.	M	07 51 40		Per.= 14 sec. u = 3.
7	Bombay	E	e	08 42 21		Feeble
		N	e	08 43 -		
		E	M	08 46 06		Per.= 11 sec. u = 1
	Poona	E	e	08 44 52		
		N	e	08 41 37		
			e	08 42 29		
			M	08 48 30		
			Mn	08 50 -		Per.= 22 sec. u = 4.
	Hyderabad	N	M	08 43 58		Per.= 13 sec. u = 3.
8	New Delhi	E	eP	05 14 31	990	Slight
			iS	05 16 11		
9	Bombay	N,E	e	08 48 54		Feeble, Surface waves.
10	New Delhi	E	iP	23 58 57	1370	Slight.
		N	eP	23 59 00		
		N,E	iS	00 01 16		
	Poona	E	eP (?)	00 01 09		Slight, Near.
			e	00 02 27		
			eS (?)	00 03 20		
			e	00 04 22		

4 ...

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949						
10 (Contd.)	New Delhi	E	e	14 24 23		Slight, Near.
			i	14 24 49		
			i	14 25 19		
10	New Delhi	E	i	17 54 25		Slight, Near.
			i	17 54 27		
10	New Delhi	E	i	18 01 20		Slight, Near.
			e	18 03 10		
12	New Delhi	E, N	e	23 09 52		Slight, Near.
			i	23 11 30		
13	Hyderabad	N	M	01 46 23		Per.=15 sec. u = 2.
13	New Delhi	E	e	14 09 58		Slight, Near
			i	14 11 35		
13	New Delhi	E	i	19 06 51		Slight, Near
13	Epicentre West Washington where felt strongly. 5 deaths and a number of injured reported. O = 19 h. 55.4 m. (Poona)					
13	New Delhi	N	eP	20 09 34	11670	Moderate
			PP	20 13 46		
			i	20 13 51		
		E	i	20 13 53		
		N	i	20 14 07		
			i	20 15 43		
			iSKS	20 20 12		
			iSKS	20 20 16		
			iSKKS	20 20 39		
			eSKKS	20 20 46		
			pS	20 22 51		
			i	20 23 17		
			iPPS	20 23 20		
			SS	20 28 31		
			SSP	20 28 59		
			i	20 37 30		
	Kodaikanal	E	e	20 10 30		
	Calcutta	E	e	20 14 39		Slight, Distant.
			e	20 20 34		
		-	Mn	20 57 26		
	Bombay	N,E	ePP	20 14 53		Moderate
		E	eSKKS	20 22 40		
			PS	20 24 34		
			SS	20 30 38		
			L	20 42 53		
			M	20 54 53		Per.=34 sec. u = 36.
		N	M	20 56 45		Per.=30 sec. u = 17.
	Poona	E	ePP	20 14 56		
			e	20 16 49		
			eSS	20 22 39		
			L_R	20 50 -		
		N	M	20 52 56		
15	Poona	E	e	14 13 44		Slight, Distant
		N	e	14 15 21		
		E	i	14 16 57		
		E	i	14 18 30		
		N	e	14 24 15		
		E	i	14 24 30		
	Hyderabad	N	eP	14 16 20	5710	from S-PP?

5 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949						
15 (Contd.)	Hyderabad	N	PP	14 17 59		
			S	14 23 28		
			SS	14 27 05		
			M	14 38 52		Per.= 15 sec. u = 4.
	Bombay	N,E	eP	14 16 57	6155	Slight.
			eS	14 24 42		
15	New Delhi	N	eP	14 54 18	1010	Slight
		E	iP	14 54 19		
		N	iP	14 54 20		
		N,E	i	14 54 37		
			i	14 55 59		
			iS	14 56 01		
		E	i	14 56 04		
		N,E	i	14 56 16		
	Poona	E	eP	14 56 12	2070	
			pP (?)	14 57 06		
			sP (?)	14 57 23		
			e	14 57 43		
			iS	14 59 38		
			isS(?)	15 00 07		
			i	15 00 20		
			i	15 00 34		
			i	15 00 49		
			i	15 01 47		
			i	15 02 09		
16	Poona	E	e	13 02 30		Slight
			e	13 02 37		
			i	13 06 45		
			i	13 07 02		
	New Delhi	E	e	13 03 18		Slight, Near
			i	13 03 29		
			i	13 07 24		
17	New Delhi	N,E	eP	06 43 44	1010	Slight
		E	iS	06 45 24		
		N	iS	06 45 25		
			iS	06 45 27		
			i	06 45 31		
			i	06 45 33		
			i	06 45 36		
			i	06 45 37		
		E	i	06 45 38		
		N	i	06 45 44		
		E	i	06 45 46		
19	Poona	E	iP	15 30 26	8000	Slight, Distant.
			i	15 30 44		[No Milne-Shaw record]
			iS	15 39 46		
			e	15 40 34		
	Bombay	N,E	eP	15 30 33	7620	Slight
			eS	15 39 36		
	New Delhi	N	e	15 37 36		Slight, Distant.
			e	15 52 21		
20	Epicentre 38°S., 73°W (appr.) (Strasbourg). Felt violently at South Chile, 57 died and 60 injured. (Press).					
	Kodaikanal	E	P (?)	03 48 31	10345	
			PP(?)	03 52 13		Other phases not clear.
	Poona	N,E	$iPKP_1$	03 48 41	16110	Moderate, Distant.
			$iPKP_2$	03 49 00		
			PP	03 52 00		
			PKS_1	03 52 13		
			PKS_2	03 52 36		

6...

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949						
20 (Contd.)	Poona	N,E	i	03 53 08		
			i	03 53 27		
			i	04 01 22		
			iSKSP (?)	04 01 51		
			PS	04 01 58		
			SS	04 10 08		
			SSP	04 10 47		
			L_Q	04 29 -		
			L_R	04 36 -		
			M	04 46 -		
	Bombay	N,E	$iPKP_1$	03 48 42	16190	Moderate.
			iPP	03 52 08		
			iPPP	03 55 11		
			$iSKKS_1$	03 58 44		
			iPPS	04 04 10		
			iSS	04 10 57		
			iSSP	04 11 27		
			ISSS	04 17 12		
			LQ	04 27 -		
			LR	04 37 30		
		E	M	04 40 -		Per.= 28 sec. u = 30.
		N	M	04 40 -		Per.= 20 sec. u = 9.
	New Delhi	N	$ePKP_1$	03 48 53	16970	Moderate
			$ePKP_2$	03 49 11		
			iPKS	03 52 33		
			iPP	03 52 42		
			eSKS	03 55 53		
			iSKKS	03 59 16		
			iSKKKS	04 00 08		
			ePSKS	04 03 17		
			iPPS	04 06 08		
			i	04 09 34		
			iSS	04 12 18		
			M	04 43 54		
	Calcutta	E	$ePKP_1$	03 49 05	17710	Moderate
			$ePKP_2$	03 49 41		
			iSKP	03 52 38		
			iSKS	03 54 57		
			iPPP	03 56 01		
			iPSKS	04 02 47		
			iPPS	04 06 10		
			M	04 54 45		
	Hyderabad	N	PP	03 52 42		P' lost while changing paper.
			SKKS	03 58 51		
			SKSP	04 02 31		
			SS	04 11 24		
			M	04 39 50		Per.= 18 sec. u = 11
20	New Delhi	N	eP	20 06 14		
		E	eP	20 06 16		
			i	20 07 31		
		N	i	20 07 33		
			i	20 08 15		
22	Bombay	N	e	17 38 06		Feeble, Distant.
		E	e	17 38 27		
22	Hyderabad	N	M	18 41 14		Per.= 15 sec. u = 5.
23	Epicentre 8°S. 119°E. in Flores Sea. O = 11 h. 15 m. 45 sec.					h = 60 kms. ± (Poona).
	Kodaikanal	E	iP	11 23 40	5720	
			PP	11 25 35		

7 .....

				h. m. s.	Km	
23 (Contd.)	Kodaikanal	E	eS	11 31 00		
			L	11 39 30		
			M	11 44 25		Per.= 17 sec. u = 100
	Calcutta	E	eP	11 23 45	4835	Moderate
			iPP	11 25 21		
			iPcP	11 25 41		
			iS	11 30 13		
			iSS	11 33 08		
			iScS	11 33 45		
			M	11 39 33		
	Hyderabad	N	P	11 24 16	5280	
			PP	11 26 07		
			S	11 31 10		
			SS	11 34 41		
			L	11 39 03		
			M	11 42 28		Per.= 14 sec. u = 16
	Poona	N,E	iP	11 24 48	5780	Moderate
			pP	11 25 04		
		N	sP	11 25 16		
		E,N	PcP (?)	11 26 16		
			PP	11 26 57		
			iS	11 32 08		
			ScS(?)	11 34 41		
	Bombay	E	iP	11 24 56	6000	Moderate
		N	eP			
		N	iS	11 32 32		
		E	eS			
		N,E	L	11 41 06		
		N	M	11 49 56		Per = 18 sec. u = 13.
		E	M	11 50 20		Per = 23 sec. u = 26.
	New Delhi	N	iP	11 25 03	6020	Moderate
		N,E	iP	11 25 03		
		E	i	11 25 18		
		N	iS	11 32 40		
			iS	11 32 42		
		E	iS	11 32 45		
		N	i	11 37 23		
			i	11 37 41		
			i	11 40 43		
			M	11 46 53		

24 Epicentre 27°N, 55°E. in South Iran. 0 = 04 h. 22 m. 07 sec. Damages and casualities at Bundar Abbas, Gulf (Poona) of Persia (Press Report , Trieste).

Bombay	N,E	iP	04 26 13	2000	
	N	iS	04 29 28		
	E	eS			
	E	L	04 31 00		
	N	L	04 31 04		
	E	M	04 35 17		Per.= 17 sec. u = 43.
	N	M	04 38 13		Per.= 13 sec. u = 33.
New Delhi	N,E	eP	04 26 25	2020	Moderate
		iPP	04 26 37		
	N,E	iS	04 29 54		
	N	L	04 31 00		
	N	M	04 32 40		
		Mn	04 35 06		Per.= 13 sec. u = 92.
Poona	N,E	iP	04 26 25	2120	
	N	PP	04 26 47		
	E	PP	04 26 48		
	N	PPP	04 26 55		
	E	PPP	04 26 53		
		eS	04 29 51		

8.....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	
April 1949.						
24 (Contd.)	Poona	E	SS	04 30 14		
			SSS	04 30 29		
			LR	04 30 55		
		N	M	04 32 17		
		E	M	04 32 11		
	Kodaikanal	E	iP	04 27 45	3055	
			iS	04 32 25		
			L	04 35 30		
			M	04 38 00		Per.= 20 sec. u = 111.
	Hyderabad	N	P	04 27 10	2670	
			S	04 31 22		
			SS	04 32 24		
			M	04 35 45		Per.= 18 sec. u = 37.
	Calcutta	E	eP	04 28 18	3390	Moderate
			iPP	04 29 12		
			iPcP	04 31 14		
			iS	04 33 19		
			iSS	04 34 54		
			iScS	04 38 54		
			M	04 39 04		
			Mn	04 42 04		Per.= 7 sec. u = 80.
25	Epicentre 20°S., 69°.5 W. Notth Chile. H = 13 hrs. 55.0 m. h = 100 Kms (U.S.C.G.S.) ; h = 115 Kms. Strasbourg. Felt strongly at Iquique and Arica and the village of Zapiga (Press).					
	Bombay	E	$iPKP_1$	14 14 29	16110	Moderate
			ePP	14 17 44		
			$iPKS_2$	14 18 36		
			ePPP	14 20 29		
			SKS_2	14 21 15		
			$PKKP_1$	14 23 28		
			$iSKKS_1$	14 24 29		
			SKSP	14 27 56		
			PS	14 28 36		
			iSS	14 36 28		
			iSSS	14 41 58		
			LQ	14 55 -		
			LR	15 03 -		
			Mn	15 19 -		Per.= 18 sec. u = 20.
	Poona	N,E	PKP_1	14 14 33	16000	
			$ipPKP_1$ (?)	14 14 58		
		E	i	14 15 18		
			PP	14 17 48		
			$iPKS_1$	14 18 09		
			$iPKS_2$	14 18 34		
			$iSKKS_1$	14 24 32		
			i	14 25 23		
			iPS	14 28 11		
			SS	14 36 07		
			SSP	14 36 40		
			LQ	14 42 00		
			LR	15 04 00		
			M	15 15 -		
	Kodaikanal	E	i	14 14 35		Phases not clear.
	New Delhi	E	$ePKP_1$	14 14 40	15920	Moderate
		N	$ePKP_1$	14 14 42		
		N,E	i	14 18 35		
		N	eSKS	14 22 41		
		N,E	iSKKS	14 24 44		
			i	14 25 24		
		N	iSS	14 36 35		
			i	14 39 46		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949.						
25 (Contd.)	New Delhi	N	i	14 47 51		
	Calcutta	E	iPKP$_1$	14 15 01		Moderate
			i	14 16 47		
			SKKS	14 25 45		
			i	14 27 21		
			SKSP	14 29 41		
			i	14 34 06		
	Hyderabad		A shock of moderate intensity in 14 hrs. GMT. Time marks absent.			
	Calcutta	E	e	19 36 01		Tremor.
			e	19 44 31		
26	Kodaikanal	E	e	10 33 00		
26	New Delhi	E	i	14 27 24		Slight, Near
			i	14 27 36		
			i	14 27 44		
28	Bombay	N	e	01 38 48		Feeble
		E	e	01 42 52		
	New Delhi	E	e	01 52 53		Slight, Near.
			i	01 53 01		
			i	01 53 09		
29	Calcutta	E	e	03 04 48		Slight, Near
			i	03 05 18		
	New Delhi	N,E	P ?	03 07 23	1470	Slight, Beginning lost in hour mark.
		E	PP	03 07 33		
		N	iS	03 09 48		
		E	iS	03 09 50		
			SS	03 10 01		
		N	SSS	03 10 12		
	Poona	E	e(P) ?	03 07 39		Slight, Near.
			i(S) ?	03 10 10		
			e	03 11 22		
			i	03 12 18		
	Bombay	N	e	03 10 27		Feeble, Near.
29	New Delhi	E	i	06 35 30		Slight, Local.
			i	06 38 00		
29	New Delhi	E	eP	18 14 52	980	Slight.
			eS	18 16 31		
			i	18 16 35		
30	Epicentre 5°N., 127°E., South East of Minbanao Islands in Pacific Ocean. O = 01 h. 23 m. 27 s. h = 150 Km. ± (Poona).					
	Kodaikanal	E	iP	01 32 05	6890	Other phases lost while changing chart.
			PP	01 34 15		
	New Delhi	E	iP	01 32 23	5430	Moderate
		N	iP	01 32 24		
			PP	01 34 23		
			PPP	01 35 08		
		E	PPP	01 35 11		
		N	i	01 36 35		
			iS	01 39 30		
			i	01 40 15		
		E	SeS	01 42 00		
		N	SS	01 43 00		
			M	01 50 36		

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Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks
April 1949.						
30	Poona	N,E	iP	01 32 30	5945	
			ipP	01 33 05		
			sP	01 33 21		
		E	PcP	01 33 36		
		N,E	iPP	01 34 16		
		E	PPP	01 35 33		
		N,E	iS	01 39 46		
			isS	01 40 37		
		N	ScS	01 42 07		
			SS	01 43 25		
			LQ	01 45 21		
			LR	01 47 21		
			M	01 52 10		
	Calcutta	E	eP	01 30 54	5220	Moderate
			iPP	01 32 38		
			i(?)	01 36 50		
			iS	01 37 45		
			iSS	01 40 53		
			L	01 44 20		
			M	01 48 -		
	Bombay	E	iP)	01 32 40	5735	Moderate
		N	eP)			
		E	iPP	01 34 43		
		N	ePP	01 34 48		
		N,E	iSS	01 43 08		
		N	L	01 49 22		
		E	L	01 49 38		
			M	01 54 18		Per.= 17 sec. u = 34.
		N	M	01 55 54		Per.= 14 sec. u = 36.

NCGore Sept.15.

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METEOROLOGICAL DEPARTMENT.

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MAY 1949.

Published under the direction of

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Director General of Observatories.

I N T R O D U C T I O N.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'Meters'	Lithologic Foundation	Officer-in-charge of Observatory
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	Director.
Calcutta	22°32'N.	88°22'E.	(i) 7 (ii)6	Alluvium	Director.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E.	682	Gravel	Director.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	Director.
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzites	Dy. Director General of Observatories (I.& S.)
P o o n a	18°32'N.	73°51'E.	560	Deccan-Trap	Dy. Director General of Observatories (C.& G.)

TABLE II.

The instruments and their constants.

Station	Instrument	Component	Period in Sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	20:1	8
	Milne-Shaw	E	12	350	20:1	8
Calcutta	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
	Milne-Shaw	E	6 (From 1. 5.1949 to 20.5.49)	350	5:1	8
	Milne-Shaw	E	12 (from 21.5.1949 to 31.5.49)	250	17:1	8
Hyderabad	Milne-Shaw	N	12	250	20:1	8
	Milne-Shaw	E	12	250	20:1	8
Kodaikanal	Milne-Shaw	E	10	250	20:1	8
New Delhi	Milne-Shaw	N	12	247	20:1	8
	Wood-Anderson	N	4	922	20:1	16
	Wood-Anderson	E	2	1474	30:1	60
	Omori-Ewing	E	30	30	-	12
Poona	Milne-Shaw	N	12	250	20:1	8
	Wood-Anderson	E	4	1100	20:1	16
	Wood-Anderson	N	2	1900	30:1	60

Date	Station	Compt	Phase	G. M. T. h- m. s.	Δ Km.	Remarks
May 1949.						
2	New Delhi	N,E	e	03 07 43		Slight, Near.
			i	03 08 56		
		N	i	03 09 17		
2	Poona	E	iP	05 42 47	4088	Shock suspected to be deep focused. Depth of focus probably between 200 to 300 Kms.
			iS	05 48 36		
3	Poona	N,E	e	03 08 -		Slight, Tremor.
3	Bombay	N,E	e	03 35 38		Slight.
		E	M	03 46 10		Per.= 13 sec. μ = 3.
		N	M	03 49 48		Per.= 9 sec. μ = 2.
	Kodaikanal	E	e	03 38 30		Per. =10. sec. μ = 20.
	Hyderabad	N	M	03 44 33		Per.= 11 sec. u = 6.
	New Delhi	N	e	03 50 21		Slight, Distant.
3	Epicentre Lat. 50°N., Long. 152°E. in sea of Okhotsk. 0 = 05 h. 56 m. 43 sec. GMT.					
	New Delhi	N	iP	06 06 40	6460	Slight.
		E	iP	06 06 41		
		N	i	06 07 17		
		E	i	06 07 27		
		N	iS(?)	06 15 42		
			i	06 16 13		
			i	06 16 19		
			i	06 17 20		
	Hyderabad	N	iP	06 07 27		
			e	06 16 11		
			e	06 16 54		
			i	06 18 12		
			M	06 40 43		Per.= 15 sec. μ = 4.
	Poona	N,E	iP	06 07 42	7780	h = 80 Kms. (approx.)
		N	PcP(?)	06 08 02		
			ipP	06 08 15		
		E	ipP	06 08 18		
		N,E	iS	06 16 39		
		N	isS	06 17 25		
		E	isS	06 17 29		
		N	i	06 18 38		
	Bombay	N,E	iP	06 07 45	7480	Slight.
		E	eS(?)	06 16 41		
	Kodaikanal	E.	e	06 08 01		Tremor.
3	Hyderabad	N	M	11 40 41		Per = 12 sec. μ = 3.
5	New Delhi	N,E	eP	13 59 01	330	Slight
			iS	13 59 36		
5	New Delhi	E	eP	18 38 39		Slight
			i	18 38 48		
			i	18 39 02		
	Bombay	N,E	e	18 44 00		Feeble, Surface waves.
	Hyderabad	N	M	18 51 36		Per.= 11 sec. μ = 3.
6	Hyderabad	N	P	14 38 18	5060	
			eS	14 45 00		
			M	14 55 12		Per.= 11 sec. μ = 4.
	Bombay	N,E	e	14 44 --		Feeble.

3 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
MAY 1949.						
7	New Delhi	E	i	01 10 16		
			i	01 10 20		
9	New Delhi	E	eP	08 38 37	1620	Slight.
			i	08 38 44		
			i	08 38 52		
			iS	08 41 18		
			i	08 41 36		
	Hyderabad	N	M	08 51 36		Per.=11 sec. μ = 2.
9	Dehra Dun	N	e	10 42 34		
			e	10 47 31		
			e	10 52 00		
			e	10 54 48		
			M	10 56 30		Per.= 18 sec.
9	Epicentre Lat. 1°.5 N. Long. 94°.5 E. in Indian Ocean. h = 65 Kms. O = 13 h. 36 m. 02 s. GMT.					
	Kodaikanal	E	iP	13 40 32	2220	Intensity moderate.
			PP	13 40 46		
			iS	13 44 09		
			SS	13 44 32		
			L	13 45 54		
			M	13 47 34		Per.= 18. sec. μ=137.
	Calcutta	E	eP	13 40 42	2280	Intensity moderate.
			ePP	13 40 55		
			iS	13 44 24		
			iSS	13 44 44		
			M	13 47 12		
	Hyderabad	N,	iP	13 41 03	2420	
			iS	13 44 55		
			L	13 47 11		
			M	13 48 35		Per = 16 sec. μ = 69.
	Poona	N	iP	13 41 44	2967	Intensity moderate
		E	iP	13 41 50		
			pP	13 42 05		
		N,E	sP	13 42 15		
		N	PP	13 42 30		
			PcP	13 45 15		
		N,E	iS	13 46 18		
		E	sS	13 46 40		
			M	13 50 --		
		N	M	13 50 30.		
			Mn	13 52 30		Per. = 17 sec. μ = 7.
	Bombay	N,E	iP	13 42 02	3010	Intensity moderate.
			iS	13 46 39		
		E	L	13 49 10		
		N	L	13 49 46		
			M	13 52 32		Per. = 19 sec. μ = 68.
		E	M	13 53 14		Per. = 17 sec. μ = 65.
	New Delhi	N	iP	13 42 25	3190	Intensity moderate
		E	iP	13 42 26		
		N,E	i	13 42 55		
		N	iS (?)	13 47 14		
			i	13 48 04		
			i	13 49 19		
			L	13 50 43		
			M	13 53 31		
			Mn	13 56 19		Per. = 14 sec. μ = 57.

4 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
MAY 1949.						
10	New Delhi	N,E	eP	02 52 22	1030	Slight.
			e	02 52 30		
		E	e	02 52 35		
			iS	02 54 06		
		N	iS	02 54 07		
			i	02 54 29		
			i	02 54 48		
10	New Delhi	N	iP	09 15 34	1030	Slight.
		N	i	09 15 49		
		E	i	09 15 52		
		N	i	09 16 11		
		E	i	09 17 11		
			i	09 17 16		
		N	iS	09 17 18		
			i	09 17 40		
			i	09 18 07		
12	Kodaikanal	E	e	09 18 00		Tremor.
12	Epicentre Lat. 4°N., Long. 95°.5 E. West of North Sumatra. 0 = 10 h. 19 m. 35 s. GMT.					
	Kodaikanal	E	iP	10 23 00	2200	
			eS	10 26 35		
			SS	10 26 55		
			L	10 28 37		
			M	10 30 00	Per.= 17 sec.	μ = 7
	Hyderabad	N	eP	10 23 28	2420	
			eS	10 27 20		
			L	10 29 30		
			M	10 31 44	Per. = 14 sec.	μ = 4.
	Bombay	N,E	e	10 24 00		
			e	10 29 08		
		E	M	10 35 12	Per. = 17 sec.	μ = 3.
	Poona	N,E	eP	10 24 22	2879	
			eS	10 28 50		
	Calcutta	E	e	10 27 22		Slight, Near.
	New Delhi	N	e	10 36 20		
12	Hyderabad	N	M	23 30 53	Per.= 14 sec.	μ = 3.
13	Bombay	N,E	e	19 54 --		
	Hyderabad	N	i	19 55 35		
			M	20 40 43	Per. = 15 sec.	μ = 3.
15	New Delhi	E	e	12 54 22		Slight, Near.
			i	12 55 38		
			i	12 56 20		
15	New Delhi	E	iS	16 23 37		Slight, Near.
16	Epicentre Lat. 10°N., Long. 130° E., East of Philippines in Pacific Ocean. 0 = 04 h. 32 m. 25 sec. GMT.					
	Kodaikanal	E	iP	04 37 34	5410	
			eS	04 44 34		
			ScS	04 46 24		
			SS	04 47 46		
			L	04 52 05		
			M	04 56 03	Per. = 24 sec.	μ = 11.
	Hyderabad	N	P	04 41 10	5380	
			S	04 48 10		
			L	04 55 22		

5 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
MAY 1949.						
16 (Contd.)	Hyderabad	N	M	04 59 50		Per. = 20 sec. μ = 11.
	Poona	N,E	P	04 41 45	5890	
		E	ePP	04 43 37		
			iPPP(?)	04 44 54		
		N,E	iS	04 49 15		
			iPS	04 49 21		
		N	L	04 57 --		
			M	05 01 --		Per = 24 sec. μ = 22.
	Bombay	E	eP	04 41 57	5990	Moderate
		N	eP(?)			
		N,E	eS	04 49 32		
		E	L	04 57 21		
		N	L	04 57 36		
			M	05 06 48		Per. = 19 sec. μ = 6.
		E	M	05 07 00		Per. = 19 sec. μ = 7.
	Calcutta	E	e	04 42 03		Slight, Deep focus.
			iS(?)	04 47 27		
	New Delhi	E	iP	04 42 04	6110	Slight.
		N	iP	04 42 05		
			iS	04 49 47		
		E	eS	04 49 48		
		N	iPS	04 49 59		
			eScS	04 52 00		
			iSS	04 53 43		
			eSSS	04 55 17		
			M	05 02 29		
16	New Delhi	E	iP	18 01 02	1025	Slight.
			i	18 01 10		
			i	18 01 18		
			iS	18 02 45		
17	Hyderabad	N	e	02 49 41		
	Bombay	N,E	e	02 50 16		Feeble.
18	New Delhi	E	e	05 25 48		Slight, Near.
			i	05 26 12		
			eS(?)	05 28 34		
18	New Delhi	E	eP	11 18 32	330	Slight.
			pP*	11 18 36		
			Pg	11 18 42		
			iS	11 19 07		
19	Poona	E	eP	05 14 33	6665	h = 300 Km. (approx.)
			e	05 14 59		
			ipP(?)	05 15 37		
			iS	05 22 16		
			esS	05 24 18		
	Bombay	N,E	e	05 22 27		
		E	M	05 40 12		Per. = 18 sec. μ = 2.
	Hyderabad	N	M	05 34 27		Per. = 19 sec. μ = 5.
20	New Delhi	E	eP	19 49 27	430	Slight.
		N	e	19 49 36		
		N,E	i	19 49 41		
		E	i	19 50 02		
		N,E	iS	19 50 12		
		E	i	19 50 27		
			i	19 50 36		
21	Epicentre Lat. 20°.5 N., Long. 140°.5 E., in Pacific Ocean. O = 21 h. 40 m. 03 sec. GMT.					
	Calcutta	E	eP	21 48 44	5290	Moderate
			iPP	21 50 35		
			iS	21 55 40		

6.....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
MAY 1949.						
21 (Contd.)	Calcutta	E	iSS	21 59 21		
			iSSS	22 00 17		
			L	22 02 27		
			M	22 06 27		
			Mn	22 08 57		Per. = 20 sec. μ = 63.
	New Delhi	N	iP	21 49 28	5850	Slight.
		E	iP	21 49 28		
		N	iS	21 56 55		
			eSS	21 59 33		
			M	22 11 22		
	Hyderabad	N	eP	21 49 59	6350	
			PP	21 52 09		
			eS	21 57 55		
			PS	21 58 13		
			L	22 09 01		
			M	22 13 16		Per.= 15 sec. μ = 9.
	Poona	N,E	iP	21 50 23	6780	
		E	PP	21 52 28		
		N	S_1 (?)	21 58 27		
		E	S_1 (?)	21 58 28		
		N	S_2 (?)	21 58 39		
		E	S_2 (?)	21 58 42		
		N,E	PPS	21 58 54		
		E	ScS	22 00 24		
			SS	22 02 42		
		N	SS	22 02 47		
			M	22 13 47		
	Kodaikanal	E	iP	21 50 26	6980	Slight.
			eS	21 58 56		
			ScS	21 59 06		
			SS	22 02 54		
			L	22 10 21		
			M	22 15 22		Per. = 27 sec. μ = 14.
	Bombay	N,E	eP	21 50 28	6865	Moderate
		E	eS	21 58 52		
		N	i	21 59 19		
		E	L	22 09 12		
		N	L	22 09 58		
			M	22 19 27		Per. = 18 sec. μ = 5.
		E	M	22 21 43		Per. = 17 sec. μ = 9.
	Dehra Dun	N	e	21 54 48		
			e	22 03 42		
			eL	22 10 24		
			M	22 11 52		Per. = 16 sec.
24	New Delhi	N	e	05 55 06		Slight, Local
			e	05 55 13		
			i	05 55 26		
			i	05 55 36		
			i	05 55 43		
24	New Delhi	E	eP	13 25 20	350	Slight.
			eS	13 26 57		
			i	13 27 02		
			i	13 27 11		
24	New Delhi	E	eP	19 08 43		Slight, Near.
			i	19 08 54		
			i	19 09 02		

25 Epicentre Lat. 42°N., Long. 83°E., Sinkiang Province, in China.
O = 08 h. 23 m. 52 sec. GMT.

7 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks.
MAY 1949.						
25 (Contd.)	New Delhi	N,E	iP	08 27 08	1550	Moderate
		N	eP	08 27 14		
			iS	08 29 41		
		E	iS	08 29 42		
		N	SS	08 29 52		
			M	08 31 38		
	Calcutta	E	eP	08 28 21	2165	Moderate
			iPP	08 28 40		
			iS	08 31 55		
			iSS	08 32 20		
			M	08 34 45		
			Mn	08 40 45	Per. = 9 sec.	μ = 88.
	Dehra Dun	N	eP	08 28 50		
			e	08 29 46		
			e	08 30 44		
			M	08 32 20	Per. = 15 sec.	
	Hyderabad	N	eP	08 28 59	2890	
			iS	08 33 27		
			SS	08 34 14		
			L	08 36 20		
			M	08 38 32	Per. = 14 sec.	μ = 73.
	Poona	N,E	P	08 29 11	2665	
		N	PP	08 29 45		
			PPP	08 29 58		
			PcP	08 32 46		
		N,E	S	08 33 26		
			LQ	08 33 45		
		E	SS	08 34 19		
		N,E	SSS	08 34 29		
		N	LR	08 35 07		
		N,E	PcS	08 36 31		
		E	M	08 37 07	Per. = 9 sec.	μ = 4.
		N	M	08 37 11	Per.= 10 Sec.	μ = 4.
	Bombay	N	iP	08 29 14	2820	Moderate
		E	eP			
		N,E	iS	08 33 37		
		E	L	08 35 53		
		N	L	08 35 57		
		E	M	08 40 25	Per. = 13 sec.	μ = 27.
		N	M	08 41 08	Per. = 8 sec.	μ = 33.
	Kodaikanal	E	eP	08 35 23	Phases not clear	
26	New Delhi	E	eP	22 30 22	989	Slight.
			e	22 30 40		
			eS	22 32 02		
			i	22 32 08		
			i	22 32 24		
30	Bombay	N,E	e	02 49 00		Surface Waves.

NCGore Sept.16.

GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

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Published under the direction of

S. K. BANERJI, D. Sc., F. N. I.

Director General of Observatories.

I N T R O D U C T I O N.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory.
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	D i r e c t o r.
Calcutta	22°32'N.	88°22'E.	(i)7 (ii)6	Alluvium	D i r e c t o r.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E.	682	G r a v e l	D i r e c t o r.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	D i r e c t o r.
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzite	Dy.Director General of Observatories (I&S)
Poona	18°32'N.	73°51'E.	560	Deccan-Trap	Dy.Director General of Observatories (C&G).

TABLE II.

The instruments and their constants.

Station	Instrument	Compo-nent.	Period in sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	20:1	8.
	Milne-Shaw	E	12	350	20:1	8.0
Calcutta	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
	Milne-Shaw	E	12	250	20:1	8.0
Hyderabad	Milne-Shaw	E	12	250	20:1	8.0
	Milne-Shaw	N	12	250	20:1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20:1	8.0
Poona	Milne-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	E	4	1100	20:1	16.0
	Wood-Anderson	N	2	1900	30:1	60.0
Colombo	Milne-Shaw	E	12	250	20:1	8.0

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Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
June 1949.						
1	Poona	N	M	08 04 -		Per.= 17 sec. μ = 7.
	Hyderabad	N	M	08 08 14		Per. = 15 sec. μ = 4.
11	Bombay	N	e	14 18 19		Slight
		E	e	14 24 --		
		N	M	14 42 09		Per.= 13 sec. μ = 3
		E	M	14 43 31		Per.= 15 sec. μ = 2
	Calcutta	E	e	14 28 01		Slight, Distant.
			e	14 32 45		
	Hyderabad	N	eS	14 28 12		
			M	14 37 37		Per. = 14 sec. μ = 5
	Poona	N	e	14 36 40		
			e	14 39 30		
			M	14 41 30		Per.= 12 sec. μ 3.
11	Calcutta	E	e	14 47 55		Slight, Near, Felt at Ghatsila.
			iS (?)	14 48 07		
12	Bombay	E	e	18 18 25		Very Feeble.
		N	e	18 14 28		
14	Epicentre Lat. 10°.5 N., Long. 96°.5 E. in the Bay of Bengal near Mergui Islands. 0 = 00 h. 21 m. 055 sec. GMT.					
	Calcutta	E	e	00 24 29	1780	
			iS	00 26 34		
			iSS(?)	00 26 53		
			M	00 28 24		
			Mn	00 34 14		Per.= 15 sec. μ = 75.
	Colombo	E	P	00 25 04		
			S	00 27 38		
			L	00 28 58		
			M	00 30 48		
	Hyderabad	N	eP	00 25 17	2060	
			iS	00 28 42		
			SS	00 29 03		
			L	00 30 08		
			M	00 31 32		Per.= 15 sec. μ = 13.
	Kodaikanal	E	iP	00 25 19	2400	Short distance earthquake. Slight.
			iS	00 29 14		
			L	00 30 31		
			M	00 31 16		Per. = 12 sec. μ = 3.
	Poona	N,E	iP	00 26 08	2368	Slight
		E	pP(?)	00 26 20		
		N,E	PP	00 26 30		
		E	PPP	00 26 45		
			i(?)	00 26 58		
		N,E	eS	00 30 01		
			LQ(?)	00 30 25		
			SS	00 30 45		
			LR	00 31 52		
			M	00 32 27		Per. = 135 sec. μ = 11.
	Bombay	N,E	eP	00 26 18	2655	Moderate.
			eS	00 30 29		
		N	iSS	00 31 39		
		E	L	00 33 32		
		N	L	00 33 39		
		E	M	00 37 45		Per. = 17 sec. μ = 11.
		N	M	00 42 46		Per. = 13 sec. μ = 6

3.....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
June 1949.						
15	Epicentre Lat. 17°.5 N., Long. 94°.0 E., of Bassein Coast. O = 09 h. 48 m. GMT.					
	Hyderabad	N	e	09 48 07		
			e(P)	09 52 32		
			e(S)	09 55 14		
			M(?)	09 55 54		Per. = 14 sec. μ = 9.
	Calcutta	E	eP	09 49 10	855	Slight.
			iS	09 50 38		
			iS*	09 51 08		
	Poona	N,E	eP	09 53 19	2190	Slight.
			eS	09 56 57		
			LQ	09 57 16		
			LR	09 58 12		
		N	M	09 59 55		
	Bombay	N,E	eP	09 53 35	2345	Slight.
			eS	09 57 22		
		N	i	09 58 04		
		E	i	09 58 21		
	Calcutta	E	e	21 16 30		Slight, Distant.
			e	21 31 36		
15	Calcutta	E	e	23 09 58		Tremor.
16	U.S.C.G.S. gives epicentre = Gulf of Eden of South Arabia. O = 17 h. 57 m. 55 sec. GMT.					
	Bombay	N	e	18 08 26		Slight.
		E	e	18 10 45		
		N	e	18 10 49		
	Poona	N	e	18 09 22		
		E	e	18 11 10		
	Kodaikanal	E	e	18 10 14		Slight shock.
	Calcutta	E	e	18 13 01		Slight, Distant.
			e	18 16 38		
			Mn	18 31 18		
	Hyderabad	N	M	18 13 33		Per. = 15 sec. μ = 3.
16	Poona	E	iP(?)	21 30 20		Slight
			iS(?)	21 34 24		
17	Calcutta	E	e	00 42 56		Slight, Near.
	Hyderabad	N	M	00 48 12		Per. = 12 sec. μ = 3.
	Poona	N	M	00 48 15		
17	Bombay	N,E	eP	07 48 00	3090	Slight, Near.
			eS	07 50 19		
		N	M	07 51 26		Per. = 10 sec. μ = 2.0
		E	M	07 51 29		Per. = 11 sec.
	Hyderabad	N	M	07 49 45		Per. = 12 sec. μ = 4.
	Poona	N,E	M	07 50 15		
19	Bombay	N,E	e	09 08 --		Surface waves.
	Hyderabad	N	M	09 32 58		Per. = 20 sec. μ = 5.
	Poona	N	M	09 38 --		
23	Poona	E	i	22 50 50		
	Bombay	N,E	e	22 51 01		Very feeble.
24	Epicentre Lat. 5°.8 S., Long. 105°.8 E. 70 miles to the west of Batavia. O = 22 h. 38 m. 47 sec. GMT.					
	Colombo	E	P	22 44 40		
			S	22 49 33		
			L	22 52 25		
			M	22 55 28		

4.....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
June 1949.						
24 (Contd.)	Kodaikanal	E	iP	22 45 17	3610	Fairly short distance earthquake with moderate intensity.
			PP	22 46 20		
			iS	22 50 32		
			SS	22 52 32		
			L	22 54 02		
			M	22 56 47		Per. = 18 sec. μ = 18.
	Hyderabad	N	iP	22 45 45	3900	
			PP	22 46 51		
			iS	22 51 18		
			SS	22 53 29		
			L	22 55 41		
			M	22 58 27		Per. = 19 sec. μ = 21.
	Poona	E	iP	22 46 18	4250	Moderate.
			ipP	22 46 33		
			isP	22 46 49		
			i	22 47 19		
			iPP	22 47 48		
			ePPP	22 48 08		
			iS	22 52 13		
			SS	22 54 48		
			LQ	22 55 12		
			SSS	22 55 27		
			ScS	22 56 18		
			LR	22 56 46		
			M	23 00 00		Per. = 18 sec. μ = 24.
	Bombay	N,E	iP	22 46 27	4490	Moderate. Δ from E compt.
			ePP	22 48 05		
		N	eS	22 52 32		
		E	iS	22 52 35		
		E	SS	22 55 48		
		N	SS	22 55 56		
		E	L	22 58 18		
		N	L	22 58 33		
		E	M	23 01 47		Per. = 25 sec. μ = 24.
		N	M	23 03 48		Per. = 19 sec. μ = 16.
	Calcutta	E	eP	22 47 07	4290	Moderate
			ePcP	22 49 25		
			iS	22 53 03		
			iSS	22 55 33		
			L	22 57 53		
			M	23 01 03		
			Mn	23 06 03		Per. = 15 sec. μ = 46.
25	Hyderabad	N	M	00 37 55		Per. = 12 sec. μ = 3.
26	U.S.C.G.S. gives epicentre Celebes Islands Region. 0 = 08 h. 41 m. 16 sec.GMT.					
	Bombay	E	e	08 49 12		Slight. Pronounced microseisms throughout the record.
		N	e	08 55 45		
		E	e	08 58 54		
		N	e	09 00 28		
			M	09 12 16		Per. = 25 sec. μ = 11.
		E	M	09 16 59		Per. = 19 sec. μ = 6.
	Calcutta	E	e	08 49 15	4480	Slight.
			PpP	08 51 18		
			i	08 53 16		
			iS	08 55 26		

5 .....

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
June 1949						
26 (Contd)	Calcutta	E	iSS	08 58 26		
			iScS	08 59 11		
			L	09 00 38		
			M	09 04 26		
	Colombo	E	P	08 49 40		
			S	08 56 35		
			L	09 02 50		
			M	09 05 42		
	Poona	N,E	e	08 50 18		
			M	09 10 --		Per. = 22 sec. μ = 17.
27	Bombay	E	e	23 28 --		Feeble surface waves.
		N	e	23 40 --		

NCGore Sept.17.

GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT.

S E I S M O L O G I C A L B U L L E T I N

JULY 1949.

Published under the direction of

S. K. BANERJI, D. Sc., F.N.I.

Director General of Observatories

INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph stations

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	Director
Calcutta	22°32'N.	88°22'E.	(i) 7 (ii) 6	Alluvium	Director
Colombo	06°54'N.	79°52'E	7	Beach-sand	Superintendent
Dehra Dun	30°19'N.	78°03'E	682	Gravel	Director
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	Director
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzites.	Dy.Director General of Observatories (I.& S.).
P o o n a	18°32'N.	73°51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& G.)

(i) Milne-Shaw.
(ii) Omori-Ewing

TABLE II.

The Instruments and their Constants.

Station	Instrument	Compo-nent	Period in Sec.	Static Magnifi-cation	Damping Ratio	Paper speed mm. / min.
Bombay	Milne-Shaw	N	12	250	20:1	8.0 from 1 to 22 16.0 from 23 to 31
	Milne-Shaw	E	12	350	20:1	8.0
Calcutta	Milne-Shaw	E	12	250	20:1	8.0
	Wood-Anderson	N	4	1000	30:1	60.0
	Omori-Ewing	N	15	32	-	25:4
	Omori-Ewing	E	16	30	-	25.4
Colombo	Milne-Shaw	E	12	250	20:1	8.0
Dehra Dun	Omori-Ewing	N	32	12	-	-
Hyderabad	Milne-Shaw	N	12	250	20:1	8.0

continued on page 2 .....

Station	Instrument	Component	Period in Sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Hyderabad	Milne-Shaw	E	12	250	20:1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20:1	8.0
New Delhi	Milme-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	N	4	922	20:1	16.0
	Omori-Ewing	E	2	1474	30:1	60.0
	Omari-Ewing	E	30	30	-	12.0
Poona	Milne-Shaw	N	12	250	20:1	8.0
	Wood Anderson	E	4	1100	20:1	16.0
	Wood Anderson	N	2	1900	30:1	60.0

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
1	Bombay	N	e	01 07 -		Feeble surface waves
		E	e	01 18 -		
2	New Delhi	E	eP	02 29 54	850	Slight
		N,E	iS	02 31 21		
		N	i	02 31 47		
			iS	02 32 19		
	Poona	N	e	02 31 15		Phases masked by microseisms.
		E	e	02 34 05		
		N	e	02 34 47		
	Bombay	E	e	02 32 38		Feeble
			e	02 34 51		
	Hyderabad	N	M	02 35 47		Per.= 9 sec. μ = 10.
	Calcutta	E	eP	02 35 58	1445	Slight
			iS	02 38 25		
2	Bombay	N	e	05 52 03		Feeble
2	Bombay	N,E	e	11 32 -		Feeble, Distant.
		N	e	11 55 17		
	Hyderabad	N	eS	11 54 30		
			M	12 17 55		Per. = 16 sec. μ = 4.
	Poona	N	M	12 24 -		Phases masked by microseisms
2	Epicentre 16°.5 N., 147°.0 E. in the Pacific near Marianas Islands. O = 19 h. 57 m. 14 sec.					
	Calcutta	E	eP	20 06 52	6165	Moderate
			iPPP	20 09 57		
			iS	20 14 36		
			isS(?)	20 14 57		
			iSS	20 18 14		
			L	20 21 57		
			M	20 27 14		
			Mn	20 32 17		Per.= 18 sec. μ = 10.
	New Delhi	N,E	eP	20 07 56	7070	Moderate
		N	PPP	20 11 21		
			iS	20 16 30		
		E	eS	20 16 32		
		N	iPS	20 16 43		
		E	PS	20 16 45		
		N	iScS	20 17 43		
			SSS	20 22 36		
			i	20 23 51		
			M	20 32 43		
	Hyderabad	N	eP	20 08 00	7220	
		E	iP	20 08 05		
		N	PP	20 10 16		
			S	20 16 42		
			SS	20 21 07		
			L	20 26 35		
			M	20 33 49		Per. = 16 sec. μ = 13.
	Colombo	E	P	20 08 05	7390	
			S	20 16 55		
			L	20 31 00		
			M	20 38 32		
	Poona	N	eP ?	20 08 25	7780	Moderate
		E	iP ?			
		N,E	iS	20 17 26		
		N	L(?)	20 35 -		
			M	20 44 -		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
2	Bombay	N,E	eP	20 08 29	7835	Moderate
			iS	20 17 43		
		E	iPS	20 18 23		
		N	iSS	20 22 13		
		E	SS	20 22 50		
		N	L	20 27 22		
		E	L	20 29 34		
			M	20 37 38		Per. = 21 sec. μ = 13.
		N	M	20 42 19		Per. = 17 sec. μ = 9.
4	Epicentre 27°.5N; 55°.5E. near Bundar Abbas on the coast of Persian Gulf 0 = 03 h. 04 m. 40 sec.					
	Bombay	N,E	eP	03 44 45	2080	Slight.
			iS	03 48 07		
		N	L	03 50 19		
		E	L	03 50 27		
			M	03 53 55		Per. = 12 sec. μ = 5.
	New Delhi	N,E	eP	03 44 54	2130	Slight.
		E	PP	03 45 03		
		N	iS	03 48 21		
			iSS	03 48 42		
			L	03 49 54		
			M	03 51 11		
			Mn	03 54 11		
			ScS	03 56 39		
	Poona	N,E	iP	03 44 58	1940	Moderate
			iPPP	03 45 21		
			eS	03 48 13		
			iSS	03 48 34		
			L_R (?)	03 49 -		
	Hyderabad	N	iP	03 45 50	2540	
			iS	03 49 56		
			SS	03 50 57		
			M	03 56 31		Per. = 16 sec. μ = 12.
	Colombo	E	P	03 46 05	4335	
			S	03 52 05		
			L	03 57 20		
			M	03 58 45		
	Calcutta	E	eP	03 47 18	2890	Slight
			eS	03 51 47		
			eSS	03 52 53		
			M	03 56 09		
5	Bombay	N,E	e	02 30 25		Feeble
			e	02 37 29		
	Poona	N,E	e	02 31 30		Feeble movements masked by microseisms.
	New Delhi	E	eP	02 34 17	2170	Slight
		N	eS	02 37 48		
	Hyderabad	N	S	02 39 17		
8	New Delhi	N	eP	07 53 25	1330	Slight
			eS	07 55 38		
			M	07 58 57		
	Dehra Dun	N	e	07 53 50		
			M_1	07 56 40		
	Bombay	E	e	07 55 07		
	Hyderabad	N	eP	07 59 55	2820	
			S	08 04 20		
	Poona	E	eP	07 55 15	2500	Slight
			iS	07 59 15		
			Mn	08 03 30		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
8	Calcutta	E	eP	07 59 49		Slight, Near.
			iS(?)	08 03 18		
8	Epicentre 41°.5 N., 73°.0 E. in Kirghiz in Central Asia. 0 = 08 hrs. 01 m. 52 sec.					
	New Delhi	N	eP(?)	08 05 03	1330	Slight . Beginning doubtful due to the tremors of the preceding shock.
			eS	08 07 16		
			M	08 10 33		
	Dehra Dun	N	eP	08 06 00		
			M_1	08 07 40		
	Calcutta	E	eP	08 06 18	3365	Slight.
			eS	08 11 18		
			iSS	08 13 03		
			L	08 14 31		
			M	08 16 21		
	Bombay	N	iP	08 06 54	2455	Slight
		E	eP			
		N,E	eS	08 10 49		
		N	M	08 15 12		Per. = 11 sec. μ = 3.
		E	M	08 15 35		Per. = 7 sec. μ = 3.
	Poona	N,E	iP	08 06 56	2500	
			iS	08 11 06		
			M	08 15 -		
	Hyderabad	N	eP	08 07 18	2700	
			S	08 11 35		
			M	08 15 57		Per. = 10 sec. μ = 12.
10	Epicentre 40°.0 N., 72°.5 E. in the Alai Mountains on the border of Tadzhik and Kirgiz. 0 = 03 hrs. 53 m. 24 sec.					
	Dehra Dun	N	iP	03 55 00	1127	Direction of first motion north.
			iS	03 56 48		
			eL	03 58 00		
			M_1	03 59 00		
			M_2	04 00 00		
			M_3	04 02 50		
	New Delhi	N	iP	03 56 22	1320	Great. Direction of first motion north.
			iS	03 58 34		
			SS	03 58 48		
			ScS(?)	04 08 44		
	Bombay	N	eP	03 58 15	2410	Very Great. Distance from north component.
		E	iP			Time of M phases x.
				approximate		due to quick movements.
		E	iS	04 02 02		
		N	iS	04 02 07		
		E	M	04 05 53		Per.=11 sec. μ > 323.
		N	M	04 06 38		Per. = 13 sec. μ > 506.
	Poona	N,E	iP	03 58 17	2390	Very great.
			iPP	03 58 38		
			iPPP	03 58 47		
			iS	04 02 07		
			iSS	04 02 43		
			M	04 05 22		
		N	Mn	04 06 -		Per.= 6 sec. μ = 265.

Date	Station	Compt	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
10 (Contd.)	Hyderabad	N	iP	03 58 37	2490	
			iS	04 02 39		
			L	04 04 27		
			M	04 06 54		
	Calcutta	E	iP	03 58 37		Per.= 10 sec. μ = 174.
	Kodaikanal	E	iS	04 02 43	2515	Very great. First movement west.
			eP	03 59 11	3365	Great.
			PP	04 00 06		
			PPP	04 00 22		
			PcP	04 02 15		
			iS	04 04 11		
			LR	04 07 11		
	Colombo	E	M	04 09 45		Per.= 11 sec. μ = 10.
			P	04 00 -		Beginning of P lost
			S	04 05 36		in the timemark.
			L	04 07 16		
			M	04 14 -		
10	Hyderabad	N	M	06 49 31		Per.= 21 sec. μ = 12.
10	After shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	10 46 40	1300	Slight.
			PP	10 46 49		
			eS	10 48 50		
			M	10 50 09		
	Hyderabad	N	M	10 57 29		Per.=12 sec. μ = 4.
	Kodaikanal	E	e	10 59 22		Slight.
10	After shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	11 00 12	1280	Slight.
			eS	11 02 20		
			M	11 03 46		
	Hyderabad	N	M	11 11 08		Per.= 8 sec. μ = 3.
	Kodaikanal	E	e	11 11 34		Slight
10	After shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	12 00 36	1300	Slight
			PP	12 00 44		
			iS	12 02 46		
			M	12 04 03		
	Bombay	N,E	eP	12 02 30	2390	Slight
		N	eS	12 06 20		
		E	e	12 08 20		
	Poona	N	iP	12 02 30	2400	Slight.
			eS	12 06 26		
	Hyderabad	N	P	12 02 50	2540	
	Kodaikanal	E	S	12 06 56		
			e	12 08 57		Slight.
10	After shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	14 16 06	1280	Slight.
			PP	14 16 15		
			eS	14 18 13		
			SS	14 18 27		
			M	14 19 31		
	Dehra Dun	N	eP	14 16 54		
			e	14 18 00		
			e	14 18 27		
			Ml	14 19 00		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
10	Poona	N	iP	14 18 00	2370	Slight
			eS	14 21 53		
	Hyderabad	N	iP	14 18 20	2790	
			iS	14 22 43		
			L	14 25 13		
			M	14 27 28		Per.= 9 sec. μ = 7.
	Bombay	N,E	eP	14 18 24	2090	Slight.
			eS	14 21 47		
		N	L	14 22 42		
			M	14 26 50		Per.= 8 sec. μ = 5.
	Kodaikanal	E	e	14 24 17		Slight. Phases not clear.
10	An after shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	15 10 33	1300	Slight.
			eS	15 12 43		
			M	15 14 02		
	Dehra Dun	N	eP	15 11 00	1127	
			eS	15 12 50		
			eL	15 30 00		
			M_1	15 14 00		
	Poona	N,E	eP	15 12 26	2380	Slight.
			eS	15 16 20		
	Bombay	N,E	e	15 16 06		Feeble.
		E	i	15 18 23		
	Kodaikanal	E	e	15 19 57		Slight. Phases not clear.
	Hyderabad	N	M	15 21 08		Per.= 8 sec. μ = 3.
10	After shock of the very great shock at 03 hrs. 53 m.					
	New Delhi	N	eP	15 21 46	1280	Moderate.
			iS	15 23 53		
			M	15 25 10		
			Mn	15 26 43		Per.= 11 sec. μ = 129.
	Dehra Dun	N	eP	15 22 00	1127	
			eS(?)	15 23 45		
			M_1	15 23 55		
			M_2	15 24 42		
	Bombay	N,E	eP	15 23 36	2470	Moderate. Beginning
		E	eS(?)	15 27 21		mixed up with previous
		N	iS	15 27 34		shock.
			L	15 28 50		
		E	L	15 29 08		
			M	15 31 09		Per.= 7 sec. μ = 7.
		N	M	15 31 46		Per.= 7 sec. μ = 10.
	Poona	N,E	iP	15 23 41	2370	Moderate.
			iS	15 27 34		
	Hyderabad	N	iP	15 24 02	2490	
			iS	15 28 04		
			SS	15 29 49		
			M	15 32 35		Per.= 13 sec. μ = 42.
	Calcutta	N	eP(?)	15 27 57		
	Kodaikanal	E	e	15 30 37		Moderate.
	Colombo	E	eP	15 33 06		
			S(?)	15 36 06		
			L	15 38 11		
			M	15 39 06		
10	After shock of the very great shock at 03hrs. 53 m.					
	Dehra Dun	N	iP	15 50 54	1127	Direction of first motion
			iS(?)	15 52 48		towards north.
			iL	15 53 36		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
JULY 1949.						
10 (Contd.)	Dehra Dun	N	M_1	15 54 48		
	New Delhi	N	iP	15 51 59	1280	Moderate
			iS	15 54 07		
			M	15 55 28		
	Bombay	N,E	iP	15 53 54	2290	Moderate
		N	iS)	15 57 36		
		E	eS)			
		E	L	15 58 54		
		N	L	15 59 15		
		E	M	16 01 04	Per.= 11 sec.	μ = 47.
		N	M	16 02 42	Per.= 7 sec.	μ = 15.
	Poona	N,E	iP	15 53 55	2400	Moderate.
			iS	15 57 51		
	Hyderabad	N	iP	15 54 10	2660	
			iS	15 58 25		
			SS	15 59 01		
			L	16 00 15		
			M	16 02 15	Per.= 12 sec.	μ = 110.
	Calcutta	N	eP	15 55 47	2510	Moderate.
			iS	15 58 15		
	Kodaikanal	E	eP	15 55 47	3365	Moderate.
			PcP	15 58 51		
			iS	16 00 47		
			LR	16 03 47		
			M	16 06 21		
	Colombo	E	P	15 56 46		
			S	-- -- --		
			L	16 02 56		
			M	16 06 51		
10	After shock of the very great shock at 03 hrs. 53 m.					
	Dehra Dun	N	iP	16 25 44	1127	Direction of first motion north.
			iS	16 27 36		
			iL	16 28 20		
			M_1	16 29 50		
	New Delhi	N	iP	16 26 49	1300	Moderate.
			iS	16 28 59		
			M	16 30 23		
	Bombay	N,E	iP	16 28 40	2320	Moderate.
			iS	16 32 25		
		E	L	16 33 54		
		N	L	16 34 05		
		E	M	16 36 34	Per.= 12 sec.	μ = 76.
		N	M	16 37 05	Per.= 12 sec.	μ =121.
	Poona	N,E	iP	16 28 42	2410	Moderate.
			iS	16 32 39		
	Hyderabad	N	iP	16 28 59	2530	
			iS	16 33 04		
			L	16 35 01		
			M	16 37 31	Per.= 12 sec.	μ = 223.
	Calcutta	N	eP	16 28 59	2480	Moderate.
			iS	16 32 53		
	Kodaikanal	E	eP	16 30 07	3365	Moderate.
			PcP	16 33 11		
			iS	16 35 07		
			L_R	16 38 07		
			M	16 40 41		
	Colombo	E	P	16 31 --		
			S	-- -- --		
			L	16 37 31		
			M	16 44 36		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
11	Probably after shock of the very great shock at 03 hrs.53 m. on the 10th July 1949.					
11	New Delhi	N	eP	01 15 10	1290	Feeble.
			eS	01 17 19		
11	Probably after shock of the very great shock at 03 hrs. 53 m. on the 10th July 1949.					
	New Delhi	N	eP	03 58 26	1280	Feeble.
			eS	04 00 33		
			M	04 01 55		
	Bombay	N	eP(?)	04 04 13		Feeble.
			eS(?)	04 08 13		
	Poona	N	L (?)	04 08 00		Earlier phases masked by microseisms.
	Hyderabad	N	M	04 09 12		Per.= 12 sec. μ = 3.
11	Poona	N	e	13 36 30		Feeble, tremor.
			i	13 36 44		
			i	13 37 20		
11	Calcutta	E	e	15 17 42		
			e	15 19 11		
11	New Delhi	N	iP	16 19 15	5240	Slight.
			eS	16 26 07		
			PS	16 26 21		
			SS	16 29 07		
			SSS	16 29 55		
			M	16 38 20		
	Calcutta	E	e	16 20 18		Slight, Distant.
			e	16 24 28		
			e	16 27 38		
	Hyderabad	N	e	16 26 58		
		N	M	17 05 27		Per.=16 sec. μ = 3.
	Bombay	N,E	e	16 27 53		Slight.
	Kodaikanal	E	eP	16 27 56	7580	Slight, Distant.
			eS	16 36 56		
			SS	16 44 11		
			M	16 56 26		Per. = 19 sec. μ = 12.
13	New Delhi	N	eP	08 53 23	3050	Feeble.
		E	iS	08 55 37		
		N	e	08 56 59		
		i	i	08 58 02		
13	New Delhi	N,E	eP	10 16 45	1280	Slight.Presumably an after shock of the very great shock at 03 hrs. 53 m. 24 sec. on the 10th July 1949.
			eS	10 18 53		
			M	10 20 15		
	Calcutta	E	e	10 23 06	Tremor	
			i	10 27 14		
13	New Delhi	N	eP	18 31 11	1280	" " "
			i	18 31 34		
			iS	18 33 19		
	Calcutta	E	i	18 36 57		Tremor.
			i	18 38 52		
14	New Delhi	N	eP	03 38 23	1280	Slight. Presumably an after shock of the very great shock at 03 hrs. 53 m. 24 sec. on the 10th July 1949.
			eS	03 40 32		
			M	03 41 56		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949						
14	Calcutta	E	i(?)	20 45 45		Slight, Distant.
	Bomba,	N	e	20 45 52		Slight.
			e	20 45 59		
	Poona	N	i	20 47 15		
			i	20 49 50		
			L(?)	20 52 30		
14	New Delhi	N	iP	23 28 48	6350	Week.
			iPP	23 28 56		
			i	23 29 15		
			iS	23 36 44		
			ScS	23 38 48		
15	Calcutta	E	e	02 51 04		Tremor
15	Calcutta	E	eP	11 02 46	700	Slight.
			iS	11 03 59		
			iS	11 34 38		
15	Calcutta	E	eP	11 27 22		Slight.
			iP	11 27 59		
			iS	11 28 48		
			iS*	11 29 16		
			iS	11 29 37		
	Bombay	E	e	11 31 37		Feeble.
17	New Delhi	E	eP	23 06 40	1250	Slight.
			eS	23 08 45		
18	Bombay	E	e	00 42 18		Slight.
		N	e	00 44 05		
		E	e	00 49 34		
		N	e	00 49 40		
	Calcutta	E	eP(?)	00 42 37	2555	Slight.
			eS	00 46 44		
			i	00 48 10		
	Hyderabad	N	S	00 48 19		
			L	00 57 57		
	Poona	N,E	i	00 49 28		Earlier phases masked by microseisms.
			M(?)	01 04 --		
18	New Delhi	E	eP	04 50 59	5550	Slight.
			iS	04 58 09		
	Calcutta	E	e	04 52 14		Slight.
			iS(M)	04 55 32		
	Hyderabad	N	M	05 01 13		Per. = 9 sec. μ = 3.
18	New Delhi	N,E	iP	17 43 24	990	Slight.
		N	P*	17 43 54		
			P	17 44 21		
			iS	17 45 04		
			S*	17 45 37		
			S	17 46 03		
	Poona	N	e	17 45 06		Feeble.
			i	17 45 09		
			i	17 49 21		
			i	17 50 52		

Date	Station	Comp.	Phase	h. m. s.	Km.	
JULY 1949.						
19	New Delhi	E	eP	13 31 46	1240	Feeble.
			iS	13 33 50		
	Poona	N,E	L(?)	13 41 30		
	Hyderabad	N	M	13 42 36		Per.= 11 sec. μ = 4.
19	Epicentre 39°.5 N., 71°.0 E. in Alai mountain on the border of Tadzhik and Kirgiz. 0 = 17 h. 42 m. 10 sec.					
	New Delhi	N,E	eP	17 45 02	1260	Slight.
			i	17 45 55		
			iS	17 47 08		
			M	17 48 29		
	Bombay	N,E	eP	17 46 50	2320	Moderate.
			iS	17 50 35		
			L	17 52 23		
		E	M	17 53 21		Per.= 7 sec. μ = 8.
		N	M	17 54 51		Per.= 10 " μ = 12.
	Poona	N,E	iP	17 46 53	2400	Moderate
			iPPP	17 47 25		
			iS	17 50 40		
			LR	17 52 00		
		N	Mn	17 55 --		Per= 10 sec. μ= 33.
	Calcutta	E	eP	17 47 12	2455	Moderate.
			ePP	17 47 38		
			iS	17 51 12		
			iSS	17 51 50		
			L	17 52 36		
			M	17 54 18		
	Hyderabad	N	eP	17 47 12	2600	Moderate
			iS	17 51 22		
			SS	17 52 02		
			L	17 53 24		
			M	17 55 50		Per.= 12 sec. μ = 37.
	Kodaikanal	E	e(?)	17 53 29		
			M	18 02 --		Per.= 8 sec. μ = 14.
	Colombo	E	P	17 56 00	2390	
			S	17 59 55		
			L	18 02 50		
			M	18 04 50		
20	Epicentre 10°.0S 102°.0 E., South of Sumatra in Indian Ocean. 0 = 22 hrs. 20 m. 13 sec.					
	Colombo	E	P	22 26 00	3140	
			S	22 30 46		
			L	22 34 30		
			M	22 36 35		
	Kodaikanal	E	eP	22 26 30	3635	Slight.
			eS	22 31 46		
			LR	22 35 12		
			Mn	22 37 52		Per.= 15 sec. μ = 7.
	Hyderabad	N	P	22 27 10	4010	
			eP	22 28 31		
			S	22 32 50		
			M	22 38 31		Per.= 16 sec. μ = 7.
	Poona	N,E	iP	22 27 43	4335	Moderate.
			iPP	22 29 15		
		E	ePPP	22 29 36		
		E	eS	22 33 43		
		N	iS			
		N	eSS	22 36 02		
			eSSS	22 37 02		
		E	M	22 41 31		
		N	M	22 41 31		Per.= 17 sec. μ=6.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
20	Bombay	N,E	eP	22 27 59	4445	Slight.
		N	eP	22 29 31		
		N	iS	22 34 04		
		E	eS			
		N	SS	22 37 21		
			L	22 40 06		
		E	L	22 40 26		
		N	M	22 44 27		Per.= 16 sec. μ = 4.
		E	M	22 50 27		Per. = 13 sec. μ = 4.
	Calcutta	E	e	22 32 34		Slight, Distant.
			Mn	22 51 36		
21	New Delhi	E	eP	12 54 30	1000	Slight.
			iS	12 56 11		
21	Bombay	N,E	e	21 33 36		Feeble.
23	Epicentre 18°.5 S. 169°.0 E. in the Pacific near Hebridges Islands. 0 = 10 hrs. 26 m. 49 sec. (U.S.C.G.S.)					
	New Delhi	N	e	10 24 41		Slight, Very distant.
			e	10 26 43		
			i	10 50 36		
			i	10 51 38		
			i	10 54 31		
	Colombo	E	P	10 39 44	5560	
			S	10 49 50		
			L	10 53 25		
			M	10 57 00		
	Calcutta	E	P	10 39 44	9780	Moderate. Deep focus.
			SKS_1	10 49 38		
			iS	10 50 25		
			PS	10 51 00		
			PPS	10 51 15		
			SS	10 55 28		
			LQ	11 03 30		
			LR	11 06 50		
	Kodaikanal	E	eP	10 40 10	10450	Slight. Distant.
			SKS_1	10 50 09		
			iS	10 51 19		
			PS	10 52 22		
			SS	10 57 18		
	Poona	N,E	eP(?)	10 40 37	11090	Moderate. Deep focus.
			SKS_1	10 50 33		
			iS	10 52 07		
		N	eS	10 53 00		
			ePS	10 54 17		
			SS	10 58 30		
			SSS	11 02 25		
			LQ	11 08 20		
			L_R	11 12 18		
			M	11 21 30		
	Bombay	E	eP(?)	10 40 39	11160	Slight.
			iS	10 52 13		
	Hyderabad	N	SKS_1	10 15 18		
			e	10 15 58		
			S(?)	10 52 40		
			SS(?)	10 57 39		
			SSS	11 03 47		
			LR	11 10 31		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
JULY 1949.						
23	Epicentre 38°.0 N., 25°.0E., in Aegean Sea 0 = 15 hr. 03 m. 23 sec.					
	New Delhi	N,E	eP	15 11 34	4720	Moderate
		N	pp	15 30 18		
			iS	15 17 56		
			i	15 18 22		
			i	15 19 27		
			i	15 21 18		
			M	15 27 55		
	Bombay	E	iP	15 11 54	5090	Moderate
		N	P			Record faint
		E	iPP	15 13 38		
		N	ePP			
		N,E	eS	15 18 38		
		E	iSS	15 22 09		
		N	L	15 28 00		
		E	L	15 28 10		
			M	15 33 59		Per.= 20 sec. μ = 18.
		N	M	15 34 34		Per.= 18 sec. μ = 17.
	Poona	N,E	iP	15 11 56	5220	Moderate
			iPP	15 13 39		
			iPPP	15 14 40		
			iS	15 17 46		
			iSS	15 21 10		
			L_Q	15 22 --		
			L_R	15 24 --		
			M	15 29 --		
	Hyderabad	N	iP	15 12 25	5690	
			PP	15 14 13		
			S	15 19 44		
			SS	15 23 44		
			L	15 29 00		
			M	15 33 30		Per.= 20 sec. μ = 37.
	Dehra Dun	N	e	15 12 28		
			e	15 15 10		
			M_1	15 30 12		
	Kodaikanal	E	eP	15 12 51		Moderate, Distant.
			PcP	15 30 56		
			PP	15 15 01		
			PPP	15 16 16		
			PcS	15 17 56		
			iS	15 20 34		
			SSS	15 26 02		
			L_R	15 28 42		
	Colombo	E	P	15 13 21	6630	
			S	15 21 31		
			L	15 37 --		
			M	15 43 16		
25	New Delhi	E	eP	09 35 22	1320	Slight
			eS	09 37 34		
25	Hyderabad	N	M	12 50 52		Per.= 15 sec. μ = 4.
27	Calcutta	E	e	11 10 15		Tremor
			i	11 17 05		
	Colombo	E	eP	11 10 17	5520	
			S	11 17 26		
			L	11 27 21		
			M	11 32 41		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	△ Km.	Remarks
JULY 1949.						
27	Bombay	E	eP	11 11 33	6665	Slight
		N	P	-- -- --		Masked by microseisms
		N,E	eS	11 19 46		
	New Delhi	N,E	eP	11 11 35	6550	Slight.
			iS	11 19 43		
		N	iSS	11 23 20		
			i	11 27 28		
	Hyderabad	N	S	11 18 26		
			M	11 38 43		Per.= 15 sec. μ = 3.
27	New Delhi	E	iP	12 21 54	930	Slight.
			iS	12 23 30		
27	Poona	N	i	15 20 07		Distant.
			L	15 30 --		
			M	15 41 --		
	Bombay	E	e	15 25 56		Moderate. Distant.
			M	16 19 33		Per.= 19 sec. μ = 15.
		N	-	-- -- --		Microseisms through-
	Calcutta	E	e	15 36 34		Slight, out.
						Distant.
			i	15 37 45		
			Mn	16 13 25		
	Hyderabad	N	SKS	15 38 38		
			M	16 09 47		Per. = 20 sec. μ = 9 .
	New Delhi	N	e	15 39 14		Slight. Very distant.
			e	15 41 29		
			e	15 43 03		
	Colombo	E	L	16 07 --		
			M	16 11 41		
28	Calcutta	E	e	04 55 06		Tremor
			e	05 00 26		

NCGore Nov.22.

The following table contains a list of earthquakes reported by voluntary Observers from various stations, during the period January to July 1949.

Station at which felt	Date	G. M. T. of earthquake h. m.	Duration in seconds	Intensity R.F. Scale	No. of shocks
Tezpur	4- 2-1949	09 42	10 - 15	6	3
Simla	4- 3-1949	10 21	6	6	2
Gurdaspur	4- 3-1949	10 23	15	5	2
Dalhousie	4- 3-1949	10 20	10	6	2
Dehra Dun	4- 3-1949	10 26	3	6	1
Jammu	4- 3-1949	10 25	150	6	2
Jaipur	4- 3-1949	10 29	7	6	1
Srinagar	4- 3-1949	10 32	30	7	10
Srinagar	4- 3-1949	10 45	3	6	2
Srinagar	10-3-1949	23 45	1	6	1
Tezpur	31-3-1949	10 43	20	6	1
Srinagar	26-4-1949	11 55	1	6	1
Gulmarg	10-7-1949	04 00	5	6	2
Srinagar	10-7-1949	03 52	3	6	2
Srinagar	10-7-1949	16 06	1	6	1
Srinagar	19-7-1949	17 43	1/2	6	1

GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT.

SEISMOLOGICAL BULLETIN

AUGUST 1949.

PUBLISHED UNDER THE DIRECTION OF

V. V. SOHONI, B.A.(Hons.), M. Sc.

Offg. Director General of Observatories

INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, The Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	D i r e c t o r
Calcutta	22°32'N.	88°22'E.	(i)7 (ii)6	Alluvium	D i r e c t o r
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent
Dehra Dun	30°19'N.	78°03'E.	682	Gravel	D i r e c t o r
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	D i r e c t o r
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzites	Dy.Director General of Observatories (I.& S).
P o o n a	18°32'N.	73°51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& G).

(i) Milne-Shaw
(ii) Omori-Ewing

TABLE II.

The Instruments and their Constants.

Station	Instrument	Component.	Period in sec.	Static Magnification.	Damping Ratio.	Paper speed mm. / min.
Bombay	Milne-Shaw	N	12	250	20:1	16 from 1 to 15 8 from 16 to 31
	Milne-Shaw	E	12	350	20:1	8.0
Calcutta	Milne-Shaw	E	12	250	20:1	8.0
	Wood-Anderson	N	4	1000	30:1	60.0
			(from 1.8.49 to		11.8.49)	
	Wood-Anderson	N	4	1000	5:1	60:0
			(from 12.8.49 to		31.8.49)	
	Omori-Ewing	N	15	32	-	25.4
	Omiro-Ewing	E	16	30	-	25.4
Colombo	Milne-Shaw	E	12	250	20:1	8.0
Dehra Dun	Omori-Ewing	N	30	12	-	
Hyderabad	Milne-Shaw	E	12	250	20:1	8.0
	Milne-Shaw	N	12	250	20:1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20:1	8.0
New Delhi	Milne-Shaw	N	12	250	20:1	8.0
	Omori-Ewing	E	30	30	-	12.0
	Wood-Anderson	E	2	1474	30:1	60.0
			(Instrument out of order from 11.8.1949)			
Poona	Milne-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	E	4	1100	20:1	16.0
	Wood-Anderson	N	2	1900	30:1	60.0

Date	Station	Comp.	Phase	G.M.T. h. m. s.	Δ	Remarks
AUGUST 1943						
1	Epicentral region near Lat. 38°.0 N. Long. 79°.0 E. in Eastern Turkestan. O = 07 hrs. 39 m. 14 secs. (E.S.T. Eastern Turkistan. E = 07 hrs. 40 m. 03 secs. U.S.C.G.S.					
1	New Delhi	E	eP	07 41 35	73°	Slight
			iS	07 42 55		
			e*	07 43 15		
			e	07 43 36		
	Poona	N	e	07 43 45	28°.0	Phases masked by
		E	i	07 47 00		strong microseisms.
		N	iS	07 47 20		
		E	i	07 47 26		
		N	i	07 47 28		
			e	07 47 48		
			i	07 48 25		
			/	07 50 --		
	Hyderabad	N	eP	07 43 52	25°.0	
			e	07 47 25		
			i	07 49 06		
			/	07 50 53	Period 7 sec.	μ = 10.
	Bombay	N,E	e	07 46 58		Slight, Microseisms
			i	07 48 30		throughout record.
		N	e	07 49 01		
		E	e	07 49 07		
		N	/	07 50 29	Period 8 sec.	μ = 4.
		E	/	07 50 44	Period 7 sec.	μ = 5.
	Kodaikanal	E	eS	07 50 18		Phases not clear.
4	New Delhi	E	e	21 24 49		People, Near.
			iS	21 25 59		
5	New Delhi	E	e	07 18 54		Slight.
		N	e	07 26 23		Surface waves.
5	Epi. 1°.0 S. 78°.0 W. O = 19 hrs. 08 m. 41 secs. Very Great, destructive in Ecuador (U.S.C.G.S.).					
	Bombay	E	e	19 27 10		Slight.
		N,E	e	19 28 32		
		E	/	19 36 45	Period 22 sec.	μ = 12.
		N	[	20 28 53		
			/	20 40 46	Period 19 sec.	μ = 6.
	Poona	N	ePKP$_1$	19 28 18	178°.0	Moderate. Movements
			ePKP$_2$	19 28 46		masked by strong microseisms
			eP	19 32 10		in E-W comp't.
			ePP	19 35 37		
			iSS	19 51 15		
		N	[	20 12 --		
			[	20 21 --		
			/	20 31 --		
			/	20 37 --	Period 24 sec.	μ = 16.
	New Delhi	N,E	e	19 28 24		Slight, Distant.
		N	e	19 38 35		
			e	19 50 24		
			e	20 38 46		Surface waves.
	Hyderabad	N	e	19 28 33		
			/	20 27 12	Period 25 sec.	μ = 7.
	Calcutta	E	ePKP$_1$	19 28 15	198°.0	Moderate.
			ePP	19 34 10		
			ePPP	19 38 14		

Date	Station	Compt.	Phase	G. M. T. h.mm. s.	Δ Km.	
AUGUST 1949.						
5	Colombo	E	eP	19 28 50		
			L	20 25 20		
			M	20 38 25		
	Kodaikanal	E	e	19 31 09		
6	Epicentre 19°.0 S. 174°.5 W. Tonga Island region. 0 = 00 hrs. 35 m. 27 sec. (U.S.G. G. S.)					
	New Delhi	N	e	00 52 02	13110	Slight.
			ePP	00 55 02		
			iSKS	01 00 51		
			iSKKS	01 01 59		
			ePs	01 04 50		
			M	01 38 03		
	Kodaikanal	E	eP(?)	00 52 09	6835	Slight, Distant.
			PP	00 54 24		
			S	01 04 30		
			SS	00 08 35		
			M	01 36 --		Per.= 23 sec. μ = 31.
	Calcutta	E	e	00 53 29	10665	Moderate.
			ePPP	00 54 47		
			iS	01 00 12		
			i	01 02 57		
			iSS	01 06 42		
			iSSS	01 10 17		
			M	01 28 07		
	Bombay	N,E	eP	00 53 48		Moderate.
		E	e	00 55 25		
		N	e	01 01 02		
		E	i			
		N,E	i	01 05 20		
		E	L	01 25 32		
		N	L	01 27 00		
		E	M	01 35 05		Per.= 35 sec. μ = 30
		N	M			Lost due to failure of the recording unit.
	Hyderabad	N	ePP	00 54 39	12930	
			SKS	01 00 33		
			SKKS	01 01 36		
			PS	01 04 09		
			SS	01 09 50		
			L	01 24 11		
			M	01 32 36		Per.= 20 sec. μ = 17.
	Colombo	E	P	00 54 40		
			S	01 06 --		
			L	01 28 50		
			M	01 36 30		
	Poona	N	e	00 55 08	12780	Slight. Phases masked by microseisms in E-W chart.
			PP	00 55 45		
			SKS_1	01 00 59		
			$iSKS_2$	01 01 36		
			iPS	01 05 08		
			iPPS(?)	01 06 17		
			iSS	01 11 22		
			L_Q	01 24 30		
			L_R	01 30 --		
			M	01 39 --		Per.= 30 sec. μ = 200.
6	New Delhi	E	eP	14 37 11	1300	Slight.
			eS	14 39 11		

				h. m. s.	K	Remarks
AUGUST 1949.						
6	New Delhi	E	eP	15 33 03	1200	Slight
			eS	15 35 03		
8	Epicentre near Lat. 17°.0 S. Long. 66°.0 E. in the Indian Ocean.					
				0 = 07 hrs. 09 .3 m.		
	Bombay	E	e	07 15 34		Slight.
			eS	07 22 12		
			M	07 27 26		Per.= 24 sec. μ = 22.
		N		Record Lost		
	Hyderabad	N	eP	07 16 11	4110	
			eS	07 21 57		
			L	07 27 26		
			M	07 30 01		Per.= 12 sec. μ = 4.
	Poona	N	eP	07 16 28		
			iS	07 22 10		
			L_R	07 27 --		
	New Delhi	N	e	07 18 10		Slight, Distant.
			i	07 24 47		
			e	07 32 17		Surface waves.
	Kodaikanal	E	eS	07 20 21	1089	Slight.
			i	07 22 13		
			L	07 22 48		
			M	07 23 48		Per.= 10 sec. μ = 3.
	Calcutta	E	eS	07 24 31		Slight, Distant.
			Mn	07 42 54		
9	Poona	N	e	21 20 45		Slight.
			L(?)	21 25 00		
	New Delhi	E	eP	21 34 51	1260	Feeble.
			eS	21 36 56		
	Bombay	E	e	21 40 23		
		N				Microseisms throughout record.
	Calcutta	E	e	21 40 57		Tremor.
			e	21 45 56		
			e	21 47 26		
11	New Delhi	N	e	20 55 13		Slight, Probably near
	Bombay	N,E	e	21 06 24		Slight.
		N	e	21 06 47		
			M	21 11 18		Per.= 10 sec. μ = 5.
		E	M	21 11 23		Per.= 11 sec. μ = 5.
	Poona	E	eP	21 07 30	1725	Phases masked by
			e	21 08 28		microseisms in E-W
			L_Q	21 10 12		compt. and too feeble to be
			S	21 10 23		identified in N-S record.
			M	21 12 10		
	Hyderabad	N	M	21 09 26		Per.= 12 sec. μ = 7.
	Calcutta	E	eP	21 32 05		
			iS	22 04 58		
			iS*	22 05 30		
	Kodaikanal	E	e	22 09 09		
12	Poona	N	e	07 43 14		Tremor.
		E	e	07 50 00		
		N	L(?)	07 51 50		
	Calcutta	E	e	07 46 39		Slight. Near.
			Mn	07 52 34		
	Bombay	N,E	e	07 46 59		Feeble.
13	Bombay	N,E	e	01 27 --		Surface waves.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Km.	Remarks

AUGUST 1949.

13 Epicentre Lat. 0°;147°.0 E., in the Pacific Ocean near Admir lty Islands. 0 = 18 hrs. 24 m. 47 secs.
Epicentre 0° Lat., Long. 146°.0 E. 0 = 18 hrs. 24 m. 49 secs (U.S.C.G.S.)

Calcutta	E	eP	18 35 06	6835	Moderate.
		iPP	18 37 18		
		iS	18 43 27		
		i	18 43 54		
		M	18 55 07		
Colombo	E	P	18 35 46		
		S	18 44 39		
		M	19 05 01		
Kodaikanal	E	iP	18 36 01	7590	Moderate
		PP	18 38 33		
		iS	18 45 02		
		SS	18 49 41		
		L	18 57 26		
		M	19 03 04	Per.= 24 sec. μ = 11.	
New Delhi	N	e	18 36 22		Slight, Distant.
		iS	18 45 41		
Poona	N,E	eP	18 36 24	8220	Moderate.
		iS	18 45 53		
		SS	18 50 43		
Bombay	N,E	eP	18 36 30	8265	Slight.
	E	iS	18 46 06	Δ	from E-W compt.
	N	eS	18 46 08		
	E	SS	18 50 55		
	N	SS	18 51 06		
		L	19 00 21		
Hyderabad	N	S	18 45 00		
		M	19 03 14	Per.= 15 sec. μ = 4.	

15 Kodaikanal E e 21 22 05 Tremor.

16 Poona E i 11 25 00 Slight, Probably near.
i 11 55 25
N,E i 11 56 30
N L(?) 11 58 30
New Delhi N eP 11 51 31 880 Slight.
eS 11 53 00
Bombay E e 11 54 41 Slight.
e 11 56 02
M 11 59 13 Per.= 10 sec. μ = 4.
N Loss of record
Calcutta E eP 11 57 49 1490 Slight.
iS 12 00 17

16 Calcutta E e 21 23 44 Slight, Near.
i 21 24 31

17 Epicentre 39°.0 N., 40°.0 E., in the North-East sector of Turkey 0 = 18 hrs. 44 m. 10 sec.

Dehra Dun	N	eP	18 50 14	4565	
		eS	18 56 12		
		e	18 59 47		
		eL	19 02 38		
		M_1	19 04 40		
		M_2	19 07 00		
New Delhi	N	iP	18 50 44	3490	Moderate.
		PP	18 50 50		
		PPP	18 51 14		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
AUGUST 1949.						
17 (Contd.)	New Delhi	N	iS	18 55 52		
			iSS	18 57 44		
			L	18 59 02		
			M	19 02 14		
			Mn	19 04 13		Per.= 16 sec. μ = 167(?)
	Bombay	N,E	eP	18 51 08	3790	Moderate. N-S record
		E	PP	18 52 21		too faint.
		N,E	iS	18 56 34		
			eSS	18 58 57		
			L	19 02 23		
			M	19 07 14		Per.= 17 sec. μ = 11.
	Poona	N,E	eP	18 51 11	3990	Moderate.
			iPP	18 52 42		
			PPP	18 53 05		
			PcP(?)	18 53 38		
			S	18 56 49		
			PcS	18 57 30		
			SS	18 59 33		
			SSS	19 00 00		
			L_R	19 01 15		
			M	19 05 --		Per.= 30 sec. μ = 195.
	Hyderabad	N	eP	18 51 40	4420	
			i	18 51 44		
			PP	18 53 17		
			iS	18 57 49		
			SS	19 00 44		
			L	19 03 15		
			M	19 06 11		Per.= 21 sec. μ = 241.
	Kodaikanal	E	iP	18 52 20	4790	Moderate
			PP	18 53 06		
			iS	18 58 47		
			SS	19 01 51		
			L	19 04 11		
			M	19 07 40		
			Mn	19 14 --		Per.= 18 sec. μ = 73.
	Calcutta	E	iP	18 52 25	4880	Moderate. First move-
			iS	18 58 57		ment west.
			iSS	19 02 06		
			L	19 05 07		
			M	19 08 37		
			Mn	19 09 57		Per.= 13 sec. μ = 165.
	Colombo	E	P	18 52 52		
			S	19 03 17		
			L	19 14 47		
			M	19 21 12		
18	Poona	N	L(?)	14 04 --		
			M(?)	14 15 --		
	Bombay	N,E	e	14 46 --		Feeble, surface waves.

22 Epicentre 54°.0 N., 133°. 0 W., 0 = 04 hrs. 01 m. 12 secs. (U.S.C.G.S) North Canadian Ports and neighbourhood towns were rocked for five munutes. Tremors were felt 200 miles away in Edmantan. Albasta and towns along the entire length of Skeena valley running in-land from Prince Rupert. No death casuality reported.

New Delhi	N	iP	04 14 38	10560	Great. Direction of first motion South.
		i	04 14 50		
		iPP	04 18 22		
		i	04 18 34		
		iPPP	04 20 29		
		iSKS	04 25 18		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
AUGUST 1949.						
22 (Continued)	New Delhi	N	i	04 25 56		
			iPS	04 26 56		
			i	04 27 17		
			iSS	04 32 11		
			iSSS	04 35 36		
			i	04 40 15		
			L	04 44 49		
			M	04 52 43		
			Mn	04 59 49		Per. = 16 sec. μ = 289.
	Poona	N,E	P	04 50 15	11505	Great.
			PP	04 19 46		
			PPP	04 21 50		
			SKKS	04 26 28		
			S	04 27 03		
			PS	04 28 52		
			PPS	04 29 49		
			SS	04 34 26		
			SSS	04 38 25		
			L_Q	04 46 22		
			L_R	04 52 19		
		N	M	04 57 41		
			Mn	05 00 00		Per. = 22 sec. μ = 452.
	Hyderabad	N	iP	04 50 18	11680	
			PP	04 19 57		
			iPS	04 28 52		
			SS	04 34 08		
			M	04 58 45		Per. = 22 sec. μ = 702.
	Bombay	N,E	eP	04 15 29	11700	Great. Δ from PP - P
		E	ePP	04 19 45		
			iSKS	04 27 18		
			iPS	04 27 45		
			iSS	04 34 05		
			L	04 44 15		
			M	04 55 15		Per. = 32 sec. $\mu > 1326$
	Colombo	E	eP	04 20 21		
			S	04 28 46		
			L	04 47 41		
			M_1	05 04 16		
			M_2	05 10 21		
	Kodaikanal	E	PKP	04 20 25	11945	
			ePP	04 20 55		
			PPP	04 23 10		
			PS	04 30 15		
			SS	04 36 00		
			L_Q	04 40 44		
			L_R	04 45 45		
			M	04 54 35		Per. = 30 sec. μ = 2000.
22	Bombay	E	e	21 11 --		Feeble, Surface waves.
23	Bombay	E	e	16 26 --		Feeble, Surface waves.
23	Epicentre 53°.0 N., 132°.0 W., 0 = 20 hrs. 24 m. 32 secs. (U.S.C.G.S)					
	New Delhi	N	e	20 37 59	12330	Slight.
			iSKS	20 48 36		
			iSKKS	20 49 29		
			M	21 24 38		
	Calcutta	E	e	20 42 19		
			e	20 49 31		
			e	20 56 16		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	△ Km.	Remarks
AUGUST 1949.						
23	Calcutta	E	Mn	21 28 11		
	Hyderabad	N	PP	20 42 51		
			SKS	20 49 18		
	Bombay	E	M	21 23 11		Per. = 14 sec. μ = 6.
			e	20 43 06		
			e	20 50 44		
	Kodaikanal	E	M	21 30 21		Per. = 19 sec. μ = 5.
	Poona	N	e	20 49 02		Slight.
			i	20 49 30		Slight. Distant.
			i	20 50 46		
			i	20 52 22		
			i	20 58 40		
			i	21 00 00		
			L(?)	21 25 00		
			M(?)	21 37 00		
23	New Delhi	N	e	22 06 38		Slight, Probably near.
			e	22 09 00		
			i	22 09 55		
			i	22 10 13		
	Poona	N	iP	22 08 35	2445	Slight.
			iS	22 12 34		
			LR	22 14 34		
	Calcutta	E	Mn	22 16 38		Per. = 11 sec. μ = 11.
			eP	22 08 52	2455	Slight.
			eS	22 12 52		
			eSS	22 13 31		
	Bombay	E	M	22 16 11		
		E	e	22 12 21		Feeble.
	Hyderabad	N	e	22 14 37		
			eS	22 12 55		
	Kodaikanal	E	M	22 18 04		Per. = 9 sec. μ = 5.
			eP	22 15 43	2000	Slight.
			PP	22 16 12		
			eS	22 19 02		
			L	22 18 53		
			M	22 20 22		Per. = 10 sec. μ = 5.
25	New Delhi	N	e	13 02 50		Slight, Near.
			i	13 04 26		
			i	13 05 25		
			e	13 05 54		
25	Epicentre 7°.0 S. 128°.0 E., to the north of Timor Island in the Pacific. 0 = 23 hrs. 25 m. 49 secs. h. = 100 Km ±					
	Calcutta	E	eP	23 34 37	5555	Slight. Depth of focus about 105 Kms.
			iS	23 41 37		
	Colombo	E	isS	23 42 23		
			P	23 43 52		
			S	23 44 38		
			L	23 59 --		
			M	00 02 00		
	Hyderabad	N	P	23 35 17	5990	
			PP	23 37 02		
			S	23 42 52		
			i	23 43 44		
			ScS	23 44 56		
			L	23 52 55		
			M	23 57 56		Per. 18 sec. μ = 7.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
AUGUST 1949.						
25	Poona	N	eP	23 35 46	6890	Slight, Distant. Deep focus
		E	iP			
		E	ipP	23 36 22		
			iPP	23 38 10		
			iS	23 43 49		
			iSS	23 44 39		
			iScS	23 45 28		
			iSS	23 48 00		
		N	N eSSS	23 50 42		
			M	23 59 --		
	Bombay	E	eP	23 35 59	6665	Slight. Deep focus.
			epP(?)	23 36 31		
			iPP	23 38 24		
			eS	23 44 11		
			esS	23 44 57		
			iSS	23 48 18		
			L	23 56 55		
	New Delhi	N	iP	23 36 06	6480	Slight, Direction of first motion South.
			iS	23 44 06		
			i	23 44 53		
			e	23 45 28		
			iScS	23 45 40		
			i	23 48 55		
26	New Delhi	N	e	05 17 12		Slight, Near.
			e	05 18 09		
			i	05 19 48		
27	Calcutta	E	e	12 27 55		
			i	12 30 33		
29	New Delhi	N	e	14 38 52		Slight, Probably near.
			i	14 39 07		
	Bombay	E	e	14 40 53		Feeble surface waves.
	Poona	E	e	14 41 40		Feeble, Probably near.
			i	14 43 27		
			i	14 45 07		
	Hyderabad	N	M	14 45 45	Per. = 9 sec. μ = 3.	

NCGore Nov.24.

GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

SEISMOLOGICAL BULLETIN.

SEPTEMBER 1949.

Published under the direction of

V. V. SOHONI, B.A.(Hons.), M.Sc.

Offg: Director General of Observatories.

INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of observatory.
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	D i r e c t o r.
Calcutta	22°32'N.	88°22'E.	(i)7 (ii)6	Alluvium	D i r e c t o r.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E.	682	Gravel	D i r e c t o r.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	D i r e c t o r.
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzite	Dy.Director General of Observatories (I.& S.).
Poona	18°32'N.	73°51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& G.).

(i) Milne-Shaw (ii) Omori-Ewing.

TABLE II.

The Instruments and their Constants.

Station	Instrument	Compo-nent	Period in Sec.	Static Magnifi-cation	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	21:1	8
	Milne-Shaw	E	12	350	20:1	8
Calcutta	Milne-Shaw	E	12	250	20:1	8
	Wood-Anderson	N	4	1000	5:1	60
	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
Hyderabad	Milne-Shaw	E	12	250	20:1	8
	Milne-Shaw	N	12	250	20:1	8
Kodaikanal	Milne-Shaw	E	10	250	20:1	8
Poona	Milne-Shaw	N	12	250	20:1	8
	Wood-Anderson	E	4	1100	20:1	16
	Wood-Anderson	N	2	1900	30:1	60

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
SEPTEMBER 1949.						
	Epicentral region near Lat. 12°.0N. Long. 120°.0 E. Philippines. Epc. Luzon, Philippine Islands. 0 = 02 h. 54 m. 00 s. (U.S.C.G.S)					
5	Bombay	E	eP	03 02 35	4950	Slight.
			PP	03 04 34		
			eS	03 09 16		
			PPS	03 09 33		
			SSS	03 13 11		
	Kodaikanal	E	eP	03 02 17	4545	
			eS	03 08 29		
			L_R	03 13 47		
			M	03 17 06		Per. = 6 sec. μ = 3.
	Calcutta	E	eP	03 00 21	3445	Slight. Distant.
			PP	03 01 09		
			PPP	03 01 33		
			PcP	03 03 16		
			iS	03 05 27		
			Mn	03 17 --		Per. = 13 sec. μ = 24.
	Hyderabad	N	M	03 19 45		Per. = 14 sec. μ = 3.
5	Epicentre 17°.0 N., 121°.0 E., Luzon, Philippine Islands. 0 = 03 h. 18 m. 09 s. (U.S.C.G.S.).					
	Kodaikanal	E	eP	03 26 15	4545	Replica of the shock at 03 h. 02 m.
			eS	03 32 27		
			L_R	03 37 45		
			M	03 41 04		Per. = 16 sec. μ = 3.
	Calcutta	E	eP	03 24 35		
			eS	03 29 39		
			Mn	03 41 --		Per. = 13 sec. μ = 24.
6	Calcutta	E	e	22 19 54		Slight, Near.
			i	22 20 13		
8	Bombay	E	e	07 20 --		Feeble, Surface waves.
	Hyderabad	N	M	07 26 11		Per. = 14 sec. μ = 3.
11	Poona	N	Pg	10 33 02	75	Slight.
			P*	10 33 2.8		
			P	Lost in the minute gap.		
			PP	10 33 11.3		
			iSg	10 33 12.3		
			iS*	10 33 13.8		
			iS	10 33 16.3		
			PPP	10 33 17.8		
			SS	10 33 26.8		
			SSS	10 33 37.8		
11	Bombay	E	e	14 20 --		Feeble, Surface waves.
12	Epicentre 22°.0 S., 170°.0 E. Loyalty Islands Region. 0 =.09 h. 17 m. 04 s. (U.S.C.G.S.).					
	Bombay	N,E	eP (?)	09 35 38		Slight.
			e	09 41 46		
		E	M	10 26 32		Per. = 17 sec. μ = 4.
	Hyderabad	N	ePP	09 42 11		
			L	10 06 27		
			M	10 12 59		Per. = 18 sec. μ = 5.
13	Bombay	E	e	07 00 33		Feeble.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
SEPTEMBER 1949.						
13	Bombay	E	e	12 03 20		Feeble.
			e	12 12 55		
13	Bombay	E	e	13 55 29		Feeble.
14	Bombay	E	e	01 45 25		Feeble.
14	Epicentre 3°.5 S. 71°.0 E. in Indian Ocean. 0 = 16 h. 43 m. 40 s.					
	Kodaikanal	E	eP	16 47 15	1665	Slight.
			eS	16 50 03		
			M	16 52 --		
	Hyderabad	E	e	16 47 50	2490	
		N	P	16 48 42		
			eS	16 52 42		
		E	M	16 56 21		Per. = 10 sec. μ = 6.
	Bombay	N,E	eP (?)	16 48 40	2496	Slight.
			eS	16 52 45		
	Poona	E	eP	16 48 32	2390	Slight.
		N	eP	16 48 30		
		E	eS	16 52 25		
		N	eS	16 52 27		
		N,E	L	16 55 --		
	Calcutta	E	e	16 53 19		Slight, Distant.
			e	16 57 49		
			Mn	17 18 09		
14	Epicentre 1°.0 S. 124°.0 E. near Celebes Islands in the Pacific Ocean. 0 = 19 h. 50 m. 22 s.					
	1°.0 N. 126°.0 E. Celebes Islands Region. 0 = 19 h. 50 m. 15 s. (U.S.C.G.S.).					
	Calcutta	E	iP	19 58 14	4645	Moderate. First movement West.
			iPPP	20 00 17		
			iS	20 04 32		
			iSS	20 07 09		
			L	20 10 39		
			M	20 14 24		
			Mn	20 20 39		Per. = 20 sec. μ = 224.
	Kodaikanal	E	iP	19 59 05	5310	Moderate.
			PP	20 00 57		
			PPP	20 01 41		
			iS	20 06 02		
			L_R	20 12 46		
		-	M	20 18 36		Per. = 21 sec. μ = 80.
	Hyderabad	N,E	iP	19 59 08	5360	
		N	PP	20 01 04		
		E	iS	20 06 08		
			L	20 14 14		
			M	20 18 23		Per. = 22 sec. μ = 96.
		N	M	20 19 46		Per. = 18 sec. μ = 30.
	Poona	N,E	iP	19 59 41	5890	Moderate.
		E	PcP	20 00 45		
		N,E	iPP	20 01 43		
		E	iPPP	20 02 50		
		N	PcS	20 04 46		
		N,E	iS	20 07 09		
			iScS	20 09 33		
			iSS	20 10 54		
			SSS	20 12 20		
		N	M	20 19 00		
			Mn	20 24 --		Per. = 18 sec. μ = 29.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
SEPTEMBER 1949.						
14 (Contd.)	Bombay	E	iP }	Lost in hour gap	6000	Moderate.
		N	eP }			Probably a double shock with the second onset of P one minute after the first.
		N,E	iS	20 07 26		
			iSS	20 12 07		
		E	L	20 16 40		
		N	L	20 17 04		
			M	20 24 43		Per.=17 sec. μ = 18.
		E	M --	20 30 19		Per.=20 sec. μ = 40.
15	Poona	N	eP	05 44 21	1335	Slight.
			iPP	05 44 31		
			PPP	05 44 38		
			S	05 46 37		
			SS	05 46 51		
			M	05 48 --		
	Bombay	E	eP(?)	05 44 35	2190 ?	Slight.
			eS	05 48 09		
			M	05 50 06		Per. = 7 sec. μ = 2.
	Calcutta	E	e	05 45 17		Slight, Near.
			i	05 45 34		
16	Bombay	E	e	19 20 22		Slight.
	Poona	E	P	19 20 31	6780	Slight. Movements feeble in N Compt.
			PcP(?)	19 21 14		
			PP	19 22 46		
			PPP	19 24 15		
			S	19 28 50		
			PS	19 29 04		
		N	M	19 43 --		
	Hyderabad	N	M	19 45 24		Per. = 15 sec. μ = 2.
17	Bombay	E	e	02 08 33		Slight.
			e	02 12 31		
	Hyderabad	N	L	02 11 23		
			M	02 20 07		Per. = 12 sec. μ = 2.
17	Bombay	E	e	23 23 --		Slight, Surface waves.
	Poona	N,E	M	23 46 --		Feeble, Distant.
19	Poona	N	M	22 00 --		Feeble.
20	Epicentre 30°.0 S. 178°.0 W. Kermadec Islands. O = 11 h. 55 m. 20 s. (U.S.C.G.S.).					
	Bombay	E	e	12 15 00		Slight.
			e	12 18 07		
			e	12 24 53		
	Calcutta	E	e	12 20 08		Slight, Distant.
			e	12 23 20		
			Mn	13 03 20		
	Kodaikanl	E	e	12 12 17		Slight, Distant.
	Hyderabad	N	M	13 00 03		Per. = 18 sec. μ = 5.
	Poona	N	M	13 01 --		Per. = 22 sec. μ = 7.
20	Poona	N	e	16 24 30		Feeble.
			e	16 26 30		
			eM	16 43 --		
	Bombay	E	e	16 25 53		Feeble.
	Calcutta	E	e	16 26 16		Slight, Distant.
			Mn	16 35 41		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ K	
SEPTEMBER 1949.						
21	Hyderabad	N	eP	13 14 44		
			eSKS	13 24 44		
			M	14 14 47		Per. = 22 sec. μ = 7.
	Calcutta	E	e	13 16 30		Slight, Distant.
			e	13 22 10		
			Mn	14 13 20		
	Bombay	N,E	e	13 16 35		Slight.
			e	13 18 00		
	Poona	N	M	14 15 --		Feeble.
22	Calcutta	E	L	13 39 20		Slight, Near.
24	Epicentre 6°.0 S. 154°.0 E. near Solomon Islands in the Pacific Ocean. 0 = 04 hrs. 17 min. 38 sec. (U.S.C.G.S.).					
	Poona	N	eP	04 30 00	9335	Slight.
			ePP	04 33 18		
			iS	04 40 24		
			PS	04 41 17		
			PPS(?)	04 41 42		
	Bombay	N,E	eP (?)	04 30 20	9180 ?	Slight.
			iS	04 40 40		
	Hyderabad	N	S	04 39 40		
			M	05 11 20		Per. = 15 sec. μ = 4.
24	Bombay	N,E	e	07 31 09		Feeble.
			e	07 35 15		
25	Poona	E	eP	15 27 28	9170	Slight.
			i	15 27 45		
			i	15 28 55		
			i	15 31 07		
			iS	15 37 44		
			i	15 37 51		
			PS	15 38 22		
	Bombay	E	eP(?)	15 29 25	7090 ?	Slight.
		N	P	Movement not clear.		
		N,E	iS	15 38 00		
	Hyderabad	N	S	15 36 59		
26	Bombay	N,E	e	08 27 10		Feeble.
27	Bombay	E	e	12 04 19		Feeble.
27	Epicentre 62°.0 N., 147°.0 W. in Alaska. 0 = 15 h. 30 m. 50 s. Epicentre 60°.0 N., 149°.0 W. South of Alaska and felt at Anchorage (U.S.C.G.S.)					
	Calcutta	E	eP	15 43 26	9265	Moderate.
			eS	15 53 47		
			iPS	15 54 34		
			M	16 17 34		
	Hyderabad	N	eP	15 44 02	10290	Δ from (PP - P)
			PP	15 47 46		
			PS	15 56 35		
			SS	16 01 34		
			L	16 16 15		
			M	16 21 53		Per. = 24 sec. μ = 55.
	Bombay	N,E	ep	15 44 06	10480	Moderate. Δ from
			ePP	15 47 50		(SS - P).
			SKS	15 54 34		
			eSS	16 01 33		
		E	M	16 30 23		Per. = 22 sec. μ = 25.
		N	M	16 33 12		Per. = 19 sec. μ = 15.

				h. m. s.	Km.	
SEPTEMBER 1949.						
27 (Contd.)	Poona	N	eP	15 44 07	10335	Moderate.
			ePP	15 47 51		
			SKS_1	15 54 32		
			S	15 55 12		
			PS	15 56 30		
			SS	16 01 25		
			L_Q(?)	16 10 --		
			M	16 23 --		
			Mn	16 32 --		Per. = 20 sec. μ = 23.
	Kodaikanal	E	e(?)	15 46 41		Moderate. Distant.
27	Hyderabad	N	M	17 48 32		Per. = 15.sec. μ = 7.
29	Poona	E	e	00 03 31		Tremor.
29	Calcutta	E	e	04 55 28		Tremor.
			e	04 59 20		
	Bombay	N,E	e	04 57 13		Feeble.
	Poona	N,E	e	05 03 45		Feeble, Surface waves.
29	Calcutta	E	e	23 16 52		Tremor.
			Mn	23 25 50		
30	Bombay	E	e	04 19 30		Slight.
			i	04 38 07		
	Calcutta	E	e	04 23 41		Slight, Distant.
30	Bombay	E	e	09 12 39		Feeble.
30	Calcutta	E	e	14 54 02		Tremor.
			e	14 57 02		
30	Calcutta	E	e	15 39 34		Tremor.
			e	15 41 24		
	Bombay	E	e	16 01 --		Feeble, Surface waves.
30	Bombay	E	e	18 41 --		Feeble. Tremor
	Calcutta	E	e	18 41 58		Tremor.
			e	18 44 25		
30	Bombay	E	e	22 47 --		

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GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

SEISMOLOGICAL BULLETIN.

OCTOBER 1949.

Published under the direction of

V. V. SOHONI, B.A. (Hons.), M.Sc.

Offg: Director General of Observatories.

INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, the Curator of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of observatory.
Bombay	18°54'N.	72°49'E.	6	Deccan Trap	D i r e c t o r.
Calcutta	22°32'N.	88°22'E.	(i)7 (ii)6	Alluvium	D i r e c t o r.
Colombo	06°54'N.	79°52'E.	7	Beach-sand	Superintendent.
Dehra Dun	30°19'N.	78°03'E.	682	Gravel	D i r e c t o r.
Hyderabad	17°26'N.	78°27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°14'N.	77°28'E.	2343	R o c k	D i r e c t o r.
New Delhi	28°35'N.	77°12'E.	207	Massive Quartzite	Dy.Director General of Observatories (I.& S.).
Poona	18°32'N.	73°51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& G.).

(i) Milne-Shaw (ii) Omori-Ewing.

TABLE II.

The Instruments and their Constants.

Station	Instrument	Component	Period in Sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	21:1	8
	Milne-Shaw	E	12	350	20:1	8
Calcutta	Milne-Shaw	E	12	250	20:1	8
	Wood-Anderson	N	4	1000	5:1	60
	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
Hyderabad	Milne-Shaw	E	12	250	20:1	8
	Milne-Shaw	N	12	250	20:1	8
Kodaikanal	Milne-Shaw	E	10	250	20:1	8
Poona	Milne-Shaw	N	12	250	20:1	8
	Wood-Anderson	E	4	1100	20:1	16
	Wood-Anderson	N	2	1900	30:1	60

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
OCTOBER 1949.						
1	Bombay	E	e	18 08 48		Feeble.
	Poona	N	M	18 30 00		Feeble, Distant.
2	Bombay	N,E	e	14 04 --		Feeble. Tremors.
3	Bombay	N,E	e	09 42 --		Feeble.
4	Epicentre 1°.0 S., 22°.0 W. 0 = 10 hrs. 20 m. 24 secs. (U.S.C.G.S.)					
	Bombay	E	eP	10 33 49	9620	Slight.
			eS	10 44 29		
	Poona	E	P	10 33 55	10335	Slight.
			PP	10 37 39		
			SKKS	10 44 35		
		N,E	S	10 45 00		
			PS	10 46 27		
			PPS	10 46 59		
		N	SS	10 51 18		
		N,E	SSP	10 51 26		
			M	11 14 00		
	Kodaikanal	E	eP	10 37 15	8490	Slight, Distant.
			eS	10 47 00		
			PPS	10 47 56		
			M	11 08 00		Per. = 21 sec. μ = 7.
	Calcutta	E	e	10 39 36		Slight, Distant.
			e	10 48 48		
			e	10 55 18		
			Mn	11 22 28		Per. = 18 sec. μ = 19.
	Hyderabad	N	SS	10 52 41		
			L	11 02 34		
			M	11 07 36		Per. = 15 sec. μ = 4.
5	Calcutta	E	e	18 39 05		Tremor.
	Bombay	E	e	19 13 --		Feeble.
	Poona	E	e	19 19 29		Feeble, probably near.
			e	19 20 15		
5	Calcutta	E	e	20 34 50		Tremor.
	Bombay	E	e	20 51 --		Very feeble.
5	Calcutta	E	e	21 25 10		Tremor.
			e	21 28 05		
7	Epicentre 34°.0 S., 60°.0 E., in Indian Ocean. 0 = 12 hrs. 02 m. 25 secs.					
	Kodaikanal	E	iP	12 11 00	5630	Moderate
			PP	12 11 56		
			iS	12 18 15		
			ScS	12 21 07		
			SSS	12 23 15		
			L_R	12 25 30		
			M	12 29 30		Per. = 13 sec. μ = 61.
	Hyderabad	N,E	iP	12 11 45	6140	
		E	PP	12 13 56		
		N,E	iS	12 19 28		
		N	ScS	12 21 23		
			SS	12 23 13		
			M	12 30 00		Per. = 19 sec. μ = 84

Date	Station	Compt.	Phase	G. M. T. h.m. s.	Δ Km.	
OCTOBER 1949.						
7 (Contd.)	Poona	N,E	iP	12 11 50	5990	Moderate
			ePP	12 13 56		
			iPPP	12 15 02		
			iPcS	12 16 52		
			iS	12 19 24		
			iPS	12 19 34		
			iPPS	12 19 42		
			iScS	12 21 40		
			iSS	12 23 04		
			L_Q	12 25 --		
			L_R	12 27 30		
		N	M	12 30 --		Per. = 20 sec. μ = 80
	Bombay	N,E	iP	12 11 50	6145	Moderate.
		E	PP	12 14 04		
		N,E	iS	12 19 34		
		E	SS	12 23 32		
			L	12 26 42		
			M	12 31 08		Per. = 17 sec. μ = 27.
		N	M	12 32 27		Per. = 17 sec. μ = 29.
	Calcutta	E	iP	12 12 52	7100	Moderate.
			iPP	12 15 28		
			iS	12 21 28		
			L_R	12 32 53		
7	Poona	e	eP	22 45 30	6000	Slight. Felt in Malta.
			eS	22 53 05		(Press Report).
8	Bombay	N	e	11 46 --		Slight, Surface waves.
		E	e	11 50 --		
	Poona	N	M	11 59 02		Feeble, Distant.
	Hyderabad	N	M	11 59 51		Per. = 18 sec. μ = 6.
8	Bombay	N,E	e	20 46 --		Feeble.
	Hyderabad	N	e	20 48 19		
			M	20 00 33		Per. = 15 sec. μ = 3.
	Poona	N,E	e	20 49 17		Slight.
			i	20 52 31		
			M	21 05 --		
10	Bombay	N,E	e	13 15 31		Feeble.
	Calcutta	E	i	13 17 19		Tremor.
			e	13 23 08		
	Hyderabad	N	M	13 22 25		Per. = 15 sec. μ = 3
	Poona	N	M	13 25 --		Feeble.
12	Poona	E	e	11 59 00		Feeble.
			i	12 00 40		
18	Bombay	N,E	e	08 27 --		Feeble.
18	Bombay	N	e	15 14 --		Feeble. Surface waves.
		E	e	15 19 --		
19	Epicentre 7°.0 S. 152°.0 E., near Solomon Islands in the Pacific Ocean. 0 = 21 h. 00 m. 25 s.					
	Calcutta	E	eP	21 11 32	7590	Moderate.
			iS	21 20 33		
			iSS	21 24 56		
			Mn	21 39 14		Per. = 26 sec. μ = 226.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
OCTOBER 1949.						
19 (Contd.)	Hyderabad	E	iP	21 12 05	8950	
			iS	21 22 12		
			PS	21 22 39		
			SS	21 27 10		
		N	i	21 33 43		
			M	21 41 46		Per. = 21 sec. μ = 32.
		E	M	21 44 25		Per. = 22 sec. μ = 47.
	Kodaikanal	E	iP	21 12 14	8800	Moderate.
			PP	21 15 14		
			iS	21 22 14		
			PS	21 23 00		
			L_R	21 37 29		
			$SKKS_2$	21 38 14		
			M	21 44 14		Per. = 19 sec. μ = 13.
	Poona	N,E	eP	21 12 41	8960	Moderate.
		E	PcP	21 12 52		
		N	PP	21 15 42		
		E	PP	21 17 36		
		N,E	eP	21 22 48		
			iPS	21 23 30		
		N	PPS	21 23 54		
		N,E	SS	21 28 00		
			L_Q	21 34 00		
			L_R	21 37 30		
			M	21 44 00		
	Bombay	N,E	eP	21 12 42	9135	Moderate.
			PP	21 15 54		
			iS	21 23 00		
		N	iSS	21 28 54		
		E	iSS	21 28 56		
		N	L	21 39 14		
		E	L	21 40 09		
			M	21 46 08		Per. = 27 sec. μ = 57.
		N	M	21 51 17		Per. = 24 sec. μ = 26.
20	Calcutta	E	i	02 31 05		Slight, Near.
			e	02 34 26		
			Mn	02 35 39		Per. = 11 sec. μ = 15.
	Bombay	N	e	02 31 37		Feeble.
		E	e	02 33 --		
			M	02 39 22		Per. = 15 sec. μ = 3.
	Hyderabad	N	M	02 40 13		Per. = 11 sec. μ = 2.
20	Probably an after-shock of the moderate shock at 21 h. 00 m. on the 19th. 0 = 12 h. 45 m. 02 s.					
	Calcutta	E	iP	12 56 08	7635	Slight.
			iPP	12 58 46		
			iPPP	13 00 26		
			iS	13 05 11		
	Hyderabad	N,E	iP	12 56 46	8410	
		N	iS	13 06 28		
		E	SS	13 11 26		
			L	13 22 00		
		N	M	13 26 30		Per. = 16 sec. μ = 67.
		E	M	13 28 13		Per. = 18 sec. μ = 8.
	Kodaikanal	E	iP	12 57 00	8645	Moderate.
			iPP	13 00 00		
			iSS	13 06 53		
			PS	13 07 30		
			SS	13 11 45		
			LR	13 21 15		
			$SKKS_2$	13 23 00		
			M	13 27 49		Per. = 26 sec. μ = 20.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
OCTOBER 1949.						
20 (Contd.)	Poona	N,E	iP	12 57 16	8930	Moderate.
			ePP	13 00 13		
			iS	13 07 22		
			PS	13 08 08		
			PPS	13 08 30		
			L_R	13 23 --		
	Bombay	E	iP	12 57 24	9000	Moderate.
		N	eP			
		E	PP	13 00 35		
		N,E	iS	13 07 35		
		E	iSS	13 13 14		
		N	SS	13 13 36		
			L	13 24 52		
		E	L	13 25 12		
			M	13 38 11		Per. = 22 sec. μ = 6.
21	Probably an aftershock of the moderate shock at 21 h. 00 m. on 19th.					
	Poona	E	eP	06 17 18	8665	Slight.
			iS	06 27 16		
	Bombay	N,E	e	06 17 27		Feeble.
21	Probably an after-shock of the moderate shock at 21 h. 00 m. on 19th.					
	Calcutta	E	eP	21 45 32	7810	Slight.
			ePP	21 48 10		
			iS	21 54 44		
			eSS	21 59 15		
	Kodaikanal	E	eP	21 46 13	8630	Slight.
			PP	21 49 02		
			PPP	21 50 54		
			iS	21 56 05		
			SS	22 00 58		
			L_R	22 10 54		
			M	22 17 24		Per. = 23 sec. μ = 5.
	Poona	N	eP	21 46 42	8890	Slight.
			iS	21 56 45		
			PS	21 57 30		
	Bombay	N,E	eP	21 46 50	9035	Slight.
		E	eS	21 57 03		
		N	iS			
		E	M	22 18 14		Per. = 24 sec. μ = 5.
22	Bombay	E	e	01 22 29		Feeble.
26	Bombay	E	e	09 28 18		Feeble. Microseisms
		N,E	e	09 35 38		throughout the record.
29	Bombay	N,E	e	06 39 33		Feeble.
31	Bombay	E	e	00 23 30		Feeble.
		N	e	00 23 35		
		N,E	e	01 44 19		
	Hyderabad	N	M	02 45 36		Per. = 12 sec. μ = 3.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
OCTOBER 1949.						
31	Epicentre 8°.0 S., 152°.0 E. West of Solomon Islands in the Pacific Ocean. 0 = 17 h. 55 m. 38 s.					
	Calcutta	E	eP	18 06 46	7555	Slight.
	Hyderabad	N	eS	18 15 44		
			eP	18 07 31	8410	
			iS	18 17 13		
			PS	18 17 51		
			L	18 33 09		
	Kodaikanal	E	iP	18 07 31	8445	Slight.
			PP	18 10 31		
			iS	18 17 12		
			LR	18 33 38		
			M	18 40 27		
	Poona	N	eP	18 07 46	9000	Per. = 23 sec. μ = 6. Slight.
			PcP	18 07 58		
			iS	18 17 58		
			ScS	18 18 25		
			iPS	18 18 36		
			PPS	18 19 07		
			SS(?)	18 23 07		
			LQ	18 29 30		
			LR	18 33 --		
			M(?)	18 40 --		
	Bombay	N,E	eP	18 08 00	9055	Slight.
			PP	18 11 21		
		E	eS	18 18 14		
		N	iS			
		E	L	18 35 02		
		N	L	18 36 28		

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GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

SEISMOLOGICAL BULLETIN.

NOVEMBER 1949.

Published under the direction of

S. K. BANERJI, D. Sc., F.N.I.

Director General of Observatories.

INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, The Curator of the Nizamiah Observatory, Hyderabad, and of the Director, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory
Bombay	18°.54'N.	72°.49'E.	6	Deccan Trap	D i r e c t o r
Calcutta	22°.32'N.	88°.22'E.	(i) 7 (ii) 6	Alluvium	D i r e c t o r
Colombo	06°.54'N.	79°.52'E.	7	Beach-sand	D i r e c t o r
Dehra Dun	30°.19'N.	78°.03'E.	682	G r a v e l	P r e s i d e n t
Hyderabad	17°.26'N.	78°.27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°.14'N.	77°.28'E.	2343	R o c k	D i r e c t o r
New Delhi	28°.35'N.	77°.12'E.	207	Massive Quartzites	Dy.Director General of Observatories (I.& S.)
P o o n a	18°.32'N.	73°.51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& G.

(i) Milne-Shaw. (ii) Omori-Ewing.

TABLE II.

The Instruments and their Constants.

Station	Instrument	Compo-nent	Period in sec.	Static Ma-gnification	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	21:1	8.0
	Milne-Shaw	E	12	350	20:1	8.0
Calcutta	Milne-Shaw	E	12	250	20:1	8.0
	Wood-Anderson	N	4	1000	5:1	60.0
	Omori-Ewing	N	15	32	-	25.4
	Omori-Ewing	E	16	30	-	25.4
Colombo	Milne-Shaw	E	12	250	20:1	8.0
Dehra Dun	Omori-Ewing	N	30	12	-	-
Hyderabad	Milne-Shaw	N	12	250	20:1	8.0
	Milne.Shaw	E	12	250	20:1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20:1	8.0
New Delhi	Milne-Shaw	N	12	250	20:1	8.0
	Omori-Ewing	E	30	30	1	12.0
Poona	Milne-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	E	4	1100	20:1	16.0
	Wood-Anderson	N	2	1900	30:1	60.0

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
NOVEMBER 1949.						
1	Epicentre 43°.0 N., 96°.0 E., in Mongolia.					0 = 13 h. 04 m. 30 s.
	New Delhi	N	eP	13 09 17	2610	Slight.
			iPP	13 09 39		
			eS	13 13 25		
			eSS	13 13 59		
			M	13 16 40		
	Calcutta	E	eP	13 09 18	2345	Slight.
			iS	13 13 44		
			iSS	13 14 47		
	Hyderabad	N	eP	13 10 44	3330	
			eS	13 15 42		
			M	13 23 31		Per.= 9 s. μ = 4.
	Poona	N	eP	13 10 54	3500	Feeble.
			eS	13 16 01		
	Bombay	N	eP	13 10 55	3510	Slight.
		E	e	13 13 51		
		N	e	13 18 04		
		E	M	13 24 14		Per.= 9 sec, μ = 2.
		N	M	13 24 58		Per.= 11 " μ = 3.
	Kodaikanal	E	e	13 17 00		Tremor
2	Epicentre 3°.0 S., 134°.0 E., North Western New Guinea U.S.C.G.S.					
	Colombo	E	P	02 41 05		
			S	02 50 00		
			L	02 59 --		
	Poona	N	e	02 42 22		Slight.
			e	02 51 30		
	Kodaikanal	E	iP	02 42 27	6445	Slight.
			iS	02 50 27		
			Mn	03 08 30		
	Hyderabad	N	eP	02 42 31	6460	
			S	02 50 32		
			L	03 00 32		
			M	03 04 22		Per.= 15 sec. μ = 4.
	Bombay	N,E	e	02 43 13		Slight
		E	e	02 44 42		
	New Delhi	N	e	02 51 29		Slight, Distant.
			e	02 52 56		
3.	Epicentre 48°.5 N., 154°.0 E. (Kurile Islands) (U.S.C.G.S.)					0 = 01 h. 12 m. 37 s. h = 200 Km. ±
	New Delhi	N	iP	01 22 33	6390	Moderate
			e	01 23 37		
			iS	01 13 30		
			e	01 31 26		
			iScS	01 32 07		
			i	01 33 15		
			eSS	01 34 19		
			M	01 44 00		
	Kodaikanal	E	iP	01 22 42	7890	Slight, Distant.
			PP	01 25 22		
			iS	01 31 58		
	Poona	N	iP	01 23 33	7780	Slight. Depth of focus
			ipP	01 23 53	about	75 Kms.
			eSP	01 24 05		
			PP	01 26 12		
			PPP(?)	01 27 45		
			iS	01 32 33		
			esS	01 33 09		
			iSKS$_1$	01 33 36		
			isSKS$_1$	01 34 14		
			L$_R$	01 42 --		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
NOVEMBER 1949.						
3 (Contd.)	Bombay	N,E	iP	01 23 36		Slight.
		N	M	01 57 49		Per.= 9 sec. μ = 3.
		E	M	01 58 10		Per.= 13sec. μ = 3.
	Colombo	E	P	01 24 15		
			S	01 33 30		
			L	01 49 --		
			M	02 28 --		
3	Calcutta	E	e	17 40 35		Slight, Near.
			e	17 41 59		
	Bombay	E	e	17 45 11		Very feeble.
		N	e	17 47 53		
3	Bombay	N,E	e	19 23 41		Feeble, Tremors.
	Hyderabad	N	M	19 27 33		
	Poona	N	M	19 28 --		
4	Bombay	N	e	11 03 44		Very feeble.
5	Poona	E	i	15 11 17		
			e	15 15 20		
	Bombay	N	e	15 11 01		Feeble.
		N,E	e	15 15 18		
	New Delhi	N	e	15 14 03		Slight, Distant.
			e	15 17 54		
	Calcutta	E	e	15 18 31		Tremor.
			e	15 22 04		
			Mn	15 30 10		
	Hyderabad	N	M	15 27 56		Per.= 10 sec. μ = 3.
7	Epicentre 14°.0 S., 166°.5 E. (New Hebrides Region) O = 05 h. 59 m. 35 s U.S.C.G.S.					
	Kodaikanal	E	e	06 07 52		Distant, phases not
	Hyderabad	N	eP	06 12 24	11080	clear.
			S	06 23 55		
			L	06 45 37		
			M	06 51 25		Per. = 18 sec. μ = 12.
	Colombo	E	P	06 12 42		
			S	06 23 20		
			L	06 33 30		
	Poona	N,E	eP	06 13 14	10890	Moderate
			ePP	06 17 19		
		N	ePPP	06 19 20		
		E	ePPP	06 19 21		
		N	i	06 23 05		
		E,N	iSKS	06 23 52		
			iS	06 24 38		
		E	iPS	06 25 57		
		N	iPS	06 26 01		
		N,E	iSSP	06 31 22		
			iSSS	06 35 21		
		E	iL_Q	06 39 21		
		N	iL_Q	06 39 25		
			iL_R	06 48 04		
			M	06 50 38		Per.= 23. sec. μ = 12
	Bombay	N,E	eP	06 13 17		Moderate
			ePP	06 17 28		
			iSKS	06 24 02		
			eSS	06 32 10		
		E	M	07 08 12		Per.= 17 sec. μ = 6.
		N	M	07 08 40		Per.= 17 sec. μ = 6.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	△ Km.	Remarks
NOVEMBER 1949.						
7	New Delhi	N	e	06 17 02		Slight, Distant.
			i	06 23 47		
			i	06 24 37		
			e	07 03 14		Surface waves.
8	Bombay	E	e	08 53 44		Feeble.
		N	e	09 00 36		
		E	M	09 17 42		Per.= 17 sec. μ = 2.
	Kodaikanal	E	e	09 00 00		Tremor
11	Kodainanal	E	e	04 21 40		Tremor
11	Epicentral Region China Sea ?					
	Poona	E	iP	15 52 35	5000	Slight.
		N	ePP	15 54 11		
			eS	15 59 08		
			ePS	15 59 19		
			ePPS	15 59 30		
			iSS	16 02 31		
			L	16 05 31		
			M	16 09 04		
	Calcutta	E	eP	15 55 30	1445	Slight.
			eS	15 57 57		
			M	15 59 54		
	Hyderabad	N	e	15 58 01		
			M	16 07 44		Per.= 15 sec. μ = 5.
	Bombay	E	e	* 15 59 11		
		E	M	16 13 11		Per.= 14 sec. μ = 2.
	New Delhi	N	e	16 01 08		Slight, Distant.
			e	16 09 26		
	Kodaikanal	E	e	16 04 00		Tremor.
			e	16 35 00		
13	Epicentral Region near Lat. 36°.0 N., Long. 90°.0 E. in Kuenlun Mountains. Tibet. O = 05 h. 27 m. 00 s.					
	Calcutta	E	iP	05 30 12	1120	Slight.
			iS	05 32 07		
	Hyderabad	N	eP	05 30 52	2200	
			S	05 34 30		
			M	05 38 53		Per.= 11 sec. μ = 5.
	Poona	N,E	eP	05 31 56	1380	Slight.
		E	e	05 32 42		
		N	e	05 32 26		
		N,E	e	05 32 41		
		N	eS	05 36 05		
			e	05 36 18		
		E	e	05 36 28		
		E	eSSS	05 36 34		
			L_R	05 36 57		
		N	L_R(?)	05 37 08		
	New Delhi	N	e	05 34 17		
			e	05 37 33		
			e	05 39 03		
	Bombay	N	i	05 36 07		Slight
		E	e			
		N	M	05 42 40		Per.= 9 sec. μ = 2.
15	Poona	N	e	05 31 11		Very feeble.
		E	i	05 33 24		
		N	i	05 33 29		
	*Bombay	N	e	* 15 59 21		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	△ Km.	Remarks
NOVEMBER 1949.						
15	Bombay	N,E	e	05 32 33		Very feeble.
17	Bombay	N	e	05 12 58		Very feeble.
		E	Movements insignificant.			
	Hyderabad	N	M	05 22 05		Per. = 11 sec. μ = 3.
17	Epicentre 27°.5 N., 97°.5 E. on the Northeast border of Assam. O = 19 h. 20 m. 30 s.					
	Calcutta	N	eP	19 22 43	866	Slight.
			iS	19 24 12		
	Kodaikanal	E	e	19 23 39		Slight.
	Hyderabad	N,E	P	19 24 55	2190	
		E	S	19 28 32		
		N	SS	19 28 54		
		E	L	19 30 32		
		N	M	19 32 08		Per. = 8 sec. μ = 5.
		E	M	19 32 26		Per. = 9 sec. μ = 4.
	Poona	N	eP	19 25 30	2500	Slight.
			ePP	19 25 56		
			ePPP	19 26 10		
			iS	19 29 33		
			e	19 29 47		
			L_Q	19 29 51		
			eSS	19 30 19		
			L_R	19 30 55		
			M	19 34 06		
	Bombay	N,E	eP	19 25 40	2600	Slight.
			eS	19 29 47		
		E	M	19 34 45		Per. = 10 sec. μ = 6.
		N	M	19 33 05		Per. = 7 sec. μ = 7.
	New Delhi	N	eS	19 27 38	1780	
			eSS	19 27 56		
			L	19 28 30		
			M	19 29 38		
20	Epicentre 28°.5 N., 112°.0W. (Gulf of California. Felt in Sonora Mexico) U.S.C.G.S.					
	Bombay	N	e	07 30 57		Slight, Distant.
			M	08 34 31		Per. = 24 sec. μ = 11.
		E	M	08 34 46		Per. = 19 sec. μ = 9.
	Poona	N	$ePKP_1$	07 32 37		Moderate.
			$ePKS_1$	07 36 28		
			iPPP	07 38 25		
			iPS	07 45 56		
			ePPS	07 47 44		
			eSSP	07 54 22		
			eSSS	07 58 32		
			iL_R	08 17 52		
			M	08 30 17		Per.= 20 sec. μ = 17.
	Colombo	E	P	07 33 --		
			L	08 19 00		
			M	08 38 40		
	Hyderabad	E	PKP_1	07 33 21		
			SS	07 49 28		
			M	08 16 01		Per. = 19 sec. μ = 14.
	New Delhi	N	e	07 40 14		Slight, Distant.
			e	08 16 55		
	Kodaikanal	E	e	07 42 00		Distant, phases
	Dehra Dun	E	eP	08 04 39	Slight.	not clear.
			eS ?	08 15 44		
			M	08 30 27		

Date	Station	Compt	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
NOVEMBER 1949.						
22	Epicentre 29°.0 S. 178°.0 W. Kermadec Islands region. 0 = 00 h. 51 m. 32 sec. U.S.C.G.S.					32 sec.
	Kodaikanal	E	e	01 07 07		Distant, phases not clear.
	Poona	N,E	eP	01 09 20	11335	Moderate
			iSKS	01 20 00		
			iS	01 21 00		
			iPS	01 22 40		
			iPPS	01 23 33		
			iSS	01 28 00		
			SSP	01 28 21		
			L_Q	01 38 00		
			L_R	01 43 00		
	Bombay	N	eP ?	01 09 34		Slight.
			e	01 14 48		
		N,E	e	01 22 04		
			i	01 23 25		
		N	i	01 28 16		
		E	M	01 59 44		Per. = 17 sec. μ = 4.
		N	M	02 02 36		Per. = 19 sec. μ = 5.
	Calcutta	E	eP	01 09 47	4520	Moderate.
			iS	01 15 58		
	Hyderabad	E	eP	01 09 51		
			M	01 26 19		Per. = 19 sec. μ = 23.
	Colombo	E	P	01 10 10	9110	
			S	01 20 25		
			L	01 36 30		
			M	01 41 30		
	New Delhi	N	iSKS	01 17 54	12000	Moderate. Beginning
			iSKKS	01 18 43		lost while changing paper
			i	01 20 09		
			iPS	01 21 03		
			iPPS	01 21 54		
			iPKKP	01 22 43		
			eSS	01 26 46		
			L	01 43 17		
			M	01 53 32		
22	Bombay	E	e	06 35 00		Very feeble.
		N	e	06 42 12		
22	Poona	N	PKP_1	15 25 31	14220	Slight.
			PP ?	15 27 34		
			PKS_1	15 29 03		
			PPP ?	15 30 18		
			PKS_2	15 32 30		
			$SKKS_1$	15 34 23		
			iSKSP	15 37 15		
			iPS	15 37 31		
			SSS	15 49 16		
	Kodaikanal	E	e	15 31 00		Tremor.
	Calcutta	E	e	15 33 54		Tremor.
27	Epicentre 18°.0 S. 173°.0 W. 0 = 08 h. 42 m. 16 sec. Tonga Islands Region. U.S.C.G.S.					
	Kodaikanal	E	PKP_1	08 56 59	14000	Moderate.
			PPP	09 00 49		
			$PKKP_1$	09 07 12		
			PS	09 08 37		
			SS	09 15 31		
			L_R	09 36 12		
			M	09 46 22		Per. = 19 sec. μ = 10.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
NOVEMBER 1949.						
27	Bombay	E	eP ?	08 57 26	13735	Moderate.
		N,E	$ePKP_1$	09 00 33		
			ePP_1	09 02 03		
			eSKS	09 08 03		
		N	iSKS	09 08 06		
		E	iPS	09 12 12		
		N	ePS			
		E	M	09 54 27		Per. = 19 sec. μ = 11.
		N	M	09 57 19		Per. = 19 sec. μ = 6.
	Poona	N	PKP_1	08 58 23	14000	Moderate.
			PP	09 00 16		
			PPP	09 01 46		
			PKS_1	09 02 02		
			PKKP	09 07 46		
			PS	09 10 08		
			PPS	09 11 47		
			SS	09 15 23		
			SSP	09 15 53		
			SKKS	09 18 20		
			SSS	09 19 47		
			L_Q	09 31 --		
			L_R	09 37 30		
			M	09 47 30		
	Hyderabad	N	e	09 01 35		
			M	09 43 51		Per. = 20 sec. μ = 16.
	Colombo	E	P	09 07 30		
			S	-- -- --		
			L	09 35 --		
			M	09 40 45		
	Dehra Dun	E	eP	09 44 57		Slight.
			eS	09 51 36		
			eL ?	10 03 38		
			M	10 05 30		

NCGore Feb.9.

GOVERNMENT OF INDIA.

METEOROLOGICAL DEPARTMENT.

S E I S M O L O G I C A L B U L L E T I N.

DECEMBER 1949.

Published under the direction of

S. K. BANERJI, D. Sc., F.N.I.

Director General of Observatories.

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INTRODUCTION.

Till the end of 1937, the seismic data from the observatories of the India Meteorological Department were being published annually as Part D of the Annual Summary of the India Weather Review. Since 1938, the data were being published in the form of the Quarterly Seismological Bulletin. From the month of January 1948, the data are being published in the present form of a Monthly Seismological Bulletin. With the kind co-operation of the Surveyor-General of India, The Curator of the Nizamiah Observatory, Hyderabad, and of the Director, Colombo Observatory, it has been possible to incorporate in the Bulletin the seismic data of their respective observatories viz. Dehra Dun, Hyderabad and Colombo. The instrumental and non-instrumental voluntary observations are collected and edited at the Meteorological Office, P o o n a.

TABLE I.

List of Seismograph Stations.

Station	Latitude	Longitude	Height above M.S.L. 'meters'	Lithologic Foundation	Officer-in-charge of Observatory
Bombay	18°.54'N.	72°.49'E.	6	Deccan Trap	D i r e c t o r
Calcutta	22°.32'N.	88°.22'E.	(i) 7 (ii) 6	Alluvium	D i r e c t o r
Colombo	06°.54'N.	79°.52'E.	7	Beach-sand	D i r e c t o r
Dehra Dun	30°.19'N.	78°.03'E.	682	G r a v e l	P r e s i d e n t
Hyderabad	17°.26'N.	78°.27'E.	528	Granite	Curator, Nizamiah Observatory.
Kodaikanal	10°.14'N.	77°.28'E.	2343	R o c k	D i r e c t o r
New Delhi	28°.35'N.	77°.12'E.	207	Massive Quartzites	Dy.Director General of Observatories (I.& S.)
P o o n a	18°.32'N.	73°.51'E.	560	Deccan Trap	Dy.Director General of Observatories (C.& S.)

(i) Milne-Shaw (ii) Omori-Ewing

TABLE II.

The Instruments & their Constants.

Station	Instrument	Compo-nent	Period in sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Bombay	Milne-Shaw	N	12	250	21:1	8.0
	-Do-	E	12	350	20:1	8.0
Calcutta	Milne-Shaw	E	12	250	20:1	8.0
	Omori-Ewing	N	15	32	-	25.4
	-Do-	E	16	30	-	25.4
	Wood-Anderson	N	4	1000	5:1	60.0
Colombo	Milne-Shaw	E	12	250	20:1	8.0
Dehra Dun	O m o r i	N	30	12	-	-
Hyderabad	Milne-Shaw	E	12	250	20:1	8.0
	-Do.-	N	12	250	20:1	8.0
Kodaikanal	Milne-Shaw	E	10	250	20:1	8.0
New Delhi	Milne-Shaw	N	12	247	20:1	8.0
	Omori-Ewing	E	30	30	1	12.0
Poona	Milne-Shaw	N	12	250	20:1	8.0
	Wood-Anderson	E	4	1100	20:1	16.0
	-Do-	N	2	1900	30:1	60.0

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Date	Station	Compt	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
DECEMBER 1949.						
2	Kodaikanal	E	e	17 37 00		Tremor
3	Bombay	N	e	10 24 12	12	Feeble
		E	e	10 32 00		
				Movements not identifiable		
10	Epicentre 27°.0 N., 90°.0 E. near Dhubri. O = 19 h. 37 m. 10 s. Felt **severaly** in Dhubri and slightly at Darjeeling, Gauhati, Tezpur and Cooch-Behar.					
	Calcutta	E	eP	19 38 17	544	Moderate
			P*	19 38 27		
			P	19 38 39		
			iS	19 39 15		
	New Delhi	N	iP	19 40 14	1380	Slight.
			e	19 40 40		
			i	19 42 07		
			iS	19 42 31		
			L	19 43 07		
			M	19 43 33		
	Hyderabad	E,N	P	19 40 25	1330	
		E	PP	19 40 32		
			S	19 42 41		
			M	19 44 12		Per. = 4 sec. μ = 5.
		N	M	19 44 14		Per. = 4 sec. μ = 8.
	Poona	E	iP	19 40 53	1780	Moderate
			PP	19 41 05		
			PPP	19 41 12		
			S	19 43 51		
			SS	19 44 11		
			SSS	19 44 17		
			M	19 45 52		
		N	M	19 45 52		Per. = 3 sec. μ = 27.
	Bombay	N,E	eP	19 41 16	1800	Moderate.
		N	eS	19 44 13		
		E	S	Movements not clear.		
		N,E	L	19 45 50		
		N	M	19 47 32		Per. = 5 sec. μ = 3.
	Kodaikanal	E	iP	19 41 45	1665	Slight.
			iS	19 45 19		
			M	19 47 35		
	Dehra Dun	E	eP	19 45 02	1127	
			eS?	19 46 48		
			M	19 47 04		
16	Kodaikanal	E	e	05 16 02		Tremor.
17	Epicentre 54°.0 S., 71°.0 W. (Southern Magallanes Province 50 miles South of Punta Arenas). O = 06 h. 53 m. 29 s. U.S.C.G.S. Most violent in the Terra Del Fuego Region, South America. (Press Report).					
	New Delhi	N	ePKP$_1$	07 13 07	13780	Great.
			ePP	07 14 59		
			ePPP	07 17 49		
			i	07 19 19		
			i	07 23 24		
			iPS	07 25 01		
			iPPS	07 26 39		
			i	07 29 14		
			iSS	07 31 27		
			i	07 35 25		
			iSSS	07 36 27		
			i	07 40 38		

3...

			Phase	h. m. s.	Δ Km.	
17 (Contd.)	New Delhi	N	L_Q	07 46 05		
			L_R	07 52 24		
			M	09 01 08		
			Mn	09 06 20		Per. = 26 sec. μ = 176.
	Bombay	N,E	ePP	07 16 01	15555	Moderate.
			PKS_1	07 16 34		
			PKS_2	07 16 44		
			PPP	07 19 01		
			SKS_2	07 20 18		
			$PKKP_1$	07 22 23		
			PS	07 26 11		
			PPS	07 28 01		
			SS	07 34 01		
			SSP	07 34 31		
			SSS	07 39 18		
			L_Q	07 51 --		
			L_R	07 58 --		
		N	M	08 12 24		Per. = 21 sec. μ = 88.
		E	M	08 12 43		Per. = 21 sec. μ = 71.
	Poona	N,E	PKP_1	07 13 27	15665	Moderate.
			PP	07 16 12		
			PKS_1	07 16 29		
			PKS_2	07 16 49		
			PPP	07 19 05		
			SKS_2	07 20 12		
			$PKKP_1$	07 22 05		
			$PKKS_1$	07 25 35		
			PPS	07 27 57		
			SS	07 33 56		
			SSP	07 34 41		
			SSS	07 39 19		
			L_Q	07 51 00		
			L_R	07 59 00		
			M	08 09 00		
		N	Mn	08 15 --		Per. = 17 sec. μ = 80.
	Calcutta	E	$ePKP_1$	07 13 15	17000	Moderate
			e	07 21 19		
			eSS	07 33 22		
	Colombo	E	ePKP	07 14 21		
			e	07 32 --		
			L	07 54 31		
			M_1	08 02 36		
			M_2	08 04 51		
	Kodaikanal	E	PKP_1	07 14 34	14445	Moderate
			PP	07 16 12		
			PKS_1	07 18 05		
			SKS_1	07 21 44		
			PS	07 25 55		
			PPS	07 27 21		
			SS	07 32 36		
			SSP	07 32 54		
			SSS	07 37 16		
			L_Q	07 46 39		
			L_R	07 56 43		
			M	08 02 53		Per.= 25.5 sec, μ = 94.
	Hyderabad	E,N	PKP_1	07 15 46	15780	
		N	e	07 16 28		
			SKS	07 22 29		
			PS	07 27 35		
			SS	07 34 07		
			L	07 50 20		
			M	07 59 52		Per. = 14 sec. i μ = 86.

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
DECEMBER 1949.						
17 (Contd.)	Dehra Dun	E	e	07 16 00		Moderate
			e	07 20 15		
			e	07 26 18		
			L	07 38 15		
			L?	07 49 29		
			M_1	08 05 49		
			M_2	08 10 15		
17	Bombay	E	e	13 53 --		Very feeble tremor.
		N	e	14 01 --		
17	Epicentre 54°.0 S., 71°.0 W. (Southern Magallanes Province 50 miles south of Punta Arenas) 0 = 15 h. 07 m. 53 s.					
	Colombo	E	PKP_1	15 27 17		
			e	15 46 42		
			L	16 10 --		
			M	16 44 22		
	Poona	N,E	PKP_1	15 27 35	15663	Moderate.
			PP	15 30 41		
			PKS_1	15 30 58		
			PKS_2	15 31 22		
			$PKKP_1$	15 36 42		
			$PKKS_1$	15 40 12		
			$SKKS_1$	15 43 05		
			SS	15 48 35		
			SSP	15 49 20		
			L_Q	16 05 --		
			M	16 27 --		
			Mn	16 35 --		Per. = 17sec. μ = 43.
	Bombay	N,E	ePKP_1	15 27 35	15555	Moderate
		N	ePP	15 29 53		
			eSS	15 47 54		
		E	iSS?	15 48 37		
		N	e	15 52 38		
		E	i	16 03 17		
		N	i	16 03 24		
			M	16 28 15		Per. = 19 sec. μ = 39.
		E	M	16 44 57		Per.= 18 sec. μ = 43.
	Kodaikanal	E	e	15 27 40		Distant phases not clear
	Calcutta	E	ePKP_1	15 27 48	17000	Great
			ePP	15 31 19		
			eSKS	15 34 45		
			eSS	15 50 19		
			iSSS	15 55 38		
			Mn	16 48 36		u = 208.
	Hyderabad	N	PKP_1	15 29 58	15780	
			PP	15 31 48		
			SKS	16 36 48		
			PS	15 42 09		
			SS	15 48 30		
		E	eL	16 04 46		
		N	L	16 04 51		
			M	16 14 46		Per. = 16 sec μ = 29.
		E	M	16 14 48		Per. = 16 sec μ = 33.
	Dehra Dun	E	e	15 30 57		
			e?	15 44 39		
			e?	15 58 49		
			e?	16 19 19		
			M	16 33 19		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
DECEMBER 1949.						
18	Bombay	E	e	04 58 22		Feeble.
		N	e	05 00 31		
		N,E	e	05 58 12		
	Kodaikanal	E	e	05 57 35		Tremor.
18	New Delhi	N	i	19 17 30		Slight, Near.
			i	19 18 32		
	Poona	E	eP	19 20 39	833	Slight.
			PP	19 20 42		
			PPP	19 20 53		
			i	19 21 42		
			L_Q	19 21 59		
			eS	19 22 16		
			SS	19 22 32		
			M	19 22 54		
20	Epicentre 27°.5 N., 54°.0 E., in South Iran. 0 = 00 h. 34 m. 28 s.					
	Bombay	N,E	eP	00 39 02	2210	Slight.
			eS	00 42 38		
		N	M	00 48 52		Per. = 10 sec. μ = 3.
	Poona	E	P	00 39 18	2270	Slight.
			PP	00 39 45		
			PPP	00 39 57		
			S	00 43 03		
			L_Q	00 43 20		
			L_R	00 44 30		
			M	00 46 --		
	Hyderabad	E	P	00 40 02	2760	
			S	00 44 23		
		N	S	00 44 25		
		E	L	00 46 32		
			M	00 47 48		Per. = 14 sec. μ = 11.
		N	M	00 48 11		Per. = 12 sec. μ = 7.
	Kodaikanal	E	iP	00 40 04	2055	Slight
			iS	00 44 24		
			L_R	00 46 17		
			M	00 40 26		
	New Delhi	N	e	00 40 47		Slight, Distant.
			e	00 44 51		
			i	00 46 19		
			i	00 48 19		
			i	00 49 25		M waves
	Calcutta	E	e	00 42 29		
			eS?	00 46 56		
21	Kodaikanal	E	e	19 51 24		Tremor.
	Poona	E	eP	19 51 25	1390	Slight.
			ePP	19 51 34		
			ePPP	19 51 43		
			iS	19 53 50		
			iSSS	19 54 13		
	New Delhi	N	i	19 51 32		Slight, Near.
			i	19 51 35		
	Bombay	N	e	19 51 36		Feeble, Near.
		E	e	19 54 14		
		E	e	19 54 28		
	Hyderabad	N	M	20 13 02		Per. = 11 sec. μ = 3.

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22	Bombay	N,E	e	05 56 --			Feeble, Tremors.
	Hyderabad	N	M	06 07 21			Per. = 15 sec μ = 4.
22	Bombay	N	eP	09 50 10			Slight.
		E	e	09 50 32			
		N	e	09 53 27			
			e	10 00 04			
	Poona	E	eP	09 50 25		3000	Slight. Probably deep.
			i	09 50 51			
			PP?	09 51 00			
			PPP	09 51 19			
			PcP ?	09 53 59			
			iS	09 55 00			
			eSS	09 56 19			
			SSS	09 56 30			
			PcS?	09 57 30			
	New Delhi	N	e	09 52 06			Slight, very distant.
			e	09 52 29			
			i	09 53 10			
			e	10 04 10			
			e	10 05 05			
			e	10 09 03			
			i	10 11 48			
			e	10 41 58			Surface waves.
23	Bombay	N,E	e	21 47 --			Feeble, Surface waves.
25	Epicentre 36°.0 N., 141°.0 E. in Pacific near east coast of Japan						
	0 = 23 h. 17 m. 20 s.						
	Calcutta	E	eP	23 26 01		5220	Moderate.
			eS	23 32 53			
			iSS	23 36 19			
			Mn	23 55 31			Per. = 18 sec. μ = 53.
	Hyderabad	E,N	P	23 27 16		6350	
		N	S	23 35 12			
			M	23 50 22			Per. = 21 sec. μ = 18.
	Poona	E	iP	23 27 34		6670	Slight.
			pP	23 27 58			h = 110 Kms. ±
			sP	23 28 13			
			PcP	23 28 16			
			iS	23 35 47			
			PS	23 35 58			
			PPS	23 36 06			
			sS	23 36 30			
	Bombay	N,E	e	23 27 45			Slight.
			e	23 35 08			
		N	M	00 03 19			Per. = 17 sec. μ = 5.
		E	M	00 03 36			Per. = 18 sec. μ = 10.
	Kodaikanal	E	e	23 27 50			Tremor.
	Poona	E	iP	23 34 57		6660	Slight. After shock of
			iS	23 43 12			previous shock at 23 h
			iPS	23 43 24			17 m.
		N	L_R	23 50 30			
			M	23 55 --			
	Colombo	E	P(?)	23 35 51			
			S	23 43 31			
			L	23 54 51			
			M	00 04 51			

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26 Epicentral Region near 20°.0 S. 180°.0 E. in Pacific near Fiji Islands.

Kodaikanal	E	iPP	06 42 23	11110	Moderate.
		PPP	06 44 26		
		ePS	06 51 25		
		SS	06 56 55		
		SSS	07 00 42		
		L_Q	07 07 24		
		L_R	07 12 24		
		M	07 20 54	Per. = 20 sec. μ = 33.	
Hyderabad	E	$ePKP_1$	06 42 31	12850	
		SKS	06 48 55		
		PS	06 52 42		
		SS	06 56 56		
	N	L	07 08 45		
	E	M	07 50 46	Per. = 22 sec. μ = 23.	
	N	M	07 15 55	Per. = 22 sec. μ = 21.	
Bombay	N,E	e	06 42 32	Moderate.	
		e	06 52 32		
	E	M	07 31 03	Per. = 16 sec. μ = 7.	
	N	M	07 31 12	Per. = 23 sec. μ = 21.	
Poona	E	PKP_1	06 42 33	12335	Moderate.
		PP	06 43 22		
		PPP	06 45 35		
		SKS_1	06 49 11		
		SKS_2	06 49 24		
		$SKKS_1$	06 50 08		
	N	iPS	06 52 41		
	E	iPPS	06 53 31		
	N	$PKKS_1$	06 57 18		
		eSS	06 58 47		
		SSP	06 59 10		
		SSS	07 02 43		
		iSKKKS	07 04 21		
		L_Q	07 10 --		
		L_R	07 15 --		
		M	07 25 --		
Colombo	E	PKP_1	06 42 41	11335	
		e?	06 51 36		
		L	07 16 --		
		M	07 23 06		
Dehra Dun	E	eP	06 51 07		
		e?	06 58 32		
		e?	07 09 38		
		L	07 16 18		
		M	07 25 38		
28 Kodaikanal	E	iPP	00 15 06	8055	Moderate
		PPP	00 16 56		
		eS	00 21 46		
		PS	00 22 14		
		SS	00 26 16		
		L_Q	00 31 30		
		L_R	00 35 02		
		M	00 41 16	Per. = 40 sec. μ = 15.	
Bombay	N,E	eP	00 15 22	9200	Moderate.
	N	iS	00 25 43		
	E	eS			
	N,E	L	00 42 32		
	E	M	00 49 26	Per. = 23 sec. μ = 17.	
	N	M	00 49 58	Per. = 21 μ = 15.	

Date	Station	Compt	Phase	G. M. T. h. m. s.	Δ Km.	Remarks
DECEMBER 1949.						
28	Poona	N,E	eP	00 16 09	8130	Slight.
		E	PcP	00 16 19		
			PP	00 18 42		
		N	iS	00 25 38		
			PPS	00 26 27		
			L_Q	00 35 30		
	Hyderabad	E	P	00 16 26	8020	
		E,N	S	00 25 43		
		E	SS	00 31 50		
			L	00 41 08		
			M	00 45 54		Per. = 16 sec. μ = 13.
		N	M	00 47 14		Per. = 16 sec. μ = 13.
	New Delhi	N	e	00 17 26		Moderate. Movements
			e	00 25 11		due to traffic ?
			e	00 26 57		
			i	00 38 20		
			i	00 46 37		M Waves
	Calcutta	E	eP	00 17 37		
			eS	00 27 14		
			SSS	00 35 32		
	Colombo	E	L	00 39 --		P & S lost while
			M	00 39 56		changing chart.
28	Poona	N	iP	00 22 12	8130	Slight. After shock
			PP	00 24 50		of the previous
			iS	00 31 41		shock at 00 h. 16 m.
			PPS	00 32 20		
			SS	00 36 21		
			L_Q	00 42 00		
			M	00 50 00		Per. = 30 sec. μ = 48.
29	Epicentre 5°. 0 N., 120°.0 E. in the Pacific. 0 = 03 h. 03 m. 25 s. Felt violently in Manila, Phillipines (Press Report).					
	Calcutta	E	iP	03 10 17	4035	Great
			iS	03 16 58		
			iPP	03 11 40		
			iPPP	03 12 01		
			Mn	03 30 40		Per. = 19 sec μ = 900.
	Hyderabad	E,N	iP	03 11 37	5860	
			PcP	03 12 50		
			PP	03 13 23		
			iS	03 19 05		
			M	03 29 30		Per. = 16 sec. μ = 135.
	Colombo	E	P	03 11 47	4780	
			S	03 18 12		
			L	03 28 32		
			M	03 29 27		
	New Delhi	N	eP	03 11 55	5380	Great.
			i	03 14 58		
			ePPP	03 14 37		
			i	03 15 00		
			i	03 16 49		
			iS	03 18 55		
			i	03 21 22		
			iSS	03 22 08		
			M	03 27 30		
			Mn	03 29 34		Per. = 18 sec μ = 243.
	Kodaikanal	E	iP	03 12 00	6500	Moderate.
			iPP	03 14 11		
			iPPP	03 15 29		
			PcS	03 17 03		
			S	03 19 50		
			PS	03 20 02		

Date	Station	Compt.	Phase	G. M. T. h. m. s.	Δ Km.	
DECEMBER 1949.						
29 (Contd.)	Kodaikanal	E	PPS	03 20 25		
			SS	03 23 38		
			SSS	03 25 35		
			L_R	03 28 38		
			M	03 33 15		Per. = 12sec. μ = 69.
	Poona	N,E	eP	03 12 10	6000	Great
			PcP	03 13 17		
			PP	03 14 21		
			iPPP	03 15 37		
			iPcS	03 17 14		
			iS	03 19 43		
			iPS	03 20 07		
			PPS	03 20 24		
			ScS	03 21 52		
			iSS	03 23 29		
			SSS	03 25 37		
			L_Q	03 25 44		
			L_R	03 28 30		
			M	03 31 00		Per. = 16sec. μ = 151.
	Bombay	N,E	iP	03 12 21	5445	Great.
			iS	03 19 25		
		N	SS	03 22 49		
		E	iSS	03 23 03		
		N,E	L	03 27 02		
		N	M	03 32 57		Per. = 18 sec. μ = 152.
		E	M	03 35 56		Per. = 17sec. μ = 119.
29	Hyderabad	N	M	06 48 00		Per. = 15 sec. μ = 4.
29	Bombay	E	e	09 28 23		Feeble.
		N,E	e	09 33 15		
29	Poona	E	eP	10 26 18	4910	Very feeble.
			PP	10 28 08		
			S	10 32 53		
			SS	10 36 15		
	Hyderabad	N	M	10 44 12		Per. = 14 sec. μ = 3.
29	Bombay	E	e	16 02 30		Slight.
		N	e	16 03 23		
		E	e	16 08 23		
			M	16 53 15		Per. = 21sec. μ = 5.0
29	New Delhi	N	e	17 08 19		Slight, Very distant.
			e	17 09 29		
			e	17 52 10		
29	Hyderabad	N	M	17 49 26		Per. 16sec. μ = 6.
	Poona	E	M	17 53 --		Feeble, Distant.
29	Bombay	N,E	e	22 20 09		Very feeble.
		N	e	22 23 01		
29	Poona	E	iP	23 13 57	4210	Feeble. Depth of focus
			pP	23 14 18		about 100 Kms. Double shock with
			sP	23 14 31		second onset of P at 23 h. 16 m
			PP	23 15 29		52 s- and S at 23 h. 52 m. 54 s.
			PPP	23 15 55		
			PcP	23 16 13		
			iS	23 19 49		
			PS	23 19 55		
			sS	23 20 27		

The following table contains a list of earthquakes reported by voluntary observers from various stations.

Place at which felt	D a t e	G.M.T. of earthquake h. m.	Duration in secs.	Intensity R.F.Scale	No. of shocks	R e m a r k s
Mukteswar	4.10.49	19 55	30	5	1	Thunder like sound preceded the shock.
Mukteswar	4.10.49	20 25	5	4	1	
Silchar	10.10.49	03 33	1	5	1	
Cooch-Behar	10.12.49	19 30	7-10	5	1	Moderate
Gauhati	10.12.49	19 37	30	5	1	
Darjeeling	-do-	19 35	7	5	3	
Tezpur	10.12.49	19 45	20	5	3	
English Bazar	10.12.49	19 40	15- 20	5	1	
Tezpur	28.12.49	17 06	2	5	1	

NCGore Feb.18.

MONTHLY SEISMOLOGICAL BULLETIN

1 9 4 9.

Supplement - Data for Dehra Dun.

Station	Instrument	Component	Period in sec.	Static Magnification	Damping Ratio	Paper Speed mm. / min.
Dehra Dun	Omori	N	30	12	-	-

Date	Compt.	Phase	G. h.	M. m.	T. s.	Km.	Remarks
March 1949.							
3	N	iP	10	20	51	805	Hindu-kush Moun-tain-Also locally felt very slightly Direct-ion of first motion North.
		i	10	21	39		
		iS	10	22	17		
		M_1	10	22	35		
		M_2	10	24	05		
		M_3	10	26	57		
April 1949.							
20	N	e	03	49	00?		
		M_1	03	56	50?		
24	N	eP	04	25	50?	2450	
		eS	04	29	33		
		eL	04	32	24		
		M_1	04	34	15		
		M_2	04	35	00		
25	N	e	14	15	18?		
		M_1	15	25	30?		
30	N	e	01	34	00?		
		e	01	41	00?		
		e	01	45	00?		
		e	01	51	00?		
		M_1	01	53	42?		
		M_2	01	55	23?		
May 1949.							
9	N	e	10	42	34?		
		e	10	47	31?		
		e	10	52	00?		
		e	10	54	48?		
		M_1	10	56	30?		
21	N	e	21	54	48?		
		e	22	03	42?		
		eL	22	10	24?		
		M_1	22	11	52?		
25	N	eP	08	28	50?		
		e	08	29	46		
		e	08	30	44		
		M_1	08	32	20		
September 1949.							
14	N	eP	19	58	36	2400	Mo... ra...
		eS	20	06	11		
		e	20	17	24		
		M	20	28	42?		
15	N	eP	05	43	00		Sligh... Local...
27	N	eP	15	43	38	3478	Modera...
		eS	15	53	50		
		e	16	22	59		
		M	16	24	40		
October 1949.							
7	N	eP	12	12	06		Mode-rate.
		eS	12	17	42		
		e	12	20	12		
		e	12	26	08		
		M	12	34	36		
19	N	e	21	14	52		Slight.
		e	21	18	56		
		e	21	21	58		
		M	21	24	57		
20	N	eP	13	05	10		Slight.
		eS	13	10	06		
		M?	13	17	09?		

NCGore Feb.22.

INDIA METEOROLOGICAL DEPARTMENT.

MONTHLY SEISMOLOGICAL BULLETIN.

SEPTEMBER AND OCTOBER 1949.

SUPPLEMENT - Data for Colombo.

Station	Instrument	Component	Period in Sec.	Static Magnification	Damping Ratio	Paper Speed mm./min.
Colombo	Milne-Shaw	E	12	250	18:1 for Sep. 20:1 for Oct.	8.0

Date	Compt.	Phase	G.M.T. h.m.s.	Km.	Remarks
SEPTEMBER 1949.					
5	E	P	03 02 20		
		S	03 09 15		
		L	03 17 12		
		M1	03 20 40		
		M_2	03 25 30		
		M_3	03 49 15		
12	E	P	09 41 00		
		M	10 14 15		
14	E	P	16 47 32		
		S	16 50 00		
		L	16 51 25		
		M	16 52 15		
14	E	iP	19 58 55		
		S	20 05 40		
		L	20 17 35		
		M	20 20 35		
16	E	P	19 19 45		
		S	19 28 50		
		L	19 38 00		
		M 8	19 43 05		
17	E	L	02 11 --		
		M	02 12 15		
20	E	P	12 13 50		
		S	12 24 15		
		L	12 49 30		
		M	12 56 05		
24	E	eP	04 29 15		
		M	04 39 20		
24	E	P	07 28 15		
		S	07 29 55		
		L	07 32 20		
		M	07 33 05		
27	E	P	15 48 15		
		L	16 24 --		
		M	16 38 45		
OCTOBER 1949.					
4	E	P	10 45 12		
		L	11 10 00		
		M	11 16 15		
7	E	P	12 10 50		
		S	12 17 35		
		L	12 24 35		
		M	12 25 15		
10	E	L	13 18 --		
		M	13 20 00		
19-	E	P	21 12 10		
		S	21 21 55		
		L	21 37 45		
		M_1	21 40 55		
		M_2	21 42 30		
20	E	P	12 56 47		
		S	13 06 20		
		L	13 22 --		
		M	13 25 10		
21	E	P	21 46 00		
		S	21 55 45		
		L	22 14 --		
		M	22 16 --		
31	E	P	18 07 30		
		S	18 17 40		
		L	18 32 45		
		M	18 36 15		

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INDIA METEOROLOGICAL DEPARTMENT

MONTHLY SEISMOLOGICAL BULLETIN

September and October 1949.

SUPPLEMENT - Data for New Delhi.

Station	Instrument	Component	Period in sec.	Static Magnification	Damping ratio	Paper Speed mm./min.
New Delhi	Milne-Shaw	N	12	247	20:1	8
	Omori-Ewing	E	30	30	1	12

Date	Compt.	Phase	G.M.T. h.m.s.	Km.	Remarks.
September 1949.					
5	N	e	03 11 42	....	Slight, Distant
		e	03 17 48		
		e	03 25 45		
5	N	e	03 40 33	....	Slight, Near
		e	03 40 51		
		e	03 41 32		
10	N	e	06 35 37	....	Slight,
		i	06 36 46		Near.
12	N	e	09 41 45	....	Slight,
		i	09 42 49		Distant.
		e	10 27 11	...	Surface waves
14	N	e	16 55 24	...	Slight,
		i	16 56 13		Distant.
		e	16 57 43		
		e	17 02 05	...	Surface waves.
14	N	iP	19 59 43	5710	Moderate.
		i	20 00 00		
		PP	20 01 46		
		i	20 03 12		
		i	20 03 48		
		iS	20 07 03		
		ScS	20 09 24		
		i	20 09 35		
		SS	20 12 01		
		i	20 12 34		
		L	20 14 53		
		M	20 19 42		
15	N	e	05 42 30	...	Slight,
		i	05 43 00		Near.
		i	05 43 24		
		i	05 43 51		
20	N	e	12 25 10	...	Slight, Distant.
		e	13 01 16	...	Surface waves.
21	N	i	13 18 18	...	Slight,
		i	13 37 15		Very
		e	14 01 20		distant. Surface waves.
24	N	i	04 40 10	...	Slight,
		e	04 43 50		Very distant.
25	N	i	15 37 33	..	Very
		i	15 15 55		distant.
27	N	eP	15 43 14	9110	Moderate.
		PP	15 46 13		
		iS	15 53 31		
		ePS	15 54 19		
		iPPS	15 54 36		
		i	15 55 14		
		i	15 59 19		
		i	16 03 51		
		M	16 17 13		
29	N	e	04 53 54		Feeble
October 1949.					
4	N	e	10 44 46	...	Slight, Very distant
		e	11 07 25	...	Surface waves
7	N	iP	12 13 01	7050	Moderate
		i	12 13 09		
		i	12 13 22		
		iPP	12 15 25		
		i	12 16 12		
		iPPP	12 16 55		
		PcS	12 17 41		
		iS	12 21 34		
		i	12 22 03		
		PPS	12 22 16		
		i	12 23 01		
		iSS	12 25 57		
		i	12 27 28		
		i	12 30 01		
		i	12 33 55		
		M	12 37 20		
19	N	eP	21 12 35	8720	Moderate. Deep Focus.
		i	21 12 56		
		PP	21 15 33		
		i	21 21 47		
		iS	21 22 33		
		i	21 22 44		
		iPS	21 23 06		
		i	21 27 58		
		i	21 28 32		
		i	21 34 39		
		i	21 37 47		
20	N	eP	12 57 08	8720	Moderate.
		ePP	13 00 15		Deep
		iS	13 07 06		Focus
		iPS	13 07 45		
		iPPS	13 08 06		

Date	Compt	Phase	G. M. T. h. m. s.	Km.	Remarks
New Delhi.					
October 1949 (Continued).					
21	N	eP	21 46 37	8720	Moderate, Deep Focus
		iS	21 56 35		
		e	21 57 05		
31	N	eP	18 07 50	8620	Slight, Deep focus.
		e	18 08 16		
		iS	18 17 43		
		iSKS	18 17 53		
		iPS	18 18 19		
		iPPS	18 18 31		
		eSS	18 22 33		

NCGore Feb.22.