

New catalogue of earthquakes for Peninsular India during 1839-1900

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सार — दिसम्बर 1967 के कोयना भूकम्प के बाद यूनेस्को के विशेषज्ञों की सिफारिशों के आधार पर 1839-1900 की अवधि में प्रायःद्वीपीय भारत में आए भूकम्पों की एक नई सूची तैयार की गई है। इसके लिये आंकड़े टाइम्स आफ इन्डिया, स्टेट्समैन तथा हिन्दू समाचार पत्रों के प्रकाशनारम्भ (1839) से भारत में भूकम्प विज्ञान संयंत्रों की स्थापना (1900) तक की अवधि के लिए इनकी माइक्रो फिल्मों से लिये गए हैं।

इसमें ध्यान देने योग्य दिलचस्प बात यह है कि जिस क्षेत्र में उल्लेखनीय भूकम्प आए वहाँ इन भूकम्पों से कई वर्ष पहले से भी भूकम्प के काफी तेज झटके महसूस किये जाते थे। इस सूची के माध्यम से 19 फरवरी 1892 को मनभूम जिले में V गति से आए भूकम्प के एक घंटा पहले भारतीय क्षेत्र में पशुओं के असामान्य व्यवहार का पहला मामला भी प्रकाश में आया।

ABSTRACT. Based upon the recommendations of the UNESCO experts after the Koyna earthquake of December 1967, a new catalogue of earthquakes for Peninsular India has been prepared for the period 1839-1900. The data has been extracted from the microfilms of *Times of India*, *Statesman* and *Hindu* for the period commencing with their publication (1839) to installation of seismological instruments in the country (1900).

It is interesting to note that the region where significant earthquakes have occurred, tremors of felt intensity have been reported several years preceding the main events. Also through this catalogue, the first case of unusual animal behaviour in the Indian region about one hour prior to an earthquake of intensity V in Manbhoom district on 19 February 1892 is brought to light.

1. Introduction

Occurrence of Koyna earthquake of December 1967 (Magnitude, 6.5) in the hitherto considered stable region attracted the attention of seismologists throughout the world. The Government of India thereafter appointed an experts committee consisting of scientists from India and UNESCO. This committee which published its report in 1968 called for a number of investigations to be undertaken by the various organizations like Geological Survey of India and Meteorological Department of India. Of these, an important item of work assigned to India Meteorological Department was collection of historical data on past earthquakes in the Peninsular India.

A number of catalogues of past Indian earthquakes are available but none of them is up to date and comprehensive. The earliest publication is by Oldham (1883) which gives a list of significant Indian earthquakes upto 1869. Similar catalogues published later are largely based on data supplied in this catalogue for this period. Kelkar (1968) brought to light a number of new events recorded in Maharashtra during the past two hundred years. Gubin (1968) published a list of significant earthquakes of the Peninsular India upto 1968. Tandon and Srivastava (1974) published a catalogue of earthquakes in India of magnitude 5

and above based on available historical data before 1969 and instrumental & macroseismic data upto 1970. More recently Chandra (1977) has compiled a catalogue of Indian earthquakes upto 1975 based on different sources. In this catalogue earthquakes with maximum intensity less than V M.M. have not been included. There are also some noteworthy omissions. For example, earthquakes of magnitude 5 which occurred on 1 September 1862 and 9 April 1909 (Tandon and Srivastava 1974) have not been reported. It appeared from a study of these catalogues that earthquake events which occurred in India during 1869 to 1900 have not been properly listed. The only source of information which appeared to be easily accessible was collection of earthquake reports for this period from files of old newspapers. Consequently files of the *Times of India* (1839 to date), the *Statesman* (1875 to date) and the *Hindu* (1907 to date) were scanned for earthquake reports. This study brought forward a larger number of events, not reported by anybody earlier. In this paper all the new earthquakes reported in these newspapers for the period 1839-1900 have been listed. The period after 1900 has been omitted as instrumental data for this period is available in published form. It is proposed to publish a more comprehensive & upto date catalogue of earthquakes in Peninsular India and other Indian regions after studying instrumental data.

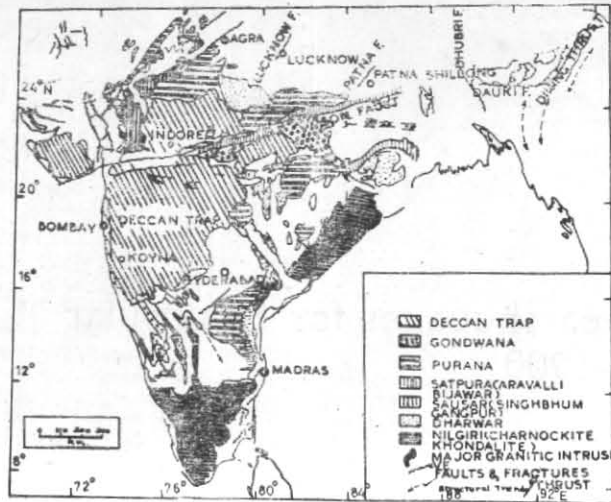


Fig. 1. Tectonic map of Peninsular India (after Valdiya 1973). Blank part in Karnataka and Andhra Pradesh are mostly peninsular gneisses

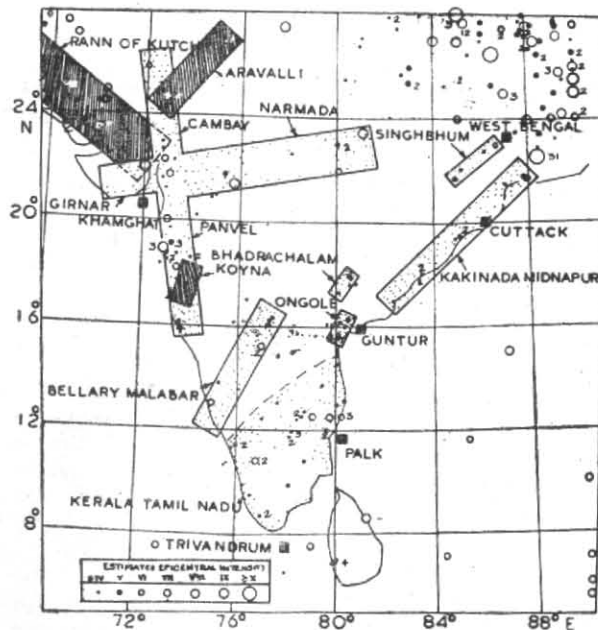


Fig. 2. Epicentral map of Peninsular India (after Chandra 1977)

TABLE 1

Date	Place	Description of earthquake	Intensity	Source
30 Apr 1839	Deesa (Gujarat)	Most distinctly felt with an upward motion ; accompanied by a loud noise resembling discharge of heavy artillery at a great distance. A bright thing appeared a couple of minutes before the earthquake near Proegon and moving towards the western horizon exploded very near the Dassirtus.	IV	TOI/11-5-39
10 Nov 1840	Ahmedabad (Gujarat)	Felt by persons awake ; direction appeared to be from NW to SE. A hollow rumbling crashing noise, followed by shaking of bed ; doors, windows and padlocks on boxes began to rattle.	V	TOI/1-12-40
Mar 1848	Colombo (Ceylon)	Rumbling noise and tremor ; caused panic among people ; lamps started vibrating to and fro and furniture were shaking ; direction appeared to be west to east.	IV	TOI/1-4-48

TABLE 1 (contd)

Date	Place	Description of earthquake	Intensity	Source
02 Jan 1849	Erinpoorah (Rajasthan)	Severe shock experienced ; rumbling noise loud and continued ; direction of motion appeared north to south ; pieces of plaster shaken from walls. A second rumbling after half an hour and the third after 7 hours.	VI	TOI/13-1-49
21 Feb 1853	Visakhapatnam (A.P.)	Rumbling noise resembling the rolling of heavy gun carriage. Direction of movement appeared from SW to NE, breaking some of the walls and rattling of bottles and glasses ; people aroused from sleep.	IV	TOI/9-3-53
08 Dec 1854	Bombay (Maharashtra)	Rumbling noise like passing of heavy wagon. Direction appeared to be from NE to SW. Tumblers, glass lamps, furniture etc shake. Lasted for 4-5 sec. Felt at Tardeo, Fort, Mazgaon, Chinchpokhli and Girgaon in Bombay city.	IV	TOI/11-12-54
18 Nov 1862	Dhulia (Maharashtra)	Smart shock. Direction appeared to be from SW to NE, duration 3-4 secs., roofs and terraces quivered.	IV	TOI/22-11-62
04 Jun 1865	Mysore (Karnataka)	Deep hollow rumbling noise like passing of a laden carriage ; cot rocked from side to side ; doors, windows, furniture vibrated perceptibly. Direction appeared to be from east to west, no damage done.	IV	TOI/20-6-65
24 Jun 1865	Coimbatore (Tamilnadu)	Felt by a number of persons, direction appeared to be from NE to SW, sensation like passing of a heavy goods train.	IV	TOI/3-8-65
20 Dec 1865	Kishanganj (W.B.)	Smart shock, closed doors opened ; open doors banged.	IV	TOI/30-12-65
01 Jan 1871	Deesa (Gujarat)	Duration about 15 secs, shock the plaster from ceilings.	V	TOI/30-1-71
31 Jan 1871	Baroda (Gujarat)	Rumbling noise followed by shaking of the whole house. Doors and windows rattled with a cracking noise. Direction appeared to be south to north ; fall of tiles, duration about 10 secs, table, chairs rattled.	IV	TOI/3-2-71 4-2-71 6-2-71 7-2-71
Do.	Surat (Gujarat)	Rumbling noise accompanied by uneasy rolling motion of ground and shaking of trees overhead. Duration about 4-5 secs. Direction appeared to be west to east.	IV	Do.
Do.	Malegaon (Maharashtra)	Distinctly felt, duration about 4 secs, tiles of the roofs began to rattle and walls of the building began to shake.	IV	Do.
Do.	Amrolee (Gujarat)	Felt distinctly, duration about 30 secs. Bungalows shook perceptibly.	IV	Do.
14 Apr 1872	Bhavnagar (Gujarat)	Sharp shock felt in the neighbourhood of Bhavnagar ; a large portion of the dam of a large tank which was in the course of construction, fell down.	VI	TOI/19-4-72
22 Nov 1872	Sironcha (Upper Godavari Distt)	No loss of life and no serious damage but the earthquake caused great alarm, many persons ran out of their houses and several were thrown down, direction appeared to be from south to west.		TOI/3-12-72
Oct/Nov 1876	Secunderabad (A.P.)	Felt throughout the city. Caused general alarm, glass panes broken in some of the houses, a number of sparrows found dead after the earthquake. Barracks in cantonment area were more or less in an oscillating condi-	VI	TOI/7-11-76

TABLE 1 (contd)

Date	Place	Description of earthquake	Intensity	Source
		tion during a period of 55-60 secs. Effects in different areas ranged from being thrown out of bed to as if being rocked in a cradle. Punkah wires jingled, doors and window shutters shook, parrots screamed, dogs barked and men woke up by the rolling and loud noise accompanying the earthquake; some private bungalows in and out of cantonment were damaged, but no large scale destruction or loss of life.		
Dec 1877	Bombay (Maharashtra)	Smart shock felt at Thana and Parel, feeling like passing of heavily laden wagons, glass drops of a chandelier jingled and glasses on a table knocked together.	IV	TOI/19-12-77
Jan 1879	Chicacole (Orissa)	Felt around midnight, appeared to come from the side of Bay of Bengal. The shock was preceded by a loud noise, tents etc. shock considerably, felt by many including a sub-judge and several policemen.	IV	FOI/13-1-79 18-1-79
28 Apr 1879	Bagapully (A.P.)	Felt at Bagapully and surrounding villages, loud noise followed by a rumbling noise like passing of a train. Lasted for about a minute but no damage done. At nearby Kodikandi the supporting bamboos of a pandal appeared to be lifted off the ground and replaced.	IV	TOI/8-5-79
17 Jun 1879	Hosur (Tamilnadu)	Loud crumbling sound resembling passage of a railway train awakened many sleepers. A distinct vibration was also felt. Sound lasted for 15 secs. Direction appeared to be from SW to NE.	IV	TOI/23-6-79
Apr 1882	Bangalore (Karnataka)	Severely felt. Direction appeared to be from east to west, duration about 60 secs. Houses, furniture, crockery etc. shook considerably. Also felt at Ootacamand, Yercaud and Hosur (Tamilnadu).	IV	TOI/15-4-82
15 Dec 1882	Mount Abu (Rajasthan)	Severe shock felt; direction appeared from west to east; extent of damage unknown but little tiles were shaken from roofs; window panes smashed. Splits visible in almost every building, the domed ones being the worst. Distant rumblings continued for few days. Felt at Virangam and Deesa also, though slightly. Generally felt over western Rajputana and western portion of Narmada valley.	VI	Sta/20-12-82 25-12-82
21 Aug 1885	Monghyr (Bihar)	Severe shock felt; duration about 7 secs; direction appeared to be from west to east; preceded by a low rumbling sound like distant thunder; shutters of windows made a rattling noise; Chandeliers started moving.	IV	TOI/28-8-85
19 May 1886	Bhagirathpur (W.B.)	Smart shock (a previous shock had been felt in July 85); large masonry buildings rocked to and fro, but without being damaged; lasted for about 60 secs; people alarmed. The shock was also felt at Saidpore, Burdwan and Tangail with lesser intensity.	IV	TOI/27-5-86
31 Mar 1889	Mangalore (Karnataka)	Two distinct shocks within a few seconds. Rumbling sound accompanied by the severe shaking of houses. Felt throughout the city, no damage done.	IV	TOI/ 6-4-89
12 Aug 1889	Madras (Tamilnadu)	Slight shock direction appeared west to east; duration 3-4 secs. Felt in Saidapet, Pallavaram, St. Thomes Mount (suburbs of Madras within a radius of 10 km) where	IV	Sta/17-8-89

TABLE 1 (contd)

Date	Place	Description of earthquake	Intensity	Source
17 Feb 1891	Bangalore (Karnataka)	houses shook. The shock was sharp in the suburbs and was accompanied by noise like an ordinary distant clap of thunder. Severe shock felt throughout the district. Duration about 20 secs. Direction appeared to be from west to east.	IV	Sta/ 22-2-91
19 Feb 1892	Govindpur (Manbhoom Distt)	Severe earthquake shook the whole district. No damage except cracking of a few houses. Animals became restless about an hour before the earthquake. They were noticed to sniff the ground and exhibit nervousness such as dog shows in the presence of an "unaccustomed object" while the air had distinctly sulphurous smell. A loud roaring sound was also heard prior to the earthquake followed by a crackling like the sound of distant musketry firing. Caused great panic among people.	V	Sta/ 21-2-92
03 Jan 1896	Barakur (Orissa)	Smart shock accompanied by heavy rumbling noise. Direction appeared to be from SE. Furniture and crockery in houses rattled. Duration of quake about two secs.	IV	Sta/9-1-96
22 Jun 1897	Berhampore (Orissa)	Strongest shock after the main earthquake of 12 th. Four persons killed and three hurt by falling houses. Seven or eight more persons died. People scared and started living in tents, gardens and lower stories of houses.	VII	Sta/25-6-97
Oct 1898	Ahmedabad (Gujarat)	Distinct oscillations felt for 10-15 secs. Felt by a sitting person; window shaking slightly on the hinges. Atmosphere appeared to be electrified. Direction appeared from east to west. No loss of life or property.	IV	TOI/17-10-98 18-10-98
07 Feb 1900	Alleppey (Kerala)	Everyone felt the shock. Duration about 30 secs. Buildings violently shaken: windows, doors rattled in pronounced fashion, pendulum clocks stopped.	V	TOI/14-2-1900

TABLE 2

Date	Place	Intensity (M.M.)	Source	Date	Place	Intensity (M.M.)	Source
20-2-1839	Deesa	III	TOI/6-3-39	21-2-1853	Visakhapatnam	IV	TOI/9-3-53
30-4-1839	Deesa	IV	TOI/11-5-39	26-2-1853	Burdwan	III	TOI/13-3-53
9-11-1840	Ahmedabad	V	TOI/1-12-40	26-7-1854	Calcutta	II	TOI/8-8-54
1844	Luckput	V	Earthquakes by N.H. Heck.	8-12-1854	Bombay	IV	TOI/11-12-54
March 1848	Colombo	IV	TOI/1-4-48	2-11-1856	Bhuj	II	TOI/15-11-56
2-1-1849	Erinpura (Near Abu)	VI	TOI/13-1-49	7-1-1857	Allahabad	II	TOI/31-1-57
3-6-1852	Deesa	III	TOI/16-6-52	12-3-1859	Calcutta	II	TOI/23-3-59
10-6-1852	Deesa	II	TOI/10-7-52	Sep/Oct 1859	Darbhangha	III	TOI/22-10-59
22-10-1852	107 km north of Calcutta.	III	TOI/13-11-52	27-4-1860	Surat	III to IV	
				13-11-1861	Vizianagaram	III	TOI/23-12-61
				18-11-1862	Dhulja	IV	TOI/22-11-62

TABLE 2 (contd)

Date	Place	Intensity (M.M.)	Source	Date	Place	Intensity (M.M.)	Source
Sep. 1864	Oudh	III	TOI/10-9-64	29-12-1878	Bhovani	II	TOI/6-1-79
4-6-1865	Mysore	IV	TOI/20-6-65	Dec. 1878	Chicocole	IV	TOI/13-1-79 18-1-79
24-6-1865	Coimbatore	IV	TOI/3-8-65	28-4-1879	Bagapully	IV	TOI/8-5-79
20-12-1865	Kishanganj	IV	TOI/30-12-65	17-6-1879	Hosur	IV	TOI/23-6-79
31-12-1865	Sholapur	III	TOI/31-1-66	30-7-1879	Mhow	III	TOI/2-8-79
	Bombay	III	8-1-68		Indore	II	6-8-79
	Lingsugur	III		01 Nov 1880	Gopalpore	II	TOI/3-4-80
1867	Calcutta	II	TOI/4-7-1930	16-3-1881	Nanguneri Taluk (Tirunelveli Dist.)	III	TOI/25-3-81
Aug 1868	Andaman Islands	VII	(Bodan K. Log, 1903)				
16-11-1868	Jubbulpur	III	TOI/25-11-68	10-12-1881	Malda	III	TOI/5-1-82
1-1-1871	Deesa	V	TOI/30-1-71		Hazaribagh	III	
				27-12-1881	Rajkot	II	TOI/5-1-82
31-1-1871	Baroda	IV		28-2-1882	Ootacamund	III	Sta/6-3-82
	Surat	IV	TOI/3-2-71		Calicut	III	
	Bulsar	IV	4-2-71		Felt in other parts of Madras State		
	Malegaun	IV	6-2-71	Apr 1882	Bangalore	IV	
	Amrolee	IV	7-2-71		Ootacamund	III	TOI/15-4-82
	Bardolee	III			Yercaud	III	19-4-82
	Matheran	III			Hosur	III	
15-2-1871	Barrackpore	III	TOI/21-2-71	10-6-1882	Wowania (Kathiawar)	III	TOI/26-6-82
	Calcutta	III			Bhacha (Kutch)	III	
27-7-1871	Surat	III	TOI/31-7-71	28-6-1882	Chitrod	III	TOI/11-7-82
Sep 1871	Colombo	III	TOI/13-9-71		Lakadiya (Kutch)	III	
27-9-1871	Chicocole	III	TOI/10-10-71	29-6-1882	Lakadiya	III	TOI/14-7-82
Dec 1871	Ceylon	III	TOI/2-1-72	Oct 1882	Calcutta	II	TOI/17-10-82
14-4-1872	Bhavnagar	VI	TOI/19-4-72	15-12-1882	Mount Abu	VIII	
Jun 1872	Amelsad	III	TOI/13-6-72		Felt at Vira- mgam, Dessa.	III	
12-7-1872	Chopeo (Khandesh)	III			Generally over western Rajasthan and also western portion of Narmada Valley		Sta/20-12-82 25-12-82
	Amelner	III	TOI/2-8-72	27-7-1883	Nagpur	II	TOI/4-8-83 Sta/28-7-83
	Dhunangon	III		6-10-1883	Muzaffarpur	III	
	Dhulia	III		20-10-1883	Patna	II	Sta/11-10-83
	Jalgaon	III			Songadh	III	TOI/3-11-83
22-10-1872	Ankleshwar	III	TOI/31-10-72		Chamardi (Kathiawar) †	III	
22-11-1872	Sironcha (Upper Godavari Dist)	IV	TOI/3-12-72	5-2-84	Limbda (Kathiawar)	II	Sta/2-3-84
Jun/Jul 1873	Broach	II	TOI/7-8-73				
2-1-1875	Ongole	III	Sta/22-1-75				
3-7-1876	Udaipur	III	TOI/9-8-76				
Oct/Nov 1876	Secunderabad	VI	TOI/7-11-76				
Dec 1877	Bombay	IV	TOI/19-12-77				

TABLE 2 (contd)

Date	Place	Intensity (M.M.)	Source	Date	Place	Intensity (M.M.)	Source
Mar/Apr 1885	Banaras	II	TOI/9-4-85	27-7-1891	Kundala (Bhirbum)	III	Sta/30-7-91
22-7-1885	Rungpur	III	TOI/28-7-85	19-2-1892	Manbhoom Dist.	V	Sta/21-2-92
25-7-1885	Sankrail	III	Sta/30-7-85	6-5-1892	Madras Chingleput	III	Sta/10-5-92 TOI/9-5-92
28-7-1885	Serampore			10-10-1892	Calcutta (felt)		Sta/14-10-92 21-10-92
3-8-1885	Bhagirathpur Kumarkhali Ulipore	III IV III	Sta/7-8-85	16-10-1892	Tangail	II	
21-8-1885	Monghyr	IV	TOI/28-8-1885	Jan 1894	Allahabad	III	Sta/21-10-92 TOI/9-1-94
Sep 1885	Rungpur	II	TOI/28-9-85	3-1-1896	Barkur	IV	Sta/9-1-96
Feb 1886	Murshidabad	III	TOI/8-2-86	8-3-1896	Murshidabad	II	Sta/17-3-96
12-2-1886	Hirekerur (Dharwar)	III	TOI/19-2-86	30-4-1896	Bombay	II	
14-4-1886	Kalawar (Navangar)	III	TOI/27-5-86	20-9-1896	Matheran	III	Sta/3-5-96
2-5-1886	Ranpur (Havnagar, Saurashtra)	III	TOI/27-5-86	12-6-1897	Lanowli	III	9-5-96
13-5-1886	Kolhapur	III	Sta/18-5-86	22-6-1897	Coochbehar	III	Sta/26-9-96
19-5-1886	Siadpore Burdwan Tangail Bhagirathpore	II II III V	Sta/22, 23, 29 May 86	8-7-1897	Bobbili (A.P.)	II	Sta/22-6-97
May 1886	Calcutta	III	TOI/25-5-86	29-7-1897	Berhampore	VII	Sta/24-6-97
11-11-1887	Rajkot	III	Sta/20-11-87 TOI/16-11-87	29-8-1897	Berhampore	III	Sta/12-7-97
24-12-1888	Murshidabad	III	Sta/27-12-88	2-9-1897	Malda	—	Sta/6-8-97
14-1-1889	Nashimpur	III	Sta/26-1-89	18-8-1897	Sirajgunj	II	Sta/26-8-97
17-1-1889	Jiaganj	—	Sta/22-1-89	29-8-1897	Sirajgunj	II	Sta/2-9-97
19-1-1889	Pabna (Serajgunje)	—	Sta/24-1-89	27-9-1897	Tangail	II	Sta/8-9-97
27-1-1889	Berhampore	III	Sta/5-2-89	Sep 1897	Nadosistam (Nilgiris)	II	TOI/16-9-97
31-3-1889	Mangalore	IV	TOI/6-4-89	8-10-1897	Rampore Boalia	III	Sta/5-10-97
12-5-1889	Dinajpur	III	Sta/19-5-89	8-10-1897	Araria Malda	II II	Sat/19-10-97 28-10-97
12-8-1889	Madras	IV	Sta/17-8-89	Oct 1897	Purnesh, Dinajpur	III	TOI/16-10-97
10-11-1889	Askal (Ganjam Distt.)	III	Sta/13-11-89	19-10-1897	Hetampur	II	Sta/30-10-97
23-3-1890	Chinsurah	III	Sta/27-3-90	2-11-1897	Coochbehar		Sta/10-11-97
17-5-1890	Dumraon	III	Sta/22-5-90	30-11-1897	Jamalpore	II	Sta/4-12-97
May 1890	Banaras Allahabad	III II	TOI/20-5-90	27-3-1898	Banmor	III	Sta/2-4-98
27-9-1890	Kathiawar	III	Sta/5-10-90 7-10-90	4-4-1898	Hetampur	III	Sta/15-4-98
17-2-1891	Bangalore	IV	Sta/22-2-91	18-4-1898	Damkdia	II	Sta/28-4-98
7-4-1891	Ceylon (felt)	III	Sta/2-5-91	Jun 1898	Kakina	III	Sta/15-6-98
18-4-1891	Ceylon (felt)	II	Sta/2-5-91	Aug 1898	Rungpur Dinapore	III III	TOI/26-8-98
6-5-1891	Bandra, Kurla	III	Sta/12-5-1891	9-10-1898	Rungpore	III	TOI/11-10-98
8-7-1891	Pabna	III	Sta/14-7-91	Oct 1898	Ahmedabad	IV	TOI/17-10-98
10-7-1891	Calcutta (felt) Noakhilly Tangail	III IV III	Sta/12-7-91 16-7-91	15-10-1898	Belgaum	III	TOI/18-10-98
				6-2-1899	Coochbehar	III	Sta/17-2-99
				17-9-1899	Dinajpur Coochbehar	III III	Sta/22-9-99
				16-1-1900	Lower Daman Udwara	III III	Sta/18-1-00
				7-2-1900	Alleppey	V	TOI/14-2-00
				2-5-1900	Coochbehar	III	Sta/19-5-00
				9-9-1900	Colombo	III	TOI/12-9-00
				14-10-1900	Jodhpur	III	Sta/16-10-00

Sta—Statesman, Calcutta

TOI—Times of India, Bombay

2. Procedure adopted

Microfilms of three newspapers were scanned at Bombay, Calcutta and Madras and description along with the date and time (if available) including felt reports were noted. The shocks were then assigned intensity in modified Mercalli Scale based on the description reported. In the case of larger events attempts were made to draw isoseismals to fix the epicentre which was taken as centre of the meizoseismal region. For earthquakes with insufficient data, the zone which suffered the most was taken as the epicentre. Table 1 gives the description of earthquakes of intensity IV or more. Table 2 includes all the new earthquakes felt in different parts of Peninsular India. It may be mentioned that in this catalogue, events reported or published earlier by Oldham (1883), Gubin (1968), Tandon and Srivastava (1974) and Chandra (1977) have been excluded.

3. Discussion

Some significant points which have been brought to light as a result of this compilation are given below :

(1) An earthquake of intensity VI M.M. occurred on 17 May 1903 (Turner *et al.* 1912) near Jabalpur. The new catalogue has reported a felt earthquake at the same place on 16 November 1868.

(2) In the region of damaging earthquake of 8 February 1900 near Coimbatore, an earthquake (intensity IV) was reported earlier on 24 June 1865.

(3) Near Ongole, where an earthquake of magnitude 5.4 occurred on 27 March 1967 earthquakes of slightly lesser intensity were reported on 1 September 1869 and later. In this case, two of the felt earthquakes reported in the new catalogue on 10 and 11 September were the after shocks of the main event of 1 September but with decreasing intensity.

(4) An earthquake of intensity VII M.M. occurred at Bhavnagar on 21 April 1919. The catalogue events an earthquake (intensity VI) on 14 April 1872 at the same place.

(5) Recently an earthquake of magnitude 5 caused minor damage near Hyderabad on 30 June 1983. The new catalogue shows an event of similar intensity in 1876 with its epicentre near Secunderabad.

(6) The catalogue contains reports of earthquakes of intensity V or more felt at Ahmedabad, Erinpoorah, Deesa, Mount Abu, Govindpur and Alleppy.

(7) Animals were reported to have become restless about an hour before the earthquake of 19 February 1892 in Govindpur (Manbhoom district), which had an intensity of V M.M. The animals were noticed "To sniff the ground and exhibit nervousness such as a dog shows in the presence of an unaccustomed object while the air had distinctly sulphurous smell" (Table 1, *Statesman* dated 21 February 1892). This event has, therefore, brought to light the first documented case of unusual animal behaviour in the Indian region.

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