EPICENTRE   ○ STATION
Fig. 1. Map of India and neighbourhood
Mercator Projection

550·342

A NOTE ON THE TRAVEL TIMES OF P AND S WAVES IN THE DECCAN PLATEAU

It is well-known that although difference between travel ti nes in different regions is very small yet there is some evidence that they exist (Jeffreys and Bullen 1948). Nag (1966) recently presented the travel-time curves for the Indian subcontinent. These regional differences in the travel times are partly due to the earth's crustal structure and partly caused by regional anomalies of the crustal wave velocities. The aim of the present note is to present the travel-time curves for the Deccan plateau separately as it is geologically different from the rest of the country. The regional travel-time curves obtained from observed data will enable better and more precise location of epicentres.

Data for the above work were collected from the monthly *Seismological Bulletins* published by India Meteorological Department. Original records were also consulted to confirm the data published in the bulletins. Epicentres so far located in the Deccan Trap only were selected and given in Table 1 (see also Fig. 1).

Stations selected for the study are Bokaro, Bombay, Madras, Hyderabad, Kodaikanal, Poona, Sehore and Visakhapatnam. Where the depth of shock was not mentioned, it was considered in the present study as a shallow shock as it gave rise to P_g and S_g waves.
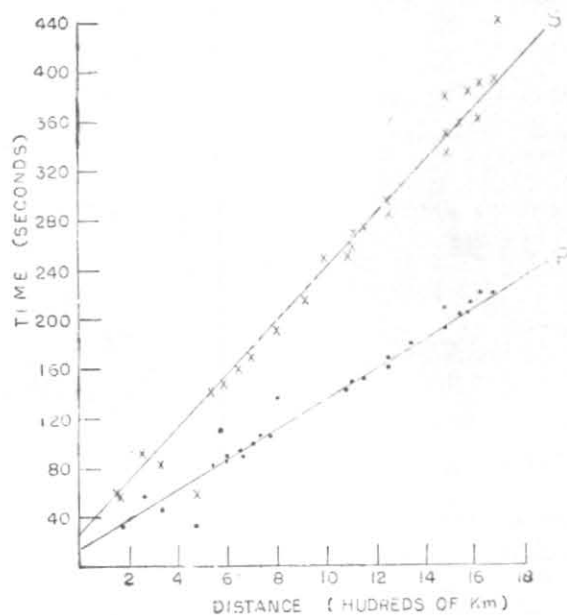
Fig. 2. Travel time curves in Deccan Plateau

TABLE 1

Date	Co-ordinates of epicentre			Origin-time (GMT)		
				h	m	s
22-8-1957	22·0°N	80·0°E	Satpura mountains	21	04	50·0
17-10-1957	21·5°N	70·0°E	Central India	05	10	05·0
26-2-1965	24·0°N	70·3°E	Rann of Kutch region	10	04	09·0
5-12-1963	17·3°N	80·1°E	East of Hyderabad	04	07	42·8
9-4-1963	22·2°N	85·6°E		00	03	35·6
9-6-1964	22·0°N	87·6°E	About 100 km SW of Calcutta	12	33	25·0
15-4-1964	21·7°N	88·0°E	India-East Pakistan border region	16	35	57·5

TABLE 2

Phase	Gangetic valley (Roy 1939)	Central India (Mukherjee 1942)	NE India (Tandon 1954)	Indian subcontinent (Nag 1966)	Deccan Plateau (present author)
P	7·80	7·73	7·91	8·0	8·25
S	4·38	4·38	4·46	4·54	4·67

Epicentral distances were calculated from a knowledge of the co-ordinates of epicentres and stations using the direction cosine method (Bullen 1963).

Fig. 2 is a plot of distance *versus* time taken by the *P* and *S* waves. Both the curves appear to be straight lines as the distance range is below 2000 km (Nag 1966). The velocity of *P* wave was found to be 8·25 km/sec and that for *S* wave was 4·67 km/sec. These appear to be slightly different from that of others reported earlier. For comparison, all the values are presented in Table 2.

From the above it seems there are variations in travel times between different regions. Where accuracy cannot be sacrificed it is necessary to draw different travel-time curves for geologically different regions in order to determine the epicentres with much more precision.

B. PADMANABHAMURTY

Ridge Seismological Observatory,
Delhi
December 28, 1966

REFERENCES

Jeffreys, H. and Bullen, K.E.	1948	*Seismological Tables*, p. 4
Bullen, K. E.	1963	*An introduction to the theory of Seismology,* Camb. Univ. Press, p.155
Mukherjee, S. M.	1942	*Proc. Indian Acad. Sci.,* 16, pp. 167-175.
Nag, S. K.	1966	*Indian J. Met. Geophys.,* 17, 2, pp. 281–286.
Roy, S. C.	1939	*Mem. geol. Surv. India,* 73, pp. 49–74.
Tandon, A. N.	1954	*Indian J. Met. Geophys.,* 5, 2, pp. 95–137.