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# METEOROLOGICAL DEPARTMENT

# SEISMOLOGICAL BULLETIN

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CONTENTS.



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# INTRODUCTION.

The seismic data from the observatories of the India Meteorological Department have been hitherto published annually as Part D of the Annual Summary of the India Weather Review. With a view to expedite the publication of the data, it has been decided to bring out the Indian data in the form of a quarterly bulletin. The present number is the first of the series. Owing to the kind co-operation of the Surveyor-General of India, the Director of the Nizamiah Observatory, Hyderabad and of the Superintendent, Colombo Observatory, it has also been possible to incorporate in this bulletin the data of their respective observatories, *viz.*, Dehra Dun, Hyderabad and Colombo. The instrumental seismological data were collected and edited at the Colaba Observatory, Bombay, and the non-instrumental voluntary observations at the Meteorological Office, Poona.

TABLE 1.

*List of Seismograph Stations.*

| Station. | Latitude. | Longitude. | Height above M. S. L. | Lithologic foundation. | Officer-in-charge of Observatory. |
|---|---|---|---|---|---|
| Agra | 27°8′ N. | 78°01′ E. | 163 meters | Indo-Gangetic Alluvium | Meteorologist. |
| Bombay | 18°54′ N. | 72°49′ E. | 6 meters | Deccan Trap | Meteorologist. |
| Calcutta | 22°32′ N. | 88°20′ E. | (1) 7 meters<br>(2) 6 meters. | Alluvium | Meteorologist. |
| Colombo | 6°54′ N. | 79°52′ E. | 7 meters | Beach-Sand resting on gneiss probably decomposed. | Superintendent. |
| Dehra Dun | 30°19′ N. | 78°03′ E. | 682 meters | Gravel | Director, Geodetic Branch, Survey of India. |
| Hyderabad | 17°26′ N. | 78°27′ E. | 554 meters | Granite | Director, Nizamiah Observatory. |
| Kodaikanal | 10°14′ N. | 77°28′ E. | 2343 meters | Rock | Director. |

(1) Milne-Shaw, (2) Omori-Ewing.

TABLE 2.

*The instruments and their constants*

| Station. | Component. | Type of instrument. | Mass. | Period. | Static magnification. | Damping ratio. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | kg. | secs. | | | |
| Agra | N | Omori-Ewing | 45 | 29·5 | 29 | 1 | |
| | E | Milne-Shaw | 0·47 | 12 | 250 | 20 : 1 | |
| Bombay | N | Milne-Shaw | 0·45 | 12 | 250 | 40 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 350 | 12 : 1 | |
| Calcutta | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | N | Omori-Ewing | 50 | 28 | 32 | ... | |
| | E | Omori-Ewing | 50 | 28 | 30 | ... | |
| Colombo | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Dehra Dun | N | Omori | 50 | 30 | 12 | ... | |
| Hyderabad | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Kodaikanal | E | Milne-Shaw | 0·45 | 12·2 | 250 | 22 : 1 | |

## Errata Slip for January—March 19

Page.

10 Under "Remarks" column against March 31, *insert* 'S' *after* "First movement".

15 ,, ,, ,, ,, March 2, *read* "depth" *for* "length".

18 ,, ,, ,, ,, March 31, *delete* "'S".

19 ,, "Date" column, *insert* "1" *after* "Feb.".

22 ,, "Remarks" column against February 5, *read* "phases lost during" *for* "phaseslos ing".

# UPPER AIR OBSERVATORY, AGRA.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Jan. 1-2* | E | e | 23 37 41 | ... | ... | ... | Very distant. |
| | | iS | 45 30 | ... | ... | ... | |
| | | $M_1$ | 0 4 9 | 20 | 15 | ... | |
| | | $M_2$ | 7 2 | 20 | 11 | ... | |
| ,, 2* | E | e | 22 47 59 | ... | ... | ... | Very distant. |
| | | i (SS?) | 23 7 21 | ... | ... | ... | |
| | | i (SSS?) | 12 26 | ... | ... | ... | |
| | | F | Mixed with microseisms. | | | | |
| ,, 3* | E | e | 16 47 39 | ... | ... | ... | |
| | | F | 17 56 ... | ... | ... | ... | |
| ,, 4* | E | eP | 4 53 8 | ... | ... | 1900 | |
| | | S | 56 25 | ... | ... | ... | |
| | | $M_1$ | 5 0 38 | 10 | 5 | ... | |
| | | $M_2$ | 1 29 | 7 | 3 | ... | |
| | | F | 23 ... | ... | ... | ... | |
| ,, 10* | E | P | 21 2 45 | ... | ... | 4980 | |
| | | PP | 4 29 | ... | ... | ... | |
| | | S | 9 28 | ... | ... | ... | |
| | | SS | 12 37 | ... | ... | ... | |
| | | $M_1$ | 25 42 | 15 | 5 | ... | |
| | | F | 22 28 ... | ... | ... | ... | |
| ,, 11* | E | iP | 15 20 22 | ... | ... | 5365 | Direction of the first movement E. Epc. : Japan. |
| | | PP | 22 12 | ... | ... | ... | |
| | | PPP | 23 2 | ... | ... | ... | |
| | | iS | 27 27 | ... | ... | ... | |
| | | PS | 28 7 | ... | ... | ... | |
| | | SS | 30 47 | ... | ... | ... | |
| | | SSS | 31 55 | ... | ... | ... | |
| | | L? | 35 5 | ... | ... | ... | |
| | | $M_1$ | 40 47 | 25 | 53 | ... | |
| | | $M_2$ | 43 47 | 25 | 78 | ... | |
| | | $M_3$ | 47 47 | 15 | 12 | ... | |
| ,, 12* | E | e | 1 11 12 | ... | ... | ... | Slight. |
| | | e | 13 29 | ... | ... | ... | |
| | | $M_1$ | 15 21 | 7 | 94 | ... | |
| | | F | 43 ... | ... | ... | ... | |
| ,, 13* | E | e | 11 15 38 | ... | ... | ... | Slight. △ Perhaps less than 9°. |
| | | e | 15 54 | ... | ... | ... | |
| | | i | 16 56 | ... | ... | ... | |
| | | F | 38 ... | ... | ... | ... | |
| ,, 18 | E | eP | 3 11 09 | ... | ... | ... | Near. Slight. |
| | | S? | 11 52 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Jan. 18 | E | eP | 4 27 27 | ... | ... | 4210 | Deep focus type? |
| | | ? | 27 41 | ... | ... | ... | |
| | | iS | 33 15 | ... | ... | ... | |
| | | ? | 33 37 | ... | ... | ... | |
| | | SSS | 36 7 | ... | ... | ... | |
| | | M? | 41 51 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 18 | E | eP | 5 20 7 | ... | ... | 2545 | Surface waves poor. |
| | | iS | 24 17 | ... | ... | ... | |
| | | F | 6 22 ... | ... | ... | ... | |
| ,, 18 | N | P | 9 31 31 | ... | ... | 1220 | Depth of focus about 200 km. Felt at different parts of the Punjab. |
| | E | iP | | | | | |
| | N,E | iS | 33 29 | ... | ... | ... | |
| | N,E | F | Mixed up with the following shock. | | | | Direction of the first movement W. |
| ,, 18 | E | $\overline{P}$ | 9 43 9 | ... | ... | 890 | Slight. |
| | N,E | S | 44 1 | ... | ... | ... | |
| | N,E | $\overline{S}$ | 44 54 | ... | ... | ... | |
| | N,E | F | Mixed up with the following shock. | | | | |
| ,, 18 | E | $\overline{P}$ | 9 56 54 | ... | ... | 890 | Slight. Aftershock of the previous one. |
| | N,E | S | 57 46 | ... | ... | ... | |
| | N,E | $\overline{S}$ | 58 39 | ... | ... | ... | |
| | E | F | 10 43 ... | ... | ... | ... | |
| ,, 19* | E | eP | 6 6 25 | ... | ... | ... | Near, Slight. Deep focus ? |
| | | e | 6 50 | ... | ... | ... | |
| | | iS | 8 19 | ... | ... | ... | |
| | | F | 35 ... | ... | ... | ... | |
| ,, 22 | E | P | 15 35 7 | ... | ... | 4310 | Feeble. Surface waves poor. |
| | | S | 41 14 | ... | ... | ... | |
| | | F | 16 26 ... | ... | ... | ... | |
| ,, 23 | E | ePP | 8 51 37 | ... | ... | 12000 | Train of surface waves. |
| | | SKS | 57 51 | ... | ... | ... | |
| | | SKKS | 58 47 | ... | ... | ... | |
| | | PS | 9 1 7 | ... | ... | ... | |
| | | SS | 6 57 | ... | ... | ... | |
| | | SSS | 11 7 | ... | ... | ... | |
| ,, 24 | E | e | 10 51 2 | ... | ... | 13800 | Train of surface waves. |
| | | SKP | 52 32 | ... | ... | ... | |
| | | PPP | 53 55 | ... | ... | ... | |
| | | SKS? | 56 42 | ... | ... | ... | |
| | | SKKS | 57 54 | ... | ... | ... | |
| | | iS | 59 26 | ... | ... | ... | |

*Absolute time correct within ± 10 secs.

* Absolute time correct within ± 3 secs.

# UPPER AIR OBSERVATORY, AGRA.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 24 | | PS | 11 1 32 | ... | ... | ... | |
| | | iPPS | 2 39 | ... | ... | ... | |
| | | L | 30 8 | ... | ... | ... | |
| | | F | 15 2 ... | ... | ... | ... | |
| ,, 25 | E | e | 17 19 10 | ... | ... | ... | Very distant. |
| | | i(SKS?) | 22 56 | ... | ... | ... | |
| | | i | 29 45 | ... | ... | ... | |
| ,, 26 | E | eP | 3 45 59 | ... | ... | ... | |
| | | S | 50 50 | ... | ... | ... | |
| | | i | 51 13 | ... | ... | ... | |
| | | M | 59 20 | 11 | 9 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 26 | E | i | 4 16 38 | ... | ... | ... | |
| | | $M_1$ | 24 33 | 20 | 7 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 26 | E | iP | 10 50 42 | ... | ... | 1220 | Depth of focus about 200 km. Direction of the first movement W. |
| | N,E | iS | 52 35 | ... | ... | ... | |
| | E | F | 11 21 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 26 | E | eP | 18 5 38 | ... | ... | 610 | Slight. |
| | | S | 6 43 | ... | ... | ... | |
| | | S* | 6 58 | ... | ... | ... | |
| | N | eS | 7 24 | ... | ... | ... | |
| | E | $\overline{S}$ | | | | | |
| | E | F | 21 ... | ... | ... | ... | |
| ,, 27 | E | iP | 6 53 43 | ... | ... | 1155 | Depth of focus about 220 km. Direction of the first movement E. |
| | | sP? | 54 42 | ... | ... | ... | |
| | | iS | 55 38 | ... | ... | ... | |
| | | F | 7 22 ... | ... | ... | ... | |
| ,, 29 | E | iP | 4 15 7 | ... | ... | 855 | Felt at Darbhanga and Muzaffarpur in Bihar. Direction of the first movement W. |
| | E | P* | 15 35 | ... | ... | ... | |
| | N,E | $\overline{P}$ | 15 55 | ... | ... | ... | |
| | N,E | S | 16 43 | ... | ... | ... | |
| | E | S* | 17 9 | ... | ... | ... | |
| | N,E | $\overline{S}$ | 17 34 | ... | ... | ... | |
| ,, 30 | E | e | 13 30 56 | ... | ... | ... | Tremor. |
| | | F | 46 ... | ... | ... | ... | |
| ,, 31 | E | e | 8 35 49 | ... | ... | ... | △ perhaps less than 9°. |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Feb. 1 | N | P | 19 14 37 | ... | ... | 6590 | Very great. Maximum amplitude > 1250μ. |
| | | i | 14 44 | ... | ... | ... | |
| | | PPP? | 18 35 | ... | ... | ... | |
| | | iS | 22 51 | ... | ... | ... | |
| | | SS | 26 49 | ... | ... | ... | |
| ,, 4 | E | eP | 0 22 00 | ... | ... | 1460 | |
| | N | e | 24 12 | ... | ... | ... | |
| | E | eS | 24 26 | ... | ... | ... | |
| | | L | 25 12 | ... | ... | ... | |
| | | $M_1$ | 28 29 | 10 | 8 | ... | |
| | | $M_2$ | 29 56 | 10 | 7 | ... | |
| | N | F | 42 ... | ... | ... | ... | |
| | E | F | 1 10 ... | ... | ... | ... | |
| ,, 5 | E | $eP_1'$ | 2 42 57 | ... | ... | 15400 | △ from $P_1'$ and SS. |
| | N | e | 43 37 | ... | ... | ... | |
| | E | ePP | 45 27 | ... | ... | ... | |
| | | eSKP | 47 3 | ... | ... | ... | |
| | | e | 48 24 | ... | ... | ... | |
| | | e | 50 1 | ... | ... | ... | |
| | | e | 52 27 | ... | ... | ... | |
| | | iSKKS | 52 52 | ... | ... | ... | |
| | | i | 54 6 | ... | ... | ... | |
| | | SKKP | 55 19 | ... | ... | ... | |
| | | PPS | 58 27 | ... | ... | ... | |
| | | SS | 3 3 51 | ... | ... | ... | |
| | | SSS | 8 52 | ... | ... | ... | |
| | | L? | 25 35 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 5 | | $M_1$ | 3 39 11 | 20 | 11 | ... | |
| | | $M_2$ | 44 11 | 20 | 9 | ... | |
| | | F | 5 23 ... | ... | ... | ... | |
| ,, 10 | E | e | 20 52 39 | ... | ... | ... | |
| ,, 11 | E | P | 7 6 14 | ... | ... | 6510 | L wave poor. |
| | | S | 14 24 | ... | ... | ... | |
| | | eSS | 18 23 | ... | ... | ... | |
| | | M | 28 44 | ... | ... | | |
| ,, 11 | E | iP | 14 46 55 | ... | ... | 4400 | L wave poor. Direction of the first movement W. |
| | | iPPP | 48 45 | ... | ... | ... | |
| | | S | 53 7 | ... | ... | ... | |
| | | SSS | 56 2 | ... | ... | ... | |
| | | $M_1$ | 15 4 58 | 15 | 4 | ... | |
| | | $M_2$ | 7 15 | 15 | 4 | ... | |
| ,, 13 | E | i | 8 23 20 | ... | ... | ... | Very distant. |
| | | SKSP | 33 6 | ... | ... | ... | |
| | | L? | 57 35 | ... | ... | ... | |
| | | $M_1$ | Between 9 7 49 and 9 49 | 25 | 17 | ... | |
| | | $M_2$ | 14 13 | 20 | 17 | ... | |
| | | $M_3$ | 17 21 | 20 | 12 | ... | |
| | | $M_4$ | 21 7 | 20 | 11 | ... | |
| | | $M_5$ | Between 22 49 and 23 49 | 15 | 5 | ... | |
| | | F | 11 5 ... | ... | ... | ... | |





# UPPER AIR OBSERVATORY, AGRA.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 14 | N,E | iP | 2 59 27 | ... | ... | 2580 | Depth of focus about 65 km. Direction of the first movement E and S. |
| | N,E | pP | 59 39 | ... | ... | ... | |
| | E | PPP | 3 0 4 | ... | ... | ... | |
| | N | S | 3 41 | ... | ... | ... | |
| | E | iS | | | | | |
| | N,E | sS | 4 2 | ... | ... | ... | |
| | E | SS | 4 34 | ... | ... | ... | |
| | | F | 4 37 ... | ... | ... | ... | |
| ,, 15 | E | eP | 3 41 1 | ... | ... | 12045 | |
| | | eSKS | 51 30 | ... | ... | ... | |
| | | SKKS | 52 25 | ... | ... | ... | |
| | | L? | 4 18 56 | ... | ... | ... | |
| | | F | 5 38 ... | ... | ... | ... | |
| ,, 15 | E | e | 7 21 7 | ... | ... | ... | Very distant. |
| ,, 22 | E | e | 5 31 51 | ... | ... | ... | Very distant. |
| | | e | 57 55 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 22 | E | e | 6 17 0 | ... | ... | ... | |
| | N | e | 17 57 | ... | ... | ... | |
| ,, 26 | E | P | 12 13 34 | ... | ... | 1165 | Felt slightly at long. |
| | E | $\overline{eP}$ | 14 47 | ... | ... | ... | |
| | N | e | 15 33 | ... | ... | ... | |
| | E | S | 15 47 | ... | ... | ... | |
| | E | $\overline{S}$ | 17 1 | ... | ... | ... | |
| | N | F | 33 ... | ... | ... | ... | |
| | E | F | 57 ... | ... | ... | ... | |
| ,, 27 | E | iP | 1 39 10 | ... | ... | 6300 | Direction of the movement W. |
| | | ePP | 41 20 | ... | ... | ... | |
| | | S | 47 8 | ... | ... | ... | |
| | | PS | 47 47 | ... | ... | ... | |
| | | SS | 51 20 | ... | ... | ... | |
| | | $M_1$ | 2 5 48 | 20 | 9 | ... | |
| | | $M_2$ | 9 47 | 15 | 4 | ... | |
| | | F | 54 ... | ... | ... | ... | |

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Mar. 1 | E | eP | 4 29 14 | .. | .. | .. | |
| | | i | 33 5 | .. | .. | .. | |
| | | e | 33 37 | .. | .. | .. | |
| | | F | 5 37 .. | .. | .. | .. | |
| ,, 1-2 | E | e | 23 51 27 | .. | .. | .. | |
| | | $M_1$ | 0 19 13 | 21 | 6 | .. | |
| | | F | Lost while changing chart. | | | | |
| ,, 8 | E | e | 3 30 46 | .. | .. | .. | |
| | | F | 4 23 .. | .. | .. | .. | |
| ,, 8 | E | iP | 5 47 23 | .. | .. | 8665 | Direction of the 1st movement W. |
| | E | ePP | 50 16 | .. | .. | .. | |
| | N,E | S | 57 20 | .. | .. | .. | |
| | E | PS | 58 3 | .. | .. | .. | |
| | | SS | 6 2 33 | .. | .. | .. | |
| | | SSS | 5 25 | .. | .. | .. | |
| | | L | 12 58 | .. | .. | .. | |
| | | $M_2$ | 25 43 | 17 | 5 | .. | |
| | | $M_3$ | 29 32 | 16 | 6 | .. | |
| ,, 9 | E | e | 0 19 36 | .. | .. | .. | Tremor. |
| | | F | 26 .. | .. | .. | .. | |
| ,, 10 | E | P | 15 50 45 | .. | .. | 6455 | |
| | | ePP | 54 5 | .. | .. | .. | |
| | | S | 58 52 | .. | .. | .. | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 10 | E | iP | 16 29 46 | .. | .. | 5400 | Surface waves poor. Depth of focus about 80 km. Direction of the 1st movement W. |
| | | pP | 30 5 | .. | .. | .. | |
| | | PP? | 32 1 | .. | .. | .. | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 10 | | iS | 16 36 53 | .. | .. | .. | |
| | | sS | 37 25 | .. | .. | .. | |
| | | SSS | 41 22 | .. | .. | .. | |
| | | F | 17 40 .. | .. | .. | .. | |
| ,, 11 | E | e | 15 6 42 | .. | .. | .. | |
| | | F | 52 .. | .. | .. | .. | |
| ,, 11 | E | i | 17 4 31 | .. | .. | .. | |
| | | F | 47 .. | .. | .. | .. | |
| ,, 13 | E | e | 18 1 19 | .. | .. | .. | |
| ,, 13 | E | eP | 21 8 0 | .. | .. | 1250 | Slight. |
| | N | eS | 10 1 | .. | .. | .. | |
| | E | iS | | | | | |
| | N | F | 56 .. | .. | .. | .. | |
| | E | F | 22 1 .. | .. | .. | .. | |
| ,, 14 | N,E | P | 0 49 58 | .. | .. | 565 | Moderate. Felt Agra, Akola, Ahm abad, Bomb Baroda, De Dewas, Indo Mhow, Nagp Nasik and Sur Little damage no loss of life. |
| | N | i | 50 6 | .. | .. | .. | |
| | N | eP* | 50 18 | .. | .. | .. | |
| | E | P* | | | | | |
| | N | iS | 51 1 | .. | .. | .. | |
| | E | S | | | | | |
| | N | $\overline{S}$ | 51 35 | .. | .. | .. | |
| | N,E | F | Lost while changing chart. | | | | |
| ,, 14 | N | eP | 5 19 20 | .. | .. | 2490 | Direction of the movement W. |
| | E | iP | | | | | |
| | E | ePP | 19 42 | .. | .. | .. | |
| | | PPP | 19 56 | .. | .. | .. | |
| | | iS | 23 25 | .. | .. | .. | |

# UPPER AIR OBSERVATORY, AGRA.

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 14 | N | I | 23 33 | .. | .. | .. | |
| | E | SS | 24 25 | .. | .. | .. | |
| | | L | 25 45 | .. | .. | .. | |
| | | $M_1$ | 29 10 | 22 | 45 | .. | |
| | N | F | 54 .. | .. | .. | .. | |
| | E | F | 6 25 .. | .. | .. | .. | |
| „ 22 | E | eP | 15 35 42 | .. | .. | 10610 | |
| | | PP | 39 36 | .. | .. | .. | |
| | | PPP | 41 37 | .. | .. | .. | |
| | | SKS? | 46 23 | .. | .. | .. | |
| | | S | 47 2 | .. | .. | .. | |
| | | PS | 48 8 | .. | .. | .. | |
| | | PPS | 48 52 | .. | .. | .. | |
| 1938. Mar. 22 | | SS | 15 53 34 | .. | .. | .. | |
| | | L | 16 7 32 | .. | .. | .. | |
| | | M | 14 33 | .. | .. | .. | |
| | | $M_1$ | 21 27 | 17 | 15 | .. | |
| | | F | 18 18 .. | .. | .. | .. | |
| „ 31-1 | E | P | 22 38 44 | .. | .. | 4165 | |
| | | PPP | 40 25 | .. | .. | .. | |
| | | iS | 44 42 | .. | .. | .. | |
| | | L? | 49 50 | .. | .. | .. | |
| | | $M_1$ | from 58 18 and 59 18 | 11 .. | 8 .. | .. .. | |
| | | $M_2$ | 23 1 45 | 10 | 8 | .. | |
| | | F | 0 23 .. | .. | .. | .. | |

Upper Air Observatory, Agra.

G. CHATTERJEE,
*Meteorologist-in-charge.*



# COLABA OBSERVATORY, BOMBAY.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 1 | E | e | 12 42 ... | ... | ... | ... | |
| | E | F | 13 17 ... | ... | ... | ... | |
| „ 1-2 | N, E | eP | 23 38 41 | ... | ... | 7000 | Slight. |
| | N, E | e | 39 02 | ... | ... | ... | Epc: 24°N., 141°·5E. Near Volcano Islands. O = 23h 28m 10s. |
| | N, E | e | 41 06 | ... | ... | ... | |
| | N, E | iS | 47 12 | ... | ... | ... | |
| | N | e | 51 ... | ... | ... | ... | |
| | E | | 51 23 | ... | ... | ... | |
| | N, E | e | 55 14 | ... | ... | ... | |
| | N, E | eL | 57 ... | ... | ... | ... | |
| | E | Mn | 0 10 44 | 15 | 1 | .. | |
| | N | Mn | 11 22 | 15 | 1 | ... | |
| | N | F | 1 6 ... | | | | |
| | E | F | Lost in shifting. | | | | |
| „ 2-3 | N, E | e | 22 46 55 | ... | ... | ... | Slight. Pacific Ocean off Central America. 16°N., 98° W. H. O. = 22h 27m 13s (U. S. C. G. S.). |
| | N | e | 48 17 | ... | ... | ... | |
| | N, E | e | 50 10 | ... | ... | ... | |
| | N | e | 50 40 | ... | ... | ... | |
| | N | i | 53 19 | ... | ... | ... | |
| | N | e | 57 05 | ... | ... | ... | |
| | N | i | 23 03 10 | ... | ... | ... | |
| | N, E | e | 09 03 | ... | ... | ... | |
| | N, E | e | 14 12 | ... | ... | ... | |
| | E | e | 38 10 | ... | ... | ... | |
| | N, E | eL | 51 10 | ... | ... | ... | |
| | N | M | 00 00 00 | 20 | 3 | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| „ 3 | E | e | 14 57 10 | ... | ... | ... | Feeble. |
| | E | e | 15 00 56 | In minute mark. | | | |
| | E | e | 04 56 | Large waves. | | | |
| | E | F | 16 00 ... | ... | ... | ... | |
| „ 3 | E | e | 16 46 19 | ... | ... | ... | Feeble. |
| | N, E | i | 46 26 | ... | ... | ... | |
| | N, E | e | 50 26 | Large waves. | | | |
| | N, E | F | 17 45 ... | ... | ... | ... | |
| „ 3 | E | Mn | 20 13 ... | ... | ... | ... | Feeble. |
| | E | F | 47 ... | ... | ... | ... | |
| „ 3 | E | e | 21 42 42 | ... | ... | ... | Feeble. |
| | E | e | 22 20 ... | Large waves. | | | |
| | E | F | 23 40 ... | ... | ... | ... | |
| „ 4 | N | ePP? | 04 55 23 | ... | ... | (3110) | Slight. |
| | N | eS? | 59 24 | ... | ... | ... | Epc: Near 41°N., 80°E. Gobi desert. |
| | N | Mn | 05 04 ... | 9 | 3 | ... | |
| | E | Mn | 05 ... | 9 | 3 | ... | |
| | N, E | F | 40 ... | ... | ... | ... | |
| „ 7 | N, E | eP | 15 39 04 | ... | ... | 9220 | Slight. Surface waves poor. Epc: 3·5° S., 153°E. Felt at Rabaul in New Guinea. |
| | E | e | 42 02 | ... | ... | ... | |
| | E | e | 43 58 | ... | ... | ... | |
| 1938. Jan. 7 | N, E | eS | 15 49 04 | ... | ... | ... | 0 = 15h 26·9m. (h = 150 km., Wellington). |
| | N, E | e | 49 19 | ... | ... | ... | |
| | N, E | ScS | 50 14 | ... | ... | ... | |
| | N, E | SS | 53 39 | ... | ... | ... | |
| | E | e | 58 09 | ... | ... | ... | |
| | N, E | L | 16 04 07 | ... | ... | ... | |
| | N, E | F | 18 26 ... | ... | ... | ... | |
| „ 10 | E | e | 18 36 ... | ... | ... | ... | Feeble. |
| | E | Mn | 41 ... | ... | ... | ... | |
| | E | F | 19 05 ... | ... | ... | ... | |
| „ 10 | N, E | iP | 21 03 51 | ... | ... | 5920 | Slight. Epc: 31·5°N., 130° E., to the South of Kinsui Island. O = 20h 54m 35s. |
| | N, E | iS | 11 21 | ... | ... | ... | |
| | E | e | 13 51 | ... | ... | ... | |
| | E | eSS | 14 47 | ... | ... | ... | |
| | E | Mn | 31 27 | 15 | 3 | ... | |
| | N, E | F | 22 20 ... | ... | ... | ... | |
| „ 11 | N | e } P | 15 21 43 | ... | ... | 6350 | Moderate. Epc: 34°N., 134·5° E., SW of Osaka, Japan. Felt all over western Japan. O = 15h 11m 59s. |
| | E | i } | | | | | |
| | E | e | 22 42 | ... | ... | ... | |
| | E | ePP | 23 42 | ... | ... | ... | |
| | E | PPP | 24 04 | ... | ... | ... | |
| | N, E | iS | 29 37 | ... | ... | ... | |
| | N, E | ScS | 31 27 | ... | ... | ... | |
| | N, E | SS | 33 27 | ... | ... | ... | |
| | N, E | eL | 38 50 | ... | ... | ... | |
| | E | Mn | 50 12 | 19 | 21 | ... | |
| | N, E | F | 18 15 ... | ... | ... | ... | |
| „ 12 | E | e | 1 16 49 | ... | ... | ... | Feeble |
| | E | F | 2 06 ... | ... | ... | ... | |
| „ 13 | N, E | e | 11 17 08 | ... | ... | ... | Feeble. |
| | E | e | 20 06 | ... | ... | ... | |
| | N, E | e | 21 25 | ... | ... | ... | |
| | N, E | e | 22 20 | ... | ... | ... | |
| | N, E | F | 57 ... | ... | ... | ... | |
| „ 16 | N | e | 6 23 01 | ... | ... | ... | Feeble. |
| | E | e | 23 30 | ... | ... | ... | |
| | E | Mn | 26 ... | ... | ... | ... | |
| | N, E | F | 7 10 ... | ... | ... | ... | |
| „ 16 | E | e | 14 18 58 | ... | ... | ... | |
| | E | Mn | 15 06 ... | ... | ... | ... | |
| | E | F | 16 27 ... | ... | ... | ... | |
| „ 16 | E | Mn | 23 11 ... | ... | ... | ... | |
| | E | F | 45 ... | ... | ... | ... | |
| „ 18 | N, E | e | 3 14 09 | ... | ... | ... | Slight. Epc: Probably in Garhwal Kumaon Hills. |
| | N, E | eS | 16 06 | ... | ... | ... | |
| | N, E | S* | 17 02 | ... | ... | ... | |
| | N, E | $\overline{eS}$ | 17 42 | ... | ... | ... | |
| | N, E | F | 4 10 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Jan. 18-19 | N | Record lost from | 4 19 ... | ... | ... | ... | |
| | | | 2 55 ... | ... | ... | ... | |
| „ 18 | E | eP | 4 27 06 | ... | ... | 4220 | Slight. Surface waves poor. Epc: 6·5° S., 1°E. h=250km ? O=4h 20m 08s. |
| | E | e | 27 32 | ... | ... | ... | |
| | E | e | 27 56 | ... | ... | ... | |
| | E | isP(?) | 28 24 | ... | ... | ... | |
| | E | e | 29 14 | ... | ... | ... | |
| | E | e | 32 37 | ... | ... | ... | |
| | E | iS | 32 45 | ... | ... | ... | |
| | E | e | 33 16 | ... | ... | ... | |
| | E | e | 34 21 | ... | ... | ... | |
| | E | iSS | 35 48 | ... | ... | ... | |
| | E | i | 36 06 | ... | ... | ... | |
| | E | e | 37 11 | ... | ... | ... | |
| | E | F | 7 20 ... | ... | ... | ... | |
| „ 18 | E | iP | 9 32 55 | ... | ... | 2000 | Moderate. Epc: 37°N., 70·5° E. O=9h 28m 56s. h=250km. (approx.) |
| | E | e | 33 31 | ... | ... | ... | |
| | E | esP ? | 34 10 | ... | ... | ... | |
| | E | iS | 36 05 | ... | ... | ... | |
| | E | e | 37 02 | ... | ... | ... | |
| | E | F | Lost in the following shock. | | | | |
| 18 | E | eP(?) | 9 44 36 | ... | ... | 1900 | Moderate. Epc: 29° N., 87°E. North of the Mt. Everest. |
| | E | e | 46 35 | ... | ... | ... | |
| | E | eS | 47 47 | ... | ... | ... | O=9h 40m 38s. Felt at Darbhanga. |
| | E | F | Lost in the following shock. | | | | |
| „ 18 | E | eP | 9 58 15 | ... | ... | 1900 | Slight. After shock of the previous one at 9h 41m. O=9h 54m 20s. Felt at Katmandu and Jalpaiguri. |
| | E | S | 10 01 26 | ... | ... | ... | |
| | E | F | 11 06 ... | ... | ... | ... | |
| „ 19 | N, E | e | 6 08 08 | ... | ... | ... | Feeble. After shock of the Hindukush one at 18d 9h 29m. O=6h 4·0m. Felt at Drosh. |
| | N, E | eP? | 08 26 | ... | ... | ... | |
| | N, E | iS | 11 33 | ... | ... | ... | |
| „ 22 | N, E | eP | 15 34 58 | ... | ... | ... | Slight. Epc.: 2° S., 105°E. Off south Sumatra. H. O.=15h 27·7m. |
| | N, E | e | 37 02 | ... | ... | ... | |
| | N, E | eS | 40 59 | ... | ... | ... | |
| | E | e | 44 44 | ... | ... | ... | |
| | N, E | F | 16 48 ... | ... | ... | ... | |
| „ 23 | N, E | eP'1 | 8 51 42 | ... | ... | 12890 | Slight. Epc: 21·2° N., 156·1° W. Felt in Hawaii. H. O.=08h 32·8m. (U. S. C. G. S.) |
| | N, E | eSKS | 58 33 | ... | ... | ... | |
| | N, E | iPS | 9 02 32 | ... | ... | ... | |
| | N, E | PPS | 03 20 | ... | ... | ... | |
| | N, E | eSS | 08 28 | ... | ... | ... | |
| | N, E | SSS | 13 21 | ... | ... | ... | |
| | N, E | F | 12 17 ... | ... | ... | ... | |
| 1938. Jan. 24 | E | e | 10 46 40 | ... | ... | 12950 | Moderate. △from PS—H. O. Epc: 58° S., 37·5° W. South Atlantic Ocean. H. O.=10h 31m 45s. Cape Town eP=10h 39m 49s. Wellington P=43m 33s. Riverview P=44m 28s. 58° S., 37° W. (Strasbourg). |
| | N, E | ePP | 51 22 | ... | ... | ... | |
| | N, E | i | 51 58 | ... | ... | ... | |
| | N, E | e | 54 29 | ... | ... | ... | |
| | N, E | e | 57 35 | ... | ... | ... | |
| | N, E | iPS | 11 01 15 | ... | ... | ... | |
| | N, E | iPPS | 02 36 | ... | ... | ... | |
| | N, E | i | 03 00 | ... | ... | ... | |
| | N, E | iSS | 07 55 | ... | ... | ... | |
| | N, E | eG? | 17 30 | ... | ... | ... | |
| | N, E | L | 25 35 | ... | ... | ... | |
| | E | $M_1$ | 32 17 | 18 | 24 | ... | |
| | N | $M_1$ | 33 30 | 18 | 10 | ... | |
| | E | $M_2$ | 35 03 | 18 | 23 | ... | |
| | N | $M_2$ | 39 30 | ... | ... | ... | |
| | E | $M_2$ | 41 02 | 17 | 19 | ... | |
| | E | $M_4$ | 45 27 | 17 | 15 | ... | |
| | N, E | F | 14 47 ... | ... | ... | ... | |
| „ 25 | E | e | 16 36 12 | ... | ... | ... | Slight. |
| | E | e | 46 04 | ... | ... | ... | |
| | E | e | 56 34 | ... | ... | ... | |
| | N, E | e | 17 13 27 | ... | ... | ... | |
| | N, E | e | 23 08 | ... | ... | ... | |
| | N, E | e | 29 57 | ... | ... | ... | |
| | E | Mn | 18 00 ... | 20 | 6 | ... | |
| | N,E | F | 20 09 | ... | ... | ... | |
| „ 26 | N, E | e | 3 37 25 | ... | ... | ... | |
| | N, E | F | 6 12 ... | ... | ... | ... | |
| „ 26 | N, E | eP | 3 46 00 | ... | ... | 1950 | Slight. Epc: 34·8° N., 46·7°E. Felt at Baghdad, Irak. (Strasbourg.) |
| | N,E | eS | 50 47 | ... | ... | ... | |
| | E | e | 56 45 | ... | ... | ... | |
| | N, E | F | Mixed with coda of preceding shock. | | | | |
| „ 26 | N, E | iP | 10 52 06 | ... | ... | 2050 | Slight. First movement S and W (very small). Epc: 37°N., 71°E. Hindukush. O=10h 48m 03s. h=230km. ? Felt fairly strongly at Drosh, moderately at Peshawar and very feebly at Rawalpindi and Ferozepur. |
| | N | esP | 53 07 | ... | ... | ... | |
| | N, E | iS | 55 18 | ... | ... | ... | |
| | N, E | F | 11 20 ... | ... | ... | ... | |
| „ 26 | N, E | e | 18 08 20 | ... | ... | ... | Feeble, near. |
| | N, E | e | 08 37 | ... | ... | ... | |
| „ 27 | N | iP | 6 55 04 | ... | ... | ... | Slight. Aftershock of the previous one at 26d 10h 48m. O=6h 51·2m. |
| | N | iS | 58 18 | ... | ... | ... | |
| | E | Record lost; congestion of lines. | | | | | |



# COLABA OBSERVATORY, BOMBAY.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Jan. 29 | N, E | iP | 4 16 49 | ... | ... | 1750 | Moderate. Epc: 27°·8N., 87°E. Near Mt. Everest in the Himalayas. O=4h 13m 11s. Directions of first movements, N and E. Felt at Dharbanga and other places. |
| | N, E | i | 17 07 | ... | ... | ... | |
| | N, E | i | 17 15 | ... | ... | ... | |
| | N, E | PP | 17 30 | ... | ... | ... | |
| | N, E | eS(?) | 19 45 | ... | ... | ... | |
| | N, E | iS | 20 01 | ... | ... | ... | |
| | N, E | e | 20 22 | ... | ... | ... | |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| Feb. 1 | N, E | e | 19 05 59 | ... | ... | ... | |
| | N, E | e | 08 39 | .. | .. | ... | |
| „ 1-2 | N, E | eP | 19 14 39 | ... | ... | 7000 | Very great. First movement: S and E. |
| | N, E | iP | 14 50 | ... | ... | ... | Epc: 5°S., 131°E. H·O=19h 4·4m (U. S. C. G. S.) 5°S., 131°·7E., H. O=19h 4m 29s (Strasbourg) Banda Sea. Felt in Australia. |
| | N, E | e | 15 16 | ... | ... | ... | |
| | N | i | 19 17 | ... | ... | ... | |
| | N, E | iS | 23 09 | ... | ... | ... | |
| | N, E | e | 27 09? | .. | ... | ... | |
| | E | M | ? | 20-23 | >955 | ... | |
| | N | M | ? | 18-20 | >975 | ... | |
| | N | e | 21 08 ... | 60 | ... | ... | |
| | N, E | F | 1 07 ... | ... | ... | ... | |
| „ 2 | E, N | iP, eP | 9 43 44 | ... | ... | 4000 | Slight. Epc: 4°·5S., 102°E. O=9h 37m 00s. h=200—250km. |
| | E | e | 44 24 | ... | ... | ... | |
| | N, E | sP | 45 04 | ... | ... | ... | |
| | N, E | eS | 49 05 | ... | ... | ... | |
| | N, E | e | 49 25 | ... | .. | ... | |
| | N, E | e | 50 23 | ... | ... | ... | |
| | N, E | F | 10 51 ... | ... | ... | ... | |
| „ 3 | N, E | e | 16 15 53 | ... | ... | ... | |
| | N, E | e | 36 30 | ... | ... | ... | |
| | N, E | F | 17 39 ... | ... | ... | ... | |
| „ 3-4 | N | Overlapping of lines. | 23 10 ... | ... | ... | ... | |
| | | | 2 40 ... | ... | ... | ... | |
| „ 4 | E | e | 0 21 18 | ... | ... | 1250 | Slight. P uncertain due to preceding movements. |
| | E | P? | 21 37 | ... | ... | ... | |
| | E | i | 21 48 | ... | ... | ... | S not well developed and preceded by long period movements. Epc: 25°·5N., 63°·5 E. Makran Coast. O=0h 19·0m. |
| | E | iS? | 23 44 | ... | ... | ... | |
| | E | e | 24 32 | ... | ... | ... | |
| | E | i | 26 06 | ... | ... | ... | |
| | E | M? | 26 45 | ... | ... | ... | |
| | E | $M_1$ | 44 45 | 20 | 12 | ... | |
| | E | $M_2$ | 48 14 | 21 | 13 | ... | |
| | E | F | 1 26 ... | ... | ... | ... | |
| 1938. Jan. 29 | E | Mn | 51 ... | 7 | 2 | .. | Places in the district. |
| | N | Mn | 51 ... | 7 | 6 | ... | |
| | N, E | F | 5 43 ... | ... | ... | ... | |
| „ 30 | N | e | 13 33 23 | ... | ... | ... | |
| | N | F | 14 00 ... | ... | ... | ... | |
| Feb. 4 | E | Record lost from | 6 58 ... | ... | ... | ... | |
| | | to | 10 48 ... | ... | ... | ... | |
| | | and from | 12 00 ... | ... | ... | ... | |
| | | to | 15 20 ... | ... | ... | ... | |
| „ 5-6 | N | Record lost from | 2 54 ... | ... | ... | ... | |
| | | to | 2 25 ... | ... | ... | ... | |
| „ 5 | N, E | iP | 2 40 32 | ... | ... | ... | Moderate. Epc :4°·5 N.,75°·9 W |
| | E | iSKKS | 52 34 | ... | ... | ... | H.O=2h 23·6m. h=80 km. (U. S. C. G. S.) H.O=2h 23m 37s. h=150 km. (Strasbourg). |
| | E | i | 3 04 15 | ... | ... | ... | |
| | E | e | 09 40 | ... | ... | ... | |
| | E | e | 19 48 | ... | ... | ... | |
| | E | M | 44 ... | ... | ... | ... | |
| | E | Mn | 48 44 | 20 | 12 | ... | |
| | E | F | 5 55 ... | ... | ... | ... | |
| „ 5 | E | iP | 10 03 45 | ... | ... | 5480 | Slight. Probably deep. Epc: 14°N., 124°·5E. O=9h 55·0m. Felt in SE Luzon. First movement as read: 0·8mm W. |
| | E | i | 04 07 | ... | ... | ... | |
| | E | i | 04 25 | ... | ... | ... | |
| | E | iPP | 05 43 | ... | ... | ... | |
| | E | PPP | 10 06 22 | ... | ... | ... | |
| | E | iS | 10 48 | ... | ... | ... | |
| | E | i | 11 22 | ... | ... | ... | |
| | E | i | 12 14 | ... | ... | ... | |
| | E | iSS | 14 19 | ... | ... | ... | |
| | E | SSS | 15 21 | ... | ... | ... | |
| | E | i | 15 59 | ... | ... | ... | |
| | E | L | 18 40 | ... | ... | ... | |
| | E | F | 11 40 ... | ... | ... | ... | |
| „ 7 | N, E | i | 01 31 18 | ... | ... | ... | Feeble. |
| | N, E | e | 41 21 | ... | ... | ... | |
| | N, E | F | Lost while changing chart. | | | | |
| „ 7 | N, E | iP | 14 52 58 | ... | ... | 6580 | Slight. |
| | N, E | iS | 15 01 05 | ... | ... | ... | |
| | N, E | e | 03 29 | ... | ... | ... | |
| | N, E | eSS | 05 22 | ... | ... | ... | |
| | E | e | 07 41 | ... | ... | ... | |
| | N, E | F | 16 20 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Feb. 8 | E | e | 6 01 39 | ... | ... | ... | Slight. |
| | E | Mn | 7 16 39 | 16 | 3 | ... | |
| | E | F | Lost in the next shock. | | | | |
| ,, 8 | N, E | e | 7 36 07 | ... | ... | ... | Slight. |
| | N, E | e | 46 22 | ... | ... | ... | |
| | E | Mn | 8 46 ... | 19 | 6 | ... | |
| | N, E | F | 10 00 ... | ... | ... | ... | |
| ,, 8 | E | eP? | 13 21 43 | ... | ... | 5010 | Slight. △ from S-O |
| | N, E | S | 28 13 | ... | ... | ... | Epc: Near Formosa Islands. |
| ,, 8 | N, E | e | 13 28 34 | ... | ... | ... | O=13h 13m 21s. Hongkong (S-P) |
| | N, E | F | 14 28 ... | ... | ... | ... | △=7°·5; Manila (S-P) △=9°·4. Slight. |
| ,, 8 | N, E | e | 14 41 28 | ... | ... | ... | |
| | E | Mn | 16 00 ... | 17 | 3 | ... | |
| | N, E | F | 57 ... | ... | ... | ... | |
| ,, 9 | E | No record | | | | | |
| | | from | 2 33 ... | ... | ... | ... | |
| | | to | 11 14 ... | ... | ... | ... | |
| ,, 10 | E | e | 20 49 34 | ... | ... | ... | Slight. |
| | E | e | 56 01 | ... | ... | ... | |
| | E | F | 21 44 ... | ... | ... | ... | |
| ,, 11 | E | e | 7 07 16 | ... | ... | ... | |
| | E | e | 16 07 | ... | ... | ... | |
| | E | F | 8 55 ... | ... | ... | ... | |
| ,, 11 | E | e | 14 47 42 | ... | ... | ... | Slight. |
| | N, E | e | 54 09 | ... | ... | ... | |
| | N, E | e | 57 37 | ... | ... | ... | |
| | E | Mn | 15 09 51 | 16 | 4 | ... | |
| | N, E | F | 16 15 ... | ... | ... | ... | |
| ,, 13 | E | No record | | | | | |
| | | from | 3 23 ... | ... | ... | ... | |
| | | to | 11 36 ... | ... | ... | ... | |
| | | and from | 16 52 ... | ... | ... | ... | |
| | | to | 17 22 ... | ... | ... | ... | |
| ,, 13 | N | e | 8 22 40 | ... | ... | 12720 | Slight. △ from SKS-H. O. Epc: 33°S., 179°W. (U. S. C. G. S.) H.O.=8h 3·7m. |
| | N | ePP | 23 25 | ... | ... | ... | |
| | N | e | 25 41 | ... | ... | ... | |
| | N | iSKS | 29 14 | ... | ... | ... | |
| | N | iSKSP | 33 13 | ... | ... | ... | |
| | N | iPS? | 34 23 | ... | ... | ... | |
| | N | e | 58 14 | ... | ... | ... | |
| | N | Mn | 9 13 48 | 21 | 14 | ... | |
| | N | F | 10 40 ... | ... | ... | ... | |
| 1938 | | | | | | | |
| Feb. 14 | N, E | iP | 3 00 00 | ... | ... | 2920 | Slight. Epc: 38°·5 N., 52°·5 E. Off the Persian Coast in the Caspian Sea. O=2h 54m 22s. 40°·8 N., 52°·5 E. |
| | N, E | | 00 09 | ... | ... | ... | |
| | E | | 00 15 | ... | ... | ... | |
| | N, E | iPP | 00 37 | ... | ... | ... | |
| | N, E | iS | 04 31 | ... | ... | ... | H·O=2h 54·3m (Strasbourg). |
| | N, E | eSS | 05 34 | ... | ... | ... | |
| | N, E | eL | 07 15 | ... | ... | ... | |
| | N, E | M | 09 18 | ... | ... | ... | |
| | N, E | ScS(?) | 10 42 | ... | ... | ... | |
| ,, 14 | N, E | F | 4 54 ... | ... | ... | ... | |
| ,, 14 | N, E | e | 19 18 42 | ... | ... | ... | Feeble. Felt strongly at Cherat, Peshawar and Drosh. |
| | N, E | e | 19 10 | ... | ... | ... | |
| | N | e | 22 12 | ... | ... | ... | |
| | N | F | 57 ... | ... | ... | ... | |
| ,, 14-15 | N | No record | | | | | |
| | | from | 07 42 ... | ... | ... | ... | |
| | | to | 11 52 ... | ... | ... | ... | |
| | | from | 21 54 ... | ... | ... | ... | |
| | | to | 22 48 ... | ... | ... | ... | |
| | | and from | 01 32 ... | ... | ... | ... | |
| | | to | 02 56 ... | ... | ... | ... | |
| ,, 15-16 | E | No record | | | | | |
| | | from | 03 05 ... | ... | ... | ... | |
| | | to | 10 52 ... | ... | ... | ... | |
| | | and from | 15 52 ... | ... | ... | ... | |
| | | to | 02 50 ... | ... | ... | ... | |
| ,, 15 | N | e(P) | 3 40 28 | ... | ... | ... | Feeble. Epc: 18°N., 25°W. H·O=3h 27·7m (Strasbourg). |
| | N | e(SKS) | 50 42 | ... | ... | ... | |
| | N | e | 51 35 | ... | ... | ... | |
| | N | e | 52 15 | ... | ... | ... | |
| ,, 15 | N | No record | | | | | |
| | | from | 15 52 ... | ... | ... | ... | |
| | | to | 16 59 ... | ... | ... | ... | |
| ,, 21 | E | e | 14 02 24 | ... | ... | ... | Slight. |
| | E | e | 05 48 | ... | ... | ... | |
| | N, E | e | 10 22 | ... | ... | ... | |
| | N, E | F | 54 ... | ... | ... | ... | |
| ,, 21 | E | e | 5 23 36 | ... | ... | ... | Slight. |
| | N, E | e | 30 09 | ... | ... | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| ,, 21 | N, E | e | 6 17 20 | ... | ... | ... | Slight. |
| | N, E | i | 27 57 | ... | ... | ... | |
| | N, E | F | 8 19 ... | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Feb. 26 | N, E | eP | 12 15 05 | ... | ... | 2110 | Slight. Epc: 28°N., 91°·3 E. Off North Bhutan. O=12h 10m 46s. Felt moderately at Gauhati and feebly at Shillong. |
| | N, E | eS | 18 34 | ... | ... | ... | |
| | N, E | SS(?) | 18 54 | ... | ... | ... | |
| | N, E | e(L) | 20 23 | ... | ... | ... | |
| | N, E | F | 13 20 ... | ... | ... | ... | |
| 1938. | | | | | | | |
| Feb. 27 | N, E | eP | 1 40 08 | ... | ... | ... | Slight. |
| | N, E | eS | 49 09 | ... | ... | ... | Epc: Near 60°N., 145°E. in Sibeila (Strasbourg). |
| | N, E | e | 50 21 | ... | ... | ... | |
| | N, E | M | 2 06 55 | ... | ... | ... | |
| | N, E | F | Lost in shifting. | | | | |

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| Mar. 1 | N, E | iP | 4 29 07 | ... | ... | 2770 | Slight. Probably deep. |
| | N | e | 29 52 | ... | ... | ... | Epc: Probably off North Sumatra. |
| | N | i | 33 08 | ... | ... | ... | |
| | E | e | | | | | |
| | N, E | S? | 33 27 | ... | ... | ... | |
| | N, E | F | 5 50 ... | ... | ... | ... | |
| ,, 1-2 | E | e | 23 40 10 | ... | ... | ... | Slight |
| | E | e | 51 10 | ... | ... | ... | |
| | N, E | e | 52 8 | ... | ... | ... | |
| | N, E | Mn | 0 12 ... | ... | ... | ... | |
| | N, E | F | 1 18 ... | ... | ... | ... | |
| ,, 2 | N E | e | 15 59 ... | ... | ... | ... | Feeble. |
| | N, E | F | 16 14 ... | ... | ... | ... | |
| ,, 5 | E | e | 00 23 35 | ... | ... | ... | Slight. |
| | N, E | F | 01 21 ... | ... | ... | .. | |
| ,, 5 | N | No record from | 03 55 ... | ... | ... | ... | |
| | | to | 11 02 ... | ... | ... | ... | |
| ,, 5 | E | e | 11 42 20 | ... | ... | ... | Feeble. |
| | N, E | e | 49 39 | ... | ... | ... | |
| | N, E | F | 13 00 ... | ... | ... | ... | |
| ,, 8 | E | No record from | 3 24 ... | ... | ... | ... | |
| | | to | 09 58 ... | ... | ... | ... | |
| ,, 8 | N | eP | 05 47 49 | ... | ... | 8910 | Slight. Epc: In the region of 3° S., 153° E. Bismarck Archipelago. O=5h 35·4m. |
| | N | iS | 57 58 | ... | ... | ... | |
| | N | PS | 58 31 | ... | ... | ... | |
| | N | L | 06 14 23 | ... | ... | ... | |
| | N | F | 08 18 ... | ... | ... | ... | |
| ,, 10 | N, E | e | 16 00 11 | ... | ... | ... | Slight. |
| | E | e | 30 34 | ... | ... | ... | |
| | N, E | e | 37 33 | ... | ... | ... | |
| | N, E | F | 17 40 ... | ... | ... | ... | |
| ,, 11 | E | e | 17 00 12 | ... | ... | ... | |
| | N, E | F | 53 ... | ... | ... | ... | |
| 12 | E | e | 13 11 51 | ... | ... | ... | |
| | N, E | F | 55 ... | ... | ... | ... | |
| 12 | E | e | 20 10 30 | ... | ... | ... | |
| | N, E | F | 21 06 ... | ... | ... | ... | |
| ,, 14 | N, E | iP | 05 20 35 | ... | ... | 3400 | Slight. Epc: 33°·5 N., 103°E. China. |
| | N, E | PP | 21 26 | ... | ... | ... | |
| | N, E | PcP | 23 33 | ... | ... | ... | O=5h 14m 18s. |
| | N, E | iS | 25 38 | ... | ... | ... | First movement:— E and N, very small. |
| | N, E | SS | 27 11 | ... | ... | ... | |
| | N, E | L | 29 00 | ... | ... | ... | |
| | E | ScS | 31 02 | ... | ... | ... | |
| | N | Mn | 31 23 | 7 | 10 | ... | |
| | E | Mn | 33 36 | 8 | 7 | ... | |
| | N, E | F | 07 08 ... | ... | ... | ... | |
| ,, 22 | N, E | eP | 15 36 25 | ... | ... | 11950 | Slight. Epc: 53° N., 132° W. (U. S. C. G. S.) Queen Charlotte Islands. |
| | N, E | ePP | 40 49 | ... | ... | ... | |
| | N, E | eSKS | 47 20 | ... | ... | ... | |
| | N, E | ePS | 50 10 | ... | ... | ... | |
| | N, E | iSSS | 16 00 28 | ... | ... | ... | |
| | N, E | L | 14 35 | ... | ... | ... | |
| | E | $M_1$ | 24 35 | 22 | 15 | ... | |
| | E | $M_2$ | 29 04 | 17 | 9 | ... | |
| | E | $M_3$ | 31 00 | 17 | 9 | ... | |
| | N | Mn | 32 40 | 17 | 9 | ... | |
| | E | $M_4$ | 32 40 | 17 | 9 | ... | |
| | N, E | F | 18 51 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 25 | E | e | 04 14 ... | ... | ... | ... | |
| | N, E | F | 05 30 ... | ... | ... | ... | |
| 25 | N, E | e | 16 10 ... | ... | ... | ... | Slight. |
| | N, E | Mn | 17 01 ... | ... | ... | ... | |
| | N, E | F | 18 37 ... | ... | ... | ... | |
| ,, 27 | N, E | e | 11 25 ... | ... | ... | ... | |
| | N, E | F | 12 35 ... | ... | ... | ... | |
| ,, 28 | N | No record from | 10 59 ... | ... | ... | ... | |
| | | to | 15 02 ... | ... | ... | ... | |
| ,, 28 | E | e | 14 14 35 | ... | ... | ... | |
| | E | Mn | 26 ... | ... | ... | ... | |
| | E | F | 15 10 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 31-1 | E | iP | 22 39 30 | ... | ... | 5090 | |
| | N | eP | 39 33 | ... | ... | ... | Slight. |
| | N, E | e | 41 33 | ... | ... | ... | Epc: 28°N., 120°E, China. |
| | E | i | 45 43 | ... | ... | ... | O=22h 31·2m. |
| | E | i(?) | 45 53 | ... | ... | ... | First movement (very small) and W. |
| | N, E | i | 46 06 | ... | ... | ... | |
| | N, E | iS | 46 12 | ... | ... | ... | |
| | N, E | i | 49 12 | ... | ... | ... | |
| | N, E | L | 52 33 | ... | ... | ... | |
| | N | $M_1$ | 23 2 20 | 13 | 5 | ... | |
| | E | $M_1$ | 2 22 | 14 | 9 | ... | |
| | N | $M_2$ | 3 41 | 13 | 7 | ... | |
| | E | $M_2$ | 4 12 | 12 | 9 | ... | |
| | E | $M_2$ | 05 22 | 11 | 9 | ... | |
| | N, E | F | 24 40 ... | ... | ... | ... | |

COLABA OBSERVATORY,
BOMBAY.

K. R. RAMANATHAN,
*Meteorologist.*



# ALIPORE OBSERVATORY, CALCUTTA.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 1 | N | eP | 23 36 53 | ... | ... | 5,350 | Slight. |
| | | ePP | 38 39 | ... | ... | ... | |
| | | iS | 43 57 | ... | ... | ... | |
| | | ePS | 44 33 | ... | ... | ... | |
| | | iSSS | 48 29 | ... | ... | ... | |
| | | iL | 51 44 | ... | ... | ... | |
| | | M | 55 35 | ... | ... | ... | |
| | | Mn | 59 48 | 17 | 26 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 2 | N | i | 22 50 3 | ... | ... | ... | Slight; very distant. |
| | | i | 53 5 | ... | ... | ... | |
| | | i | 56 48 | ... | ... | ... | |
| | | e | 23 2 16 | ... | ... | ... | |
| | | e | 8 27 | ... | ... | ... | |
| | | Mn | 57 40 | 20 | 12 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 3 | N | e | 15 11 26 | ... | ... | ... | Tremor. |
| | | F | 41 ... | ... | ... | ... | |
| ,, 3 | N | e | 16 53 47 | ... | ... | ... | Slight, distant. |
| | | e | 56 35 | ... | ... | ... | |
| | | Mn | 59 8 | ... | ... | ... | |
| | | F | 17 47 ... | ... | ... | ... | |
| ,, 3 | N | e | 20 17 19 | ... | ... | ... | Tremor. |
| | | F | 32 ... | ... | ... | ... | |
| ,, 3 | N | e | 21 40 22 | ... | ... | ... | Tremor. |
| | | F | 23 8 ... | ... | ... | ... | |
| 4 | N | | 2 51 50 | ... | ... | ... | Tremor. |
| | | i | 52 48 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 4 | N | eP(?) | 4 53 34 | ... | ... | 2,050 | Slight. |
| | | iS | 57 4 | ... | ... | ... | |
| | | iSS | 57 42 | ... | ... | ... | |
| | | iL | 58 28 | ... | ... | ... | |
| | | M | 5 0 8 | ... | ... | ... | |
| | | Mn | 1 43 | 10 | 12 | ... | |
| | | F | 23 ... | ... | ... | ... | |
| ,, 7 | N | e | 15 39 35 | ... | ... | 5,410 | Slight. |
| | | ePP | 40 37 | ... | ... | ... | |
| | | e | 41 23 | ... | ... | ... | |
| | | iS | 46 43 | ... | ... | ... | |
| | | e | 47 20 | ... | ... | ... | |
| | | i | 50 1 | ... | ... | ... | |
| | | e | 51 21 | ... | ... | ... | |
| | | iL | 54 30 | ... | ... | ... | |
| | | M | 58 0 | ... | ... | ... | |
| | | F | 17 36 ... | ... | ... | ... | |
| ,, 7 | N | iP | 18 32 35 | ... | ... | 2,700 | Slight |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 7 | N | iPP | 18 33 6 | ... | ... | ... | Direction of 1st movement North. |
| | | iS | 36 57 | ... | ... | ... | |
| | | eSS | 37 56 | ... | ... | ... | |
| | | eL | 39 19 | ... | ... | ... | |
| | | M | 40 51 | ... | ... | ... | |
| | | Mn | 43 44 | 10 | 5 | ... | |
| | | F | 19 16 ... | ... | ... | ... | |
| ,, 10 | N | eP(?) | 5 9 36 | ... | ... | 510 | Slight. |
| | | eP* | 9 46 | ... | ... | ... | |
| | | $e\overline{P}$ | 9 56 | ... | ... | ... | |
| | | iS | 10 30 | ... | ... | ... | |
| | | iS* | 10 45 | ... | ... | ... | |
| | | $i\overline{S}$ | 10 56 | ... | ... | ... | |
| | | F | 5 18 ... | ... | ... | ... | |
| ,, 10 | N | e | 18 34 47 | ... | ... | ... | Tremor. |
| | | F | 55 ... | ... | ... | ... | |
| ,, 10 | N | e | 21 01 53 | ... | ... | ... | Slight. |
| | | e | 2 23 | ... | ... | ... | |
| | | ePPP | 3 49 | ... | ... | ... | |
| | | iS | 7 48 | ... | ... | ... | |
| | | eSS | 9 53 | ... | ... | ... | |
| | | i | 11 53 | ... | ... | ... | |
| | | iL | 13 16 | ... | ... | ... | |
| | | M | 15 26 | ... | ... | ... | |
| | | Mn | 18 53 | 20 | 26 | ... | |
| | | F | 53 ... | ... | ... | ... | |
| ,, 11 | N | eP | 15 19 58 | ... | ... | 4,620 | Moderate. |
| | | iPPP | 22 0 | ... | ... | ... | Epicentre in West Japan. (70 miles to the South-West of Osaka) at lat. 34°·2 N. and long. 134°·5E. |
| | | iS | 26 22 | ... | ... | ... | |
| | | iSS | 29 2 | ... | ... | ... | |
| | | iSSS | 29 45 | ... | ... | ... | |
| | | iL | 32 23 | ... | ... | ... | |
| | | M | 35 55 | ... | ... | ... | |
| | | $M_1$ | 37 48 | 20 | 122 | ... | |
| | | Mn | 41 28 | 17 | 91 | ... | |
| | | F | 17 13 ... | ... | ... | ... | |
| ,, 12 | N | iP? | 1 17 27 | ... | ... | 2,000 | Slight. |
| | | i | 18 19 | ... | ... | ... | |
| | | iS? | 20 43 | ... | ... | ... | |
| | | i | 21 22 | ... | ... | ... | |
| | | iSS | 21 45 | ... | ... | ... | |
| | | F | 52 ... | ... | ... | ... | |
| ,, 12 | N | i | 15 7 7 | ... | ... | ... | Slight; near. |
| | | F | 20 ... | ... | ... | ... | |
| ,, 13 | N | e | 8 30 21 | ... | ... | ... | Slight; distant. |
| | | Mn | 38 47 | ... | ... | ... | |
| | | F | 53 ... | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## January 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | | | | |
| Jan. 13 | N | iP | 11 19 22 | ... | ... | 1,150 | Slight. Direction of first movement North. |
| | | $\overline{iP}$(?) | 20 22 | ... | ... | ... | |
| | | eS | 21 18 | ... | ... | ... | |
| | | eS* | 22 1 | ... | ... | ... | |
| | | $\overline{iS}$ | 22 31 | ... | ... | ... | |
| | | F | 39 ... | ... | ... | ... | |
| „ 16 | N | eP | 6 12 40 | ... | ... | 710 | Slight. Focal depth about 200 km.? |
| | | isP? | 13 32 | ... | ... | ... | |
| | | iS | 13 52 | ... | ... | ... | |
| | | i | 14 16 | ... | ... | ... | |
| | | i | 14 32 | ... | ... | ... | |
| | | F | 34 ... | ... | ... | ... | |
| „ 16 | N | e | 14 19 56 | ... | ... | ... | Slight; very distant. |
| | | Mn | 15 8 39 | ... | ... | ... | |
| | | F | 16 2 ... | ... | ... | ... | |
| „ 18 | N | S | 3 15 38 | ... | ... | ... | Slight. |
| | | S* | 16 31 | ... | ... | ... | |
| | | F | 30 ... | ... | ... | ... | |
| „ 18 | N | eP(?) | 4 26 10 | ... | ... | 3,750 | Slight. Focal depth about 200 km. |
| | | e | 26 24 | ... | ... | ... | |
| | | iS | 31 0 | ... | ... | ... | |
| | | isS | 32 17 | ... | ... | ... | |
| | | iSS | 33 31 | ... | ... | ... | |
| | | i | 36 50 | ... | ... | ... | |
| | | F | Masked by the next shock. | | | | |
| „ 18 | N | e | 5 20 00 | ... | ... | ... | Slight. |
| | | e | 20 23 | ... | ... | ... | |
| | | S | 22 27 | ... | ... | ... | |
| | | SS | 23 27 | ... | ... | ... | |
| | | e | 24 2 | ... | ... | ... | |
| | | iL | 24 40 | ... | ... | ... | |
| | | M | 26 15 | ... | ... | ... | |
| | | Mn | 27 45 | 9 | 15 | ... | |
| | | F | 6 3 ... | ... | ... | ... | |
| „ 18 | N | iP | 9 33 29 | ... | ... | 2,350 | Moderate. Focal depth about 200 km. Felt in the Punjab and the N.-W.F. Province. 1st movement-North. |
| | | ipP(?) | 34 3 | ... | ... | ... | |
| | | esP(?) | 34 31 | ... | ... | ... | |
| | | iS | 37 9 | ... | ... | ... | |
| | | isS | 38 8 | ... | ... | ... | |
| | | iSS | 38 32 | ... | ... | ... | |
| | | F | Masked by the next shock. | | | | |
| „ 18 | N | iP | 9 42 14 | ... | ... | 730 | Moderate. Felt at Darbhanga (North Bihar). |
| | | i | 42 33 | ... | ... | ... | |
| | | iS | 43 30 | ... | ... | ... | |
| | | F | Masked by the next shock. | | | | |
| „ 18 | N | iP | 9 55 55 | ... | ... | 730 | Slight. Felt at Siliguri (North Bengal). |

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | | | | |
| Jan. 18 | | i | 9 56 14 | ... | ... | ... | |
| | | i | 56 47 | ... | ... | ... | |
| | | iS | 57 11 | ... | ... | ... | |
| | | F | 10 32 ... | ... | ... | ... | |
| „ 19 | N | eP | 6 8 33 | ... | ... | 2,180 | Slight. M waves feeble. |
| | | sP? | 9 38 | ... | ... | ... | |
| | | iS | 12 13 | ... | ... | ... | |
| | | eSS | 12 55 | ... | ... | ... | |
| | | eL | 13 43 | ... | ... | ... | |
| | | F | 32 ... | ... | ... | ... | |
| „ 22 | N | e | 15 35 38 | ... | ... | ... | Slight; distant. |
| | | iSS | 39 55 | ... | ... | ... | |
| | | i | 41 35 | ... | ... | ... | |
| | | F | 16 12 ... | ... | ... | ... | |
| „ 23 | N | e | 8 47 47 | ... | ... | ... | Slight. |
| | | eP' | 50 42 | ... | ... | ... | |
| | | e | 52 21 | ... | ... | ... | |
| | | SKS | 57 35 | ... | ... | ... | |
| | | e | 58 12 | ... | ... | ... | |
| | | e | 9 2 41 | ... | ... | ... | |
| | | iSS | 5 44 | ... | ... | ... | |
| | | eL | 12 30 | ... | ... | ... | |
| | | M | 18 30 | ... | ... | ... | |
| | | Mn | 22 0 | 30 | 37 | ... | |
| | | F | 11 55 | ... | ... | ... | |
| „ 23 | N | e | 14 31 34 | ... | ... | ... | Slight distant. |
| | | e | 35 55 | ... | ... | ... | |
| | | F | 47 ... | ... | ... | ... | |
| „ 24 | N | e | 10 49 11 | ... | ... | 14,170 | Moderate. △ from SS-PP. |
| | | iPP | 52 50 | ... | ... | ... | |
| | | i | 53 53 | ... | ... | ... | |
| | | iPPP | 56 25 | ... | ... | ... | |
| | | eSKKS? | 59 41 | ... | ... | | |
| | | e | 11 0 55 | ... | ... | ... | |
| | | e | 1 47 | ... | ... | ... | |
| | | ePS | 3 20 | ... | ... | ... | |
| | | ePPS | 4 43 | ... | ... | ... | |
| | | iSS | 9 58 | ... | ... | ... | |
| | | iSSS | 14 33 | ... | ... | ... | |
| | | iL | 29 31 | ... | ... | ... | |
| | | M | 34 28 | ... | ... | ... | |
| | | Mn | 40 19 | 19 | 63 | ... | |
| | | F | 14 9 ... | ... | ... | ... | |
| „ 25 | N | e | 16 40 58 | ... | ... | ... | Slight; very distant. |
| | | i | 54 44 | ... | ... | ... | |
| | | e | 17 16 55 | ... | ... | ... | |
| | | Mn | 59 36 | ... | ... | ... | |
| | | F | 19 56 ... | ... | ... | ... | |
| „ 26 | N | e | 3 39 21 | ... | ... | ... | Slight; very distant. |
| | | e | 55 35 | ... | ... | ... | |



# ALIPORE OBSERVATORY, CALCUTTA.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | | | | |
| Jan. 26 | | Mn | 4 19 20 | ... | ... | ... | |
| | | F | 5 18 ... | ... | ... | ... | |
| „ 26 | N | e | 3 56 53 | ... | ... | 2,130 | Slight. |
| | | i(?) | 59 36 | ... | ... | ... | |
| | | i | 4 0 29 | ... | ... | ... | |
| | | i | 1 59 | ... | ... | ... | |
| | | M | 3 41 | ... | ... | ... | |
| | | Mn | 5 20 | 12 | 14 | ... | |
| | | F | Masked in the previous shock. | | | | |
| „ 26 | N | e | 5 27 6 | ... | ... | ... | Tremor. |
| | | F | 57 ... | ... | ... | ... | |
| „ 26 | N | e | 10 54 5 | ... | ... | ... | Slight. |
| | | iS | 56 15 | ... | ... | ... | |
| | | e | 57 5 | ... | ... | ... | |
| | | isS? | 57 39 | ... | ... | ... | |
| | | F | 11 39 ... | ... | ... | ... | |
| „ 26 | N | e | 18 11 54 | ... | ... | ... | Slight. |
| | | e | 12 24 | ... | ... | ... | |
| | | i | 12 46 | ... | ... | ... | |
| | | i | 13 0 | ... | ... | ... | |
| | | i | 13 10 | ... | ... | ... | |
| | | F | 26 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | | | | |
| Jan. 27 | N | e | 6 57 28 | ... | ... | ... | Slight. |
| | | iS | 59 21 | ... | ... | ... | |
| | | e | 7 0 2 | ... | ... | ... | |
| | | i | 0 31 | ... | ... | ... | |
| | | F | 16 ... | ... | ... | ... | |
| „ 27 | N | i | 9 12 14 | ... | ... | ... | Slight. |
| | | i | 13 46 | ... | ... | ... | |
| | | e | 14 14 | ... | ... | ... | |
| | | i | 14 39 | ... | ... | ... | |
| | | F | 36 ... | ... | ... | ... | |
| „ 29 | N | iP | 4 14 29 | ... | ... | 570 | Moderate. Direction of 1st movement North. Felt strongly at Darbhanga and mildly at Muzafarpur and other places in North Bihar. |
| | | iP* | 14 39 | ... | ... | ... | |
| | | $\overline{iP}$ | 14 49 | ... | ... | ... | |
| | | iS | 15 29 | ... | ... | ... | |
| | | iS* | 15 37 | ... | ... | ... | |
| | | $\overline{iS}$ | 16 48 | ... | ... | ... | |
| | | F | 5 13 ... | ... | ... | ... | |
| „ 30 | N | | 13 36 17 | ... | ... | ... | Slight. |
| | | iS | 38 7 | ... | ... | ... | |
| | | | 38 37 | ... | ... | ... | |
| | | e | 39 6 | ... | ... | ... | |
| | | F | 54 ... | ... | ... | ... | |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| Feb. 1 | N, E* | iP | 19 13 17 | ... | ... | 5,450 | *Omri-Ewing (E-W) |
| | N, E* | i | 14 38 | ... | ... | ... | Intensity—Very great. |
| | E* | e | 15 16 | ... | ... | ... | Epicentre at lat. 5°·5 S, long. 130°E in the Banda Sea (Nature, Feb. 12, 1938). First movement N and E. |
| | N | iPP | 15 47 | ... | ... | ... | |
| | N | iS | 19 51 | ... | ... | ... | |
| | E* | eS | 19 52 | ... | ... | ... | |
| | E* | iS(?) | 20 8 | ... | ... | ... | |
| | N, E* | i | 22 20 | ... | ... | ... | |
| | N | F | 23 59 ... | ... | ... | ... | |
| „ 2 | N | epP(?) | 9 43 26 | ... | ... | 2,420 | Slight. Focal depth about 200 km. |
| | | esP(?) | 44 28 | ... | ... | ... | |
| | | iS | 47 11 | ... | ... | ... | |
| | | isS | 48 10 | ... | ... | ... | |
| | | iSS | 48 39 | ... | ... | ... | |
| | | F | 10 38 ... | ... | ... | ... | |
| „ 3 | N | e | 16 14 20 | ... | ... | ... | Slight, distant. |
| | | Mn | 40 33 | ... | ... | ... | |
| | | F | 17 4 ... | ... | ... | ... | |
| „ 4 | N | iS | 0 28 3 | ... | ... | ... | Slight. |
| | | i | 28 24 | ... | ... | ... | |
| | | iL | 30 45 | ... | ... | ... | |
| | | i | 31 37 | ... | ... | ... | |
| | | M | 32 45 | ... | ... | ... | |
| | | F | 1 6 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | | | | |
| Feb. 5 | N | $iPKP_1$ | 2 43 17 | ... | ... | 16,450 | Slight. |
| | | $iPKP_2$ | 43 55 | ... | ... | ... | △ from SS-PKP$_1$. Maximum movement in SS. |
| | | e | 47 34 | ... | ... | ... | |
| | | i | 50 10 | ... | ... | ... | 1st movement South. |
| | | i | 51 17 | ... | ... | ... | |
| | | i | 54 17 | ... | ... | ... | |
| | | i | 58 0 | ... | ... | ... | |
| | | iSS | 3 5 39 | ... | ... | ... | |
| | | F | 5 30 ... | ... | ... | ... | |
| „ 5 | N | i | 10 2 41 | ... | ... | ... | Slight. |
| | | i | 3 16 | ... | ... | ... | First movement North. |
| | | i | 3 30 | ... | ... | ... | |
| | | iS | 7 16 | ... | ... | ... | |
| | | iL | 9 44 | ... | ... | ... | |
| | | M | 12 9 | ... | ... | ... | |
| | | Mn | 16 19 | 20 | 17 | ... | |
| | | F | 11 14 ... | ... | ... | ... | |
| „ 6 | N | e | 7 18 28 | ... | ... | ... | Tremor. |
| | | i | 27 14 | ... | ... | ... | |
| | | i | 28 21 | ... | ... | ... | |
| | | F | 8 30 ... | ... | ... | ... | |
| „ 7 | N | i | 1 38 54 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |

# ALIPORE OBSERVATORY, CALCUTTA.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 7 | N | e | 4 6 59 | ... | ... | ... | Slight. distant. |
| | | Mn | 13 16 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | e | 5 4 2 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | e | 14 17 25 | ... | ... | ... | Tremor. |
| | | F | 33 ... | ... | ... | ... | |
| ,, 7 | N | i | 14 51 17 | ... | ... | ... | Slight, distant. |
| | | i | 57 52 | ... | ... | ... | |
| | | i | 15 1 24 | ... | ... | ... | |
| | | Mn | 11 58 | ... | ... | ... | |
| | | F | 42 ... | ... | ... | ... | |
| ,, 8 | N | e | 7 39 22 | ... | ... | ... | Slight, very distant. |
| | | Mn | 8 56 7 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 8 | N | eP? | 13 19 29 | ... | ... | 3,340 | Slight. |
| | | e | 21 49 | ... | ... | ... | |
| | | ePcP? | 22 51 | ... | ... | ... | |
| | | S | 24 29 | ... | ... | ... | |
| | | i | 26 47 | ... | ... | ... | |
| | | eL | 28 11 | ... | ... | ... | |
| | | eScS? | 30 0 | ... | ... | ... | |
| | | M | 32 28 | ... | ... | ... | |
| | | Mn | 37 48 | 8 | 11 | ... | |
| | | F | 14 2 ... | ... | ... | ... | |
| ,, | N | e | 14 47 58 | ... | ... | ... | Slight, very distant. |
| | | i | 52 32 | ... | ... | ... | |
| | | Mn | 16 11 32 | ... | ... | ... | |
| | | F | 54 ... | ... | ... | ... | |
| ,, 10 | N | e | 20 55 1 | ... | ... | ... | Slight, distant. |
| | | Mn | 21 14 14 | ... | ... | ... | |
| | | F | 44 ... | ... | ... | ... | |
| ,, 11 | N | e | 7 5 50 | ... | ... | ... | Slight, very distant. |
| | | i | 13 17 | ... | ... | ... | |
| | | Mn | 36 49 | ... | ... | ... | |
| | | F | 8 25 ... | ... | ... | ... | |
| ,, 11 | N | eP | 14 45 50 | ... | ... | 3,830 | Slight. |
| | | eS | 51 27 | ... | ... | ... | |
| | | eSS | 53 25 | ... | ... | ... | |
| | | eL | 55 55 | ... | ... | ... | |
| | | M | 58 53 | ... | ... | ... | |
| | | Mn | 15 2 52 | 13 | 13 | ... | |
| | | F | 41 ... | ... | ... | ... | |
| ,, 12 | N | e | 10 14 10 | ... | ... | ... | Tremor. |
| | | F | 42 ... | ... | ... | ... | |
| 1938. Feb. 13 | N | eP | 8 18 3 | ... | ... | 11,710 | Slight. |
| | | ePP | 22 17 | ... | ... | ... | |
| | | ePPP | 24 40 | ... | ... | ... | |
| | | iSKS | 28 37 | ... | ... | ... | |
| | | eSKKS | 29 27 | ... | ... | ... | |
| | | iPS | 31 28 | ... | ... | ... | |
| | | eSSS | 40 33 | ... | ... | ... | |
| | | iL | 54 10 | ... | ... | ... | |
| | | M | 9 1 58 | ... | ... | ... | |
| | | Mn | 10 20 | 20 | 34 | ... | |
| | | F | 11 12 ... | ... | ... | ... | |
| ,, 14 | N | eP | 3 1 5 | ... | ... | 3,870 | Slight. Focal depth from Brunner's chart about 200 km. |
| | | ipP | 1 46 | ... | ... | ... | |
| | | iS | 6 28 | ... | ... | ... | |
| | | isS | 7 48 | ... | ... | ... | |
| | | iSS | 8 35 | ... | ... | ... | |
| | | i | 11 12 | ... | ... | ... | |
| | | F | Lost in microsesms. | | | | |
| ,, 14 | N | e | 19 22 50 | ... | ... | ... | Tremor. |
| | | F | 37 ... | ... | ... | ... | |
| 15 | N | e | 3 49 23 | ... | ... | ... | Slight, very distant. |
| | | Mn | 4 26 45 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 15 | N | e | 8 1 10 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 16 | N | e | 20 9 46 | ... | ... | ... | Tremor. |
| | | F | 26 ... | ... | ... | ... | |
| ,, 21 | N | i | 14 0 48 | ... | ... | ... | Slight, distant |
| | | Mn | 7 27 | ... | ... | ... | |
| | | F | 40 ... | ... | ... | ... | |
| ,, 22 | N | e | 5 55 39 | ... | ... | ... | Slight, distant |
| | | Mn | 6 15 2 | ... | ... | ... | |
| | | F | Masked by next shock. | | | | |
| ,, 22 | N | e | 6 20 16 | ... | ... | ... | Slight, Distant. Deep—focus (?) |
| | | i | 21 44 | ... | ... | ... | |
| | | i | 25 43 | ... | ... | ... | |
| | | i | 26 21 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 26 | N | eP | 12 12 14 | ... | ... | 666 | Slight. Felt at Dhubri. |
| | | $\overline{iP}$ | 12 41 | ... | ... | ... | |
| | | iS | 13 22 | ... | ... | ... | |
| | | i | 13 31 | ... | ... | ... | |
| | | iS* | 13 42 | ... | ... | ... | |
| | | F | 13 1 ... | ... | ... | ... | |



# ALIPORE OBSERVATORY, CALCUTTA.

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 1 | N | eP? | 4 29 23 | ... | ... | ... | Slight. |
| | | e | 30 8 | ... | ... | ... | |
| | | eS? | 32 23 | ... | ... | ... | |
| | | e | 33 49 | ... | ... | ... | |
| | | i | 34 52 | ... | ... | ... | |
| | | e | 36 12 | ... | ... | ... | |
| | | M | 38 32 | ... | ... | ... | |
| | | Mn | 38 59 | 13 | 15 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 1-2 | N | e | 23 51 42 | ... | ... | ... | Slight, very distant. |
| | | Mn | 0 21 12 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 2 | N | eP | 15 54 3 | ... | ... | 3,650 | Slight. Focal length about 200 km. |
| | | ipP? | 54 44 | ... | ... | ... | |
| | | iS | 59 13 | ... | ... | ... | |
| | | isS? | 16 0 28 | ... | ... | ... | |
| | | F | 21 ... | ... | ... | ... | |
| ,, 8 | N | e | 5 48 17 | ... | ... | ... | Slight. |
| | | e | 50 8 | ... | ... | ... | |
| | | e | 50 58 | ... | ... | ... | |
| | | iS | 55 32 | ... | ... | ... | |
| | | i | 56 7 | ... | ... | ... | |
| | | ScS | 56 28 | ... | ... | ... | |
| | | i | 59 36 | ... | ... | ... | |
| | | i | 6 0 19 | ... | ... | ... | |
| | | iL | 3 29 | ... | ... | ... | |
| | | M | 7 45 | ... | ... | ... | |
| | | Mn | 9 57 | 22 | 42 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 10 | N | e | 15 54 50 | ... | ... | ... | Slight, distant. |
| | | Mn | 16 10 29 | ... | ... | ... | |
| | | F | Masked by next shock. | | | | |
| ,, 10 | N | e | 16 29 10 | ... | ... | ... | Slight, distant. |
| | | i | 34 5 | ... | ... | ... | |
| | | Mn | 40 42 | ... | ... | ... | |
| | | F | 17 23 ... | ... | ... | ... | |
| ,, 11 | N | e | 17 11 24 | ... | ... | ... | Slight, distant. |
| | | Mn | 24 52 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 13 | N | e | 18 3 23 | ... | ... | ... | Slight, distant. |
| | | Mn | 20 31 | ... | ... | ... | |
| | | F | 54 ... | ... | ... | ... | |
| ,, 13 | N | eP | 21 10 16 | ... | ... | 2,350 | Moderate. |
| | | e | 12 35 | ... | ... | ... | |
| | | S | 14 5 | ... | ... | ... | |
| | | PcP | 14 9 | ... | ... | ... | |
| 1938 Mar. 13 | | SS | 21 14 30 | ... | ... | ... | |
| | | iL | 16 22 | ... | ... | ... | |
| | | i | 16 43 | ... | ... | ... | |
| | | iL | 16 59 | ... | ... | ... | |
| | | M | 17 48 | ... | ... | ... | |
| | | F | 22 23 ... | ... | ... | ... | |
| ,, 14 | N, N* | eP | 0 51 32 | ... | ... | 1,280 | Moderate. Felt over the Central India, United Provinces, Delhi, Rajputana Bombay and Central Provinces. Slight damages at Nasik, Ahmedabad and Baroda. *From Omori-Ewing (N—S) instrument. |
| | N* | iS | 53 41 | ... | ... | ... | |
| | N* | $\overline{iS}$* | 54 30 | ... | ... | ... | |
| | N* | iS | 55 4 | ... | ... | ... | |
| | N | F | 2 44 ... | ... | ... | ... | |
| ,, 14 | N | iP | 5 18 14 | ... | ... | 1,870 | Moderate. 1st movement North. |
| | | iPPP | 18 31 | ... | ... | ... | |
| | | iS | 21 28 | ... | ... | ... | |
| | | iSS | 22 1 | ... | ... | ... | |
| | | iL | 22 38 | ... | ... | ... | |
| | | M | 24 9 | ... | ... | ... | |
| | | Mn | 27 18 | 7 | 42 | ... | |
| | | F | 6 52 ... | ... | ... | ... | |
| ,, 16 | N | e | 2 23 21 | ... | ... | ... | Tremor. |
| | | F | 43 ... | ... | ... | ... | |
| ,, 22 | N | eP | 15 35 58 | ... | ... | 10,830 | Slight. |
| | | iPP | 39 51 | ... | ... | ... | |
| | | ePPP | 42 3 | ... | ... | ... | |
| | | eSKS | 46 27 | ... | ... | ... | |
| | | eSKKS | 47 6 | ... | ... | ... | |
| | | iS | 47 27 | ... | ... | ... | |
| | | ePS | 48 38 | ... | ... | ... | |
| | | ePPS | 49 16 | ... | ... | ... | |
| | | iSS | 54 8 | ... | ... | ... | |
| | | eL | 16 8 58 | ... | ... | ... | |
| | | M | 16 26 | ... | ... | ... | |
| | | Mn | 23 6 | 17 | 35 | ... | |
| | | F | 18 27 ... | ... | ... | ... | |
| ,, 25 | N | e | 4 22 3 | ... | ... | ... | Slight, distant. |
| | | Mn | 32 20 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 25 | N | e | 16 8 40 | ... | ... | ... | Slight, very distant. |
| | | i | 14 44 | ... | ... | ... | |
| | | i | 21 17 | ... | ... | ... | |
| | | Mn | 48 52 | ... | ... | ... | |
| | | F | 17 57 ... | ... | ... | ... | |
| ,, 27 | N | e | 11 34 48 | ... | ... | ... | Slight, very distant. |
| | | Mn | 59 54 | ... | ... | ... | |
| | | F | 12 31 ... | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## March, 1938.

| Date. | Compt. | Phase. | G. M. T | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Mar. 28 | N | e | 13 27 9 | ... | ... | ... | Tremor. |
| | | F | 40 ... | ... | ... | ... | |
| ,, 28 | N | e | 14 16 54 | ... | ... | ... | Slight, distant. |
| | | Mn | 28 37 | ... | ... | ... | |
| | | F | 51 ... | ... | ... | ... | |
| ,, 31 | N | e | 5 46 39 | ... | ... | ... | Slight, distant. |
| | | Mn | 56 9 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Mar. 31 | | F | 6 10 ... | ... | ... | ... | |
| ,, 31 | N | eP | 22 37 23 | ... | ... | 3,250 | Moderate. |
| | | IS | 42 24 | ... | ... | ... | |
| | | eSS | 43 48 | ... | ... | ... | |
| | | IL | 45 48 | ... | ... | ... | |
| | | M | 48 11 | ... | ... | ... | |
| | | Mn | 54 38 | 11 | 47 | ... | |
| | | F | Lost in microseisms. | | | | |

METEOROLOGICAL OFFICE, ALIPORE, CALCUTTA.

S. K. PRAMANIK,
*Meteorologist.*



# COLOMBO OBSERVATORY, CEYLON.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm. | Km. | |
| 1938. | | | | | | | |
| Jan. 1-2 | E | P | 23 38 24 | ... | ... | ... | |
| | | S | 46 42 | ... | ... | ... | |
| | | M | 00 01 06 | ... | <0·2 | ... | |
| | | F | 37 30 | ... | ... | ... | |
| ,, 3 | E | e | 16 47 ... | ... | ... | ... | |
| | | F | 59 30 | ... | ... | ... | |
| ,, 7 | E | P | 15 38 11 | ... | ... | ... | M Not pronounced. |
| | | S | 47 51 | ... | ... | ... | |
| | | L | 59 49 | ... | ... | ... | |
| | | M | 16 07 04 | ... | 0·2 | ... | |
| | | F | 51 30 | ... | ... | ... | |
| ,, 10 | E | e | 21 02 30 | ... | ... | ... | |
| | | F | 38 ... | ... | ... | ... | |
| ,, 11 | E | P | 15 21 47 | ... | ... | ... | |
| | | PP? | 25 24 | ... | ... | ... | |
| | | S | 29 46 | ... | ... | ... | |
| | | L | 42 25 | ... | ... | ... | |
| | | M | 43 34 | ... | 0·5 | ... | |
| | | F | 16 49 30 | ... | ... | ... | |
| ,, 12 | E | e | 01 21 ... | ... | ... | ... | |
| | | F | 40 ... | ... | ... | ... | |
| ,, 16 | E | e | 06 18 ... | ... | ... | ... | |
| | | F | 36 30 | ... | ... | ... | |
| ,, 16 | E | e | 14 14 30 | ... | ... | ... | |
| | | F | 15 29 30 | ... | ... | ... | |
| ,, 18 | E | P | 04 25 21 | ... | ... | ... | Amplitude of S greater than that of L. |
| | | S | 29 43 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm. | Km. | |
| 1938. | | | | | | | |
| Jan. 18 | | L | 04 35 20 | ... | ... | ... | |
| | | M | 37 09 | ... | 1·1 | ... | |
| | | F | 06 17 30 | ... | ... | ... | |
| ,, 18 | E | P? | 09 33 51 | ... | ... | ... | Amplitude of S greater than that of L. |
| | | S? | 41 04 | ... | ... | ... | |
| | | L | 47 24 | ... | ... | ... | |
| | | M | 50 36 | ... | 0·6 | ... | |
| | | F | 10 31 30 | ... | ... | ... | |
| ,, 22 | E | P | 15 33 16 | ... | ... | ... | M not pronounced; amplitude <0·2 mm. |
| | | S | 37 55 | ... | ... | ... | |
| | | F | 16 08 ... | ... | ... | ... | |
| ,, 23 | E | eP | 08 51 49 | ... | ... | ... | M not pronounced; amplitude <0·2 mm |
| | | PP? | 58 34 | ... | ... | ... | |
| | | F | 11 26 ... | ... | ... | ... | |
| ,, 24 | E | eP | 10 46 15 | ... | ... | ... | |
| | | L? | 11 15 21 | ... | ... | ... | |
| | | M | 34 03 | ... | ... | ... | |
| | | F | 13 32 30 | ... | ... | ... | |
| ,, 25 | E | P | 17 08 21 | ... | ... | ... | |
| | | M | 51 34 | ... | 0·5 | ... | |
| | | F | 18 36 ... | ... | ... | ... | |
| ,, 26 | E | e | 03 45 30 | ... | ... | ... | |
| | | F | 05 39 30 | ... | ... | ... | |
| ,, 26 | E | e | 11 00 ... | ... | ... | ... | |
| | | F | 32 30 | ... | ... | ... | |
| ,, 29 | E | P | 04 18 04 | ... | ... | ... | M not pronounced; amplitude about 0·5 mm. |
| | | S | 22 17 | ... | ... | ... | |
| | | F | 05 14 30 | ... | ... | ... | |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm. | Km. | |
| 1938. Feb. 1 | E | P | 19 13 35 | ... | ... | ... | |
| | | ? | 19 30 | ... | ... | ... | |
| | | S | 21 10 | ... | ... | ... | |
| | | M | 30 55 | ... | >120 | ... | |
| | | F | 23 37 ... | ... | ... | ... | |
| ,, 2 | E | P | 09 41 59 | ... | ... | ... | |
| | | S | 46 04 | ... | ... | ... | |
| | | M | 58 07 | ... | 0·5 | ... | |
| | | F | 10 30 ... | ... | ... | ... | |
| ,, 4 | E | e | 00 22 30 | ... | ... | ... | |
| | | F | 48 30 | .. | ... | ... | |
| ,, 4 | E | e | 14 38 30 | ... | ... | ... | |
| | | F | 15 11 30 | ... | ... | ... | |
| ,, 5 | E | $P_1'$ | 02 43 18 | ... | ... | ... | |
| | | $M_1$ | 03 46 40 | ... | 0·5 | ... | |
| | | F | 04 45 30 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm. | Km. | |
| 1938. Feb. 5 | E | P | 10 03 04 | ... | ... | ... | M not pronounced; amplitude <0·2 mm. |
| | | S | 09 35 | ... | ... | ... | |
| | | F | 46 30 | ... | ... | ... | |
| ,, 6 | E | e | 07 19 ... | ... | ... | ... | |
| | | F | 08 00 .. | ... | ... | ... | |
| ,, 7 | E | e | 01 30 30 | ... | ... | ... | |
| | | F | 02 22 ... | ... | ... | ... | |
| ,, 7 | E | Record lost from | 02 27 ... | ... | ... | ... | |
| | | to | 05 43 ... | ... | ... | ... | |
| ,, 7 | E | e | 14 31 ... | ... | ... | ... | |
| | | F | 15 46 30 | ... | ... | ... | |
| ,, 8 | E | e | 08 33 ... | ... | ... | ... | |
| | | F | 09 51 30 | ... | ... | ... | |
| ,, 8 | E | e | 14 42 ... | ... | ... | ... | |
| | | F | 16 30 ... | ... | ... | ... | |

# COLOMBO OBSERVATORY, CEYLON.

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. mm. | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| **February, 1938.** | | | | | | | |
| 1938. Feb. 11 | E | e | 14 47 ... | ... | ... | ... | |
| | | F | 15 26 30 | ... | ... | ... | |
| ,, 12 | E | e | 10 11 ... | ... | ... | ... | |
| | | F | 11 30 ... | ... | ... | ... | |
| ,, 13 | E | ? | 08 20 50 | ... | ... | ... | |
| | | SKS | 28 23 | ... | ... | ... | |
| | | M | 09 00 40 | ... | 0·5 | ... | |
| ,, 14 | E | P | 03 01 54 | ... | ... | ... | M not pronounced; amplitude <0·2 mm. |
| | | S? | 07 56 | ... | ... | ... | |
| **March, 1938.** | | | | | | | |
| 1938. Mar. 1 | E | P? | 04 21 04 | ... | ... | ... | |
| | | S? | 27 34 | ... | ... | ... | |
| | | M' | 32 48 | ... | 0·7 | ... | |
| | | F | 05 17 ... | ... | ... | ... | |
| ,, 4 | E | e | 08 59 ... | ... | ... | ... | |
| | | F | 09 34 ... | ... | ... | ... | |
| ,, 5 | E | e | 11 41 ... | ... | ... | ... | |
| | | F | 12 25 ... | ... | ... | ... | |
| ,, 8 | E | e | 03 20 30 | ... | ... | ... | |
| | | F | 04 09 ... | ... | ... | ... | |
| ,, 8 | E | P | 05 46 56 | ... | ... | ... | P possibly earlier as it is masked by a local vibration. |
| | | S | 56 33 | ... | ... | ... | |
| | | M | ... ... | ... | 0·5? | | |
| | | F | 07 30 ... | ... | ... | ... | |
| ,, 9 | E | e | 02 22 30 | ... | ... | ... | |
| | | F | 03 32 30 | ... | ... | ... | |
| 1938. Mar. 10 | E | P | 16 29 19 | ... | ... | ... | |
| | | S | 35 59 | ... | ... | ... | |
| | | M | 48 02 | ... | <0·2 | ... | |
| | | F | 17 12 30 | ... | ... | ... | |
| ,, 13 | E | S | 21 15 18 | ... | ... | ... | M not pronounced; amplitude <0·5 mm. |
| | | L? | 19 50 | ... | ... | ... | |
| | | F | 22 02 30 | ... | ... | ... | |
| ,, 14 | E | P | 00 52 06 | ... | ... | ... | |
| | | S | 54 43 | ... | ... | ... | |
| | | L | 56 25 | ... | ... | ... | |
| | | M | 57 54 | ... | 9·5 | ... | |
| | | F | 02 31 ... | ... | ... | ... | |
| ,, 14 | E | e | 05 21 ... | ... | ... | ... | |
| | | F | 06 30 ... | ... | ... | ... | |
| ,, 25 | E | e | 16 38 ... | ... | ... | ... | |
| | | F | 17 07 30 | ... | ... | ... | |
| ,, 31 | E | P | 22 39 00 | ... | ... | ... | M not pronounced; amplitude 0·4 mm. |
| | | F | 23 59 30 | ... | ... | ... | |

D. T. E. DASSANAYAKE,
*Ag. Superintendent.*

COLOMBO OBSERVATORY.



# HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

| Date. | Compt. | Phase. | G. M. T. | Per. sec. | Amp. On trace in inch. | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| **January, 1938.** | | | | | | | |
| 1938. Jan. 11 | N | eP | 15 19 39 | ? | ·002? | 5280 | P very doubtful. Perhaps nothing. |
| | | iS? | ... 26 33 | 11 | ·01 | ... | S first movement north. |
| | | i? | 30 15 | 20 | ·02 | ... | |
| | | eL | 36 03 | 35 | ·02 | ... | |
| | | M | 37 08 | 25 | ... | ... | |
| | | $M_1$ | 38 03 | ... | ·20 | ... | |
| | | F | 16 00 27? | ... | ... | ... | |
| ,, 18 | N | iP | 9 31 11 | 3 | ·02 | 900 | First movement north |
| | | e? | 31 53 | 8 | ·01 | ... | |
| | | iS | 32 35 | 5 | ·07 | ... | |
| 1938. Jan. 18 | | F | 10 20 05? | ... | ... | ... | |
| ,, 24 | N | eP'? | 10 51 ? | ? | ·002? | 13760? | Very doubtful. No phases recognisable. |
| | | ePS? | 11 04 ? | 8 | ·004 | ... | |
| | | e? | 1 ? | 10 | ·004 | ... | |
| | | M? | 33 ? | 30 | ·02 | ... | |
| | | F | 12 40 ? | ... | ... | ... | |
| ,, 26 | N | e | 10 50 56? | ? | ·002 | ... | S clear. |
| | | e | 51 38? | 6? | ·002 | ... | |
| | | iS | 52 02 | 2 | ·01 | ... | |
| | | F | 11 01 56 | ... | ... | ... | |
| **February, 1938.** | | | | | | | |
| 1938. Feb. | N | iP | 19 14 33 | 3<br>24 | ·01<br>·15 | } 6900 | First movement "North". Two periods superposed n P. |
| | | i? | 18 45 | 24 | ·11 | ... | |
| | | iS | 22 51 | 27 | 1·95 | ... | |
| | | e? | 26 51 | 20 | 1·2 | ... | |
| | | $M_1$ | 39 09? | 25 | 3·3 | ... | Hitting stops. |
| | | $M_2$ | 56 21 | 27 | 2·0 | ... | |
| | | F | 23 44 57? | ... | ... | ... | |
| | 2 | eS? | 9 50 19 | 5 | ·005 | ... | First movement 'North'. |
| | | F | 10 18 52? | ... | ... | ... | |
| 1938. Feb. 4 | | eS? | 00 24 23 | ? | ·001 | ... | |
| | | e? | 26 02? | 8 | ·002 | ... | |
| | | e? | 27 36? | 8 | ·005 | ... | |
| | | e? | 30 14? | 8 | ·01 | ... | |
| | | $M_1$ | 31 08 | 5 | ·01 | ... | |
| | | F | 44 38? | ... | ... | ... | |
| ,, 5 | | e | 2 43 25? | ? | ·001 | ... | |
| | | eSKP | 47 09 | 5 | ·01 | ... | |
| | | e? | 49 58? | 6 | ·005 | ... | |
| | | $M_1$ | 52 25? | 6 | ·01 | ... | |
| | | F | 3 29 53? | ... | ... | ... | |
| **March, 1938.** | | | | | | | |
| 1938. Mar. 8 | N | e | 5 46 50 | ... | ... | ... | |
| | | $M_1$ | 59 07 | 10 | ·005 | ... | |
| | | F | 6 19 03 | ... | ... | ... | |
| ,, 13 | N | eS | 21 09 53 | 10 | ·002 | ... | |
| | | i? | 11 36 | 18 | ·08 | ... | |
| | | $M_1$ | 12 11 | ... | ... | ... | |
| | | F | 26 41? | ... | ... | ... | |
| ,, 14 | N | iP | 0 50 34 | ... | ·01 | 958 | Direction of 1st movement "South". |
| | | iS | 52 04 | 6 | ·02 | ... | |
| | | i? | 52 55? | 5 | ·26 | ... | |
| 1938 March 14 | | $M_1$ | 0 53 10? | 20<br>5 | ·30<br>·10 | } ... | Two periods superposed. |
| ,, 14 | N | eP | 5 19 16 | 5 | ·002 | 1420 | |
| | | iL? | 23 20 | 7 | ·02 | ... | |
| | | F | 52 21? | ... | ... | ... | |
| ,, 31 | N | eP? | 22 39 20? | 5 | ·003 | 4509 | |
| | | eS? | 45 14? | 7 | ·005 | ... | |
| | | eL? | 55 38? | 11 | ·010 | ... | |
| | | $eM_1$? | 58 29? | 13 | ·015 | ... | |
| | | F | 23 29 26? | ... | ... | ... | |

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DEHRA DUN.

# NIZAMIAH OBSERVATORY, BEGAMPET, HYDERABAD, DECCAN, INDIA.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Jan. 3 | E, N | eP | 16 47 35 | ... | ... | 2440 | |
| | E | PP | 48 12 | ... | ... | ... | |
| | E, N | S | 51 36 | ... | ... | ... | |
| | E | L | 53 20 | ... | ... | ... | |
| | N | M | 54 20 | 10 | 2 | ... | |
| | E | M | 55 50 | 12 | 3 | ... | |
| ,, 4 | N | M | 5 3 22 | 12 | 4 | ... | |
| | E | M | 3 52 | 11 | 4 | ... | |
| ,, 7 | E, N | ? | 15 38 1 | ... | ... | 8500 | Slight. Times approximate. Time breaks absent. |
| | E,N | S | 47 46 | ... | ... | ... | |
| | E | PS | 48 27 | ... | ... | ... | |
| | E | SS | 52 57 | ... | ... | ... | |
| | E | L | 16 3 35 | ... | ... | ... | |
| | E | M | 14 15 | 22 | 8 | ... | |
| | N | M | 16 5 | 20 | 6 | ... | |
| | N | F | 17 10 ... | ... | ... | ... | |
| ,, 7 | E | M | 18 45 32 | 12 | 2 | ... | Times approximate. Time breaks absent. |
| | N | M | 46 54 | 12 | 3 | ... | |
| ,, 11 | E, N | P | 15 21 11 | ... | ... | 5890 | |
| | E | PP | 23 18 | ... | ... | ... | |
| | E, N | S | 28 41 | ... | ... | ... | |
| | E | ScS | 30 48 | ... | ... | ... | |
| | E | SS | 32 11 | ... | ... | ... | |
| | E | L | 37 33 | ... | ... | ... | |
| | N | M | 45 41 | 18 | 19 | ... | |
| | E | M | 45 41 | 20 | 32 | ... | |
| | N | F | 16 35 ... | ... | ... | ... | |
| ,, 12 | E,N | eP? | 1 17 43 | ... | ... | 1040 | |
| | E | S? | 19 35 | ... | ... | ... | |
| | E | L | 20 00 | ... | ... | ... | |
| | E | M | 20 25 | 8 | 5 | ... | |
| | N | M | 20 35 | 6 | 3 | ... | |
| ,, 18 | E | M | 3 17 6 | 8 | 2 | ... | |
| | N | M | 17 36 | 8 | 3 | ... | |
| ,, 18 | E, N | eP | 4 25 22 | ... | ... | 3370 | Probable time correction of +1m. |
| | E | ? | 26 14 | ... | ... | ... | |
| | E, N | S | 30 30 | ... | ... | ... | |
| | E | SS | 32 0 | ... | ... | ... | |
| | E | L | 34 14 | ... | ... | ... | |
| | E | ScS | 35 44 | ... | ... | ... | |
| | N | M | 36 29 | 10 | 5 | ... | |
| | E | M | 38 52 | 16 | 9 | ... | |
| 1398. Jan. 18 | E, N | P | 9 32 32 | ... | ... | 2110 | Probable time correction of +1m. |
| | N | ? | 33 26 | ... | ... | ... | |
| | E, N | S | 36 5 | ... | ... | ... | |
| | N | ? | 37 26 | ... | ... | ... | |
| | N | ? | 38 34 | 6 | 14 | ... | |
| | E | ? | 38 41 | 6 | 11 | ... | |
| ,, 18 | E, N | S | 9 46 37 | ... | ... | ... | P lost in the previous shock. |
| | N | SS | 46 55 | ... | ... | ... | |
| | N | L | 48 13 | ... | ... | ... | |
| | N | M | 49 43 | 6 | 8 | ... | |
| | E | M | 49 52 | 8 | 7 | ... | |
| ,, 18 | E, N | S | 10 0 19 | ... | ... | ... | P lost in the previous shock. |
| | N | SS | 0 29 | ... | ... | ... | |
| | N | L | 2 04 | ... | ... | ... | |
| | N | M | 2 56 | 8 | 5 | ... | |
| | E | M | 2 56 | 6 | 5 | ... | |
| ,, 23 | N | M | 9 38 9 | 18 | 7 | ... | |
| | E | M | 39 9 | 19 | 6 | ... | |
| ,, 24 | N | SKP? | 10 53 7 | ... | ... | ... | P not clear. |
| | N | S? | 59 52 | ... | ... | ... | |
| | E, N | PS | 11 1 24 | ... | ... | ... | |
| | N | PPS? | 2 37 | ... | ... | ... | |
| | N | ? | 7 40 | ... | ... | ... | |
| | N | L | 26 37 | ... | ... | ... | |
| | E | M | 31 7 | 20 | 22 | ... | |
| | N | M | 32 22 | 17 | 19 | ... | |
| | N | F | 13 40 ... | ... | ... | ... | |
| ,, 25 | N | M | 17 58 35 | 18 | 9 | ... | |
| | E | M | 18 0 5 | 18 | 8 | ... | |
| ,, 26 | E | M | 4 18 19 | 17 | 5 | ... | |
| | N | M | 19 26 | 15 | 5 | ... | |
| ,, 26 | E, N | P | 10 52 30 | ... | ... | 2380 | |
| | N | ? | 53 34 | ... | ... | ... | |
| | N | S | 56 12 | ... | ... | ... | |
| | N | ? | 58 37 | 6 | 4 | ... | |
| | E | ? | 58 39 | 5 | 4 | ... | |
| | N | F | 11 11 ... | ... | ... | ... | |
| ,, 29 | E, N | P | 4 16 12 | ... | ... | 1260 | |
| | E, N | S | 18 26 | ... | ... | ... | |
| | N | L | 19 26 | ... | ... | ... | |
| | N | M | 19 56 | 6 | 41 | ... | |
| | M | | 20 12 | 6 | 43 | ... | |
| | N | F | 5 15 ... | ... | ... | ... | |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Feb. 1 | E, N | P | 19 14 7 | ... | ... | 6290 | |
| | E, N | S | 21 59 | ... | ... | ... | |
| 1938. Feb. 1 | | SS | 19 25 47 | ... | ... | ... | |
| | N | L | 30 37 | ... | ... | ... | |



NIZAMIAH OBSERVATORY, BEGAMPET, HYDERABAD, DECCAN, INDIA.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Feb. 1 | N | M | 19 38 17 | 5 | 268 | ... | |
| | N | F | 23 48 ... | ... | ... | ... | |
| ,, 2 | E | M | 9 49 5 | 9 | 3 | ... | |
| | N | M | 49 30 | 9 | 4 | ... | |
| ,, 4 | E, N | S | 0 25 46 | ... | ... | ... | P not clear. |
| | N | L | 28 0 | ... | ... | ... | |
| | E | M | 29 27 | 15 | 9 | ... | |
| | N | M | 29 48 | 12 | 5 | ... | |
| ,, 5 | E, N | $P_1'$ | 2 43 8 | ... | ... | ... | |
| | E | M | 3 47 20 | 21 | 16 | ... | |
| ,, 5 | E, N | P | 10 3 6 | ... | ... | 4780 | |
| | E | PP | 4 49 | ... | ... | ... | |
| | E, N | S | 9 36 | ... | ... | ... | |
| | E | ScS | 13 0 | ... | ... | ... | |
| | E | L | 16 10 | ... | ... | ... | |
| | N | M | 22 20 | 12 | 3 | ... | |
| | E | M | 24 20 | 15 | 4 | ... | |
| ,, 8 | E | M | 8 47 33 | 18 | 7 | ... | |
| | N | M | 50 3 | 18 | 6 | ... | |
| ,, 8 | N | M | 16 3 32 | 15 | 4 | ... | |
| | E | M | 3 47 | 14 | 4 | ... | |
| ,, 11 | N | M | 15 3 29 | 15 | 6 | ... | |
| | E | M | 3 53 | 12 | 4 | ... | |
| 1938. Feb. 13 | E, N | PP | 8 22 44 | ... | ... | ... | |
| | E, N | ? | 33 24 | ... | ... | ... | |
| | E | L | 51 48 | ... | ... | ... | |
| | N | M | 9 5 18 | 20 | 15 | ... | |
| | E | M | 6 18 | 21 | 14 | ... | |
| | E | F | 10 27 ... | ... | ... | ... | |
| ,, 14 | E, N | P | 3 0 38 | ... | ... | 3170 | |
| | E, N | S | 5 33 | ... | ... | ... | |
| | E | SS | 6 58 | ... | ... | ... | |
| | E | L | 8 56 | ... | ... | ... | |
| | E | ScS | 11 20 | ... | ... | ... | |
| | E | M | 11 58 | 9 | 4 | ... | |
| | N | M | 12 25 | 9 | 5 | ... | |
| | E | F | 4 11 ... | ... | ... | ... | |
| ,, 15 | E | M | 4 26 16 | 14 | 4 | ... | Tremor. |
| ,, 15 | E | M | 7 57 6 | 15 | 4 | ... | Tremor. |
| ,, 21 | E | M | 14 13 12 | 10 | 2 | ... | Tremor. |
| | N | M | 13 14 | 10 | 3 | ... | |
| ,, 22 | N | M | 6 27 4 | 7 | 4 | ... | Tremor. |
| | M | | 28 10 | 6 | 2 | ... | |
| ,, 26 | E, N | S | 12 17 25 | ... | ... | ... | P not clear. |
| | N | L | 18 45 | ... | ... | ... | |
| | N | M | 19 55 | 12 | 9 | ... | |
| | E | M | 19 55 | 14 | 10 | ... | |

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. March 1 | N | M | 4 39 48 | 15 | 3 | ... | |
| | E | M | 41 18 | 12 | 3 | ... | |
| ,, 2 | E | M | 0 14 23 | 18 | 6 | ... | |
| | N | M | 14 48 | 15 | 3 | ... | |
| ,, 8 | E, N | P | 5 47 17 | ... | ... | 8650 | |
| | E, N | S | 57 9 | ... | ... | ... | |
| | E | L | 6 12 57 | ... | ... | ... | |
| | N | M | 27 51 | 18 | 4 | ... | |
| | E | M | 28 0 | 18 | 7 | ... | |
| | E | F | 7 16 ... | ... | ... | ... | |
| ,, 10 | N | M | 16 39 37 | 9 | 3 | ... | A very slight shock. |
| ,, 13 | E, N | eS | 21 11 28 | ... | ... | ... | |
| | E, N | e | 13 38 | ... | ... | ... | |
| | N | L | 13 57 | ... | ... | ... | |
| | E | M | 14 57 | 12 | 18 | ... | |
| | N | M | 15 42 | 10 | 13 | ... | |
| | N | F | 52 ... | ... | ... | ... | |
| ,, 14 | E, N | P | 0 49 38 | ... | ... | 550 | Felt in several places of Hyderabad State, Bombay Presidency and Central India. |
| | E, N | S | 50 37 | ... | ... | ... | |
| | N | L | 50 53 | ... | ... | ... | |
| | E | M | 51 4 | 4 | 118 | ... | |
| 1938 March 14 | N | M | 0 51 33 | 4 | 114 | ... | |
| | N | F | 1 51 ... | ... | ... | ... | |
| ,, 14 | E, N | P | 5 20 0 | ... | ... | 3180 | |
| | N | PcP | 23 4 | ... | ... | ... | |
| | E, N | S | 24 56 | ... | ... | ... | |
| | N | L | 28 29 | ... | ... | ... | |
| | N | $M_1$ | 30 50 | 6 | 4 | ... | |
| | E | $M_1$ | 30 58 | 6 | 4 | ... | |
| | N | $M_2$ | 34 6 | 6 | 5 | ... | |
| | N | F | 6 4 ... | ... | ... | ... | |
| ,, 22 | E, N | P'? | 15 39 52 | ... | ... | ... | S not clear. |
| | N | L | 15 1 | ... | ... | ... | |
| | N | M | 28 31 | 15 | 11 | ... | |
| | E | M | 28 31 | 15 | 7 | ... | |
| | N | F | 17 30 ... | ... | ... | ... | |
| ,, 31 | E,N | P | 22 38 40 | ... | ... | 4500 | |
| | E, N | S | 44 55 | ... | ... | ... | |
| | E | L | 50 31 | ... | ... | ... | |
| | N | M | 57 31 | 12 | 11 | ... | |
| | E | M | 59 16 | 12 | 8 | ... | |
| | N | F | 23 51 ... | ... | ... | ... | |

NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN,

T. P. BHASKARA SASTRI,
*Director.*

# KODAIKANAL OBSERVATORY, KODAIKANAL.

## January, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Jan. 1-2 | E | | | | | | Slight shock. No minute marks. Phases not readable. |
| ,, 2-3 | E | SKSP | 23 0 35 | ... | ... | ... | |
| | | SS | 10 40 | ... | ... | ... | |
| | | e | 12 49 | ... | ... | ... | |
| | | e | 14 8 | ... | ... | ... | |
| | | SSS | 16 28 | ... | ... | ... | |
| | | (G) | 28 5 | ... | ... | ... | |
| | | e | 46 46 | 18 | 7 | ... | |
| | | Mn | 0 5 10 | ... | ... | ... | |
| | | F | | Trace lost. | | | |
| ,, 3-11 | | Lines overlapping. Times cannot be read. | | | | | |
| ,, 12 | E | ... | ... ... ... | ... | ... | ... | Tremors. No minute marks. |
| ,, 12 | E | ... | ... ... ... | ... | ... | ... | Tremors. Lines overlapping and lines missing. |
| ,, 13 | E | ... | ... ... ... | ... | ... | ... | Tremors. No minute marks on the trace. |
| ,, 13 | E | e | 11 21 ... | ... | ... | ... | Feeble shock. No minute marks. |
| | | M | 27 30 | ... | ... | ... | |
| | | F | ? ... | ... | ... | ... | |
| ,, 13 | E | ... | ... ... ... | ... | ... | ... | Tremors. Lines overlapping. |
| ,, 16 | E | e | 14 18 28 | ... | ... | ... | Distant feeble shock. |
| | | F | 15 38 ... | ... | ... | ... | |
| ,, 16 | E | e | 23 01 ... | ... | ... | ... | Tremors. |

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 1-2 | E | iP | 19 14 ... | 16 | 870 | 5,800 | First movement to E. No minute marks. Times approximate. |
| | | e | 16 30 | ... | ... | ... | |
| | | i | 17 30 | ... | ... | ... | |
| | | iS | 21 30 | ... | ... | ... | |
| | | i | 26 ... | ... | ... | ... | |
| | | Mn | 40 ... | ... | ... | ... | |
| | | F | 2 37 ... | ... | ... | ... | |
| ,, 2 | E | iP | 9 42 30 | ... | ... | 2,830 | First movement to E. |
| | | i | 43 4 | ... | ... | ... | |
| | | i | 43 21 | ... | ... | ... | |
| | | iS | 47 1 | ... | ... | ... | |
| | | iL | 50 0 | ... | ... | ... | |
| | | M | 52 10 | 15 | 4 | ... | |
| | | F | 10 35 ... | ... | ... | ... | |
| ,, 2 | E | e | 13 53 ... | ... | ... | ... | Tremors. |
| | | F | 59 ... | ... | ... | ... | |
| ,, 4 | E | eP | 00 23 32 | ... | ... | 2,215 | |
| | | iS | 27 15 | ... | ... | ... | |
| | | iSS | 28 14 | ... | ... | ... | |
| | | L | 29 11 | ... | ... | ... | |
| | | Mn | 32 12 | 18 | 10 | ... | |
| 1938. | | | | | | | |
| Jan. 16 | | F | 42 ... | ... | ... | ... | |
| ,, 22 | E | | ... ... ... | ... | ... | ... | Feeble shock. Record defective. |
| ,, 23 | E | ePP | 8 52 45 | ... | ... | ... | |
| | | F | Traced lost. | | | | |
| ,, 25 | E | | ... ... ... | ... | ... | ... | Moderate shock. Lines overlapping. |
| ,, 26 | E | e | 3 41 22 | ... | ... | ... | Distant slight sock. |
| | | F | 6 01 ... | ... | ... | ... | Phases uncertain. |
| ,, 27 | E | e | 9 07 34 | ... | ... | ... | Tremors. Lines overlapping. Times cannot be checked. |
| | | F | 42 ... | ... | ... | ... | |
| ,, 29 | E | e | 3 37 ... | ... | ... | ... | Tremors. |
| | | F | 46 ... | ... | ... | ... | |
| ,, 29 | E | iP | 4 17 42 | ... | ... | 1,965 | Faint movement to W. |
| | | S | 21 05 | ... | ... | ... | |
| | | SS | 21 27 | ... | ... | ... | |
| | | L | 22 14 | ... | ... | ... | |
| | | M | 23 33 | 2 | 46 | ... | |
| | | F | 5 23 ... | ... | ... | ... | |
| ,, 30 | E | e | 12 20 ... | ... | ... | ... | Tremors. |
| | | F | 33 ... | ... | ... | ... | |
| ,, 30 | E | e | 13 38 ... | ... | ... | ... | Tremors. |
| | | F | 14 02 ... | ... | ... | ... | |
| ,, 30 | E | e | 17 36 ... | ... | ... | ... | Feeble shock. |
| | | F | 19 03 ... | ... | ... | ... | |
| 1938. | | | | | | | |
| Feb. 4 | E | e | 10 39 ... | ... | ... | ... | Tremors. |
| | | F | 14 14 ... | ... | ... | ... | |
| ,, 4 | E | e | 14 44 ... | ... | ... | ... | Feeble shock. |
| | | F | 15 7 ... | ... | ... | ... | |
| ,, 5 | E | eP[1] | 2 43 11 | ... | ... | 16,955 | Some phases losing shifting. |
| | | iSKKS | 53 20 | ... | ... | ... | |
| | | iSS | 3 6 30 | ... | ... | ... | |
| | | iSSS | 12 15 | ... | ... | ... | |
| | | iL | 34 00 | ... | ... | ... | |
| | | Mn | 47 20 | 20 | 17 | ... | |
| | | F | 5 30 ... | ... | ... | ... | |
| ,, 5 | E | iP | 10 03 17 | ... | ... | 4,040 | First impluse to E. |
| | | iS | 9 58 | ... | ... | ... | |
| | | iSS | 12 54 | ... | ... | ... | |
| | | iSSS | 13 54 | ... | ... | ... | |
| | | L | 16 35 | ... | ... | ... | |
| | | M | 20 10 | 21 | 6 | ... | |
| | | F | 13 21 ... | ... | ... | ... | |
| ,, 6 | E | e | 7 19 ... | ... | ... | ... | Tremors. |
| | | F | 8 26 ... | ... | ... | ... | |



# KODAIKANAL OBSERVATORY, KODAIKANAL.

## February, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Feb. 7 | E | e | 1 31 ... | ... | ... | ... | Feeble shock. |
| | | F | 3 6 ... | ... | ... | ... | |
| ,, 7 | E | e | 14 53 ... | ... | ... | ... | Tremors. |
| | | F | 16 15 ... | ... | ... | ... | |
| ,, 8 | E | e | 6 02 ... | ... | ... | ... | Feeble shock. |
| | | F | 10 07 ... | ... | ... | ... | |
| ,, 8 | E | e | 12 19 ... | ... | ... | ... | Tremors. |
| | | F | 12 44 ... | ... | ... | ... | |
| ,, 8 | E | e | 13 21 ... | ... | ... | ... | Tremors. |
| | | F | 14 4 ... | ... | ... | ... | |
| ,, 8 | E | e | 14 38 ... | ... | ... | ... | Feeble shock. |
| | | F | 17 6 ... | ... | ... | ... | |
| ,, 10 | E | e | 20 54 ... | ... | ... | ... | Feeble shock. |
| | | F | 21 43 ... | ... | ... | ... | |
| ,, 11 | E | e | 6 15 ... | ... | ... | ... | Tremors. |
| | | F | 11 58 ... | ... | ... | ... | |
| ,, 11 | E | e | 14 47 ... | ... | ... | ... | |
| | | F | 15 53 ... | ... | ... | ... | |
| ,, 12 | E | e | 3 37 ... | ... | ... | ... | Tremors. |
| | | F | 4 20 ... | ... | ... | ... | |
| 12 | E | e | 7 13 ... | ... | ... | ... | Tremors. |
| | | F | 10 54 ... | ... | ... | ... | |
| ,, 12 | E | e | 15 51 ... | ... | ... | ... | Tremors. |
| | | F | 16 50 ... | ... | ... | ... | |
| ,, 12 | E | e | 18 03 ... | ... | ... | ... | Tremors. |
| | | F | 19 16 ... | ... | ... | ... | |
| ,, 13 | E | ePP | 8 22 22 | ... | ... | ... | Preceded by tremors. |
| | | iSKS | 28 43 | ... | ... | ... | |
| | | i | 32 59 | ... | ... | ... | |
| 1938. | | | | | | | |
| Feb. 13 | | iPKKP? | 8 33 44 | ... | ... | ... | |
| | | ? | 34 05 | ... | ... | ... | |
| | | i | 44 47 | ... | ... | ... | |
| | | L | 56 22 | ... | ... | ... | |
| | | Mn | 9 6 45 | 18 | 25 | ... | |
| | | F | ? ... | ... | ... | ... | |
| ,, 14 | E | eP | 03 01 26 | ... | ... | 3,740 | |
| | | iS | 6 57 | ... | ... | ... | |
| | | SS | 8 39 | ... | ... | ... | |
| | | L | 10 45 | ... | ... | ... | |
| | | Mn | 16 14 | 26 | 19 | ... | |
| | | F | 04 44 ... | ... | ... | ... | |
| ,, 14 | E | e | 16 59 ... | ... | ... | ... | Tremors. |
| | | F | 17 09 ... | ... | ... | ... | |
| ,, 15 | E | e | 3 52 ... | ... | ... | ... | Feeble shock. |
| | | F | 5 31 ... | ... | ... | ... | |
| ,, 15 | E | e | 7 23 ... | ... | ... | ... | |
| | | F | 9 02 ... | ... | ... | ... | |
| ,, 21 | E | e | ? ... | ... | ... | ... | Lines overlapping. |
| | | F | ? ... | ... | ... | ... | Times not readable. |
| ,, 22 | E | e | 5 18 ... | ... | ... | ... | Tremors. |
| | | F | 8 26 ... | ... | ... | ... | |
| ,, 26 | E | e | 7 49 ... | ... | ... | ... | Tremors. |
| | | F | 8 17 ... | ... | ... | ... | |
| ,, 26 | E | eP | 12 18 20 | ... | ... | 2,300 | Lines overlapping. Probable time correction about 3 m. due to failure of time-marks. |
| | | iS | 22 10 | ... | ... | ... | |
| | | iSS | 22 45 | ... | ... | ... | |
| | | iL | 23 22 | ... | ... | ... | |
| | | Mn | 24 40 | 10 | 6 | ... | |
| | | F | ? ... | ... | ... | ... | |
| ,, 27 | E | e | 1 49 ... | ... | ... | ... | Tremors. |
| | | F | 2 52 ... | ... | ... | ... | |

## March, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Mar. 1 | E | e | 4 22 29 | ... | ... | ... | |
| | | i | 27 54 | ... | ... | ... | |
| | | Mn | 34 44 | 20 | 12 | ... | |
| | | F | 5 24 ... | ... | ... | ... | |
| 1-2 | E | e | 23 50 ... | ... | ... | ... | Long distance shock. |
| | | F | 0 53 ... | ... | ... | ... | |
| ,, 8 | E | e | 3 7 ... | ... | ... | ... | |
| | | F | 4 14 ... | ... | ... | ... | |
| Jan. 8 | E | iP | 5 47 14 | ... | ... | 8,430 | |
| | | PP | 49 50 | ... | ... | ... | |
| | | PPP | 51 48 | ... | ... | ... | |
| | | iS | 57 ... | ... | ... | ... | |
| | | iPS | 57 37 | ... | ... | ... | |
| | | SS | 6 2 ... | ... | ... | ... | |
| | | L | 11 47 | ... | ... | ... | |
| | | Mn | 23 57 | 20 | 13 | ... | |
| | | F | 8 15 ... | ... | ... | ... | |

# KODAIKANAL OBSERVATORY, KODAIKANAL.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. | Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **March, 1938.** | | | | | | | | | | | | | | | |
| 1938. | | | h. m. s. | sec. | μ | Km. | | 1938. | | | h. m. s. | sec. | μ | Km. | |
| Mar. 10 | E | e | 4 51 ... | ... | ... | ... | Tremors. | Mar. 22 | E | ep | 15 36 9 | ... | ... | ... | Beginning not clear. |
| | | F | 53 ... | ... | ... | ... | | | | SS? | 57 2 | ... | ... | ... | |
| „ 13 | E | | ... ... ... | ... | ... | ... | Lines too faint for interpretation. | | | Mn | 16 32 20 | 20 | 23 | ... | |
| | | | | | | | | | | F | 18 ... ... | ... | ... | ... | |
| „ 14 | E | IP | 5 20 50 | ... | ... | 2,215 | | „ 25 | E | e | 16 14 ... | ... | ... | ... | Long distance earthquake. |
| | | IS | 26 10 ... | ... | ... | ... | | | | F | 17 54 ... | ... | ... | ... | |
| | | F | 6 15 0 | ... | ... | ... | | | | | | | | | |

SOLAR PHYSICS OBSERVATORY,
KODAIKANAL.

A. L. NARAYAN,
*Director.*



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

| Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. |
|---|---|---|---|---|---|---|
| | 1938. | H. M. | Sec. | | | |
| Drosh | Jan. 8 | 22 10 | about 60 | 6 | 2 | |
| | | 22 35 | „ 5 | | | |
| Drosh | „ 7 | 00 05 | „ 15 | 4 | 1 | |
| Drosh | „ 18 | 09 32 | „ 75 | 6 | 1 | |
| Katmandu | „ 18 | 09 40 | 5 | 3 | 1 | |
| Jalpaiguri | „ 18 | 09 50 | ... | 4 | 1 | |
| Srinagar | „ 18 | 09 26 | about 10 | 8 | 3 | |
| Peshawar | „ 18 | 09 30 | 20-25 | 6 | 2 | |
| Rawalpindi | „ 18 | 09 30 | 20-25 | 3 | 1 | |
| Lahore | „ 18 | 09 34 | about 5 | 6 | 1 | |
| Cherat | „ 18 | 09 34 | „ 30 | 3 | 1 | |
| Sonamarg | „ 18 | 09 30 | 2 | 6 | 1 | |
| Gilgit | „ 18 | 09 30 | 3·4 | 6 | 1 | |
| Skardu | „ 18 | 09 15 | 60 | 5 | 1 | |
| Drosh | „ 19 | 06 03 | about 5 | 6 | 1 | |
| Drosh | „ 25 | 23 45 | „ 10 | 6 | 1 | |
| Drosh | „ 26 | 10 37 | „ 10 | 6 | 1 | |
| Rawalpindi | „ 26 | 10 55 | „ 30 | 3 | 2 | |
| Peshawar | „ 26 | 10 46 | 2/3 | 5 | 1 | |
| Laharia Sarai | „ 29 | 16 15 | ... | ... | ... | Heavy tremor. |
| Ormora | Feb. 3 | 18 55 | ½ | ... | 1 | |
| Drosh | „ 7 | 20 45 | 30 | 3 | 1 | |
| Cherat | „ 14 | 19 30 | 70 | 7 | 3 | |
| Peshawar | „ 14 | 19 14 | ... | 5 | ... | |
| Drosh | „ 14 | 19 15 | 40 | 6 | 1 | |
| Drosh | „ 16 | 06 48 | 3 | 5 | 1 | |
| Drosh | „ 19 | 22 15 | 5 | 5 | 1 | |
| Sambar | „ 24 | 15 25 | 2 | 4 | 1 | |
| Sambhar Lake | „ 24 | 15 30 | ... | ... | ... | |
| Shillong | „ 26 | 12 15 | Approx. 50 | 4 | 1 | |
| Gauhati | „ 26 | 12 20 | about 25 | 5 | 2 | |
| Baroda | Mar.14 | 00 55 | ... | ... | 1 | |

| Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. |
|---|---|---|---|---|---|---|
| | 1938. | H. M. | Sec. | | | |
| Sambhar Lake | Mar. 14 | 00 55 | ... | ... | 1 | |
| Miraj (Sr.) | „ 14 | 01 30 | ... | ... | ... | |
| Pachora | East Khandesh „ 14 | 01 00 | about 60 | ... | 1* | |
| Raver | | | | | | |
| Amalner | | | | | | |
| Chopda | | | | | | |
| Erandol | | | | | | |
| Parola | | | | | | |
| Chalisgaon | | | | | | |
| Bhushawal | | | | | | |
| Yawal | | | | | | |
| Bhadgaon | | | | | | |
| Edalabad | | | | | | |
| Kaira Distt. | „ 14 | 00 50 | about 30 | ... | ...† | |
| Jaipur | „ 14 | 00 53 | „ 10 | 5 | 4-5 | |
| Ajmer | „ 14 | 00 45 | „ 10 | 5 | ... | |
| Dessa | „ 14 | 00 45 | 1 | 6 | 1 | |
| Barmer | „ 14 | 00 50 | 3 | 6 | 1 | |
| Tarala (Satara Distt.) | „ 14 | 00 30 | 120 | 4 | 1 | |
| Brijnagar | „ 14 | 00 50 | 3 | 3 | 1 | |
| Poona | „ 14 | 00 47 | about 20 | 3 | 1 | |
| Dungarpur | „ 14 | 00 45 | „ 90 | 6 | 1 | |
| Jalna (near Aurangabad) | „ 14 | 00 40 | „ 7 | ... | 1 | |
| Bilara (Jodhpur State) | „ 14 | 01 10 | 60 | 6 | 1 | |
| Pachmarhi | „ 14 | 00 50 | 2 | 4 | 1 | |
| Amla | „ 14 | 00 50 | 3 | 7 | 1 | |
| Shahada (west Khandesh) | „ 14 | 00 50 | ... | 4 | 1 | |
| Maheswar (Indore) | „ 14 | 00 55 | 120 | ... | 1‡ | |
| Aurangabad | „ 14 | 00 40 | ... | 4 | 1 | |
| Dewas (Jr.) | „ 14 | 00 29 | ... | ... | 1 | |
| Drosh | „ 23 | 05 20 | 5 | 4 | 1 | |

*Reported by the District Magistrate, East Khandesh. There was no damage to life and property. Minor damages resulting in cracks to some buildings—particularly to old houses is reported.

†Reported by the District Collector of Kaira. Shock felt throughout the district. One mud house fallen down in Davapura in Nadiad Taluka and 2 children injured.

‡Few houses collapsed, few damaged, Ameen's quarters wall collapsed, western fort wall cracked.

METEOROLOGICAL OFFICE,
POONA.

J. M. SIL,
*Meteorologist,*
*Instruments Section.*

GIPD—S1—32 Meteoro Bombay—25-10-38—300.

GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT

# SEISMOLOGICAL BULLETIN

## APRIL - JUNE 1938.

CONTENTS.




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# INTRODUCTION.

The seismic data from the observatories of the India Meteorological Department have, till the end of 1937, been published annually as Part D of the Annual Summary of the India Weather Review. With a view to expedite the publication of the data, it has been decided to bring out the Indian data in the form of a quarterly bulletin. Owing to the kind co-operation of the Surveyor-General of India, the Director of the Nizamiah Observatory, Hyderabad, and of the Superintendent, Colombo Observatory, it has also been possible to incorporate in this bulletin the data of their respective observatories, *viz.*, Dehra Dun, Hyderabad and Colombo. The instrumental seismological data were collected and edited at the Colaba Observatory, Bombay, and the non-instrumental voluntary observations at the Meteorological Office, Poona.

TABLE 1.

*List of Seismograph Stations.*

| Station. | Latitude. | Longitude. | Height above M. S. L. | Lithologic foundation. | Officer-in-charge of Observatory. |
|---|---|---|---|---|---|
| Agra | 27°8′ N. | 78°01′ E. | 163 meters | Indo-Gangetic Alluvium | Meteorologist. |
| Bombay | 18°54′ N. | 72°49′ E. | 6 meters | Deccan Trap | Meteorologist. |
| Calcutta | 22°32′ N. | 88°20′ E. | (1) 7 meters<br>(2) 6 meters. | Alluvium | Meteorologist. |
| Colombo | 6°54′ N. | 79°52′ E. | 7 meters | Beach-Sand resting on gneiss probably decomposed. | Superintendent. |
| Dehra Dun | 30°19′ N. | 78°03′ E. | 682 meters | Gravel | Director, Geodetic Branch, Survey of India. |
| Hyderabad | 17°26′ N. | 78°27′ E. | 528* meters | Granite | Director, Nizamiah Observatory. |
| Kodaikanal | 10°14′ N. | 77°28′ E. | 2343 meters | Rock | Director. |

(1) Milne-Shaw, (2) Omori-Ewing.
* The height above M. S. L. for Jan. to Mar. is *523 meters* and not 554 as given in the bulletin for Jan. to Mar.

TABLE 2.

*The instruments and their constants.*

| Station. | Component. | Type of Instrument. | Mass. | Period. | Static magnification. | Damping ratio. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | kg. | secs. | | | |
| Agra | N | Omori-Ewing | 45 | 29·5 | 29 | 1 | |
| | E | Milne-Shaw | 0·47 | 12 | 250 | 20 : 1 | |
| Bombay | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 350 | 12 : 1 | for April. |
| | | | | | | 20 : 1 | for May and June. |
| Calcutta | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | N | Omori-Ewing | 50 | 28 | 32 | ... | |
| | E | Omori-Ewing | 50 | 28 | 30 | * ... | |
| Colombo | E | Milne-Shaw | 0·45 | 12 | 250 | 19 : 1 | for April and May. |
| | | | | | | 20 : 1 | for June. |
| Dehra Dun | N | Omori | 50 | 30 | 12 | ... | |
| Hyderabad | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Kodaikanal | E | Milne-Shaw | 0·45 | 12·2 | 250 | 22 : 1 | for April. |
| | | | | 12 | 250 | 20 : 1 | for May and June. |

# ERRATA S

Page

35 *Under* 'G. M. T.' *against* April 20, *read* "$6^h$" *for* "$16^h$" *after* eP.

36 *Under* 'remarks' column *against* May 6, *read* "h = 90—100 km" *for* "h = 90 = 100 km".

36 *Under* 'remarks' column *against* May 14, *delete* "$O = 12^h\ 3^m$" repeated.

37 *Under* 'remarks' column *against* May 30, *insert* '$= 23°{\cdot}0$' *after* 'Wellington $\Delta$ (S—P)'.

48 *Under* 'G. M. T.' *against* June 23, *read* "$15^h\ 4^m$" *for* "$4^h\ 15^m$".

49 *Read* "April, 1938" *for* "April 2, 1938" at the top of the page.

# UPPER AIR OBSERVATORY, AGRA.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| April 1 | E | e | 0 51 33 | ... | ... | ... | |
| | | ePPP? | 52 58 | ... | ... | ... | |
| | | S | 57 29 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 1 | E | P | 21 38 45 | ... | ... | 4,245 | |
| | | PPP | 40 29 | ... | ... | ... | |
| | | S | 44 48 | ... | ... | ... | |
| | | $M_1$ | 57 29 | 11 | 5 | ... | |
| | | $M_2$ | 59 25 | 11 | 5 | ... | |
| | | $M_3$ | 22 1 37 | 11 | 6 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 1 | E | eP | 22 36 53 | ... | ... | 1,000 | Felt at Peshawar. |
| | | iS | 38 43 | ... | ... | ... | |
| | | F | 23 22 ... | ... | ... | ... | |
| ,, 2 | E | e | 6 24 22 | ... | ... | ... | Very distant shock. Train of surface waves. |
| | | $M_1$ | 7 5 59 | 25 | 10 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 2 | E | eP? | 7 39 56 | ... | ... | 6,380 | |
| | | e | 42 9 | ... | ... | ... | |
| | | e | 43 11 | ... | ... | ... | |
| | | S | 47 58 | ... | ... | ... | |
| | | e | 48 31 | ... | ... | ... | |
| | | e | 52 3 | ... | ... | ... | |
| | | e | 53 53 | ... | ... | ... | |
| | | L | 57 31 | ... | ... | ... | |
| | | M | 8 2 21 | ... | ... | ... | |
| | | $M_1$ | 6 57 | 21 | 11 | ... | |
| | | F | 9 21 ... | ... | ... | ... | |
| ,, 6 | E | eP | 1 17 8 | ... | ... | 1,055 | Deep focus. |
| | E | iS | 19 6 | ... | ... | ... | |
| | N | eS | 19 16 | ... | ... | ... | |
| | E | F | 37 ... | ... | ... | ... | |
| ,, 7 | E | e | 14 3 13 | ... | ... | ... | Slight, near. |
| | | iS | 4 43 | ... | ... | ... | |
| | | F | 19 ... | ... | ... | ... | |
| ,, 10 | E | iP | 5 10 20 | ... | ... | 2,145 | Direction of the 1st movement E. |
| | | S | 13 57 | ... | ... | ... | |
| | | SS | 14 39 | ... | ... | ... | |
| | | M? | 16 53 | ... | ... | ... | |
| | | F | 58 ... | ... | ... | ... | |
| ,, 13 | E | e(P?) | 1 13 2 | ... | ... | (1,235) | Feeble. |
| | | S | 15 17 | ... | ... | ... | |
| | | F | 38 ... | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| April 13 | E | iP | 2 54 38 | ... | ... | 5,690 | Depth of focus about 300 km. Direction of the 1st movement E. |
| | | pP | 55 38 | ... | ... | ... | |
| | | PPP | 57 54 | ... | ... | ... | |
| | | iS | 3 1 43 | ... | ... | ... | |
| | | sS | 3 42 | ... | ... | ... | |
| | | SS } | 5 34 | ... | ... | ... | |
| | | F | 4 29 ... | ... | ... | ... | |
| ,, 14 | N,E | P | 1 20 00 | ... | ... | 1,500 | Mild shock felt at different parts of Assam and Bengal. |
| | E | iS | 22 45 | ... | ... | ... | |
| | | | Rest of the record lost while changing charts in both the components. | | | | |
| ,, 16 | E | eP | 16 10 52 | ... | ... | (665) | Slight. |
| | | S | 12 11 | ... | ... | ... | |
| | | F | 27 ... | ... | ... | ... | |
| ,, 17 | E | P | 4 28 11 | ... | ... | 310 | Slight. |
| | N,E | P* | 28 22 | ... | ... | ... | |
| | N,E | $\overline{P}$ | 28 32 | ... | ... | ... | |
| | N,E | S | 28 50 | ... | ... | ... | |
| | E | S* | 29 1 | ... | ... | ... | |
| | E | $\overline{S}$ | 29 10 | ... | ... | ... | |
| | N | F | 38 ... | ... | ... | ... | |
| | E | F | 51 ... | ... | ... | ... | |
| ,, 17 | E | $PKP_1$ | 14 59 16 | ... | ... | (17,000) | |
| | | $PKP_2$ | 59 27 | ... | ... | ... | |
| | | SKP? | 15 2 49 | ... | ... | ... | |
| | | PP? | 3 11 | ... | ... | ... | |
| | | $M_1$ | 16 8 21 | 20 | 6 | ... | |
| | | $M_2$ | 11 31 | 20 | 8 | ... | |
| | | F | 17 19 ... | ... | ... | ... | |
| ,, 19 | N,E | iP | 11 6 41 | ... | ... | 4,100 | Catastrophic earthquake in Anatolia in Turkey. Direction of the 1st movement E. and S |
| | N,E | PP | 7 56 | ... | ... | ... | |
| | E | PPP | 8 23 | ... | ... | ... | |
| | N | S } | 12 35 | ... | ... | ... | |
| | E | iS } | | | | | |
| | E | SS | 14 48 | ... | ... | ... | |
| | | SSS | 15 11 | ... | ... | ... | |
| | | L | 17 33 | ... | ... | ... | |
| | | M | 21 9 | ... | ... | ... | |
| | N | $M_1$ | 22 15 | 22 | 352 | ... | |
| | E | $M_2$ | 23 21 | 15 | 84 | ... | |
| ,, 19 | E | e | 22 9 13 | ... | ... | ... | |
| | | F | 23 10 ... | ... | ... | ... | |
| ,, 19-20 | E | i | 23 24 29 | ... | ... | ... | |
| | | F | 0 15 ... | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 14 | N | S | 12 11 31 | ... | ... | ... | |
| | E | iS | | | | | |
| | E | L | 13 18 | ... | ... | ... | |
| | | M | 15 6 | ... | ... | ... | |
| | | $M_1$ | 17 41 | 10 | 22 | ... | |
| | | $M_2$ | 18 35 | 11 | 14 | ... | |
| | N | F | 48 ... | ... | ... | ... | |
| | E | F | 13 55 ... | ... | ... | ... | |
| ,, 16 | E | eP | 7 16 6 | ... | ... | 6,690 | Surface waves absent. |
| | | S | 24 26 | ... | ... | ... | |
| | | PS | 25 3 | ... | ... | ... | |
| | | SS | 28 26 | ... | ... | ... | |
| | | F | 8 24 ... | ... | ... | ... | |
| ,, 16 | E | S? | 10 43 9 | ... | ... | ... | |
| ,, 16 | E | eP | 15 40 43 | ... | ... | 5,920 | Surface Waves absent. |
| | | ePP | 42 50 | ... | ... | ... | |
| | | S | 48 19 | ... | ... | ... | |
| | | PS | 48 59 | ... | ... | ... | |
| | | SS | 51 56 | ... | ... | ... | |
| | | SSS | 53 28 | ... | ... | ... | |
| | | F | 16 56 ... | ... | ... | ... | |
| ,, 19 | E | e | 0 26 13 | ... | ... | ... | Tremor. |
| | | F | 46 ... | ... | ... | ... | |
| ,, 19 | E | i | 3 27 7 | ... | ... | ... | Near, Slight. |
| | | i | 28 0 | ... | ... | ... | |
| | | F | 47 ... | ... | ... | ... | |
| ,, 19 | E | iP | 17 17 13 | ... | ... | 5,620 | Direction of the 1st movement W. |
| | N | e | 17 17 | ... | ... | ... | |
| | E | i | 17 34 | ... | ... | ... | |
| | N | i | 17 40 | ... | ... | ... | |
| | N,E | PP | 19 36 | ... | ... | ... | |
| | N,E | iS | 24 33 | ... | ... | ... | |
| | N | i | 27 16 | ... | ... | ... | |
| | N,E | SS | 28 25 | ... | ... | ... | |
| | N | L? | 31 3 | ... | ... | ... | |
| | N | $M_1$ | 36 1 | 26 | 1110 | ... | |
| | E | $M_1$ | 38 25 | 17 | 334 | ... | |
| | N | $M_2$ | 39 3 | 26 | 732 | ... | |
| | N | $M_3$ | 41 7 | ... | 725 | ... | |
| | E | $M_2$ | 41 33 | 20 | 267 | ... | |
| | N | $M_4$ | 43 23 | 30 | 1213 | ... | |
| | E | $M_3$ | 43 40 | 24 | 427 | ... | |
| | E | $M_4$ | 46 52 | 19 | 339 | ... | |
| ,, 22 | E | S | 8 10 8 | ... | ... | ... | Surface waves absent. |
| | | F | Mixed up with the following shock. | | | | |
| ,, 22 | E | i | 8 46 28 | ... | ... | ... | Very distant. |
| May 22 | E | eP | 11 38 21 | ... | ... | 5,890 | Surface waves absent. |
| | | S | 45 55 | ... | ... | ... | |
| | | F | 12 40 ... | ... | ... | ... | |
| ,, 23 | N | P | 7 27 48 | ... | ... | 5,765 | Direction of the 1st movement W. Shock of very great intensity. Epc: Probably in Japan. |
| | E | iP | | | | | |
| | N | ePP | 29 55 | ... | ... | ... | |
| | E | iPP | | | | | |
| | E | PPP? | 31 5 | ... | ... | ... | |
| | N | S | 35 16 | ... | ... | ... | |
| | E | iS | | | | | |
| | E | SS | 38 55 | ... | ... | ... | |
| | N | SS | 39 1 | ... | ... | ... | |
| | E | SSS | 40 27 | ... | ... | ... | |
| | E | L | 43 17 | ... | ... | ... | |
| | N | L | 44 1 | ... | ... | ... | |
| | N | $M_1$ Between | 51 1 | ... | > 1290 | ... | Motion of the recording pen restricted due to side stops for about 3 minutes. |
| | | and | 54 1 | ... | ... | ... | |
| | E | $M_1$ | 52 29 | 15 | 577 | ... | |
| | | $M_2$ | 57 27 | 17 | 132 | ... | |
| | | $M_3$ | 8 0 23 | 15 | 75 | ... | |
| | | $M_4$ | 3 41 | 16 | 63 | ... | |
| | N,E | F | Mixed up with the following shock. | | | | |
| ,, 23 | E | eP | 8 29 16 | ... | 4565 | ... | |
| | E | PP | 30 39 | ... | ... | ... | |
| | N,E | S | 35 37 | ... | ... | ... | |
| | N | SS | 38 28 | ... | ... | ... | |
| | E | SS | 38 36 | ... | ... | ... | |
| | E | SSS | 39 19 | ... | ... | ... | |
| | N | $M_1$ | 44 35 | 21 | 276 | ... | |
| | E | $M_1$ | 46 35 | 16 | 51 | ... | |
| | E | $M_2$ | 47 52 | 16 | 73 | ... | |
| | | $M_3$ | 50 9 | 15 | 45 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 24 | E | eP | 9 39 54 | ... | ... | 1,065 | |
| | | P* | 40 24 | ... | ... | ... | |
| | | S | 41 54 | ... | ... | ... | |
| | | S* | 42 24 | ... | ... | ... | |
| | | $\overline{S}$ | 43 9 | ... | ... | ... | |
| | | F | 10 5 ... | ... | ... | ... | |
| ,, 28 | E | e | 10 58 58 | ... | ... | ... | |
| | | F | 11 44 ... | ... | ... | ... | |
| ,, 28 | E | P | 16 51 34 | ... | ... | 6,000 | |
| | | PP | 53 47 | ... | ... | ... | |
| | | iS | 59 14 | ... | ... | ... | |
| | | PS | 59 47 | ... | ... | ... | |
| | | SS | 17 3 2 | ... | ... | ... | |
| | | SSS | 4 47 | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| April 20 | E | e | 6 45 30 | ... | ... | ... | Very distant shock. |
| | | i(SKS?) | 51 50 | ... | ... | ... | |
| | | $M_1$ | 7 31 11 | 21 | 10 | ... | |
| | | $M_2$ | 39 9 | 20 | 11 | ... | |
| ,, 23 | E | P | 0 36 21 | ... | ... | 5,200 | |
| | | PP | 38 7 | ... | ... | ... | |
| | | PPP | 38 43 | ... | ... | ... | |
| | | S | 43 17 | ... | ... | ... | |
| | | F. | Lost while changing chart. | | | | |

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| May 2 | E | e | 15 5 35 | ... | ... | ... | |
| | | $M_1$ | 25 33 | 15 | 4 | ... | |
| | | F | 54 ... | ... | ... | ... | |
| ,, 3 | E | e | 2 38 7 | ... | ... | ... | Very distant. |
| | | i | 48 52 | ... | ... | ... | |
| ,, 3 | E | iP | 19 25 44 | ... | ... | 6,345 | Direction of the 1st movement E. Surface waves absent. |
| | | S | 33 44 | ... | ... | ... | |
| | | F | 20 17 ... | ... | ... | ... | |
| ,, 4 | E | e | 6 1 48 | ... | ... | ... | Very distant. Surface waves poor. |
| | | S? | 7 7 | ... | ... | ... | |
| | | SSS? | 11 53 | ... | ... | ... | |
| | | F | 53 ... | ... | ... | ... | |
| ,, 6 | E | P | 3 44 37 | ... | ... | 1,735 | |
| | | eS | 47 39 | ... | ... | ... | |
| | | F | 4 37 ... | ... | ... | ... | |
| | E | e | 18 57 46 | ... | ... | ... | Very distant. |
| | | F | 20 37 ... | ... | ... | ... | |
| ,, 8 | E | eP | 13 43 27 | ... | ... | (13,220) | Train of surface waves. |
| | | P' | 47 27 | ... | ... | ... | |
| | | PP | 48 44 | ... | ... | ... | |
| | | SS | 14 4 38 | ... | ... | ... | |
| | N | e | 7 59 | ... | ... | ... | |
| | E | SSS | 9 47 | ... | ... | ... | |
| | | L | 24 0 | ... | ... | ... | |
| | | $M_1$ | 27 42 | 20 | 26 | ... | |
| | | $M_2$ | 30 17 | 20 | 25 | ... | |
| | N | $M_3$ | 38 12 | 15 | 18 | ... | |
| | N | F | 15 11 ... | ... | ... | ... | |
| ,, 9 | E | P | 15 44 52 | ... | ... | 2,280 | |
| | | S | 48 40 | ... | ... | ... | |
| | | F | 16 52 ... | ... | ... | ... | |
| ,, 11 | E | eP' | 15 5 7 | ... | ... | 14,820 | |
| | | SS? | 25 35 | ... | ... | ... | |
| | | SSS? | 30 35 | ... | ... | ... | |
| | | $M_1$ | 16 1 59 | 25 | 37 | ... | |
| | | $M_2$ | 4 35 | 22 | 14 | ... | |
| | | F | 17 16 ... | ... | ... | ... | |
| May 12 | E | iP | 15 50 39 | ... | ... | 8,045 | Direction of the 1st movement W. Train of surface waves. |
| | N | e | 50 47 | ... | ... | ... | |
| | E | PP | 53 25 | ... | ... | ... | |
| | | PPP | 54 55 | ... | ... | ... | |
| | | iS | 16 0 7 | ... | ... | ... | |
| | N | i | 0 20 | ... | ... | ... | |
| | E | PS | 0 35 | ... | ... | ... | |
| | | SS | 4 55 | ... | ... | ... | |
| | | SSS | 7 51 | ... | ... | ... | |
| | | i | 9 24 | ... | ... | ... | |
| | N | L | 13 5 | ... | ... | ... | |
| | E | L | 13 55 | ... | ... | ... | |
| | | $M_1$ | 18 17 | 30 | 275 | ... | |
| | | $M_2$ | 23 15 | 26 | 240 | ... | |
| | | $M_3$ | 27 15 | 25 | 170 | ... | |
| | | $M_4$ | 32 27 | 17 | 57 | ... | |
| | | F | 20 27 ... | ... | ... | ... | |
| ,, 12 | E | P | 21 38 54 | ... | ... | 4,835 | |
| | | PP | 40 27 | ... | ... | ... | |
| | | I | 51 46 | ... | ... | ... | |
| | | $M_1$ | 57 44 | 15 | 11 | ... | |
| | | $M_2$ | 22 0 1 | 12 | 8 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 12 | E | eP | 22 18 5 | ... | ... | 4,765 | |
| | | S | 24 37 | ... | ... | ... | |
| | | SSS | 28 7 | ... | ... | ... | |
| | | F | 23 46 ... | ... | ... | ... | |
| ,, 13 | E | iP | 15 16 23 | ... | ... | 6,155 | Direction of the 1st movement W. |
| | | iS | 24 12 | ... | ... | ... | |
| | | PS | 24 47 | ... | ... | ... | |
| | | eSS | 27 55 | ... | ... | ... | |
| | | F | 16 39 ... | ... | ... | ... | |
| ,, 14 | E | e | 6 8 23 | ... | ... | ... | Tremors. |
| | | iS | 9 15 | ... | ... | ... | |
| | | F | 23 ... | ... | ... | ... | |
| ,, 14 | E | iP | 12 7 41 | ... | ... | 2,300 | Direction of the 1st movement W. |
| | N | e | 7 45 | ... | ... | ... | |
| | E | PP | 8 6 | ... | ... | ... | |



# UPPER AIR OBSERVATORY, AGRA.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 14 | N, E | S, iS | 12 11 31 | ... | ... | ... | |
| | E | L | 13 18 | ... | ... | ... | |
| | | M | 15 6 | ... | ... | ... | |
| | | $M_1$ | 17 41 | 10 | 22 | ... | |
| | | $M_2$ | 18 35 | 11 | 14 | ... | |
| | N | F | 48 ... | ... | ... | ... | |
| | E | F | 13 55 ... | ... | ... | ... | |
| ,, 16 | E | eP | 7 16 6 | ... | ... | 6,690 | Surface waves absent. |
| | | S | 24 26 | ... | ... | ... | |
| | | PS | 25 3 | ... | ... | ... | |
| | | SS | 28 26 | ... | ... | ... | |
| | | F | 8 24 ... | ... | ... | ... | |
| ,, 16 | E | S? | 10 43 9 | ... | ... | ... | |
| ,, 16 | E | eP | 15 40 43 | ... | ... | 5,920 | Surface Waves absent. |
| | | ePP | 42 50 | ... | ... | ... | |
| | | S | 48 19 | ... | ... | ... | |
| | | PS | 48 59 | ... | ... | ... | |
| | | SS | 51 56 | ... | ... | ... | |
| | | SSS | 53 28 | ... | ... | ... | |
| | | F | 16 56 ... | ... | ... | ... | |
| ,, 19 | E | e | 0 26 13 | ... | ... | ... | Tremor. |
| | | F | 46 ... | ... | ... | ... | |
| ,, 19 | E | i | 3 27 7 | ... | ... | ... | Near, Slight. |
| | | i | 28 0 | ... | ... | ... | |
| | | F | 47 ... | ... | ... | ... | |
| ,, 19 | E | iP | 17 17 13 | ... | ... | 5,620 | Direction of the 1st movement W. |
| | N | e | 17 17 | ... | ... | ... | |
| | E | i | 17 34 | ... | ... | ... | |
| | N | i | 17 40 | ... | ... | ... | |
| | N, E | PP | 19 36 | ... | ... | ... | |
| | N, E | iS | 24 33 | ... | ... | ... | |
| | N | i | 27 16 | ... | ... | ... | |
| | N, E | SS | 28 25 | ... | ... | ... | |
| | N | L? | 31 3 | ... | ... | ... | |
| | N | $M_1$ | 36 1 | 20 | 1110 | ... | |
| | E | $M_1$ | 38 25 | 17 | 334 | ... | |
| | N | $M_2$ | 39 3 | 26 | 732 | ... | |
| | N | $M_2$ | 41 7 | ... | 725 | ... | |
| | E | $M_2$ | 41 33 | 20 | 267 | ... | |
| | N | $M_3$ | 43 23 | 30 | 1213 | ... | |
| | E | $M_3$ | 43 40 | 24 | 427 | ... | |
| | E | $M_4$ | 46 52 | 19 | 339 | ... | |
| ,, 22 | E | S | 8 10 8 | ... | ... | ... | Surface waves absent. |
| | F | Mixed up with the following shock. | | | | | |
| ,, 22 | E | i | 8 46 28 | ... | ... | ... | Very distant. |
| May 22 | E | eP | 11 38 21 | ... | ... | 5,890 | Surface waves absent. |
| | | S | 45 55 | ... | ... | ... | |
| | | F | 12 40 ... | ... | ... | ... | |
| ,, 23 | N | P, iP | 7 27 48 | ... | ... | 5,765 | Direction of the 1st movement W. Shock of very great intensity. Epc: Probably in Japan. |
| | N | ePP, iPP | 29 55 | ... | ... | ... | |
| | E | PPP? | 31 5 | ... | ... | ... | |
| | N | S, iS | 35 16 | ... | ... | ... | |
| | E | SS | 38 55 | ... | ... | ... | |
| | N | SS | 39 1 | ... | ... | ... | |
| | E | SSS | 40 27 | ... | ... | ... | |
| | E | L | 43 17 | ... | ... | ... | |
| | N | L | 44 1 | ... | ... | ... | |
| | N | $M_1$ Between and | 51 1 | ... | 1290 | ... | Motion of the recording pen restricted due to side stops for about 3 minutes. |
| | | | 54 1 | ... | ... | ... | |
| | E | $M_1$ | 52 29 | 15 | 577 | ... | |
| | | $M_2$ | 57 27 | 17 | 132 | ... | |
| | | $M_3$ | 8 0 23 | 15 | 75 | ... | |
| | | $M_4$ | 3 41 | 16 | 63 | ... | |
| | N, E | F | Mixed up with the following shock. | | | | |
| ,, 23 | E | eP | 8 29 16 | ... | 4565 | ... | |
| | E | PP | 30 39 | ... | ... | ... | |
| | N, E | S | 35 37 | ... | ... | ... | |
| | N | SS | 38 28 | ... | ... | ... | |
| | E | SS | 38 36 | ... | ... | ... | |
| | E | SSS | 39 19 | ... | ... | ... | |
| | N | $M_1$ | 44 35 | 21 | 276 | ... | |
| | E | $M_1$ | 46 35 | 16 | 51 | ... | |
| | E | $M_2$ | 47 52 | 16 | 73 | ... | |
| | | $M_3$ | 50 9 | 15 | 45 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 24 | E | eP | 9 39 54 | ... | ... | 1,065 | |
| | | P* | 40 24 | ... | ... | ... | |
| | | S | 41 54 | ... | ... | ... | |
| | | S* | 42 24 | ... | ... | ... | |
| | | $\overline{S}$ | 43 9 | ... | ... | ... | |
| | | F | 10 5 ... | ... | ... | ... | |
| ,, 28 | E | e | 10 58 58 | ... | ... | ... | |
| | | F | 11 44 ... | ... | ... | ... | |
| ,, 28 | E | P | 16 51 34 | ... | ... | 6,000 | |
| | | PP | 53 47 | ... | ... | ... | |
| | | iS | 59 14 | ... | ... | ... | |
| | | PS | 59 47 | ... | ... | ... | |
| | | SS | 17 3 2 | ... | ... | ... | |
| | | SSS | 4 47 | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | | Km. | |
| May 28 | | $M_1$ Between | 17 13 32 | 12 | 8 | ... | |
| | | and | 15 32 | ... | ... | ... | |
| | | $M_2$ | 16 32 | 20 | 23 | ... | |
| | | $M_4$ | 18 2 | 15 | 13 | ... | |
| | | F | 18 57 ... | ... | ... | ... | |
| „ 30 | E | P | 14 43 32 | ... | ... | 11,720 | Δ from P and SKS. |
| | | PP | 47 41 | ... | ... | ... | |
| | | iSKS | 54 6 | ... | ... | ... | |
| | | SKKS | 55 1 | ... | ... | ... | |
| | | PS | 56 41 | ... | ... | ... | |
| | | SS? | 15 1 32 | ... | ... | ... | |
| | | SSS | 6 13 | ... | ... | ... | |

## June, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| June 9 | E | iP | 19 24 39 | ... | ... | 6,200 | Direction of the first movement E. |
| | N | i | 24 49 | ... | ... | ... | |
| | E | PP | 26 53 | ... | ... | ... | |
| | | PPP | 28 5 | ... | ... | ... | |
| | | i | 29 34 | ... | ... | ... | |
| | N | S } | 32 31 | ... | ... | ... | |
| | E | iS } | | | | | |
| | N,E | PS | 33 3 | ... | ... | ... | |
| | E | i | 34 37 | ... | ... | ... | |
| | N | i | 34 41 | ... | ... | ... | |
| | N,E | SS | 36 21 | ... | ... | ... | |
| | E | SSS | 38 19 | ... | ... | ... | |
| | | L | 42 8 | ... | ... | ... | |
| | | $M_1$ | 47 22 | 25 | 154 | ... | |
| | | $M_2$ | 50 9 | 20 | 71 | ... | |
| | | $M_3$ | 52 27 | 20 | 74 | ... | |
| | | F | 22 44 ... | ... | ... | ... | |
| „ 10 | E | P | 10 1 28 | ... | ... | 4780 | |
| | N | e } | 1 44 | ... | ... | ... | |
| | E | i } | | | | | |
| | E | PP | 3 18 | ... | ... | ... | |
| | E | i | 7 25 | ... | ... | ... | |
| | N, E | S | 7 58 | ... | ... | ... | |
| | E | iSS | 10 49 | ... | ... | ... | |
| | N | iSS | 11 7 | ... | ... | ... | |
| | N | L | 14 3 | ... | ... | ... | |
| | E | L | 14 30 | ... | ... | ... | |
| | N | M Between | 16 3 | ... | 1376 | ... | Maximum for about 3 minutes. |
| | | and | 19 3 | ... | ... | ... | |
| | E | $M_1$ | 19 48 | 16 | 167 | ... | |
| | | $M_2$ | 21 39 | 15 | 206 | ... | |
| | | F | 14 7 ... | ... | ... | ... | |
| „ 16 | E | P? | 1 57 15 | ... | ... | ... | Very feeble. |
| | | S? | 2 4 25 | ... | ... | ... | |
| | | F | Lost in the following shock. | | | | |
| May 30 | | L | 15 17 49 | ... | ... | ... | |
| | | $M_1$ | 30 8 | 19 | 18 | ... | |
| | | $M_2$ | 34 15 | 20 | 23 | ... | |
| | | F | 18 24 ... | ... | ... | ... | |
| „ 30-31 | E | e | 23 38 26 | ... | ... | ... | Very distant. |
| | | F | 1 1 ... | ... | ... | ... | |
| „ 31 | E | e | 18 8 26 | ... | ... | ... | |
| | | F | 48 ... | ... | ... | ... | |
| „ 31 | E | e | 19 48 5 | ... | ... | ... | Beginning masked by microseisms. |
| | | F | 20 22 ... | ... | ... | ... | |
| June 16 | E | iP | 2 23 31 | ... | ... | 5345 | Δ from P and Direction of the movement W. |
| | | PP | 25 33 | ... | ... | ... | |
| | | PPP | 26 13 | ... | ... | ... | |
| | | eS? | 30 12 | ... | ... | ... | |
| | | S | 30 35 | ... | ... | ... | |
| | | SS | 33 40 | ... | ... | ... | |
| | N | iSS | 34 0 | ... | ... | ... | |
| | E | L | 38 20 | ... | ... | ... | |
| | E | $M_1$ | 41 19 | 23 | 870 | ... | |
| | N | M | 41 49 | ... | ... | ... | |
| | E | $M_1$ | 43 49 | 15 | 79 | ... | |
| | | $M_2$ | 44 32 | 16 | 105 | ... | |
| | | $M_3$ | 45 46 | 15 | 123 | ... | |
| | | $M_4$ | 47 0 | 11 | 72 | ... | |
| | | $M_5$ | 47 53 | 14 | 110 | ... | |
| | | $M_6$ | 2 49 19 | 15 | 61 | ... | |
| „ 20-21 | N, E | P | 23 54 13 | ... | ... | 1545 | Epc: Apex Eastern Tu |
| | N, E | i | 54 18 | ... | ... | ... | |
| | E | S | 56 57 | ... | ... | ... | |
| | | SS | 57 21 | ... | ... | ... | |
| | | M | 58 53 | ... | ... | ... | |
| | N | M? | 58 57 | ... | ... | ... | |
| | | $M_1$ | 0 0 41 | 19 | 845 | ... | |
| | | F | 40 ... | ... | ... | ... | |
| | E | F | Lost while changing chart. | | | | |
| „ 21 | E | i | 6 52 48 | ... | ... | ... | |
| | | F | 8 7 ... | ... | ... | ... | |
| „ 23 | E | P | 13 9 6 | ... | ... | 11480 | Δ from P |
| | | PP | 13 15 | ... | ... | ... | |
| | | SKS | 19 39 | ... | ... | ... | |
| | | SKKS | 20 38 | ... | ... | ... | |
| | | PS | 22 4 | ... | ... | ... | |
| | | SS | 27 54 | ... | ... | ... | |
| | | SSS | 31 49 | ... | ... | ... | |
| | | L | 43 35 | ... | ... | ... | |



UPPER AIR OBSERVATORY, AGRA.

## June, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | | Km. | |
| June 23 | E | M | 13 51 17 | ... | ... | ... | |
| | | $M_1$ | 56 9 | 24 | 12 | ... | |
| | | $M_2$ | 14 0 2 | 20 | 11 | ... | |
| | | F | 16 21 ... | ... | ... | ... | |
| „ 24 | E | eP | 12 46 49 | ... | ... | 935 | Felt at Peshawar. |
| | | S | 48 30 | ... | ... | ... | |
| | | F | 13 5 ... | ... | ... | ... | |
| June 26 | E | e | 0 1 22 | ... | ... | ... | |
| | | M | 23 20 | 15 | 6 | ... | |
| | | F | 58 ... | ... | ... | ... | |
| „ 27 | E | e | 10 24 59 | ... | ... | ... | |
| | | F | 11 22 ... | ... | ... | ... | |
| „ 29 | E | eP | 9 49 21 | ... | ... | 5735 | Beginning mixed with microseisms. Surface waves poor. |
| | | iS | 56 47 | ... | ... | ... | |
| | | F | 10 39 ... | ... | ... | ... | |

UPPER AIR OBSERVATORY,
AGRA.

G. CHATTERJEE,
*Meteorologist-in-charge.*

# COLABA OBSERVATORY, BOMBAY.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| April 1 | E | e | 0 52 6 | ... | ... | ... | Slight. Epc: Probably in the neighbourhood of the following shock at 21h 31m. |
| | E | e | 58 50 | ... | ... | ... | |
| | N, E | e | 1 2 11 | ... | ... | ... | |
| | N, E | e(L) | 7 22 | ... | ... | ... | |
| | N | Mn | 16 ... | ... | ... | ... | |
| | E | Mn | 17 51 | 10 | 2 | ... | |
| | N, E | F | 59 ... | ... | ... | ... | |
| ,, 1 | N, E | eP | 21 39 34 | ... | ... | 4920 | Slight. Epc: 21°N., 122°E. off north Luzon. 0=21h 31m 16s. |
| | N, E | i | 41 20 | ... | ... | ... | |
| | N, E | eS | 46 14 | ... | ... | ... | |
| | N, E | e | 46 32 | ... | ... | ... | |
| | N, E | e | 49 57 | In minute gap. | | | |
| | N, E | eL | 54 50 | ... | ... | ... | |
| | N, E | M | 59 25 | ... | ... | ... | |
| | N | Mn | 22 04 ... | In minute gap. | | | |
| | E | Mn | 05 21 | 11 | 4 | ... | |
| ,, 2 | N, E | e | 6 22 17 | ... | ... | ... | |
| | N, E | e | 27 37 | ... | ... | ... | |
| | N, E | e | 29 06 | ... | ... | ... | |
| | N, E | e | 32 11 | ... | ... | ... | |
| | N, E | e | 38 36 | ... | ... | ... | |
| | E | L | 53 ... | ... | ... | ... | |
| | E | Mn | 7 11 31 | 17 | 6 | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| ,, 2 | N, E | e | 7 50 13 | ... | ... | ... | Slight. |
| | N, E | e | 51 7 | ... | ... | ... | |
| | N, E | e | 54 40 | ... | ... | ... | |
| | E | M | 8 13 34 | 15 | 3 | ... | |
| | N, E | F | 9 41 ... | ... | ... | ... | |
| ,, 3 | N, E | e | 11 11 12 | ... | ... | ... | |
| | E | Mn | 29 ... | ... | ... | ... | |
| | N | Mn | 30 ... | ... | ... | ... | |
| | N, E | F | 12 43 ... | ... | ... | ... | |
| ,, 4 | N, E | e | 19 33 08 | ... | ... | ... | |
| | N, E | F | 20 22 ... | ... | ... | ... | |
| ,, 4 | E | eP | 21 18 25 | ... | ... | ... | Slight. Probably deep. Epc: near 7°S., 120°E. Flores Sea. 0=21h 9m 10s. |
| | E | e | 20 27 | ... | ... | ... | |
| | N, E | iS | 25 58 | ... | ... | ... | |
| | N | i | 27 30 | ... | ... | ... | |
| | N, E | e | 28 30 | ... | ... | ... | |
| | N, E | e | 30 06 | ... | ... | ... | |
| | N, E | F | 22 16 ... | ... | ... | ... | |
| ,, 4-5 | N | Record lost from | 23 10 ... | ... | ... | ... | |
| | | to | 2 14 ... | ... | ... | ... | |
| ,, 6 | N, E | eP | 1 18 27 | ... | ... | ... | Feeble. Epc: Probably near 36°·5 N., 70°·5E. 0=1h 14m 28s. |
| | E | S | 21 42 | ... | ... | ... | |
| ,, 7-8 | E | e | 23 45 ... | ... | ... | ... | |
| | N, E | F | 00 30 ... | ... | ... | ... | |
| Apr. 9 | E | e | 9 24 15 | ... | ... | ... | |
| | E | e | 27 24 | ... | ... | ... | |
| | N, E | F | 10 48 ... | ... | ... | ... | |
| ,, 10 | E | eP | 5 11 45 | ... | ... | ... | Slight. Epc: 36°N., 101°E., in China. 0=5h 5m 45s. |
| | E | e | 12 19 | ... | ... | ... | |
| | N, E | eS | 16 40 | ... | ... | ... | |
| | N | Mn | 24 00 | ... | ... | ... | |
| | E | Mn | 25 30 | | | ... | |
| | N, E | F | 6 00 ... | ... | ... | ... | |
| ,, 13 | N,E | e(P) | 1 14 36 | ... | ... | 2090 | Slight. Epc: 26°·5 N., 91°·5E in upper Brahmaputra Valley, Assam. 0=1h. 10 3m. Felt feebly at Srimangal. |
| | N, E | eS | 18 02 | ... | ... | ... | |
| | N, E | F | 45 ... | ... | ... | ... | |
| ,, 13 | N, E | iP | 2 54 40 | ... | ... | 6110 | Slight. h=300 km. 0=2h 45m 40s. Felt throughout southern Italy. Epc: 39°·5 N., 15°·0 E. (Strasbourg). |
| | N, E | ipP | 55 40 | ... | ... | ... | |
| | N, E | isP | 56 16 | ... | ... | ... | |
| | N, E | iPP | 56 47 | ... | ... | ... | |
| | N, E | iS | 3 01 54 | ... | ... | ... | |
| | N, E | e | 02 31 | ... | ... | ... | |
| | N, E | e | 02 54 | ... | ... | ... | |
| | N, E | sS | 04 01 | ... | ... | ... | |
| | N, E | F | 4 33 ... | ... | ... | ... | |
| ,, 13 | E | e | 15 31 ... | ... | ... | ... | Feeble surface waves. |
| | E | F | 16 09 ... | ... | ... | ... | |
| ,, 14 | N, E | iP | 1 21 08 | ... | ... | 2260 | Moderate. h=140 km. Epc: 22°·5 N., 94°·5E Burma. 0=1h 16m 31s. Damages to buildings in Monywa sub-division and Mau in Upper Burma. Felt with considerable intensity at many places in Assam, Bengal and Bihar. |
| | N, E | e | 21 26 | ... | ... | ... | |
| | N, E | epP | 21 34 | ... | ... | ... | |
| | N, E | esP | 21 53 | ... | ... | ... | |
| | N, E | e | 22 08 | ... | ... | ... | |
| | N, E | iS | 24 49 | ... | ... | ... | |
| | N, E | i | 25 00 | ... | ... | ... | |
| | N, E | e | 25 19 | ... | ... | ... | |
| | N, E | e(sS) | 25 49 | ... | ... | ... | |
| | N, E | F | Lost in changing chart. | | | | |
| ,, 14 | E | e | 19 55 ... | ... | ... | ... | Surface waves. |
| | E | F | 20 24 ... | ... | ... | ... | |
| ,, 14 | E | e | 15 59 42 | ... | ... | ... | |
| | E | e | 16 6 25 | ... | ... | ... | |
| | E | F | 54 ... | ... | ... | ... | |
| ,, 16 | N, E | e | 16 16 28 | ... | ... | ... | |
| | N, E | F | 37 ... | ... | ... | ... | |
| ,, 17 | N, E | eP | 4 30 18 | ... | ... | 1370 | Slight. Epc: 28°·5 N., 81°·5E in Nepal. 0=4h 27m 26s. |
| | N, E | e | 32 47 | ... | ... | ... | |
| | N, E | eS | 33 08 | ... | ... | ... | |
| | N, E | Sg | 34 06 | ... | ... | ... | |
| | E | M | 35 23 | 9 | 2 | ... | |
| | N | M | 35 33 | 9 | 2 | ... | |
| | N, E | F | 50 ... | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 17 | N, E | iP | 9 08 14 | ... | ... | 8580 | Slight. |
| | N, E | iPP | 11 06 | ... | ... | ... | |
| | N, E | iS | 18 06 | ... | ... | ... | |
| | N, E | iPS | 18 40 | ... | ... | ... | |
| | N, E | L | 33 20 | ... | ... | ... | |
| | N, E | F | 10 18 ... | ... | ... | ... | |
| ,, 17 | N, E | iP | 14 59 07 | ... | ... | 13780 | Slight. First movement N. and W. |
| | N, E | ePKS | 15 02 27 | ... | ... | ... | |
| | N, E | e | 09 31 | ... | ... | ... | |
| | N, E | e | 15 18 | ... | ... | ... | |
| | E | e | 48 14 | ... | ... | ... | |
| | E | M | 16 03 04 | 19 | 8 | ... | |
| | N, E | F | 17 10 ... | ... | ... | ... | |
| ,, 19 | N, E | iP | 11 06 51 | ... | ... | 4400 | Moderate. First movement as read: 1·5 mm to N, and 1·3 mm to W. Destructive in Central Anatolia. Epc: 40°N., 33°E. 0=10h 59m 27s. 38°·9 N., 32°·7 E. (Strasbourg). |
| | N, E | iPP | 08 25 | ... | ... | ... | |
| | N, E | PcP | 09 06 | ... | ... | ... | |
| | N, E | iS | 12 52 | ... | ... | ... | |
| | N, E | sS | 15 28 | ... | ... | ... | |
| | N, E | ScS | 17 10 | ... | ... | ... | |
| | N, E | L | 18 06 | ... | ... | ... | |
| | E | $M_1$ | 22 52 | 23 | 106 | ... | |
| | E | $M_2$ | 26 30 | 16 | 68 | ... | |
| | N | M | 27 15 | 15 | 18 | ... | |
| | N, E | F | 14 32 ... | ... | ... | ... | |
| ,, 19 | E | e | 22 03 17 | ... | ... | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| ,, 19-20 | N, E | e | 23 24 51 | ... | ... | ... | |
| | N, E | e | 28 50 | ... | ... | ... | |
| | N, E | F | 00 12 ... | ... | ... | ... | |
| ,, 20 | E | eP | 16 41 35 | ... | ... | 12330 | Slight. Δ from P-O Epc: 21°S., 177°E. in Fiji Islands. 0=6h 27m. Wellington Δ (P-O) . =20°·4; Δ Christ Church (P-O) . =22°·7; Δ Sydney (P-O) . =25°·8; Δ Manila (P-O) . =65°·1. |
| | E | e | 44 30 | ... | ... | ... | |
| | N, E | e | 46 30 | ... | ... | ... | |
| | N, E | e(SKKS) | 53 27 | ... | ... | ... | |
| | N, E | e | 55 09 | ... | ... | ... | |
| | N, E | eL | 7 20 17 | ... | ... | ... | |
| | E | $M_1$ | 30 02 | 17 | 6 | ... | |
| ,, 20 | N | Mn | 35 ... | 20 | 8 | ... | |
| | E | $M_2$ | 7 39 ... | 17 | 5 | ... | |
| | N, E | F | 9 35 ... | ... | ... | ... | |
| Apr. 21 | N, E | e | 1 26 ... | ... | ... | ... | |
| | N, E | e | 37 43 | ... | ... | ... | |
| | N, E | F | 3 25 ... | ... | ... | ... | |
| ,, 22 | E | e | 5 17 12 | ... | ... | ... | |
| | E | F | 45 ... | ... | ... | ... | |
| ,, 23 | N, E | iP | 00 37 20 | ... | ... | 6000 | Slight. First movements as read:— 0·25 mm to West and 0·5 mm to South. Epc: 26°·5 N., 132°·5 E. East off Luchu Islands. 0=0h 27 m 56s. |
| | N, E | i | 37 22 | ... | ... | ... | |
| | N, E | ePcP | 38 28 | ... | ... | ... | |
| | N, E | PP | 39 10 | ... | ... | ... | |
| | N, E | i | 44 55 | ... | ... | ... | |
| | N, E | eScS | 47 04 | ... | ... | ... | |
| | N, E | eSS | 48 07 | ... | ... | ... | |
| | N | L | 54 ... | ... | ... | ... | |
| | E | Mn | 01 04 38 | 14 | 6 | ... | |
| | N, E | F | Lost in changing of chart. | | | | |
| ,, 23 | N, E | iP | 6 08 38 | ... | ... | 2230 | Slight. Probably deep. 0=6h 4m 12s. First movements: Very small to N. and W. Strasbourg gives near 28°N., 55°E. in Persia. |
| | N, E | ePP | 08 51 | ... | ... | ... | |
| | N, E | i | 10 15 | ... | ... | ... | |
| | N, E | i | 10 25 | ... | ... | ... | |
| | N, E | eS | 12 22 | ... | ... | ... | |
| | N, E | eSS | 12 45 | ... | ... | ... | |
| | N, E | F | 7 22 ... | ... | ... | ... | |
| ,, 23 | N, E | iP | 9 30 39 | ... | ... | 2290 | Slight. After shock of the previous one at 6h 4m 12s. |
| | N, E | eS | 34 22 | ... | ... | ... | |
| | N, E | F | 10 48 ... | ... | ... | ... | |
| ,, 25 | E | e | 14 55 32 | ... | ... | ... | |
| | E | e | 15 03 52 | ... | ... | ... | |
| | N, E | F | 16 25 ... | ... | ... | ... | |
| ,, 26 | N, E | i | 13 3 26 | ... | ... | ... | Slight. Surface waves poor. |
| | E | i | 4 26 | ... | ... | ... | |
| | N, E | i | 11 26 | ... | ... | ... | |
| | N, E | e | 12 34 | ... | ... | ... | |
| | N, E | F | 14 00 ... | ... | ... | ... | |
| ,, 30 | N | Mn | 16 08 ... | ... | ... | ... | |
| | E | Mn | 09 ... | ... | ... | ... | |

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 2 | E | e | 15 13 10 | ... | ... | ... | |
| | N, E | F | 48 ... | ... | ... | ... | |
| ,, 3 | N, E | e | 2 34 51 | ... | ... | ... | Slight. |
| | N, E | i | 38 34 | ... | ... | ... | |
| May 3 | N | e | 52 11 | ... | ... | ... | |
| | N, E | F | 4 45 ... | ... | ... | ... | |
| ,, 3 | N, E | i | 19 26 49 | ... | ... | ... | Slight. |
| | N, E | e | 32 13 | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| 1938. | | | | | | | |
| May 3 | N | i | 19 35 48 | ... | ... | ... | |
| | E | i | 36 21 | ... | ... | ... | |
| ,, 4 | N, E | e | 6 01 18 | ... | ... | ... | |
| | E | Mn | 25 ... | ... | ... | ... | |
| | N, E | F | 7 26 ... | ... | ... | ... | |
| ,, 6 | N, E | iP | 3 45 48 | ... | ... | 2350 | Slight. Epc: 24°N., 95°E. in Upper Burma. 0=3h 41·1 m. h=90=100 km. |
| | N, E | pP? | 46 05 | ... | ... | ... | |
| | N, E | e | 46 14 | ... | ... | ... | |
| ,, 6 | N | iS | 3 49 37 | ... | ... | ... | |
| | E | e | 49 44 | ... | ... | ... | |
| | N, E | e | 50 29 | ... | ... | ... | |
| | N | M | 53 21 | 7 | 8 | ... | |
| | E | ScS | 56 53 | ... | ... | ... | |
| | N, E | F | 4 56 ... | ... | ... | ... | |
| ,, 6 | E | e | 19 01 08 | ... | ... | ... | Probably Nicaragua (Strasbourg). |
| | E | e | 34 28 | ... | ... | ... | |
| | N, E | F | 20 36 ... | ... | ... | ... | |
| ,, 8 | N | e | 13 51 03 | ... | ... | ... | |
| | N | e | 54 24 | ... | ... | ... | |
| | E | e | 54 36 | ... | ... | ... | |
| | N | e | 57 00 | ... | ... | ... | |
| ,, 8 | N | e(P) | 13 59 14 | ... | ... | ... | Moderate. Epc: 50°S., 99°E. 0=13h 48·1 m. Perth |
| | N, E | i | 14 03 37 | ... | ... | ... | |
| | N, E | i | 04 37 | ... | ... | ... | Δ(S-P) . =21°·5; Sydney |
| | N, E | e | 07 46 | ... | ... | ... | |
| | N, E | e | 09 ... | ... | ... | ... | Δ(S-P) . =41°·4; Christ Church |
| | N, E | e | 13 04 | ... | ... | ... | Δ(S-P) . =50°·7; Wellington |
| | E | e(M) | 19 29 | ... | ... | ... | |
| | N | e(M) | 20 00 | ... | ... | ... | Δ(S-P) . =52°·2; Phu Lien |
| | N | $M_1$ | 23 45 | 17 | 17 | ... | Δ(S-P) . =70°·8; Tananarive |
| | E | $M_1$ | 26 02 | 17 | 22 | ... | |
| | N | $M_2$ | 27 30 | 15 | 13 | ... | Δ(S-O) =51°·4. |
| | N | $M_2$ | 32 11 | 17 | 17 | ... | |
| | E | $M_2$ | 34 30 | 15 | 20 | ... | |
| | N | $M_3$ | 35 09 | 13 | 9 | ... | |
| | E | $M_3$ | 37 14 | 16 | 14 | ... | |
| | E | $M_4$ | 40 52 | 13 | 11 | ... | |
| | N, E | i | 56 16 | ... | ... | ... | |
| | N, E | F | 17 15 ... | ... | ... | ... | |
| ,, 9 | N | e | 15 45 43 | ... | ... | 2780 | Slight. Surface waves poor. Epc: 21°·3 N., 100°·5 E., eastern border of Burma. 0=15h 40·2m. |
| | N, E | ePP | 46 17 | ... | ... | ... | |
| | N, E | iS | 50 08 | ... | ... | ... | |
| | N, E | i | 55 10 | ... | ... | ... | |
| | N, E | F | 16 52 ... | ... | ... | ... | |
| 1938. | | | | | | | |
| May 11 | N | eP' | 15 04 24 | ... | ... | ... | Slight. Epc: 16°·9 N 101°·0 W., Pacific Ocean Central America. H.0=14h 44·0m. (U. S. C. G. S.). |
| | N, E | ePKS | 08 2 | ... | ... | ... | |
| | N, E | e | 08 41 | ... | ... | ... | |
| | E | Mn | 16 03 18 | 30 | 16 | ... | |
| | N | Mn | 17 ... | ... | ... | ... | |
| | N, E | F | 17 10 ... | ... | ... | ... | |
| ,, 12 | E | iP | 15 50 58 | ... | ... | 8555 | Moderate. First movements to in minute gap. |
| | N | eP | | | | | |
| | N, E | i | 51 05 | ... | ... | ... | Epc: 5°·3 S., 145°· 0=15h 39·0m. |
| | N, E | i | 51 40 | ... | ... | ... | Felt at Salamaua Wau and Medan New Guinea. |
| | N, E | i | 52 02 | ... | ... | ... | 5° S., 146°·5 (J. S. A.). |
| | N, E | i | 54 15 | ... | ... | ... | 6°·5 S., 147°·5 (Strasbourg). |
| | N, E | iS | 16 00 49 | ... | ... | ... | 8° S., 147°·5 (U. S. C. G. S.). |
| | N, E | i | 01 59 | ... | ... | ... | h=60 km. |
| | N, E | i | 02 13 | ... | ... | ... | Felt at Rabaul (Wellington). |
| ,, 12 | N, E | SS | 16 05 33 | ... | ... | ... | |
| | N, E | L | 16 35 | ... | ... | ... | |
| | N, E | M | 22 15 | ... | ... | ... | |
| | E | $M_1$ | 24 17 | 23 | 160 | ... | |
| | N | $M_2$ | 25 54 | 24 | 69 | ... | |
| | E | $M_2$ | 28 24 | 21 | 95 | ... | |
| | N | $M_3$ | 30 28 | 17 | 26 | ... | |
| | E | $M_3$ | 30 28 | 19 | 70 | ... | |
| | E | $M_4$ | 34 30 | 16 | 62 | ... | |
| | N, E | F | 20 18 ... | ... | ... | ... | |
| ,, 12 | N, E | iP | 21 38 20 | ... | ... | ... | Slight. |
| | N, E | i | 39 30 | ... | ... | ... | Epc: 18°N, 34° Nubia, coast of R Sea. |
| | E | M | 55 ... | 15 | 5 | ... | H. 0=21h 21·0 (Strasbourg). |
| | N. E | F | 23 49 ... | ... | ... | ... | |
| 13 | E | e | 15 19 00 | ... | ... | ... | |
| | N, E | e | 25 00 | ... | ... | ... | |
| | N, E | F | 16 12 ... | ... | ... | ... | |
| 14 | N, E | eP | 12 08 43 | ... | ... | 3020 | Moderate. |
| | N | e | 08 56 | ... | ... | ... | Epc: 21°N., 101°· |
| | E | i | | | | | Eastern frontier Burma. |
| | E | ePP | 09 30 | ... | ... | ... | 0=12h 3m. |
| | N | i | 13 07 | ... | ... | ... | 0=12h 3m. |
| | E | e | | | | | |
| | N, E | iS | 13 22 | ... | ... | ... | |
| | N, E | SS | 14 23 | ... | ... | ... | |
| | N, E | L | 16 24 | ... | ... | ... | |
| | N | Mn | 20 26 | 9 | 18 | ... | |
| | E | M | 22 33 | 10 | 12 | ... | |
| | N, E | F | 13 34 ... | ... | ... | ... | |
| 16 | E | e | 15 41 06 | ... | ... | ... | |
| | N, E | e | 42 14 | ... | ... | ... | |
| | N, E | e | 49 00 | ... | ... | ... | |
| | N, E | F | 16 26 ... | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| May 19 | N, E | e | 00 33 13 | ... | ... | ... | Slight. |
| | N, E | e | 35 28 | ... | ... | ... | |
| | N, E | Mn | 36 ... | ... | ... | ... | |
| | N, E | F | 48 ... | ... | ... | ... | |
| ,, 19 | N, E | e | 3 32 18 | ... | ... | ... | |
| | N, E | F | 47 ... | ... | ... | ... | |
| ,, 19 | N, E | e | 13 26 32 | ... | ... | ... | |
| | N, E | F | 36 ... | ... | ... | ... | |
| ,, 19 | N | e | 16 10 ... | ... | ... | ... | |
| | N | F | 32 ... | ... | ... | ... | |
| ,, 19 | N, E | eP | 17 17 22 | ... | ... | 6050 | Great. |
| | N, E | i | 17 34 | ... | ... | ... | Epc: 0°·5 N., 119°·0 E. H. O. = 17h 8·7m (U. S. C. G. S.) |
| | E | i | 14 47 | ... | ... | ... | Destructive in Dongala, Celebes. |
| | N, E | i | 18 04 | ... | ... | ... | 0·0, 118·8 E, h=100 km. (Strasbourg). |
| | N, E | ePeP | 18 32 | ... | ... | ... | |
| ,, 19 | N, E | ePP | 17 19 18 | ... | ... | ... | |
| | N, E | iS | 24 59 | ... | ... | ... | Amplitude 33 mm. in N. component. |
| | N, E | SS | 28 33 | ... | ... | ... | |
| | N, E | L | 33 36 | ... | ... | ... | |
| | E | $M_1$ | 36 ... | 23 | 777 | ... | |
| | N | $M_1$ | 37 18 | 23 | 537 | ... | |
| | N | $M_2$ | 41 38 | 18 | 352 | ... | |
| | E | $M_2$ | 43 ... | 18 | 290 | ... | |
| | N, E | F | 21 50 ... | ... | ... | ... | |
| ,, 22 | N, E | e | 08 18 ... | ... | ... | ... | |
| | E | $M_1$ | 53 ... | ... | ... | ... | |
| | N | $M_1$ | 56 ... | ... | ... | ... | |
| | E | $M_2$ | 9 25 ... | ... | ... | ... | |
| | N | $M_2$ | 32 ... | ... | ... | ... | |
| | N, E | F | 10 20 ... | ... | ... | ... | |
| ,, 23 | N, E | iP | 7 28 52 | ... | ... | 6820 | Great. 0=7h 18m. 36s. Epc: 36°·0 N., 141°·0 E. 0=7h. 18m. 32s. (Strasbourg). Felt in Japan. |
| | N, E | e | 29 11 | ... | ... | ... | |
| | N, E | ePcP | 29 34 | ... | ... | ... | |
| | N | e | 29 44 | ... | ... | ... | |
| | N, E | PP | 31 07 | ... | ... | ... | |
| | N | i | 47 06 | ... | ... | ... | |
| | N, E | iS | 47 12 | ... | ... | ... | |
| | N, E | ScS | 48 48 | ... | ... | ... | |
| | N, E | SS | 51 05 | ... | ... | ... | |
| | N, E | L | 58 02 | ... | ... | ... | |
| | N | Mn | 8 07 37 | 15 | 107 | ... | |
| | E | Mn | 08 20 | 17 | 292 | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| 1938. | | | | | | | |
| May 23 | N, E | iP | 8 30 04 | ... | ... | 4950 | Moderate. Mixed up in the coda of the preceding shock. |
| | N | i | 31 50 | ... | ... | ... | Epc: 19°N., 119°E. (appr.) South of Formosa. |
| | E | i | 31 54 | ... | ... | ... | H. 0=8h 22·0m (Strasbourg). |
| | N, E | e | 36 25 | ... | ... | ... | Felt in Luzon and Hong Kong. |
| | E | iS | 36 40 | ... | ... | ... | |
| | N, E | i | 39 38 | ... | ... | ... | |
| | N, E | L | 44 15 | ... | ... | ... | |
| | N | Mn | 50 36 | 15 | 2 | ... | |
| ,, 23 | E | Mn | 8 52 48 | 15 | 4 | ... | |
| | N, E | F | 12 00 00 | ... | ... | ... | |
| ,, 24 | N | e | 9 41 11 | ... | ... | ... | Slight. |
| | N | e | 43 09 | ... | ... | ... | |
| | N. E | e | 45 12 | ... | ... | ... | |
| | N, E | F | 10 14 | ... | ... | ... | |
| ,, 28 | N, E | P | 16 52 46 | ... | ... | 6950 | Slight. Epc: 45°N., 144°·5E. to the north of Hokkaido Island. 0=16h. 42m. 08s. |
| | N | e | 53 11 | ... | ... | ... | |
| | N | e | 54 45 | ... | ... | ... | |
| | N, E | iS | 17 01 13 | ... | ... | ... | |
| | N, E | e | 02 20 | ... | ... | ... | |
| | N, E | e | 05 28 | ... | ... | ... | |
| | N | Mn | 21 48 | 13 | 6 | ... | |
| | E | Mn | 23 12 | 13 | 9 | ... | |
| | N, E | F | 18 30 ... | ... | ... | ... | |
| ,, 30 | E | iP | 14 43 42 | ... | ... | ... | Moderate. Epc: 18°S., 169°E. near New Hebrides in the Pacific. 0=14h 29·9m. |
| | E | $iP_1$ | 46 44 | ... | ... | ... | |
| | E | i | 47 58 | ... | ... | ... | |
| | N, E | i | 48 07 | ... | ... | ... | Apia Δ(S-O)=20°·5. |
| | N, E | iSKS | 54 21 | ... | ... | ... | Sydney Δ(S-P)=22°3. |
| | N, E | i(ScS) | 54 37 | ... | ... | ... | Wellington Δ(S-P) |
| | N, E | i | 55 28 | ... | ... | ... | Christchurch Δ(S-P) =23°·9. |
| | N, E | iPPS | 57 50 | ... | ... | ... | |
| | N, E | i | 15 00 58 | ... | ... | ... | |
| | N, E | iSS | 02 21 | ... | ... | ... | |
| | E | i | 03 21 | ... | ... | ... | |
| | E | i | 06 28 | ... | ... | ... | |
| | E | i | 06 58 | ... | ... | ... | |
| | N, E | eL | 12 00 | ... | ... | ... | |
| | N | Mn | 31 35 | 17 | 5 | ... | |
| | E | Mn | 31 46 | 19 | 20 | ... | |
| | N, E | F | 17 45 ... | ... | ... | ... | |
| ,, 31 | N, E | e | 0 08 06 | ... | ... | ... | Large waves. |
| | N, E | F | 0 40 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## June, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| June 9 | N, E | iP | 19 24 58 | ... | ... | 6450 | Moderate. P and S in minute gap. |
| | N, E | i | 25 25 | ... | ... | ... | Epc: 4° S., 127°·5 E. Banda Sea. |
| | N, E | i | 25 38 | ... | ... | ... | 0=19h 15m 09s. |
| | N, E | PP | 27 01 | ... | ... | ... | Kew Δ(iP-0)=114°·7. |
| | N, E | iS | 32 58 | ... | ... | ... | Ksara Δ(iP-0)=92°·5. |
| | N, E | i | 33 36 | ... | ... | ... | 4°S., 126°E. (U. S. C. G. S.) |
| | N, E | ScS | 34 45 | ... | ... | ... | |
| | N, E | SS | 36 40 | ... | ... | ... | |
| | N, E | i(G) | 39 13 | ... | ... | ... | |
| | N, E | L | 43 32 | ... | ... | ... | |
| | E | $M_1$ | 48 39 | 23 | 74 | ... | |
| | E | $M_2$ | 52 34 | 25 | 75 | ... | |
| | N | Mn | 54 ... | 16 | 24 | ... | |
| „ 9 | E | $M_2$ | 20 00 ... | 17 | 31 | ... | |
| | N, E | F | 22 30 ... | ... | ... | ... | |
| „ 10 | N, E | eP | 10 02 28 | ... | ... | 5520 | Moderate. Epc: 23°N., 125°E. to the east of Formosa Island. 0=9h 53m 40 s. |
| | N, E | i | 02 36 | ... | ... | ... | |
| | N, E | PeP | 03 40 | ... | ... | ... | Ksara Δ (P-O) = 76°·1 |
| | N, E | ePP | 04 14 | ... | ... | ... | Stuttgart Δ(P-O) = 87°·0. |
| | N, E | i | 09 20 | ... | ... | ... | Kew Δ(P-O)=90°·4. |
| | N, E | iS | 09 36 | ... | ... | ... | 25°N., 125°E. (U. S. C. G. S.) |
| | N | ScS | 12 05 | ... | .. | ... | |
| | N, E | SS | 12 43 | ... | ... | ... | |
| | N, E | L | 17 20 | ... | ... | ... | |
| | N | $M_1$ | 21 00 | 14 | 136 | ... | |
| | N | $M_2$ | 23 10 | 13 | 107 | ... | |
| | E | Mn | 26 ... | 13 | 85 | ... | |
| „ 10 | N, E | F | 13 10 ... | ... | ... | ... | |
| „ 16 | N, E | iP | 02 24 30 | ... | ... | 6050 | Moderate. |
| | N | i(PcP) | 25 47 | ... | ... | ... | First movements as read : 0·5 mm. to N and 1·0 mm. to E. |
| | N, E | PP | 26 42 | ... | ... | ... | |
| | N. E | iS | 32 07 | ... | ... | ... | 0=$2^h$ 15·$2^m$. |
| | N | i(ScS) | 34 21 | ... | ... | ... | Epc.: 28°N., 130°E. (Strasbourg.) |
| | N, E | SS | 35 51 | ... | ... | ... | |
| | N | i | 37 37 | ... | ... | ... | |
| | N, E | L | 41 08 | ... | ... | ... | |
| | N | $M_1$ | 47 03 | 15 | 71 | ... | |
| | E | $M_1$ | 49 05 | 15 | 71 | ... | |
| | N | $M_2$ | 49 37 | 15 | 86 | ... | |
| | E | $M_2$ | 51 24 | 14 | 60 | ... | |
| | N, E | F | Lost in shifting. | | | | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| June 20-21 | N, E | iP | 23 55 49 | ... | ... | 2650 | Moderate. Epc.: 42°N., in Russian tan. 0=23h 50m. |
| | N, E | ePP | 56 16 | ... | ... | ... | |
| | N, E | i | 57 12 | ... | ... | ... | |
| | N, E | iPeP | 59 24 | ... | ... | ... | |
| | N, E | iS | 00 00 01 | ... | ... | ... | |
| | N, E | SS | 00 40 | ... | ... | ... | |
| | N, E | L | 02 33 | ... | ... | ... | |
| | E | Mn | 05 ... | 13 | 250 | ... | |
| | N | Mn | 05 22 | 14 | 312 | ... | |
| | N | i | 07 32 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| „ 21 | N, E | e | 6 53 00 | ... | ... | ... | |
| „ 21 | N, E | e | 7 02 22 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| „ 23 | N, E | i | 13 09 22 | ... | ... | ... | Slight. |
| | N, E | e | 13 33 | ... | ... | ... | Epc: 19°-18.. H=12h 50m (J. S. A.) |
| | N, E | i | 19 57 | (In minute gap) | | | |
| | E | e | 21 57 | ... | ... | ... | |
| | N, E | i | 23 27 | ... | ... | ... | |
| | N, E | i | 24 32 | ... | ... | ... | |
| | E | i | 28 00 | ... | ... | ... | |
| | N, E | L | 47 02 | ... | ... | ... | |
| | E | M | 14 00 ... | 17 | 5 | ... | |
| | N, E | F | 15 40 00 | ... | ... | ... | |
| „ 24 | E | i | 12 53 27 | ... | ... | ... | Felt at Ka... and Kabul. |
| | | F | Lost in microseisms. | | | | |
| „ 24-25 | N | Record lost from | 5 05 ... | ... | ... | ... | |
| | | to | 2 19 ... | ... | ... | ... | |
| „ 25 | E | Record lost from | 1 36 ... | ... | ... | ... | |
| | | to | 2 28 ... | ... | ... | ... | |
| „ 25-26 | N | Record lost from | 21 17... | ... | ... | ... | |
| | | to | 1 49 ... | ... | ... | ... | |
| „ 26 | E | e | 00 21 48 | ... | ... | ... | |
| | E | e | 27 15 | ... | ... | ... | |
| | E | F | 01 02 ... | ... | ... | ... | |
| „ 27 | N, E | e | 10 37 03 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |

COLABA OBSERVATORY,
BOMBAY.

K. R. RAMANATHAN,
*Meteorologist.*



# ALIPORE OBSERVATORY, CALCUTTA.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Apr. 1 | N | eP | 0 49 50 | ... | ... | 3650 | Slight. |
| | | eS | 55 15 | ... | ... | ... | |
| | | eSS | 57 1 | ... | ... | ... | |
| | | iL | 59 18 | ... | ... | ... | |
| | | M | 1 2 20 | ... | ... | ... | |
| | | Mn | 7 26 | 11 | 13 | ... | |
| | | F | Lost while changing chart. | | | | |
| „ 1 | N | e | 21 27 54 | ... | ... | ... | Tremor. |
| | | F | Masked by next shock. | | | | |
| „ 1 | N | eP | 21 37 27 | ... | ... | 3460 | Slight. |
| | | ePPP | 38 46 | ... | ... | ... | |
| | | iS | 42 33 | ... | ... | ... | |
| | | iSS | 44 45 | ... | ... | ... | |
| | | eL | 47 6 | ... | ... | ... | |
| | | M | 50 4 | ... | ... | ... | |
| | | Mn | 54 3 | 12 | 52 | ... | |
| | | F | 23 18 ... | ... | ... | ... | |
| „ 2 | N | e | 6 24 32 | ... | ... | ... | Slight. |
| | | i | 28 8 | ... | ... | ... | |
| | | i | 30 11 | ... | ... | ... | |
| | | e | 34 54 | ... | ... | ... | |
| | | e | 35 31 | ... | ... | ... | |
| | | e | 41 51 | ... | ... | ... | |
| | | M | 7 2 11 | ... | ... | ... | |
| | | Mn | 9 41 | 20 | 17 | ... | |
| | | F | 8 52 ... | ... | ... | ... | |
| „ 3 | N | e | 10 48 17 | ... | ... | ... | Slight ; very distant. |
| | | i | 11 11 45 | ... | ... | ... | |
| | | Mn | 28 28 | ... | ... | ... | |
| | | F | 12 31 ... | ... | ... | ... | |
| „ 4 | N | e | 19 45 3 | ... | ... | ... | Tremor. |
| | | F | 20 18 ... | ... | ... | ... | |
| „ 4 | N | iP | 21 17 4 | ... | ... | 5250 | Slight. Focal depth about 400 km. 1st movement–North. |
| | | epP | 18 24 | ... | ... | ... | |
| | | ePP(?) | 19 37 | ... | ... | ... | |
| | | iS | 23 27 | ... | ... | ... | |
| | | isS | 25 54 | ... | ... | ... | |
| | | i | 29 37 | ... | ... | ... | |
| | | F | 21 57 ... | ... | ... | ... | |
| „ 10 | N | iP | 5 9 45 | ... | ... | 1950 | Slight. |
| | | iS | 12 58 | ... | ... | ... | |
| | | eSS | 13 51 | ... | ... | ... | |
| | | iL | 14 51 | ... | ... | ... | |
| | | M | 16 43 | ... | ... | ... | |
| | | Mn | 22 1 | 8 | 11 | ... | |
| | | F | 47 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Apr. 12 | N | e | 2 10 56 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 13 | N | eP | 1 11 23 | ... | ... | 420 | Slight. Felt at Srimangal and Comilla. |
| | | iP* | 11 31 | ... | ... | ... | |
| | | iP | 11 39 | ... | ... | ... | |
| | | iS | 12 9 | ... | ... | ... | |
| | | iS* | 12 20 | ... | ... | ... | |
| | | iS | 12 28 | ... | ... | ... | |
| | | F | Lost in changing chart. | | | | |
| „ 13 | N | e | 2 55 55 | ... | ... | ... | Slight, distant. |
| | | i | 56 54 | ... | ... | ... | |
| | | i | 3 0 7 | ... | ... | ... | |
| | | i | 3 59 | ... | ... | ... | |
| | | Mn | 5 44 | ... | ... | ... | |
| | | F | 4 10 ... | ... | ... | ... | |
| „ 13 | N | e | 10 43 0 | ... | ... | ... | Slight, near. |
| | | i | 43 39 | ... | ... | ... | |
| | | F | 54 ... | ... | ... | ... | |
| „ 14 | N | e | 0 4 11 | ... | ... | ... | Slight, near. |
| | | e | 5 10 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 14 | E,*N* | eP | 71 17 54 | ... | ... | 600 | Moderate. Felt over Bengal and Assam. *From Omori-Ewing Instruments. |
| | E* | e | 18 6 | ... | ... | ... | |
| | E* | i | 18 19 | ... | ... | ... | |
| | E*,N* | iS | 18 57 | ... | ... | ... | |
| | E,*N* | i | 19 16 | ... | ... | ... | |
| | E,*N* | i | 19 28 | ... | ... | ... | |
| | E,*N* | F | Lost while changing chart. | | | | |
| „ 14 | N | e | 16 2 37 | ... | ... | ... | Slight, distant. |
| | | Mn | 13 11 | ... | ... | ... | |
| | | F | 45 ... | ... | ... | ... | |
| „ 17 | N | eP | 4 29 40 | ... | ... | 980 | Slight. |
| | | eS | 31 20 | ... | ... | ... | |
| | | eS* | 31 55 | ... | ... | ... | |
| | | iS | 32 20 | ... | ... | ... | |
| | | F | 4 52 ... | ... | ... | ... | |
| „ 17 | N | e | 15 0 3 | ... | ... | ... | Slight, very distant. |
| | | i | 4 18 | ... | ... | ... | |
| | | i | 51 48 | ... | ... | ... | |
| | | F | 17 5 ... | ... | ... | ... | |
| „ 19 | N | eP | 11 8 19 | ... | ... | 5250 | Moderate. Destructive in Anatolia particularly in area between Kahedir and Dyozgad. |
| | | ePP | 10 2 | ... | ... | ... | |
| | | ePPP | 10 48 | ... | ... | ... | |
| | | iS | 15 18 | ... | ... | ... | |
| | | iSS | 18 29 | ... | ... | ... | |
| | | iSSS | 19 43 | ... | ... | ... | |
| | | iL | 22 43 | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **April, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 19 | N | M | 11 26 29 | ... | ... | ... | |
| | | Mn | 28 18 | 19 | 268 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 19 | N | e | 21 7 59 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 19 | N | i | 23 27 13 | ... | ... | ... | Slight, distant. |
| | | Mn | 39 48 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 23 | N | eP | 0 35 25 | ... | ... | 4130 | Slight. |
| | | ePP | 36 39 | ... | ... | ... | |
| | | ePPP | 37 5 | ... | ... | ... | |
| | | iS | 41 21 | ... | ... | ... | |
| | | eSS | 43 35 | ... | ... | ... | |
| **May, 1938.** | | | | | | | |
| May 6 | N | eP | 3 42 33 | ... | ... | 670 | Slight. |
| | | e | 42 52 | ... | ... | ... | |
| | | iS | 43 42 | ... | ... | ... | |
| | | i | 44 4 | ... | | ... | |
| | | e | 44 19 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 8 | N | e | 11 51 57 | ... | ... | ... | Tremor. |
| | | i | 55 17 | ... | ... | ... | |
| | | F | 12 14 ... | ... | ... | ... | |
| „ 8 | N | e(?) | 13 43 51 | ... | ... | ... | Moderate, very distant. |
| | | i | 47 9 | ... | ... | ... | |
| | | i | 14 8 43 | ... | ... | ... | |
| | | M | 21 8 | ... | ... | ... | |
| | | Mn | 27 13 | 18 | 67 | ... | |
| | | F | 16 48 ... | ... | ... | ... | |
| „ 9 | N | eP | 15 43 18 | ... | ... | 1150 | Slight. |
| | | iS | 45 25 | ... | ... | ... | |
| | | eSS | 45 43 | ... | ... | ... | |
| | | eL | 45 57 | ... | ... | ... | |
| | | M | 46 45 | ... | ... | ... | |
| | | Mn | 48 37 | 9 | 43 | ... | |
| | | F | 16 33 ... | ... | ... | ... | |
| „ 11 | N | ePKP | 15 5 11 | ... | ... | 15570 | Slight. |
| | | iPP | 8 3 | ... | ... | ... | |
| | | iSKKP | 8 41 | ... | ... | ... | |
| | | ePPP | 11 10 | ... | ... | ... | |
| | | eSKKS | 14 48 | ... | ... | ... | |
| | | ePSKS | 18 6 | ... | ... | ... | |
| | | eSS | 26 27 | ... | ... | ... | |
| | | eL | 52 18 | ... | ... | ... | |
| | | M | 16 2 53 | ... | ... | ... | |
| | | Mn | 11 33 | 20 | 12 | ... | |
| | | F | 17 1 ... | ... | ... | ... | |
| May 12 | N | iP | 15 49 37 | ... | ... | 7000 | Moderate. Direction of 1st movement—North. |
| | | ePP | 52 2 | ... | ... | ... | |
| | | iPPP | 53 15 | ... | ... | ... | |
| | | iS | 58 14 | ... | ... | ... | |
| | | iSS | 16 2 35 | ... | ... | ... | |
| | | Mn | 18 17 | 20 | 270 | ... | |
| | | F | 20 24 ... | ... | ... | ... | |
| „ 12 | N | e | 21 39 26 | ... | ... | ... | Slight. |
| | | iS | 47 6 | ... | ... | ... | |
| | | eSS | 50 50 | ... | ... | ... | |
| | | eSSS | 52 29 | ... | ... | ... | |
| | | eL | 56 9 | ... | ... | ... | |
| | | M | 22 0 30 | ... | ... | ... | |
| | | Mn | 2 36 | 14 | 22 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 13 | N | eP | 15 15 18 | ... | ... | 5080 | Slight. |
| | | ePP | 16 57 | ... | ... | ... | |
| | | ePPP | 17 40 | ... | ... | ... | |
| | | iS | 22 7 | ... | ... | ... | |
| | | eSS | 25 10 | ... | ... | ... | |
| | | eL | 29 10 | ... | ... | ... | |
| | | M | 32 58 | ... | ... | ... | |
| | | F | 16 20 ... | ... | ... | ... | |
| „ 14 | N | iP | 12 5 39 | ... | ... | 1150 | Moderate. Direction of 1st movement—South. |
| | | iS | 7 47 | ... | ... | ... | |
| | | iSS | 8 6 | ... | ... | | |
| | | iL | 8 20 | | ... | ... | |
| | | M | 9 8 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 16 | N | i | 7 22 17 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 16 | N | i | 15 46 11 | ... | ... | ... | Tremor. |
| | | F | 16 48 ... | ... | ... | ... | |
| Apr. 23 | N | iL | 0 46 25 | ... | ... | ... | |
| | | M | 49 35 | ... | ... | ... | |
| | | Mn | 52 45 | 18 | 76 | ... | |
| | | F | Lost while changing charts. | | | | |
| „ 23 | N | e | 6 10 17 | ... | ... | ... | Slight. |
| | | eS | 15 36 | ... | | ... | |
| | | iSS | 17 29 | ... | ... | ... | |
| | | eL | 19 42 | ... | ... | ... | |
| | | Mn | 25 2 | 13 | 12 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 23 | N | e | 9 37 42 | ... | ... | ... | Slight, distant. |
| | | Mn | 45 30 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |



# ALIPORE OBSERVATORY, CALCUTTA.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **May 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 19 | N | iP | 17 15 53 | ... | ... | 4420 | Great. Direction of 1st movement—South. |
| | N* | eP | 15 53 | ... | ... | ... | *From Omori-Ewing (N-S). |
| | N* | iPPP | 17 46 | ... | ... | ... | |
| | N* | iS | 22 6 | ... | ... | ... | |
| | N* | iSS | 24 35 | ... | ... | ... | |
| | N* | iSSS | 25 16 | ... | ... | ... | |
| | N* | iL | 27 42 | ... | ... | ... | |
| | N | F | 21 35 ... | | ... | ... | |
| „ 22 | N | i | 8 9 40 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 22 | N | e | 8 40 58 | ... | ... | ... | Tremor. |
| | | i | 45 55 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 22 | N | i | 11 43 32 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 23 | N | iP | 7 27 11 | ... | ... | 5,180 | Great. Direction of 1st movement—South. |
| | | iPP | 28 52 | ... | ... | ... | |
| | | iPPP | 29 37 | ... | ... | ... | |
| | | iS | 34 6 | ... | ... | ... | |
| | | iSS | 37 14 | ... | ... | ... | |
| | | iSSS | 38 26 | ... | ... | ... | |
| | | iL | 41 20 | ... | ... | ... | |
| | | M | 45 14 | ... | ... | ... | |
| | | F | 12 10 ... | ... | ... | ... | |
| „ 28 | N | eP | 16 51 17 | ... | ... | 5,290 | Slight. |
| | | iS | 58 18 | ... | ... | ... | |
| May 28 | N | eSS | 17 1 31 | ... | ... | ... | |
| | | iSSS | 2 46 | ... | ... | ... | |
| | | eL | 5 48 | ... | ... | ... | |
| | | M | 9 43 | ... | ... | ... | |
| | | Mn | 15 35 | 12 | 16 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 30 | N | iP | 14 42 44 | ... | ... | 9,870 | Moderate. Direction of 1st movement—South. |
| | | ePP | 46 12 | ... | ... | ... | |
| | | ePPP | 48 13 | ... | ... | ... | |
| | | eSKS | 53 1 | ... | ... | ... | |
| | | iS | 53 33 | ... | ... | ... | |
| | | ePS | 54 29 | ... | ... | ... | |
| | | iPPS | 54 57 | ... | ... | ... | |
| | | eSS | 59 39 | ... | ... | ... | |
| | | eSSS | 15 3 13 | ... | ... | ... | |
| | | iL | 12 24 | ... | ... | ... | |
| | | M | 19 14 | ... | ... | ... | |
| | | Mn | 25 54 | 20 | 41 | ... | |
| | | F | 17 34 ... | ... | ... | ... | |
| „ 30 | N | e | 23 45 54 | ... | ... | ... | Slight, very distant. |
| „ 31 | N | e | 0 8 17 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 31 | N | e | 18 13 32 | ... | ... | ... | Slight, distant |
| | | Mn | 23 54 | ... | ... | ... | |
| | | F | 1 45 ... | ... | ... | ... | |
| **June, 1938.** | | | | | | | |
| June 5 | N | e | 16 45 36 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 9 | N | iP | 19 23 24 | ... | ... | 5,030 | Moderate. Direction of 1st movement—South. |
| | | iPP | 25 2 | ... | ... | ... | |
| | | iPPP | 25 43 | ... | ... | ... | |
| | | iS | 30 10 | ... | ... | ... | |
| | | iSS | 33 11 | ... | ... | ... | |
| | | iSSS | 34 18 | ... | ... | ... | |
| | | iL | 37 10 | ... | ... | ... | |
| | | M | 41 0 | ... | ... | ... | |
| | | Mn | 42 50 | 23 | 281 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 10 | N | iP | 10 0 45 | ... | ... | 3,350 | Great. Direction of 1st movement—North. |
| | | ePP | 1 34 | ... | ... | ... | |
| | | ePPP | 1 52 | ... | ... | ... | |
| | | iS | 5 51 | ... | ... | ... | |
| | | iSS | 7 22 | ... | ... | ... | |
| | | iL | 9 21 | ... | ... | ... | |
| | | M | 12 1 | ... | ... | ... | |
| | | F | 13 38 ... | ... | ... | ... | |
| June 15 | N | i | 13 4 46 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 15 | N | i | 20 37 46 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 16 | N | i | 2 1 58 | ... | ... | ... | Slight, distant. |
| | | i | 17 41 | ... | ... | ... | |
| | | F | Masked by next shock. | | | | |
| „ 16 | N | iP | 2 22 32 | ... | ... | 4,310 | Moderate. Direction of 1st movement—North. |
| | | iPP | 23 52 | ... | ... | ... | |
| | | iPPP | 24 20 | ... | ... | ... | |
| | | iS | 28 39 | ... | ... | ... | |
| | | iSS | 31 2 | ... | ... | ... | |
| | | iSSS | 31 39 | ... | ... | ... | |
| | | iL | 35 4 | ... | ... | ... | |
| | | M | 37 24 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 16 | N | e | 23 0 24 | ... | ... | ... | Slight, distant. |
| | | Mn | 13 11 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |

# ALIPORE OBSERVATORY, CALCUTTA.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **June, 1938.** | | | | | | | |
| 1938. | | | h.m.s. | sec. | μ | Km. | |
| June 20-21 | N | iP | 23 55 41 | ... | ... | 2,450 | Moderate. Direction of 1st movement—North. |
| | | iPP | 56 6 | ... | ... | ... | |
| | | iPPP | 56 15 | ... | ... | ... | |
| | | iS | 59 43 | ... | ... | ... | |
| | | iSS | 0 0 34 | ... | ... | ... | |
| | | iL | 1 40 | ... | ... | ... | |
| | | M | 3 38 | ... | ... | ... | |
| | | Mn | 5 5 | 10 | 286 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 21 | N | eP (?) | 6 45 44 | ... | ... | 4,700 | Slight. |
| | | ePP (?) | 47 14 | ... | ... | ... | |
| | | iS | 52 12 | ... | ... | ... | |
| | | iSS | 54 56 | ... | ... | ... | |
| | | eSSS | 55 49 | ... | ... | ... | |
| | | iL | 58 27 | ... | ... | ... | |
| | | M | 7 1 55 | ... | ... | ... | |
| | | Mn | 5 5 | 13 | 19 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 23 | N | eP (?) | 13 9 20 | ... | ... | 8,620 | Slight. |
| | | ePP | 12 19 | ... | ... | ... | |
| | | ePPP | 13 59 | ... | ... | ... | |
| | | iS | 19 15 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h.m.s. | sec. | μ | Km. | |
| June 23 | N | iPS | 13 19 55 | ... | ... | ... | |
| | | eSS | 24 27 | ... | ... | ... | |
| | | eSSS | 27 34 | ... | ... | ... | |
| | | eL | 34 39 | ... | ... | ... | |
| | | M | 40 27 | ... | ... | ... | |
| | | Mn | 50 39 | 25 | 26 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 24 | N | e | 12 52 46 | ... | ... | ... | Slight, near. |
| | | i | 55 18 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 25—26 | N | i | 23 56 26 | ... | ... | ... | Slight, very distant. |
| | | i | 0 4 55 | ... | ... | ... | |
| | | Mn | 29 37 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 29 | N | i | 9 54 17 | ... | ... | ... | Slight, distant. |
| | | Mn | 10 4 27 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 30 | N | i | 17 8 25 | ... | ... | ... | Slight, very distant. |
| | | Mn | 39 55 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |

METEOROLOGICAL OFFICE, ALIPORE, CALCUTTA.

S. K. PRAMANIK,
*Meteorologist.*



# COLOMBO OBSERVATORY, CEYLON. —

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **April, 1938.** | | | | | | | |
| 1938 | | | h. m. s. | sec. | mm. | Km. | |
| Apr. 1 | E | e | 00 51 30 | ... | ... | ... | |
| | | F | 02 08 ... | ... | ... | ... | |
| ,, 1 | E | e | 21 39 ... | ... | ... | ... | |
| | | F | 22 57 30 | ... | ... | ... | |
| ,, 2 | E | e | 06 29 ... | ... | ... | ... | |
| | | F | 08 30 ... | ... | ... | ... | |
| ,, 3 | E | e | 11 09 ... | ... | ... | ... | |
| | | F | 12 09 30 | ... | ... | ... | |
| ,, 4 | E | e | 19 37 30 | ... | ... | ... | |
| | | F | 20 02 30 | ... | ... | ... | |
| ,, 4 | E | (PP) | 21 18 52 | ... | ... | ... | M not pronounced; amplitude <0·3 mm. |
| | | S | 23 46 | ... | ... | ... | |
| | | F | 41 30 | ... | ... | ... | |
| ,, 10-11 | E | Record lost from | 21 33 ... | ... | ... | ... | |
| | | to | 01 07 ... | ... | ... | ... | |
| ,, 13 | E | e | 01 14 30 | ... | ... | ... | |
| | | F | 42 30 | ... | ... | ... | |
| ,, 13 | E | P | 02 56 07 | ... | ... | ... | The S-waves commence with a swing of bigger amplitude than any other in this shock. M not pronounced; amplitude <0·5 mm. |
| | | S | 03 04 23 | ... | ... | ... | |
| | | F | 54 30 | ... | ... | ... | |
| ,, 14 | E | P | 01 21 16 | ... | ... | ... | |
| | | S | 25 07 | ... | ... | ... | The actual maximum is lost in the 7 hour mark (Ceylon Standard Time) of 30 seconds duration. Amp. probably greater than 2·7 mm. |
| | | L | 26 23 | ... | ... | ... | |
| | | M | 29 04 | ... | ... | ... | |
| | | F | 02 56 30 | ... | ... | ... | |
| ,, 17 | E | $P_1$ | 09 07 01 | ... | ... | ... | M not pronounced. |
| | | S | 15 52 | ... | ... | ... | |
| | | M | 35 06 | ... | 0·2 | ... | |
| | | F | 10 17 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | mm. | Km. | |
| Apr. 17 | E | P | 14 59 18 | ... | ... | ... | M not pronounced. |
| | | M | 16 01 31 | ... | 0·3 | ... | |
| | | F | 44 30 | ... | ... | ... | |
| ,, 19 | E | P | 11 08 34 | ... | ... | ... | |
| | | S | 15 55 | ... | ... | ... | |
| | | L | 26 53 | ... | ... | ... | |
| | | M | 29 05 | ... | 2·5 | ... | |
| | | F | 13 15 ... | ... | ... | ... | |
| ,, 20 | E | (e) | 06 37 05 | ... | ... | ... | S elusive. |
| | | L | 07 12 10 | ... | ... | ... | |
| | | M | 25 23 | ... | 0·9 | ... | |
| | | F | 08 58 30 | ... | ... | ... | |
| ,, 21 | E | P | 01 26 51 | ... | ... | ... | M not pronounced; amplitude <0·3 mm. |
| | | S | 36 12 | ... | ... | ... | |
| | | F | 02 25 ... | ... | ... | ... | |
| ,, 23 | E | P | 00 37 12 | ... | ... | ... | |
| | | S | Lost while changing chart. | | | | |
| | | L | 00 53 58 | ... | ... | ... | |
| | | M | 01 02 00 | ... | 0·4 | ... | |
| | | F | 42 30 | ... | ... | ... | |
| ,, 23 | E | e | 04 01 ... | ... | ... | ... | |
| | | F | 14 30 | ... | ... | ... | |
| ,, 23 | E | e | 06 08 ... | ... | ... | ... | |
| | | F | 07 17 ... | ... | ... | ... | |
| ,, 23 | E | e | 09 37 30 | ... | ... | ... | |
| | | F | 10 21 30 | ... | ... | ... | |
| ,, 26 | E | e | 11 59 ... | ... | ... | ... | |
| | | F | 13 24 ... | ... | ... | ... | |
| ,, 26-27 | E | Record lost from | 14 37 30 | ... | ... | ... | |
| | | to | 04 01 30 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **May, 1938.** | | | | | | | |
| May 6 | E | P | 03 45 55 | ... | ... | ... | M not pronounced; amplitude <0·5mm. |
| | | S? | 50 05 | ... | ... | ... | |
| | | F | 04 22 30 | ... | ... | ... | |
| ,, 6 | E | e | 19 49 30 | ... | ... | ... | |
| | | F | 20 17 ... | ... | ... | ... | |
| ,, 8 | E | ? | 13 57 12 | ... | ... | ... | |
| | | ? | 14 05 56 | ... | ... | ... | |
| | | M | 35 54 | ... | 1·4 | ... | |
| | | F | 16 46 ... | ... | ... | ... | |
| ,, 9 | E | eP | 15 46 20 | ... | ... | ... | M not pronounced; amplitude <0·5 mm. |
| | | S? | 49 46 | ... | ... | ... | |
| | | F | 16 30 ... | ... | ... | ... | |
| ,, 11 | E | e | 14 51 30 | ... | ... | ... | |
| | | F | 16 47 30 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | mm. | Km. | |
| May 12 | E | P | 15 50 06 | ... | ... | ... | |
| | | S | 59 24 | ... | ... | ... | |
| | | L | 16 09 48 | ... | ... | ... | |
| | | M | 16 51 | ... | 12·5 | ... | |
| | | F | 19 45 30 | ... | ... | ... | |
| ,, 12 | E | ? | 21 31 44 | ... | ... | ... | |
| | | M | 22 00 12 | ... | 0·2 | ... | |
| | | F | 23 06 30 | ... | ... | ... | |
| ,, 13 | E | e | 15 16 ... | ... | ... | ... | |
| | | F | 42 ... | ... | ... | ... | |
| ,, 14 | E | P | 12 09 51 | ... | ... | ... | M not pronounced amplitude <0·5 mm. S and L unreadable owing to overlapping trace. |
| | | F | 13 22 30 | ... | ... | ... | |
| ,, 16 | E | e | 07 12 30 | ... | ... | ... | |
| | | F | 54 30 | ... | ... | ... | |

# COLOMBO OBSERVATORY, CEYLON. —

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **May, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | mm. | Km. | |
| May 16 | E | e | 15 40 ... | ... | ... | ... | |
| | | F | 16 00 30 | ... | ... | ... | |
| „ 19 | E | P | 17 16 08 | ... | ... | ... | |
| | | (PP?) | 18 15 | ... | ... | ... | |
| | | S | 22 03 | ... | ... | ... | |
| | | L | 28 08 | ... | ... | ... | |
| | | M | 32 48 | ... | 105 | ... | M wave cut off on east side by lens frame. Amp. appr. |
| | | F | 20 59 30 | ... | ... | ... | |
| „ 22 | E | e | 08 42 30 | ... | ... | ... | |
| | | F | 09 08 30 | ... | ... | ... | |
| „ 23 | E | P | 07 28 58 | ... | ... | ... | |
| | | S | 37 28 | ... | ... | ... | |
| | | L | 49 51 | ... | ... | ... | |
| | | M | 58 51 | ... | 29·0 | ... | |
| **June, 1938.** | | | | | | | |
| June 9 | E | eP | 19 23 47 | ... | ... | ... | |
| | | iP | 23 49 | ... | ... | ... | |
| | | S | 30 48 | ... | ... | ... | |
| | | SS? | 34 24 | ... | ... | ... | |
| | | L | 40 05 | ... | ... | ... | |
| | | M | 44 31 | ... | 6·0 | ... | |
| | | F | 21 21 ... | ... | ... | ... | |
| „ 10 | E | P | 10 02 03 | ... | ... | ... | |
| | | S? | 09 08 | ... | ... | ... | |
| | | L? | 16 33 | ... | ... | ... | |
| | | M | 31 43 | ... | 5·9 | ... | |
| | | F | 13 01 30 | ... | ... | ... | |
| „ 16 | E | e | 02 02 ... | ... | ... | ... | |
| | | F | Merged into the following shock. | | | | |
| „ 16 | E | P | 02 24 20 | ... | ... | ... | |
| | | S | 31 36 | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | mm. | Km. | |
| „ 23 | E | P | 08 29 31 | ... | ... | ... | The P waves of th shock are superim posed on the dim nishing end wave of preceding shock. |
| | | S | 35 14 | ... | ... | ... | |
| | | L | 43 50 | ... | ... | ... | |
| | | M | ... ... ... | ... | 4·6 | ... | |
| | | F | 12 12 ... | ... | ... | ... | |
| „ 28 | E | e | 16 54 30 | ... | ... | ... | |
| | | F | 18 07 ... | ... | ... | ... | |
| „ 30 | E | P | 14 42 57 | ... | ... | ... | |
| | | S | 53 32 | ... | ... | ... | |
| | | L | 15 10 ... | ... | ... | ... | |
| | | M | 21 51 | ... | 0·8 | ... | |
| | | F | 17 28 ... | ... | ... | ... | |
| | | L | 42 00 | ... | ... | ... | |
| | | M | 46 12 | ... | 10·0 | ... | |
| | | F | 05 16 30 | ... | ... | ... | |
| June 20-21 | E | eP] | 23 57 37 | ... | ... | ... | P uncertain owing gradual emergen from microseism |
| | | S | 00 03 04 | ... | ... | ... | |
| | | (SS)] | 06 01 | ... | ... | ... | |
| | | L | 10 49 | ... | ... | ... | |
| | | M | 12 34 | ... | 12·3 | ... | |
| | | F | 02 03 30 | ... | ... | ... | |
| „ 23 | E | (SKS) | 13 19 04 | ... | ... | ... | M not pronounce amplitude sli 0·5 mm. |
| | | F | 14 43 ... | ... | ... | ... | |
| „ 27 | E | e | 10 23 ... | ... | ... | ... | |
| | | F | 53 30 | ... | ... | ... | |
| „ 30 | E | e | 16 56 30 | ... | ... | ... | |
| | | F | 18 02 ... | ... | ... | ... | |

D. T. E. DASSANAYAKE,
*Ag. Superintendent.*

COLOMBO OBSERVATORY.



# HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| **April, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | On trace in inch. | Km. | |
| Apr. 19 | N | cP | 11 06 50? | 11 | ·01 | 5411? | |
| | | eS? | 12 12? | 12 | ·015 | ... | |
| | | iP | 18 04 | 25 | ·030 | ... | |
| **May, 1938.** | | | | | | | |
| May 8 | N | e | 14 00 34? | 12 | ·002 | ... | |
| | | e | 09 50? | 12 | ·004 | ... | |
| | | e? | 15 37? | 12 | ·006 | ... | |
| | | eL | 27 26? | 20 | ·028 | ... | |
| | | $M_1$ | 31 20 | 21 | ·051 | ... | |
| | | $M_2$ | 36 06 | 16 | ·039 | ... | |
| | | $M_3$ | 39 15 | 16 | ·034 | ... | |
| | | $M_4$ | 43 13 | 17 | ·021 | ... | |
| | | F | 15 23 47? | ... | ... | ... | |
| „ 9 | N | eS | 15 48 59? | 10 | ·002 | 1522? | |
| | | eL? | 53 17? | 12 | ·005 | ... | |
| | | M | 53 47 | 12 | ·005 | ... | |
| | | F | 16 20 14? | ... | ... | ... | |
| „ 12 | N | eP | 15 50 49 | 18 | ·011 | 8398 | |
| | | iS | 59 37? | 28 | ·168 | ... | |
| | | | 16 00 25? | ... | ... | ... | |
| | | i? | 04 45 | 29 | ·075 | ... | |
| | | eL? | 15 34 | 24 | ·173 | ... | |
| | | e? | 25 27 | 34 | ·405 | ... | |
| | | M | 27 25 | 34 | ·405 | ... | |
| | | F | 18 33 14? | ... | ... | ... | |
| „ 12 | N | e | 21 45 10? | 7 | ·003 | 3337? | |
| | | e | 49 59? | 10 | ·004 | ... | |
| | | eL | 54 19 | 20 | ·015 | ... | |
| | | M | 56 28 | 17 | ·019 | ... | |
| | | F | 22 37 13? | ... | ... | ... | |
| „ 14 | N | eP | 12 07 30 | 5 | ·001 | 2424 | |
| | | iS | 11 16 | 8 | ·005 | ... | |
| | | eL | 14 54? | 14 | ·033 | ... | |
| | | M | 15 12 | 14 | ·033 | ... | |
| | | F | 50 45? | ... | ... | ... | |
| „ 19 | N | iP | 17 17 44 | 23 | ·053 | 5614 | Direction of 1st motion: South. |
| | | i? | 18 55 | 16 | ·054 | ... | |
| 1938. | | | h. m. s. | sec. | On trace in inch. | Km. | |
| Apr. 19 | | eL | 21 22? | 27 | ·14 | ... | |
| | | M | 22 30 | 27 | ·14 | ... | |
| | | F | 12 22 35? | ... | ... | ... | |
| May 19 | N | iS | 24 54 | 28 | ·275 | ... | |
| | | i? | 27 20 | 29 | ·370 | ... | |
| | | i? | 31 49 | 28 | ·394 | ... | |
| | | eL? | 34 49? | 31 | 1·286 | ... | |
| | | $M_1$ | 41 22 | 24 | 2·165 | ... | |
| | | $M_2$ | 48 35 | 25 | 1·209 | ... | |
| | | F | 19 41 29? | ... | ... | ... | |
| „ 23 | N | iP | 7 27 39 | 24 | ·014 | 5952 | Direction of 1st motion: South. |
| | | iS | 35 05 | 26 | ·030 | ... | |
| | | i? | 39 06 | 23 | ·166 | ... | |
| | | iL | 44 51 | 35 | ·420 | ... | |
| | | $M_1$ | 51 15 | 25 | 1·160 | ... | |
| | | $M_2$ | 8 44 03 | 26 | ·211 | ... | |
| | | F | 10 49 39? | ... | ... | ... | |
| „ 24 | N | eP? | 9 41 16 | 1 | ·001 | 473 | |
| | | eS? | 42 01 | 2 | ·001 | ... | |
| | | | | 12 | | ... | |
| | | M | 42 12 | 2 | ·002 | ... | |
| | | | | 12 | | ... | |
| | | F | 54 43? | ... | ... | ... | |
| „ 28 | N | e | 16 52 34? | 7 | ·001 | 7383 | |
| | | e? | 58 20 | 9 | ·005 | ... | |
| | | i | 17 02 57 | 8 | ·004 | ... | |
| | | iL | 11 57 | 16 | ·008 | ... | |
| | | M | 15 23 | 17 | ·016 | ... | |
| | | F | 18 00 33? | ... | ... | ... | |
| „ 30 | N | eP? | 14 43 59? | 4 | ·001 | ... | |
| | | e? | 49 29? | 8 | ·003 | ... | |
| | | e? | 55 51? | 14 | ·005 | ... | |
| | | e? | 15 17 33? | 22 | ·006 | ... | |
| | | e? | 28 09? | 24 | ·012 | ... | |
| | | e? | 37 33? | 21 | ·012 | ... | |
| | | M | 46 32 | 20 | ·012 | ... | |
| | | F | 16 13 51? | ... | ... | ... | |
| **June, 1938.** | | | | | | | |
| June 9 | N | eP | 19 25 17 | 15 | ·006 | 5523 | |
| | | eS | 32 19 | 15 | ·025 | ... | |
| | | i? | 37 16 | 19 | ·065 | ... | |
| | | eL | 43 07? | 32 | ·108 | ... | |
| | | $M_1$ | 50 48 | 26 | ·353 | ... | |
| | | $M_2$ | 52 43 | 25 | ·180 | ... | |
| | | $M_3$ | 55 06 | 25 | ·054 | ... | |
| | | $M_4$ | 57 32 | 24 | ·095 | ... | |
| | | F | 20 56 00? | ... | ... | ... | |
| June 10 | N | eP? | 10 00 54 | 8 | ·005 | 4824 | |
| | | iS | 07 16 | 14 | ·048 | ... | |
| | | i? | 10 20 | 22 | ·105 | ... | |
| | | i? | 11 26 | 22 | ·145 | ... | |
| | | iL | 13 53? | 26 | 1·688 | ... | |
| | | $M_1$ | 16 25 | 26 | 1·688 | ... | |
| | | $M_2$ | 21 52 | 25 | ·513 | ... | |
| | | F | 11 58 53? | ... | ... | ... | |

# HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

## June, 1938.

| Date. | Compt | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938 | | | h. m. s. | sec. | On trace in inch. | Km. | |
| June 16 | N | eP? | 2 22 35 | 2 | ·002 | 5963 | |
| | | eS | 29 22 | 14 | ·005 | ... | |
| | | e? | 32 27 | 22 | ·030 | ... | |
| | | iL | 38 29 | 25 | ·838 | ... | |
| | | $M_1$ | 39 59 | 25 | ·838 | ... | |
| | | $M_2$ | 45 35 | 18 | ·113 | ... | |
| | | F | 3 45 16 | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | On trace in inch. | Km. | |
| June 20-21 | N | eP | 23 53 25 | 8 | ·009 | 1217 | |
| | | iS | 55 22 | 2 | ·045 | ... | |
| | | | | 25 | ·084 | ... | |
| | | iL? | 57 33? | 21 | ·595 | ... | |
| | | M | 58 29 | 21 | ·595 | ... | |
| | | F | 1 19 32? | ... | ... | ... | |

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DEHRA DUN.



# NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 1 | N | M | 1 9 53 | 10 | 4 | ... | |
| | E | M | 13 53 | 10 | 3 | ... | |
| ,, 2 | N | M | 7 6 11 | 18 | 8 | ... | |
| | E | M | 9 21 | 18 | 7 | ... | |
| | N | F | 8 41 ... | ... | ... | ... | |
| ,, 3 | N | M | 11 29 26 | 15 | 5 | ... | |
| | E | M | 31 22 | 15 | 4 | ... | |
| ,, 4 | E | M | 19 44 1 | 12 | 8 | ... | |
| | N | M | 44 46 | 9 | 3 | ... | |
| ,, 4 | E, N | S | 21 24 41 | ... | ... | ... | Slight. |
| | N | M | 30 25 | 8 | 2 | ... | |
| | E | M | 31 50 | 8 | 2 | ... | |
| ,, 10 | N | M | 5 21 41 | 9 | 5 | ... | |
| | E | M | 21 42 | 9 | 5 | ... | |
| ,, 13 | E, N | S | 1 16 21 | ... | ... | ... | P not clear. |
| | N | M | 17 50 | 6 | 14 | ... | |
| | E | M | 18 2 | 6 | 6 | ... | |
| ,, 13 | E N | S | 3 2 48 | ... | ... | ... | P not clear. |
| | E | M | 23 40 | 12 | 4 | ... | |
| | N | M | 24 9 | 8 | 2 | ... | |
| ,, 14 | E, N | P | 1 20 6 | ... | ... | 1620 | |
| | E, N | S | 22 55 | ... | ... | ... | |
| | N | L | 24 13 | ... | ... | ... | |
| | E | M | 24 51 | 10 | 46 | ... | |
| | N | M | 25 5 | 10 | 45 | ... | |
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 17 | E | M | 16 1 0 | 18 | 6 | ... | Distant. |
| | N | M | 1 20 | 20 | 5 | ... | |
| ,, 19 | E, N | P | 11 7 37 | ... | ... | 4780 | Turkey. |
| | E | PcP | 9 22 | ... | ... | ... | |
| | E, N | S | 14 7 | ... | ... | ... | |
| | E | ScS | 17 34 | ... | ... | ... | |
| | E | L | 21 2 | ... | ... | ... | |
| | E | M | 25 27 | 19 | 84 | ... | |
| | N | M | 25 43 | 17 | 48 | ... | |
| | N | F | 13 7 ... | ... | ... | ... | |
| ,, 20 | N | M | 7 25 19 | 18 | 8 | ... | |
| | E | M | 26 9 | 18 | 7 | ... | |
| ,, 21 | E | M | 1 57 49 | 15 | 4 | ... | |
| | N | M | 58 19 | 12 | 3 | ... | |
| ,, 23 | E, N | P | 0 37 15 | ... | ... | 5490 | Times approximate. |
| | E, N | S | 44 23 | ... | ... | ... | |
| | E | L | 52 50 | ... | ... | ... | |
| | N | M | 1 0 0 | 12 | 10 | ... | |
| | E | M | 2 30 | 12 | 7 | ... | |
| ,, 23 | E | M | 6 19 34 | 12 | 4 | ... | |
| | N | M | 20 42 | 12 | 3 | ... | |
| ,, 25 | E | M | 15 43 0 | 10 | 3 | ... | |
| | N | M | ... 43 27 | 9 | 3 | ... | |

## May, 1938.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| May 6 | N | M | 3 52 47 | 8 | 5 | ... | |
| | E | M | 53 27 | 8 | 6 | ... | |
| ,, 8 | N | L | 14 19 0 | ... | ... | ... | |
| | N | M | 23 36 | 15 | 29 | ... | |
| | E | M | 24 6 | 15 | 19 | ... | |
| ,, 9 | E, N | eP | 15 44 41 | ... | ... | 2380 | |
| | E, N | S | 48 36 | ... | ... | ... | |
| | N | M | 54 39 | 12 | 11 | ... | |
| | E | M | 54 55 | 10 | 6 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 11 | E | M | 16 6 54 | 22 | 17 | ... | Distant. |
| | N | M | 8 45 | 22 | 10 | ... | |
| ,, 12 | E, N | P | 15 15 30 | ... | ... | 7840 | |
| | E, N | S | 59 42 | ... | ... | ... | |
| | N | L | 16 2 56 | ... | ... | ... | |
| | E | M | 23 36 | 20 | 83 | ... | |
| | N | M | 25 36 | 20 | 90 | ... | |
| | | F | Lost in microseisms. | | | | |
| May 12 | N | M | 21 56 42 | 15 | 7 | ... | |
| | E | M | 56 48 | 14 | 8 | ... | |
| ,, 14 | E, N | P | 12 7 52 | ... | ... | 2340 | |
| | E, N | S | 11 44 | ... | ... | ... | |
| | N | SS | 12 14 | ... | ... | ... | |
| | N | L | 13 59 | ... | ... | ... | |
| | N | M | 17 5 | 10 | 21 | ... | |
| | E | M | 17 11 | 10 | 14 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 16 | E | M | 15 49 43 | 8 | 3 | ... | |
| | N | M | 50 22 | 6 | 1 | ... | |
| ,, 19 | E, N | P | 17 16 42 | ... | ... | 5220 | |
| | N | PcP | 18 2 | ... | ... | ... | |
| | N | PP | 18 27 | ... | ... | ... | |
| | E, N | S | 23 36 | ... | ... | ... | |
| | N | ScS | 26 5 | ... | ... | ... | |
| | N | SS | 26 51 | ... | ... | ... | |
| | N | L | 30 21 | ... | ... | ... | |

# HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

## June, 1938.

| Date. | Compt | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938 June 16 | N | eP? | h. m. s. 2 22 35 | sec. 2 | On trace in inch. ·002 | Km. 5963 | |
| | | eS | 29 22 | 14 | ·005 | ... | |
| | | e? | 32 27 | 22 | ·030 | ... | |
| | | iL | 38 29 | 25 | ·838 | ... | |
| | | $M_1$ | 39 59 | 25 | ·838 | ... | |
| | | $M_2$ | 45 35 | 18 | ·113 | ... | |
| | | F | 3 45 16 | ... | ... | ... | |
| 1938. June 20-21 | N | eP | 23 53 25 | 8 | ·009 | 1217 | |
| | | iS | 55 22 | 2 | ·045 | ... | |
| | | | | 25 | ·084 | ... | |
| | | iL? | 57 33? | 21 | ·595 | ... | |
| | | M | 58 29 | 21 | ·595 | ... | |
| | | F | 1 19 32? | ... | ... | ... | |

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DEHRA DUN.



# NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. Apr. 1 | N | M | h. m. s. 1 9 53 | sec. 10 | μ 4 | Km. ... | |
| | E | M | 13 53 | 10 | 3 | ... | |
| „ 2 | N | M | 7 6 11 | 18 | 8 | ... | |
| | E | M | 9 21 | 18 | 7 | ... | |
| | N | F | 8 41 ... | ... | ... | ... | |
| „ 3 | N | M | 11 29 26 | 15 | 5 | ... | |
| | E | M | 31 22 | 15 | 4 | ... | |
| „ 4 | E | M | 19 44 1 | 12 | 8 | ... | |
| | N | M | 44 46 | 9 | 3 | ... | |
| „ 4 | E, N | S | 21 24 41 | ... | ... | ... | Slight. |
| | N | M | 30 25 | 8 | 2 | ... | |
| | E | M | 31 50 | 8 | 2 | ... | |
| „ 10 | N | M | 5 21 41 | 9 | 5 | ... | |
| | E | M | 21 42 | 9 | 5 | ... | |
| „ 13 | E, N | S | 1 16 21 | ... | ... | ... | P not clear. |
| | N | M | 17 50 | 6 | 14 | ... | |
| | E | M | 18 2 | 6 | 6 | ... | |
| „ 13 | E N | S | 3 2 48 | ... | ... | ... | P not clear. |
| | E | M | 23 40 | 12 | 4 | ... | |
| | N | M | 24 9 | 8 | 2 | ... | |
| „ 14 | E, N | P | 1 20 6 | ... | ... | 1620 | |
| | E, N | S | 22 55 | ... | ... | ... | |
| | N | L | 24 13 | ... | ... | ... | |
| | E | M | 24 51 | 10 | 46 | ... | |
| | N | M | 25 5 | 10 | 45 | ... | |
| 1938. Apr. 17 | E | M | h. m. s. 16 1 0 | sec. 18 | μ 6 | Km. ... | Distant. |
| | N | M | 1 20 | 20 | 5 | ... | |
| „ 19 | E, N | P | 11 7 37 | ... | ... | 4780 | Turkey. |
| | E | PcP | 9 22 | ... | ... | ... | |
| | E, N | S | 14 7 | ... | ... | ... | |
| | E | ScS | 17 34 | ... | ... | ... | |
| | E | L | 21 2 | ... | ... | ... | |
| | E | M | 25 27 | 19 | 84 | ... | |
| | N | M | 25 43 | 17 | 48 | ... | |
| | N | F | 13 7 ... | ... | ... | ... | |
| „ 20 | N | M | 7 25 19 | 18 | 8 | ... | |
| | E | M | 26 9 | 18 | 7 | ... | |
| „ 21 | E | M | 1 57 49 | 15 | 4 | ... | |
| | N | M | 58 19 | 12 | 3 | ... | |
| „ 23 | E, N | P | 0 37 15 | ... | ... | 5490 | Times approximate. |
| | E, N | S | 44 23 | ... | ... | ... | |
| | E | L | 52 50 | ... | ... | ... | |
| | N | M | 1 0 0 | 12 | 10 | ... | |
| | E | M | 2 30 | 12 | 7 | ... | |
| „ 23 | E | M | 6 19 34 | 12 | 4 | ... | |
| | N | M | 20 42 | 12 | 3 | ... | |
| „ 25 | E | M | 15 43 0 | 10 | 3 | ... | |
| | N | M | ... 43 27 | 9 | 3 | ... | |

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| May 6 | N | M | h. m. s. 3 52 47 | sec. 8 | μ 5 | Km. ... | |
| | E | M | 53 27 | 8 | 6 | ... | |
| „ 8 | N | L | 14 19 0 | ... | ... | ... | |
| | N | M | 23 36 | 15 | 29 | ... | |
| | E | M | 24 6 | 15 | 19 | ... | |
| „ 9 | E, N | eP | 15 44 41 | ... | ... | 2380 | |
| | E, N | S | 48 36 | ... | ... | ... | |
| | N | M | 54 39 | 12 | 11 | ... | |
| | E | M | 54 55 | 10 | 6 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 11 | E | M | 16 6 54 | 22 | 17 | ... | Distant. |
| | N | M | 8 45 | 22 | 10 | ... | |
| „ 12 | E, N | P | 15 15 30 | ... | ... | 7840 | |
| | E, N | S | 59 42 | ... | ... | ... | |
| | N | L | 16 2 56 | ... | ... | ... | |
| | E | M | 23 36 | 20 | 83 | ... | |
| | N | M | 25 36 | 20 | 90 | ... | |
| | | F | Lost in microseisms. | | | | |
| 1938. May 12 | N | M | h. m. s. 21 56 42 | sec. 15 | μ 7 | Km. ... | |
| | E | M | 56 48 | 14 | 8 | ... | |
| „ 14 | E, N | P | 12 7 52 | ... | ... | 2340 | |
| | E, N | S | 11 44 | ... | ... | ... | |
| | N | SS | 12 14 | ... | ... | ... | |
| | N | L | 13 59 | ... | ... | ... | |
| | N | M | 17 5 | 10 | 21 | ... | |
| | E | M | 17 11 | 10 | 14 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 16 | E | M | 15 49 43 | 8 | 3 | ... | |
| | N | M | 50 22 | 6 | 1 | ... | |
| „ 19 | E, N | P | 17 16 42 | ... | ... | 5220 | |
| | N | PcP | 18 2 | ... | ... | ... | |
| | N | PP | 18 27 | ... | ... | ... | |
| | E, N | S | 23 36 | ... | ... | ... | |
| | N | ScS | 26 5 | ... | ... | ... | |
| | N | SS | 26 51 | ... | ... | ... | |
| | N | L | 30 21 | ... | ... | ... | |

# NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 19 | N | M | 17 32 21 | 23 | 840 | ... | |
| | E | M | 33 57 | 23 | 970 | ... | |
| | N | F | 21 23 ... | ... | ... | ... | |
| „ 23 | E, N | P | 7 28 27 | ... | ... | 6390 | |
| | E | PP | 30 24 | ... | ... | ... | |
| | E, N | S | 36 24 | ... | ... | ... | |
| | E | PS | 36 40 | ... | ... | ... | |
| | E | ScS | 38 6 | ... | ... | ... | |
| | E | SS | 40 8 | ... | ... | ... | |
| | E | L | 42 45 | ... | ... | ... | |
| | E | M | 51 38 | 22 | 464 | ... | |
| | N | M | 53 30 | 22 | 271 | ... | |
| | | F | Lost in microseisms. | | | | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 24 | E | M | 9 49 8 | 9 | 4 | ... | |
| | N | M | 49 22 | 9 | 4 | ... | |
| „ 28 | E, N | S | 17 0 30 | ... | ... | ... | |
| | N | M | 18 33 | 14 | 8 | ... | |
| | E | M | 18 33 | 12 | 7 | ... | |
| „ 30 | E, N | P | 14 43 19 | ... | ... | 10380 | |
| | N | SKS | 53 49 | ... | ... | ... | |
| | E, N | S | 54 34 | ... | ... | ... | |
| | N | SS | 15 1 4 | ... | ... | ... | |
| | N | L | 15 54 | ... | ... | ... | |
| | N | M | 29 1 | 19 | 29 | ... | |
| | E | M | 29 43 | 16 | 9 | ... | |
| | | F | Lost in microseisms. | | | | |

## June, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| June 9 | E, N | P | 10 24 15 | ... | ... | 5870 | |
| | N | PP | 26 25 | ... | ... | ... | |
| | E | S | 31 31 | ... | ... | ... | |
| | N | S | 31 44 | ... | ... | ... | |
| | N | ScS | 34 6 | ... | ... | ... | |
| | N | SS | 35 3 | ... | ... | ... | |
| | N | L | 40 16 | ... | ... | ... | |
| | N | M | 49 21 | 20 | 53 | ... | |
| | E | M | 49 21 | 20 | 42 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 10 | E, N | P | 10 1 42 | ... | ... | 5090 | |
| | E, N | S | 8 29 | ... | ... | ... | |
| | N | SS | 12 4 | ... | ... | ... | |
| | N | L | 16 7 | ... | ... | ... | |
| | N | M | 19 46 | 17 | 278 | ... | |
| | E | M | 19 48 | 13 | 74 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 16 | E, N | P | 2 23 47 | ... | ... | 5440 | Times approximate. |
| | E, N | S | 30 53 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| June 16 | N | SeS | 2 33 32 | ... | ... | ... | |
| | E | L | 39 0 | ... | ... | ... | |
| | N | M | 42 0 | 18 | 172 | ... | |
| | E | M | 42 45 | 15 | 73 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 20-21 | N | P | 23 56 0 | ... | ... | 2790 | |
| | N | PP | 56 31 | ... | ... | ... | |
| | N | S | 0 0 26 | ... | ... | ... | |
| | N | L | 3 44 | ... | ... | ... | |
| | N | M | 5 53 | 13 | 294 | | |
| | | F | Lost in microseisms. | | | | |
| „ 21 | N | M | 7 10 3 | 13 | 5 | ... | |
| „ 23 | E, N | eP | 13 9 4 | ... | ... | 9220 | |
| | E, N | SKS? | 19 25 | ... | ... | ... | |
| | N | PS | 20 10 | ... | ... | ... | |
| | N | L | 37 12 | ... | ... | ... | |
| | N | M | 48 58 | 22 | 12 | ... | |
| | E | M | 52 4 | 21 | 6 | ... | |
| | N | F | 4 15 ... | ... | ... | ... | |

NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

T. P. BHASKARA SASTRI,
*Director.*



# KODAIKANAL OBSERVATORY, KODAIKANAL.

## April 2, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 1 | E | ... | ... ... ... | ... | ... | ... | Lines overlapping. |
| „ 1 | E | e | 6 21 ... | ... | ... | ... | Phases not clear. No time marks. |
| | | F | 9 6 ... | ... | ... | ... | |
| „ 3 | E | i | 11 12 45 | ... | ... | ... | Distant. Phases not clear. No time marks. |
| | | F | 13 7 ... | ... | ... | ... | |
| „ 4 | E | i | 19 34 22 | ... | ... | ... | Time marks not clear. |
| | | e | 35 25 | ... | ... | ... | |
| | | M | 37 ... | 11 | 12 | ... | |
| | | F | 20 4 ... | ... | ... | ... | |
| „ 4 | E | e | 21 15 ... | ... | ... | ... | Slight. |
| | | F | 53 ... | ... | ... | ... | |
| „ 13 | E | eP | 1 14 37 | ... | ... | 2320 | Slight. |
| | | ePP | 14 53 | ... | ... | ... | |
| | | eS | 18 23 | ... | ... | ... | |
| | | L | 20 34 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| „ 13 | E | iP | 2 55 45 | ... | ... | 6430 | Phases L and M lost by the removal of the sheet. |
| | | PP | 58 9 | ... | ... | ... | |
| | | S | 3 3 50 | ... | ... | ... | |
| | | SS | 8 ... | ... | ... | ... | |
| | | F | 4 15 ... | ... | ... | ... | |
| „ 14 | E | iP | 1 21 11 | ... | ... | 2135 | |
| | | PP | 21 27 | ... | ... | ... | |
| | | iS | 24 47 | ... | ... | ... | |
| | | SS | 25 22 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | Not significant. Lines overlapping. |
| | | M | ? ... | ... | ... | ... | |
| | | F | ? ... | ... | ... | ... | |
| „ 14 | E | e | 4 43 ... | ... | ... | ... | Slight. |
| | | F | 5 59 ... | ... | ... | ... | |
| „ 14 | E | e | 15 3 ... | ... | ... | ... | |
| | | F | 32 ... | ... | ... | ... | |
| „ 16 | E | e | 16 19 ... | ... | ... | ... | Tremors. |
| | | F | 31 ... | ... | ... | ... | |
| „ 17 | E | e | 4 32 ... | ... | ... | ... | Tremors. |
| | | F | 48 ... | ... | ... | ... | |
| „ 17 | E | e | 9 7 ... | ... | ... | ... | Feeble shock. |
| | | F | 10 27 ... | ... | ... | ... | |
| „ 17 | E | e | 14 59 ... | ... | ... | ... | Feeble shock. |
| | | F | 17 1 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 19 | E | iP | 11 8 8 | ... | ... | 5185 | First movement to E. Epicentre Anatolia. |
| | | iPP | 9 45 | ... | ... | ... | |
| | | iPPP | 10 28 | ... | ... | ... | |
| | | iS | 15 3 | ... | ... | ... | |
| | | iSS | 18 10 | ... | ... | ... | |
| | | iSSS | 19 0 | ... | ... | ... | |
| | | iL | 21 13 | ... | ... | ... | |
| | | Mn | 30 37 | 18 | 86 | ... | |
| | | F | 14 51 ... | ... | ... | ... | |
| „ 20 | E | e | 22 4 ... | ... | ... | ... | Feeble shock. |
| | | F | 8 ... | ... | ... | ... | |
| „ 20 | E | eP | 6 41 00 | ... | ... | 11000 | |
| | | ePPP | 47 5 | ... | ... | ... | |
| | | iSKS | 51 36? | ... | ... | ... | |
| | | iSKKS | 52 11 | ... | ... | ... | |
| | | iS | 52 34 | ... | ... | ... | |
| | | iPS | 53 52 | ... | ... | ... | |
| | | iPPS | 54 33 | ... | ... | ... | |
| | | iSS | 59 24 | ... | ... | ... | |
| | | iSSS | 7 3 49 | ... | ... | ... | |
| | | L | 15 22 | ... | ... | ... | |
| | | M | 22 23 | 23 | 30 | ... | |
| | | F | 9 40 ... | ... | ... | ... | |
| „ 21 | E | e | 16 46 ... | ... | ... | ... | Tremors. |
| | | F | 17 25 ... | ... | ... | ... | |
| „ 23 | E | iP | 0 37 13 | ... | ... | 5900 | First movement to W. |
| | | iS | 44 48 | ... | ... | ... | |
| | | SSS | 49 28 | ... | ... | ... | |
| | | L | 53 10 | ... | ... | ... | |
| | | Mn | 1 4 50 | 15 | 4 | ... | |
| | | F | 2 5 ... | ... | ... | ... | |
| „ 23 | E | e | 6 9 ... | ... | ... | ... | Feeble shock. |
| | | F | 7 11 ... | ... | ... | ... | |
| „ 23 | E | e | 9 31 ... | ... | ... | ... | Feeble shock. |
| | | F | 10 27 ... | ... | ... | ... | |
| „ 23 | E | e | 23 8 ... | ... | ... | ... | Tremors. |
| | | F | 18 ... | ... | ... | ... | |
| „ 24 | E | e | 2 6 ... | ... | ... | ... | Tremors. |
| | | F | 26 ... | ... | ... | ... | |
| „ 25 | E | e | 9 42 ... | ... | ... | ... | Tremors. |
| | | F | 10 46 ... | ... | ... | ... | |
| „ 25 | E | e | 14 55 ... | ... | ... | ... | Feeble shock. |
| | | F | 16 17 ... | ... | ... | ... | |
| „ 25 | E | e | 18 4 ... | ... | ... | ... | Feeble shock. |
| | | F | 19 21 ... | ... | ... | ... | |

# KODAIKANAL OBSERVATORY, KODAIKANAL.

## April, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Apr. 26 | E | e | 12 25 ... | ... | ... | ... | Tremors. |
| | | F | 13 51 ... | ... | ... | ... | |
| ,, 28 | E | e | 10 17 ... | ... | ... | ... | Tremors. |
| | | F | 52 ... | ... | ... | ... | |

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| May 1 | E | e | 15 27 ... | ... | ... | ... | Tremors. |
| | | F | 51 ... | ... | ... | ... | |
| ,, 2 | E | e | 15 11 ... | ... | ... | ... | Tremors. |
| | | F | 39 ... | ... | ... | ... | |
| ,, 3 | E | e | 3 5 ... | ... | ... | ... | Tremors. |
| | | F | 4 31 ... | ... | ... | ... | |
| ,, 3 | E | e | 19 27 ... | ... | ... | ... | Tremors. |
| | | F | 20 13 ... | ... | ... | ... | |
| ,, 4 | E | e | 5 19 ... | ... | ... | ... | Tremors. |
| | | F | 6 58 ... | ... | ... | ... | |
| ,, 4 | E | e | 14 27 ... | ... | ... | ... | Tremors. No minute marks. |
| | | F | 35 ... | ... | ... | ... | |
| ,, 6 | E | e | 3 45 ... | ... | ... | ... | Feeble shock. |
| | | F | 4 23 ... | ... | ... | ... | |
| ,, 6 | E | eP | 5 45 55 | ... | ... | ... | |
| | | iS | 49 46 | ... | ... | ... | |
| | | F | 9 4 ... | ... | ... | ... | |
| ,, 6 | E | e | 17 39 ... | ... | ... | ... | Tremors. |
| | | F | 21 41 ... | ... | ... | ... | |
| ,, 8 | E | e | 13 58 20 | ... | ... | ... | |
| | | i | 14 6 48 | ... | ... | ... | |
| | | i | 10 46 | ... | ... | ... | |
| | | e | 12 41 | ... | ... | ... | |
| | | i | 16 58 | ... | ... | ... | |
| | | M | 21 46 | 17 | 22 | ... | |
| | | F | 17 10 ... | ... | ... | ... | |
| ,, 9 | E | eP | 15 45 32 | ... | ... | 2645 | Feeble shock. |
| | | iS | 49 50 | ... | ... | ... | |
| | | Mn | 58 5 | 14 | 3 | ... | |
| | | F | ... ... | ... | ... | ... | Trace lost. |
| ,, 11 | E | $eP_1{}^1$ | 15 5 25 | ... | ... | 17040 | |
| | | iSS | 28 52 | ... | ... | ... | |
| | | SSS | 35 5 | ... | ... | ... | |
| | | L | 58 40 | ... | ... | ... | |
| | | M | 16 11 22 | 26 | 19 | ... | |
| | | F | 18 21 ... | ... | ... | ... | |
| ,, 12 | E | iP | 15 50 21 | ... | ... | 7840 | First impulse to west |
| | | iS | 59 38 | ... | ... | ... | |
| | | iPS | 16 0 4 | ... | ... | ... | |
| | | iSS | 4 23 | ... | ... | ... | |
| May 12 | | iSSS | 16 7 6 | ... | ... | ... | |
| | | iL | 12 40 | ... | ... | ... | |
| | | Mn | 20 30 | 34 | 800 | ... | |
| | | F | 20 30 ... | ... | ... | ... | |
| ,, 12 | E | ePP? | 21 40 30 | ... | ... | 3120 | |
| | | S | 45 22 | ... | ... | ... | |
| | | iL | 48 17 | ... | ... | ... | |
| | | Mn | 53 58 | 15 | 7 | ... | |
| | | F | 23 26 ... | ... | ... | ... | |
| ,, 13 | E | e | 15 16 ... | ... | ... | ... | Tremors. |
| | | F | 56 ... | ... | ... | ... | |
| ,, 14 | E | eP? | 12 8 15 | ... | ... | 3150 | |
| | | iS | 13 9 | ... | ... | ... | |
| | | iSS | 14 22 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | Mn | 20 19 | 14 | 11 | ... | |
| | | F | 13 24 ... | ... | ... | ... | |
| ,, 19 | E | iP | 17 16 30 | ... | ... | 5095 | |
| | | iPP | 18 40 | ... | ... | ... | |
| | | S | 23 20 | ... | ... | ... | |
| | | L | 30 10 | ... | ... | ... | |
| | | Mn | 33 ... | 12 | 629 | ... | |
| | | F | 21 18 ... | ... | ... | ... | |
| ,, 22 | E | iP | 7 9 50 | ... | ... | ... | Long distance earthquake. |
| | | F | 10 ... ... | ... | ... | ... | |
| ,, 22 | E | i | 11 45 22 | ... | ... | ... | Tremors. |
| | | F | 12 10 ... | ... | ... | ... | |
| ,, 23 | E | iP | 7 28 57 | ... | ... | 6770 | |
| | | iS | 37 22 | ... | ... | ... | |
| | | iPS | 37 53 | ... | ... | ... | |
| | | iSS | 41 48 | ... | ... | ... | |
| | | iSSS | 43 32 | ... | ... | ... | |
| | | L | 48 ... | ... | ... | ... | |
| | | Mn | 58 41 | 20 | 269 | ... | |
| | | F | 11 47 ... | ... | ... | ... | |
| ,, 24 | E | i | 9 50 15 | ... | ... | ... | Short distance earthquake. |
| | | F | 10 3 ... | ... | ... | ... | |
| ,, 28 | E | i | 17 1 42 | ... | ... | ... | Long distance shock. |
| | | F | 18 14 ... | ... | ... | ... | |
| Apr. 30 | E | e | 9 55 ... | ... | ... | ... | Tremors. |
| | | F | 10 17 ... | ... | ... | ... | |
| ,, 30 | E | e | 16 9 ... | ... | ... | ... | Tremors. |
| | | F | 20 ... | ... | ... | ... | |





# KODAIKANAL OBSERVATORY, KODAIKANAL.

## May, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| May 30 | E | iP | 14 43 11 | ... | ... | 10440 | |
| | | iSKS | 53 45 | ... | ... | ... | |
| | | iS | 54 23 | ... | ... | ... | |
| | | PS | 55 4 | ... | ... | ... | |
| | | iPPS | 56 ... | ... | ... | ... | |

## June, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| June 9 | E | iP | 19 24 12 | ... | ... | 5600 | |
| | | iS | ... 31 30 | ... | ... | ... | |
| | | L | ... 39 29 | ... | ... | ... | |
| | | Mn | ... 46 30 | 24 | 145 | ... | |
| | | F | 22 20 ... | ... | ... | ... | |
| ,, 10 | E | iP | 10 2 15 | ... | ... | 5390 | |
| | | iPP | ... 4 20 | ... | ... | ... | |
| | | iS | ... 9 15 | ... | ... | ... | |
| | | i | ... 10 20 | ... | ... | ... | |
| | | PS | ... 10 55 | ... | ... | ... | |
| | | iSSS | ... 16 15 | ... | ... | ... | |
| | | L | ... ? | ... | ... | ... | |
| | | Mn | ... 24 37 | 18 | 105 | ... | |
| | | F | 13 10 ... | ... | ... | ... | |
| ,, 16 | E | iP | 2 24 39 | ... | ... | 5645 | Probably superposed by another shock. |
| | | iS | ... 32 ... | ... | ... | ... | |
| | | iSSS | ... 36 40 | ... | ... | ... | |
| | | iL | ... 40 10 | ... | ... | ... | |
| | | M | ... 44 28 | 24 | 60 | ... | |
| | | F | 5 24 ... | ... | ... | ... | |
| ,, 20-21 | E | eP | 23 58 10 | ... | ... | 3470 | Lines overlapping. |
| | | iS | 0 3 25 | ... | ... | ... | |
| May 30 | E | SS | 15 1 12 | ... | ... | ... | |
| | | L | ... 15 ... | ... | ... | ... | |
| | | Mn | ... 22 ... | 20 | 61 | ... | |
| | | F | 18 6 ... | ... | ... | ... | |
| June 21 | E | SS | 0 5 30 | ... | ... | ... | |
| | | iL | 7 23 | ... | ... | ... | |
| | | M | 9 50 | 11 | 133 | ... | |
| | | F | 2 30 ... | ... | ... | ... | |
| ,, 21 | E | e | 6 40 ... | ... | ... | ... | Tremors. |
| | | F | 8 14 ... | ... | ... | ... | |
| ,, 23 | E | eP? | 13 8 48 | ... | ... | 10980 | |
| | | iSKS | 19 36 | ... | ... | ... | |
| | | iS | 20 21 | ... | ... | ... | |
| | | iSS | 26 30 | ... | ... | ... | |
| | | SSS | 30 14 | ... | ... | ... | |
| | | L | 40 36 | ... | ... | ... | |
| | | M | 48 4 | 24 | 26 | ... | |
| | | F | 15 58 ... | ... | ... | ... | |
| ,, 26 | E | e | 0 10 ... | ... | ... | ... | Tremors. |
| | | F | 49 ... | ... | ... | ... | |
| ,, 26 | E | e | 20 40 ... | ... | ... | ... | |
| | | F | 21 24 ... | ... | ... | ... | |
| ,, 27 | E | e | 10 12 ... | ... | ... | ... | Feeble shock. |
| | | | 11 14 ... | ... | ... | ... | |

SOLAR PHYSICS OBSERVATORY,
KODAIKANAL.

A. L. NARAYAN,
*Director.*

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

| Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks | Remarks. | Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1938. | H. M. | Sec. | | | | | 1938. | H. M. | Sec. | | | |
| Drosh . . . | Apl. 1 | 22 30 | about 60 | 6 | 1 | | Yatung (Tibet) . . | Apl. 14 | 01 07 | about 3 | 4 | 1 | |
| Peshawar . . . | ,, 1 | 22 35 | ,, 7 | 3 | 1 | | Dibrugarh . . | ,, 14 | 01 18 | 2 | 5 | 2 | |
| Drosh . . . | ,, 2 | 00 40 | ,, 60 | 6 | 1 | | Shillong . . . | ,, 14 | 01 17 | about 120 | 4 | 2 | |
| Srimangal . . | ,, 13 | 01 14 | 4/5 | ... | 1 | | Chittagong (P. B. Obsy.). | ,, 14 | 01 19 | 2 | 5 | 1 | |
| Cooch Behar . | ,, 14 | 01 11 | about 4 | 4 | 1 | | Chittagong (Surface Obsy.). | ,, 14 | 01 15 | about 15 | 3 | 2 | |
| Gauhati . . . | ,, 14 | 01 20 | ,, 60 | 4 | 3 | At intervals of 15-20 secs. | Dinajpur . . . | ,, 14 | 01 22 | 23 | 5 | 1 | |
| Berhampur . . | ,, 14 | 01 20 | 3 | 6 | 1 | | Srimangal . . | ,, 14 | 01 22 | about 30 | 5 | 1 | |
| Bogra . . . | ,, 14 | 01 18 | about 30 | 4 | 2 | At interval of 10 secs. | Mymensingh . . | ,, 14 | 01 15 | 10 | 6 | 2 | |
| Silchar . . . | ,, 14 | 01 18 | 2 | 5 | 2 | | Quetta . . . | ,, 27 | 06 35 | 3 | 5 | 1 | |
| Jalpaiguri . . | ,, 14 | 01 20 | about 45 | 6 | 1 | | Shillong . . . | May 3 | 16 51 | 40-60 | 7 | 2 | |
| Jalapahar (Darjeeling) | ,, 14 | 01 28 | 2 | 5 | 3 | | Quetta . . . | ,, 30 | 13 32 | 3 | 4 | 1 | |
| Narayanganj . . | ,, 14 | 01 16 | 1 | 3 | 3 | Simultaneously. | Shillong . . . | June 1 | 06 22 | about 3 | 6 | 1 | |
| Jessore . . . | ,, 14 | 01 21 | about 1½ | 5 | 1 | | Rawalpindi . . | ,, 24 | 12 46 | ,, 40 | 4 | 1-2 | |
| Faridpur . . . | ,, 14 | 01 14 | 3 | 5 | 1 | | Kabul . . . | ,, 24 | 12 43 | 5 | 3 | 1 | |

J. M. SIL,

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GIPD—S1 94 Meteo. Bombay—9-3-39—300.

GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT

# SEISMOLOGICAL BULLETIN

## JULY - SEPT., 1938.

CONTENTS.



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# INTRODUCTION.

The seismic data from the observatories of the India Meteorological Department have, till the end of 1937, been published annually as Part D of the Annual Summary of the India Weather Review. With a view to expedite the publication of the data, it has been decided to bring out the Indian data in the form of a quarterly bulletin. Owing to the kind co-operation of the Surveyor-General of India, the Director of the Nizamiah Observatory, Hyderabad and of the Superintendent, Colombo Observatory, it has also been possible to incorporate in this bulletin the data of their respective observatories, *viz.*, Dehra Dun, Hyderabad and Colombo. The instrumental seismological data were collected and edited at the Colaba Observatory, Bombay, and the non-instrumental voluntary observations at the Meteorological Office, Poona.

TABLE 1.

*List of Seismograph Stations.*

| Station. | Latitude. | Longitude. | Height above M. S. L. | Lithologic foundation. | Officer-in-charge of Observatory. |
|---|---|---|---|---|---|
| Agra | 27°8′ N. | 78°01′ E. | 163 meters | Indo-Gangetic Alluvium | Superintending Meteorologist. |
| Bombay | 18°54′ N. | 72°49′ E. | 6 meters | Deccan Trap | Director. |
| Calcutta | 22°32′ N. | 88°20′ E. | (1) 7 meters<br>(2) 6 meters. | Alluvium | Meteorologist. |
| Colombo | 6°54′ N. | 79°52′ E. | 7 meters | Beach-Sand resting on gneiss probably decomposed. | Superintendent. |
| Dehra Dun | 30°19′ N. | 78°03′ E. | 682 meters | Gravel | Director, Geodetic Branch, Survey of India. |
| Hyderabad | 17°26′ N. | 78°27′ E. | 528 meters | Granite | Director, Nizamiah Observatory. |
| Kodaikanal | 10°14′ N. | 77°28′ E. | 2343 meters | Rock | Director. |

(1) Milne-Shaw, (2) Omori-Ewing.

TABLE 2.

*The instruments and their constants.*

| Station. | Component. | Type of Instrument. | Mass. | Period. | Static magnification. | Damping ratio. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | kg. | secs. | | | |
| Agra | N | Omori-Ewing | 45 | 29·5 | 29 | 1 | |
| | E | Milne-Shaw | 0·47 | 12 | 250 | 20 : 1 | |
| Bombay | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 350 | | |
| Calcutta | N | Milne-Shaw | 0·45 | 12 | 250 | 20: 1 | |
| | N | Omori-Ewing | 50 | 28 | 32 | ... | |
| | E | Omori-Ewing | 50 | 28 | 30 | ... | |
| Colombo | E | Milne-Shaw | 0·45 | 12 | 250 | 25 : 1<br>20 : 1 | For July, Aug. and Sept. |
| Dehra Dun | N | Omori | 50 | 30 | 12 | .. | |
| Hyderabad | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Kodaikanal | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |

# UPPER AIR OBSERVATORY, AGRA.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. h. m. s. | Per. sec. | Amp. μ | △ Km. | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. July 4 | E | e | 21 30 12 | ... | ... | ... | Very distant. Surface waves poor. |
| | | i (SKS) | 36 58 | ... | ... | ... | |
| | | F | 22 55 ... | ... | ... | ... | |
| „ 5 | E | SKS | 2 28 6 | ... | ... | ... | Beginning mixed with microseisms. |
| | | SKKS? | 29 0 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| „ - | E | i | 3 19 0 | ... | ... | ... | |
| „ 5-6 | E | e | 22 25 16 | ... | ... | ... | Very distant. Beginning mixed with microseisms. Train of surface waves. |
| | | i | 32 49 | ... | ... | ... | |
| | | F | 0 30 ... | ... | ... | ... | |
| „ 6 | E | PP | 1 42 40 | ... | ... | 11,335 | Beginning mixed with microseisms. |
| | | iSKS | 49 14 | ... | ... | ... | |
| | | SKKS | 50 0 | ... | ... | ... | |
| | | S | 50 29 | ... | ... | ... | |
| | | PS | 51 48 | ... | ... | .. | |
| | | F | 4 10 ... | ... | ... | ... | |
| „ 12 | E | SKS | 13 1 17 | ... | ... | (11,365) | Beginninng mixed with microseisms. Surface waves poor. |
| | | SKKS | 2 3 | ... | ... | ... | |
| | | S | 2 27 | ... | ... | ... | |
| | | PS | 3 57 | ... | ... | ... | |
| „ 12 | E | e | 20 19 1 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| „ 13 | E | i | 13 53 13 | ... | ... | ... | |
| | | F | 14 15 ... | ... | ... | ... | |
| „ 19 | E | i | 19 49 34 | ... | ... | ... | |
| | | F | 20 16 ... | ... | ... | ... | |
| „ 19 | E | e (P) | 22 52 30 | ... | ... | 900 | |
| | | a | 53 38 | ... | ... | ... | |
| | | e (S) | 54 3 | ... | ... | ... | |
| | | i | 54 18 | ... | ... | ... | |
| | | i | 54 37 | ... | ... | ... | |
| „ 20 | E | eP | 0 32 1 | ... | ... | 5,055 | Felt throughout Greece. Epc: Island of Euboea. Loss of life and damage to property. |
| | | PP | 33 54 | ... | ... | ... | |
| | | S | 38 49 | ... | ... | ... | |
| | | SS? | 41 34 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| „ 21 | E | i | 9 25 53 | ... | ... | ... | |
| | | F | 10 15 ... | ... | ... | ... | |
| 1938. July 21 | E | e | 22 12 16 | .... | ... | ... | |
| | | F | 32 ... | ... | ... | ... | |
| „ 22 | E | ePKS | 8 11 5 | ... | ... | ... | Very distant. |
| | | G? | 49 25 | ... | ... | ... | |
| | | $M_1$ | 9 11 35 | 17 | 13 | ... | |
| | | $M_2$ | 13 2 | 16 | 9 | ... | |
| | | $M_3$ | 14 11 | 16 | 7 | ... | |
| | | F | 10 11 ... | ... | ... | ... | |
| „ 23 | E | eP | 12 6 39 | ... | ... | 780 | Epc: In the neighbourhood of Pallad in Kathiawar. Damage to property. |
| | | S | 8 7 | ... | ... | ... | |
| | | S• | 8 32 | ... | ... | ... | |
| | | $\overline{S}$ | 8 47 | ... | ... | ... | |
| | | F | 30 ... | ... | ... | ... | |
| „ 23-24 | E | e (P) | 23 11 40 | ... | ... | 7,965 | Surface waves absent. |
| | | i (S) | 21 4 | ... | ... | ... | |
| | | F | 0 12 ... | ... | ... | ... | |
| „ 24 | E | eP | 13 24 34 | ... | ... | 9,665 | |
| | | SKS | 34 48 | ... | ... | ... | |
| | | S | 35 11 | ... | ... | ... | |
| | | PS | 35 53 | ... | ... | ... | |
| | | eL | 52 53 | ... | ... | ... | |
| | | F | 14 52 ... | ... | ... | ... | |
| „ 27 | E | e(P) | 17 3 44 | ... | ... | ... | |
| | | F | 18 19 ... | ... | ... | ... | |
| „ 27 | E | i | 23 0 32 | ... | ... | ... | |
| | | F | 24 ... | ... | ... | ... | |
| „ 28 | E | i | 0 57 36 | ... | ... | ... | |
| | | F | 6 23 ... | ... | ... | ... | |
| „ 29 | E | iP | 13 13 19 | ... | ... | 3,465 | Depth of focus 100 km. Direction of the first movement W. |
| | | ipP | 13 41 | ... | ... | ... | |
| | | iPP | 14 36 | ... | ... | ... | |
| | | e | 16 6 | ... | ... | ... | |
| | | S | 18 41 | ... | ... | ... | |
| | | i | 19 1 | ... | ... | ... | |
| | | sS? | 19 21 | ... | ... | ... | |
| | | PcS | 19 46 | ... | ... | ... | |
| | | i | 20 31 | ... | ... | ... | |
| | | iSSS | 21 27 | ... | ... | ... | |
| | | G? | 26 11 | ... | ... | ... | |
| | | F | 15 27 ... | ... | ... | ... | |

## August, 1938.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Aug. 4 | E | $iP_1$ | 9 14 36 | ... | ... | 15,800 | Depth of focus about 210 km. Direction of the first movement E. |
| | | i | 14 21 | ... | ... | ... | |
| | | e | 15 7 | ... | ... | ... | |
| Aug. 4 | E | PP | 9 17 42 | ... | ... | ... | |
| | | e | 18 41 | ... | ... | ... | |
| | | iSKS | 21 5 | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Aug. 4 | | SKKS | 9 24 16 | ... | ... | ... | |
| | | e | 24 51 | ... | ... | ... | |
| | | I (PS) | 27 45 | ... | ... | ... | |
| | | e | 30 21 | ... | ... | ... | |
| | | e | 32 4 | ... | ... | ... | |
| | | e | 33 8 | ... | ... | ... | |
| | | G? | 37 16 | ... | ... | ... | |
| | | F | 11 19 ... | ... | ... | ... | |
| „ 5 | E | eP | 14 20 17 | ... | ... | 1,220 | Depth of focus perhaps of the order of 200 Km. |
| | | I | 20 42 | ... | ... | ... | |
| | | eP? | 21 1 | ... | ... | ... | |
| | | I | 21 38 | ... | ... | ... | |
| | | IS | 22 19 | ... | ... | ... | |
| | | F | 35 ... | ... | ... | ... | |
| „ 11 | E | e | 7 50 3 | ... | ... | ... | Near, slight. |
| | | e | 50 23 | ... | ... | ... | |
| „ 12 | E | e | 4 24 31 | ... | ... | ... | Beginning mixed with microseisms. |
| | | F | 5 42 ... | ... | ... | ... | |
| „ 16 | E | IP | 4 31 21 | ... | ... | 1,555 | Epc : Upper Burma. Depth of focus about 60 km. Direction of the first movement W. |
| | N | e | 31 24 | ... | ... | ... | |
| | N, E | pP | 31 32 | ... | ... | ... | |
| | N | I | 32 ? | ... | ... | ... | |
| | N, E | S | 34 0 | ... | ... | ... | |
| | N | I | 34 12 | ... | ... | ... | |
| | | sS | 34 24 | ... | ... | ... | |
| | | $M_1$ Between | 36 58 | ... | 1,444 | ... | |
| | | to | 38 53 | ... | ... | ... | |
| | E | F | Mixed up in the following shock. | | | | |
| „ 16 | E | e | 6 7 24 | ... | ... | ... | Tremors. |
| | | e | 9 41 | ... | | ... | |
| „ 16 | E | e | 17 1 14 | ... | ... | ... | |
| | | F | 47 ... | ... | ... | ... | |
| „ 17 | E | I | 2 2 56 | ... | ... | ... | |
| | | F | 44 ... | ... | ... | ... | |
| „ 18 | E | IP | 0 37 23 | ... | ... | 4,135 | Depth of focus about 100 km. Direction of the 1st movement E. |
| | E | pP | 37 43 | ... | ... | ... | |
| | N | I | 37 47 | ... | ... | ... | |
| | E | PPP | 39 24 | ... | ... | ... | |
| | E | I | 42 28 | ... | ... | ... | |
| | N | S | 43 10 | ... | ... | ... | |
| | E | IS | | | | | |
| | N, E | IPcS | 43 16 | ... | ... | ... | |
| | E | sS | 43 48 | ... | ... | ... | |
| | | I | 44 33 | ... | ... | ... | |
| | | ScS | 47 8 | ... | ... | ... | |
| | | sScS | 48 3 | ... | ... | ... | |
| | | I | 49 59 | ... | ... | ... | |
| | | F | 11 28 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Aug. 18 | E | P | 19 14 39 | ... | ... | 4,535 | Depth of focus 65 km. |
| | | pP | 14 52 | ... | ... | ... | |
| | | PPP | 16 33 | ... | ... | ... | |
| | | S | 20 57 | ... | ... | ... | |
| | | sS? | 21 24 | ... | ... | ... | |
| | | SSS | 24 34 | ... | ... | ... | |
| | | F | 20 33 ... | ... | ... | ... | |
| „ 20 | E | e | 5 23 58 | ... | ... | ... | |
| | | F | 36 ... | ... | ... | ... | |
| „ 20 | E | I | 8 23 22 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| „ 20 | E | eP | 8 42 45 | ... | ... | 8,100 | Deep focus? Surface waves absent. |
| | | I | 42 48 | ... | ... | ... | |
| | | IS | 52 16 | ... | ... | ... | |
| „ 22 | N | e | 21 45 | 39 | ... | ... | |
| | | F | 22 1 | ... | ... | ... | |
| „ 23 | E | IP | 8 19 17 | ... | ... | 1,415 | Direction of the first movement W. |
| | N | eS | | | | | |
| | E | IS | 21 44 | ... | ... | ... | |
| | E | I | 21 55 | ... | ... | ... | |
| | E | $M_1$ | 23 44 | 12 | 15 | ... | |
| | | $M_2$ | 24 56 | 14 | 31 | ... | |
| | N | F | 48 ... | ... | ... | ... | |
| | E | F | Lost while changing chart. | | | | |
| „ 24 | E | P | 15 53 9 | ... | ... | 5,820 | Deep focus type. |
| | | S | 16 0 40 | ... | ... | ... | |
| „ 25 | E | IP | 1 35 32 | ... | ... | 4,445 | Depth of focus between 125-145 km. Direction of the 1st movement E. |
| | | IpP | 36 2 | ... | ... | ... | |
| | | IPP | 37 10 | ... | ... | ... | |
| | | IPcP | 37 22 | ... | ... | ... | |
| | | I | 38 47 | ... | ... | ... | |
| | | ScP | 41 7 | ... | ... | ... | |
| | | PcS | 41 19 | ... | ... | ... | |
| | | S | 41 30 | ... | ... | ... | |
| | | sS | 42 23 | ... | ... | ... | |
| | | I | 42 55 | ... | ... | ... | |
| | | IsSS | 44 31 | ... | ... | ... | |
| | | ScS? | 45 15 | ... | ... | ... | |
| „ 25 | E | I | 1 49 12 | ... | ... | ... | |
| | | $M_1$ | 57 7 | 15 | 27 | ... | |
| | | $M_2$ | 58 42 | 15 | 20 | ... | |
| | | $M_3$ | 2 0 49 | 13 | 20 | ... | |
| | | $M_4$ | 3 12 | 20 | 26 | ... | |
| | | F | 5 14 0 | ... | ... | ... | |
| „ 26 | E | e | 7 43 11 | ... | ... | ... | |
| | | F | 8 16 ... | ... | ... | ... | |



# UPPER AIR OBSERVATORY, AGRA.

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Aug. 26 | E | P | 18 2 8 | ... | ... | 1,035 | |
| | | I | 2 10 | ... | ... | ... | |
| | | I | 2 20 | ... | ... | ... | |
| | | I | 2 42 | ... | ... | ... | |
| | | I | 3 48 | ... | ... | ... | |
| | | S? | 3 55 | ... | ... | ... | |
| | N | e | 4 3 | ... | ... | ... | |
| | E | I | 4 10 | ... | ... | ... | |
| | N | F | 14 ... | ... | ... | ... | |
| | E | F | 28 ... | ... | ... | ... | |
| „ 28 | E | P | 3 25 5 | ... | ... | 900 | Deep focus. |
| | | S | 26 40 | ... | ... | ... | |
| „ 29 | E | IP | 15 30 42 | ... | ... | 5,255 | Depth of focus between 80—100 km ? |
| | | pP? | 31 0 | ... | ... | ... | |
| | | PP | 32 35 | ... | ... | ... | |
| | | e | 35 41 | ... | ... | ... | |
| | N | e | 37 21 | ... | ... | ... | |
| | E | IS | 37 31 | ... | ... | ... | |
| | | sS? | 38 12 | ... | ... | ... | |
| | | I | 39 7 | ... | ... | ... | |
| | | I | 39 52 | ... | ... | ... | |
| | | I | 40 37 | ... | ... | ... | |
| | | SS | 41 1 | ... | ... | ... | |
| | N | SS | 41 13 | ... | ... | ... | |
| | E | SSS | 42 32 | ... | ... | ... | |
| | | F | 17 43 ... | ... | ... | ... | |
| „ 30 | E | P | 12 0 49 | ... | ... | 8,000 | Depth of focus between 80—100 km. |
| | | I | 0 52 | ... | ... | ... | |
| | | pP | 1 10 | ... | ... | ... | |
| | | I | 2 3 | ... | ... | ... | |
| | | PP | 3 40 | ... | ... | ... | |

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| Sep. 1 | E | I | 3 1 48 | ... | ... | ... | |
| | | I | 3 23 | ... | ... | ... | |
| | | $M_3$ | 20 47 | 15 | 8 | ... | |
| | | F | 59 ... | ... | ... | ... | |
| „ 1-2 | E | I (P??) | 23 8 1 | ... | ... | ... | Direction of the 1st motion W. |
| | | I (SKP?) | 11 23 | ... | ... | ... | |
| | | F | 1 10 ... | ... | ... | ... | |
| „ 4 | E | PP | 19 31 11 | ... | ... | (4,480) | Beginning lost in hour mark. |
| | | IS | 35 43 | ... | ... | ... | |
| | | SSS | 38 59 | ... | ... | ... | |
| | | F | 20 22 ... | ... | ... | ... | |
| „ 7 | E | P | 2 3 34 | ... | ... | 5,720 | Depth of focus about 100 km. |
| | | pP | 3 57 | ... | ... | ... | |
| | | PP | 5 39 | ... | ... | ... | |
| | | PcS | 8 45 | ... | ... | ... | |
| | | IS | 10 51 | ... | ... | ... | |
| | | sS | 11 38 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec | μ | km. | |
| 1938. | | | | | | | |
| Aug. 30 | E | PPP | 12 5 13 | ... | ... | ... | |
| | | S | 9 55 | ... | ... | ... | |
| | | sS | 10 39 | ... | ... | ... | |
| | | I | 13 12 | ... | ... | ... | |
| | | SS | 14 33 | ... | ... | ... | |
| | | SSS | 18 27 | ... | ... | ... | |
| „ 30 | E | IP | 17 18 28 | ... | ... | 6,220 | Deep focus ? Surface waves absent. Direction of the first movement E. |
| | | S | 26 21 | ... | ... | ... | |
| | | F | 18 14 ... | ... | ... | ... | |
| „ 31 | E | e | 11 55 41 | ... | ... | ... | |
| „ 31 | E | eP | 15 29 30 | ... | ... | 335 | Felt at Simla. |
| | N | eP* | 29 37 | ... | ... | ... | |
| | E | IP* | | | | | |
| | E | eP | 29 50 | ... | ... | ... | |
| | N, E | S | 30 11 | ... | ... | ... | |
| | E | S* | 30 21 | ... | ... | ... | |
| | N, E | S | 30 29 | ... | ... | ... | |
| | E | F | 45 ... | ... | ... | ... | |
| „ 31 | E | IP | 17 56 29 | ... | ... | 8,000 | Depth of focus 435 km. Direction of the 1st movement E. |
| | | PcP | 56 46 | ... | ... | ... | |
| | | pP | 57 59 | ... | ... | ... | |
| | | pPcP | 58 28 | ... | ... | ... | |
| | | PP | 59 24 | ... | ... | ... | |
| | | PPP | 18 1 16 | ... | ... | ... | |
| | | eS | 5 41 | ... | ... | ... | |
| | | I | 7 26 | ... | ... | ... | |
| | | sS | 8 14 | ... | ... | ... | |
| | | SS | 10 25 | ... | ... | ... | |
| | | SSS | 13 7 | ... | ... | ... | |

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec | μ | km. | |
| Sep. 7 | E | ScS | 1 1 23 | ... | ... | ... | |
| | | L | 19 48 | ... | ... | ... | |
| | | F | 3 29 ... | ... | ... | ... | |
| „ 7 | E | IP | 4 10 47 | ... | ... | 4,280 | Depth of focus between 40-50 km. Direction of the 1st motion W. |
| | N | e | 10 53 | ... | ... | ... | |
| | E | I | 10 59 | ... | ... | ... | |
| | E | PP | 12 19 | ... | ... | ... | |
| | N, E | S | 16 44 | ... | ... | ... | |
| | N, E | I | 17 5 | ... | ... | ... | |
| | N, E | SSS | 19 45 | ... | ... | ... | |
| | E | L | 21 57 | ... | ... | ... | |
| | E | M | 25 29 | ... | ... | ... | |
| | N | $M_1$ | 28 47 | 17 | 164 | ... | |
| | E | $M_2$ | 29 3 | 16 | 188 | ... | |
| | | $M_3$ | 30 12 | 18 | 76 | ... | |
| | | $M_4$ | 31 21 | 15 | 37 | ... | |
| | | F | 7 27 ... | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Sep. 7 | E | iP | 13 10 24 | ... | ... | 9,110 | Depth of focus about 150 km. Direction of the 1st motion E. |
| | | e | 11 01 | ... | ... | ... | |
| | | sP | 11 21 | ... | ... | ... | |
| | | e | 14 14 | ... | ... | ... | |
| | | iS | 20 19 | ... | ... | ... | |
| | | sS | 21 24 | ... | ... | ... | |
| | | e | 21 54 | ... | ... | .. | |
| | | F | 14 46 ... | ... | ... | ... | |
| ,, 9 | E | e | 9 37 9 | ... | ... | ... | |
| | | F | 10 11 ... | ... | ... | ... | |
| ,, 9 | E | e | 17 59 6 | ... | ... | ... | Very distant. |
| | | F | 20 23 ... | ... | ... | ... | |
| ,, 10 | N | P | 22 28 31 | ... | ... | 2,110 | Felt in Ceylon. Depth of focus probably between 40-50 km. |
| | E | eP | | | | | |
| | E | pP | 28 41 | ... | ... | ... | |
| | N | eS | 32 2 | ... | ... | ... | |
| | E | S | | | | | |
| | N, E | sS | 32 20 | ... | ... | ... | |
| | N | F | 50 ... | ... | ... | ... | |
| | E | F | 23 38 ... | ... | ... | ... | |
| ,, 18 | E | P | 3 59 9 | ... | ... | 5,400 | |
| | | PPP | 4 1 5 | ... | ... | ... | |
| | | S | 6 10 | ... | ... | ... | |
| | | F | 5 8 ... | ... | ... | ... | |
| ,, 20 | E | eP | 15 46 2 | ... | ... | 6,235 | |
| | | ePPP | 49 16 | ... | ... | ... | |
| | | eS | 53 56 | ... | ... | ... | |
| | | F | 16 29 ... | ... | ... | ... | |
| ,, 20 | E | e(P?) | 22 9 33 | ... | ... | ... | |
| | | i(S?) | 14 6 | ... | ... | ... | |
| | | F | 37 ... | ... | ... | ... | |
| ,, 21 | E | P | 19 1 15 | ... | ... | 5,855 | Time Correction ± 10sec. |
| | | PP | 3 25 | ... | ... | ... | |
| | | S | 8 40 | ... | ... | ... | |
| | | SS | 12 27 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Sep. 21 | E | M | 19 22 10 | ... | ... | ... | |
| | | M, | 25 59 | 19 | 47 | ... | |
| | | $M_2$ | 29 10 | 17 | 17 | ... | |
| | | $M_3$ | 30 49 | 17 | 13 | ... | |
| ,, 23 | E | e(S) | 1 14 34 | ... | ... | ... | Beginning not recorded. |
| | | F | Lost while changing chart. | | | | |
| ,, 26-27 | E | e | 23 58 42 | ... | ... | ... | Very feebie. |
| | | S | 58 56 | ... | ... | ... | |
| | | F | 0 13 ... | ... | ... | ... | |
| ,, 27 | E | e | 2 20 57 | ... | ... | ... | Near, slight. |
| | | S | 21 44 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 27 | E | P | 2 39 15 | ... | ... | 4,380 | |
| | | PP | 40 45 | ... | ... | ... | |
| | | I | 41 25 | ... | ... | ... | |
| | | S | 45 26 | ... | ... | ... | |
| | | SS | 48 6 | ... | ... | ... | |
| | | L | 50 33 | ... | ... | ... | |
| | | F | 4 41 ... | ... | ... | ... | |
| ,, 27 | E | P | 10 27 40 | ... | ... | 8,755 | |
| | | PP | 30 52 | ... | ... | ... | |
| | | IS | 37 41 | ... | ... | ... | |
| | | SS | 43 6 | ... | ... | ... | |
| ,, 28 | E | e | 18 30 9 | ... | ... | (10,110) | Beginning mixed with microseisms. |
| | | I(SKS?) | 37 12 | ... | ... | ... | |
| | | I(PS?) | 38 50 | ... | ... | ... | |
| ,, 30 | E | eP | 9 4 26 | ... | ... | 720 | |
| | | S | 5 42 | ... | ... | ... | |
| | | S | 6 23 | ... | ... | ... | |
| | | F | 29 ... | ... | ... | ... | |
| ,, 30 | E | e | 14 44 28 | ... | ... | ... | Tremors. Probably the one felt at Lahore. |
| | | F | 47 ... | ... | ... | ... | |

UPPER AIR OBSERVATORY, AGRA.

G. CHATTERJEE,
*Superintending Meteorologist.*



# COLABA OBSERVATORY, BOMBAY.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| July 4 | E | i (SKS) | 21 37 14 | ... | ... | ... | Epc : Near the following shock (5d. 2h.). Strasbourg gives 22°·0S., 169·2° E. and H. O = 21h. 12·7 m. |
| | | F | 22 40 ... | ... | ... | ... | |
| ,, 5 | E | e | 02 21 15 | ... | ... | 11,355 | Slight △ from (SKS-0). |
| | E | e | 22 02 | ... | ... | ... | Epc : 21°S., 170°E. South off the New Hebrides Islands. 0 = 2h. 3m. 45s. |
| | E | i | 23 43 | ... | ... | ... | Wellington △ (P-O) |
| | E | i | 24 41 | ... | ... | ... | = 20°·3 ; Riverview △ (P-O) = 20°·4 ; |
| | E | e | 25 20 | ... | ... | ... | Christchurch △ (P-O) |
| | E | i (SKS) | 28 21 | ... | ... | ... | = 22°·4 ; Manila △ |
| | E | (SS) | 41 12 | ... | ... | ... | (P-O) = 59°·1 ; Pasadena △ (P-O) = 87° |
| | E | eL | 03 06 45 | ... | ... | ... | ·4 ; Calcutta △ (S-O) = 90°·5 ; Agra △ (SKS-O) = 99°·0. |
| ,, 5 | N, E | e (S) | 22 33 14 | ... | ... | 11,620 | Slight. △ from (S-O). |
| | N, E | e | 36 23 | ... | ... | ... | Epc : 22°·5 S., 173°·5 E. near that at 2h. 0 = 22h. 7m. 7s. |
| | N, E | e | 45 30 | ... | ... | ... | Wellington △ (P-O) = |
| | N, E | e (L) | 23 01 18 | ... | ... | ... | 19°·1 ; Riverview △ (P-O) = 22°·4 ; |
| | N, E | M | 16 ... | ... | ... | ... | Manila △ (P-O) = 62° |
| | N, E | F | Lost in microseisms. | | | | ·9 ; Hongkong △ (P-O) = 72°·6 ; Pasadena △ (P-O) = 88°·0. U. S. C. G. S. gives 24°S., 173°W. (from Strasbourg bulletin). Sydney gives h = 100 km. |
| ,, 6 | E | e (PP) | 01 42 34 | ... | ... | 11,780 | Slight. Epc : Same as that of 5d. 22h. 0 = 1h. 24 3m. |
| | N, E | e (S) | 50 33 | ... | ... | ... | |
| | N, E | F | 03 35 ... | ... | ... | ... | |
| ,, 12 | E | M | 13 36 ... | ... | ... | ... | |
| | N | M | 39 ... | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 19 | N, E | eP | 22 51 26 | ... | ... | 390 | Slight. Epc : Paliad in Kathiawar. |
| | N, E | iS | 52 08 | ... | ... | ... | Damage to houses in Paliad. |
| | E | iS* | 52 19 | ... | ... | ... | Felt in many places in Kathiawar. |
| | N, E | $\overline{iS}$ | 52 25 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 20 | N, E | e (P) | 00 32 00 | ... | ... | ... | Slight. Epc : 38° 17'N., 23° 45' E., (Strasbourg). Destructive in the Island of Euboea and felt throughout Greece. |
| | N, E | e (PP) | 34 00 | ... | ... | ... | |
| | N, E | i | 36 10 | ... | ... | ... | |
| | N, E | e (S) | 38 40 | ... | ... | ... | |
| | N, E | i | 39 00 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 21 | N, E | e | 09 29 00 | ... | ... | ... | |
| | N, E | F | Lost in microseisms | | | | |
| Aug. 4 | N, E | ePKS | 09 17 22 | ... | ... | 15,800 | Slight. Epc : 24°·0S., 65°·4 W., Argentine. h = 200 km. H. O = 08h. 54·8m. (U. S. C. G. S.). |
| | N, E | iSKKS | 23 45 | ... | ... | ... | |
| | N, E | e | 28 09 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| July 22 | N | e (PKS) | 08 11 30 | ... | ... | ... | Slight. Epc : 18°·9 N., 107°·0 W., Central America. H. O = 7h. 48·1m. (U. S. C. G. S.). |
| | N | e | 13 00 | ... | ... | ... | |
| | N | e (SKS) | 15 34 | ... | ... | ... | |
| | N, E | e (L) | 47 31 | ... | ... | ... | |
| | N, E | M | 09 17 ... | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 23 | N, E | eP | 12 05 40 | ... | ... | 390 | Slight. Epc : 22°·4 N., 71°·8 E. near Paliad in Kathiawar. 0 = 12h. 4m. 50s. Damage to buildings in Paliad, Wadhwan and Limbdi ; felt all over Kathiawar. |
| | N, E | iS | 06 23 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 23 | E | e | 23 12 03 | ... | ... | ... | Slight, distant. |
| | E | i | 12 30 | ... | ... | ... | |
| | E | i | 21 44 | ... | ... | ... | |
| ,, 24 | N, E | i (S) | 13 36 15 | ... | ... | ... | Slight. Epc : 53°N., 167°W. (U. S. C. G. S.). |
| | N, E | M | 14 10 ... | ... | ... | ... | |
| | N, E | F | 55 ... | ... | ... | ... | |
| ,, 27 | N, E | (P) | 17 04 38 | ... | ... | ... | Slight. Epc : Near 27°N., 126°E. Northeast of the Formosa Island. |
| | N, E | (S) | 11 35 | ... | ... | ... | |
| | N, E | (SS) | 14 19 | ... | ... | ... | |
| | N, E | M | 27 ... | ... | ... | ... | |
| | N, E | F | 18 22 ... | ... | ... | ... | |
| ,, 29 | N, E | iP | 13 13 05 | ... | ... | 3,520 | Moderate. Probably deep. First movements as read : 0·5 mm. to S. and 0·3 mm. to E. Epc : 0°, 98°·8 E., West coast of Sumatra. 0 = 13h. 06m. 42s. 1°N., 96°E. H. O = 13h. 06·2m. (U. S. C. G. S.). 6°·3N., 99°·3 E., H.O = 13h. 06m. 45s. (Strasbourg). 4°·2S., 100°·5E. H = 13h. 06m. 24s. (J. S. A.). |
| | E | PP | 14 03 | ... | ... | ... | |
| | N, E | iS | 18 15 | ... | ... | ... | |
| | N, E | i | 20 15 | ... | ... | ... | |
| | N, E | L | 22 16 | ... | ... | ... | |
| | N, E | M | 25 03 | ... | ... | ... | |
| | N | M | 26 51 | 16 | 12 | ... | |
| | N, E | F | 15 25 ... | ... | ... | ... | |
| | | | Record was lost as shown below : | | | | |
| | | | From To | | | | |
| 4 | N | | 12 23 03 40 | ... | ... | ... | |
| 16/17 | N | | 21 47 01 42 | ... | ... | ... | |
| 17 | N | | 15 27 17 21 | ... | ... | ... | |
| 18 | N | | 08 48 11 43 | ... | ... | ... | |
| 20 | N | | 19 55 22 00 | ... | ... | ... | |
| 21 | N | | 01 54 02 50 | ... | ... | ... | |
| 23/24 | N | | 23 47 02 15 | ... | ... | ... | |
| 27 | N | | 08 55 09 21 | ... | ... | ... | |
| 30 | N | | 01 26 02 08 | ... | ... | ... | |
| 31 | N | | 18 06 18 46 | ... | ... | ... | |

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Aug. 4 | E | M | 10 15 ... | ... | ... | ... | |
| | N, E | F | 45 ... | ... | ... | ... | |
| ,, 5 | N, E | e | 14 25 21 | ... | ... | ... | Feeble. |
| | N, E | F | 35 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Aug. 16 | N, E | iP | 04 32 28 | ... | ... | 2,250 | Great. First movements as read : 13mm to E. and 0·7 mm to N. Epc : 24°N., 94°E. in Upper Burma. O=04h. 27m. 56s. Felt strongly at Silchar and Noakhali. 24°N., 95°E. H.O=4h. 27·7m. (U. S. C. G. S.). 22°·6N., 94°·6E. H.O=4h. 27m. 54s. h=60 km. (Strasbourg). |
| | N, E | iS | 36 08 | ... | ... | ... | |
| | N, E | iSS | 36 31 | ... | ... | ... | |
| | N, E | PcP | 36 47 | ... | ... | ... | |
| | E | Mn | 41 ... | 15 | >913 | ... | |
| | N | Mn | 42 20 | 11 | 319 | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| „ 16 | N | e } (P) | 06 08 09 | ... | ... | ... | |
| | E | i } | | | | | |
| | N, E | e (S) | 12 08 | ... | ... | ... | |
| | N, E | F | 54 ... | ... | ... | ... | |
| „ 16 | N, E | e | 17 23 22 | ... | ... | ... | |
| | N, E | F | 35 ... | ... | ... | ... | |
| „ 18 | N, E | iP | 09 37 10 | ... | ... | 4,200 | Moderate. Epc : 4°S., 103°E. South Sumatra. h=100 km. O=9h. 30m. 00s. 4°S., 104°E. h=100 km. H. O=9h.. 30·0m. (Strasbourg). Pasadena gives h=100 km. |
| | N, E | ipP | 37 32 | ... | ... | ... | |
| | N, E | isP | 37 45 | ... | ... | ... | |
| | N, E | iPP | 38 36 | ... | ... | ... | |
| | N, E | PcP | 39 21 | ... | ... | ... | |
| | N, E | iS | 42 51 | ... | ... | ... | |
| | N, E | isS | 43 18 | ... | ... | ... | |
| | N | i | 44 23 | ... | ... | ... | |
| | N, E | SS | 45 51 | ... | ... | ... | |
| | N, E | ScS | 47 06 | ... | ... | ... | |
| | N | i | 48 41 | ... | ... | ... | |
| | N, E | F | 11 41 ... | ... | ... | ... | |
| „ 18 | N, E | iP | 19 15 40 | ... | ... | 5,800 | Slight. Epc : 29°N., 129°·7E. to the north of Luchu Islands. O=19h. 6·5m. |
| | N, E | iS | 23 05 | ... | ... | ... | |
| | N, E | i | 23 33 | ... | ... | ... | |
| | N, E | eSS | 26 35 | ... | ... | ... | |
| | N, E | F | 20 10 ... | ... | ... | ... | |
| „ 20 | N, E | e | 05 24 30 | ... | ... | ... | |
| | N, E | F | 06 05 ... | ... | ... | ... | |
| 20 | N,E | e | 08 21 30 | ... | ... | ... | |
| | E | e | 43 06 | ... | ... | ... | |
| | N, E | i | 52 59 | (In minute gap) | | | |
| | N, E | F | 09 40 ... | ... | ... | ... | |
| „ 22 | N | eP | 21 43 38 | ... | ... | 3,140 | Slight. Epc : Probably Gobi desert. |
| | N, E | iS | 48 24 | ... | ... | ... | |
| | N, E | iSS | 49 37 | ... | ... | ... | |
| | N, E | eL | 51 44 | ... | ... | ... | |
| | E | Mn | 54 00 | 15 | 5 | ... | |
| | N | Mn | 54 18 | 10 | 5 | ... | |
| | E | i | 54 25 | ... | ... | ... | |
| | N, E | F | 22 35 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938 | | | h. m. s. | sec. | μ | Km. | |
| Aug. 23 | N, E | eP | 08 21 05 | ... | ... | 2,580 | Slight. Epc : 33°N., 93°E. in Tibet. O=08h. 16m. 07s. |
| | N, E | iS | 25 06 | ... | ... | ... | |
| | E | Mn | 30 08 | 8 | 14 | ... | |
| | N | Mn | 30 09 | 8 | 11 | ... | |
| | N, E | F | 09 10 ... | ... | ... | ... | |
| „ 24 | N, E } | e | 15 53 17 | ... | ... | ... | |
| | N, E | e | 16 00 38 | ... | ... | ... | |
| | N | i | 02 56 | ... | ... | ... | |
| | N, E | F | 58 ... | ... | ... | ... | |
| „ 25 | N, E | iP | 01 35 16 | ... | ... | 4,500 | Moderate. First movements as read : 0·3 mm. to N and 0·5 mm. to W. Epc : 7°S., 102° E. off south Sumatra O=1h. 27m. 57s. The above epc. is obtained with an assumed depth of about 150 km. Manila △ (P-O)=29°·5 ; Hongkong △ (P-O)=32°·5 Tannanarive △ (P-O =53°·4. 5°S., 100°E. (Strasbourg). |
| | N | i | 35 38 | ... | ... | ... | |
| | N, E | i(pP) | 35 51 | ... | ... | ... | |
| | N, E | i(sP) | 36 07 | ... | ... | ... | |
| | N, E | iPP | 36 43 | ... | ... | ... | |
| | N, E | iPcP | 37 29 | ... | ... | ... | |
| | N, E | iS | 41 13 | ... | ... | ... | |
| | N, E | sS | 42 14 | ... | ... | ... | |
| | N, E | F | 04 40 ... | ... | ... | ... | |
| „ 26 | N | eP(?) | 18 03 09 | ... | ... | 1,880 | Slight.2 Epc : 7° N., 89° E. km. O=17 h 59·2m. Felt strongly at Jalpaiguri. |
| | N, E | iS | 06 12 | ... | ... | ... | |
| | N, E | i | 07 09 | ... | ... | ... | |
| | N, E | i | 06 48 | ... | ... | ... | |
| | N, E | F | 01 33 ... | ... | ... | ... | |
| „ 27/28 | N | Record lost from | 09 42 ... | ... | ... | ... | |
| | | To | 02 38 ... | ... | ... | ... | |
| | E | Record lost from | 23 37 ... | ... | ... | ... | |
| | | To | 02 47 ... | ... | ... | ... | |
| „ 29 | N | eP } | 15 31 14 | ... | ... | 5,555 | Slight. Deep.? Epc : 12°N., 125°E. east of the Philippine Islands. O=15h. 22m. 22s 12° 5′ N., 124°5′E. Destructive in Masbate. Felt in Southeast Luzon and north Visayas (Manila). |
| | E | iP } | | | | | |
| | N, | PcP | 32 27 | ... | ... | ... | |
| | N, E | i | 33 32 | ... | ... | ... | |
| | N, E | iS | 38 25 | ... | ... | ... | |
| | N | i | 39 14 | ... | ... | ... | |
| | N, E | ScS | 41 18 | ... | ... | ... | |
| | E | Mn | 53 37 | 18 | 9 | ... | |
| | N | Mn | 57 34 | 18 | 10 | ... | |
| | N, E | F | 17 22 ... | ... | ... | ... | |
| „ 30 | N, E | eP | 12 01 13 | ... | ... | 8,200 | Slight. Epc: 2°·5S., 144°E. to the North of New Guinea. O=11h. 49m. 45s. Hongkong △ (P-O)=38°·2; Perth △(P-O) =40°·4 ; Wellington △ (P-O)=47°·6 ; Weston △ (P′-O)=129°·5. 3°S., 146°E. H.O=11h. 49·7m. (Strasbourg). |
| | N | i | 01 21 | ... | ... | ... | |
| | N, E | ePP | 04 10 | ... | ... | ... | |
| | N, E | iS | 10 46 | ... | ... | ... | |
| | N, E | PS | 11 22 | ... | ... | ... | |
| | N, E | SS | 15 18 | ... | ... | ... | |
| | N | Mn | 13 08 44 | 14 | 3 | ... | |
| | N, E | F | 14 04 ... | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Aug. 20 | N, E | e | 17 18 42 | ... | ... | ... | |
| | N, E | e | 19 00 | ... | ... | ... | |
| | N, E | e | 19 50 | ... | ... | ... | |
| | N, E | e | 21 44 | ... | ... | ... | |
| | N, E | e | 26 50 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| „ 31 | N, E | i (S*) | 15 34 58 | ... | ... | ... | Slight. Epc : 30·5°N., 79°E. Garhwal Kumaon Hills. O=15h. 28m. 41s. Felt strongly at Simla and moderately at Mussoorie. |
| | N, E | i (S) | 35 08 | ... | ... | ... | |
| | N, E | e | 35 47 | ... | ... | ... | |
| | N, E | i (L) | 36 16 | ... | ... | ... | |

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Sept. 1 | E | e | 03 04 37 | ... | ... | ... | |
| | N, E | e | 12 33 | ... | ... | ... | |
| „ 1 | N | i } $P_1'$ | 23 07 57 | ... | ... | 15,700 | Slight. Epc : 13°·1N., 89°·4 W. O=22h. 48·5m. (U. S. C. G. S.). |
| | E | e } | | | | | |
| | N | iPKS } | 11 48 | ... | ... | ... | |
| | E | ePKS } | | | | | |
| | N, E | iSKKS | 18 06 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| „ 2 | N, E | e | 20 29 40 | ... | ... | ... | Slight. Felt at Ormara (Makran Coast). |
| „ 4 | E | iP } | 19 30 03 | ... | ... | ... | Slight. |
| | N | eP } | | | | | |
| | E | i | 31 53 | ... | ... | ... | |
| | N, E | iS | 36 47 | ... | ... | ... | |
| | N, E | Mn | 54 ... | ... | ... | ... | |
| | N, E | F | 20 20 ... | ... | ... | ... | |
| „ 5 | N, E | i | 15 05 15 | ... | ... | ... | Slight. |
| | N | Mn | 55 ... | ... | ... | ... | |
| | N, E | F | 16 26 ... | ... | ... | ... | |
| „ 6 | N, E | e | 21 25 28 | ... | ... | ... | Feeble. |
| | N, E | F | 22 00 ... | ... | ... | ... | |
| „ 6/7 | N | Record lost from | 23 ... ... | ... | ... | ... | |
| | | to | 02 ... ... | ... | ... | ... | |
| „ 7 | E | iP | 02 03 57 | (In minute gap). | | | Slight. Epc : 3·5°N., 126°E. to the north-east of the Celebes Islands. O=2h. 54m. 40s. |
| | E | eS | 11 27 | ... | ... | ... | |
| | N, E | F | 03 20 ... | ... | ... | ... | |
| „ 7 | N, E | iP | 04 11 40 | ... | ... | 5,390 | Moderate. First movements as read : Slightly to North and 2mm. to E. Epc : 23°·5N., 121°·3 E. Formosa O=4h. 3m. 27s. 23°·4 N., 121°·7 E. H. O=04h. 03m. 20s. (Strasbourg). 24°·0 N., 121°·5 E. |
| | N, E | iPcP | 12 51 | ... | ... | ... | |
| | N, E | iPP | 13 25 | ... | ... | ... | |
| | N, E | iS | 18 40 | ... | ... | ... | |
| | E | iPS | 18 50 | ... | ... | ... | |
| | E | ScS | 21 31 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Aug. 31 | N | M | 15 36 25 | 9 | 5 | ... | |
| | N, E | F | 50 ... | ... | ... | ... | |
| „ 31 | E | eP | 17 56 54 | ... | ... | 9,000 | Slight. Epc : 3°·5 S., 152°E. Bismarck Archipelago. O.=17h. 45m. 18s h.=400 km. (appr.). 3°S., 151°E. h.=340 km. (Strasbourg). |
| | E | ipP | 58 13 | ... | ... | ... | |
| | N, E | esP | 58 54 | ... | ... | ... | |
| | N, E | e | 18 00 04 | ... | ... | ... | |
| | E | e | 01 58 | (In minute gap). | | | |
| | N | iS } | 06 29 | ... | ... | ... | |
| | E | eS } | | | | | |
| | N, E | esS | 09 00 | ... | ... | ... | |
| | N, E | F | 19 05 ... | ... | ... | ... | |
| Sept. 7 | N, E | sS | 04 21 59 | ... | ... | ... | H. O=04h. 03.4m (U. S. C. G. S.). 24°·9N., 122°E. (J. S. A.). |
| | N, E | L | 28 07 | ... | ... | ... | |
| | N | $M_1$ | 31 10 | 15 | 32 | ... | |
| | E | $M_1$ | 32 50 | 15 | 38 | ... | |
| | N | $M_2$ | 33 30 | 15 | 36 | ... | |
| | E | $M_2$ | 34 51 | 15 | 36 | ... | |
| | N, E | F | 06 30 ... | ... | ... | ... | |
| „ 7 | E | iP } | 13 10 44 | ... | ... | 9,600 | Slight. △ from P-O. Epc : 6°·6S., 156°E. Solomon Islands. Riverview △ (P-O)=28°·0 ; Hongkong △(P-O)=49°·7 ; Pasadena △ (P-O)=90°·0. O=12h. 58m. 14s. h.=150 km. Pasadena gives h—150 km. |
| | N | eP } | | | | | |
| | N, E | esP | 11 41 | ... | ... | ... | |
| | E | i | 14 00 | ... | ... | ... | |
| | N, E | iS | 20 52 | ... | ... | ... | |
| | N | isS | 22 00 | ... | ... | ... | |
| | N, E | i | 21 58 | (In minute gap) | | | |
| | N, E | F | 15 00 ... | ... | ... | ... | |
| „ 9 | N, E | eP | 09 31 57 | ... | ... | 2,170 | Slight. Epc : In the region of 1°N., 64°·5 E. in the Indian Ocean O=9h. 27·5 m. |
| | N, E | iS | 35 30 | ... | ... | ... | |
| | N, E | F | 10 25 ... | ... | ... | ... | |
| „ 9 | E | e | 18 45 11 | ... | ... | ... | |
| | E | e | 55 ... | ... | ... | ... | |
| | E | F | 19 25 ... | ... | ... | ... | |
| „ 10 | N | eP | 22 26 51 | ... | ... | 1,435 | Moderate. Max. movement after S, Epc : 7°·7N., 79°·2E. about 70 miles to the north-west of Colombo in the sea. O=22h. 23m. 57s. Felt strongly at Colombo, in the sea to the west of Ceylon and mildly at Nuwara Eliya, Trivandrum, Tinnevelly and Kodaikanal. |
| | E | i | 27 07 | ... | ... | ... | |
| | N, E | eS | 29 13 | ... | ... | ... | |
| | N, E | i (SS) | 29 41 | ... | ... | ... | |
| | E | i | 29 46 | ... | ... | ... | |
| | N, E | iL | 30 16 | ... | ... | ... | |
| | N, E | i | 30 32 | ... | ... | ... | |
| | N, E | i (S) | 30 47 | ... | ... | ... | |
| | N, E | F | 23 10 ... | ... | ... | ... | |
| „ 11 | E | e | 14 35 11 | ... | ... | ... | |
| | E | e | 41 15 | ... | ... | ... | |
| | E | F | 15 10 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| Sep. 14 | N | e | 09 16 21 | ... | ... | ... | |
| | E | e | 19 7 | ... | ... | ... | |
| | N, E | F | 45 ... | ... | ... | ... | |
| ,, 14 | N, E | e | 12 21 30 | ... | ... | ... | Felt very strongly at Kalat. |
| | N, E | e | 24 00 | (In minute gap). | | | |
| ,, 14/15 | N | Record lost from | 15 20 ... | ... | ... | ... | |
| | | to | 02 54 ... | ... | ... | ... | |
| | E | Record lost from | 18 45 ... | ... | ... | ... | |
| | | to | 03 07 ... | ... | ... | ... | |
| ,, 18 | N, E | iP | 00 45 11 | ... | ... | 3,440 | Slight. Epc : 9°·5 N., 40°·3 E., Abyssinnia. O=0h. 38m. 40s. |
| | E | e | 46 23 | ... | ... | ... | |
| | N, E | eS | 50 15 | ... | ... | ... | |
| | N, E | F | 01 30 ... | ... | ... | ... | |
| ,, 18 | N | iP | 03 59 09 | ... | ... | 5,310 | Slight. Deep? Epc : 38° N., 23°·5 E. in Greece. (Strasbourg). |
| | E | eP | | | | | |
| | N, E | e | 59 27 | ... | ... | ... | |
| | N, E | i | 04 01 01 | ... | ... | ... | |
| | N, E | iS | 06 05 | ... | ... | ... | |
| | E | i | 06 28 | ... | ... | ... | |
| | N, E | e | 09 00 | (In minute gap). | | | |
| ,, 19/20 | E | Record lost from | 02 41 ... | ... | ... | ... | |
| | | to | 02 46 ... | ... | ... | ... | |
| ,, 20 | N | Record lost from | 01 12 ... | ... | ... | ... | |
| | | to | 02 37 ... | ... | ... | ... | |
| ,, 20 | N, E | e | 14 41 30 | ... | ... | ... | |
| | N, E | F | 15 30 ... | ... | ... | ... | |
| ,, 20 | E | e | 15 53 29 | ... | ... | ... | Feeble. |
| | N, E | e | 16 04 25 | ... | ... | ... | |
| | N, E | e | 13 20 | ... | ... | ... | |
| | N, E | F | 40 ... | ... | ... | ... | |
| ,, 20 | E | e | 22 22 18 | ... | ... | ... | |
| | N, E | e | 25 08 | ... | ... | ... | |
| | N, E | F | 45 ... | ... | ... | ... | |
| 1938. | | | | | | | |
| Sept. 21 | N, E | iP | 19 02 17 | ... | ... | 6,660 | Moderate. First movements as read : 1 mm. to E. and 0·4 mm. to N. Epc : 34°·0 N., 141°·0 E. to the east of Japan. O=18h. 52m. 04s. Hongkong P=18h. 57m. 43s. ; Riverview eP=19h. 05m. 14s. ; PasadenaP=19h.05m. 58s. ; Ksara iP=19h. 04m. 15s. ; Stuttgart IP=19h. 04m. 34·5s. Kew iP=19h. 04m. 41s. |
| | N, E | iPcP | 03 01 | ... | ... | ... | |
| | E | i | 04 52 | ... | ... | ... | |
| | N | e } S | | | | | |
| | E | i } | 10 35 | ... | ... | ... | |
| | N, E | i | 10 49 | ... | ... | ... | |
| | N, E | i | 13 13 | ... | ... | ... | |
| | N. E. | i | 14 35 | ... | ... | ... | |
| | E | i | 15 03 | ... | ... | ... | |
| | N | Mn | 31 30 | 14 | 3 | ... | |
| | E | Mn | 31 50 | 16 | 6 | ... | |
| | N, E | F | 22 05 ... | ... | ... | ... | |
| ,, 23 | N, E | iP | 01 08 19 | ... | ... | 2,490 | Slight. Epc : 1°·5S., 79°E. in the Indian Ocean. O=1h. 3m. 23s. |
| | N, E | iS | 12 17 | ... | ... | ... | |
| | N, E | F | 55 ... | ... | ... | ... | |
| ,, 25 | E | e | 20 28 50 | ... | ... | ... | |
| | E | e | 30 41 | ... | ... | ... | |
| | N, E | e | 38 30 | ... | ... | ... | |
| | N, E | F | 22 05 ... | ... | ... | ... | |
| ,, 26 | E | e | 9 53 36 | ... | ... | ... | |
| | E | F | 10 40 ... | ... | ... | ... | |
| ,, 27 | N | iP | 02 38 21 | ... | ... | ... | Slight. Record partially lost in shifting of charts in E. Epc : 8°N., 39°·5 E. Abyssinnia. O=2h. 31m. 40s. |
| | N | e | 39 26 | ... | ... | ... | |
| | N | e | 40 18 | ... | ... | ... | |
| | N, E | iS | 43 46 | ... | ... | ... | |
| | E | i | 47 08 | ... | ... | ... | |
| | N, E | e | 50 03 | ... | ... | ... | |
| | N, E | F | 04 18 ... | ... | ... | ... | |
| ,, 27 | N, E | e (P) | 10 28 00 | (In minute gap). | | | |
| | N, E | e (S) | 38 15 | ... | ... | ... | |
| | N, E | F | 12 15 ... | ... | ... | ... | |
| ,, 28 | N, E | e | 18 37 29 | ... | ... | ... | |
| | N, E | F | 20 25 ... | ... | ... | ... | |
| ,, 30 | N, E | eP | 09 06 24 | ... | ... | ... | Slight. Epc : 33°·5 N., 79°·5 E. to the south-east of Kashmir. |
| | N, E | eS | 09 21 | ... | ... | ... | |
| | N, E | F | 35 ... | ... | ... | ... | |

COLABA OBSERVATORY,
BOMBAY.

S. R. SAVUR,
*Director.*





# ALIPORE OBSERVATORY, CALCUTTA.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. | | | | | | | |
| July 5 | N | e | 2 16 14 | ... | ... | ... | Slight. |
| | | eSKS | 26 43 | ... | ... | ... | |
| | | iSKKS | 27 22 | ... | ... | ... | |
| | | iS | 27 44 | ... | ... | ... | |
| | | ePS | 28 56 | ... | ... | ... | |
| | | ePPS | 29 36 | ... | ... | ... | |
| | | e (SS) | 33 28 | ... | ... | ... | |
| | | eSSS | 38 27 | ... | ... | ... | |
| | | eL | 49·27 | ... | ... | ... | |
| | | M | 57 7 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 5 | N | e | 22 19 29 | ... | ... | ... | Slight. |
| | | ePP | 23 45 | ... | ... | ... | |
| | | ePPP | 26 11 | ... | ... | ... | |
| | | e | 30 3 | ... | ... | ... | |
| | | eSKS | 30 58 | ... | ... | ... | |
| | | iS | 31 33 | ... | ... | ... | |
| | | iPS | 33 3 | ... | ... | ... | |
| | | iPPS | 33 56 | ... | ... | ... | |
| | | eSS | 39 4 | ... | ... | ... | |
| | | eSSS | 43 14 | ... | ... | ... | |
| | | eL | 56 8 | ... | ... | ... | |
| | | M | 23 4 23 | ... | ... | ... | |
| | | Mn | 12 13 20 | 11 | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 13 | N | eP (?) | 13 48 24 | ... | ... | 1,450 | Slight. |
| | | iS | 50 48 | ... | ... | ... | |
| | | e | 51 47 | ... | ... | ... | |
| | | i | 52 25 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 18 | N | e | 14 59 41 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 19 | N | e | 19 59 55 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 19 | N | e | 22 58 3 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| 20 | N | i | 0 41 18 | ... | ... | ... | Slight, distant. |
| | | Mn | 58 2 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 20 | N | e | 12 5 12 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 20 | N | e | 16 19 32 | ... | ... | .. | Slight, near. |
| | | F | Lost in microseisms. | | | | |
| ,, 21 | N | i | 9 27 22 | ... | ... | ... | Slight, distant. |
| | | Mn | 37 10 | ... | ... | ... | |
| | | F | 10 7 ... | ... | .. | ... | |
| 1938. | | | | | | | |
| July 21 | N | e | 22 23 43 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 22 | N | ePKS | 8 10 56 | ... | ... | 14,835 | Slight. |
| | | e | 12 38 | ... | ... | ... | |
| | | e | 13 58 | ... | ... | ... | |
| | | iSKKS | 16 52 | ... | ... | ... | |
| | | i | 22 44 | ... | ... | ... | |
| | | e | 24 1 | ... | ... | ... | |
| | | eL | 50 53 | ... | ... | ... | |
| | | M | 9 1 5 | ... | ... | ... | |
| | | Mn | 7 28 23 | 18 | ... | | |
| | | F | Lost in microseisms. | | | | |
| ,, 23 | N | eP (?) | 12 9 27 | ... | ... | 1,670 | Slight; felt at Paliad (Kathiawar). Probable time correction—1 m. M waves feeble. |
| | | iS | 12 23 | ... | ... | ... | |
| | | iSS | 12 50 | ... | ... | ... | |
| | | iL | 13 25 | ... | ... | ... | |
| | | M | 14 37 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 23 | N | e(?) | 23 14 32 | ... | ... | ... | Slight, distant ? |
| | | i | 19 20 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 24 | N | e | 13 34 20 | ... | ... | ... | Slight, very distant. |
| | | eL | 54 20 | ... | ... | ... | |
| | | Mn | 14 4 50 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 27 | N | e(P) | 17 02 20 | ... | ... | ... | Slight. |
| | | e | 5 32 | ... | ... | ... | |
| | | e | 5 57 | ... | ... | ... | |
| | | e(S) | 7 26 | ... | ... | ... | |
| | | iSS | 9 34 | ... | ... | ... | |
| | | e | 10 25 | ... | ... | ... | |
| | | iL | 11 33 | ... | ... | ... | |
| | | M | 13 58 | ... | ... | ... | |
| | | Mn | 16 48 | 15 | 36 | ... | |
| | | F | 18 5 ... | ... | ... | ... | |
| ,, 27 | N | eP(?) | 23 0 48 | ... | ... | 1,250 | Slight. |
| | | iS | 2 53 | ... | ... | ... | |
| | | $\frac{iS^*}{iS}$ | 3 41 | ... | ... | ... | |
| | | | 4 14 | ... | ... | ... | |
| | | F | 23 21 ... | ... | ... | ... | |
| ,, 28 | N | eP | 5 59 4 | ... | ... | 1,250 | Slight. |
| | | eS | 6 1 11 | ... | ... | ... | |
| | | $\frac{iS^*}{iS}$ | 1 59 | ... | ... | ... | |
| | | | 2 32 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |

# ALIPORE OBSERVATORY, CALCUTTA.

| Date | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| **July, 1938.** | | | | | | | |
| 1938. | | | | | | | |
| July 29 | N | iP | 13 12 11 | ... | ... | 2,810 | Moderate. Direction of first movement—North. |
| | | iPP | 12 45 | ... | ... | ... | |
| | | iPPP | 12 58 | ... | ... | ... | |
| | | iS | 16 41 | ... | ... | ... | |
| | | iSS | 17 46 | ... | ... | ... | |
| **August, 1938.** | | | | | | | |
| Aug. | N | $eP_1'$ | 9 15 18 | ... | ... | 16,580 | Slight. |
| | | e(PKS) | 18 13 | ... | ... | ... | |
| | | e | 19 51 | ... | ... | ... | |
| | | iSKKS | 25 5 | ... | ... | ... | |
| | | e | 25 42 | ... | ... | ... | |
| | | i | 30 10 | ... | ... | ... | |
| | | i | 33 11 | ... | ... | ... | |
| | | L | 38 0 | ... | ... | ... | |
| | | F | 11 23 ... | ... | ... | ... | |
| ,, 5 | N | e | 14 22 47 | ... | ... | ... | Slight, distant. |
| | | i | 26 2 | ... | ... | ... | |
| | | Mn | 29 8 | ... | ... | ... | |
| | | F | 46 ... | ... | ... | ... | |
| ,, 10 | N | e | 12 24 41 | ... | ... | ... | Tremor. |
| | | F | 40 ... | ... | ... | ... | |
| ,, 16 | N, * | iP | 4 29 13 | ... | ... | 600 | Great. Direction of 1st movement—South and West. Severely felt at Aijal (Lushai Hills) and slightly in south-east Bengal and in Arakan. *From Omori. |
| | N* | eP | 29 13 | ... | ... | ... | |
| | N. E* | i | 29 25 | ... | ... | ... | |
| | | i | 29 38 | ... | ... | ... | |
| | | iS | 30 16 | ... | ... | ... | |
| | N* | i | 30 34 | ... | ... | ... | |
| | | i | 33 49 | ... | ... | ... | |
| | | F | Lost | | | | |
| ,, 16 | N | e | 9 12 45 | ... | ... | ... | Tremor. |
| | | F | 26 .. | ... | ... | ... | |
| ,, 16 | N | eP | 17 14 1 | ... | ... | 840 | Slight. |
| | | ēP | 14 39 | ... | ... | ... | |
| | | iS | 15 28 | ... | ... | ... | |
| | | iS | 15 57 | ... | ... | ... | |
| | | īS | 16 18 | ... | ... | ... | |
| | | F | 34 ... | ... | ... | ... | |
| ,, 18 | N | eP | 9 36 15 | ... | ... | 3,550 | Moderate; focal depth about 250 km. |
| | | epP | 37 6 | ... | ... | ... | |
| | | iS | 41 17 | ... | ... | ... | |
| | | isS | 42 49 | ... | ... | ... | |
| | | F | 11 39 ... | ... | ... | ... | |
| ,, 1 | N | eP | 19 13 41 | ... | ... | .. | Slight. |
| | | iL | 23 51 | ... | ... | ... | |
| | | M | 28 34 | ... | ... | ... | |
| | | Mn | 31 9 | 20 | 34 | ... | |
| | | F | Lost in microseisms. | | | | |
| 1938. July 29 | N | iL | 13 19 8 | ... | ... | ... | |
| | | M | 21 31 | ... | ... | ... | |
| | | Mn | 27 16 | 16 | 79 | ... | |
| | | F | 15 10 ... | ... | ... | ... | |
| Aug. 18 | N | e | 22 31 44 | ... | ... | ... | Slight,, distant. |
| | | Mn | 40 44 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 20 | N | e | 5 19 10 | ... | ... | ... | Slight, distant. |
| | | Mn | 33 50 | ... | ... | ... | |
| | | F | 6 2 ... | ... | ... | ... | |
| ,, 20 | N | e | 6 59 8 | ... | ... | ... | Tremor. |
| | | F | 7 15 ... | ... | ... | ... | |
| ,, 20 | N | e | 8 42 0 | ... | ... | ... | Slight, very distant. |
| | | i | 50 21 | ... | ... | ... | |
| | | i | 51 38 | ... | ... | ... | |
| | | F | 9 56 ... | ... | ... | ... | |
| ,, 21 | N | e | 15 22 22 | ... | ... | ... | Slight, near (?) |
| | | i | 23 30 | ... | ... | ... | |
| | | i | 25 37 | ... | ... | ... | |
| | | F | 47 ... | ... | ... | ... | |
| ,, 22 | N | iP | 21 41 22 | ... | ... | 2,080 | Slight. Direction of first movement—North. |
| | | iPP | 41 40 | ... | ... | ... | |
| | | iS | 44 54 | ... | ... | ... | |
| | | iSS | 45 33 | ... | ... | ... | |
| | | eL | 46 19 | ... | ... | ... | |
| | | M | 48 4 | ... | ... | ... | |
| | | Mn | 50 29 | 9 | 23 | ... | |
| | | F | 22 59 ... | ... | ... | ... | |
| ,, 23 | N | eP | 8 18 42 | ... | ... | 1,200 | Slight. |
| | | iS | 20 44 | ... | ... | ... | |
| | | iS* | 21 29 | ... | ... | ... | |
| | | īS | 22 1 | ... | ... | ... | |
| | | F | 9 13 ... | ... | ... | ... | |
| ,, 24 | N | e | 16 1 47 | ... | ... | ... | Slight, very distant. |
| | | Mn | 16 27 | ... | ... | ... | |
| | | F | 37 ... | ... | ... | ... | |
| ,, 25 | N | iP | 1 34 17 | ... | ... | 3,910 | Moderate; direction of 1st movement—South. Focal depth about 300 km. |
| | | ipP | 35 16 | ... | ... | ... | |
| | | iS | 40 33 | ... | ... | ... | |
| | | isS | 41 26 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 26 | N,E* | eP | 18 0 12 | ... | ... | 510 | Slight. Felt in North Bengal. *From Omori. |
| | N | iS | 1 7 | ... | ... | ... | |
| | E* | eS | 1 7 | ... | ... | ... | |



# ALIPORE OBSERVATORY, CALCUTTA.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| **August, 1938.** | | | | | | | |
| 1938. Aug. 26 | E | eS* | 18 1 22 | ... | ... | ... | |
| | | ēS | 1 33 | ... | ... | ... | |
| | N | F | Lost in microseisms. | | | | |
| 29 | N | eP(?) | 15 28 49 | ... | ... | ... | Moderate. |
| | | ePP | 30 9 | ... | ... | ... | |
| | | ePPP | 30 38 | ... | ... | ... | |
| | | iS | 34 57 | ... | ... | ... | |
| | | eSS | 37 22 | ... | ... | ... | |
| | | iSSS | 37 59 | ... | ... | ... | |
| | | iL | 40 25 | ... | ... | ... | |
| | | M | 43 47 | ... | ... | ... | |
| | | Mn | 49 47 | 15 | 78 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 30 | N | eP | 12 0 1 | ... | ... | 6,350 | Slight. M waves feeble. |
| | | iS | 8 1 | ... | ... | ... | |
| | | iPS | 8 33 | ... | ... | ... | |
| | | eSS | 11 58 | ... | ... | ... | |
| | | eSSS | 13 49 | ... | ... | ... | |
| 1938. Aug. 30 | | eL | 12 17 51 | ... | ... | ... | |
| | | M | 22 30 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 30 | N | e | 17 17 3 | ... | ... | ... | Slight, very distant. |
| | | i | 24 11 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 31 | N | i | 11 54 22 | ... | ... | ... | Slight, near. |
| | | F | Lost in microseisms. | | | | |
| ,, 31 | N | i(¯) | 15 35 3 | ... | ... | ... | Slight, near. |
| | | F‴ | Lost in microseisms. | | | | |
| ,, 31 | N | e | 17 59 32 | ... | ... | ... | Slight; M waves feeble. |
| | | e | 18 0 16 | ... | ... | ... | |
| | | iS | 3 55 | ... | ... | ... | |
| | | i | 4 57 | ... | ... | ... | |
| | | i | 6 16 | ... | ... | ... | |
| | | M | 8 29 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| **September, 1938.** | | | | | | | |
| Sep. 1 | N | e | 3 4 14 | ... | ... | ... | Slight. |
| | | e | 8 14 | ... | ... | ... | |
| | | e | 9 48 | ... | ... | ... | |
| | | e | 11 54 | ... | ... | ... | |
| | | M | 14 56 | ... | ... | ... | |
| | | Mn | 17 6 | 11 | 14 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 1-2 | N | i | 23 8 4 | ... | ... | ... | Slight, very distant. |
| | | i | 11 39 | ... | ... | ... | |
| | | Mn | 0 11 14 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 2 | N | i | 20 32 7 | ... | ... | ... | Slight, distant. Felt at Ormora (Makran Coast). |
| | | F | Lost in microseisms. | | | | |
| ,, 4 | N | i | 19 31 49 | ... | ... | ... | Slight. Direction of first movement—North. |
| | | i | 32 23 | ... | ... | ... | |
| | | e | 32 36 | ... | ... | ... | |
| | | iS | 33 19 | ... | ... | ... | |
| | | i | 36 19 | ... | ... | ... | |
| | | eL | 37 24 | ... | ... | ... | |
| | | i | 38 42 | ... | ... | ... | |
| | | M | 41 9 | ... | ... | ... | |
| | | Mn | 43 16 | 19 | 18 | ... | |
| | | F | 20 24 ... | ... | ... | ... | |
| ,, 5 | N | e | 15 20 47 | ... | ... | ... | Slight; very distant. |
| | | Mn | 16 1 34 | ... | ... | ... | |
| | | F | 32 ... | ... | ... | ... | |
| Sep. 6 | N | e | 20 55 12 | ... | ... | ... | Slight, very distant. |
| | | i | 21 3 7 | ... | ... | ... | |
| | | M | 16 42 | ... | ... | ... | |
| | | Mn | 19 44 | ... | ... | ... | |
| | | F | 22 3 ... | ... | ... | ... | |
| ,, 7 | N | eP | 2 2 17 | ... | ... | 4,010 | Slight. |
| | | iS | 8 5 | ... | ... | ... | |
| | | i | 8 27 | ... | ... | ... | |
| | | eSS | 10 12 | ... | ... | ... | |
| | | eL | 12 56 | ... | ... | ... | |
| | | M | 16 3 | ... | ... | ... | |
| | | Mn | 17 32 | 17 | 17 | ... | |
| | | F | 51 ... | ... | ... | ... | |
| ,, 7 | N | iP | 4 9 34 | ... | ... | 3,600 | Moderate. Direction of 1st movement—North. |
| | | ePP | 10 31 | ... | ... | ... | |
| | | ePPP | 10 50 | ... | ... | ... | |
| | | i | 13 13 | ... | ... | ... | |
| | | iS | 14 56 | ... | ... | ... | |
| | | iSS | 16 39 | ... | ... | ... | |
| | | iL | 18 54 | ... | ... | ... | |
| | | M | 21 49 | ... | ... | ... | |
| | | F | 6 34 ... | ... | ... | ... | |
| ,, 7 | N | eP | 13 9 19 | ... | ... | 7,450 | Slight. M waves feeble. |
| | | ePP | 11 53 | ... | ... | ... | |
| | | iS | 18 19 | ... | ... | ... | |
| | | i | 19 04 | ... | ... | ... | |
| | | i | 19 27 | ... | ... | ... | |
| | | e | 18 50 | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Sep. 7 | | eL | 13 29 33 | ... | ... | ... | |
| | | F | 14 9 ... | ... | ... | ... | |
| ,, 10 | N | eP(?) | 22 28 2 | ... | ... | 2,150 | Slight. Felt in Ceylon and Travancore. |
| | | ePP | 28 21 | ... | ... | ... | |
| | | ePPP | 28 27 | ... | ... | ... | |
| | | iS | 31 40 | ... | ... | ... | |
| | | eSS | 32 20 | ... | ... | ... | |
| | | eL | 33 12 | ... | ... | ... | |
| | | M | 34 52 | ... | ... | ... | |
| | | Mn | 35 31 | 17 | 24 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 11 | N | iP | 14 32 48 | ... | ... | 840 | Slight. Direction of first movement—South. |
| | | iP* | 33 7 | ... | ... | ... | |
| | | $\overline{iP}$ | 33 26 | ... | ... | ... | |
| | | iS | 34 15 | ... | ... | ... | |
| | | iS* | 34 44 | ... | ... | ... | |
| | | $\overline{iS}$ | 35 5 | ... | ... | ... | |
| | | F | 57 ... | ... | ... | ... | |
| ,, 11 | N | e | 17 35 53 | ... | ... | ... | Slight, distant. |
| | | Mn | 52 22 | ... | ... | ... | |
| | | F | 18 5 ... | ... | ... | ... | |
| ,, 11 | N | e(?) | 19 57 30 | ... | ... | ... | Slight, distant. |
| | | Mn | 20 13 47 | ... | ... | ... | |
| | | F | 37 ... | ... | ... | ... | |
| ,, 14 | N | e | 9 0 8 | ... | ... | ... | Slight, distant. |
| | | i | 6 47 | ... | ... | ... | |
| | | F | 32 ... | ... | ... | ... | |
| ,, 14 | N | e | 12 23 24 | ... | ... | ... | Slight, distant. |
| | | i | 25 54 | ... | ... | ... | |
| | | F | 43 ... | ... | ... | ... | |
| ,, 19 | N | i | 7 9 30 | ... | ... | ... | Slight, near. |
| | | F | Lost in microseisms. | | | | |
| ,, 20 | N | e | 15 46 34 | ... | ... | 4,690 | Slight. |
| | | eS? | 53 02 | ... | ... | ... | |
| | | e | 55 46 | ... | ... | ... | |
| | | e | 56 38 | ... | ... | ... | |
| | | iL | 59 1 | ... | ... | ... | |
| | | M | 16 2 49 | ... | ... | ... | |
| | | Mn | 6 52 | 10 | 8 | ... | |
| | | F | 34 ... | ... | ... | ... | |
| ,, 20 | N | e | 22 14 46 | ... | ... | ... | Slight, distant. |
| | | Mn | 21 10 | ... | ... | ... | |
| | | F | 34 ... | ... | ... | ... | |
| ,, 21 | N | eP | 19 0 32 | ... | ... | 4,930 | Moderate. |
| | | iPP | 2 7 | ... | ... | ... | |
| 1938. | | | | | | | |
| Sep. 21 | N | iPPP | 2 47 | ... | ... | ... | |
| | | iS | 7 13 | ... | ... | ... | |
| | | eSS | 10 9 | ... | ... | ... | |
| | | iSSS | 11 12 | ... | ... | ... | |
| | | iL | 13 58 | ... | ... | ... | |
| | | M | 17 39 | ... | ... | ... | |
| | | Mn | 23 18 | 18 | 38 | ... | |
| | | F | 20 58 ... | ... | ... | ... | |
| ,, 23 | N | i (S) | 1 13 15 | ... | ... | ... | Slight. |
| | | Mn | 17 52 | ... | ... | ... | |
| | | F | Masked by next shock. | | | | |
| ,, 23 | N | e (?) | 1 23 10 | ... | ... | ... | Slight, distant. |
| | | Mn | 28 32 | ... | ... | ... | |
| | | F | 42 ... | ... | ... | ... | |
| ,, 25 | N | eP | 4 51 54 | ... | ... | 930 | Slight. |
| | | iS | 53 30 | ... | ... | ... | |
| | | eS* | 54 3 | ... | ... | ... | |
| | | $\overline{iS}$ | 54 26 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 25 | N | i | 20 36 57 | ... | ... | ... | Slight, very distant. |
| | | Mn | 21 11 10 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 27 | N | i (?) | 2 22 21 | ... | ... | ... | Slight, distant. |
| | | Mn | 28 37 | ... | ... | ... | |
| | | F | Masked by next shock. | | | | |
| ,, 27 | N | eP (?) | 2 40 40 | ... | ... | 5,080 | Slight. |
| | | iS | 47 29 | ... | ... | ... | |
| | | iSS | 50 32 | ... | ... | ... | |
| | | iSSS | 51 41 | ... | ... | ... | |
| | | iL | 54 31 | ... | ... | ... | |
| | | M | 58 20 | ... | ... | ... | |
| | | Mn | 3 1 50 | 12 | 15 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 27 | N | e | 10 35 43 | ... | ... | ... | Slight, distant. |
| | | Mn | 53 11 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 28 | N | i | 18 35 59 | ... | ... | ... | Slight, very distant. |
| | | Mn | 58 26 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 30 | N | e (S) | 9 8 27 | ... | ... | ... | Slight. |
| | | i (L) | 11 1 | ... | ... | ... | |
| | | e | 11 25 | ... | ... | ... | |
| | | e | 11 49 | ... | ... | ... | |
| | | M | 12 49 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |

METEOROLOGICAL OFFICE, ALIPORE, CALCUTTA.

S. K. PRAMANIK,
*Meteorologist.*





# COLOMBO OBSERVATORY, CEYLON.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | mm. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | | Km. | |
| July 4 | E | e | 21 36 ... | ... | ... | ... | |
| | | F | 22 29 30 | ... | ... | ... | |
| ,, 5 | E | e | 02 23 30 | ... | ... | ... | |
| | | F | 03 34 ... | ... | ... | ... | |
| ,, 5 | E | e | 22 28 30 | ... | ... | ... | |
| | | F | 23 36 ... | ... | ... | ... | |
| ,, 6 | E | e | 01 37 ... | ... | ... | ... | |
| | | F | 03 40 30 | ... | ... | ... | |
| ,, 8 | E | Record lost from | 03 52 ... | ... | ... | ... | |
| | | to | 11 00 ... | ... | ... | ... | |

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | mm. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Aug. 16 | E | P | 04 32 36 | ... | ... | ... | |
| | | S | 36 28 | ... | ... | ... | |
| | | L | 41 28 | ... | ... | ... | |
| | | M | 43 47 | ... | 25 | ... | |
| | | F | 06 31 ... | ... | ... | ... | |
| ,, 18 | E | P | 09 35 26 | ... | ... | ... | |
| | | S | 39 48 | ... | ... | ... | |
| | | ? | 40 01 | ... | 5·8 | ... | |
| | | F | 10 53 ... | ... | ... | ... | |
| ,, 18 | E | e | 19 31 30 | ... | ... | ... | |
| | | F | 50 30 | ... | ... | ... | |
| ,, 23 | E | e | 08 24 30 | ... | ... | ... | |
| | | F | 09 00 ... | ... | ... | ... | |
| ,, 25 | E | P | 01 33 26 | ... | ... | ... | |
| | | S | 37 56 | ... | ... | ... | |
| 1938. | | | | | | | |
| July 12 | E | P | 08 56 28 | ... | ... | ... | S, L and M not distinguishable; amplitude of M <1·0 mm. |
| | | F | 09 15 30 | ... | ... | ... | |
| ,, 12 | E | e | 20 15 30 | ... | ... | ... | |
| | | F | 30 ... | ... | ... | ... | |
| ,, 21 | E | e | 09 29 30 | ... | ... | ... | |
| | | F | 39 30 | ... | ... | ... | |
| ,, 22 | E | e | 08 59 30 | ... | ... | ... | |
| | | F | 09 30 ... | ... | ... | ... | |
| ,, 29 | E | P | 13 11 10 | ... | ... | ... | M not pronounced; amplitude about 0·5 mm. |
| | | S? | 15 03 | ... | ... | ... | |
| | | F | 14 43 ... | ... | ... | ... | |
| Aug. 25 | E | L | 01 40 00 | ... | ... | ... | |
| | | M | 45 46 | ... | 12·1 | ... | |
| | | F | 03 40 ... | ... | ... | ... | |
| ,, 29 | E | S | 15 37 03 | ... | ... | ... | P between 15h 29m 59s. and 30m. 29s. |
| | | L | 44 59 | ... | ... | ... | |
| | | M | 54 04 | ... | 1·3 | ... | |
| | | F | 16 49 ... | ... | ... | ... | |
| ,, 30 | E | P | 2 00 23 | ... | ... | ... | |
| | | S | 09 04 | ... | ... | ... | |
| | | L | 35 45 | ... | ... | ... | |
| | | M(?) | 40 02 | ... | <0·5 | ... | |
| | | F | 13 29 30 | ... | ... | ... | |
| ,, 31 1 | E | No record from | 12 26 | ... | ... | ... | |
| | | to | 00 59 | ... | ... | ... | |

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | mm. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Sep. 1-2 | E | e | 23 08 ... | ... | ... | ... | |
| | | F | 00 29 30 | ... | ... | ... | |
| ,, 4 | E | e | 19 29 30 | ... | ... | ... | |
| | | F | 20 10 ... | ... | ... | ... | |
| ,, 7 | E | P | 02 02 57 | ... | ... | ... | |
| | | S | 09 47 | ... | ... | ... | |
| | | M | 19 30 | ... | <0·5 | ... | Not pronounced. Wave of longest period read. |
| | | F | 40 ... | ... | ... | ... | |
| ,, 7 | E | P | 04 11 23 | ... | ... | ... | |
| | | S | 18 09 | ... | ... | ... | |
| | | L | 28 39 | ... | ... | ... | |
| | | M | 32 07 | ... | 4·0 | ... | |
| | | F | 05 55 30 | ... | ... | ... | |
| ,, 7 | E | P | 13 09 54 | ... | ... | ... | S, L and M indefinite; amplitude of M <0·3 mm. |
| | | F | 14 13 ... | ... | ... | ... | |
| Sep. 9 | E | (S) | 09 34 46 | ... | ... | ... | A very unusual trace P not discernible but S (probably) commences abruptly. |
| | | M | 37 18 | ... | 1·0 | ... | |
| | | F | 55 30 | ... | ... | ... | |
| ,, 10-11 | E | P | 22 24 10 | ... | ... | ... | Thrown out of action at 22h 24m 30s. Set recording again at 22h 51m. This earthquake was felt in Ceylon and in South India, and at sea to the west of Ceylon. |
| | | F | 00 23 30 | ... | ... | ... | |
| ,, 14 | E | Record lost from | 03 35 ... | ... | ... | ... | |
| | | to | 10 29 30 | ... | ... | ... | |
| ,, 20 | E | e | 14 36 ... | ... | ... | ... | |
| | | F | 51 30 | ... | ... | ... | |
| ,, 21 | E | P | 19 02 23 | ... | ... | ... | |
| | | S | 10 50 | ... | ... | ... | |
| | | L | 23 05 | ... | ... | ... | |
| | | M | 32 20 | ... | 0·5 | ... | |
| | | F | 20 10 30 | ... | ... | ... | |

## LOMBO OBSERVATORY, CEYLON.

| Date. | Compt. | Phase. | G. M. T | Per. | Amp. | △ | Remarks. | Date. | Compt. | Phase. | G. M. T | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **September 1938.** | | | | | | | | |
| 1938. | | | h. m. s. | sec. | mm. | Km. | | 1938. | | | h. m. s. | sec. | mm. | Km. | |
| Sep. 23 | E | P | 01 05 21 | ... | ... | ... | The P waves are of small amplitude, and distinguishable from the microseisms only by their very small period. The iS commences abruptly with waves of very small period and of amplitude about 1·5mm. The period increases rapidly, the amplitude dies away as fast. | Sep. 27 | E | P | 02 39 06 | ... | ... | ... | |
| | | iS | 06 38 | ... | ... | ... | | | | S | 45 27 | ... | ... | ... | |
| | | F | 38 30 | ... | ... | ... | | | | L | 50 07 | ... | ... | ... | |
| | | | | | | | | | | M | 53 32 | ... | 0·5 | ... | |
| | | | | | | | | | | F | 03 40 ... | ... | ... | ... | |
| ,, 25 | E | e | 20 36 30 | ... | ... | ... | | ,, 28 | E | e | 18 36 30 | ... | ... | ... | |
| | | F | 21 25 30 | ... | ... | ... | | | | F | 19 24 30 | ... | ... | ... | |

COLOMBO OBSERVATORY.

H. JAMESON,
*Superintendent.*



## HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. | Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | |
| | | | h. m. s. | sec. | On trace in inch. | Km. | | | | | h. m. s. | sec. | On trace in inch. | Km. | |
| | | | | | | | **July, 1938.** | | | | | | | | |
| 1938. July 22 | N | ? | 8 57 21? | ? | ? | ... | | 1938. July 29 | N | eP | 13 13 11? | 2? | ·002 | 4,193 | |
| | | ? | 9 04 51? | 20 | ·006 | ... | | | | eS | 18 54 | 23 | ·020 | ... | |
| | | $M_1$ | 10 03 | 17 | ·015 | ... | | | | eL | 26 35 | 21 | ·165 | ... | |
| | | F | 56 39? | ... | ... | ... | | | | $M_1$ | 29 18 | 21 | ·165 | ... | |
| | | | | | | | | | | F | 14 29 00? | ... | ... | ... | |
| | | | | | | | **August, 1938.** | | | | | | | | |
| Aug. 16 | N | iP | 4 31 36 | 2 10 | ·01 ·03 | 1,781 | Direction of 1st motion "North". | Aug. 25 | N | e? | 1 45 41 | 12 | ·015 | ... | |
| | | iS | 34 23 | 13 | ·38 | ... | | | | eL | 51 28? | 25 | ·07 | ... | |
| | | iL | 37 09 | 25 | 2·24 | ... | | | | $M_1$ | 54 00 | 25 | ·07 | ... | |
| | | $M_1$ | 39 35 | 25 | 2·24 | ... | | | | $M_2$ | 56 00 | 19 | ·075 | ... | |
| | | F | 7 36 48? | ... | ... | ... | | | | $M_3$ | 57 29 | 20 | ·053 | ... | |
| | | | | | | | | | | F | 4 28 26? | ... | ... | ... | |
| ,, 18 | N | eP | 9 38 10? | 2 | ·002 | ... | | ,, 29 | N | e | 15 31 34? | ... | ... | ... | |
| | | i | 43 52 | 11 | ·03 | ... | | | | eS | 38 00 | 10 | ·015 | ... | |
| | | eL | 51 04 | 20 | ·012 | ... | | | | eL | 42 25 | 27 | ·05 | ... | |
| | | $M_1$ | 54 17? | 24 | ·015 | ... | | | | $M_1$ | 43 11 | 27 | 05 | ... | |
| | | $M_2$ | 57 45? | 19 | ·015 | ... | | | | $M_2$ | 49 52 | 28 | ·04 | ... | |
| | | F | 10 26 02? | ... | ... | ... | | | | $M_3$ | 53 29 | 25 | ·055 | ... | |
| | | | | | | | | | | $M_4$ | 59 10 | 26 | ·03 | ... | |
| ,, 18 | N | SSS? | 19 24 51? | ... | ·002 | ... | | | | $M_5$ | 16 01 24 | 25 | ·035 | ... | |
| | | e | 28 22? | 15 | ·002 | ... | | | | F | 17 12 03? | ... | ... | ... | |
| | | eL? | 31 24? | 18 | ·004 | ... | | | | | | | | | |
| | | $M_1$ | 34 29 | 13 | ·006 | ... | | ,, 30 | N | eP | 12 01 43? | ... | ... | ... | |
| | | F | 20 06 05? | ... | ... | ... | | | | i | 10 52 | 11 | ·01 | ... | |
| ,, 22 | N | e? | 21 45 15 | 4 | ·003 | ... | | | | $M_1$ | 30 25 | 27 | ·01 | ... | |
| | | iL | 47 57 | 24 | ·075 | ... | | | | $M_2$ | 34 19 | 27 | ·01 | ... | |
| | | $M_1$ | 48 18 | 24 | ·075 | ... | | | | $M_3$ | 38 04 | 26 | ·01 | ... | |
| | | F | 22 16 53? | ... | ... | ... | | | | F | 13 47 25? | ... | ... | ... | |
| ,, 23 | N | eS? | 8 21 49? | ... | ... | ... | | ,, 31 | N | iP | 15 29 15 | ... | ... | 124 | Direction of motion "North". |
| | | iL | 23 20 | 20 | ·038 | ... | | | | iS | 29 28 | 1 | ·003 | ... | |
| | | $M_1$ | 23 39 | 20 10 | ·038 | ... | | | | $M_1$ | 29 37 | 2 1 | ·04 | ... | |
| | | F | 50 57? | ... | ... | ... | | | | F | 35 24? | ... | ... | ... | |
| ,, 25 | N | i | 1 36 19 | 5 | ·005 | ... | Direction of 1st motion "South". | | | | | | | | |
| | | e | 42 22 | 8 | ·01 | ... | | | | | | | | | |
| | | | | | | | **September, 1938.** | | | | | | | | |
| Sep. 7 | N | eP | 4 11 01? | 4? | ·005 | 4,396 | | Sep. 10 | N | eP | 22 29 31? | ... | ... | 2,593 | |
| | | iS | 17 01 | 25 | ·025 | ... | | | | e? | 30 41 | ... | ... | ... | |
| | | iL | 24 47 | 23 | ·235 | ... | | | | iS | 33 32 | 10? | ·01 | ... | |
| | | $M_1$ | 25 37 | 23 | ·235 | ... | | | | i | 36 10 | 6 | ·01 | ... | |
| | | $M_2$ | 27 59 | 22 | ·175 | ... | | | | eL | 37 51? | 18 | ·035 | ... | |
| | | F | 6 01 06? | ... | ... | ... | | | | $M_1$ | 38 32 | 18 | ·035 | ... | |
| | | | | | | | | | | F | 56 51? | ... | ... | ... | |

C. O. WHEELER, *Lt.-Col., M. C., R. E.,*
*Director, Geodetic Branch,*
*Survey of India.*

DEHRA DUN.

# NIZAMIAH OBSERVATORY, HYDERABAD DECCAN.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| July 5 | N | M | 3 5 34 | 18 | 11 | ... | |
| 5 | N | M | 23 18 11 | 18 | 8 | ... | |
| 6 | N | M | 2 30 31 | 14 | 6 | ... | |
| 12 | N | M | 20 19 28 | 12 | 4 | ... | |
| 21 | N | M | 9 41 16 | 15 | 4 | ... | |
| 22 | N | M | 9 15 40 | 17 | 13 | ... | |
| 23 | E | e | 12 6 22 | ... | ... | ... | |
| | E | S | 8 32 | ... | ... | ... | |
| | E | L | 9 2 | ... | ... | ... | |
| | E | M | 11 26 | 5 | 4 | ... | |

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Aug. 4 | E, N | $P_2^1$ | 9 14 11 | ... | ... | 15,480 | |
| | E, N | SKKS | 24 12 | ... | ... | ... | |
| | E | ? | 24 45 | ... | ... | ... | |
| | E | L | 37 41 | ... | ... | ... | |
| | N | M | 53 30 | 14 | 4 | ... | |
| | E | M | 53 52 | 22 | 8 | ... | |
| | E | F | 11 0 ... | ... | ... | ... | |
| ,, 5 | N | M | 14 28 26 | 5 | 3 | ... | |
| | E | M | 28 30 | 6 | 3 | ... | |
| ,, 16 | E, N | P | 4 31 33 | ... | ... | 1,600 | |
| | E, N | S | 34 19 | ... | ... | ... | |
| | N | L | 35 39 | ... | ... | ... | |
| | N | M | 37 18 | 12 | 250 | ... | |
| | N | F | 7 10 ... | ... | ... | ... | |
| ,, 18 | N | P | 9 36 26 | ... | ... | 3300 | |
| | N | PP | 37 29 | ... | ... | ... | |
| | N | S | 41 30 | ... | ... | ... | |
| | N | SS | 42 57 | ... | ... | ... | |
| | N | L | 45 39 | ... | ... | ... | |
| | N | M | 49 21 | 12 | 7 | ... | |
| | N | F | 11 22 ... | ... | ... | ... | |
| ,, 18 | N | S | 19 24 57 | ... | ... | ... | |
| | N | M | 36 17 | 20 | 9 | ... | |
| ,, 20 | N | M | 8 33 34 | 16 | 4 | ... | |
| | E | M | 34 53 | 16 | 4 | ... | |
| ,, 20 | N | M | 8 56 15 | 8 | 3 | ... | |
| ,, 22 | E, N | P | 21 43 6 | ... | ... | 2,900 | |
| | E, N | S | 47 41 | ... | ... | ... | |
| | N | SS | 48 16 | ... | ... | ... | |
| | N | L | 51 24 | ... | ... | ... | |
| | N | M | 53 0 | 10 | 10 | ... | |
| | E | M | 53 7 | 10 | 12 | ... | |
| | N | F | 22 21 ... | ... | ... | ... | |
| ,, 23 | N | P | 8 20 34 | ... | ... | 2,210 | |
| | N | S | 24 15 | ... | ... | ... | |
| | N | L | 26 2 | ... | ... | ... | |
| Aug. 23 | N | M | 8 28 14 | 8 | 10 | ... | |
| | N | F | 9 1 ... | ... | ... | ... | |
| ,, 25 | E, N | P | 1 34 35 | ... | ... | 3,470 | |
| | N | PP | 35 36 | ... | ... | ... | |
| | E, N | S | 39 50 | ... | ... | ... | |
| | N | SS | 41 16 | ... | ... | ... | |
| | N | L | 43 31 | ... | ... | ... | |
| | N | ScS | 44 56 | ... | ... | ... | |
| | N | M | 47 10 | 16 | 26 | ... | |
| | E | M | 47 52 | 15 | 32 | ... | |
| | N | F | 4 23 ... | ... | ... | ... | |
| ,, 26 | N | (S) | 18 4 51 | ... | ... | ... | |
| | N | M | 6 10 | 3 | 4 | ... | |
| ,, 29 | E | P | 15 30 39 | ... | ... | 4,840 | |
| | E | PP | 32 10 | ... | ... | ... | |
| | E, N | S | 37 13 | ... | ... | ... | |
| | E | ScS | 40 52 | ... | ... | ... | |
| | E | L | 44 20 | ... | ... | ... | |
| | E | M | 48 58 | 18 | 25 | ... | |
| | N | M | 50 13 | 16 | 18 | ... | |
| | N | F | 17 30 ... | ... | ... | ... | |
| ,, 30 | E | eP | 12 0 42 | ... | ... | 7,490 | |
| | E | S | 9 36 | ... | ... | ... | |
| | E | ScS | 10 40 | ... | ... | ... | |
| | E | SS | 14 2 | ... | ... | ... | |
| | E | L | 23 10 | ... | ... | ... | |
| | E | M | 28 22 | 15 | 6 | ... | |
| | N | M | 28 52 | 15 | 6 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 30 | E | M | 17 25 33 | 7 | 3 | ... | |
| | N | M | 25 51 | 6 | 2 | ... | |
| ,, 31 | E, N | S | 15 35 33 | ... | ... | ... | |
| | N | M | 36 44 | 8 | 4 | ... | |
| ,, 31 | E, N | S | 18 5 33 | ... | ... | ... | |
| | N | M | 19 13 | 12 | 2 | ... | |



NIZAMIAH OBSERVATORY, HYDERABAD DECCAN.

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Sep. 1 | N | M | 3 19 25 | 15 | 6 | ... | |
| | E | M | 20 18 | 14 | 5 | ... | |
| 1 | N | $P_1'$ | 23 8 10 | ... | ... | ... | |
| ,, | N | M | 10 28 | 6 | 2 | ... | |
| 2 | N | M | 0 58 14 | 14 | 3 | ... | |
| ,, 4 | E | P | 19 29 22 | ... | ... | 4,360 | |
| | E | S | 35 29 | ... | ... | ... | |
| | E | M | 46 46 | 18 | 6 | ... | |
| | N | M | 48 46 | 15 | 4 | ... | |
| | N | F | 20 12 ... | ... | ... | ... | |
| ,, 5 | N | M | 16 6 44 | 15 | 4 | ... | |
| ,, 6 | N | M | 21 27 56 | 15 | 4 | ... | |
| | E | M | 30 14 | 14 | 3 | ... | |
| ,, 7 | E | P | 2 3 20 | ... | ... | 5,390 | |
| | E,N | S | 10 23 | ... | ... | ... | |
| | E | L | 17 11 | ... | ... | ... | |
| | N | M | 28 14 | 18 | 5 | ... | |
| | E | M | 28 32 | 16 | 4 | ... | |
| | N | F | 3 8 ... | ... | ... | ... | |
| ,, 7 | E, N | P | 4 11 2 | ... | ... | 4,390 | |
| | E | PP | 12 41 | ... | ... | ... | |
| | E,N | S | 17 11 | ... | ... | | |
| | N | ScS | 20 41 | ... | ... | ... | |
| | E | L | 23 5 | ... | ... | ... | |
| | N | M | 27 5 | 15 | 82 | ... | |
| | E | M | 27 14 | 15 | 55 | ... | |
| | N | F | 6 12 ... | ... | ... | ... | |
| ,, 7 | E | M | 13 21 0 | 8 | 3 | ... | |
| | N | M | 21 2 | 8 | 3 | ... | |
| ,, 9 | N | eP | 9 32 5 | ... | ... | 2,330 | |
| | N | S | 35 56 | ... | ... | ... | |
| | N | L | 37 11 | ... | ... | ... | |
| | N | M | 39 47 | 8 | 3 | ... | |
| | N | F | 10 12 ... | ... | ... | ... | |
| ,, 10 | E, N | P | 22 26 15 | ... | ... | 1,360 | |
| | E, N | S | 28 38 | ... | ... | ... | |
| | N | L | 29 19 | ... | ... | ... | |
| | N | M | 30 26 | 13 | 40 | ... | |
| | N | F | 23 18 ... | ... | ... | ... | |
| ,, 11 | E | M | 14 39 38 | 5 | 2 | ... | |
| | N | M | 40 11 | 6 | 2 | ... | |
| Sep. 14 | N | M | 9 14 54 | 15 | 3 | ... | |
| ,, 14 | E | M | 12 24 21 | 10 | 2 | ... | |
| | N | M | 24 36 | 9 | 2 | ... | |
| ,, 18 | E | P | 0 45 56 | ... | ... | 4,060 | |
| | E | PP | 47 19 | ... | ... | ... | |
| | E | S | 51 47 | ... | ... | ... | |
| | E | L | 56 50 | ... | ... | ... | |
| | E | M | 59 21 | 12 | 3 | ... | |
| | E | F | 1 26 ... | ... | ... | ... | |
| ,, 20 | N | M | 22 27 54 | 10 | 2 | ... | |
| ,, 21 | E,N | P | 19 1 49 | ... | ... | 6,440 | |
| | E,N | S | 9 49 | ... | ... | ... | |
| | N | PS | 10 8 | ... | ... | ... | |
| | N | SS | 13 33 | ... | ... | ... | |
| | N | L | 19 31 | ... | ... | ... | |
| | N | M | 25 50 | 22 | 19 | ... | |
| | E | M | 27 1 | 21 | 28 | ... | |
| | N | F | 21 16 ... | ... | ... | ... | |
| ,, 23 | E,N | P | 1 7 42 | ... | ... | 2,190 | |
| | E,N | S | 11 21 | ... | ... | ... | |
| | N | L | 12 30 | ... | ... | ... | |
| | N | M | 14 12 | 20 | 6 | ... | |
| | E | M | 14 24 | 15 | 4 | ... | |
| | N | F | 46 ... | ... | ... | ... | |
| ,, 25 | N | M | 21 19 16 | 16 | 3 | ... | |
| | E | M | 20 26 | 16 | 3 | ... | |
| ,, 27 | E, N | P | 2 39 5 | . | ... | 4,180 | |
| | E | PP | 40 28 | ... | ... | ... | |
| | E, N | S | 45 3 | ... | ... | ... | |
| | E | SS | 47 31 | ... | ... | ... | |
| | E | L | 49 42 | ... | ... | ... | |
| | E | M | 51 46 | 15 | 15 | ... | |
| | N | M | 52 16 | 16 | 7 | ... | |
| | E | F | 4 22 ... | ... | ... | ... | |
| ,, 27 | E | M | 11 3 45 | 18 | 5 | ... | |
| | N | M | 5 25 | 22 | 7 | ... | |
| ,, 28 | E | S | 18 37 0 | ... | ... | ... | |
| | E | M | 19 1 59 | 20 | 6 | ... | |
| ,, 30 | E | M | 9 12 8 | 9 | 5 | ... | |
| | N | M | 12 48 | 9 | 4 | ... | |

NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

T. P. BHASKARA SASTRI,
*Director.*

# KODAIKANAL OBSERVATORY, KODAIKANAL.

## July, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. July 5 | E | e | h. m. s. 2 42 ... | sec. ... | μ ... | Km. ... | Distant. |
| | | F | 4 14 ? | ... | ... | ... | |
| ,, 5 | E | e | 22 33 ... | ... | ... | ... | Feeble. |
| | | F | 23 39 ... | ... | ... | ... | |
| ,, 6 | E | iS | 1 49 35 | ... | ... | ... | Feeble. |
| | | F | 2 41 ... | ... | ... | ... | |
| ,, 12 | E | e | 13 6 ... | ... | ... | ... | Feeble shock. |
| | | F | 14 ... ... | ... | ... | ... | |
| ,, 12 | E | e | 20 13 ... | ... | ... | ... | Feeble shock. |
| | | F | 35 ... | ... | ... | ... | |
| ,, 15 | E | e | 0 22 ... | ... | ... | ... | Feeble shock. |
| | | F | 50 ... | ... | ... | ... | |
| ,, 20 | E | e | 0 40 ... | ... | ... | ... | Tremor. |
| | | F | 1 31 ... | ... | ... | ... | |
| ,, 21 | E | e | 9 24 ... | ... | ... | ... | Feeble shock. |
| | | F | 59 ... | ... | ... | ... | |
| 1938. July 22 | E | e | h. m. s. 8 23 ... | sec. ... | μ ... | Km. ... | Feeble shock. |
| | | F | 10 37 ... | ... | ... | ... | |
| ,, 23 | E | e | 12 9 ... | ... | ... | ... | Feeble shock. |
| | | F | 57 ... | ... | ... | ... | |
| ,, 23-24 | E | e | 23 17 ... | ... | ... | ... | Feeble shock. |
| | | F | 0 11 ... | ... | ... | ... | |
| ,, 24 | E | e | 13 34 ... | ... | ... | ... | Tremors. |
| | | F | 14 32 ... | ... | ... | ... | |
| ,, 27 | E | e | 17 11 ... | ... | ... | ... | Tremors. |
| | | | 18 6 ... | ... | ... | ... | |
| ,, 29 | E | iP | 13 11 50 | ... | ... | 2,610 | First movement to W. |
| | | iS | 16 5 | ... | ... | ... | |
| | | iSS | 17 10 | ... | ... | ... | |
| | | iL | 18 20 | ... | ... | ... | |
| | | M | 20 25 | 19 | 105 | ... | |
| | | F | 15 24 ... | ... | ... | ... | |

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Aug. 4 | E | e | 9 11 ... | ... | ... | ... | Long distance earthquake. |
| | | F | 10 51 ... | ... | ... | ... | |
| ,, 16 | E | iP | 4 32 27 | ... | ... | 2,265 | First movement to west. |
| | | PP | 32 49 | ... | ... | ... | |
| | | iS | 36 14 | ... | ... | ... | |
| | | iSS | 36 57 | ... | ... | ... | |
| | | L | 38 ... | ... | ... | ... | |
| | | Mn | 44 5 | 13 | 196 | ... | |
| | | F | 7 51 ... | ... | ... | ... | |
| ,, 18 | E | iP | 9 35 58 | ... | ... | 3,150 | First movement to east. |
| | | iPP | 36 30 | ... | ... | ... | |
| | | iPPP | 36 43 | ... | ... | ... | |
| | | iS | 40 52 | ... | ... | ... | |
| | | L | 43 40 | ... | ... | ... | |
| | | M | 46 ... | 11 | 15 | ... | |
| | | F | 11 30 ... | ... | ... | ... | |
| ,, 18 | E | eP | 19 15 40 | ... | ... | ... | |
| | | F | 20 2 ... | ... | ... | ... | |
| ,, 20 | E | e | 4 23 ... | ... | ... | ... | Tremors. |
| | | F | 5 4 ... | ... | ... | ... | |
| ,, 20 | E | e | 7 20 ... | ... | ... | ... | Tremors. |
| | | F | 8 41 ... | ... | ... | ... | |
| ,, 22-23 | E | e | 21 35 ... | ... | ... | ... | Feeble long distance shock. |
| | | F | 0 8 ... | ... | ... | ... | |
| Aug. 23 | E | eP | h. m. s. 8 21 39 | sec. ... | μ ... | Km. 2,980 | |
| | | e | 22 00 | ... | ... | ... | |
| | | eS | 26 14 | ... | ... | ... | |
| | | SS | 27 10 | ... | ... | ... | |
| | | iL | 28 28 | ... | ... | ... | |
| | | M | 30 12 | 11 | 9 | ... | |
| | | F | 55 ... | ... | ... | ... | |
| ,, 25 | E | e | 15 52 ... | ... | ... | ... | Tremors. |
| | | F | 17 1 ... | ... | ... | ... | |
| ,, 25 | E | iP | 1 34 00 | ... | ... | 3,120 | First movement to west. |
| | | iS | 38 52 | ... | ... | ... | |
| | | iSS | 40 17 | ... | ... | ... | |
| | | iL | 42 37 | ... | ... | ... | |
| | | Mn | 48 26 | 15 | 132 | ... | |
| | | F | 4 12 ... | ... | ... | ... | |
| ,, 29 | E | P | 15 30 44 | ... | ... | 5,100 | |
| | | iPPP | 32 56 | ... | ... | ... | |
| | | iS | 37 34 | ... | ... | ... | |
| | | iSS | 40 33 | ... | ... | ... | |
| | | iSSS | 41 42 | ... | ... | ... | |
| | | iL | 44 32 | ... | ... | ... | |
| | | M | 47 50 | 22 | 58 | ... | |
| | | F | 17 32 ... | ... | ... | ... | |
| ,, 30 | E | eP | 12 00 32 | ... | ... | 7,350 | |
| | | iS | 9 27 | ... | ... | ... | |
| | | iPS | 9 58 | ... | ... | ... | |





KODAIKANAL OBSERVATORY, KODAIKANAL.

## August, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. Aug. 30 | E | iSS | h. m. s. 12 14 10 | sec. ... | μ ... | Km. ... | |
| | | L | 21 9 | ... | ... | ... | |
| | | Mn | 38 4 | 19 | 16 | ... | |
| | | F | 14 59 ... | ... | ... | ... | |
| ,, 30 | E | e | 17 18 ... | ... | ... | ... | Tremors. |
| | | F | 18 4 ... | ... | ... | ... | |
| 1938. Aug. 31 | E | e | h. m. s. 15 37 ... | sec. ... | μ ... | Km. ... | Feeble shock. |
| | | F | 50 ... | ... | ... | ... | |
| ,, 31 | E | iP | 17 56 20 | ... | ... | ... | Feeble shock. |
| | | F | 19 0 4 | ... | ... | ... | |

## September, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| Sep. 1-2 | E | ePₙ' | h. m. s. 23 8 28 | sec. ... | μ ... | Km. ... | Long distance earthquake. |
| | | F | 0 38 00 | ... | ... | ... | |
| ,, 4 | E | eP | 19 29 27 | ... | ... | 4,790 | Phases not quite clear. |
| | | iPP | 31 10 | ... | ... | ... | |
| | | iS | 36 ... | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | M | 45 3 | 24 | 8 | ... | |
| | | F | 20 9 ... | ... | ... | ... | |
| ,, 5 | E | e | 15 45 ... | ... | ... | ... | Tremors. |
| | | F | 16 4 ... | ... | ... | ... | |
| ,, 6 | E | e | 21 29 ... | ... | ... | ... | Tremors. |
| | | F | 51 ... | ... | ... | ... | |
| ,, 7 | E | iP | 2 3 16 | ... | ... | 5,290 | |
| | | iPPP | 5 40 | ... | ... | ... | |
| | | iS | 10 17 | ... | ... | ... | |
| | | iSS | 13 7 | ... | ... | ... | |
| | | iSSS | 14 26 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | Mn | 20 22 | 27 | 10 | ... | |
| | | F | 34 ... | ... | ... | ... | |
| ,, 7 | E | iP | 4 11 27 | ... | ... | 5,145 | First movement to west. |
| | | iPPP | 13 28 | ... | ... | ... | |
| | | iS | 18 20 | ... | ... | ... | |
| | | iL | 24 ... | ... | ... | ... | |
| | | Mn | 32 33 | 18 | 76 | ... | |
| | | F | 6 36 ... | ... | ... | ... | |
| ,, 7 | E | iP | 13 10 10 | ... | ... | ... | Long distance earthquake. |
| | | iS | 19 56 | ... | ... | ... | First movement to east. |
| | | i | 19 52 | ... | ... | ... | |
| | | i | 21 04 | ... | ... | ... | |
| | | F | 14 38 ... | ... | ... | ... | |
| ,, 9 | E | eP | 9 31 00 | ... | ... | 1,730 | Tremor. |
| | | eS | 33 50 | ... | ... | ... | |
| | | Mn | 35 52 | 11 | 11 | ... | |
| | | F | 58 ... | ... | ... | ... | |
| ,, 9 | E | e | 18 53 ... | ... | ... | ... | Tremors. |
| | | F | 19 11 ... | ... | ... | ... | |
| Sep. 10 | E | iP | h. m. s. 22 24 40 | sec. ... | μ ... | Km. 330 | First movement east. |
| | | P | 25 00 | ... | ... | ... | |
| | | iS | 25 25 | ... | ... | ... | |
| | | M | 26 ... | 12 | 85 | ... | |
| | | F | 57 ... | ... | ... | ... | |
| ,, 14 | E | e | 7 23 51 | ... | ... | ... | Tremors. |
| | | F | 27 ... | ... | ... | ... | |
| ,, 14 | E | e | 12 25 33 | ... | ... | ... | Tremors. |
| | | F | 37 ... | ... | ... | ... | |
| ,, 18 | E | e | 4 7 ... | ... | ... | ... | Tremors. |
| | | F | 49 ... | ... | ... | ... | |
| ,, 18 | E | e | 12 5 ... | ... | ... | ... | Tremors. |
| | | F | 12 ... | ... | ... | ... | |
| ,, 20 | E | e | 12 57 ... | ... | ... | ... | Tremors. |
| | | F | 14 04 ... | ... | ... | ... | |
| ,, 21 | E | iP | 19 02 25 | ... | ... | 6,770 | First movement to west. |
| | | iS | 10 52 | ... | ... | ... | |
| | | iPS | 11 26 | ... | ... | ... | |
| | | SS | 15 8 | ... | ... | ... | |
| | | eSSS | 17 18 | ... | ... | ... | |
| | | eL | 22 7 | ... | ... | ... | |
| | | Mn | 32 20 | 28 | 21 | ... | |
| | | F | 20 50 ... | ... | ... | ... | |
| ,, 21 | E | e | 21 14 ... | ... | ... | ... | Tremors. |
| | | F | 49 ... | ... | ... | ... | |
| ,, 23 | E | e (S) | 01 08 13 | ... | ... | ... | Feeble shock. |
| | | F | 52 ... | ... | ... | ... | |
| ,, 25 | E | e | 20 33 ... | ... | ... | ... | Feeble long distance shock. |
| | | F | 21 38 ... | ... | ... | ... | |
| ,, 26 | E | e | 9 51 ... | ... | ... | ... | Tremors. |
| | | F | 10 22 ... | ... | ... | ... | |

## KODAIKANAL OBSERVATORY, KODAIKANAL.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. | Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **September, 1938.** | | | | | | | | |
| 1938. | | | h. m. s. | sec. | μ | Km. | | 1938. | | | h. m. s. | sec. | μ | Km. | |
| Sep. 27 | E | iP? | 2 38 55 | ... | ... | 4,120 | First movement to west. | Sep. 27 | E | F | 11 53 ... | ... | ... | ... | |
| | | iS | 44 50 | ... | ... | ... | | | | | | | | | |
| | | iL | 48 28 | ... | ... | ... | | ,, 28 | E | e | 19 2 ... | ... | ... | ... | Tremors. |
| | | M | 50 50 | 22 | 37 | ... | | | | F | 20 ... | ... | ... | ... | |
| | | F | 5 57 ... | ... | ... | ... | | | | | | | | | |
| | | | | | | | | ,, 30 | E | M | 9 15 ... | ... | ... | ... | Tremors. |
| ,, 27 | E | e | 10 27 ... | ... | ... | ... | Feeble shock. | | | F | 33 ... | ... | ... | ... | |

SOLAR PHYSICS OBSERVATORY,
KODAIKANAL.

A. L. NARAYAN,
*Director.*



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

| Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. | Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1938. | h. m. | Sec. | | | | | 1938. | h. m. | Sec. | | | |
| Silchar | Jul. 4 | 14 19 | 1 | 7 | 1 | | Jalpaiguri | Aug. 26 | 17 55 | 15 | 6 | 1 | |
| Cox's Bazar | ,, 13 | 21 52 | 30 | 6 | 7 | | Mussoorie | ,, 31 | 15 30 | 20 | 5 | 1 | |
| Lahore | ,, 15 | 8 02 | 3 | 6 | 1 | | Simla | ,, 31 | 15 32 | 10 | 6 | 8 | |
| Peshawar | ,, 29 | 10 35 | 2 | 5 | 2 | | Ormara | Sep. 2 | 20 25 | 25 | 8 | 3 | |
| | | 14 05 | 4 | | 4 | | | | | | | | |
| Silchar | Aug. 16 | 04 29 | 90 | 6 | 1 | Continuous. | Bali (Jodhpur) | ,, 9 | 12 07 | 5 | ... | ... | |
| Kalat | ,, 21 | 07 00 | 8 | 6 | 1 | * | Palamcottah | ,, 10 | 22 25 | 2 | 4 | 1 | |
| Dhubri | ,, 26 | 05 59 | 6 | 6 | 3 | | Nuwara Eliya | ,, 10 | 22 26 | 5 | ... | ... | |
| Sudder station (Cooch Behar) | ,, 26 | 05 59 | 30 | 6 | 2 | | Kalat | ,, 14 | 12 11 | 10 | 8 | 1 | ** |
| | | | | | | | Lahore | ,, 30 | 14 45 | 30 | 6 | 1 | |

* Only mud plaster over wire-gauze walling of earth proof quarters cracked.

** The upper portion of His Highness' old Palace which was damaged in Earthquake of 1935 and was somewhat loose fell. Kutcha verandahs of shops were separated from the main.

J. M. SIL,
*Meteorologist, Poona.*

GIPD—81—257 Meteoro Bombay—2-5-39—300.

GOVERNMENT OF INDIA

METEOROLOGICAL DEPARTMENT

# SEISMOLOGICAL BULLETIN

## OCT. - DEC., 1938.

CONTENTS.




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S. K. BANERJI, D.Sc.,

Offg. *Director General of Observatories.*

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# INTRODUCTION.

The seismic data from the observatories of the India Meteorological Department have, till the end of 1937, been published annually as Part D of the Annual Summary of the India Weather Review. With a view to expedite the publication of the data, it has been decided to bring out the Indian data in the form of a quarterly bulletin. Owing to the kind co-operation of the Surveyor-General of India, the Director of the Nizamiah Observatory, Hyderabad and of the Superintendent, Colombo Observatory, it has also been possible to incorporate in this bulletin the data of their respective observatories, *viz.*, Dehra Dun, Hyderabad and Colombo. The instrumental seismological data were collected and edited at the Colaba Observatory, Bombay, and the non-instrumental voluntary observations at the Meteorological Office, Poona.

TABLE 1.

*List of Seismograph Stations.*

| Station. | Latitude. | Longitude. | Height above M. S. L. | Lithologic foundation. | Officer-in-charge of Observatory. |
|---|---|---|---|---|---|
| Agra | 27°8′ N. | 78°01′ E. | 163 meters | Indo-Gangetic Alluvium | Superintending Meteorologist. |
| Bombay | 18°54′ N. | 72°49′ E. | 6 meters | Deccan Trap | Director. |
| Calcutta | 22°32′ N. | 88°20′ E. | (1) 7 meters<br>(2) 6 meters. | Alluvium | Meteorologist. |
| Colombo | 6°54′ N. | 79°52′ E. | 7 meters | Beach-Sand resting on gneiss probably decomposed. | Superintendent. |
| Dehra Dun | 30°19′ N. | 78°03′ E. | 682 meters | Gravel | Director, Geodetic Branch, Survey of India. |
| Hyderabad | 17°26′ N. | 78°27′ E. | 528 meters | Granite | Director, Nizamiah Observatory. |
| Kodaikanal | 10°14′ N. | 77°28′ E. | 2343 meters | Rock | Director. |

(1) Milne-Shaw, (2) Omori-Ewing.

TABLE 2.

*The instruments and their constants.*

| Station. | Component. | Type of instrument. | Mass. | Period. | Static magnification. | Damping ratio. | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | kg. | secs. | | | |
| Agra | N | Omori-Ewing | 45 | 29·5*<br>29 | 29 | 1 | * from Oct. 1 to 9. |
| | E | Milne-Shaw | 0·47 | 12 | 250 | 20 : 1 | |
| Bombay | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 350 | 50 : 1 | |
| Calcutta | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | N | Omori-Ewing | 50 | 28 | 32 | ... | |
| | E | Omori-Ewing | 50 | 28 | 30 | ... | |
| Colombo | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Dehra Dun | N | Omori | 50 | 30 | 12 | ... | |
| Hyderabad | N | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |
| Kodaikanal | E | Milne-Shaw | 0·45 | 12 | 250 | 20 : 1 | |

# ERRATA SLIP FOR OCTOBER—DECEMBE

Page.

80 *Read* the 8th line *after* the 9th line in the right half of the page.

93 *Under* " Phase ", on Dec. 16, *read* " $iP_1$' " *for* " $iP_1$ ", " iSKS " *for* " iSKKS " and " iSKKS " *for* " iSKS ".

98 *Under* " Phase ", on Nov. 25, *read* " eSS " *for* " ESS ".

106 & 107 At the top of both the portions of the page *read* " on trace in inch " *for* " μ ".

106 In the right half of the page *read* " Oct. 19 " *for* " Oct. 10 " *under* " Date ".

# Addendum to Seismological Bulletin, Jan.-Mar. 1938.

In page 17, insert 0·7 in the amplitude column against M on Jan. 24.

# UPPER AIR OBSERVATORY, AGRA.

## October, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct.. 1 | E | e | 5 29 56 | ... | ... | ... | Beginning mixed with microseisms. |
| | | F | 47 ... | ... | ... | ... | |
| „ 1 | E | e | 17 16 55 | ... | ... | ... | Tremors. Beginning mixed with microseisms. |
| | | F | 27 ... | ... | ... | ... | |
| 2 | E | e | 10 54 59 | ... | ... | | Feeble, near. |
| | | F | 58 ... | ... | ... | ... | |
| „ 2 | E | eP | 11 51 8 | ... | ... | 1,445 | Deep focus. |
| | | S | 53 37 | ... | ... | ... | |
| | | F | 12 6 ... | ... | ... | ... | |
| „ 2 | E | e | 17 9 58 | ... | ... | ... | |
| „ 2 | E | e | 18 13 6 | ... | ... | ... | |
| | | e | 14 13 | ... | ... | ... | |
| | | F | 18 ... | ... | ... | ... | |
| „ 4 | E | i | 8 37 9 | ... | ... | (8,445) | Beginning mixed with microseisms. |
| | | S | 46 55 | ... | ... | ... | |
| | | SS | 52 29 | ... | ... | ... | |
| | | SSS | 55 55 | ... | ... | ... | |
| | | F | 9 38 ... | ... | ... | ... | |
| „ 7 | E | P | 1 0 56 | ... | ... | 5,780 | Depth of focus about 60 km. |
| | | pP | 1 11 | ... | ... | ... | |
| | | PPP | 4 8 | ... | ... | ... | |
| | | S | 8 15 | ... | ... | ... | |
| | | sS | 8 39 | ... | ... | ... | |
| | | ScS | 10 39 | ... | ... | ... | |
| | | sSS | 12 40 | ... | ... | ... | |
| | | M | 20 34 | ... | ... | ... | |
| „ 7 | E | iP | 6 16 38 | ... | ... | 2,635 | Direction of the 1st motion W. |
| | | PPP | 17 14 | ... | ... | ... | |
| | | S | 20 50 | ... | ... | | |
| | | F | 7 33 ... | ... | ... | ... | |
| „ 7 | E | iP | 10 58 47 | ... | ... | 2,690 | Direction of the 1st motion W. |
| | | PP | 59 19 | ... | ... | ... | |
| | | S | 11 3 3 | ... | ... | ... | |
| | | F | 43 ... | ... | ... | ... | |
| „ 7 | E | iP | 16 28 50 | ... | ... | 2,610 | Direction of the 1st motion E. |
| | N | e | 28 56? | ... | ... | ... | |
| | N | e | 32 50? | ... | ... | ... | |
| | E | iS | 33 0 | ... | ... | ... | |
| | | L | 35 11 | ... | ... | ... | |
| | | $M_1$ | 43 10 | 16 | 30 | ... | |
| | | $M_2$ | 45 36 | 14 | 15 | ... | |
| | | F | 18 16 ... | ... | ... | ... | |
| „ 9 | E | e | 0 59 51 | ... | ... | ... | Beginning mixed with microseisms. |
| | E | e | 1 0 39 | ... | ... | ... | |
| | | F | 8 ... | ... | ... | ... | |
| 1938. Oct. 9 | E | e | 17 22 44 | ... | ... | ... | First part of the record mixed up with microseisms. |
| „ 9 | E | P | 20 44 13 | ... | ... | 2,680 | |
| | | S | 48 28 | ... | ... | ... | |
| | | SS | 49 25 | ... | ... | ... | |
| | | F | 21 21 ... | ... | ... | ... | |
| „ 10 | E | e | 1 16 26 | ... | ... | ... | Beginning lost while putting on the chart. |
| „ 10 | E | e | 4 7 2 | ... | ... | ... | Tremors. Beginning mixed with microseisms. |
| | | F | 11 ... | ... | ... | ... | |
| „ 10 | E | e | 4 12 47 | ... | ... | ... | Tremors. |
| „ 10 | N | P | 20 57 22 | ... | ... | 5,635 | |
| | | iS | 21 4 42 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| „ 12 | E | iP | 0 44 0 | ... | ... | 6,090 | Direction of the 1st motion W. |
| | | PP | 46 3 | ... | ... | ... | |
| | | S | 51 41 | ... | ... | ... | |
| | | SS | 55 31 | ... | ... | ... | |
| | | M3? | 1 14 46 | 13 | 29 | ... | |
| | | M4? | 17 10 | 13 | 18 | ... | |
| „ 13 | E | P | 15 33 46 | ... | ... | 4,800 | Depth of focus about 80 km. |
| | | pP | 34 10 | ... | ... | ... | |
| | | PP | 35 20 | ... | ... | ... | |
| | | i | 35 37 | ... | ... | ... | |
| | | S | 40 9 | ... | ... | ... | |
| | | sS | 40 53 | ... | ... | ... | |
| | | i | 41 37 | ... | ... | ... | |
| | | SS | 42 57 | ... | ... | ... | |
| | | SSS | 44 6 | ... | ... | ... | |
| | | M? | 48 34 | ... | ... | ... | |
| | | $M_1$ | 51 58 | 13 | 20 | ... | |
| | | F | 17 8 ... | ... | ... | ... | |
| „ 14 | E | e | 3 33 17 | ... | ... | ... | |
| | | F | 45 ... | ... | ... | ... | |
| „ 17 | E | i | 15 35 43 | ... | ... | ... | Beginning not recorded. Deep focus. |
| | | PP? | 37 3 | ... | ... | ... | |
| | | iS | 42 50 | ... | ... | ... | |
| | | SS? | 46 30 | ... | ... | ... | |
| „ 19 | E | e | 3 30 31 | ... | ... | ... | |
| | | $M_1$ | 34 33 | 15 | 4 | ... | |
| | | F | 42 ... | ... | ... | ... | |
| „ 19 | N, E | P, iP | 4 18 36 | ... | ... | 2,545 | Direction of the 1st motion E. in M. S. Epc. Neighbourhood of the Altai Mountains in Central Asia. |
| | E | pP | 18 45 | ... | ... | ... | |
| | E | sP? | 18 57 | ... | ... | ... | |
| | N, E | eS, S | 22 41 | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## October, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 19 | N,E | sS | 4 22 59 | ... | ... | ... | |
| | E | SS | 23 47 | ... | ... | ... | |
| | | $M_1$ | 27 53 | 20 | 304 | ... | |
| | | $M_2$ | 29 3 | 15 | 112 | ... | |
| | N | M(n?) | 29 32 | 17 | 146 | ... | |
| | E | F | 6 36 ... | ... | ... | ... | |
| ,, 20 | N | P | 2 28 59 | ... | ... | 6,110 | Depth of focus about 110 km. Direction of the 1st motion W. |
| | E | iP | | | | | |
| | | pP | 29 23 | ... | ... | ... | |
| | | sP? | 29 41 | ... | ... | ... | |
| | | pP | 30 47 | ... | ... | ... | |
| | | pPP? | 31 37 | ... | ... | ... | |
| | | ? | 32 53 | ... | ... | ... | |
| | N | eS | 36 36 | ... | ... | ... | |
| | E | iS | | | | | |
| | E | PS | 37 9 | ... | ... | ... | |
| | | sS | 37 30 | ... | ... | ... | |
| | N,E | ScS | 38 42 | ... | ... | ... | |
| | E | SSS | 41 40 | ... | ... | | |
| | | $M_1$ | | | | | |
| | | Between | 53 42 | ... | ... | ... | |
| | | and | 55 13 | ... | ... | ... | |
| | | $M_2$ | 56 19 | 20 | 49 | ... | |
| | | $M_3$ | 57 46 | 20 | 63 | ... | |
| | | $M_4$ | 59 14 | 19 | 47 | ... | |
| | N | F | 3 47 ... | ... | ... | ... | |
| ,, 20 | E | eP | 13 22 29 | ... | ... | 4,300 | |
| | | PP | 24 0 | ... | ... | ... | |
| | | S | 28 36 | ... | ... | ... | |
| | | SS | 31 14 | ... | ... | ... | |
| | | F | 14 31 ... | ... | ... | ... | |
| ,, 21 | E | iP | 6 53 51 | ... | ... | | Rest of the record lost due to light being off. Direction of the 1st. motion E. |
| ,, 21 | N | P | 20 29 54 | ... | ... | (3,220) | Deep focus. Direction of 1st motion W. |
| | E | iP | | | | | |
| | E | i | 31 37 | ... | ... | ... | |
| | N, E | S | 34 46 | ... | ... | ... | |
| | E | SS | 35 56 | ... | ... | ... | |
| ,, 21 | E | e | 22 39 51 | ... | ... | ... | Tremors. |
| ,, 21-22 | E | e | 23 55 17 | ... | ... | ... | Very distant. |
| | | i | 0 1 5 | ... | ... | ... | |
| ,, 23 | E | P | 2 32 45 | ... | ... | 4,580 | |
| | | e | 33 18 | ... | ... | ... | |
| | | PP | 34 15 | ... | ... | ... | |
| | | i | 36 19 | ... | ... | ... | |
| | | i | 37 49 | ... | ... | ... | |
| Oct. 23 | E | S | 2 38 56 | ... | ... | ... | |
| | | e | 40 4 | ... | ... | ... | |
| | | SSS | 42 21 | ... | ... | ... | |
| | | M | 47 59 | ... | ... | ... | |
| | | $M_1$ | 50 53 | 19 | 12 | ... | |
| | | $M_2$ | 52 54 | 15 | 6 | ... | |
| | | $M_3$ | 55 11 | 15 | 6 | ... | |
| | | i | 11 15 | ... | ... | ... | |
| | | eP | 15 11 1 | ... | ... | 6,155 | Deep focus ? |
| | | iS | 18 50 | ... | ... | ... | |
| | | $M_1$ | 32 37 | 16 | 8 | ... | |
| | | $M_2$ | 36 39 | 16 | 5 | ... | |
| | | F | 17 27 .. | ... | ... | ... | |
| ,, 26 | E | P | 3 32 36 | ... | ... | 2,445 | |
| | | i | 32 42 | ... | ... | ... | |
| | | S | 36 37 | ... | ... | ... | |
| | | $M_2$ | 43 2 | 11 | 8 | ... | |
| | | F | 4 38 ... | ... | ... | ... | |
| ,, 28 | E | e | 5 3 36 | ... | ... | | |
| | | e | 6 32 | ... | ... | ... | |
| | | $M_1$ | 10 47 | 13 | 4 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 28 | E | S | 5 13 46 | ... | ... | ... | Beginning of the record lost in the previous shock. |
| | | SS | 14 7 | ... | ... | ... | |
| | | $M_1$ | 18 3 | 13 | 9 | ... | |
| | | F | 6 1 ... | ... | ... | ... | |
| | | eP | 13 17 46 | ... | ... | 5,790 | |
| ,, 29 | E | PP | 19 55 | ... | ... | ... | |
| | | iS | 25 15 | ... | ... | ... | |
| | | SS | 28 50 | ... | ... | ... | |
| | | $M_1$ | 43 27 | 19 | 14 | ... | |
| | | F | 15 2 ... | ... | ... | ... | |
| | | P | 23 1 51 | ... | ... | 5,500 | Depth of focus about 90 km. |
| ,, 29-30 | E | pP | 2 12 | ... | ... | ... | |
| | | S | 8 54 | ... | ... | ... | |
| | | sS | 9 36 | ... | ... | ... | |
| | | SS | 12 12 | ... | ... | ... | |
| | | F | 0 39 ... | ... | ... | ... | |
| ,, 31 | E | E | 5 30 6 | ... | ... | ... | |
| | | S | 31 35 | ... | ... | ... | |
| | | F | 43 ... | ... | ... | ... | |





# UPPER AIR OBSERVATORY, AGRA.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 1 | | eP | 0 40 31 | ... | ... | 1,000 | |
| | | S | 51 21 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 5 | E | iP | 8 52 48 | ... | ... | 6,190 | Shock of very great intensity. Epc: Near Lat. 35°N. and long. 141°E. Direction of the 1st motion W. |
| | N | e | 52 53 | ... | ... | ... | |
| | N,E | pP? | 53 07 | ... | ... | ... | |
| | E | PP | 55 10 | ... | ... | ... | |
| | N,E | i | 55 21 | ... | ... | ... | |
| | N,E | S | 9 0 34 | ... | ... | ... | |
| | N,E | i | 0 54 | ... | ... | ... | |
| | E | SS | 4 09 | ... | ... | ... | |
| | N | SS | 4 14 | ... | ... | ... | |
| | E | i | 4 34 | ... | ... | ... | |
| | N | L | 9 41 | ... | ... | ... | |
| | | $M_1$ from | 11 59 | ... | 1230 | ... | |
| | | to | 13 44 | ... | ... | ... | |
| | | $M_2$ from | 15 44 | ... | 1301 | ... | |
| | | to | 18 54 | ... | ... | ... | |
| | E | $M_1$ | 17 36 | 19 | 845 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 5 | N | eP | 10 59 45 | ... | ... | 6,335 | Shock of very great intensity. Epc: Near lat. 38°.5 N and long 142°E. (Northeast of (Japan Direction of the 1st) motion W. |
| | E | iP | | | | | |
| | E | e | 59 53 | ... | ... | ... | |
| | N,E | ipP | 11 0 5 | ... | ... | ... | |
| | E | PP | 1 52 | ... | ... | ... | |
| | N,E | S | 7 39 | ... | ... | ... | |
| | N,E | i | 7 57 | ... | ... | ... | |
| | E | SS | 11 27 | ... | ... | ... | |
| | N | SSS | 12 20 | ... | ... | ... | |
| | | $M_1$ | 19 51 | 21 | 1280 | ... | |
| | | $M_2$ from | 22 58 | ... | ... | ... | |
| | | to | 26 48 | ... | 1301 | ... | |
| | E | $M_1$ | 24 38 | 22 | 1288 | ... | |
| ,, 5* | E | e | 16 10 52 | ... | ... | ... | Feeble. |
| | | S | 11 55 | ... | ... | ... | |
| ,, 5* | E | e | 21 33 2 | ... | ... | ... | |
| | | S | 40 35 | ... | ... | ... | |
| | | SS | 44 16 | ... | ... | ... | |
| | | $M_1$ | 57 46 | 17 | 6 | ... | |
| ,, 5* | E | e | 23 43 27 | ... | ... | ... | |
| ,, 6 | N | P | 9 3 15 | ... | ... | 6,020 | Shock of moderate intensity. Epc: Near lat. 35°N. and long 141° E. Direction of 1st motion W. |
| | E | iP | | | | | |
| | E | pP | 3 36 | ... | ... | ... | |
| | E | PP | 5 9 | ... | ... | ... | |
| | N,E | S | 10 51 | ... | ... | ... | |
| | N | i | 11 3 | ... | ... | ... | |
| Nov. 6 | E | SS | 9 14 37 | ... | ... | ... | |
| | E | M | 23 34 | ... | ... | ... | |
| | N | $M_1$ | 24 21 | 26 | 1059 | ... | |
| | | $M_2$ | 27 41 | 22 | 950 | ... | |
| | E | $M_3$ | 27 45 | 19 | 427 | ... | |
| | N | F | 11 13 ... | ... | ... | ... | |
| ,, 6 | E | e | 17 28 55 | ... | ... | ... | |
| | | PP | 30 40 | ... | ... | ... | |
| | | S | 36 16 | ... | ... | ... | |
| | | i | 36 35 | ... | ... | ... | |
| | | SS | 39 55 | ... | ... | ... | |
| | | $M_1$ | 53 4 | 19 | 8 | ... | |
| | | $M_2$ | 54 33 | 15 | 11 | ... | |
| ,, 6 | E | e | 19 49 49 | ... | ... | ... | |
| ,, 6 | E | iP | 21 13 19 | ... | ... | 6,100 | Direction of the 1st motion W. Δ from SS-P. |
| | | i | 20 46 | ... | ... | ... | |
| | | i | 21 1 | ... | ... | ... | |
| | | PS | 21 20 | ... | ... | ... | |
| | | SS | 24 36 | ... | ... | ... | |
| | | $M_1$ | 38 3 | 17 | 11 | ... | |
| | | $M_2$ | 38 59 | 15 | 14 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 6 | E | iP | 21 48 10 | ... | ... | 6,155 | Shock of moderate intensity. Epc: Near lat. 35°N. and long. 143°E. Direction of the 1st motion W. |
| | N | e | 48 15 | ... | ... | ... | |
| | E | i | 48 19 | ... | ... | ... | |
| | E | PP | 50 0 | ... | ... | ... | |
| | E | S | 55 53 | ... | ... | ... | |
| | N,E | i | 56 10 | ... | ... | ... | |
| | E | SS | 59 39 | ... | ... | ... | |
| | N | $M_1$ | 22 9 30 | 23 | 601 | ... | |
| | E | $M_2$ | 10 31 | 22 | 197 | ... | |
| | N | $M_3$ | 11 27 | 20 | 495 | ... | |
| | E | $M_4$ | 11 51 | 21 | 175 | ... | |
| | E | $M_5$ | 14 4 | 15 | 164 | ... | |
| | N | F | 23 22 ... | ... | ... | ... | |
| | E | F | Mixed up with the following shock. | | | | |
| ,, 7 | E | P | 0 57 22 | ... | ... | 6,020 | |
| | | S | 1 4 58 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 7 | E | P | 1 47 46 | ... | ... | 6,045 | |
| | N | e | 47 52 | ... | ... | ... | |
| | E | i | | | | | |
| | E | i | 47 57 | ... | ... | ... | |
| | | PP | 49 58 | ... | ... | ... | |
| | | iS | 55 23 | ... | ... | ... | |
| | N | e | 55 36 | ... | ... | ... | |
| | E | PS | 55 54 | ... | ... | ... | |

* Absolute time uncertain by ± 10 secs.

# UPPER AIR OBSERVATORY, AGRA.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 7 | E | SS | 1 59 2 | ... | ... | ... | |
| | | SSS | 2 0 52 | ... | ... | ... | |
| | E | $M_1$ | 12 46 | 17 | 83 | ... | |
| | N | $M_1$ | 13 25 | 17 | 36 | ... | |
| | E | $M_2$ | 15 55 | 16 | 31 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 7 | E | i | 2 56 6 | ... | ... | ... | |
| | | $M_1$ | 3 3 16 | 17 | 13 | ... | |
| ,, 7 | E | eP | 4 24 55 | ... | ... | 6,020 | |
| | | eS | 32 31 | ... | ... | ... | |
| | | SS | 36 5 | ... | ... | ... | |
| | | $M_1$ | 50 28 | 15 | 12 | ... | |
| | | $M_2$ | 51 7 | 15 | 20 | ... | |
| ,, 7 | E | iP | 19 21 54 | ... | ... | 6,155 | Direction of the 1st motion W. |
| | | PP | 23 55 | ... | ... | ... | |
| | | S | 29 37 | ... | ... | ... | |
| | | SS | 33 15 | ... | ... | ... | |
| | | Surface waves and F lost in the following shock. | | | | | |
| ,, 7 | E | P | 19 42 57 | ... | ... | ... | |
| | | PP | 45 3 | ... | ... | ... | |
| | | SS? | 54 41 | ... | ... | ... | |
| | | $M_1$ | 20 8 40 | 17 | 26 | ... | |
| | | $M_2$ | 10 29 | 15 | 18 | ... | |
| | | F | 21 50 ... | ... | ... | ... | |
| ,, 8 | E | e | 13 23 26 | ... | ... | ... | Beginning mixed with microseisms. |
| | | F | 14 7 ... | ... | ... | ... | |
| ,, 9 | E | e | 8 7 1 | ... | ... | ... | Near, Feeble. |
| | | eS | 7 33 | ... | ... | ... | |
| | | F | 9 ... | ... | ... | ... | |
| ,, 9 | E | eS? | 8 20 23 | ... | ... | ... | Beginning mixed with microseisms. Feeble. |
| | | F | 25 ... | ... | ... | ... | |
| Nov. 9 | N | eP | 9 25 19 | ... | ... | 6120 | Direction of the first motion W. |
| | E | iP | | | | | |
| | E | iPP | 27 24 | ... | ... | ... | |
| | N,E | S | 33 1 | ... | ... | ... | |
| | E | SS | 36 33 | ... | ... | ... | |
| | E | M | 46 42 | ... | ... | ... | |
| | N | $M_2$ | 50 45 | 17 | 43 | ... | |
| | E | $M_2$ | 50 45 | 13 | 16 | ... | |
| | E | $M_2$ | 51 56 | 15 | 75 | ... | |
| | N | F | 10 38 ... | ... | ... | ... | |
| ,, | E | P | 16 18 14 | ... | ... | 6465 | |
| | | S | 26 20 | ... | ... | ... | |
| | | $M_2$ | 43 53 | 15 | 4 | ... | |
| | | F | 17 30 ... | ... | ... | ... | |
| Nov. 10 | E | e | 2 57 20 | ... | ... | ... | Beginning mixed with microseisms. |
| | | F | 3 6 .. | ... | ... | ... | |
| ,, 10 | E | eP | 6 53 5 | ... | ... | 7245 | Beginning mixed with microseisms. |
| | | eS | 7 1 55 | ... | ... | ... | |
| ,, 10 | E | iP | 10 55 58 | ... | ... | 6080 | Direction of the 1st motion W. |
| | E | PP | 57 58 | ... | ... | ... | |
| | E | S | 11 3 37 | ... | ... | ... | |
| | N | e | 3 43 | ... | ... | ... | |
| | E | SS | 7 43 | ... | ... | ... | |
| | | $M_1$ | 19 56 | 15 | 11 | ... | |
| | | $M_2$ | 22 25 | 17 | 30 | ... | |
| ,, 10 | E | iP | 20 31 13 | ... | ... | 9690 | Shock of very great intensity. Direction of the first motion W. Epc: South of Alaska in Pacific ocean. |
| | N | e | 31 23 | ... | ... | ... | |
| | E | i | | | | | |
| | N | PP | 34 53 | ... | ... | ... | |
| | N, E | S | 41 54 | ... | ... | ... | |
| | E | SS | 47 41? | ... | ... | ... | |
| | N | SS | 47 58 | ... | ... | ... | |
| | N | M(n) | ... ... | ... | >1408 | ... | Motion of the recording pen restricted due to side stops for about 20 minutes. Maximum movement persists for about 12 minutes. |
| | E | M(n) | ... ... | 24 | >1564 | ... | |
| ,, 10 | N | $M_1$ | 22 39 42 | 20 | 164 | ... | 1st Part of the record mixed up with the previous shock. Corresponding shock not identifiable in M-S. |
| ,, 11 | N | P | 1 10 15 | ... | ... | 9335 | Direction of the 1st motion W. |
| | E | iP | | | | | |
| | N | eS | 20 35 | ... | ... | ... | |
| | E | iS | | | | | |
| | E | PS | 21 21 | ... | ... | ... | |
| | | $M_1$ | 47 53 | 18 | 28 | ... | |
| | | $M_2$ | 50 20 | 19 | 27 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| | N | F | Lost while changing chart. | | | | |
| ,, 11 | E | P | 3 6 39 | ... | ... | 6165 | |
| | | S? | 14 24 | ... | ... | ... | |
| | | SS | 18 19 | ... | ... | ... | |
| | | $M_2$ | 32 51 | 15 | 9 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 11 | E | S? | 4 55 8 | ... | ... | ... | Beginning mixed with microseisms. |
| | | $M_2$ | 5 14 3 | 19 | 8 | ... | |
| | | F | 6 5 ... | ... | ... | ... | |
| ,, 11 | E | i | 6 46 24 | ... | ... | ... | |
| | | F | 7 14 ... | ... | ... | ... | |
| ,, 11 | E | e | 8 53 56 | ... | ... | ... | Beginning mixed with microseisms. |



# UPPER AIR OBSERVATORY, AGRA.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 12 | E | eP | 6 16 28 | ... | ... | 6220 | |
| | | S | 24 21 | ... | ... | ... | |
| ,, 12 | E | e | 8 19 42 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 12 | E | e | 8 56 41 | ... | ... | ... | |
| 12 | E | P | 15 0 16 | ... | ... | 6590 | |
| | | pP | 0 26 | ... | ... | ... | |
| | | S | 8 23 | ... | ... | ... | |
| | | SS | 8 43 | ... | ... | ... | |
| | | SS | 12 33 | ... | ... | ... | |
| | | M | 24 8 | ... | ... | ... | |
| | | $M_2$ | 29 10 | 14 | 12 | ... | |
| | | F | Mixed up with the following shock. | | | | |
| 12 | E | e | 16 36 27 | ... | ... | ... | |
| ,, 13 | E | e | 3 38 34 | ... | ... | ... | |
| | | F | 4 10 ... | ... | ... | ... | |
| ,, 13 | E | iP | 5 1 53 | ... | ... | 5320 | Direction of the 1st motion W. |
| | | pP | 2 4 | ... | ... | ... | |
| | | sP | 2 22 | ... | ... | ... | |
| | | PP | 3 42 | ... | ... | ... | |
| | | ScP | 7 15 | ... | ... | ... | |
| | | S | 8 46 | ... | ... | ... | |
| | | sS | 9 7 | ... | ... | ... | |
| | | SS | 11 58 | ... | ... | ... | |
| | | sSS | 12 29 | ... | ... | ... | |
| | | L | 17 37 | ... | ... | ... | |
| | | $M_2$ | 24 15 | 21 | 10 | ... | |
| | | F | 6 33 ... | ... | ... | ... | |
| ,, 13 | E | iP | 13 23 32 | ... | ... | 6390 | Direction of the 1st motion W. |
| | | iS | 31 28 | ... | ... | ... | |
| | | sS | 31 49 | ... | ... | ... | |
| | | PS | 32 9 | ... | ... | ... | |
| | | ScS | 33 41 | ... | ... | ... | |
| | | SS | 35 18 | ... | ... | ... | |
| | | M | 45 53 | ... | ... | ... | |
| | | $M_1$ | 50 34 | 22 | 31 | ... | |
| ,, 14 | E | P | 22 40 58 | ... | ... | 6120 | |
| | | PP | 42 51 | ... | ... | ... | |
| | | pPP | 43 13 | ... | ... | ... | |
| | | S | 48 40 | ... | ... | ... | |
| | | SS | 52 21 | ... | ... | ... | |
| | | sSS | 53 0 | ... | ... | ... | |
| | | M | 23 2 8 | ... | ... | ... | |
| | | $M_1$ | 7 0 | 19 | 37 | ... | |
| | | $M_2$ | 8 20 | 15 | 50 | ... | |
| ,, 14 | E | P | 2 45 46 | ... | ... | 6020 | |
| | | PP | 47 43 | ... | ... | ... | |
| | | S | 53 23 | ... | ... | ... | |
| | | SS | 57 11 | ... | ... | ... | |
| | | $M_1$ | 3 11 16 | 14 | 5 | ... | |
| | | $M_2$ | 12 11 | 14 | 8 | ... | |
| | | F | 4 26 ... | ... | ... | ... | |
| ,, 14 | E | P | 12 18 0 | ... | ... | 8680 | |
| | | pP | 18 11 | ... | ... | ... | |
| | | S | 27 45 | ... | ... | ... | |
| | | sS | 28 6 | ... | ... | ... | |
| | | PS? | 28 36 | ... | ... | ... | |
| | | SS | 33 6 | ... | ... | ... | |
| | | L | 41 39 | ... | ... | ... | |
| | | F | 14 28 ... | ... | ... | ... | |
| ,, 15 | E | eP | 10 4 27 | ... | ... | 9335 | |
| | | i | 4 43 | ... | ... | ... | |
| | | S | 14 47 | ... | ... | ... | |
| | | I | 15 4 | ... | ... | ... | |
| | | F | 11 20 ... | ... | ... | ... | |
| ,, 15 | E | eP | 15 31 18 | ... | ... | 6010 | |
| | | eS | 38 59 | ... | ... | ... | |
| | | SS | 42 51 | ... | ... | ... | |
| | | SSS | 44 17 | ... | ... | ... | |
| | | $M_1$ | 57 46 | 17 | 7 | ... | |
| | | F | 17 22 | ... | ... | ... | |
| ,, 15 | E | e | 19 38 0 | ... | ... | ... | |
| | | F | 20 36 ... | ... | ... | ... | |
| ,, 15 | E | eP | 21 7 33 | ... | ... | 4055 | Direction of the 1st motion of iP is E. |
| | N | P | | | | | |
| | E | iP | 7 39 | ... | ... | ... | |
| | N, E | PP | 8 51 | ... | ... | ... | |
| | E | PPP | 9 16 | ... | ... | ... | |
| | | iS | 13 15 | ... | ... | ... | |
| | | SS | 15 28 | ... | ... | ... | |
| | | SSS | 16 3 | ... | ... | ... | |
| | | $M_1$ | 21 51 | 17 | 32 | ... | |
| | | $M_2$ | 23 52 | 15 | 21 | ... | |
| | | $M_3$ | 25 25 | 14 | 32 | ... | |
| | | $M_3$ | 28 23 | 14 | 38 | ... | |
| ,, 16 | E | P | 5 48 51 | ... | ... | 9365 | |
| | | pP | 48 59 | ... | ... | ... | |
| | | S | 59 13 | ... | ... | ... | |
| | | SS | 59 29 | ... | ... | ... | |
| | | F | 6 57 ... | ... | ... | ... | |
| ,, 16 | E | P | 11 17 28 | ... | ... | 5965 | |
| | | iS | 25 0 | ... | ... | ... | |
| | | i | 25 18 | ... | ... | ... | |

# UPPER AIR OBSERVATORY, AGRA.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Nov. 16 | E | PS | 11 25 40 | ... | ... | ... | |
| | | SS | 28 45 | ... | ... | ... | |
| | | $M_2$ | 41 49 | 16 | 10 | ... | |
| | | $M_3$ | 43 7 | 14 | 8 | ... | |
| | | F | 13 19 ... | ... | ... | ... | |
| ,, 17 | N | P | 4 7 11 | ... | ... | 9335 | Direction of the 1st motion W. |
| | E | iP | | | | | |
| | E | PP | 10 30 | ... | ... | ... | |
| | | PPP | 11 59 | ... | ... | ... | |
| | | iS | 17 31 | ... | ... | ... | |
| | N | e | 17 36 | ... | ... | ... | |
| | N, E | sS? | 17 40 | ... | ... | ... | |
| | N | i | 17 52 | ... | ... | ... | |
| | E | SS | 22 53 | ... | ... | ... | |
| | | SSS | 25 58 | ... | ... | ... | |
| | E | M? | 38 41 | ... | ... | ... | |
| | N | $M_1$ | 44 24 | 27 | 72 | ... | |
| | E | $M_1$ | 45 18 | 20 | 218 | ... | |
| | N | $M_2$ | 45 55 | 29 | 198 | ... | |
| | E | $M_2$ | 48 52 | 19 | 118 | ... | |
| | N | $M_2$ | 49 25 | 20 | 742 | ... | |
| | E | $M_2$ | 51 8 | 19 | 129 | ... | |
| | | $M_4$ | 53 18 | 20 | 105 | ... | |
| | | $M_5$ | 56 16 | 20 | 68 | ... | |
| | | $M_6$ | 58 48 | 20 | 75 | ... | |
| | | F | 8 46 ... | ... | ... | ... | |
| ,, 18 | E | e | 14 28 50 | ... | ... | ... | Surface waves absent. |
| | | iS | 35 24 | ... | ... | ... | |
| | | SS | 38 0 | ... | ... | ... | |
| | | SSS | 39 5 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 18 | E | P | 15 39 18 | ... | ... | ... | Surface waves absent. |
| | | i | 46 19 | ... | ... | ... | |
| | | F | 16 18 ... | ... | ... | ... | |
| ,, 18 | E | P | 18 40 22 | ... | ... | 6835 | L waves poor. |
| | | eS | 48 40 | ... | ... | ... | |
| | | F | 20 32 ... | ... | ... | ... | |
| ,, 19 | E | e | 2 49 52 | ... | ... | ... | |
| | | F | 3 12 ... | ... | ... | ... | |
| ,, 19 | E | P | 5 49 55 | ... | ... | 6665 | |
| | | S | 58 14 | ... | ... | ... | |
| | | M | 6 13 42 | ... | ... | ... | |
| | | $M_1$ | 19 0 | 15 | 10 | ... | |
| ,, 19 | E | e | 9 56 57 | ... | ... | ... | |
| ,, 21 | E | P | 1 15 3 | ... | ... | 1845 | |
| | N, E | pP? | 15 17 | ... | ... | ... | |
| | E | sP? | 15 27 | ... | ... | ... | |
| | N | i | 18 1 | ... | ... | ... | |
| 1938. Nov. 21 | E | S | 1 18 11 | ... | ... | ... | |
| | | sS | 18 33 | ... | ... | ... | |
| | | $M_3$ | 21 47 | 15 | 114 | ... | |
| | N | F | Lost while changing chart. | | | | |
| | E | F | 3 3 ... | ... | ... | ... | |
| ,, 21 | E | P | 7 6 22 | ... | ... | ... | |
| | | e | 8 2 | ... | ... | ... | |
| | | i | 16 9 | ... | ... | ... | |
| | | F | Mixed up with the following shock. | | | | |
| ,, 21 | E | e | 7 31 13 | ... | ... | ... | |
| | | e | 34 23 | ... | ... | ... | |
| | | F | 8 26 ... | ... | ... | ... | |
| ,, 22 | E | eP | 1 23 27 | ... | ... | 6190 | Direction of the motion of I P is E. |
| | E | iP | 23 29 | ... | ... | ... | |
| | N | e | 23 34 | ... | ... | ... | |
| | E | i | 23 45 | ... | ... | ... | |
| | | PP | 25 30 | ... | ... | ... | |
| | | PPP | 26 30 | ... | ... | ... | |
| | N E | S iS | 31 13 | ... | ... | ... | |
| | E | SS | 35 2 | ... | ... | ... | |
| | | i | 41 44 | ... | ... | ... | |
| | | $M_1$ | 48 54 | 15 | 53 | ... | |
| | | $M_2$ | 50 41 | 15 | 49 | ... | |
| | N | F | Lost while changing chart. | | | | |
| | E | F | Mixed up with the following shock. | | | | |
| ,, 22 | E | i | 3 40 46 | ... | ... | ... | |
| | | F | 5 23 ... | ... | ... | ... | |
| ,, 22 | E | e | 8 23 9 | ... | ... | ... | |
| | | S | 30 48 | ... | ... | ... | |
| | | F | 9 34 ... | ... | ... | ... | |
| ,, 22 | E | e | 9 53 35 | ... | ... | ... | |
| | | S | 55 2 | ... | ... | ... | |
| | | F | 59 ... | ... | ... | ... | |
| ,, 23 | E | e | 14 32 27 | ... | ... | ... | |
| | | $M_1$ | 34 0 | ... | ... | ... | |
| | | F | 43 ... | ... | ... | ... | |
| ,, 24 | E | e | 0 26 57 | ... | ... | ... | Beginning mixed with microseisms. |
| | | i | 28 41 | ... | ... | ... | |
| | | $M_1$ | 29 43 | 12 | 3 | ... | |
| | | F | 35 ... | ... | ... | ... | |
| ,, 25 | E | iP | 8 29 46 | ... | ... | 5935 | Direction of the 1st motion W. |
| | | PP | 31 46 | ... | ... | ... | |
| | | iS | 37 16 | ... | ... | ... | |
| | | sS | 37 38 | ... | ... | ... | |
| | | SS | 40 57 | ... | ... | ... | |
| | | SSS | 42 0 | ... | ... | ... | |
| | | M | 50 25 | ... | ... | ... | |





# UPPER AIR OBSERVATORY, AGRA.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Nov. 25 | E. | $M_1$ | 8 54 37 | 17 | 13 | ... | |
| | | $M_2$ | 56 32 | 15 | 9 | ... | |
| | | F | 9 39 ... | ... | ... | ... | |
| ,, 25 | E | eP | 22 5 58 | ... | ... | 5610 | |
| | | S | 13 17 | ... | ... | ... | |
| | | eSS | 16 55 | ... | ... | ... | |
| | | F | 57 ... | ... | ... | ... | |
| ,, 30 | N | eP | 2 39 11 | ... | ... | 5935 | Direction of the 1st motion W. |
| | E | iP | | | | | |
| | E | pP | 39 20 | ... | ... | ... | |

## December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| Dec. 1 | E | iS | 2 31 37 | ... | ... | ... | Beginning mixed with artificial deflections. |
| | | Mn | 53 57 | 17 | 10 | ... | |
| ,, 1 | E | eP? | 18 11 42 | ... | ... | (1400) | Felt at Quetta. Δ from S*—S. |
| | E | e | 12 8 | ... | ... | ... | |
| | N, E | eS | 13 21 | ... | ... | ... | |
| | E | e | 13 47 | ... | ... | ... | |
| | E | S*? | 14 17 | ... | ... | ... | |
| | N | F | 30 ... | ... | ... | ... | |
| | E | F | 19 1 ... | ... | ... | ... | |
| ,, 2 | E | e | 9 54 53 | ... | ... | ... | Seismic disturbance. |
| ,, 2 | E | P | 14 19 34 | ... | ... | 3245 | Surface waves poor. |
| | | S | 24 34 | ... | ... | ... | |
| ,, 2 | E | P | 22 17 13 | ... | ... | 2010 | |
| | N | e | 19 36 | ... | ... | ... | |
| | E | S? | 20 37 | ... | ... | ... | |
| | E | sS? | 21 9 | ... | ... | ... | |
| | N | F | 53 ... | ... | ... | ... | |
| | E | F | 23 42 ... | ... | ... | ... | |
| ,, 3 | E | eP | 0 52 53 | ... | ... | 5820 | |
| | | ePP | 54 55 | ... | ... | ... | |
| | | eS | 1 0 24 | ... | ... | ... | |
| | | Mn | 19 24 | 12 | 3 | ... | |
| ,, 3 | E | iP | 12 21 4 | ... | ... | 6035 | Direction of the 1st motion W. |
| | | pP | 21 13 | ... | ... | ... | |
| | | PP | 22 57 | ... | ... | ... | |
| | | S | 28 39 | ... | ... | ... | |
| | | sS | 28 59 | ... | ... | ... | |
| | | PS | 29 8 | ... | ... | ... | |
| | | SS | 32 16 | ... | ... | ... | |
| | | Mn | 46 47 | 15 | 54 | ... | |
| | | F | 14 47 ... | ... | ... | ... | |
| ,, 5 | E | e | 17 59 25 | ... | ... | ... | |
| 1938. Nov. 30 | E | PcP | 2 40 20 | ... | ... | ... | |
| | | PP | 41 12 | ... | ... | ... | |
| | | pPP | 41 25 | ... | ... | ... | |
| | | iS | 46 41 | ... | ... | ... | |
| | N | i | 46 50 | ... | ... | ... | |
| | E | sS | 47 1 | ... | ... | ... | |
| | | ScS | 48 51 | ... | ... | ... | |
| | | SS | 50 27 | ... | ... | ... | |
| | | $M_1$ | 3 3 34 | 22 | 119 | ... | |
| | N | $M_2$ | 4 56 | 17 | 31 | ... | |
| | E | F | 6 43 | ... | ... | ... | |
| Dec. 5 | E | e | 19 10 45 | ... | ... | ... | |
| | | Mn | 28 2 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| ,, 6 | E | e | 6 33 15 | ... | ... | ... | |
| ,, 6—7 | E | iP | 23 8 23 | ... | ... | 4210 | Direction of the 1st movement W. |
| | N | e | 8 27 | ... | ... | ... | |
| | E | PP | 9 40 | ... | ... | ... | |
| | | PPP | 10 5 | ... | ... | ... | |
| | | S | 14 14 | ... | ... | ... | |
| | N | e | 14 22 | ... | ... | ... | |
| | E | sS | 14 39 | ... | ... | ... | |
| | | SSS | 17 9 | ... | ... | ... | |
| | | Mn | 27 22 | 13 | 46 | ... | |
| | N | F | 0 15 ... | ... | ... | ... | |
| | E | F | Lost while changing chart. | | | | |
| ,, 7 | E | iP | 13 13 45 | ... | ... | 6020 | Direction of the 1st movement W. |
| | | pP | 13 55 | ... | ... | ... | |
| | | PP | 15 48 | ... | ... | ... | |
| | | S | 21 21 | ... | ... | ... | |
| | | sS | 21 41 | ... | ... | ... | |
| | | SS | 25 18 | ... | ... | ... | |
| | | M | Waves mixed up with the following superimposed shock. | | | | |
| ,, 7 | E | P | 13 36 5 | ... | ... | 8945 | Depth of focus about 140 km. Train of surface waves. |
| | | pP | 36 40 | ... | ... | ... | |
| | | S | 46 3 | ... | ... | ... | |
| | | PS | 46 46 | ... | ... | ... | |
| | | sS | 47 6 | ... | ... | ... | |
| | | SS | 51 23 | ... | ... | ... | |
| | | L? | 14 1 15 | ... | ... | ... | |
| | | F | Lost in the following shock. | | | | |
| ,, 7 | E | iP | 15 8 29 | ... | ... | ... | Direction of the 1st movement W. |
| | | F | 16 48 ... | ... | ... | ... | |
| ,, 9 | E | eP | 4 8 1 | ... | ... | 9165 | |

# UPPER AIR OBSERVATORY, AGRA.

## December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Dec. 9 | N | eS | 4 18 19 | ... | ... | ... | |
| | E | S | | | | | |
| | E | $M_1$ | ... 46 41 | 20 | 10 | ... | |
| | | $M_2$ | ... 49 46 | 17 | 9 | ... | |
| | | F | Lost in the following shock. | | | | |
| ,, 9 | E | e (S?) | 5 16 15 | ... | ... | ... | |
| | | Mn | 28 48 | ... | ... | ... | |
| ,, 12–13 | E | e | 23 55 42 | ... | ... | ... | |
| | | $M_1$ | 0 12 36 | 15 | 2 | ... | |
| ,, 13 | E | iP | 17 34 59 | ... | ... | 6090 | Direction of the 1st movement W. |
| | | pP | 35 7 | ... | ... | ... | |
| | | PP | 37 4 | ... | ... | ... | |
| | | S | 42 39 | ... | ... | ... | |
| | | sS | 42 54 | ... | ... | ... | |
| | | SS | 46 24 | ... | | ... | |
| | | Mn | 18 0 0 | 17 | 16 | ... | |
| ,, 16 | E | e | 4 51 57 | ... | ... | ... | |
| | | F | 5 53 ... | ... | ... | ... | |
| ,, 16 | E | e | 17 39 34 | ... | ... | (12365) | Train of surface waves. |
| | N | e | 40 46 | ... | ... | ... | Δ from SKS and SS. |
| | N | eSKS | 46 17 | ... | ... | ... | |
| | E | SKS | | | | | |
| | E | PS | 49 48 | ... | ... | ... | |
| | | SS | 55 54 | ... | ... | ... | |
| | | L | 18 15 29 | ... | ... | ... | |
| | | F | 22 5 ... | ... | ... | ... | |
| ,, 16 | E | e | 23 33 26 | ... | ... | ... | Very distant. |
| | N | e | 42 47 | ... | ... | ... | |
| | E | i | 42 57 | ... | ... | ... | |
| | | i | 52 39 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 17 | E | eP | 16 40 36 | ... | ... | 2535 | Direction of iP E. |
| | N | P | 40 40 | ... | ... | ... | |
| | E | iP | | | | | |
| | E | PP | 41 10 | ... | ... | ... | |
| | N | eS | 44 40 | ... | ... | ... | |
| | E | S | | | | | |
| | E | sS? | 45 0 | ... | ... | ... | |
| | | SS | 45 44 | ... | ... | ... | |
| | | $M_1$ | 49 20 | 11 | 23 | ... | |
| | | $M_2$ | 52 3 | 10 | 22 | ... | |
| | | F | 18 42 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Dec. 18 | E | iP | 21 55 8 | ... | ... | 6120 | Direction of the movement W. |
| | | pP | 55 16 | ... | ... | ... | |
| | | PP | 57 11 | ... | ... | ... | |
| | | S | 22 2 50 | ... | ... | ... | |
| | | sS | 3 6 | ... | ... | ... | |
| | | SS | 6 28 | ... | ... | ... | |
| | | i | 7 9 | ... | ... | ... | |
| | | $M_1$ | 20 12 | 15 | 9 | ... | |
| | | F | 23 59 ... | ... | ... | ... | |
| ,, 19 | E | e | 5 2 15 | ... | ... | ... | |
| ,, 19 | E | iP | 18 28 4 | ... | ... | ... | Direction of the 1st movement W. |
| | | S Wave lost in the following | | | | ... | |
| ,, 19 | E | P | 18 33 28 | ... | ... | 6255 | |
| | | S | 41 23 | ... | ... | ... | |
| | | SS | 45 37 | ... | ... | ... | |
| | | Mn | 50 55 | 19 | 14 | ... | |
| | | F Lost in the following superimposed shock. | | | | | |
| ,, 19 | E | P | 19 1 15 | ... | ... | ... | |
| | | F | 21 38 ... | ... | ... | ... | |
| ,, 20 | E | e | 15 0 46 | ... | ... | ... | |
| | | eS | 8 37 | ... | ... | ... | |
| | | F | 16 7 ... | ... | ... | ... | |
| ,, 21 | E | iP | 12 36 1 | ... | ... | 5900 | Direction of the 1st movement W. |
| | | pP | 36 13 | ... | ... | ... | |
| | | PP | 38 18 | ... | ... | ... | |
| | N | eS | 43 29 | ... | ... | ... | |
| | E | S | | | | | |
| | E | SS | 46 55 | ... | ... | ... | |
| | | SSS | 48 29 | ... | ... | ... | |
| | | L | 52 18 | ... | ... | ... | |
| | | M | 55 34 | ... | ... | ... | |
| | | Mn | 13 0 36 | 20 | 17 | ... | |
| | | F | 14 44 ... | ... | ... | ... | |
| ,, 22 | E | eP | 17 4 19 | ... | ... | ... | S wave not well recorded. |
| | | PP | 5 57 | ... | ... | ... | |
| | | $M_1$ | 23 16 | 15 | 11 | ... | |
| | | F | 18 34 ... | ... | ... | ... | |
| ,, 23 | E | e | 2 8 21 | ... | ... | ... | |
| | | e | 12 12 | ... | ... | ... | |
| | | $M_1$ | 25 44 | 16 | 4 | ... | |
| ,, 23 | E | e | 18 37 42 | ... | ... | ... | |
| | | F | 19 39 ... | ... | ... | ... | |

UPPER AIR OBSERVATORY,
AGRA.

G. CHATTERJEE,
*Superintending Meteorologist.*





# COLABA OBSERVATORY, BOMBAY.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Oct. 2 | N | e | 11 48 ... | ... | ... | ... | |
| | N | e | 56 09 | ... | ... | ... | |
| | N | F | 12 21 ... | ... | ... | ... | |
| ,, 4 | N | e(P) | 08 37 15 | ... | ... | 8,530 | Slight. Phases confused by microseisms; probably preceded by a feeble tremor. Epc: 14°S., 143°·5E. near Cape York, Australia. 0=8h. 25·4m. |
| | N | e(S) | 47 25 | ... | ... | ... | |
| | N | PS | 47 55 | ... | ... | ... | |
| | N | SS | 52 12 | ... | ... | ... | |
| ,, 6 | N, E | i | 02 49 49 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 7 | N | Record lost from | 00 40 ... | ... | ... | ... | |
| | | to | 02 40 ... | ... | ... | ... | |
| ,, 7 | E | eP | 01 01 13 | ... | ... | 6,030 | Slight. Epc: 3°·5 N., 126° E., off northeast of Celebes Islands. 0=0h. 51·9m. |
| | E | e | 02 04 | ... | ... | ... | |
| | E | i | 02 19 | ... | ... | ... | |
| | E | i | 03 22 | ... | ... | ... | |
| | E | i | 04 44 | ... | ... | ... | |
| | E | iS? | 08 51 | ... | ... | ... | |
| | E | i | 09 16 | ... | ... | ... | |
| | E | e | 09 43 | ... | ... | ... | |
| | E | e | 13 33 | ... | ... | ... | |
| | E | L | 19 11 | ... | ... | ... | |
| | E | M | 23 22 | ... | ... | ... | |
| | E | Mn | 26 00 | 23 | 5 | ... | |
| | E | F | Lost in microseisms. | | | | |
| ,, 7 | N, E | eP | 06 16 36 | ... | ... | 2,670 | Slight. Epc: 75°N., 94°·5E. near Nicobar Islands. 0=6h. 11m. 28s. h=75km. |
| | N, E | i | 16 51 | ... | ... | ... | |
| | E | i | 17 04 | ... | ... | ... | |
| | E | iS | 20 48 | ... | ... | ... | |
| | N, E | i | 21 11 | ... | ... | ... | |
| | E | L | 23 00 | ... | ... | ... | |
| | E | i | 27 30 | ... | ... | ... | |
| | N, E | F | 07 40 ... | ... | ... | ... | |
| ,, 7 | N, E | eP | 10 58 43 | ... | ... | 2,720 | Slight. Aftershock of the preceding one at Oct. 7d. 6h. 11m. |
| | N | e | 02 39 | ... | ... | ... | |
| | N, E | eS | 02 59 | (In minute gap) | | | |
| | E | i | 03 58 | ... | ... | ... | |
| | N, E | F | 11 35 ... | ... | ... | ... | |
| ,, 7 | N, E | eP | 16 28 44 | ... | ... | 2,620 | Moderate. Epc: Same as at Oct. 7d. 6h. 11m. 0=16h. 23m. 31s. Probably deep. |
| | N, E | iPP | 29 07 | ... | ... | ... | |
| | N, E | PcP | 32 21 | ... | ... | ... | |
| | N, E | S | 32 56 | (In minute gap) | | | |
| | N, E | SS | 33 34 | ... | ... | ... | |
| | N, E | L | 35 14 | ... | ... | ... | |
| | N | M | 37 00 | ... | ... | ... | |
| | N | i(ScS) | 40 06 | ... | ... | ... | |
| | N | Mn | 40 50 | 15 | 10 | ... | |
| | E | Mn | 41 07 | 15 | 13 | ... | |
| | N, E | F | 18 15 ... | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Oct. 9 | N, E | e | 17 29 03 | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 9 | N, E | eP | 20 44 12 | ... | ... | 2,710 | Slight. Epc: Near that of Oct. 7d. 6h. 11m. 0=20h. 39m. 0s. |
| | N, E | iS | 48 26 | ... | ... | ... | |
| | N, E | e | 52 35 | ... | ... | ... | |
| | N, E | F | 21 40 ... | ... | ... | ... | |
| ,, 10 | N, E | e | 04 26 ... | ... | ... | ... | |
| | N, E | F | 05 00 ... | ... | ... | ... | |
| ,, 10 | N | eP | 20 57 37 | ... | ... | 6,070 | Moderate. First movements as recorded :—0·2 mm. to N and 0·5mm. to E.Epc: 2°·1 N., 126°·4E.(Strasbourg) 0=20h. 48m. 07s. A good agreement is obtained with the above epicentre using P from Agra, Bombay, Tannanarive, Riverview, Wellington, Pasadena, Hongkong and Manila. |
| | E | iP | | | | | |
| | N, E | i | 58 06 | ... | ... | ... | |
| | E | PP | 59 43 | ... | ... | ... | |
| | N, E | i | 21 01 29 | ... | ... | ... | |
| | E | iS | 05 05 | ... | ... | ... | |
| | N | iS | 05 16 | ... | ... | ... | |
| | N, E | ScS | 07 21 | ... | ... | ... | |
| | E | SS | 08 43 | ... | ... | ... | |
| | N, E | i | 10 50 | ... | ... | ... | |
| | N, E | L | 14 ... | ... | ... | ... | |
| | E | Mn | 19 22 | 24 | 241 | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| ,, 11 | N, E | e | 00 25 00 | ... | ... | ... | Slight. |
| | E | e | 37 04 | ... | ... | ... | |
| | N, E | F | 01 15 ... | ... | ... | ... | |
| ,, 12 | N, E | iP | 00 45 00 | ... | ... | 7,135 | Moderate. Epc: 40°·2N., 144°·0 E., in the Pacific, east of Japan. 0=0h. 34m. 36s. Hongkong P=0h. 40m. 05s.; Kew iP=0h. 46m. 57s.; Fordham iP=0h.47m 41s.; Weston iP=0h. 47m. 41s. |
| | N, E | iS | 53 38 | ... | ... | ... | |
| | E | SS | 57 43 | ... | ... | ... | |
| | N | $M_1$ | 01 15 13 | 12 | 11 | ... | |
| | N | $M_2$ | 16 19 | 12 | 11 | ... | |
| | E | Mn | 16 36 | 13 | 9 | ... | |
| | N, E | F | Lost in shifting. | | | | |
| ,, 13 | N, E | iP | 15 34 40 | ... | ... | 5,390 | Slight. Epc: 25°N., 125°·5 E. to the east of the Formosa Island. 0=15h. 25m. 57s. |
| | E | i | 34 55 | ... | ... | | |
| | N, E | iPP | 36 27 | ... | ... | | |
| | E | eS | 41 40 | ... | ... | ... | |
| | N | iS | | | | | |
| | E | e | 45 30 | ... | ... | ... | |
| | N, E | F | 16 50 ... | ... | ... | ... | |
| ,, 19 | N, E | P | 04 20 00 | ... | ... | 3,735 | Moderate. P in minute gap. Epc: 49°·7N., 90°·5 E. Altai Mountains. H.0=4h. 13m. 32s. (Strasbourg). |
| | N | eS | 25 23 | ... | ... | ... | |
| | E | i(S) | 25 30 | ... | ... | ... | |
| | N, E | SS | 27 00 | ... | ... | ... | |
| | N, E | L | 30 30 | ... | ... | ... | |
| | N | Mn | 35 02 | 14 | 56 | ... | |
| | E | Mn | 35 45 | 14 | 60 | ... | |
| | N, E | F | 06 30 ... | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 20 | N,E | iP | 02 29 03 | ... | ... | 6,150 | Moderate. First movements as read :— 1·0 mm to E and slightly to S. Maximum amplitude of S in E component 14 mm. h=100 km (appr.) Epc: 10°S. 123°E. H. O.=2h.19 3m. (U. S. C. G. S.) 8°5 S., 123°·5 E.H. O=2h. 19m.30s.(Strasbourg). |
| | N,E | i | 29 14 | ... | ... | ... | |
| | N,E | pP | 29 27 | ... | ... | ... | |
| | N,E | i | 30 00 | ... | ... | ... | |
| | N,E | i | 30 53 | ... | ... | ... | |
| | N | i | 31 30 | ... | ... | ... | |
| | E | iS | 36 46 | ... | ... | ... | Slight. |
| | N | eS | | | | | Epc: 16°S., 43°E. Mozambique channel. O=15h. 01m. 30s. |
| | N,E | i | 37 11 | ... | ... | ... | |
| | N,E | i | 37 47 | ... | ... | ... | |
| | N,E | i | 38 15 | ... | ... | ... | |
| | N,E | i | 40 38 | ... | ... | ... | |
| | N,E | L | 47 30 | ... | ... | ... | |
| | E | Mn | 52 30 | 24 | 115 | ... | |
| | N,E | F | 05 40 ... | ... | ... | ... | |
| „ 20 | N,E | iP | 13 21 37 | ... | ... | 3,790 | Slight. Epc: 10°N., 38°E. Abyssinia. O=13h 14m 55s. Ksara iP=13h. 20m. 17s. |
| | E | i(S) | 27 03 | ... | ... | ... | |
| | N,E | (L) | 30 14 | ... | ... | ... | |
| | N,E | F | 14 15 ... | ... | ... | ... | |
| „ 21 | N | i | 06 56 47 | ... | ... | ... | Slight. |
| | N | e | 07 01 00 | ... | ... | ... | |
| | N | e | 05 02 | ... | ... | ... | |
| | N | F | 55 ... | ... | ... | ... | |
| „ 21 | N,E | iP | 20 28 20 | ... | ... | 2,080 | Moderate. First movements as read :— 2·4 mm to N and 2·4 mm to E. Epc: 1°N., 66·°5E. Indian Ocean. O=20h. 24m. 10s. Ksara iP=20h. 32m. 13s. Hongkong P=20h.33m.10s. Manila iP=20h. 33m. 48s. ; Bucarest P=20h. 33m.56s. Strasbourg iP=20h.35m.12s.Strasbourg gives 5°N., 70° E. |
| | N | PP | 28 39 | ... | ... | ... | |
| | N | i | 29 10 | ... | ... | ... | |
| | N | i | 29 44 | ... | ... | ... | |
| | N | i | 30 38 | ... | ... | ... | |
| | N | iS | 31 43 | ... | ... | ... | |
| | N | SS | 32 08 | ... | ... | ... | |
| | N | i | 32 33 | ... | ... | ... | |
| | N | F | 22 18 ... | ... | ... | ... | |
| „ 23 | E | P | 02 31 57 | ... | ... | 3,850 | Slight. △ from P-O |
| | E | e | 33 00 | ... | ... | ... | Aftershock of the Abysinnian shock at 20d. 13h. 15m. O=2h. 25.2m. |
| | E | i | 35 27 | ... | ... | ... | |
| | E | L | 42 09 | ... | ... | ... | |
| Oct. 23 | E | $M_1$ | 2 49 15 | 15 | 4 | ... | |
| | E | $M_2$ | 51 31 | 12 | 3 | ... | |
| | E | $M_3$ | 53 15 | 14 | 3 | ... | |
| | E | $M_4$ | 56 14 | 12 | 2 | ... | |
| | NE | F | 04 00 ... | ... | ... | ... | |
| „ 23 | E | eP | 15 09 58 | ... | ... | 5,190 | Slight. |
| | N,E | iP | 10 05 | ... | ... | ... | Epc: 16°S., 43°E. Mozambique channel. O=15h. 01m. 30s. |
| | N,E | i | 11 56 | ... | ... | ... | |
| | N,E | iS | 16 47 | ... | ... | ... | |
| | E | L | 23 17 | ... | ... | ... | |
| | N,E | F | 16 53 ... | ... | ... | ... | |
| „ 26 | E | eP | 03 33 23 | ... | ... | 3,460 | Slight. Epc: Near 25°N., 102°E. South China. O=3h. 27.8m. |
| | N,E | iS | 38 29 | ... | ... | ... | |
| | N,E | F | 04 20 ... | ... | ... | ... | |
| „ 28 | N,E | e | 05 04 21 | ... | ... | ... | Feeble. |
| | N,E | e | 09 26 | ... | ... | ... | |
| „ 28 | E | P | 05 11 58 | ... | ... | 2,760 | Slight. Epc : 29°N., 98°E. off northeast frontier of Assam. O=5h. 6·7m. Felt at Digboi. |
| | N,E | ePP | 12 23 | ... | ... | ... | |
| | N,E | eS | 16 17 | ... | ... | ... | |
| | N,E | iSS | 16 41 | ... | ... | ... | |
| | N,E | F | 52 ... | ... | ... | ... | |
| „ 29 | N,E | eP | 13 18 49 | ... | ... | 6755 | Slight. Epc: 35°·7 N.,141°·0E off east coast of Japan O=13h. 8m. 37s. Pasadena e(P)=13h. 20m.28s. Ksara iP=13h.20m.46s.Stottgart eP=13h.21m.4·6sKrasbourgeP=13h.21m.5s Kew IP=13h.21m.11s; Strasbourg gives 34°N 142°E. H. O=13h. 8.5m. |
| | N,E | iS | 27 07 | ... | ... | ... | |
| | N,E | F | 14 36 ... | ... | ... | ... | |
| „ 29 | E | e(P) | 23 01 42 | ... | ... | 5,520 | Slight. Epc: 9·°0 S., 118·°E. west of Sumbawa Island. O = 22h. 531m. h = 100 km. Strasbourg gives 8·°0 S., 117·.5E, H. O = 22h 57.9m. |
| | N,E | iS | 08 51 | ... | ... | ... | |
| | N,E | i | 11 30 | ... | ... | ... | |
| | N,E | i | 12 10 | ... | ... | ... | |
| | N,E | F | 40 ... | ... | ... | ... | |
| „ 31 | E | e | 05 34 31 | ... | ... | ... | |

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 1 | N | e(P) | 00 51 00 | ... | ... | ... | Slight. Epc : Hindukush. |
| | N,E | e(S) | 54 16 | ... | ... | ... | |
| | N,E | F | 01 27 ... | ... | ... | ... | |
| „ 5 | N,E | eP | 08 53 41 | ... | ... | 7,035 | Great. h=80–100 km. First movements as read :— 1·3 mm to E and 0·4 mm. to N., Epc : 36°1 N., 141°·6 E. Pacific, off NE Japan Damage in eastern Japan. H=08h. 43m 30s. This epc. is based on P from Manila, |
| | N,E | iP | 53 43 | ... | ... | ... | |
| | N,E | i | 54 00 | ... | ... | ... | |
| | E | i | 54 14 | ... | ... | ... | |
| | N | e | 54 32 | ... | ... | ... | |
| | N,E | PP | 56 15 | ... | ... | ... | |
| Nov. 5 | E | i | 09 02 06 | ... | ... | ... | Phu—Lien, Ksara Hongkong, Wellington, Apia, Kew, Strasbourg, St. James, Weston, Christchurch and Riverview. Pasadena, 36·°3 N., 141.°2 E. h=85 km. H. O=08h.43m. 23s. (Strasbourg.) 36.°8 N., 139.°6 E. H=08h. 43m. 18s. Depth probably normal (J. S. A.) 38°N., 141°E. H. O=08h. 43 2m. (U. S. C. G. S). |
| | N,E | i | 02 16 | ... | ... | ... | |
| | N,E | i | 02 42 | ... | ... | ... | |
| | N,E | i | 02 50 | ... | ... | ... | |
| | N,E | i | 03 23 | ... | ... | ... | |
| | N | i | 03 37 | ... | ... | ... | |
| | N,E | SS | 06 00 | ... | ... | ... | |
| | N,E | L | 13 34 | ... | ... | ... | |
| | N,E | M | 18 00 | ... | ... | ... | |
| | E | Mn | 24 ... | 20 | 366 | ... | |



# COLABA OBSERVATORY, BOMBAY.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 5 | N | Mn | 9 24 45 | 15 | 86 | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 5 | E | iP | 11 00 33 | ... | ... | 6,710 | Great. Δ from (P-O) |
| | N | iP | 00 36 | ... | ... | ... | First movements a read :— 1 mm. to E. and 0·3 mm. to N. Epc : 37°·5 N., 141°·3 E. Pacific, off NE Japan. This epicentre is based on P from Riverview, Perth, Pasadena, Hamburg, Ksara, Stuttgart, Wellington, Strasbourg, Helwan, Prato, Little Rock, Fordham. H=10h. 50m. 30s. h=100 km. (approx.) Aftershock of the preceding one at 8h. 43m. H. O=10h. 50m. 16s. (Strasbourg). Aftershock of the preceding one at 8h. 43m. H. O=10h. 50·2m. (U. S. C. G. S.) 36°·7 N., 141°·0 E. H=10h. 50m. 13s. Depth probably normal (J. S. A.). |
| | N,E | pP | 00 56 | ... | ... | ... | |
| | N,E | i | 01 00 | (In minute gap) | | | |
| | E | sP | 01 10 | ... | ... | ... | |
| | N,E | iPP | 02 30 | ... | ... | ... | |
| | N,E | iS | 09 27 | ... | ... | ... | |
| | N,E | iSS | 13 30 | ... | ... | ... | |
| | N,E | L | 21 30 | ... | ... | ... | |
| | E | $M_1$ | 30 ... | 19 | 526 | ... | |
| | N | $M_1$ | 30 ... | 14 | 159 | ... | |
| | E | $M_2$ | 33 ... | 19 | 398 | ... | |
| | N | $M_2$ | 33 ... | 16 | 135 | ... | |
| | N,E | F | 15 20 ... | ... | ... | ... | |
| „ 6 | N,E | iP | 09 04 16 | ... | ... | 6,910 | Moderate. First movements as read :— 2 mm. to E. and 1 mm. to N. Epc : 35°·8 N., 141°·6 E. H=8h. 54m. 03s. h=90 km. The above epc. is based on P from Hongkong, Manila, Kew, Riverview, Pasadena, Christchurch, Wellington, Perth, Strasbourg, Ksara. 36°N., 144°E., H. O=08h. 53m. 57s. (U. S. C. G. S.). 37°·0 N., 142°·4 E. h=100 km. H. O.=08h.53m.57s. (Strasbourg). |
| | N,E | ipP | 04 38 | ... | ... | ... | |
| | N,E | sP? | 04 53 | ... | ... | ... | |
| | N,E | ePP | 06 30 | ... | ... | ... | |
| | E | iS | 12 42 | ... | ... | ... | |
| | N | eS | | | | | |
| | E | i | 13 35 | ... | ... | ... | |
| | N,E | SS | 16 28 | ... | ... | ... | |
| | E | i | 19 15 | ... | ... | ... | |
| | N,E | L | 24 28 | ... | ... | ... | |
| | N,E | M | 29 00 | ... | ... | ... | |
| | E | $M_1$ | 33 07 | 22 | 196 | ... | |
| | N | $M_1$ | 33 46 | 16 | 91 | ... | |
| | E | $M_2$ | 34 30 | 17 | 130 | ... | |
| | N | $M_2$ | 35 35 | 16 | 63 | ... | |
| | E | $M_3$ | 35 37 | 16 | 119 | ... | |
| | N | $M_3$ | 37 27 | 14 | 52 | ... | |
| | N | $M_4$ | 41 10 | 14 | 52 | ... | |
| | N,E | F | 13 40 ... | ... | ... | ... | |
| „ 6 | N,E | e(P) | 17 29 49 | ... | ... | 6,910 | Slight. Aftershock of the preceding one at 8h. 54m. |
| | N,E | e(S) | 38 19 | ... | ... | ... | |
| | N,E | F | 18 32 ... | ... | ... | ... | |
| „ 6 | N,E | e | 21 14 19 | ... | ... | ... | Slight. Aftershock of the one at Nov. 6d. 8h 54m. |
| | N,E | e | 22 45 ... | ... | ... | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 6 | N,E | iP | 21 49 11 | ... | ... | 7,000 | Moderate. First movements as read : 1·0 mm. to N, 0·8 mm. to E. Aftershock of the one at Nov. 6d. 8h. 54m. H=21h. 38m. 55s. |
| | N,E | pP | 49 31 | ... | ... | ... | |
| | N | i | 49 43 | ... | ... | ... | |
| | N,E | PP | 51 30 | ... | ... | ... | |
| | N,E | iS | 57 42 | ... | ... | ... | |
| | N,E | i | 57 50 | ... | ... | ... | |
| Nov. 6 | N,E | i | 21 58 41 | ... | ... | ... | |
| | N | i | 22 05 57 | ... | ... | ... | |
| | N,E | L | 11 30 | ... | ... | ... | |
| | E | $M_1$ | 22 17 42 | 17 | 56 | ... | |
| | N | $M_1$ | 19 00 | 17 | 70 | ... | |
| | E | $M_2$ | 20 22 | 15 | 61 | ... | |
| | N | $M_2$ | 21 15 | 15 | 50 | ... | |
| | E | $M_3$ | 21 38 | 14 | 59 | ... | |
| | N | $M_3$ | 23 03 | 12 | 38 | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 7 | E | iP | 0 58 19 | ... | ... | ... | Congestion of line. |
| „ 7 | N,E | iP | 01 48 46 | ... | ... | 6,970 | Slight. Epc : 34°·8 N. 141°·6 E. Pacific, off E. Japan. O=1h. 38·5m. |
| | N,E | iS | 57 15 | ... | ... | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 7 | N | eP | 04 26 04 | ... | ... | 7,000 | Slight. Epc : Pacific, off E. Japan. |
| | N,E | eS | 34 35 | ... | ... | ... | |
| | N,E | F | 06 20 ... | ... | ... | ... | |
| „ 7 | N,E | e(P) | 19 23 0 | ... | ... | ... | Epc : Pacific, off E. Japan. |
| | N | eS | 31 25 | ... | ... | ... | |
| | E | eS | 31 32 | ... | ... | ... | |
| | N,E | e | 36 0 | ... | ... | ... | |
| „ 7 | N,E | iP | 19 44 01 | ... | ... | 7,000 | Slight. Aftershock of Nov. 6d. 8h. 54 m. H. O=19h. 33·7m. (Strasbourg). |
| | N,E | iS | 52 32 | ... | ... | ... | |
| | N,E | F | Lost in microseisms. | | | | |
| „ 9 | N,E | iP | 09 26 20 | ... | ... | 7,020 | Moderate. Direction of 1st movements :— 0·1 mm. to N., and 0·3 mm. to E. Aftershock of Nov. 6d 8h. 54m. H=9h 16m 03s. h=100 km. (approx.) Strasbourg gives. Replique du Nov.6d. 8h 54m. h=100–125 km. H. O=9h. 16m. 03s. |
| | N,E | e | 26 46 | ... | ... | ... | |
| | E | i | 26 58 | ... | ... | ... | |
| | N,E | e | 29 06 | ... | ... | ... | |
| | N,E | iS | 34 52 | ... | ... | ... | |
| | N,E | i | 36 12 | ... | ... | ... | |
| | N,E | i | 39 13 | ... | ... | ... | |
| | N | i | 40 13 | ... | ... | ... | |
| | N,E | L | 47 59 | ... | ... | ... | |
| | N,E | M | 52 52 | 12 | 11 | ... | |
| | N | $M_1$ | 57 25 | 14 | 12 | ... | |
| | E | Mn | 59 24 | 14 | 14 | ... | |
| | N | $M_2$ | 10 00 52 | ... | ... | ... | |
| | N,E | F | 12 50 ... | ... | ... | ... | |
| „ 9 | N,E | M | 16 48 ... | ... | ... | ... | |
| | N,E | F | 17 20 ... | ... | ... | ... | |
| „ 10 | N,E | M | 07 26 ... | ... | ... | ... | |
| | N,E | F | 08 25 ... | ... | ... | ... | |
| „ 10 | N,E | iP | 10 56 57 | ... | ... | 7,000 | Slight. Epc : 31°·5 „ 142°·0 E. O=10h. 46m. 39s. This epc. is based on P from Manila, Hongkong, Pasadena, Ksara, Stuttgart, Strasbourg, and S. from Perth. |
| | N,E | iS | 11 05 28 | ... | ... | ... | |
| | E | i | 06 41 | ... | ... | ... | |
| | N,E | M | 23 ... | 16 | 13 | ... | |
| | N | Mn | 25 18 | | | | |

# COLABA OBSERVATORY, BOMBAY.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 10 | E | Mn | 11 27 21 | 13 | 4 | ... | |
| | N,E | F | 13 10 ... | ... | ... | ... | |
| ,, 10 | N,E | eP | 20 32 04 | ... | ... | 10,400 | Very great. Δ from P—O. Epc : 55° 3 N., 158°·8 W. (tentative) O = 20h. 18m. 50s. 54°·9 N., 157°·2W. H = 20h. 18m. 46s. (Strasbourgh). 56°N., 159°W H. O = 20h. 18. 7m. (U.S.C.G.S.) 55°6 N. 157°. 7 W. H = 20h. 18m. 48s. (J. S. A.) |
| | N,E | iP | 32 11 | ... | ... | ... | |
| | N,E | iPP | 36 07 | ... | ... | ... | |
| | N | i | 42 41 | ... | ... | ... | |
| | E | iSKS | 42 56 | ... | ... | ... | |
| | N,E | S | 43 51 | ... | ... | ... | |
| | N,E | i | 44 30 | ... | ... | ... | |
| | N,E | SS | 49 03 | ... | ... | ... | |
| | N,E | SSS | 53 17 | ... | ... | ... | |
| | N,E | LQ | 57 00 | ... | ... | ... | |
| | N,E | LR | 21 2 10 | ... | ... | ... | |
| | N,E | M | 7 00 | ... | ... | ... | |
| | E | $M_1$ | 8 10 | 22 to 28 | > | 1,228 | |
| | E | $M_1$ | 12 — | | > | 1,228 | |
| | N | $M_1$ | 15 30 | | > | 1,702 | |
| | N | $M_2$ | 18 50 | | > | 1,702 | |
| | N | $M_2$ | 21 20 | | > | 1,702 | |
| | N,E | F | Lost in the following shock. | | | | |
| ,, 11 | E | eP | 01 11 06 | ... | ... | 10,400 | Slight. |
| | E | iPP | 14 56 | ... | ... | ... | Aftershock of the preceding very great one. |
| | E | iSKS | 21 38 | ... | ... | ... | |
| | E | i | 21 55 | ... | ... | ... | |
| | E | iPS | 23 42 | ... | ... | ... | |
| | E | iSS | 28 38 | ... | ... | ... | |
| | N | L | 43 18 | ... | ... | ... | |
| | N | Mn | 57 00 | 19 | 21 | ... | |
| | E | Mn | 57 03 | 19 | 8 | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| ,, 11 | N,E | iP | 03 07 39 | ... | ... | 6,900 | Slight. Probably aftershock of Nov. 6d.8h.54m. |
| | N,E | iS | 16 05 | ... | ... | ... | |
| | N,E | SS | 20 12 | ... | ... | ... | |
| | N,E | Mn | 37 30 | ... | ... | ... | |
| | N,E | F | 04 20 ... | ... | ... | ... | |
| ,, 11 | N,E | e | 05 17 ... | ... | ... | ... | Surface waves. |
| ,, 11 | N,E | e | 06 54 ... | ... | ... | ... | Surface waves. |
| ,, 11 | N,E | e | 09 17 ... | ... | ... | ... | Slight. |
| | N | Mn | 31 ... | ... | ... | ... | |
| | N,E | F | 10 30 ... | ... | ... | ... | |
| ,, 12 | N,E | e | 06 24 25 | ... | ... | ... | |
| | N,E | F | 07 00 ... | ... | ... | ... | |
| ,, 12 | N,E | e | 09 26 ... | ... | ... | ... | Surface waves. |
| | N,E | F | 55 ... | ... | ... | ... | |
| ,, 12 | N,E | iP | 15 01 17 | ... | ... | 7,780 | Slight. Epc : 46°·4 N., 153°·7 E Kurile Islands. O = 14h .50m. 09s. 47°.2 N., 153°8 E. H. O = 14h. 50. 1m. (Strasbourg). |
| | N,E | iS | 10 28 | ... | ... | ... | |
| | N,E | i | 11 13 | ... | ... | ... | |
| | N,E | SS | 15 22 | ... | ... | ... | |
| 1938. Nov. 12 | E | Mn | 15 38 25 | 14 | 4 | ... | |
| | N | Mn | 38 25 | 10 | 3 | ... | |
| | N,E | F | 16 30 ... | ... | ... | ... | |
| ,, 13 | N,E | Mn | 03 53 ... | ... | ... | ... | |
| | N,E | F | 04 07 ... | ... | ... | ... | |
| ,, 13 | N,E | iP | 05 02 26 | ... | ... | 5,690 | Slight. First movements as read:—0·8 mm to E and very slight to S. Dep't Epc : 10°N., 125° E Philippine Islands. O = 4h. 53m. 24s. Felt in the North-eastern part of Mindanao. |
| | E | i | 02 52 | ... | ... | ... | |
| | E | iPP | 04 26 | ... | ... | ... | |
| | N | ePP | | ... | ... | ... | |
| | N,E | iS | 09 45 | ... | ... | ... | |
| | N,E | i | 10 03 | ... | ... | ... | |
| | N,E | eSS | 13 19 | ... | ... | ... | |
| | N | Mn | 27 35 | ... | ... | ... | |
| | E | Mn | 28 45 | 14 | 2 | ... | |
| | N,E | F | 06 12 ... | ... | ... | ... | |
| ,, 13 | N,E | iP | 13 24 34 | ... | ... | 7,410 | Slight. 46°·0 N., 149° 4 E. (Near Kurile Island). H = 13h.13m 50s. h = 80 km. (J. S. A.) |
| | N,E | iS | 33 26 | ... | ... | ... | |
| | N,E | i | 33 50 | ... | ... | ... | |
| | N,E | i | 34 16 | ... | ... | ... | |
| | N,E | eSS | 38 19 | ... | ... | ... | |
| | E | eL | 46 31 | ... | ... | ... | |
| | E | Mn | 57 00 | 20 | 5 | ... | |
| | N | Mn | 57 11 | 15 | 3 | ... | |
| | N,E | F | 15 14 ... | ... | ... | ... | |
| ,, 13—14 | N,E | eP | 22 41 58 | ... | ... | 6,990 | Moder te. P in minute gap. Aftershock of Nov. 6d.8h. 54m. 0 = 2h. 31m. 34s. |
| | N,E | PcP | 42 36 | ... | ... | ... | |
| | E | ePP | 44 28 | ... | ... | ... | |
| | N,E | iS | 50 28 | ... | ... | ... | |
| | N,E | i | 51 30 | ... | ... | ... | |
| | N,E | i | 51 40 | ... | ... | ... | |
| | E | eSS | 54 25 | ... | ... | ... | |
| | E | $M_1$ | 23 13 15 | 13 | 10 | ... | |
| | E | $M_2$ | 15 41 | 13 | 9 | ... | |
| | N | Mn | 18 00 | 13 | 9 | ... | |
| | E | $M_2$ | 19 22 | 13 | 9 | ... | |
| | E | $M_4$ | 22 ... | Lost in the hour gap. | | | |
| | N,E | F | 02 10 ... | ... | ... | ... | |
| ,, 14 | N,E | eP | 02 46 47 | ... | ... | 7,035 | Slight. |
| | N,E | e(S) | 55 20 | ... | ... | ... | Aftershock of Nov. 6d.8h.54m. 0 = 2h. 36m 22s. |
| | N,E | e(PS) | 55 27 | ... | ... | ... | |
| | N,E | F | 04 20 ... | ... | ... | ... | |
| ,, 14 | E | (e)? | 12 18 06 | ... | ... | ... | Slight. Felt at Rabaul and Cooper (Riverview). |
| | N | eP | 18 20 | ... | ... | ... | |
| | N,E | eS | 28 42 | ... | ... | ... | |
| | N,E | F | 14 12 ... | ... | ... | ... | |
| ,, 15 | N,E | Mn | 10 50 ... | ... | ... | ... | Slight. |
| | N,E | F | 11 21 ... | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h.m.s. | sec. | μ | Km. | |
| Nov. 15 | N,E | e | 15 32 24 | ... | ... | ... | Slight. |
| | N,E | e | 40 55 | (In minute gap) | | | |
| | E | e | 42 09 | ... | ... | ... | |
| | N,E | Mn | 16 02 ... | ... | ... | ... | |
| | N,E | F | 42 ... | ... | ... | ... | |
| ,, 15 | N, E | iP | 21 07 18 | ... | ... | 3,950 | Moderate. Δ from P—O. First movements as read :— 1·5 mm to W and 1·1 mm to N. Epc : 5°·0 S., 98°·7 E. to the south of Sumatra. O = 21h 00m 24s. 5°S., 97°E. (Strasbourg). |
| | N. E | e | 07 51 | ... | ... | ... | |
| | N, E | i | 08 17 | ... | ... | ... | |
| | N, E | PP | 08 34 | ... | ... | ... | |
| | N, E | iS | 12 41 | ... | ... | ... | |
| | N, E | i (ScP) | 13 06 | ... | ... | ... | |
| | N, E | sS | 13 45 | ... | ... | ... | |
| | N, E | SS | 15 11 | ... | ... | ... | |
| | E | i (ScS) | 16 57 | ... | ... | ... | |
| | N | $M_1$ | 18 28 | 20 | 113 | ... | |
| | E | $M_1$ | 20 00 | 17 | 71 | ... | |
| | N | $M_2$ | 22 00 | 16 | 40 | ... | |
| | E | $M_2$ | 23 22 | 14 | 63 | ... | |
| | N | $M_2$ | 24 06 | 14 | 32 | ... | |
| | N, E | F | 23 57 ... | ... | ... | ... | |
| ,, 16 | N, E | e | 06 27 ... | ... | ... | ... | Surface waves. |
| | N, E | F | 07 21 ... | ... | ... | ... | |
| ,, 16 | N, E | iP | 11 18 28 | ... | ... | 6,890 | Slight. Aftershock of Nov. 6d 8h 54m. O = 11h 8m 11s. |
| | E | PP | 20 41 | ... | ... | ... | |
| | N, E | iS | 26 53 | ... | ... | ... | |
| | N, E | F | 13 02 ... | ... | ... | ... | |
| ,, 17 | N, E | eP | 04 07 58 | ... | ... | 10,350 | Moderate. Δ from P—O. P in minute gap. Epc : 55 °7 N., 159·°1 W. to the south of Alaska Peninsula. O = 3h 54m 46s. |
| | N, E | iPP | 11 43 | ... | ... | ... | |
| | N, E | iSKS | 18 28 | ... | ... | ... | |
| | N, E | S | 19 28 | ... | ... | ... | |
| | N, E | iPS | 20 36 | ... | ... | ... | |
| | N | SS | 25 36 | ... | ... | ... | |
| | E | L | 40 43 | ... | ... | ... | |
| | E | Mn | 54 15 | 15 | 71 | ... | |
| | N | Mn | 56 00 | 15 | >79 | ... | |
| | N, E | F | 08 17 ... | ... | ... | ... | |
| ,, 17 | N, E | Mn | 20 33 ... | ... | ... | ... | |
| | N, E | F | 21 00 ... | ... | ... | ... | |
| ,, 18 | N, E | i | 14 35 40 | ... | ... | ... | |
| | N, E | i | 36 32 | ... | ... | ... | |
| | N, E | F | 16 19 ... | ... | ... | ... | |
| ,, 18 | N, E | e | 18 34 55 | ... | ... | ... | |
| | N, E | i | 41 20 | ... | ... | ... | |
| | N, E | Mn | 19 18 ... | ... | ... | ... | |
| | N, E | F | 20 10 ... | ... | ... | ... | |
| 1938. Nov. 19 | N, E | eP (?) | 05 51 00 | ... | ... | 7,745 | Slight. P in minute gap. |
| | E | eS | 06 00 09 | ... | ... | ... | Epc : Near 46°N., 149°E. |
| | E | e | 01 02 | ... | ... | ... | Kurile Islands. |
| | N, E | Mn | 27 ... | ... | ... | ... | O = 5h 39·7m. |
| | N, E | F | 07 40 ... | ... | ... | ... | |
| ,, 21 | N, E | eP | 01 16 34 | ... | ... | 2,850 | Moderate. First movements as read :- 0·15 mm to S. and 0·1 mm to W. |
| | N, E | i | 16 44 | ... | ... | ... | Epc : 34°·0 N., 95°·6E. eastern Tibet. |
| | N, E | sP? | 17 08 | ... | ... | ... | Felt at Dibrugarh. |
| | E | i | 17 26 | ... | ... | ... | O = 1h 11m 16s. |
| | N | i | 17 31 | ... | ... | ... | h = 100km. (approx.) |
| | N, E | i | 17 46 | ... | ... | ... | |
| | E | i | 18 42 | ... | ... | ... | |
| | N. E | iS | 20 59 | ... | ... | ... | |
| | N, E | i | 21 43 | ... | ... | ... | |
| | N | Mn | 25 37 | 12 | 44 | ... | |
| | E | Mn | 25 39 | 11 | 101 | ... | |
| | E | ScS | 27 09 | ... | ... | ... | |
| | N, E | F | 03 29 ... | ... | ... | ... | |
| ,, 21 | N | e | 07 07 17 | ... | ... | 5,000 | Slight. Epc : 24°·5 N., 121°·0E. Formosa. O = 6h 59m 07s. |
| | E | i | | | | | |
| | N, E | PP | 09 10 | ... | ... | ... | |
| | N, E | eS | 13 56 | (In minute gap) | | | |
| | E | i? | 14 21 | ... | ... | ... | |
| | N, E | SS | 17 26 | ... | ... | ... | |
| | N, E | F | 08 20 ... | ... | ... | ... | |
| ,, 22 | E, N | eP | 01 24 26 | ... | ... | 7,110 | Moderate. First movements as read:- 0·1 mm to S. and 0·6 mm to W. |
| | N, E | iP | 24 32 | ... | ... | ... | Aftershock of Nov. 6d 8h 54m. O = 1h 14·0m. |
| | E | i | 26 33 | ... | ... | ... | |
| | N, E | iS | 33 02 | ... | ... | ... | |
| | E | i | 34 10 | ... | ... | ... | |
| | N, E | SS | 37 10 | ... | ... | ... | |
| | E | $M_1$ | 54 20 | 16 | 14 | ... | |
| | N | Mn | 56 07 | 13 | 9 | ... | |
| | E | $M_2$ | 02 01 28 | 14 | 9 | ... | |
| | N, E | F | 05 13 ... | ... | ... | ... | |
| ,, 22 | E | Mn | 08 53 ... | ... | ... | ... | Feeble. |
| | N, E | F | 09 20 ... | ... | ... | ... | |
| ,, 25 | N, E | e(S) | 08 39 32 | ... | ... | 7,110 | Slight. Probably aftershock of Nov. 6d 8h 54m. O = 5h 20·3m. |
| | N, E | e | 41 19 | ... | ... | ... | |
| | E | Mn | 59 ... | ... | ... | ... | |
| | N | Mn | 09 01 ... | ... | ... | ... | |
| | N, E | F | Lost in microseisms. | | | | |
| ,, 28 | N, E | e | 22 02 01 | ... | ... | ... | Slight. Moderately felt at Kalat. |
| | N, E | e | 06 43 | ... | ... | ... | |
| | N, E | F | 35 ... | ... | ... | ... | |
| ,, 29 | N, E | iP | 13 49 49 | ... | ... | 7,000 | Slight, Epc : 35.°3 N., 142.°5 E. in the Pacific to the east of Japan. |
| | N, E | PcP | 50 16 | ... | ... | ... | |
| | N, E | PP | 52 16 | ... | ... | ... | |

# COLABA OBSERVATORY, BOMBAY.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 29 | E | i } S | 13 58 20 | ... | ... | ... | 0=13h 39m 36s. |
| | N | e } | | | | | |
| | N, E | ScS | 59 33 | ... | ... | ... | |
| | N, E | eSS | 14 02 25 | ... | ... | ... | |
| | N | Mn | 20 18 | 15 | 4 | ... | |
| | E | Mn | 20 40 | 13 | 3 | ... | |
| | N, E | F | 16 29 ... | ... | ... | ... | |
| 1938 Nov. 30 | E | iP | 02 39 44 | ... | ... | 6,890 | Moderate. Absolute times uncertain. The preliminary phases lost in N during shifting. Probably after-shock of Nov. 6d 8h 54m. 0=2h 29m 56s. |
| | E | e | 42 20 | ... | ... | ... | |
| | E | eS | 48 07 | ... | ... | ... | |
| | N | Mn | 03 10 13 | 16 | 8 | ... | |
| | N, E | F | Lost in the next shock. | | | | |
| „ 30 | E | Mn | 05 06 ... | ... | ... | ... | Slight. Preliminary phases lost in the coda of the preceding shock. |
| | N, E | F | 06 21 ... | ... | ... | ... | |

## December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| Dec. 1 | N | iP | 02 23 33 | ... | ... | 7,720 | Slight. Epc: 16°·0 N., 145° 6 E., east of the Marianne Islands. 0=2h 12m 21s. |
| | N, E | ePP | 26 07 | ... | ... | ... | |
| | N, E | iS | 32 41 | ... | ... | ... | |
| | N, E | i | 32 58 | ... | ... | ... | |
| | N, E | PS | 33 21 | ... | ... | ... | |
| | E | SS | 37 21 | ... | ... | ... | |
| | N | Mn | 56 43 | 19 | 5 | ... | |
| „ 1 | E | Mn | 03 03 00 | 15 | 3 | ... | |
| | N,E | F | 05 08 ... | ... | ... | ... | |
| „ 1 | N | eP | 18 12 17 | ... | ... | 1,740 | Slight. |
| | N,E | eS | 15 07 | ... | ... | ... | Epc: 33°·5 N., 65°·5 E. Afghanistan. Felt at Quetta. 0=18h 8m 30s. |
| | N,E | iL | 16 18 | ... | ... | ... | |
| | E | Mn | 20 41 | 7 | 2 | ... | |
| | N | Mn | 23 11 | 7 | 3 | ... | |
| | N,E | F | 56 ... | ... | ... | ... | |
| „ 2 | N,E | e | 14 19 55 | ... | ... | ... | |
| | N,E | | 24 16 | ... | ... | ... | |
| | N | e | 26 16 | ... | ... | ... | |
| | E | i | 26 30 | ... | ... | ... | |
| „ 2 | N,E | e | 22 18 02 | ... | ... | 3,000 | Moderate. △ from (S—0). Epc: Near 37° 5 N., 95° E. China. 0=22h 12 9m. Hongkong, Ksara, Hyderabad and Helwan give another near 44°N., 97° E., Mongolia, at 22h 14·1m. |
| | N,E | eP? | 18 45 | ... | ... | ... | |
| | N,E | iPP | 19 08 | ... | ... | ... | |
| | N,E | iS | 23 07 | ... | ... | ... | |
| | N,E | i? | 25 53 | ... | ... | ... | |
| | E | Mn | 27 28 | 11 | 22 | ... | |
| | N | $M_1$ | 27 17 | 11 | 20 | ... | |
| | N | $M_2$ | 28 13 | 9 | 20 | ... | |
| | N,E | F | 23 40 ... | ... | ... | ... | |
| „ 3 | N,E | e | 01 02 10 | ... | ... | ... | |
| | N | Mn | 23 ... | ... | ... | ... | |
| | E | Mn | 24 ... | ... | ... | ... | |
| | N,E | F | 52 ... | ... | ... | ... | |
| „ 3 | N,E | Record lost from 5 38 ... to 11 40 ... | | ... | ... | ... | |
| „ 3 | N,E | iP | 12 22 04 | ... | ... | 6,990 | Slight. Aftershock of Nov. 6d 8h 54m. 0=12h 11m 44s. |
| | N,E | iPP | 24 35 | ... | ... | ... | |
| | N,E | iS | 30 34 | ... | ... | ... | |
| Dec. 3 | N,E | | 12 30 50 | ... | ... | ... | |
| | E | ScS | 31 50 | ... | ... | ... | |
| | N | Mn | 51 21 | 15 | 4 | ... | |
| | E | Mn | 51 28 | 16 | 4 | ... | |
| | N,E | F | 15 15 ... | ... | ... | ... | |
| „ 4 | E | e | 06 30 50 | ... | ... | ... | |
| | N,E | F | 07 22 ... | ... | ... | ... | |
| „ 4 | E | e | 16 36 43 | ... | ... | ... | |
| | N,E | e | 55 34 | ... | ... | ... | |
| | N,E | F | 18 21 ... | ... | ... | ... | |
| „ 5 | N,E | e(P) | 00 38 03 | ... | ... | (2,490) | Slight. |
| | N,E | e(S) | 41 58 | ... | ... | ... | |
| | E | Mn | 46 05 | 9 | 3 | ... | |
| | N | Mn | 46 28 | 9 | 5 | ... | |
| | N,E | F | 01 25 ... | ... | ... | ... | |
| „ 6-7 | N,E | iP | 23 09 12 | ... | ... | ... | Moderate. First movements as read:— 1·0mm,to E. and <0·1mm, to N. Epc: 21°·5 N., 121°·3 E. Formosa. 0=23h 00m 55s. |
| | N,E | i | 10 22 | ... | ... | ... | |
| | N,E | iPP | 11 12 | ... | ... | ... | |
| | N,E | iS | 15 52 | (In minute mark) | | | |
| | N,E | i | 17 15 | ... | ... | ... | |
| | N,E | SS | 19 15 | ... | ... | ... | |
| | N,E | F | 01 40 ... | ... | ... | ... | |
| „ 7 | N,E | iP | 13 14 46 | ... | ... | 6,930 | Slight. △ from P—O. Probably aftershock of Nov. 6d 8h 54m. 0=1h 4m 25s. |
| | N,E | iPP | 17 13 | ... | ... | ... | |
| | N,E | iS? | 23 37 | ... | ... | ... | |
| | N,E | SS | 27 38 | ... | ... | ... | |
| | N,E | Later phases and F lost in the following shock. | | | | | |
| „ 7 | N,E | iP | 13 36 23 | ... | ... | 9,265 | Slight. △ from P—O. Epc: 6°S., 154°E. 0=13h 22m 58s. |
| | E | e | 36 38 | ... | ... | ... | |
| | N,E | PP | 39 45 | ... | ... | ... | |
| | N,E | i | 43 30 | M of the preceding shock. | | | |
| | N,E | i(S) | 46 37 | ... | ... | ... | |
| | N,E | i | 47 01 | ... | ... | ... | |
| | E | i | 47 21 | ... | ... | ... | |
| | E | | 47 39 | ... | ... | ... | |
| | N,E | S | 52 21 | ... | ... | ... | |



# COLABA OBSERVATORY, BOMBAY.

## December, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Dec. 7 | N,E | L | 14 04 22 | ... | ... | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 7 | E | iP | 15 09 21 | ... | ... | 5,555 | Slight. Epc: Near 21°N., 126°·5 E. to east of Formosa. 0=15h 0·6m. |
| | E | iSS | 19 52 | ... | ... | ... | |
| | E | i | 23 59(In the minute gap) | | | | |
| | E | F | 16 44 ... | ... | ... | ... | |
| „ 9 | N,E | ePP | 04 12 33 | ... | ... | ... | Slight. Probably aftershock of Nov. 10d 20h 19m. |
| | N,E | i | 19 17 | ... | ... | ... | |
| | N | Mn | 56 10 | 17 | 4 | ... | |
| | E | Mn | 56 38 | 16 | 3 | ... | |
| | N,E | F | 06 03 ... | ... | ... | ... | |
| „ 9 | N,E | e(P) | 09 44 47 | ... | ... | ... | Slight. |
| | N,E | e(S) | 53 26 | ... | ... | ... | |
| | N,E | F | 11 10 ... | ... | ... | ... | |
| „ 9-10 | E | e | 23 49 03 | ... | ... | ... | |
| | E | e | 57 43 | ... | ... | ... | |
| | E | F | 00 58 ... | ... | ... | ... | |
| „ 13 | N,E | iP | 17 35 35 | ... | ... | 7,000 | Slight. After shock of Nov. 6d 8h 54m. 0=17h 25·6m. |
| | N,E | PP | 38 24 | ... | ... | ... | |
| | E | eS | 44 32 | ... | ... | ... | |
| | N,E | i | 44 48 | ... | ... | ... | |
| | N,E | i | 48 55 | ... | ... | ... | |
| | E | Mn | 18 05 26 | 15 | 3 | ... | |
| | N | Mn | 06 48 | 10 | 2 | ... | |
| | N,E | F | 19 08 ... | ... | ... | ... | |
| „ 16 | N | eP | 17 35 35 | ... | ... | ... | Moderate. Epc: 45° S., 167°E. (Tentative). Felt extensively in the South Island of New Zealand. (Wellington). 0=17h 21·1m. |
| | E | $eP_1$ | 35 46 | ... | ... | ... | |
| | N,E | $iP_1$ | 39 00 | ... | ... | ... | |
| | N,E | iSKKS | 46 11 | ... | ... | ... | |
| | N,E | iSKS | 46 37 | ... | ... | ... | |
| | N,E | iPS | 49 02 | ... | ... | ... | |
| | N,E | | 49 41 | ... | ... | ... | |
| | N,E | e | 54 15 | ... | ... | ... | |
| | N,E | i(SS) | 55 30 | ... | ... | ... | |
| | N,E | LQ | 18 05 15 | ... | ... | ... | |
| | N,E | LR | 11 00 | ... | ... | ... | |
| | E | Mn | 32 39 | 15 | 13 | ... | |
| | N | Mn | 33 19 | 15 | 11 | ... | |
| | N,E | F | 21 10 ... | ... | ... | ... | |
| „ 16-17 | E | e | 23 29 13 | ... | ... | ... | Slight. |
| | E | e | 32 18 | ... | ... | ... | Aftershock of the preceding one. |
| | N,E | e | 33 37 | ... | ... | ... | |
| | N,E | e | 40 45 | ... | ... | ... | |
| | N,E | Mn | 00 11 ... | ... | ... | ... | |
| | N,E | F | 02 10 ... | ... | ... | ... | |
| „ 17 | N,E | iP | 16 42 7 | ... | ... | 3,500 | Slight. Epc. 47°·5 N., 94°·0 E. Mongolia. 0=16h 35m 30s. |
| | E | iS | 47 16 | ... | ... | ... | |
| | N | eS | 47 20 | ... | ... | ... | |
| Dec. 17 | E | Mn | 16 57 15 | 14 | 14 | ... | |
| | N | Mn | 56 52 | 9 | 7 | ... | |
| | N,E | F | 18 10 ... | ... | ... | ... | |
| „ 18 | N | Mn | 08 16 ... | ... | ... | ... | |
| | E | Mn | 18 ... | ... | ... | ... | |
| | N,E | F | 47 ... | ... | ... | ... | |
| | N,E | iP | 21 56 10 | ... | ... | 7,000 | Slight. After shock of Nov. 6d 8h 54m. 0=21h 45·7m. |
| | N | iS | 22 04 47 | ... | ... | ... | |
| | N | eS | 04 52 | ... | ... | ... | |
| | E | Mn | 25 43 | ... | ... | ... | |
| | N | Mn | 27 10 | ... | ... | ... | |
| | N,E | F | 23 40 ... | ... | ... | ... | |
| „ 19 | N,E | iP | 18 34 35 | ... | ... | 7,330 | Slight. △ from P-O. Epc: 43°·0 N., 147°·0 E. to the east of Hokkaido Island. 0=9h 23m 50s. |
| | N | PP | 37 01 | ... | ... | ... | |
| | N | eS | 43 40 | ... | ... | ... | |
| | N | Mn | 19 13 ... | 10 | 4 | ... | |
| | E | Mn | 13 ... | 10 | 3 | ... | |
| | N,E | F | Lost in the following shock. | | | | |
| „ 19 | N | i(P) | 19 01 44 | ... | ... | 2720 | Epc: Near 41°N., 60°E. 0=18h 56°7. |
| | N | e(S) | 06 00 | ... | ... | ... | |
| | N,E | F | 20 30 ... | ... | ... | ... | |
| „ 20 | N,E | Mn | 15 31 ... | ... | ... | ... | |
| | N.E | F | 16 10 ... | ... | ... | ... | |
| „ 21 | E | i } P | 12 36 03 | ... | ... | 5,890 | Slight. Epc: 9°·2 S., 119°·0 E. to the west of Flores Island. 0=12h 26m 43s. |
| | N | e } | | | | | |
| | N | i } S | 43 32 | ... | ... | ... | |
| | E | e } | | | | | |
| | N,E | ScS | 45 50 | ... | ... | ... | |
| | N,E | e | 50 26 | ... | ... | ... | |
| | N | Mn | 13 00 10 | 19 | 3 | ... | |
| | E | $M_1$ | 03 12 | 18 | 3 | ... | |
| | E | $M_2$ | 06 27 | 16 | 3 | ... | |
| | N,E | F | 14 36 ... | ... | ... | ... | |
| „ 22 | E | i } P | 17 05 12 | ... | ... | 5,190 | Slight. Aftershock of 7d 15h 0·6m. 0=16h 56·6m. |
| | N | e } | | | | | |
| | N,E | iPP | 07 04 | ... | ... | ... | |
| | N | i } S | 12 01 | ... | ... | ... | |
| | E | e } | | | | | |
| | N,E | F | 55 ... | ... | ... | ... | |
| „ 23 | N | e? | 18 32 13 | ... | ... | ... | Slight. |
| | N | e | 39 01 | ... | ... | ... | |
| | N,E | Mn | 19 14 ... | ... | ... | ... | |
| | N,E | F | 43 ... | ... | ... | ... | |
| „ 31 | E | Mn | 01 58 ... | ... | ... | ... | |
| | N | Mn | 02 00 ... | ... | ... | ... | |
| | N,E | F | 40 ... | ... | ... | ... | |

COLABA OBSERVATORY,
BOMBAY.

S. R. SAVUR,

# ALIPORE OBSERVATORY, CALCUTTA.

## October, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 2 | N | i | 11 50 3 | ... | ... | ... | Slight, near. |
| | | i | 50 23 | ... | ... | ... | |
| | | F | 12 9 ... | ... | ... | ... | |
| ,, 2 | N | e | 17 32 45 | ... | ... | ... | Tremor. |
| | | F | 18 1 ... | ... | ... | ... | |
| ,, 4 | N | e | 8 39 35 | ... | ... | ... | Slight, very distant. |
| | | Mn | 9 2 44 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | M(?) | 1 12 6 | ... | ... | ... | Slight, distant. |
| | | Mn | 16 28 | ... | ... | ... | The earlier phases lost while changing chart. |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | eP? | 6 15 04 | ... | ... | 1,720 | Slight, distant. |
| | | iS | 17 53 | ... | ... | ... | |
| | | Mn | 27 55 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | e | 11 0 35 | ... | ... | ... | Slight, distant. |
| | | Mn | 11 5 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 7 | N | eP | 16 26 59 | ... | ... | 1590 | Slight. |
| | | iPP | 27 8 | ... | ... | ... | |
| | | iS | 29 47 | ... | ... | ... | |
| | | eL | 30 45 | ... | ... | ... | |
| | | M | 31 52 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 9 | N | i | 20 46 20 1 | ... | 1 | ... | Slight, distant. |
| | | F | Lost in microseisms. | | | | |
| ,, 10 | N | iP | 20 56 8 | ... | ... | 4510 | Moderate. Direction of 1st movement-North. |
| | | iPP | 57 33 | ... | ... | ... | |
| | | ePPP | 58 5 | ... | ... | ... | |
| | | iS | 21 2 26 | ... | ... | ... | |
| | | iSS | 5 0 | ... | ... | ... | |
| | | eSSS | 5 45 | ... | ... | ... | |
| | | iL | 8 20 | ... | ... | ... | |
| | | M(?) | 11 40 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 11 | N | i | 0 20 57 | ... | ... | ... | Slight, distant. |
| | | Mn | 31 37 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 12 | N | iP | 0 43 27 | ... | ... | 5490 | Moderate. Direction of 1st movement-North. |
| | | ePP | 45 17 | ... | ... | ... | |
| | | iS | 50 39 | ... | ... | ... | |
| | | ePS | 51 14 | ... | ... | ... | |
| | | eSS | 54 1 | ... | ... | ... | |
| | | eSSS | 55 23 | ... | ... | ... | |
| | | iL | 58 35 | ... | ... | ... | |
| | | M | 1 2 39 | ... | ... | ... | |
| | | Mn | 8 25 | 16 | 67 | ... | |
| | | F | Lost while changing charts. | | | | |

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 13 | N | eP | 15 32 38 | ... | ... | 3735 | Moderate. |
| | | e | 33 19 | ... | ... | ... | M waves feeble. |
| | | e | 34 40 | ... | ... | ... | |
| | | iS | 38 01 | ... | ... | ... | |
| | | iSS | 39 47 | ... | ... | ... | |
| | | i | 42 33 | ... | ... | ... | |
| | | eL | 44 57 | ... | ... | ... | |
| | | M | 48 39 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 14 | N | e | 3 27 54 | ... | ... | ... | Slight, near. |
| | | i | 29 44 | ... | ... | ... | |
| | | i | 30 46 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 17 | N | e | 15 41 40 1 | ... | 1 | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 19 | N | iP | 4 19 6 | ... | ... | 3000 | Moderate. |
| | | iS | 23 49 | ... | ... | ... | Direction of first movement—South. |
| | | eSS | 25 3 | ... | ... | ... | |
| | | iL | 26 40 | ... | ... | ... | |
| | | M | 29 4 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 20 | N | iP | 2 27 50 | ... | ... | 5010 | Moderate. |
| | | iPP | 29 27 | ... | ... | ... | Direction of first movement—North. |
| | | iPPP | 30 8 | ... | ... | ... | M waves feeble. |
| | | iS | 34 35 | ... | ... | ... | |
| | | iSS | 37 35 | ... | ... | ... | |
| | | iSSS | 38 41 | ... | ... | ... | |
| | | iL | 41 27 | ... | ... | ... | |
| | | M | 45 15 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 20 | N | eS | 13 30 45 | ... | ... | ... | Slight. |
| | | eSS? | 34 28 | ... | ... | ... | P waves masked in microseisms. |
| | | eL | 37 7 | ... | ... | ... | |
| | | M | 40 43 | ... | ... | ... | |
| | | Mn | 45 31 | 13 | 6 | ... | |
| | | F | 14 14 ... | ... | ... | ... | |
| ,, 21 | N | e | 6 53 31 | ... | ... | ... | Slight, distant. |
| | | i | 55 23 | ... | ... | ... | |
| | | i | 58 59 | ... | ... | ... | |
| | | Mn | 7 7 2 | ... | ... | ... | |
| | | F | 7 27 ... | ... | ... | ... | |
| ,, 21 | N | iP | 20 30 24 | ... | ... | 3310 | Moderate. |
| | | ePP | 31 12 | ... | ... | ... | Direction of first movement—South. |
| | | ePPP | 31 30 | ... | ... | ... | |
| | | iS | 35 28 | ... | ... | ... | |
| | | eSS | 36 57 | ... | ... | ... | |
| | | iL | 38 56 | ... | ... | ... | |
| | | M(?) | 40 16 | ... | ... | ... | |
| | | F | 22 31 ... | ... | ... | ... | |



# ALIPORE OBSERVATORY, CALCUTTA.

## October, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | km. | |
| Oct. 23 | N | e (P) | 2 33 12 | ... | ... | ... | Slight. |
| | | ePP | 35 27 | ... | ... | ... | |
| | | eS | 40 32 | ... | ... | ... | |
| | | e | 42 24 | ... | ... | ... | |
| | | i | 46 55 | ... | ... | ... | |
| | | e | 48 52 | ... | ... | ... | |
| | | i | 51 17 | ... | ... | ... | |
| | | M | 54 19 | ... | ... | ... | |
| | | Mn | 58 2 | 13 | 13 | ... | |
| | | F | 4 0 | ... | ... | ... | |
| ,, 23 | N | eP | 15 11 46 | ... | ... | 6690 | Slight. |
| | | e | 13 30 | ... | ... | ... | |
| | | i | 18 46 | ... | ... | ... | |
| | | iS | 20 04 | ... | ... | ... | |
| | | iL | 26 13 | ... | ... | ... | |
| | | M | 30 8 | ... | ... | ... | |
| | | Mn | 36 6 | 17 | 13 | ... | |
| | | F | 17 12 ... | ... | ... | ... | |
| ,, 26 | N | eP | 3 31 42 | ... | ... | 1335 | Slight. |
| | | S | 33 55 | ... | ... | ... | |
| | | i | 34 25 | ... | ... | ... | |
| | | eSS | 34 50 | ... | ... | ... | |
| | | iL | 35 20 | ... | ... | ... | |
| | | M | 36 24 | ... | ... | ... | |
| | | Mn | 39 25 | 9 | 38 | ... | |
| | | F | 4 15 ... | ... | ... | ... | |
| ,, 26 | N | e | 17 6 44 | ... | ... | ... | Tremor. |
| | | F | 42 | ... | ... | ... | |

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | km. | |
| Oct. 28 | N | eP | 5 4 11 | ... | ... | 540 | Slight. |
| | | iP | 4 32 | ... | ... | ... | |
| | | iS | 5 8 | ... | ... | ... | |
| | | iS* | 5 24 | ... | ... | ... | |
| | | iS | 5 36 | ... | ... | ... | |
| | | F | Masked by the following shock. | | | | |
| ,, 28 | N | P (?) | 5 9 12 | ... | ... | 1200 | Slight. |
| | | iS | 11 13 | ... | ... | ... | |
| | | iS* | 11 54 | ... | ... | ... | |
| | | iS | 12 24 | ... | ... | ... | |
| | | F | 36 ... | ... | ... | ... | |
| ,, 29 | N | eP | 13 17 5 | ... | ... | 5450 | Slight. |
| | | ePPP | 19 43 | ... | ... | ... | |
| | | eS | 23 51 | ... | ... | ... | |
| | | eSS | 27 34 | ... | ... | ... | |
| | | iSSS | 28 50 | ... | ... | ... | |
| | | eL | 32 4 | ... | ... | ... | |
| | | M | 36 8 | ... | ... | ... | |
| | | Mn | 39 37 | 18 | 14 | ... | |
| | | F | 14 19 ... | ... | ... | ... | |
| ,, 29 | N | eP | 23 1 20 | ... | ... | 3590 | Slight. M waves feeble. |
| | | ePPP | 1 36 | ... | ... | ... | |
| | | iS | 6 42 | ... | ... | ... | |
| | | iL | 10 35 | ... | ... | ... | |
| | | M (?) | 13 32 | ... | ... | ... | |
| | | F | 23 47 ... | ... | ... | ... | |
| ,, 31 | N | e | 5 35 33 | ... | ... | ... | Tremor. |
| | | F | 45 ... | ... | ... | ... | |

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| Nov. 1 | N | e? | 0 52 8 | ... | ... | ... | Tremor. |
| | | i | 55 21 | ... | ... | ... | |
| | | F | 1 9 ... | ... | ... | ... | |
| ,, 3 | N | e | 17 44 20 | ... | ... | ... | Tremor. |
| | | F | 55 ... | ... | ... | ... | |
| ,, 5 | N | iP | 8 51 58 | ... | ... | 5,290 | Great. First movement—South. Provisional epicentre at Lat. 38 °N., Long. 141°E. (Nature Dec. 10th 1938). |
| | | iPP | 53 42 | ... | ... | ... | |
| | | iPPP | 54 29 | ... | ... | ... | |
| | | iS | 58 59 | ... | ... | ... | |
| | | eSS | 9 2 12 | ... | ... | ... | |
| | | iL | 6 29 | ... | ... | | |
| | | M | 10 24 | ... | ... | ... | |
| | | Mn | 14 7 20 | 908 | ... | | |
| | | F | Lost in the following shock. | | | | |
| ,, 5 | N | iP | 10 58 55 | ... | ... | 5,400 | Great. First movement—North. Probably an aftershock of the previous one. |
| | | iPP | 11 0 42 | ... | ... | ... | |
| | | iPPP | 1 31 | ... | ... | ... | |
| | | iS | 6 2 | ... | ... | ... | |

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | km. | |
| Nov. 5 | N | iSS | 11 9 20 | ... | ... | ... | |
| | | iSSS | 10 39 | ... | ... | | |
| | | iL | 13 45 | ... | ... | ... | |
| | | M | 17 49 | ... | ... | ... | |
| | | Mn | 19 27 | 21 | 1253 | ... | |
| | | F | 15 6 ... | ... | ... | ... | |
| ,, 5 | N | e | 21 29 4 | ... | ... | ... | Slight, very distant. |
| | | e | ... 37 9 | ... | ... | | |
| | | Mn | ... 56 19 | ... | ... | ... | |
| | | F | 22 55 ... | ... | ... | ... | |
| ,, 6 | N | iP | 9 2 29 | ... | ... | 5,370 | Great. First movement—South. Provisional epicentre at Lat. 36°N., Long. 144°E. (Nature, Dec. 10th 1938.) |
| | | iPP | 4 16 | ... | ... | ... | |
| | | iPPP | 5 3 | ... | ... | ... | |
| | | iS | 0 9 34 | ... | ... | ... | |
| | | eSS | 12 50 | ... | ... | ... | |
| | | iSSS | 14 8 | ... | ... | ... | |
| | | eL | 17 16 | ... | ... | ... | |
| | | M | 21 16 | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 6 | N | Mn | 9 23 29 | 18 | 381 | ... | |
| | | F | 13 6 ... | ... | ... | ... | |
| „ 6 | N | e | 13 52 12 | ... | ... | ... | Slight, very distant. |
| | | Mn | 14 10 52 | ... | ... | ... | |
| | | F | 40 ... | ... | ... | ... | |
| „ 6 | N | eP | 17 28 0 | ... | ... | 5,350 | Slight. |
| | | iS | 35 4 | ... | ... | ... | |
| | | M | 46 39 | ... | ... | ... | |
| | | Mn | 50 24 | ... | ... | ... | |
| | | F | 18 32 ... | ... | ... | ... | |
| „ 6 | N | e | 18 34 14 | ... | ... | ... | Slight, very distant. |
| | | Mn | 52 34 | ... | ... | ... | |
| | | F | 19 7 ... | ... | ... | ... | |
| „ 6 | N | e | 19 34 31 | ... | ... | ... | Slight, distant. |
| | | Mn | 52 44 | ... | ... | ... | |
| | | F | 20 11 ... | ... | ... | ... | |
| „ 6 | N | iP | 21 12 42 | ... | ... | 5,100 | Slight. First movement—South. |
| | | eS | 19 32 | ... | ... | ... | |
| | | eSS | 22 36 | ... | ... | ... | |
| | | eSSS | 23 46 | ... | ... | ... | |
| | | eL | 26 37 | ... | ... | ... | |
| | | M | 30 26 | ... | ... | | |
| | | Mn | 36 6 | 14 | 16 | ... | |
| | | F | Masked by the following shock. | | | | |
| „ 6 | N | iP | 21 47 28 | ... | ... | 5,370 | Great. First movement—North. Probably an aftershock of Nov. 6d. 8h. 54m. (Nature, Dec. 10th 1938.) |
| | | iPP | 49 15 | ... | ... | ... | |
| | | ePPP | 50 2 | ... | ... | ... | |
| | | iS | 54 33 | ... | ... | | |
| | | eSS | 57 49 | ... | ... | ... | |
| | | eSSS | 59 7 | ... | ... | ... | |
| | | eL | 22 2 14 | ... | ... | ... | |
| | | M | 6 14 | ... | ... | ... | |
| | | Mn | 10 14 | 18 | 248 | ... | |
| | | F | Masked by the following shock. | | | | |
| „ 7 | N | eP | 1 47 23 | ... | ... | 5,400 | Moderate. |
| | | iS | 54 30 | ... | ... | ... | |
| | | eSS | 57 48 | ... | ... | ... | |
| | | iSSS | 59 7 | ... | ... | ... | |
| | | eL | 2 2 10 | ... | ... | ... | |
| | | M | 6 9 | ... | ... | ... | |
| | | Mn | 11 9 | 18 | 71 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 7 | N | eP | 4 24 32 | ... | ... | 5,510 | Slight. |
| | | iS | 31 45 | ... | ... | ... | |
| | | eSS | 35 8 | ... | ... | ... | |
| | | eSSS | 36 30 | ... | ... | ... | |
| | | eL | 39 44 | | | ... | |
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 7 | N | M | 4 43 44 | ... | ... | ... | |
| | | Mn | 48 47 | 16 | 28 | ... | |
| | | F | Lost in microseisms. | | | ... | |
| „ 7 | N | e | 12 59 54 | 1 ... | 1 ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | ... | |
| „ 7 | N | e | 19 19 52 | ... | ... | ... | Tremor. |
| | | i | 28 25 | ... | ... | ... | |
| | | F½ | Masked by the following shock | | | | |
| „ 7 | N | eP | 19 42 2 | ... | ... | 5,510 | Slight. |
| | | iS | 49 15 | ... | ... | ... | |
| | | eSS | 52 38 | ... | ... | ... | |
| | | eSSS | 54 0 | ... | ... | ... | |
| | | eL | 57 14 | ... | ... | ... | |
| | | M | 20 1 18 | ... | ... | ... | |
| | | Mn | 6 10 | 16 | 44 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 9 | N | iP | 9 24 33 | ... | ... | 5,220 | Moderate. First movement—North. |
| | | ePP | 26 16 | ... | ... | ... | |
| | | ePPP | 27 1 | ... | ... | ... | |
| | | iS | 31 30 | ... | ... | ... | |
| | | eSS | 34 40 | ... | ... | ... | |
| | | eSSS | 35 55 | ... | ... | ... | |
| | | iL | 38 51 | ... | ... | ... | |
| | | M | 42 55 | ... | ... | ... | |
| | | Mn | 51 5 | 13 | 57 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 9 | N | e | 16 37 6 | ... | ... | ... | Slight, distant. |
| | | Mn | 41 14 | ... | ... | ... | |
| | | F | Lost in microseism . | | | | |
| „ 10 | N | eP | 10 55 04 | ... | ... | 4,910 | Slight. |
| | | i (S) | 11 2 04 | ... | ... | ... | |
| | | e | 6 32 | ... | ... | ... | |
| | | e | 7 34 | ... | ... | ... | |
| | | iL | 10 9 | ... | ... | ... | |
| | | M | 13 59 | ... | ... | ... | |
| | | Mn | 18 36 | 15 | 37 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 10 | N | eP | 20 31 12 | ... | ... | 10,300? | Great. 1st movement—South. Provisional epicentre at Lat. 56° N Long. 159° W. Dec. (Nature, 10,1938). |
| | | iP | 31 19 | ... | ... | ... | |
| | E | eP | 31 21 | ... | ... | ... | |
| | N | iSKS | 41 42 | ... | ... | ... | |
| | E | iSKS | 41 44 | ... | ... | ... | |
| | N | iS | 42 26 | ... | ... | ... | |
| | E | iS | 42 28 | ... | ... | ... | |
| | N | iPS | 43 28 | ... | ... | ... | |
| | E | iPS | 43 30 | ... | ... | ... | |
| | N | eSS | 48 49 | ... | ... | ... | |



ALIPORE OBSERVATORY, CALCUTTA.

November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | Δ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | km. | |
| Nov. 10 | E | eSS | 20 48 51 | ... | ... | ... | |
| | N | eSSS | 52 33 | ... | ... | ... | |
| | E | eSSS | 52 35 | ... | ... | ... | |
| | N | iL | 21 2 27 | ... | ... | ... | |
| | F | iL | 2 29? | ... | ... | ... | |
| | E | M | 9 29? | ... | ... | ... | |
| | N | M | 9 35 | ... | ... | ... | |
| | | Mn | 12 30 | 22? | 1343? | ... | |
| | | F | Lost in microseisms. | | | | |
| | E | F | Lost in congestion. | | | | |
| „ 11 | N | e | 1 43 7 | ... | ... | ... | Slight, distant. |
| | | Mn | 51 24 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 11 | N | e? | 3 26 2 | ... | ... | ... | Slight, distant. |
| | | Mn? | 32 41 | ... | | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 12 | N | e | 6 18 41 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 12 | N | e | 8 3 11 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| „ 12 | N | e | 9 19 12 | ... | ... | ... | Tremor. |
| | | e | 28 18 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 12 | N | eP? | 14 59 46 | ... | ... | 6,400 | Slight. |
| | | iS | 15 7 49 | ... | ... | ... | |
| | | eSS | 11 47 | ... | ... | ... | |
| | | eSSS | 13 41 | ... | ... | ... | |
| | | eL | 17 47 | ... | ... | ... | |
| | | M | 22 31 | ... | ... | ... | |
| | | Mn | 27 43 | 16 | 17 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 13 | N | iP | 5 0 42 | ... | ... | 4,050 | Slight. 1st movement —South. |
| | | iPP | 1 54 | ... | ... | ... | |
| | | iS | 6 33 | ... | ... | ... | |
| | | iSS | 8 43 | ... | ... | ... | |
| | | iSSS | 9 10 | | ... | ... | |
| | | eL | 11 26 | ... | ... | ... | |
| | | M | 14 33 | ... | ... | ... | |
| | | F | 6 1 ... | ... | ... | ... | |
| „ 13 | N | iP | 13 23 11 | ... | ... | 6,310 | Slight. 1st movement —South. |
| | | iS | 30 40 | ... | ... | ... | |
| | | i | 31 5 | ... | ... | ... | |
| | | i | 32 47 | ... | ... | ... | |
| | | F | 15 23 | ... | ... | ... | |
| „ 13 | N | eP | 22 40 18 | ... | ... | 5,550 | Moderate. |
| | | iS | 47 33 | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | μ | km. | |
| Nov. 13 | N | iSS | 22 50 57 | ... | ... | ... | |
| | | iSSS | 52 21 | ... | ... | ... | |
| | | eL | 56 39 | ... | ... | ... | |
| | | M | 59 46 | ... | ... | ... | |
| | | Mn | 23 4 56 | 16 | 123 | ... | |
| | | F | Lost while changing chart. | | | | |
| „ 14 | N | eP | 2 44 55 | ... | ... | 5,800 | Slight. |
| | | iS | 52 25 | ... | ... | ... | |
| | | eSS | 56 0 | ... | ... | ... | |
| | | eSSS | 57 32 | ... | ... | ... | |
| | | eL | 3 1 2 | ... | ... | ... | |
| | | M | 5 19 | ... | ... | ... | |
| | | F | 4 8 ... | ... | ... | ... | |
| „ 14 | N | eP? | 12 19 24 | ... | ... | 5,530 | Slight. |
| | | ePP | 21 15 | ... | ... | ... | |
| | | eS | 26 39 | ... | ... | ... | |
| | | eSS | 30 3 | ... | ... | ... | |
| | | eSSS | 31 26 | ... | ... | ... | |
| | | eL | 34 43 | ... | ... | ... | |
| | | Mn | 43 43 | 22 | 29 | ... | |
| | | F | 13 36 ... | ... | ... | ... | |
| „ 15 | N | e | 10 14 46 | ... | ... | ... | Tremor. |
| | | F | 11 15 | ... | ... | ... | |
| „ 15 | N | e | 15 32 46 | ... | ... | ... | Slight, distant. |
| | | Mn | 51 3 | ... | ... | ... | |
| | | F | 16 38 ... | ... | ... | ... | |
| „ 15 | N | iP | 21 6 24 | ... | ... | 3,110 | Moderate. First Movement—North. M wave feeble. |
| | | ePP | 7 6 | ... | ... | ... | |
| | | ePPP | 7 22 | ... | ... | ... | |
| | | iS | 11 15 | ... | ... | ... | |
| | | iSS | 12 35 | ... | ... | ... | |
| | | iScS | 13 3 | ... | ... | ... | |
| | | iL | 14 18 | ... | ... | ... | |
| | | M | 16 42 | ... | ... | ... | |
| | | F | 23 50 ... | ... | ... | ... | |
| „ 16 | N | i | 5 59 8 | ... | ... | ... | Slight, very distant. |
| | | Mn | 6 30 51 | ... | ... | ... | |
| | | F | 57 ... | ... | ... | ... | |
| „ 16 | N | iP | 11 16 44 | ... | ... | 5,220 | Slight. First movement—North. |
| | | iS | 23 41 | ... | ... | ... | |
| | | eSS | 26 51 | ... | ... | ... | |
| | | eL | 31 1 | ... | ... | ... | |
| | | M | 34 58 | ... | ... | ... | |
| | | Mn | 42 57 | 13 | 18 | ... | |
| | | F | 12 57 ... | ... | ... | ... | |
| „ 17 | N | iP | 4 7 9 | ... | ... | 9,300 | Moderate. First movement—South. |
| | | iPP | 10 24 | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Nov. 17 | N | ePPP | 4 12 17 | ... | ... | ... | |
| | | iS | 17 33 | ... | ... | ... | |
| | | ePS | 18 21 | ... | ... | ... | |
| | | eSS | 23 13 | ... | ... | ... | |
| | | eSSS | 26 37 | ... | ... | ... | |
| | | eL | 34 49 | ... | ... | ... | |
| | | M | 41 56 | ... | ... | ... | |
| | | Mn | 48 36 | 15 | 171 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 18 | N | e | 10 56 17 | ... | ... | ... | Tremor. |
| | | F | 11 7 ... | ... | ... | ... | |
| ,, 18 | N | e | 14 27 39 | ... | ... | ... | Slight, distant. |
| | | i | 34 34 | ... | ... | ... | |
| | | i | 34 49 | ... | ... | ... | |
| | | F | 15 27 ... | ... | ... | ... | |
| ,, 18 | N | e | 15 38 22 | ... | ... | ... | Tremor. |
| | | F | 16 15 ... | ... | ... | ... | |
| ,, 18 | N | e | 18 39 59 | ... | ... | ... | Slight, very distant. |
| | | e | 47 53 | ... | ... | ... | |
| | | Mn | 19 10 2 | ... | ... | ... | |
| | | F | 56 ... | ... | ... | ... | |
| ,, 19 | N | e | 2 43 30 | ... | ... | ... | Tremor. |
| | | i | 46 35 | ... | ... | ... | |
| | | F | 3 4 ... | ... | ... | ... | |
| ,, 19 | N | e | 5 49 13 | ... | ... | ... | Slight, very distant. |
| | | i | 57 19 | ... | ... | ... | |
| | | Mn | 6 17 26 | ... | ... | ... | |
| | | F | 7 17 ... | ... | ... | ... | |
| ,, 20 | N | e | 18 10 32 | ... | ... | ... | Slight, distant. |
| | | Mn | 21 43 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| ,, 21 | N | iP | 1 13 54 | ... | ... | 1,200 | Moderate. First movement—South. |
| | | iS | 15 56 | ... | ... | ... | |
| | | i | 16 41 | ... | ... | ... | |
| | | $\overline{iS}$ | 17 14 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 21 | N | eP | 7 5 26 | ... | ... | ... | Slight. |
| | | iS | 10 23 | ... | ... | ... | |
| | | iSS | 12 15 | ... | ... | ... | |
| | | eL | 14 36 | ... | ... | ... | |
| | | M | 17 36 | ... | ... | ... | |
| | | F | Masked by the following shock. | | | | |
| ,, 21 | N | eP(?) | 7 31 42 | ... | ... | 1,000 | Slight. |
| | | iS | 33 24 | ... | ... | ... | |
| | | iS* | 34 0 | ... | ... | ... | |
| | | $\overline{iS}$ | 34 26 | ... | ... | ... | |
| 1938. Nov. 21 | E | e | 15 47 32 | ... | ... | ... | Tremor. |
| | | F | 56 ... | ... | ... | ... | |
| ,, 22 | N | P? | 1 22 46 | ... | ... | 5,450 | Moderate. |
| | | iS | 29 55 | ... | ... | ... | |
| | | eSS | 33 15 | ... | ... | ... | |
| | | eSSS | 34 35 | ... | ... | ... | |
| | | iL | 37 48 | ... | ... | ... | |
| | | M | 41 53 | ... | ... | ... | |
| | | Mn | 25 23 | 16 | 151 | .. | |
| | | F | Lost while changing chart. | | | | |
| ,, 22 | N | e | 8 28 22 | ... | ... | ... | Slight, distant. |
| | | Mn | 46 0 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 25 | N | eP | 8 29 14 | ... | ... | 5,530 | Slight. |
| | | iS | 36 30 | ... | ... | ... | |
| | | ESS | 39 53 | ... | ... | ... | |
| | | iSSS | 41 16 | ... | ... | ... | |
| | | eL | 44 30 | ... | ... | ... | |
| | | M | 48 37 | ... | ... | ... | |
| | | Mn | 53 3 | 16 | 16 | ... | |
| | | F | Lost in microseisms. | | | | |
| ,, 25 | N | i | 22 10 59 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 27 | N | e | 22 19 41 | ... | ... | ... | Slight, distant. |
| | | i | 26 19 | ... | ... | ... | |
| | | F | 23 2 ... | ... | ... | ... | |
| ,, 28 | N | e | 22 11 8 | ... | ... | ... | Tremor. |
| | | F | Lost in microseisms. | | | | |
| ,, 29 | N | iP | 13 48 23 | ... | ... | 5,450 | Slight. First movement—South. |
| | | iS | 55 33 | ... | ... | ... | |
| | | ePS | 56 8 | ... | ... | ... | |
| | | eSS | 58 53 | ... | ... | ... | |
| | | eSSS | 14 0 14 | ... | ... | ... | |
| | | eL | 3 25 | ... | ... | ... | |
| | | M | 7 27 | ... | ... | ... | |
| | | Mn | 12 13 | 15 | 30 | ... | |
| | | F | 16 14 ... | ... | ... | ... | |
| ,, 30 | N | iP | 2 38 27 | ... | ... | 5,330 | Moderate. First movement—South. |
| | | iPP | 40 13 | ... | ... | ... | |
| | | iPPP | 41 0 | ... | ... | ... | |
| | | iS | 45 30 | ... | ... | ... | |
| | | eSS | 48 45 | ... | ... | ... | |



ALIPORE OBSERVATORY, CALCUTTA.

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Nov. 30 | N | iSSS | 2 50 1 | ... | ... | ... | |
| | | eL | 53 10 | ... | ... | ... | |
| | | M | 57 6 | ... | ... | ... | |
| | | Mn | 3 0 32 | 20 | 213 | ... | |
| | | F | 6 5 ... | ... | ... | ... | |
| 1938. Nov. 30 | N | e | 15 27 43 | ... | ... | ... | Slight, very distant. |
| | | i | 31 46 | ... | ... | ... | |
| | | Mn | 48 31 | ... | ... | ... | |
| | | F | 16 11 ... | ... | ... | ... | |

## December, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| Dec. 1 | N | eP | 2 21 52 | ... | ... | 6,550 | Slight. |
| | | iS | 30 4 | ... | ... | ... | |
| | | iScS | 31 41 | ... | ... | ... | |
| | | eSS | 34 9 | ... | ... | ... | |
| | | eSSS | 36 7 | ... | ... | ... | |
| | | iL | 40 11 | ... | ... | ... | |
| | | M | 45 8 | ... | ... | ... | |
| | | Mn | 51 38 17 | 33 | ... | | |
| | | F | Lost in microseisms. | | | | |
| ,, 1 | N | eP(?) | 18 13 25 | ... | ... | 2,550 | Slight. Felt at Quetta. |
| | | eS | 17 26 | ... | ... | ... | |
| | | eSS | 18 17 | ... | ... | ... | |
| | | eL | 19 24 | ... | ... | ... | |
| | | M | 21 20 | ... | ... | ... | |
| | | F | 19 5 ... | ... | ... | ... | |
| ,, 2 | N | e | 14 17 37 | ... | ... | ... | Tremor. |
| | | i | 22 21 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| ,, 2 | N | iP | 22 16 55 | ... | ... | 1,850 | Moderate. Direction of first movement—North. |
| | | iPP | 17 9 | ... | ... | ... | |
| | | iPPP | 17 12 | ... | ... | ... | |
| | | iS | 20 7 | ... | ... | ... | |
| | | iSS | 20 38 | ... | ... | ... | |
| | | iL | 21 17 | ... | ... | ... | |
| | | Mn | 22 37 | 9 | 137 | | |
| | | F | 23 41 ... | ... | ... | ... | |
| ,, 3 | N | e | 0 58 59 | ... | ... | ... | Tremor. |
| | | F | 1 52 ... | ... | ... | ... | |
| ,, 3 | N | iP | 12 20 20 | ... | ... | 5,590 | Slight. Direction of 1st movement—North. |
| | | iS | 27 38 | ... | ... | ... | |
| | | eSS | 31 4 | ... | ... | ... | |
| | | eSSS | 32 28 | ... | ... | ... | |
| | | eL | 35 42 | ... | ... | ... | |
| | | M | 39 52 | ... | ... | ... | |
| | | Mn | 43 53 | 16 | 46 | ... | |
| | | F | 14 30 ... | ... | ... | ... | |
| ,, 4 | N | e | 6 21 50 | ... | ... | ... | Slight, very distant. |
| | | Mn | 44 6 | ... | ... | ... | |
| | | F | 7 0 ... | ... | ... | ... | |
| Dec. 4 | N | eP | 16 35 43 | ... | ... | 8,780 | Slight. |
| | | iS | 45 45 | ... | ... | ... | |
| | | ePS | 46 26 | ... | ... | ... | |
| | | iSS | 51 4 | ... | ... | ... | |
| | | eSSS (?) | 54 15 | ... | ... | ... | |
| | | i (?) | 16 57 40 | ... | ... | ... | |
| | | eL | 17 1 35 | ... | ... | ... | |
| | | F | 18 4 ... | ... | ... | ... | |
| ,, 5 | N | eP(?) | 0 37 2 | ... | ... | 1,180 | Slight. |
| | | iS | 39 22 | ... | ... | ... | |
| | | eS* | 40 18 | ... | ... | ... | |
| | | $\overline{S}$ | 40 55 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 5 | N | e | 17 56 30 | ... | ... | ... | Tremor. |
| | | F | 18 39 ... | ... | ... | ... | |
| ,, 5 | N | e | 19 5 32 | ... | ... | ... | Tremor. |
| | | F | 44 ... | ... | ... | ... | |
| ,, 6 | N | e | 17 51 28 | ... | ... | ... | Slight, distant. |
| | | Mn | 18 1 10 | ... | ... | ... | |
| | | F | 14 ... | ... | ... | ... | |
| ,, 6 | N | e | 19 51 42 | ... | ... | ... | Tremor. |
| | | F | 20 5 ... | ... | ... | ... | |
| ,, 6 | N | iP | 23 7 14 | ... | ... | 4,350 | Moderate. Direction of first movement—North. |
| | | iS | 13 24 | ... | ... | ... | |
| | | eSS | 15 50 | ... | ... | ... | |
| | | eSSS | 16 28 | ... | ... | ... | |
| | | iL | 18 50 | ... | ... | ... | |
| | | M | 22 14 | ... | ... | ... | |
| | | Mn | 24 18 | 10 | 139 | ... | |
| | | F | Lost while changing chart. | | | | |
| ,, 7 | N | e | 10 22 24 | ... | ... | ... | Tremor. |
| | | e | 33 27 | ... | ... | ... | |
| | | F | 55 ... | ... | ... | ... | |
| ,, 7 | N | eP | 13 13 5 | ... | ... | 5,280 | Slight. |
| | | eS | 20 5 | ... | ... | ... | |
| | | eSS | 23 17 | ... | ... | ... | |
| | | eSSS | 24 33 | ... | ... | ... | |
| | | eL | 27 33 | ... | ... | ... | |
| | | M | 31 35 | ... | ... | ... | |

# ALIPORE OBSERVATORY, CALCUTTA.

## December, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| 1938. Dec. 7 | N | Mn | 13 36 3 | 20 | 34 | ... | |
| | | F | Masked by the following shock. | | | | |
| „ 7 | N | iS | 13 44 20 | ... | ... | 5,420 | Slight. Beginning masked in previous shock. |
| | | ePS | 44 56 | ... | ... | ... | |
| | | eSS | 47 39 | ... | ... | ... | |
| | | eSSS | 48 59 | ... | ... | ... | |
| | | eL | 52 6 | ... | ... | ... | |
| | | M | 56 10 | ... | ... | ... | |
| | | Mn | 13 58 33 | 30 | 67 | ... | |
| | | F | Masked by the following shock. | | | | |
| „ 7 | N | eP ? | 15 7 27 | ... | ... | ... | Slight. |
| | | ePP | 9 38 | ... | ... | ... | |
| | | ePPP | 10 0 | ... | ... | ... | |
| | | e | 14 10 | ... | ... | ... | |
| | | eSS | 16 8 | ... | ... | ... | |
| | | iL | 18 35 | ... | ... | ... | |
| | | M | 21 37 | ... | ... | ... | |
| | | F | 16 57 ... | ... | ... | ... | |
| „ 9 | N | e | 4 8 6 | ... | ... | ... | Slight, very distant. |
| | | i | 18 31 | ... | ... | ... | |
| | | M | 45 45 | ... | ... | ... | |
| | | Mn | 49 30 | ... | ... | ... | |
| | | F | Masked by the following shock. | | | | |
| „ 9 | N | e (?) | 5 12 51 | ... | ... | ... | Slight, distant. |
| | | i | 17 14 | ... | ... | ... | |
| | | e | 22 14 | ... | ... | ... | |
| | | F | 58 ... | ... | ... | ... | |
| „ 9 | N | e | 9 49 43 | ... | ... | ... | Slight, distant. |
| | | Mn | 10 8 9 | ... | ... | ... | |
| | | F | 46 ... | ... | ... | ... | |
| „ 11 | N | iP | 12 36 2 | ... | ... | 280 | Slight. Direction of first movement—South. |
| | | iS | 36 33 | ... | ... | ... | |
| | | iS* | 36 39 | ... | ... | ... | |
| | | $\overline{iS}$ | 36 43 | ... | ... | ... | |
| | | F | 43 ... | ... | ... | ... | |
| „ 12 | N | e | 0 36 38 | ... | ... | ... | Tremor. |
| | | F | Lost while changing chart. | | | | |
| „ 12 | N | e | 2 58 11 | ... | ... | ... | Slight, distant. |
| | | Mn | 3 12 30 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 12—13 | N | e | 23 54 20 | ... | ... | ... | Slight, distant. |
| | | Mn | 0 10 38 | ... | ... | ... | |
| | | F | 1 0 ... | ... | ... | ... | |
| „ 13 | N | eP | 17 34 24 | ... | ... | 5,480 | Slight. |
| | | eS | 41 35 | ... | ... | ... | |
| | | ePS | 42 10 | ... | ... | ... | |
| 1938. Dec. 13 | N | eSS | 17 44 56 | ... | ... | ... | |
| | | eSSS | 46 18 | ... | ... | ... | |
| | | eL | 49 29 | ... | ... | ... | |
| | | M | 53 36 | ... | ... | ... | |
| | | Mn | 57 12 | 19 | 21 | ... | |
| | | F | 19 13 ... | ... | ... | ... | |
| „ 16 | N | e(?) | 4 55 52 | ... | ... | ... | Slight, distant. |
| | | Mn | 5 8 38 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 16 | N | e | 17 35 25 | ... | .. | ... | Moderate. |
| | | ePP | 38 38 | ... | ... | ... | |
| | | ePPP | 40 29 | ... | ... | ... | |
| | | iSKS | 45 45 | ... | ... | ... | |
| | | ePS | 46 31 | ... | ... | ... | |
| | | eSS | 53 14 | ... | ... | ... | |
| | | $L_R$ | 18 8 38 | ... | ... | ... | |
| | | F | 21 22 ... | ... | ... | ... | |
| „ 16—17 | N | eP(?) | 23 28 23 | ... | ... | ... | Slight. |
| | | eSKS | 38 37 | ... | ... | ... | |
| | | i | 39 3 | ... | ... | ... | |
| | | e | 39 57 | ... | ... | ... | |
| | | e | 40 22 | ... | ... | ... | |
| | | e | 45 0 | ... | ... | ... | |
| | | e | 48 31 | ... | ... | ... | |
| | | eLQ | 57 17 | ... | ... | ... | |
| | | $L_R$ | 0 2 37 | ... | ... | ... | |
| | | F | Lost while changing chart. | | | | |
| Dec 17 | N | eP | 16 40 58 | ... | ... | 2,810 | Slight. M waves feeble. |
| | | iS | 45 28 | ... | ... | ... | |
| | | eSS | 46 33 | ... | ... | ... | |
| | | eL | 47 54 | ... | ... | ... | |
| | | F | 18 30 ... | ... | ... | ... | |
| „ 18 | N | e | 7 40 31 | ... | ... | ... | Slight, very distant. |
| | | Mn | 8 32 32 | ... | ... | ... | |
| | | F | 9 8 ... | ... | ... | ... | |
| „ 18 | N | eP | 21 54 29 | ... | ... | 5,400 | Slight |
| | | iS | 22 1 36 | ... | ... | ... | |
| | | eSS | 4 54 | ... | ... | ... | |
| | | iSSS | 6 13 | ... | ... | ... | |
| | | eL | 9 21 | ... | ... | ... | |
| | | Mn | 17 49 | 17 | 10 | ... | |
| | | F | 23 32 ... | ... | ... | ... | |
| „ 19 | N | e | 5 6 47 | ... | ... | ... | Slight, distant. |
| | | Mn | 16 51 | ... | ... | ... | |
| | | F | 35 ... | ... | ... | ... | |
| „ 19 | N | e | 7 1 21 | ... | ... | ... | Slight, near. |
| | | Mn | 3 43 | ... | ... | ... | |
| | | F | 10 ... | ... | ... | ... | |



# ALIPORE OBSERVATORY, CALCUTTA.

## December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Dec. 19 | N | e | 18 28 4 | ... | ... | ... | Tremor. |
| | | F | Masked by the following shock. | | | | |
| 19 | N | IP | 18 33 5 | ... | ... | 5,780 | Slight. Direction of first movement—North. |
| | | ePP | 35 2 | ... | ... | ... | |
| | | ePPP | 35 55 | ... | ... | ... | |
| | | IS | 40 33 | ... | ... | ... | |
| | | IPS | 41 8 | ... | ... | ... | |
| | | eSS | 44 7 | ... | ... | ... | |
| | | eSSS | 45 38 | ... | ... | ... | |
| | | eL | 49 5 | ... | ... | ... | |
| | | M | 53 25 | ... | ... | ... | |
| | | Mn | 57 10 | 20 | 14 | ... | |
| | | F | Masked by the following shock. | | | | |
| 19 | N | (S) ? | 19 8 5 | ... | ... | ... | Slight. |
| | | (L) ? | 12 55 | ... | ... | ... | |
| | | e | 14 13 | ... | ... | ... | |
| | | i | 15 54 | ... | ... | ... | |
| | | M | 18 18 | ... | ... | ... | |
| | | F | 20 10 ... | ... | ... | ... | |
| 20 | N | e | 15 0 20 | ... | ... | ... | Slight, very distant. |
| | | Mn | 22 57 | ... | ... | ... | |
| | | F | 59 ... | ... | ... | ... | |
| 21 | N | eP | 12 34 29 | ... | ... | 4,810 | Slight. |
| | | iS | 41 13 | ... | ... | ... | |
| | | eSS | 44 3 | ... | ... | ... | |
| | | eSSS | 45 1 | ... | ... | ... | |
| | | eL | 47 39 | ... | ... | ... | |
| | | M | 50 24 | ... | ... | ... | |
| | | Mn | 54 12 | 23 | 37 | ... | |
| | | F | 14 18 ... | ... | ... | ... | |
| 1938 Dec. 22 | N | e | 3 35 12 | ... | ... | ... | Tremor. |
| | | F | 59 ... | ... | ... | ... | |
| „ 22 | N | eP(?) | 17 3 12 | ... | ... | ... | Slight. |
| | | PeP(?) | 6 13 | ... | ... | ... | |
| | | i | 6 53 | ... | ... | ... | |
| | | eSS | 10 34 | ... | ... | ... | |
| | | e | 11 34 | ... | ... | ... | |
| | | iL | 12 56 | ... | ... | ... | |
| | | M | 15 9 | ... | ... | ... | |
| | | F | 18 0 ... | ... | ... | ... | |
| „ 23 | N | e | 1 53 54 | ... | ... | ... | Slight, very distant. |
| | | Mn | 2 23 44 | ... | ... | ... | |
| | | F | 49 ... | ... | ... | ... | |
| | | i | 18 37 48 | ... | ... | ... | Slight, very distant. |
| „ 23 | | Mn | 19 9 9 | ... | ... | ... | |
| | | F | 35 ... | ... | ... | ... | |
| „ 24 | N | e | 20 18 31 | ... | ... | ... | Tremor. |
| | | F | 21 0 ... | ... | ... | ... | |
| „ 28 | N | i | 5 21 36 | ... | ... | ... | Slight, distant. |
| | | e | 24 54 | ... | ... | ... | |
| | | Mn | 30 47 | ... | ... | ... | |
| | | F | 45 ... | ... | ... | ... | |
| „ 28-29 | N | e | 23 37 52 | ... | ... | ... | Slight, distant. |
| | | Mn | 46 2 | ... | ... | ... | |
| | | F | 0 5 ... | ... | ... | ... | |
| „ 29 | N | e | 21 13 1 | ... | ... | ... | Tremor. |
| | | F | 49 ... | ... | ... | ... | |
| „ 30 | N | i | 2 45 26 | ... | ... | ... | Slight, very distant. |
| | | Mn | 3 24 9 | ... | ... | ... | |
| | | F | Lost in microseisms. | | | | |

METEOROLOGICAL OFFICE, ALIPORE, CALCUTTA.

S. K. PRAMANIK,
*Meteorologist.*

# COLOMBO OBSERVATORY, CEYLON.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm. | km. | |
| 1938. Oct. 7 | E | ? | 00 56 53 | ... | ... | ... | |
| | | M | 01 20 04 | ... | 0·3 | ... | |
| | | F | 34 30 | ... | ... | ... | |
| „ 7 | E | P | 06 14 52 | ... | ... | ... | |
| | | M | 42 09 | ... | 0·3 | ... | |
| | | F | 07 10 30 | ... | ... | ... | |
| „ 7 | E | P | 16 27 03 | ... | ... | ... | |
| | | ? | 30 55 | ... | ... | ... | |
| | | M | 55 14 | ... | 0·7 | ... | |
| | | F | 18 12 | ... | ... | ... | |
| „ 9 | E | e | 20 43 30 | ... | ... | ... | |
| | | F | 21 29 ... | ... | ... | ... | |
| „ 10 | E | P | 20 56 38 | ... | ... | ... | |
| | | S | 21 03 21 | ... | ... | ... | |
| | | L | 13 48 | ... | ... | ... | |
| | | M | 15 11 | ... | 12·0 | ... | |
| | | F | 23 04 ... | ... | ... | ... | |
| „ 10 | E | e | 23 12 30 | ... | ... | ... | |
| | | F | 41 ... | ... | ... | ... | |
| „ 11 | E | e | 00 20 20 | ... | ... | ... | |
| | | M | 34 50 | ... | 0·3 | ... | |
| | | F | Lost while changing chart. | | | | |
| „ 12 | E | S | 09 54 45 | ... | ... | ... | M not pronounced. |
| | | M | 01 26 05 | ... | 0·5 | ... | |
| | | F | 02 19 30 | ... | ... | ... | |
| „ 13 | E | P | 15 34 22 | ... | ... | ... | M not pronounced, amplitude <0·5mm. |
| | | F | 16 30 ... | ... | ... | ... | |
| 19 | E | P | 04 21 35 | ... | ... | ... | |
| | | S | 27 55 | ... | ... | ... | |
| | | L? | 43 08 | ... | ... | ... | |
| | | M | 43 57 | ... | 1·6 | ... | |
| | | F | 05 55 ... | ... | ... | ... | |
| 1938. Oct. 20 | E | P | 02 27 42 | ... | ... | ... | |
| | | S | 34 16 | ... | ... | ... | |
| | | L | 45 38 | ... | ... | ... | |
| | | M | 47 04 | ... | 4·0 | ... | |
| | | F | 05 39 30 | ... | ... | ... | |
| „ 20 | E | e | 13 22 30 | ... | ... | ... | |
| | | F | 14 04 ... | ... | ... | ... | |
| „ 21 | E | P | 20 27 30 | ... | ... | ... | |
| | | L | 31 01 | ... | ... | ... | |
| | | M | 32 07 | ... | 14·6 | ... | |
| | | F | 22 18 30 | ... | ... | ... | |
| „ 22 | E | e | 00 27 30 | ... | ... | ... | |
| | | F | 45 ... | ... | ... | ... | |
| „ 23 | E | P | 02 32 50 | ... | ... | ... | M not pronounced. |
| | | SS? | 42 23 | ... | ... | ... | |
| | | L | 47 50 | ... | ... | ... | |
| | | M | 55 55 | ... | 0·3 | ... | |
| | | F | 03 36 30 | ... | ... | ... | |
| „ 23 | E | P | 15 09 39 | ... | ... | ... | M not pronounced. |
| | | S | 16 13 | ... | ... | ... | |
| | | L | 23 06 | ... | ... | ... | |
| | | M | 29 51 | ... | 0·3 | ... | |
| | | F | 16 22 ... | ... | ... | ... | |
| „ 26 | E | e | 03 38 ... | ... | ... | ... | |
| | | F | 14 03 30 | ... | ... | ... | |
| „ 29 | E | e | 13 27 ... | ... | ... | ... | |
| | | F | 14 02 ... | ... | ... | ... | |
| „ 29 | E | e | 23 00 30 | ... | ... | ... | |
| | | F | 45 ... | ... | ... | ... | |

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm | km. | |
| 1938. Nov. 5 | E | P | 8 53 49 | ... | ... | ... | |
| | | S | 9 2 28 | ... | ... | ... | |
| | | L | 14 48 | ... | ... | ... | |
| | | M | 24 11 | ... | 43·0 | ... | |
| | | F | Merged into the beginning of the following shock. | | | | |
| „ 5 | E | P | 11 0 43 | ... | ... | ... | |
| | | S | 9 39 | ... | ... | ... | |
| | | L | 22 4 | ... | ... | ... | |
| | | M | 31 41 | ... | 44·6 | ... | |
| | | F | 14 40 ... | ... | ... | ... | |
| 1938 Nov. 6 | E | P | 9 4 25 | ... | ... | ... | |
| | | S | 12 57 | ... | ... | ... | |
| | | L | 28 42 | ... | ... | ... | |
| | | M | 35 10 | ... | 11 0 | ... | |
| | | F | 12 56 30 | ... | ... | ... | |
| „ 6 | E | eS? | 17 35 50 | ... | ... | ... | M not pronounced. |
| | | M | 18 0 35 | ... | <0·3 | ... | |
| | | F | 37 ... | ... | ... | ... | |
| „ 6 | E | e | 21 13 20 | ... | ... | ... | M not pronounced. |
| | | L | 42 50 | ... | ... | ... | |
| | | M | 44 35 | ... | <0·5 | ... | |
| | | F | Lost in the following shock. | | | | |



# COLOMBO OBSERVATORY, CEYLON.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | mm | km. | |
| 1938. Nov. 6 | E | P | 21 49 20 | ... | ... | ... | |
| | | S | 58 03 | ... | ... | ... | |
| | | L | 22 13 40 | ... | ... | ... | |
| | | $M_1$ | 23 05 | ... | 4·8 | ... | |
| | | $M_2$ | 25 29 | ... | 5·2 | ... | |
| | | F | Lost in the following shock. | | | | |
| „ 7 | E | e | 0 57 50 | ... | ... | ... | M not pronounced. |
| | | M | 1 29 5 | ... | 0·3 | ... | |
| | | F | Lost in the following shock. | | | | |
| „ 7 | E | eP | 1 48 43 | ... | ... | ... | |
| | | S | 57 28 | ... | ... | ... | |
| | | L | 2 16 56 | ... | ... | ... | |
| | | M | 19 27 | ... | 1·2 | ... | |
| | | F | 3 40 30 | ... | ... | ... | |
| „ 7 | E | e | 4 27 40 | ... | ... | ... | M not pronounced. |
| | | S(?) | 34 37 | ... | ... | ... | |
| | | L | 55 26 | ... | ... | ... | |
| | | M | 5 0 51 | ... | <0·3 | ... | |
| | | F | 33 ... | ... | ... | ... | |
| „ 7 | E | e | 19 31 48 | ... | ... | ... | Two shocks superposed. |
| | | e | 43 55 | ... | ... | ... | |
| | | e | 53 30 | ... | ... | ... | |
| „ 7 | E | L | 20 11 51 | ... | ... | ... | |
| | | M | 14 51 | ... | 0·3 | ... | |
| | | F | 21 3 30 | ... | ... | ... | |
| „ 9 | E | P(?) | 9 26 56 | ... | ... | ... | Strong microseisms. |
| | | S | 35 16 | ... | ... | ... | |
| | | L | 54 26 | ... | ... | ... | |
| | | M | 59 49 | ... | 0·8 | ... | |
| | | F | Lost in microseisms. | | | | |
| „ 10 | E | S | 11 5 30 | ... | ... | ... | |
| | | L | 27 33 | ... | ... | ... | |
| | | M | 30 54 | ... | 0·6 | ... | |
| | | F | 12 6 30 | ... | ... | ... | |
| „ 10 | E | P | 20 32 54 | ... | ... | ... | M off sheet; amplitude given estimated. |
| | | S | 44 32 | ... | ... | ... | |
| | | L | 21 12 48 | ... | ... | ... | |
| | | M | 26 13 | ... | 110 | ... | |
| | | F | Lost in the following shock. | | | | |
| „ 11 | E | SKS? | 1 22 17 | ... | ... | ... | M not pronounced. |
| | | L | 48 20 | ... | ... | ... | |
| | | M | 2 3 24 | ... | 0·7 | ... | |
| | | | 44 30 | ... | ... | ... | |
| „ 11 | E | | 3 14 ... | ... | ... | ... | |
| | | | 4 0 30 | ... | ... | ... | |
| 1938. Nov. 11 | E | e | 9 36 ... | ... | ... | ... | |
| | | F | 10 29 30 | ... | ... | ... | |
| „ 12 | E | e | 15 11 ... | ... | ... | ... | |
| | | F | 16 9 30 | ... | ... | ... | |
| „ 13 | E | P | 5 1 36 | ... | ... | ... | M not pronounced. |
| | | S | 8 30 | ... | ... | ... | |
| | | L | 16 21 | ... | ... | ... | |
| | | M | 22 30 | ... | 0· | ... | |
| | | F | 40 ... | ... | ... | ... | |
| „ 13 | E | S | 13 33 59 | ... | ... | ... | M not pronounced. |
| | | L | 52 57 | ... | ... | ... | |
| | | M | 58 21 | ... | <0·3 | ... | |
| | | F | 14 18 30 | ... | ... | ... | |
| „ 13-14 | E | eP | 22 42 4 | ... | ... | ... | |
| | | S | 50 57 | ... | ... | ... | |
| | | L | 23 10 27 | ... | ... | ... | |
| | | M | 15 14 | ... | 0·9 | ... | |
| | | F | 0 48 ... | ... | ... | ... | |
| „ 14 | E | e | 1 10 ... | ... | ... | ... | |
| | | F | 56 30 | ... | ... | ... | |
| „ 14 | E | eP | 12 17 21 | ... | ... | ... | M not pronounced. |
| | | S | 26 56 | ... | ... | ... | |
| | | L | 40 51 | ... | ... | ... | |
| | | M | 47 21 | ... | <0·3 | ... | |
| | | F | 13 28 ... | ... | ... | ... | |
| „ 14-15 | E | Record lost from | 20 58 ... | ... | ... | ... | |
| | | to | 0 52 ... | ... | ... | ... | |
| „ 16 | E | P | 21 5 14 | ... | ... | ... | |
| | | S | 9 19 | ... | ... | ... | |
| | | L | 10 7 | ... | ... | ... | |
| | | M | 11 52 | ... | 23·3 | ... | |
| | | F | 23 46 ... | ... | ... | ... | |
| „ 16 | E | (S) | 11 27 10 | ... | ... | ... | M not pronounced |
| | | L | 44 22 | ... | ... | ... | |
| | | M | 52 4 | ... | <0·3 | ... | |
| | | F | 12 11 30 | ... | ... | ... | |
| „ 17 | E | eP | 4 8 35 | ... | ... | ... | |
| | | S | 19 8 | ... | ... | ... | |
| | | L | 50 46 | ... | ... | ... | |
| | | M | 5 2 33 | ... | 7·2 | ... | |
| | | F | 7 3 30 | ... | ... | ... | |
| „ 18 | E | eP ? | 14 26 34 | ... | ... | ... | |
| | | S ? | 34 51 | ... | ... | ... | |
| | | F | 15 10 ... | ... | ... | ... | |
| „ 19 | E | e | 5 58 30 | ... | ... | ... | |
| | | F | 6 58 30 | ... | ... | ... | |

# COLOMBO OBSERVATORY, CEYLON.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| **November, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | mm | km. | |
| Nov. 20 | E | e | 18 9 ... | ... | ... | ... | |
| | | F | 38 30 | ... | ... | ... | |
| „ 21 | E | eP | 1 17 26 | ... | ... | ... | M not pronounced ; amplitude about 1 mm. |
| | | ? | 21 53 | ... | ... | ... | |
| | | ? | 27 2 | ... | ... | ... | |
| | | L | 34 33 | ... | ... | ... | |
| | | F | 2 18 ... | ... | ... | ... | |
| „ 21-22 | E | Record lost from | 2 18 30 | ... | ... | ... | |
| | | to | 0 57 ... | ... | ... | ... | |
| „ 22 | E | P | 1 24 38 | ... | ... | ... | |
| | | S | 33 14 | ... | ... | ... | |
| | | L | 52 49 | ... | ... | ... | |
| | | M | 2 0 51 | ... | 1·2 | ... | |
| | | F | 3 7 30 | ... | ... | ... | |
| **December, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | mm | km. | |
| Dec. 1 | E | P | 2 23 5 | ... | ... | ... | M not pronounced. |
| | | S | 31 55 | ... | ... | ... | |
| | | L | 44 32 | ... | ... | ... | |
| | | M | 49 4 | ... | 0·5 | ... | |
| | | F | 3 35 30 | ... | ... | ... | |
| „ 1 | E | e | 18 19 30 | ... | ... | ... | |
| | | F | 38 ... | ... | ... | ... | |
| „ 2 | E | e | 22 24 30 | ... | ... | ... | |
| | | F | 23 2 30 | ... | ... | ... | |
| „ 3 | E | (S) | 12 30 53 | ... | ... | ... | M not pronounced. |
| | | L? | 51 23 | ... | ... | ... | |
| | | M | 52 38 | ... | < 0·3 | ... | |
| | | F | 13 7 30 | ... | ... | ... | |
| „ 6-7 | E | P | 23 8 30 | ... | ... | ... | Absolute times approximate ; correct to the nearest half-minute only. |
| | | S | 15 ... | ... | ... | ... | |
| | | SS? | 18 30 | ... | ... | ... | |
| | | L | 24 30 | ... | ... | ... | |
| | | M | 28 ... | ... | 0·9 | ... | |
| | | F | 0 42 ... | ... | ... | ... | |
| „ 7 | E | e | 13 15 ... | ... | ... | ... | |
| | | F | Lost in the following shock. | | | | |
| „ 7 | E | P | 13 35 36 | ... | ... | ... | M not pronounced. |
| | | S | 45 11 | ... | ... | ... | |
| | | L | 14 1 10 | ... | ... | ... | |
| | | M | 5 51 | ... | < 0·3 | ... | |
| | | F | Lost in the following shock. | | | | |
| „ 7 | E | P | 15 9 2 | ... | ... | ... | M not pronounced. |
| | | L | 26 26 | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | mm | km. | |
| Nov. 25 | E | e | 8 39 30 | ... | ... | ... | |
| | | F | 9 13 30 | ... | ... | ... | |
| „ 27 | E | e | 22 25 ... | ... | ... | ... | |
| | | F | 23 0 ... | ... | ... | ... | |
| „ 29 | E | P | 13 50 5 | ... | ... | ... | M not pronounced. |
| | | S | 58 43 | ... | ... | ... | |
| | | L | 14 18 27 | ... | ... | ... | |
| | | M | 26 24 | ... | 0·3 | ... | |
| | | F | 16 18 ... | ... | ... | ... | |
| „ 30 | E | P | 2 40 20 | ... | ... | ... | |
| | | S | 48 50 | ... | ... | ... | |
| | | L | 3 4 32 | ... | ... | ... | |
| | | M | 10 30 | ... | 2·2 | ... | |
| | | F | 6 32 30 | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | mm | km. | |
| Dec. 7 | E | M | 15 29 10 | ... | < 0·3 | ... | |
| | | F | 16 17 ... | ... | ... | ... | |
| „ 13 | E | e | 17 35 30 | ... | ... | ... | |
| | | F | 18 27 ... | ... | ... | ... | |
| „ 16 | E | ? | 17 32 50 | ... | ... | ... | |
| | | SKS | 45 4 | ... | ... | ... | |
| | | L | 18 4 26 | ... | ... | ... | |
| | | M | 10 16 | ... | 1·7 | ... | |
| | | F | 20 54 30 | ... | ... | ... | |
| „ 16-17 | E | P | 23 28 21 | ... | ... | ... | |
| | | S | 38 23 | ... | ... | ... | |
| | | ? | 52 17 | ... | ... | ... | |
| | | L | 58 56 | ... | ... | ... | |
| | | M | 0 4 41 | ... | 0·8 | ... | |
| | | F | 1 57 30 | ... | ... | ... | |
| „ 17 | E | ? | 16 39 20 | ... | ... | ... | |
| | | S | 49 38 | ... | ... | ... | |
| | | L | 17 1 5 | ... | ... | ... | |
| | | M | 3 2 | ... | 0·9 | ... | |
| | | F | 58 ... | ... | ... | ... | |
| „ 18 | E | e | 8 9 30 | ... | ... | ... | |
| | | F | 52 ... | ... | ... | ... | |
| „ 18 | E | e | 22 5 ... | ... | ... | ... | |
| | | F | 58 ... | ... | ... | ... | |
| „ 19 | E | e | 18 33 ... | ... | ... | ... | |
| | | F | 20 1 30 | ... | ... | ... | |
| „ 21 | E | P | 12 34 31 | ... | ... | ... | |
| | | S | 40 50 | ... | ... | ... | |



# COLOMBO OBSERVATORY, CEYLON.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| **December, 1938.** | | | | | | | |
| 1938. | | | h. m. s. | sec. | mm. | km. | |
| Dec. 21 | E | L | 12 48 25 | ... | ... | ... | |
| | | M | 55 55 | ... | 0·4 | ... | |
| | | F | 14 5 ... | ... | ... | ... | |
| 1938. | | | h. m. s. | sec. | mm. | km. | |
| Dec. 22 | E | e | 17 0 ... | ... | ... | ... | |
| | | F | 47 30 | ... | ... | ... | |
| „ 30 | E | e | 2 38 ... | ... | ... | ... | |
| | | F | 3 39 30 | ... | ... | ... | |

COLOMBO OBSERVATORY,
CEYLON.

H. JAMESON,
*Superintendent.*

# HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| 1938. Oct. 7 | N | ePP? | 6 17 36? | ... | ... | 2660 | |
| | | eS? | 21 38 | 7 | ·005 | ... | |
| | | eL | 25 22? | 21 | ·01 | ... | |
| | | $M_1$ | 27 16 | 21 | ·01 | ... | |
| | | F | 47 38? | ... | ... | ... | |
| ,, 7 | N | eP | 16 29 18? | 2 | ·003 | 2863 | |
| | | e | 33 27 19? | 4 | ·015 | ... | |
| | | eL | 37 16? | 25 | ·13 | ... | |
| | | $M_1$ | 39 04 | 25 | ·13 | ... | |
| | | F | 17 38 22? | ... | ... | ... | |
| ,, 10 | N | eP | 20 57 17 | 13 | ·01 | 6312 | |
| | | iS? | 21 05 04 | 28 | ·10 | ... | |
| | | iL | 16 13 | 34 | ·11 | ... | |
| | | $M_1$ | 20 29 | 26 | ·20 | ... | |
| | | $M_2$ | 23 01 | 29 | ·19 | ... | |
| | | $M_3$ | 26 35 | 25 | ·12 | ... | |
| 1938. Dec. 10 | | $M_1$ | 21 28 29 | 28 | ·18 | ... | |
| | | F | 22 34 36? | ... | ... | ... | |
| Oct. 10 | N | eP | 4 18 48 | 8 | ·01 | 2457 | |
| | | iS | 22 38 | 23 | ·15 | ... | |
| | | iL | 25 40 | 26 | ·25 | ... | |
| | | $M_1$ | 28 22 | 26 | ·25 | ... | |
| | | F | 5 34 02? | ... | ... | ... | |
| ,, 20 | N | eP | 2 29 28 | 7 | ·01 | 6763 | |
| | | iS | 37 39 | 24 | ·05 | ... | |
| | | i? | 42 25 | 27 | ·17 | ... | |
| | | eL | 45 59 | 30 | ·14 | ... | |
| | | $M_1$ | 56 08 | 29 | ·25 | ... | |
| ,, 21 | N | eP | 20 30 25 | 2 | ·005 | ... | |
| | | e | 34 26? | 11 | ·008 | ... | |
| | | e | 37 51 | 18 | ·011 | ... | |
| | | eL | 39 11 | 25 | ·031 | ... | |
| | | $M_1$ | 41 12 | 25 | ·031 | ... | |

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| Nov. 5 | N | eP | 8 52 24 | 2 26 | 0·034 | 6369 | |
| | | iS | 9 00 11 | 36 | 0·120 | ... | |
| | | i(?) | 04 05 | 27 | 0·265 | ... | |
| | | iL | 09 58 | 32 | 1·60 | ... | |
| | | $M_1$ | 16 05 | 26 | 1·71 | ... | |
| ,, 5 | N | eP | 10 59 31? | 26 | 0·031 | 6493 | |
| | | iS | 11 07 28 | 26 | 0·094 | ... | |
| | | i? | 11 37 | 28 | 0·360 | ... | |
| | | iL | 17 48 | 28 | 1·304 | ... | |
| | | $M_1$ | 23 24 | 28 | 1·850 | ... | |
| | | $M_2$ | 30 15 | 24 | 0·306 | ... | |
| ,, 6 | N | eP | 9 03 06 | 23 | 0·020 | 6200 | |
| | | iS | 10 45 | 28 | 0·130 | ... | |
| | | i? | 14 50 | 22 | 0·118 | ... | |
| | | iL | 20 26 | 26 | 1·325 | ... | |
| | | $M_1$ | 23 44 | 26 | 1·325 | ... | |
| | | $M_2$ | 29 35 | 20 | 0·263 | ... | |
| | | F | 12 51 53? | ... | ... | ... | |
| ,, 6 | N | eP | 21 47 48? | 12 | 0·005 | 6200 | |
| | | iS | 55 27 | 18 | 0·056 | ... | |
| | | i? | 59 15 | 23 | 0·060 | ... | |
| | | iL | 22 05 29? | 25 | 0·775 | ... | |
| | | $M_1$ | 09 10 | 25 | 0·775 | ... | |
| | | $M_2$ | 10 35 | 25 | 0·286 | ... | |
| ,, | N | eL | 2 04 41 | 28 | 0·027 | ... | |
| | | $M_2$ | 09 52 | 20 | 0·038 | ... | |
| ,, 9 | N | eP | 9 25 28? | 8 | 0·002 | 5829 | |
| | | eS | 32 56 | 10 | 0·011 | ... | |
| Nov. 9. | N | e? | 9 36 30 | 14 | 0·010 | ... | |
| | | eL | 42 50? | 24 | 0·028 | ... | |
| | | $M_1$ | 47 20 | 24 | 0·028 | ... | |
| | | $M_2$ | 49 50 | 17 | 0.026 | ... | |
| | | $M_3$ | 53 48 | 15 | 0·025 | ... | |
| | | F | 11 22 59? | ... | ... | ... | |
| ,, 10 | N | e? | 11 00 07 | 20 | 0·005 | ... | |
| | | eL | 14 14? | 25 | 0·038 | ... | |
| | | $M_1$ | 16 48 | 25 | 0·038 | ... | |
| | | F | 12 37 34? | ... | ... | ... | |
| ,, 10 | N | eP | 20 31 24 | 29 | 0·16 | 9243? | |
| | | i? | 34 36 | 31 | 0·26 | ... | |
| | | iS | 41 42 | 30 | 1·51 | ... | |
| | | iL | 51 57? | 26 | 2·71 | ... | |
| | | $M_1$ | 21 08 36 | 18 | 3·60 | ... | Hitting stops. |
| | | $M_2$ | 13 29 | 20 | 3·48 | ... | |
| | | $M_3$ | 20 27 | 24 | 1·58 | ... | |
| | | $M_4$ | 22 53 | 28 | 1·19 | ... | |
| | | $M_5$ | 28 07 | 30 | 1·94 | ... | |
| ,, 11 | N | eL | 1 40 34? | 26 | 0·030 | ... | |
| | | $M_1$ | 49 00 | 24 | 0·148 | ... | |
| | | F | 4 03 52? | ... | ... | ... | |
| ,, 13 | N | i (S) | 13 31 03 | 8 | 0·006 | ... | Direction of first motion—South |
| | | eL | 43 02 | 19 | 0·01 | ... | |
| | | $M_1$ | 49 32 | 20 | 0·02 | ... | |
| | | F | 14 59 18? | ... | ... | ... | |
| ,, 13-14 | N | eS(?) | 22 48 28 | 20? | 0 007 | ... | |
| | | eL? | 59 30? | 20 | 0·022 | ... | |



HAIG OBSERVATORY, SURVEY OF INDIA, DEHRA DUN.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| 1938. Nov. 13-14 | N | $M_1$ | 23 04 54 | 16 | 0·026 | ... | |
| | | F | 3 18 37? | ... | ... | ... | |
| ,, 15 | N | eP | 21 07 54? | 8 | 0·003 | 4565 | |
| | | i? | 09 31 | 8 | 0·014 | ... | |
| | | eS | 13 52 | 21 | 0·035 | ... | |
| | | i? | 16 59 | 12 | 0·015 | ... | |
| | | eL | 20 08? | 26 | 0·094 | ... | |
| | | $M_1$ | 22 08 | 26 | 0·094 | ... | |
| ,, 17 | N | e? | 4 29 16? | 22 | 0·040 | ... | P. etc. missed while changing paper. |
| | | e? | 37 37 | 28 | 0·358 | ... | |
| | | eL | 41 17 | 32 | 2·098 | ... | |
| | | $M_1$ | 45 43 | 32 | 2·098 | ... | |
| | | $M_2$ | 55 05 | 28 | 0·105 | ... | |
| | | F | 7 26 11? | ... | ... | ... | |
| ,, 21 | N | e | 1 17 23 | 3 | 0·003 | 654 | |
| | | eL? | 19 16? | 16 | 0·048 | ... | |
| | | $M_1$ | 21 42 | 30 / 7 | 0·060 / 0·029 | ... | Two periods superposed in $M_1$. |
| | | F | 2 01 00? | ... | ... | ... | |
| 1938. Nov. 22 | N | iS(?) | 1 30 50 | 13 | 0·01 | 7214? | |
| | | e? | 34 37 | 20 | 0·021 | ... | |
| | | eL | 40 47 | 26 | 0·125 | ... | |
| | | $M_1$ | 43 36 | 26 | 0·125 | ... | |
| | | F | 3 38 02? | ... | ... | ... | |
| ,, 25 | N | eS? | 8 37 18 | 10 | 0·002 | 4081? | |
| | | eL | 48 24? | 23 | 0·01 | ... | |
| | | $M_1$ | 53 06 | 23 | 0·01 | ... | |
| | | F | 9 25 44? | ... | ... | ... | |
| ,, 29 | N | e | 13 46 47? | 16 | 0·006 | 8037? | |
| | | eS? | 56 29 | 24 | 0·006 | ... | |
| | | eL | 14 07 17? | 22 | 0·015 | ... | |
| | | $M_2$ | 08 59 | 22 | 0·015 | ... | |
| ,, 30 | N | e(S)? | 2 47 01 | 12 | 0·018 | 6808? | |
| | | e? | 50 44 | 21 | 0·020 | ... | |
| | | e? | 55 26? | 16 | 0·012 | ... | |
| | | eL | 56 19? | 28 | 0·058 | ... | |
| | | $M_1$ | 3 02 47 | 26 | 0·118 | ... | |
| | | F | 4 59 45? | ... | ... | ... | |

## *December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | km. | |
| Dec. 1 | N | eL? | 2 43 52? | 17 | 0·018 | ... | |
| | | $M_1$ | 53 40 | 18 | 0·022 | ... | |
| | | F | 3 54 35? | ... | ... | ... | |
| ,, 1 | N | eS? | 18 12 45? | 2 | 0·002 | ... | |
| | | e | 13 58 | 4 | 0·008 | ... | |
| | | $M_1$ | 14 34 | 4 / 25 | 0·008 / 0·021 | ... | Two periods superposed. |
| ,, 2 | N | eP?] | 22 17 54? | 2 | 0·001 | 890? | |
| | | ES? | 18 55 | 22 | 0·007 | ... | |
| | | eL | 20 18 | 23 | 0·331 | ... | |
| | | $M_1$ | 20 36 | 23 | 0·331 | ... | |
| ,, 3 | N | eS? | 12 28 05? | 12 | 0·005 | ... | |
| | | eSSS? | 32 55? | 12 | 0·005 | ... | |
| | | eL | 38 35? | 20 | 0·012 | ... | |
| | | $M_1$ | 44 42 | 23 | 0·016 | ... | |
| | | F | 13 48 46? | ... | ... | ... | |
| Dec. 5 | N | iL? | 00 39 29 | 16 | 0·035 | ... | |
| | | $M_1$ | 39 43 | 16 | 0·035 | ... | |
| ,, 6 | N | eP | 23 08 33? | 5 | 0·004 | 4599 | |
| | | iS | 14 44 | 17 | 0·012 | ... | |
| | | iL | 22 28 | 24 | 0·081 | ... | |
| | | $M_1$ | 23 16 | 24 | 0·081 | ... | |
| ,, 16 | N | SKS | 17 46 16? | 9 | 0·005 | ... | |
| | | e? | 49 37 | 26 | 0·017 | ... | |
| | | e? | 56 14 | 32 | 0·018 | ... | |
| | | e | 59 44 | 27 | 0·014 | ... | |
| | | eL | 18 16 34? | 32 | 0·031 | ... | |
| | | $M_1$ | 20 00 | 26 | 0·114 | ... | |
| ,, 17 | N | eP | 16 39 54 | 5 | 0·004 | 2367 | |
| | | iS | 43 34 | 16 | 0·020 | ... | |
| | | iL | 46 48 | 22 | 0·025 | ... | |
| | | $M_1$ | 47 17 | 22 | 0·025 | ... | |

* The instrument was under adjustment from $21^d\ 4^h\ 30^m$ to $23^d\ 10^h\ 30^m$.

DEHRA DUN.

E. A. GLENNIE, *Lt.-Col., D. S. O., R. E.,*
*Director, Geodetic Branch,*
*Survey of India.*

# NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Oct. 7 | E | eP | 1 0 32 | ... | ... | 5310 | |
| | E | S | 7 31 | ... | ... | ... | |
| | E | L | 14 45 | ... | ... | ... | |
| | E | M | 19 18 | 18 | 8 | ... | |
| | E | F | 59 ... | ... | ... | ... | |
| „ 7 | E, N | P | 6 15 31 | ... | ... | 1950 | |
| | E, N | S | 18 50 | ... | ... | ... | |
| | E | L | 20 55 | ... | ... | ... | |
| | E | M | 24 17 | 12 | 4 | ... | |
| | N | M | 24 37 | 8 | 3 | ... | |
| | E | F | 49 ... | ... | ... | ... | |
| „ 7 | N | M | 11 6 46 | 15 | 4 | ... | |
| „ 7 | E, N | P | 16 27 38 | ... | ... | 1960 | |
| | E, N | S | 30 58 | ... | ... | ... | |
| | E | L | 31 54 | ... | ... | ... | |
| | N | M | 35 16 | 13 | 12 | ... | |
| | E | M | 34 42 | 15 | 16 | ... | |
| | E | F | 17 36 ... | ... | ... | ... | |
| „ 9 | E | M | 17 30 15 | 16 | 4 | ... | |
| „ 9 | E | P | 20 43 14 | ... | ... | 1840 | |
| | E | S | 46 23 | ... | ... | ... | |
| | E | L | 48 36 | ... | ... | ... | |
| | E | M | 52 18 | 13 | 4 | ... | |
| | E | F | 21 25 ... | ... | ... | ... | |
| „ 10 | E | P | 20 57 4 | ... | ... | 5230 | |
| | E | PP | 58 50 | ... | ... | ... | |
| | E | S | 21 3 59 | ... | ... | ... | |
| | E | ScS | 6 50 | ... | ... | ... | |
| | E | SS | 7 32 | ... | ... | ... | |
| | E | L | 11 21 | ... | ... | ... | |
| | E | M | 14 45 | 24 | 286 | ... | |
| | E | F | 22 56 ... | ... | ... | ... | |
| „ 11 | E | M | 0 35 4 | 24 | 16 | ... | |
| „ 12 | E, N | P | 0 44 35 | ... | ... | 6760 | |
| | N | PP | 46 40 | ... | ... | .. | |
| | E, N | S | 52 51 | ... | ... | ... | |
| | N | ScS | 54 12 | ... | ... | ... | |
| | N | SS | 56 48 | ... | ... | .. | |
| | N | L | 1 3 14 | ... | ... | ... | |
| | E | M | 8 9 | 14 | 12 | ... | |
| | | M | 8 21 | 14 | 16 | ... | |
| | N | | 2 30 ... | ... | ... | ... | |
| „ 13 | E, N | | 15 34 01 | ... | ... | 4710 | |
| | E, N | | 40 27 | ... | ... | ... | |
| | E | L | 46 7 | ... | ... | ... | |
| | N | M | 50 55 | 10 | 7 | ... | |
| | N | F | 16 22 | ... | ... | ... | |
| 1938. Oct. 19 | E, N | P | 4 19 47 | ... | ... | 3670 | |
| | N | PP | 21 10 | ... | ... | ... | |
| | E, N | S | 25 15 | ... | ... | ... | |
| | N | SS | 27 5 | ... | ... | ... | |
| | E | L | 29 40 | ... | ... | ... | |
| | E | M | 32 46 | 13 | 73 | ... | |
| | N | M | 34 31 | 12 | 60 | ... | |
| | N | F | 6 3 ... | ... | ... | ... | |
| „ 20 | E, N | P | 2 28 22 | ... | ... | 5,610 | |
| | N | PcP | 29 47 | ... | ... | ... | |
| | N | PP | 30 25 | ... | ... | ... | |
| | E, N | S | 35 37 | ... | ... | ... | |
| | N | ScS | 38 4 | ... | ... | ... | |
| | N | SS | 39 10 | ... | ... | ... | |
| | N | L | 43 16 | ... | ... | ... | |
| | N | M | 48 22 | 18 | 51 | ... | |
| | E | M | 48 37 | 18 | 33 | ... | |
| | N | F | 5 20 ... | ... | ... | ... | |
| „ 20 | E | PP | 13 23 46 | ... | ... | ... | |
| | E | S | 28 20 | ... | ... | ... | |
| | N | M | 34 36 | 18 | 7 | ... | |
| | E | M | 35 43 | 15 | 7 | ... | |
| | N | F | 14 12 ... | ... | ... | ... | |
| „ 21 | E, N | P | 20 28 35 | ... | ... | 2,190 | |
| | N | PP | 28 50 | ... | ... | ... | |
| | E, N | S | 32 14 | ... | ... | ... | |
| | N | SS | 32 32 | ... | ... | ... | |
| | N | L | 33 24 | ... | ... | ... | |
| | E | M | 33 53 | 15 | 77 | ... | |
| | N | M | 34 53 | 15 | 62 | ... | |
| | N | F | 22 25 ... | ... | ... | ... | |
| „ 23 | E | eP | 2 32 41 | ... | ... | 4,160 | |
| | E | PP | 34 10 | ... | ... | ... | |
| | E | S | 38 37 | ... | ... | ... | |
| | E | L | 45 29 | ... | ... | ... | |
| | E | M | 48 29 | 14 | 8 | ... | |
| | N | M | 50 2 | 12 | 7 | ... | |
| „ 23 | E, N | P | 15 10 29 | ... | ... | 5,180 | |
| | E, N | S | 17 21 | ... | ... | ... | |
| | N | L | 25 9 | ... | ... | ... | |
| | E | M | 28 27 | 15 | 10 | ... | |
| | N | M | 29 0 | 14 | 8 | ... | |
| | N | F | 16 57 ... | ... | ... | ... | |
| „ 26 | E, N | ? | 3 36 48 | ... | ... | ... | |
| | N | M | 42 29 | 12 | 7 | ... | |
| „ 28 | E | M | 5 19 2 | 8 | 3 | ... | |
| „ 29 | E | eP | 13 18 29 | ... | ... | 6,150 | |
| | E | S | 26 13 | ... | ... | ... | |
| | E | L | 35 41 | ... | ... | ... | |
| | E | M | 43 26 | 21 | 9 | ... | |
| | E | F | 14 8 ... | ... | ... | ... | |





# NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | h. m. s. | sec. | μ | Km. | |
| 1938. Nov. 5 | E, N | P | 8 53 14 | ... | ... | 6,640 | |
| | N | PP | 55 32 | ... | ... | ... | |
| | E, N | S | 9 1 24 | ... | ... | ... | |
| | N | PS | 1 36 | ... | ... | ... | |
| | N | ScS | 3 15 | ... | ... | ... | |
| | N | SS | 5 26 | ... | ... | ... | |
| | N | L | 11 1 | ... | ... | ... | |
| | N | M | 13 39 | 27 | 459 | ... | |
| | E | M | 15 42 | 24 | 331 | ... | |
| „ 5 | E, N | P | 11 0 9 | ... | ... | 6,580 | |
| | N | PP | 2 39 | ... | ... | ... | |
| | E, N | S | 8 16 | ... | ... | ... | |
| | N | PS | 8 51 | ... | ... | ... | |
| | N | SS | 12 21 | ... | ... | ... | |
| | N | L | 19 13 | ... | ... | ... | |
| | N | M | 23 51 | 21 | 316 | ... | |
| | N | F | 14 56 ... | ... | ... | ... | |
| „ 6 | E, N | P | 9 3 51 | ... | ... | 6,530 | |
| | N | PP | 6 3 | ... | ... | ... | |
| | E, N | S | 11 56 | ... | ... | ... | |
| | N | PS | 12 12 | ... | ... | ... | |
| | N | ScS | 13 43 | ... | ... | ... | |
| | N | SS | 15 57 | ... | ... | ... | |
| | N | L | 22 50 | ... | ... | ... | |
| | N | M | 27 39 | 18 | 119 | ... | |
| | E | M | 28 48 | 21 | 143 | ... | |
| | N | F | 13 28 ... | ... | ... | ... | |
| „ 6 | E, N | P | 21 48 49 | ... | ... | 6,580 | |
| | N | PP | 51 6 | ... | ... | ... | |
| | E, N | S | 56 56 | ... | ... | ... | |
| | N | PS | 57 17 | ... | ... | ... | |
| | N | ScS | 58 25 | ... | ... | ... | |
| | N | SS | 22 0 47 | ... | ... | ... | |
| | N | L | 8 25 | ... | ... | ... | |
| | N | M | 12 6 | 21 | 168 | ... | |
| | E | M | 13 42 | 14 | 40 | ... | |
| „ 7 | E, N | P | 1 48 27 | ... | ... | 6,440 | |
| | E, N | S | 56 27 | ... | ... | ... | |
| | N | L | 2 9 4 | ... | ... | ... | |
| | N | M | 12 19 | 15 | 10 | ... | |
| | E | M | 14 40 | 15 | 9 | ... | |
| | N | F | 3 52 ... | ... | ... | ... | |
| „ 7 | N | S | 4 33 34 | ... | ... | ... | |
| | N | M | 51 46 | 14 | 7 | ... | |
| | E | M | 53 46 | 13 | 4 | ... | |
| „ 7 | N | M | 20 9 23 | 13 | 6 | ... | |
| | E | M | 11 57 | 15 | 5 | ... | |
| 1938. Nov. 9 | E, N | P | 9 25 52 | ... | ... | 6,600 | |
| | E, N | S | 34 0 | ... | ... | ... | |
| | N | SS | 37 50 | ... | ... | ... | |
| | N | L | 46 12 | ... | ... | ... | |
| | N | M | 50 42 | 14 | 18 | ... | |
| | E | M | 52 55 | 14 | 8 | ... | |
| „ 10 | E, N | P | 10 56 28 | ... | ... | 6,620 | |
| | E, N | S | 11 4 37 | ... | ... | ... | |
| | N | ScS | 6 17 | ... | ... | ... | |
| | N | SS | 8 51 | ... | ... | ... | |
| | N | M | 20 31 | 14 | 8 | ... | |
| | E | M | 22 24 | 14 | 6 | ... | |
| | N | F | 12 37 ... | ... | ... | ... | |
| „ 10 | E, N | P | 20 32 0 | ... | ... | 9,550? | |
| | E, N | S? | 42 36 | ... | ... | ... | |
| | N | L | 59 51 | ... | ... | ... | |
| | E | M | 21 6 0 | 16 | 512 | ... | |
| | N | M | 6 48 | 19 | 716 | ... | |
| „ 11 | E | M | 1 50 36 | 19 | 25 | ... | |
| | N | M | 54 36 | 19 | 36 | ... | |
| „ 11 | N | M | 3 36 6 | 15 | 5 | ... | |
| „ 11 | E | M | 9 45 13 | 22 | 10 | ... | |
| | N | M | 45 13 | 22 | 10 | ... | |
| „ 12 | E | M | 9 33 52 | 10 | 2 | ... | |
| | N | M | 34 16 | 12 | 3 | ... | |
| „ 12 | E, N | P | 15 0 55 | ... | ... | 7510 | |
| | E, N | S | 9 51 | ... | ... | ... | |
| | N | L | 22 1 | ... | ... | ... | |
| | N | M | 31 43 | 15 | 9 | ... | |
| | E | M | 32 19 | 12 | 5 | ... | |
| „ 13 | E, N | P | 5 1 46 | ... | ... | 5290 | |
| | E | PP | 3 36 | ... | ... | ... | |
| | E, N | S | 8 44 | ... | ... | ... | |
| | E | SS | 11 59 | ... | ... | ... | |
| | E | L | 17 9 | ... | ... | ... | |
| | E | M | 20 57 | 15 | 4 | ... | |
| | N | M | 23 42 | 15 | 5 | ... | |
| | N | F | 6 2 ... | ... | ... | ... | |
| „ 13 | E, N | P | 13 24 16 | ... | ... | 7000 | |
| | E, N | S | 32 45 | ... | ... | ... | |
| | N | PS | 33 11 | ... | ... | ... | |
| | E | SS | 36 49 | ... | ... | ... | |
| | E | L | 45 8 | ... | ... | ... | |
| | E | M | 49 31 | 14 | 4 | ... | |
| | N | M | 52 49 | 15 | 5 | ... | |
| | N | F | 14 42 ... | ... | ... | ... | |

## NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

### November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 13-14 | E, N | P | 22 41 30 | ... | ... | 6,640 | |
| | N | PP | 43 42 | ... | ... | ... | |
| | E, N | S | 49 40 | ... | ... | ... | |
| | E | PS | 50 6 | ... | ... | ... | |
| | N | SS | 53 12 | ... | ... | ... | |
| | N | L | 23 0 58 | | | ... | |
| | E | M | 5 8 | 15 | 11 | ... | |
| | N | M | 5 16 | 16 | 16 | ... | |
| | N | F | 1 36 ... | ... | ... | ... | |
| „ 14 | N | M | 12 57 26 | 17 | 5 | ... | |
| | E | M | 58 41 | 18 | 5 | ... | |
| „ 15 | E | M | 10 43 59 | 18 | 5 | ... | |
| | N | M | 44 1 | 16 | 6 | ... | |
| „ 15-16 | E, N | P | 21 6 31 | ... | .. | 3110 | |
| | N | PP | 7 13 | ... | ... | ... | |
| | N | PcP | 9 40 | .. | ... | ... | |
| | E, N | S | 11 22 | ... | ... | ... | |
| | N | SS | 12 44 | ... | ... | ... | |
| | N | L | 14 22 | ... | ... | ... | |
| | N | M | 17 42 | 15 | 45 | ... | |
| | E | M | 18 22 | 15 | 40 | | |
| | N | F | 0 9 ... | ... | ... | ... | |
| „ 16 | N | M | 6 35 58 | 15 | 4 | ... | |
| | E | M | 36 0 | 15 | 4 | ... | |
| „ 16 | E, N | P | 11 17 58 | ... | ... | 6550 | |
| | E, N | S | 26 4 | ... | ... | ... | |
| | N | M | 40 44 | 15 | 5 | ... | |
| | E | M | 40 44 | 14 | 3 | ... | |
| | N | F | 12 28 ... | ... | ... | ... | |
| „ 17 | E, N | P | 4 7 49 | ... | ... | 9,500 | |
| | N | PP | 11 36 | ... | ... | ... | |
| | E, N | S | 18 23 | ... | ... | ... | |
| | N | PS | 19 6 | ... | ... | ... | |
| | N | SS | 23 42 | ... | ... | ... | |
| | N | L | 35 45 | ... | ... | ... | |
| | E | M | 43 15 | 20 | 214 | | |
| | N | M | 44 6 | 20 | 262 | ... | |
| | N | F | 7 19 .. | ... | ... | ... | |
| Nov. 18 | E | M | 19 14 34 | 14 | 3 | ... | |
| | N | M | 14 38 | 15 | 4 | ... | |
| „ 19 | E | M | 6 22 6 | 14 | 5 | ... | |
| | N | M | 24 15 | 14 | 6 | ... | |
| „ 21 | E, N | P | 1 15 57 | .. | | 2,330 | |
| | E, N | S | 19 48 | ... | ... | | |
| | E | L | 21 41 | ... | ... | ... | |
| | E | M | 2 12 | 10 | 49 | ... | |
| | N | M | 23 16 | 9 | 45 | ... | |
| | E | F | 2 25 ... | ... | ... | ... | |
| „ 21 | N | M | 7 39 11 | 8 | 3 | ... | |
| | E | M | 39 21 | 9 | 4 | ... | |
| „ 22 | F, N | P | 1 24 2 | ... | ... | 6720 | |
| | E | PP | 26 16 | ... | ... | ... | |
| | E, N | S | 32 16 | ... | ... | ... | |
| | E | ScS | 33 49 | ... | ... | ... | |
| | E | SS | 36 18 | ... | ... | ... | |
| | E | L | 43 23 | ... | ... | ... | |
| | N | M | 47 9 | 20 | 43 | ... | |
| | E | M | 49 28 | 18 | 21 | ... | |
| | E | F | 3 21 ... | ... | ... | ... | |
| „ 22 | E | M | 4 3 19 | 15 | 4 | ... | |
| „ 25 | E | M | 8 57 21 | 18 | 6 | ... | |
| | N | M | 58 1 | 14 | 6 | ... | |
| „ 29 | E, N | P | 13 49 31 | ... | ... | 6,550 | |
| | E, N | S | 57 37 | ... | ... | ... | |
| | N | ScS | 59 20 | ... | ... | ... | |
| | N | SS | 14 1 15 | ... | ... | ... | |
| | N | L | 8 46 | ... | ... | ... | |
| | N | M | 13 13 | 15 | 9 | ... | |
| | E | M | 15 25 | 15 | 4 | ... | |
| | N | F | 15 21 ... | ... | ... | ... | |
| „ 30 | E, N | P | 2 39 46 | ... | ... | 6,550 | |
| | N | PP | 42 3 | ... | ... | ... | |
| | E, N | S | 47 52 | ... | ... | ... | |
| | N | SS | 51 45 | ... | ... | ... | |
| | N | L | 58 12 | ... | ... | ... | |
| | N | M | 3 3 1 | 21 | 46 | ... | |
| | E | M | 6 4 | 20 | 20 | ... | |

### December, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Dec. 1 | E, N | P | 2 22 58 | ... | ... | 7,290 | |
| | E, N | S | 31 42 | ... | ... | ... | |
| | E | ScS | 32 22 | ... | ... | ... | |
| | E | L | 43 3 | ... | ... | ... | |
| | N | M | 52 51 | 15 | 11 | ... | |
| | E | M | 53 20 | 15 | 4 | ... | |
| | E | F | 3 52 ... | ... | ... | ... | |
| Dec. 1 | E, N | S | 18 16 14 | ... | ... | ... | |
| | E | M | 19 36 | 6 | 5 | ... | |
| | N | M | 19 43 | 7 | 8 | ... | |
| „ 2 | E | M | 14 22 59 | 7 | 2 | ... | |
| | N | M | 23 17 | 6 | 2 | ... | |





## NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

### December, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Dec. 2 | E,N | P | 22 18 42 | ... | ... | 2,260 | |
| | E,N | S | 22 28 | ... | ... | ... | |
| | E | L | 23 55 | ... | ... | ... | |
| | E | M | 25 15 | 9 | 17 | ... | |
| | N | M | 25 27 | 10 | 26 | ... | |
| | E | F | 23 18 ... | ... | ... | .. | |
| 3 | E,N | P | 12 21 38 | ... | ... | 6,480 | |
| | E | PP | 23 48 | ... | ... | ... | |
| | E,N | S | 29 40 | ... | ... | ... | |
| | E | PS | 30 02 | ... | ... | ... | |
| | N | ScS | 31 21 | ... | ... | ... | |
| | N | M | 46 24 | 15 | 10 | ... | |
| | E | M | 47 36 | 15 | 4 | ... | |
| | N | F | 13 45 ... | ... | ... | ... | |
| „ 4 | E | M | 16 47 2 | 9 | 2 | ... | |
| | N | M | 47 12 | 9 | 3 | ... | |
| „ 5 | E | M | 0 44 31 | 7 | 6 | ... | |
| | N | M | 45 31 | 8 | 6 | ... | |
| „ 6-7 | E,N | P | 23 8 33 | ... | ... | 4,470 | |
| | E | PP | 10 16 | ... | ... | ... | |
| | E,N | S | 14 46 | ... | ... | ... | |
| | E | SS | 17 22 | ... | ... | ... | |
| | E | L | 21 4 | ... | ... | ... | |
| | E | M | 25 42 | 16 | 28 | ... | |
| | N | M | 26 11 | 12 | 21 | ... | |
| | N | F | 1 5 ... | ... | .. | ... | |
| „ 7 | E | P | 13 35 57 | ... | ... | 8,510 | |
| | E | S | 45 43 | ... | ... | ... | |
| | E | L | 59 48 | ... | ... | ... | |
| | E | M | 14 6 40 | 21 | 15 | ... | |
| | N | M | 7 26 | 18 | 10 | ... | |
| | E | F | 15 6 ... | ... | ... | ... | |
| „ 9 | E | M | 4 51 20 | 15 | 9 | ... | |
| | N | M | 53 41 | 15 | 11 | ... | |
| „ 13 | E | M | 18 3 8 | 15 | 4 | ... | |
| | N | M | 3 53 | 15 | 5 | ... | |
| „ 16 | E,N | P | 17 35 35 | ... | ... | ... | |
| | N | e | 38 09 | ... | ... | ... | |
| | E,N | SKS | 45 50 | ... | ... | ... | |
| 1938. Dec. 16 | N,E | ? | 17 48 29 | ... | ... | ... | |
| | N | SS | 51 0 | ... | ... | ... | |
| | N | L | 18 2 22 | ... | ... | ... | |
| | N | M | 11 53 | 18 | 41 | ... | |
| | N | M | 16 39 | 18 | 40 | ... | |
| | E | M | 16 53 | 15 | 10 | ... | |
| | N | F | 20 31 ... | ... | ... | ... | |
| „ 16-17 | E,N | S | 23 39 13 | ... | ... | ... | |
| | E | M | 0 3 30 | 15 | 4 | ... | |
| | N | M | 4 28 | 18 | 16 | ... | |
| | N | F | 1 51 ... | ... | ... | ... | |
| „ 17 | N | P | 16 41 59 | ... | ... | 3,380 | |
| | N | PP | 43 0 | ... | ... | ... | |
| | E,N | S | 47 8 | ... | ... | ... | |
| | E | SS | 48 56 | ... | ... | ... | |
| | E | L | 51 58 | ... | ... | ... | |
| | E | ScS | 52 52 | ... | ... | ... | |
| | N | M | 55 26 | 14 | 20 | ... | |
| | E | M | 56 35 | 9 | 9 | ... | |
| | N | F | 18 0 ... | .. | ... | ... | |
| „ 18 | N | M | 22 24 11 | 16 | 6 | ... | |
| „ 19 | E, N | P | 18 34 1 | ... | ... | 6910 | |
| | E, N | S | 42 36 | ... | .. | ... | |
| | N. | M | 19 3 3 | 18 | 10 | ... | |
| „ 19 | N | M | 19 14 47 | 9 | 6 | ... | |
| | E | M | 14 53 | 9 | 5 | ... | |
| „ 21 | E, N | P | 12 35 25 | ... | ... | 5130 | |
| | E, N | S | 42 4 | ... | ... | ... | |
| | N | SS | 45 19 | ... | ... | ... | |
| | N | L | 49 55 | ... | ... | ... | |
| | E | M | 53 31 | 16 | 4 | ... | |
| | N | M | 53 49 | 18 | 21 | ... | |
| | N | F | 13 53 ... | ... | ... | ... | |
| „ 29 | E, N | SS? | 17 14 35 | ... | ... | ... | |
| | N | M | 21 53 | 14 | 6 | ... | |
| | E | M | 25 20 | 15 | 5 | ... | |
| „ 23 | E | M | 19 12 58 | 15 | 4 | ... | |
| | N | M | 13 42 | 15 | 6 | ... | |
| „ 31 | N | M | 1 57 40 | 20 | 6 | ... | |

NIZAMIAH OBSERVATORY, HYDERABAD, DECCAN.

T. P. BHASKARA SAST
*Director.*

# KODAIKANAL OBSERVATORY, KODAIKANAL.

## October, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 7 | E | eP | 1 0 24 | ... | ... | 5200 | |
| | | iS | 7 25 | ... | ... | ... | |
| | | L | 14 33 | ... | ... | ... | |
| | | Mn | 20 21 | 30 | 22 | ... | |
| | | F | 53 0 | ... | ... | ... | |
| ,, 7 | E | iP | 6 15 16 | ... | ... | 1735 | First movement to west. |
| | | eS | 18 18 | ... | ... | ... | |
| | | L | 19 29 | ... | ... | ... | |
| | | M | 20 46 | 20 | 13 | ... | |
| | | F | 59 0 | ... | ... | ... | |
| ,, 7 | E | eP | 7 5 30 | ... | ... | ... | Tremors. |
| | | F | 20 ... | ... | ... | ... | |
| ,, 7 | E | eP | 10 57 26 | ... | ... | 1655 | |
| | | eS | 11 0 20 | ... | ... | ... | |
| | | eL | 1 28 | ... | ... | ... | |
| | | Mn | 2 52 | 25 | 12 | ... | |
| | | F | 20 ... | ... | ... | ... | |
| ,, 7 | E | iP | 16 27 30 | ... | ... | 1820 | First movement to west. |
| | | iPP | 27 40 | ... | ... | ... | |
| | | iS | 30 40 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | M | 33 ... | 23 | 90 | ... | |
| | | F | 18 2 ... | ... | ... | ... | |
| ,, 9 | E | eP | 20 43 ... | ... | ... | 1490 | |
| | | eS | 45 39 | ... | ... | ... | |
| | | L | 46 50 | ... | ... | ... | |
| | | M | 48 ... | 20 | 12 | ... | |
| ,, 10 | E | P | 20 57 28 | ... | ... | 5060 | First movement to west. No time-mark Probable corrections for P, about—40s. |
| | | iS | 21 4 16 | ... | ... | ... | |
| | | iSS | 7 15 | ... | ... | ... | |
| | | iSSS | 8 35 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | Mn | 16 30 | 20 | 221 | ... | |
| | | F | 23 57 ... | ... | ... | ... | |
| ,, 11 | E | eP | 0 16 36 | ... | ... | ... | Long distance earthquake. |
| | | F | 58 ... | ... | ... | ... | |
| ,, 12 | E | iP | 0 45 6 | ... | ... | 7210 | Time given approximate as the time marks are not clear. |
| | | iS | 53 55 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | Mn? | 1 23 45 | 12 | 14 | ... | |
| | | F | 2 32 ... | ... | ... | ... | |
| ,, 13 | E | iP | 13 35 31 | ... | ... | 5235 | Times given are approximate as the time marks are not clear in the sheet. Probable time correction about —1 m. |
| | | iPP | 37 15 | ... | ... | ... | |

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 13 | E | iPPP | 13 37 57 | ... | ... | ... | |
| | | iS | 42 29 | ... | ... | ... | |
| | | L? | ... ... | ... | ... | ... | |
| | | Mn | 56 44 | 24 | 23 | ... | |
| | | F | 14 35 ... | ... | ... | ... | |
| ,, 19 | E | eP | 04 21 00 | ... | ... | 4530 | |
| | | iS | 27 19 | ... | ... | ... | |
| | | iSS | 30 5 | ... | ... | ... | |
| | | iL | 33 23 | ... | ... | ... | |
| | | M | 37 5 | 26 | 226 | ... | |
| | | F | 06 15 ... | ... | ... | ... | |
| ,, 20 | E | iP | 02 28 10 | ... | ... | 5100 | First movement to west. |
| | | iS | 35 00 | ... | ... | ... | |
| | | iSS | 38 00 | ... | ... | ... | |
| | | iSSS | 39 07 | ... | ... | ... | |
| | | M | 43 55 | 37 | 266 | ... | |
| | | F | 05 48 ... | ... | ... | ... | |
| ,, 20 | E | e(P) | 13 22 12 | ... | ... | 4070 | |
| | | iS | 28 04 | ... | ... | ... | |
| | | L | 32 25 | ... | ... | ... | |
| | | Mn | 37 52 | 23 | 12 | ... | |
| | | F | 14 34 ... | ... | ... | ... | |
| ,, 21 | E | iP | 20 27 23 | ... | ... | 1440 | First movement to west. |
| | | iS | 29 57 | ... | ... | ... | |
| | | iSS | 30 22 | ... | ... | ... | |
| | | iL | 30 50 | ... | ... | ... | |
| | | M | 31 52 | 15 | 196 | ... | |
| | | F | 22 18 ... | ... | ... | ... | |
| ,, 21-22 | E | e | 23 54 25 | ... | ... | ... | Tremors. |
| | | F | 01 21 ... | ... | ... | ... | |
| ,, 23 | E | e | 02 32 25 | ... | ... | 4055 | Record lost during the interval before the next sheet was put on. |
| | | iS? | 38 16 | ... | ... | ... | |
| | | iSS? | 41 38 | ... | ... | ... | |
| | | F | 04 08 ... | ... | ... | ... | |
| ,, 23 | E | eP | 15 9 38 | ... | ... | 4800 | |
| | | ePP | 11 0 | ... | ... | ... | |
| | | iPPP | 11 40 | ... | ... | ... | |
| | | iS | 16 12 | ... | ... | ... | |
| | | iSSS | 19 38 | ... | ... | ... | |
| | | iL | 21 58 | ... | ... | ... | |
| | | M | 24 58 | 19 | 21 | ... | |
| | | F | 17 9 ... | ... | ... | ... | |
| ,, 26 | E | e | 3 35 ... | ... | ... | ... | Feeble shock. |
| | | F | 4 28 ... | ... | ... | ... | |
| ,, 26 | E | e | 17 18 ... | ... | ... | ... | Tremors. |
| | | F | 26 ... | ... | ... | ... | |



# KODAIKANAL OBSERVATORY, KODAIKANAL.

## October, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 28 | E | e | 5 17 ... | ... | ... | ... | Tremors. |
| | | F | 42 ... | ... | ... | ... | |
| ,, 29 | E | P | 13 19 0 | ... | ... | 6550 | |
| | | iS | 27 12 | ... | ... | ... | |
| | | eL | 38 37 | ... | ... | ... | |

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Oct. 29 | E | Mn | 13 50 0 | 23 | 12 | ... | |
| | | F | 14 32 ... | ... | ... | ... | |
| ,, 29-30 | E | e | 23 1 ... | ... | ... | ... | Feeble shock. |
| | | F | 0 37 ... | ... | ... | ... | |

## November, 1938.

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 5 | E | iP | 8 53 46 | ... | ... | 6940 | First movement to west. |
| | | iPP | 56 10 | ... | ... | ... | |
| | | iS | 9 2 20 | ... | ... | ... | |
| | | iPS | 2 53 | ... | ... | ... | |
| | | iSS | 7 14 | ... | ... | ... | |
| | | iSSS | 8 36 | ... | ... | ... | |
| | | iL | 13 14 | ... | ... | ... | |
| | | Mn | 25 37 | 18 | 242 | ... | |
| | | F | Merged in the next earthquake. | | | | |
| ,, 5 | E | iP | 11 0 43 | ... | ... | 7455 | First movement to west. |
| | | iPP | 3 17 | ... | ... | ... | |
| | | iPPP | 4 44 | ... | ... | ... | |
| | | iS | 9 43 | ... | ... | ... | |
| | | iPS | 10 9 | ... | ... | ... | |
| | | iSS | 14 13 | ... | ... | ... | |
| | | iSSS | 17 0 | ... | ... | ... | |
| | | iL | 23 0 | ... | ... | ... | |
| | | Mn | 32 44 | 17 | 280 | ... | |
| | | F | 15 10 ... | ... | ... | ... | |
| ,, 6 | E | iP | 9 4 25 | ... | ... | 7050 | First movement to west. |
| | | iS | 13 5 | ... | ... | ... | |
| | | iPS | 13 27 | ... | ... | ... | |
| | | L | ? ... | ... | ... | ... | |
| | | Mn | 42 25 | 15 | 99 | ... | |
| | | F | 13 35 | ... | ... | ... | |
| ,, 6 | E | e | 17 55 ... | ... | ... | ... | Tremors. |
| | | F | 18 48 ... | ... | ... | ... | |
| ,, 6 | E | iP | 21 49 14 | ... | ... | 7160 | First movement to west. |
| | | iPP | 52 35 | ... | ... | ... | |
| | | iS | 58 0 | ... | ... | ... | |
| | | iPS | 58 30 | ... | ... | ... | |
| | | iSS | 22 2 15 | ... | ... | ... | |
| | | iL | 9 0 | ... | ... | ... | |
| | | Mn | 25 30 | 15 | 54 | ... | |
| | | F | Merged in the next earthquake. | | | | |
| ,, 7 | E | iP | 1 49 30? | ... | ... | 6860 | First movement to west. |
| | | iPP | 52 25 | ... | ... | ... | |
| | | iS | 58 0 | ... | ... | ... | |
| | | iPS | 58 33 | ... | ... | ... | |

| Date. | Comp. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. | | | h. m. s. | sec. | μ | Km. | |
| Nov. 7 | E | iSS | 2 2 5 | ... | ... | ... | |
| | | L | ? | ... | ... | ... | |
| | | Mn | 20 31 | 17 | 18 | ... | |
| | | F | 3 49 ... | ... | ... | ... | |
| ,, 7 | E | eP | 4 26 0 | ... | ... | ... | Long distance earthquake. Phases clear. |
| | | F | 5 52 ... | ... | ... | ... | |
| ,, 7 | E | eP | 19 44 5 | ... | ... | ... | Long distance earthquake. Phases clear. |
| | | F | 21 33 ... | ... | ... | ... | |
| ,, 9 | E | eP | 9 26 25 | ... | ... | 7350 | |
| | | iPP | 29 6 | ... | ... | ... | |
| | | iS | 35 20 | ... | ... | ... | |
| | | iPS | 36 0 | ... | ... | ... | |
| | | iSS | 39 45 | ... | ... | ... | |
| | | iL | 47 50 | ... | ... | ... | |
| | | Mn | 59 0 | 12 | 14 | ... | |
| | | F | Not clear. | | | | |
| ,, 10 | E | iP | 20 32 33 | ... | ... | ... | First movement east. |
| | | iPP | 36 14 | ... | ... | ... | |
| | | iL | 21 4 10 | ... | ... | ... | |
| | | M | 11 45 | 20 | ... | >1440 | |
| | | F | ? | | | | |
| ,, 11 | E | e | 9 26 ... | ... | ... | .. | Tremors. |
| | | F | 54 ... | ... | ... | ... | |
| ,, 12 | E | e | 6 18 20 | ... | ... | ... | Tremors. |
| | | F | 50 ... | ... | ... | ... | |
| ,, 12 | E | e | 15 1 32 | ... | ... | ... | Tremors. |
| | | F | 17 27 ... | ... | ... | ... | |
| ,, 13 | E | iP | 5 1 54 | ... | ... | 5735 | First movement to west. |
| | | iPP | 3 46 | ... | ... | ... | |
| | | iS | 8 48 | ... | ... | ... | |
| | | ePS | 9 57 | ... | ... | ... | |
| | | eSS | 12 49 | ... | ... | ... | |
| | | L | 17 49? | ... | ... | ... | |
| | | Mn | 21 5 | 19 | 14 | ... | |
| | | F | 41 ... | ... | ... | ... | |
| ,, 13 | E | eP | 13 24 50 | ... | ... | 7510 | |
| | | iS | 33 52 | .. | .. | ... | |
| | | iPS | 34 23 | ... | ... | ... | |

# KODAIKANAL OBSERVATORY, KODAIKANAL.

## November, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. Nov. 13 | E | L | 13 47 0 | ... | ... | ... | |
| | | Mn | 57 14 | 24 | 14 | ... | |
| | | F | 14 52 ... | ... | ... | ... | |
| „ 13-14 | E | eP | 22 42 2 | ... | ... | 7420 | |
| | | eS | 51 0 | .. | ... | ... | |
| | | ePS | 51 37 | ... | ... | ... | |
| | | iSS | 55 39 | ... | ... | ... | |
| | | iSSS | 58 0 | ... | ... | ... | |
| | | L | 23 3 0 | ... | ... | ... | |
| | | Mn | 19 32 | 15 | 17 | ... | |
| | | F | 1 58 ... | ... | ... | ... | |
| „ 14 | E | | Lines overlapping. | | | | |
| „ 15 | E | iP | 21 6 52 | ... | .. | 2790 | First movement to west. Probable time correction = —1 m. |
| „ 15 | E | iPP | 21 7 22 | ... | ... | ... | |
| | | iS | 11 20 | .. | .. | .. | |
| | | iSS | 12 40 | ... | ... | ... | |
| | | iL | 14 0 | ... | ... | ... | |
| | | Mn | 15 30 | 19 | 211 | ... | |
| | | F | 23 45 ... | ... | .. | ... | |
| „ 16 | E | e | 6 27 .. | ... | ... | ... | Tremors. |
| | | F | 7 4 ... | ... | ... | ... | |
| „ 16 | E | eP | 11 18 44 | ... | ... | 6885 | Feeble Shock. |
| | | eS | 27 15 | ... | ... | ... | |
| | | eL | 38 45 | ... | ... | ... | |
| | | Mn | 50 20 | 15 | 3 | ... | |
| | | e | 12 36 ... | ... | ... | ... | |
| „ 17 | E | eP | 4 8 25 | ... | ... | 11400 | |
| | | iPP | 12 31 | ... | ... | ... | |
| | | iSKS | 18 58 | ... | ... | ... | |
| | | iSKKS | 19 31 | ... | ... | ... | |
| | | iS | 20 6 | ... | ... | ... | |
| | | iPPS | 21 42 | ... | ... | ... | |
| | | iSS | 26 47 | ... | ... | ... | |
| | | iSSS | 30 55 | ... | ... | ... | |
| | | iL | 42 46 | ... | ... | ... | |
| | | Mn | 55 25 | 30 | 397 | ... | |
| | | F | 7 46 ... | ... | ... | ... | |
| „ 17 | E | e | 20 25 ... | ... | ... | ... | Tremors. |
| | | F | 52 .. | ... | ... | ... | |
| „ 17 | E | e | 21 53 ... | ... | ... | ... | Tremors. |
| | | F | 22 19 ... | ... | ... | ... | |
| „ 18 | E | eP | 14 28 30 | ... | ... | 4955 | Feeble shock. |
| | | iS | 35 12 | ... | ... | ... | |
| | | iSS | 37 53 | ... | ... | ... | |
| | | L | 42 10 | ... | ... | ... | |
| | | M | ? | ... | ... | ... | |
| | | F | 16 9 .. | ... | ... | ... | |
| 1938. Nov. 18 | E | e | 18 51 ... | ... | ... | ... | Tremors. |
| | | F | 19 56 .. | ... | ... | ... | |
| „ 19 | E | e | 0 11 .. | ... | ... | ... | Tremors. |
| | | F | 45 ... | ... | ... | ... | |
| „ 19 | E | e | 5 5 1 .. | ... | ... | ... | Feeble shoc . |
| | | F | 7 35 .. | ... | ... | ... | |
| „ 20 | E | e | 17 37 ... | .. | .. | ... | Tremors. |
| | | F | 18 53 .. | ... | ... | ... | |
| „ 21 | E | iP | 1 17 00 | ... | ... | 2955 | First movement to east. Lines overlapping. |
| | | iS | 21 40 | ... | ... | ... | |
| | | iSS | 22 45 | ... | ... | ... | |
| | | iL | 23 55 | ... | ... | ... | |
| | | M | 27 0 | 9 | 22 5 | ... | |
| | | F | 2 36 ... | ... | ... | ... | |
| „ 21 | E | e | 5 5 ... | ... | ... | ... | Tremors |
| | | F | 6 2 ... | ... | ... | ... | |
| „ 22 | E | iP | 1 24 35 | .. | ... | 7050 | First movement to ast. Lines overlapping. |
| | | iS | 33 15 | ... | ... | ... | |
| | | iPS | 33 39 | ... | ... | ... | |
| | | iSS | 37 33 | ... | ... | ... | |
| | | iSSS | 39 45 | ... | ... | ... | |
| | | iL | 44 41 | ... | ... | ... | |
| | | Mn | 2 0 35 | 15 | 14 | ... | |
| | | F | 5 56 ... | ... | ... | ... | |
| „ 25 | E | e | 8 39 .. | ... | ... | ... | Tremors. |
| | | F | 9 17 ... | ... | ... | ... | |
| „ 25 | E | e | 22 12 .. | ... | ... | ... | Tremors. |
| | | F | 49 ... | ... | ... | ... | |
| „ 27 | E | e | 22 22 .. | .. | ... | ... | Tremors. |
| | | F | 23 8 ... | ... | ... | ... | |
| „ 29 | E | P | 13 50 2 | ... | ... | 7065 | |
| | | iS | 58 43 | ... | ... | ... | |
| | | PS | 59 4 | ... | ... | ... | |
| | | L | 14 10 21 | ... | ... | ... | |
| | | Mn | 24 45 | 15 | 6 | ... | |
| | | F | 15 42 ... | ... | ... | ... | |
| „ 30 | E | P | ? | | | 9100 | Beginning of the record lost in the interval before the sheet was put on. |
| | | iS | 2 48 53 | .. | ... | ... | |
| | | iPS | 49 36 | ... | ... | ... | |
| | | iSS | 57 50 | ... | ... | ... | |
| | | iL | 3 5 31 | ... | ... | ... | |
| | | M | 12 3 | 20 | 32 | ... | |
| | | F | 6 13 ... | ... | ... | ... | |
| „ 30 | E | e | 15 35 .. | .. | .. | ... | Tremors |
| | | F | 16 16 ... | ... | ... | ... | |





KODAIKANAL OBSERVATORY, KODAIKANAL.

## December, 1938.

| Date. | Compt. | Phase. | G. M. T. | Per. | Amp. | △ | Remarks. |
|---|---|---|---|---|---|---|---|
| 1938. Dec. 1 | E | e | 2 23 ... | ... | ... | ... | Feeble shock. |
| | | F | 5 20 ... | ... | ... | ... | |
| „ 1 | E | iP | 18 18 18 | ... | ... | 1910 | Slight, first movement to east. |
| | | iS | 21 28 | ... | ... | ... | |
| | | L | 22 50 | ... | ... | ... | |
| | | M | ? | | | | |
| | | F | 44 ... | ... | ... | ... | |
| „ 2 | E | eP(?) | 22 19 20 | ... | ... | 3535 | |
| | | iS | 24 38 | ... | ... | ... | |
| | | iL | 28 21 | ... | ... | ... | |
| | | Mn | 30 32 | 19 | 23 | ... | |
| | | F | 23 31 ... | .. | ... | .. | |
| „ 3 | E | iP | 12 22 12 | ... | .. | ... | First movement to west. |
| | | PP | 24 58 | ... | ... | ... | |
| | | S? | 31 0 | ... | ... | ... | |
| | | iPS | 32 6 | ... | ... | ... | |
| | | L | 45 45 | ... | ... | ... | |
| | | M | 51 40 | 22 | 10 | ... | |
| | | F | 13 59 ... | ... | ... | ... | |
| „ 4 | E | e | 16 36 10 | ... | ... | ... | Distant earthquake. |
| | | i | 46 42 | ... | ... | ... | |
| | | i | 54 44 | ... | ... | ... | |
| | | F | 18 3 .. | ... | ... | ... | |
| „ 5 | E | e | 0 43 0 | ... | ... | ... | Slight. |
| | | i | 46 20 | ... | ... | ... | |
| | | iSS | 46 58 | .. | ... | ... | |
| | | L | ? | ... | ... | ... | |
| | | Mn | ? | ... | ... | ... | |
| | | F | 1 9 ... | ... | ... | ... | |
| „ 6-7 | E | iP | 23 8 58 | ... | ... | 4885 | First movement to west. |
| | | iS | 15 38 | ... | ... | ... | |
| | | iSSS | 19 18 | | ... | ... | |
| | | iL | 22 20 | ... | ... | ... | |
| | | Mn | 31 0 | 17 | 27 | ... | |
| | | F | 1 4 ... | ... | ... | ... | |
| „ 7 | E | e | 13 15 ... | ... | ... | ... | Tremors. |
| | | i | 23 34 | ... | ... | ... | |
| | | F | 35 ... | ... | ... | ... | |
| „ 7 | E | iP | 13 35 52 | ... | ... | 8515 | First movement to west. |
| | | iPP | 38 52 | ... | ... | ... | |
| | | iS | 45 42 | ... | ... | ... | |
| | | iPS | 46 26 | ... | ... | ... | |
| | | iSS | 51 0 | ... | ... | ... | |
| | | L | ? | ... | ... | ... | |
| | | Mn | 14 5 20 | 27 | 24 | ... | |
| | | F | 16 28 | ... | ... | ... | |
| 1938. Dec. 9 | E | e | 4 19 1 | ... | ... | ... | Distant earthquake. |
| | | i | 45 1 | ... | ... | ... | |
| | | i | 50 16 | ... | ... | ... | |
| | | Mn | 58 21 | 20 | 17 | ... | |
| | | F | 5 39 ... | ... | ... | ... | |
| „ 13 | E | e | 17 37 19 | ... | ... | ... | Tremors. |
| | | F | 18 36 ... | ... | ... | ... | |
| „ 16 | E | eP | 17 34 50 | ... | ... | ... | Distant earthquake. |
| | | iPP | 38 58 | ... | ... | ... | |
| | | iSKS | 45 26 | ... | ... | ... | |
| | | iSKKS | 46 0 | ... | ... | ... | |
| | | e | 46 12 | ... | ... | ... | |
| | | PS | 47 -6 | ... | ... | ... | |
| | | PPS | 48 11 | ... | ... | ... | |
| | | iSS | 52 04 | ... | ... | ... | |
| | | iSSS | 56 23 | ... | ... | ... | |
| | | iLR | 18 6 15 | ... | ... | ... | |
| | | M | 8 30 | 24 | 50 | ... | |
| | | F | 20 37 ... | ... | ... | ... | |
| „ 16-17 | E | e | 23 28 18 | ... | ... | ... | Distant earthquake. Phases not clear. |
| | | F | 1 51 ... | ... | ... | ... | |
| „ 17 | E | iS | 16 48 50 | ... | ... | ... | |
| | | i | 50 56 | ... | ... | ... | |
| | | i | 56 34 | ... | ... | ... | |
| | | i | 57 8 | ... | ... | ... | |
| | | i | 59 56 | ... | ... | ... | |
| | | i | 17 1 12 | ... | ... | ... | |
| | | F | 18 2 ... | ... | ... | ... | |
| „ 18 | | e | 22 23 ... | ... | ... | ... | Tremors. |
| | | F | 40 ... | ... | ... | ... | |
| „ 19 | E | e | 18 34 50 | ... | ... | ... | Distant earthquake. |
| | | i | 19 41 ... | ... | ... | ... | |
| „ 21 | E | iP | 12 35 3 | ... | ... | ... | First movement to west. |
| | | iS | 41 45 | ... | ... | ... | |
| | | L | 48 52 | ... | ... | ... | |
| | | Mn | 53 5 | 22 | 14 | ... | |
| | | F | 13 45 ... | ... | ... | ... | |
| „ 22 | E | eP | 17 5 10 | ... | ... | ... | Time marks not clear. Distant earthquake. |
| | | i | 11 45 | ... | ... | ... | |
| | | F | 50 ... | ... | ... | ... | |
| „ 23 | E | e | 19 9 ... | ... | ... | ... | Time marks not clear. |
| | | F | 27 ... | ... | ... | ... | |
| „ 29 | E | e | 16 48 ... | ... | ... | ... | Tremors. |
| | | F | 57 ... | ... | ... | ... | |
| „ 30 | | e | 3 11 ... | ... | ... | ... | Tremors. |
| | | F | 39 ... | ... | ... | ... | |

SOLAR PHYSICS OBSERVATORY,
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The following table contains a list of earthquakes that were reported by voluntary observers from various stations.

| Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. | Place at which felt. | Date. | G. M. T. of earthquake. | Duration. | Intensity (Rossi-Forel scale). | Number of shocks. | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1938. | h. m. | Sec. | | | | | 1938. | h. m. | Sec. | | | |
| Kabul . . . | Oct. 9 | 00 15 | 2-3 | 5 | 1 | | Dibrugarh Town . | Nov. 21 | 01 14 | 1 | 6 | 2 | |
| Digboi . . . | „ 28 | 05 08 | 5-7 | 5 | 1 | | Kalat . . . | „ 28 | 22 00 | 7 | 6 | 1 | |
| Drosh . . . | „ 31 | 05 25 | 4 | 4 | 2 | | Dera Ismail-Khan . | Dec. 12 | 19 00 | 1/8 | 4 | 1 | |
| Drosh . . . | Nov. 1 | 00 45 | 4 | 4 | 1 | | Sudder (Cooch Behar) . | „ 20 | 21 15 | 3 | 5 | 1 | |
| Gauhati . . . | „ 1 | 15 50 | 20 | 6 | 1 | | | | | | | | |

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