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MADE AT THE

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BOMBAY AND ALIBAG

IN THE YEAR

1936

UNDER THE DIRECTION OF

S. C. ROY, M.Sc., D.Sc. (Lond.)

AND

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TABLE OF CONTENTS.

		Page
1.	Dr. N. A. F. Moos, Obituary notice	v
2.	Introduction	ix
	Meteorological instruments at Colaba	ix
	System of observation at Colaba	xi
	Magnetic instruments at Alibag	xii
	System of observation at Alibag	xiv
	General Review	xiv
	Magnetic Storms	xvi
	Absolute observations and base-line values	xvi
	Seismographs	xviii
	Atmospheric Electricity	xix
3.	Barometric pressure—	
	January	A-2
	February	A-2
	March	A-4
	April	A-4
	May	A-6
	June	A-6
	July	A-8
	August	A-8
	September	A-10
	October	A-10
	November	A-12
	December	A-12
4.	Rainfall—	
	May	A-14
	June	A-14
	July	A-16
	August	A-16
	September	A-18
	November	A-18
5.	Wind velocity—	
	January	A-20
	February	A-20
	March	A-22
	April	A-22
	May	A-24
	June	A-24
	July	A-26
	August	A-26
	September	A-28
	October	A-28
	November	A-30
	December	A-30
6.	Direction of wind—	
	January	A-32
	February	A-32
	March	A-34
	April	A-34
	May	A-36
	June	A-36
	July	A-38
	August	A-38
	September	A-40
	October	A-40
	November	A-42
	December	A-42

7. Air temperature— Page

January A-44
February A-44
March A-46
April A-46
May A-48
June A-48
July A-50
August A-50
September A-52
October A-52
November A-54
December A-54

8 Relative humidity—

January A-56
February A-56
March A-58
April A-58
May A-60
June A-60
July A-62
August A-62
September A-64
October A-64
November A-66
December A-66

9. Diary of cloud, visibility and weather A-68

10. Duration of Bright Sunshine A-76

11. Diurnal variation of magnetic elements B-1

12. Declination—

January B-6
February B-6
March B-8
April B-8
May B-10
June B-10
July B-12
August B-12
September B-14
October B-14
November B-16
December B-16

13. Horizontal force—

January B-18
February B-18
March B-20
April B-20
May B-22
June B-22
July B-24
August B-24
September B-26
October B-26
November B-28
December B-28

PAGE.

14. Vertical force—
January .. B-32
February .. B-32
March .. B-32
April .. B-32
May .. B-34
June .. B-34
July .. B-36
August .. B-36
September .. B-38
October .. B-38
November .. B-40
December .. B-40

15. Magnetic disturbances .. B-42

16. Fourier analysis of the diurnal and annual variations of the horizontal force .. B-43

17. Potential gradient .. C-1

18. Seismic disturbances .. D-1

19 Alibag Observatory Magnetograms .. *Plates I to V*

INTRODUCTION.

This volume on the magnetic, meteorological, seismographic and atmospheric electric observations made at the Government Observatories, Bombay and Alibag, during the year 1936, is the fifty-eighth volume of its kind issued by the Observatory and extends the records of continuous meteorological and magnetic observations to a period of ninety-one years, of seismographic observations to a period of thirty-eight years, and of atmospheric potential gradient observations to a pericd of six years. It has been prepared in the same form as the volume for the year 1935. The hourly values of all the important meteorological and magnetic elements have been given and these represent their average values over one hour and not their momentary values at the end of each hour. Columns have been added giving the daily means and the monthly mean hourly values of barometric pressure in millibars and of air temperature in degrees Centigrade. The mean values of potential gradient for the four hourly intervals, 2-3, 8-9, 14-15, and 20-21 hours I. S. T. have also been given.

The transfer of magnetic work from Colaba to Alibag in 1904, due to the decision of the city of Bombay to introduce electric tram service, caused a certain amount of discontinuity in the magnetic records, which had then run uninterruptedly at Colaba for about sixty years, but as comparative observations could be taken at both the stations for a period of two years before the electric tram lines were completed and the service commenced its operations, the 'discontinuity' could be calculated and allowed for. The comparative observations showed that at Alibag, the horizontal component of magnetic force was lower by 0·00510 C. G. S. unit of force, easterly declination higher by 53′·5 and inclination higher by 1° 4′·7 than at Colaba, and these have been adopted differences between the values at the two sites. The figures published in this volume, like those in the previous volumes since 1906, have *not* been corrected for these differences.

A Milne-Shaw seismograph to record movements in N-S direction was installed in the underground constant temperature room in 1923 and another instrument to record E-W-movements in 1930.

The Colaba Observatory is situated almost at the extreme south end of the narrow ridge of land extending about three miles to the south-west of the Fort of Bombay and separating the Harbour from the Back Bay. The mean level of the Observatory compound is about 32 feet above the mean level of the sea. The regular registration of meteorological observations in the Colaba Observatory commenced in November 1841.

The astronomical co-ordinates* giving the position of the Colaba Observatory are :—

Latitude	18° 53′ 36·18″ N.
Longitude	72° 48′ 54·03″ E.

The Alibag Magnetic Observatory is situated on the main land about 18 miles south-south-east of Bombay, and its astronomical co-ordinates are—

Latitude	18° 38′ 17″ N.
Longitude	72° 52′ 21″ E.

For a general description of the buildings and instruments in both the Observatories, see "Magnetical, Meteorological and Seismographic Observations made at the Government Observatories, Bombay and Alibag, 1906—1910," and also the similar volume for 1916—20.

Unless otherwise stated, all times given in this volume refer to local mean time.

Meteorological instruments at Colaba.

1. *Standard Barometer.*—The barometer by Newman (No. 58) which has been in un-interrupted use since the establishment of the Observatory remains the standard barometer of the observatory. It reads on an average 0·004″ below the Kew Standard and 0·012″ below the old Calcutta standard barometer. The height of the barometer is 37 feet above the mean sea-level. A subsidiary standard barometer, Newman No. 48, has also been maintained in the underground constant temperature room, and its reading exceeded that of the standard barometer by 0·001″ on the average during the year. Since the 1st of January 1936, regular observations of the Newman barometer (No. 58) were discontinued and barometer No. 2880 of Fortin type by Calderara brought into use for daily observations.

2. *Barograph.*—The instrument is of the Kew pattern and was installed in the underground constant temperature room in 1872. The level of the mercury is recorded photographically. The barograph has been treated, as in the past, as an independent instrument in respect of the variations of pressure occurring in the course of a day. A comparative study of the differences between the readings of the barograph and of the standard

*Magnetic, Meteorological and Seismographic observations made at the Government Observatories, Bombay and Alibag, 1922, p. I.

barometer for a large number of years indicates that these differences remain fairly constant and do not show variations at different hours of the day. The mean of the excesses of the eye observations of the barometer made at 8 hrs. (B. M. T.) and 17 hrs. (I. S. T.) on seven consecutive days over the corresponding barograph tabulations has been applied as a common correction to all the tabulated hourly readings of the day which is the fourth of the seven.

3. *Standard Dry bulb and Wet bulb Thermometers.*—On the 26th November 1917, the freezing points were tested and the zero of the dry bulb standard thermometer No. 401 was found to have changed from 32°·6F. to 33°·0F and that of wet bulb standard thermometer No. 402 from 32°·5 F to 33°·0F. These thermometers were again tested on the 3rd February 1926 and their corrections were found to be the same as those determined in 1917. Besides the above, there are eye reading dry bulb, wet bulb, maximum and minimum thermometers installed in a standard Stevenson Screen. The heights of the bulbs of the thermometers above the ground in the two sheds are given below :—

Thermograph Shed : Dry bulb 10′ ; Wet bulb 10′.

Stevenson Screen : ,, ,, 4′ 4½″ ; ,, ,, 4′ 4″ ; Max. 4′ 11½″ ; Min. 4′ 4″.

For the results of comparative observations of these thermometers see p. 2 of the volume for the year 1924.

4. *Kew Dry bulb and Wet bulb Thermograph.*—The bulbs of these thermograph thermometers are placed close to those of the standard dry and wet bulb thermometers in a large double-louvre shed constructed in 1872, and the temperatures are recorded photographically. The tables of air temperature have been obtained from the records of dry bulb thermograms and of humidity from those of the dry and wet bulb thermograms. The mean differences between the readings of the standard dry and wet bulb thermometers described in the preceding para. and the corresponding readings of the thermograms for the year 1936 were +0·2° and +0·1° respectively and were neglected.

5. *Robinson-Beckley's Anemograph.*—This anemograph is of the kind designed by Robinson, with improvements by Robert Beckley and has been in uninterrupted use in the Observatory since 1867, except that a new instrument of the same pattern and by the same makers was installed in 1907 to replace the old one. It is erected on the Anemometer Tower with its cups at a height of 58 feet above the ground and 100 feet above the mean sea-level. The centres of each pair of opposite hemi-spherical cups are four feet apart, and the diameter of each of the cups is 9 inches. The diameter of the vanes of the direction recorder is 15 inches and the breadth of the fans 4 inches.

6. *Dines' Anemograph, 1924 (velocity and direction).*—The old Dines' anemograph which was in continuous operation from 1896 and was provided with velocity recorder only was stopped in December 1929. A new Dines' anemograph with both velocity and direction recorders by R. W. Munro and Co. was received in 1923 and installed on the Anemometer Tower in January 1924. With a view to improve the exposure, its T-shaped head-vane was placed on the top of a telegraph post, 32·5 feet high, fixed on the Tower at a distance of 3 feet from the cups of the Robinson-Beckley's cups and 127 feet above the mean sea-level. The diameter of the post near the Beckley's Anemograph is 8 inches and does not exercise appreciable influence on the records of Robinson-Beckley. The results of a series of comparisons of this instrument with a U-tube pressure-gauge showed that W, the difference in level of water in inches in the two arms of the U-tube, which is a measure of the pressure exerted by the wind, and V, the velocity of the wind in miles per hour as indicated in the charts, practically obey the standard rule, $W = \cdot 00073\ V^2$.

The height of the vane of this anemometer is 27 feet above that of the Beckley's cups. On account of the greater height, this instrument records a larger speed of wind. The ratio of the mean wind velocities recorded by the new Dines' anemograph to those recorded by the Beckley's anemograph during 1924–36 is given below for the different months, seasons and the year :—

Ratio of Wind Velocities.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Means.			
													October to February.	March to May.	June to September.	Year.
New Dines to Rob. Beckley (1924-36.)	1·40	1·39	1·33	1·33	1·36	1·46	1·67	1·65	1·52	1·42	1·43	1·39	1·41	1·34	1·58	1·45

The hourly values of wind velocity and wind direction tabulated in this volume represent the averages from the Dines' records for periods of sixty minutes, from full hour to full hour of local mean time. The daily mean directions have been derived by converting the hourly velocity into N or S and E or W components and combining the mean components.

7. *Rain-gauge.*—Newman's rain-gauge, which has been in use since 1845, exposes for the collection of rain-drops at a height of four feet above the ground a circular surface of an average diameter of 12·035 inches, forming the top of the funnel, which opens into a cylindrical vessel below, having a diameter of 5·732 inches. Each division of the graduated rod resting on the float represents ·05 inch of rain and the readings of this scale are easily estimated to one-fifth of a division.

8. *Photographic Rain-gauge.*—This instrument takes a continuous record of rainfall by photographing the head of a mercury column balancing the rainfall collected in a glass vessel, with an arrangement for syphon discharge when full. A full description of this instrument will be found in the introduction to the " Bombay Magnetical and Meteorological Observations, 1877 to 1878 ", page xlvi. For methods of reduction of pluviograph records, reference is made to the introduction to the " Bombay Magnetical, Meteorological and Seismographic Observations, 1916—20 ". The height of the receiving funnel of this instrument is 28 feet above the ground. The pluviograph gave slightly higher value for rainfall than the Newman gauge.

For comparative study a syphon rain-gauge by L. Casella, London, was installed in the enclosure of the standard Newman rain-gauge on the 12th June 1930, so that the receiving funnels of both were at the same height. It was removed to a separate enclosure on the 28th April 1931 and its receiving funnel was kept at the standard height of 30 inches above the ground surface.

System of observation at Colaba.

From the beginning of 1929, eye observations of the barometer and thermometers at 10 hrs. and 16 hrs. were stopped but continued to be taken at 8 hrs. An afternoon observation at 17 hrs., Indian Standard Time, was however introduced from the 15th November 1929.

The eye observations at 8 hrs. (local time) and 17 hrs. (Indian Standard Time) were taken in the following order :—

From 5 minutes before the hour to 2 minutes after the hour.	Kind and amount of cloud, state of weather, direction of wind and any noteworthy weather phenomena.
At 2 minutes after the hour	Thermograph standard thermometer, dry-bulb. Thermograph standard thermometer, wet-bulb.
At 3 ,, ,, ,,	Newman's rain-gauge.
From 7 to 9 ,, ,,	Fortin barometer Calderara No. 2880 and attached thermometer. Newman's standard barometer No. 48 and attached thermometer (read at 8 hrs. only).
At 10 ,, ,, ,,	Thermometer attached to barograph (read at 8 hrs. only).

Observations of the kind and amount of cloud, state of weather, special phenomena and rainfall (in wet season) were also taken at 6, 10 and 22 hrs. Observations with nephoscope were taken at $8\frac{1}{2}$, $12\frac{1}{2}$ and $16\frac{1}{2}$ hrs. every day. The maximum and minimum thermometers in the Stevenson Screen were read daily at 8 hrs. only.

During the monsoon months, Newman's rain-gauge was read daily at midnight in addition to the usual observations and the discharges of the syphon of the self-registering pluviograph were also read as often as required.

A Campbell-Stokes Sunshine recorder was installed on the balloon observation tower and was brought into regular use from August 1925. The sun-shine data given in the volume refer to *local apparent time.*

Observations of magnetic declination were made once every month at Colaba about the middle of each month. The mean of the differences between the absolute values of declination at Colaba and Alibag, observed during 1936 was 50′·0 as against 53′·5 obtained from the comparative observations taken at the two stations in the years 1904 and 1905.

Time-supply service.

The electric clock at the Colaba Observatory controlling the drop of the time ball was regulated once every day by comparison with the standard sidereal clocks, two Riefflers and one Kullberg. Government chronometers belonging to the Royal Indian Navy, were wound daily or twice a week as required and comparisons with the standard clock were made with sufficient frequency to render the instruments always ready for use at call with well-determined rates.

Magnetic Instruments at Alibag.

Variation Instruments.

The horizontal force, vertical force and declination magnetographs in use at Alibag are all by Watson and are mounted on isolated pillars in the magnetograph room. They were maintained in continuous action throughout the year. As explained on pages 1-2 of the Observatory volume for 1927, the sensitiveness of the vertical force magnetograph was increased eight-fold on the 7th August 1927 by introducing certain alterations in the mechanism for adjusting the position of the centre of gravity of the 'balance'. The V. F. instrument showed frequent changes of zero and it became necessary to adjust it once in the beginning of October and again towards the end of the same month. After the re-adjustment, the sensitiveness was reduced to two-thirds of its former value.

A declination magnetograph with high optical magnification (1 cm.=3·43 minutes of arc) was constructed locally and installed in 1931 in the ground floor room of the magnetometer building. It was in continuous action throughout the year. The records furnished by this instrument are identical with those obtained with the Watson declination magnetograph except that the variations are shown in a more conspicuous manner.

The highest maximum and lowest minimum temperatures in each month in the magnetograph room during 1936 are shown below in degrees Fahrenheit.

1936.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Year.
	°	°	°	°	°	°	°	°	°	°	°	°	°
Maximum .	84·8	83·0	85·6	87·8	90·2	90·3	87·8	86·7	87·7	88·8	88·7	87·8	90·3
Minimum .	81·9	82·0	83·0	85·5	87·9	87·8	86·6	85·9	85·7	88·0	88·2	84·2	81·9

A Kew Horizontal Force Magnetometer, a Kew Vertical Force Magnetometer and a Declination Magnetometer are installed in the ground-floor room of the magnetometer building as auxiliary eye-reading instruments. The eye observations were regularly plotted and were used mainly for a comparative study of the performance of the different instruments. The hourly tabulations from the magnetograms represent the average values during one hour, centred at the full hours of Greenwich Mean Time.

The scale coefficients of the force magnetographs were obtained every fortnight from deflection observations performed on the instruments with deflectors, at distances of 100 cm. and 120 cm. in the case of H and at distances of 124·05 cm.* and 148·6 cm.* in the case of V magnetograph. The usual distribution coefficient $(1 + \frac{P}{r^2})$ was introduced in the formula for the computation of scale coefficients. It was found that the mean values of the factor in the case of H. magnetograph were for both the distances equal to unity and in the case of V. magnetograph 1·09 and 1·06 for the shorter and the longer distances respectively. The value of the scale coefficient adopted for any month is the average of the mean observed value for that month and those for the preceding and succeeding months.

*After the adjustment to the V. F. magnetograph on the26th Oc tober 1936 these distances were changed to 126·75 cms and 151·3 cms. respectively.

The following table gives the scale coefficients of the force magnetographs, that is the values in γ, corresponding to 1 cm. ordinate on the photographic paper, where as usual γ =0·00001 C. G. S. unit of force.

Instrument.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ	γ
H. F. Magnetograph	44·4	44·6	44·6	44·6	44·4	44·5	44·5	44·7	44·8	44·9	44·9	44·9
V. F. Magnetograph	13·4	13·3	13·5	13·6	13·9	13·6	13·5	13·3	13·3	19·4*	19·7	19·7

The scale coefficient of the Watson declination magnetograph for 1 cm. of ordinate is 10′·28.

The temperature coefficient of the horizontal force magnetograph was determined by Dr. Moos by heating experiments and its adopted value is 3·0γ/°F. The temperature coefficient of the vertical force magnetograph was found by similar experiments to be negligible as no appreciable change in force, after allowing for the actual diurnal change, could be definitely ascertained as being due to temperature effect. The above conclusions were checked by Dr. Banerji by an analysis of the observed monthly values of base lines† by means of the formula $B_t = B_m + \alpha (t - m)$, where B_t is the monthly mean value of the base line, uncorrected for temperature but corrected for the slow secular change caused by the loss of magnetic moment and other causes, 't' the mean temperature during the month, B_m the annual mean of the observed values of the base line, m the annual mean temperature of the magnetograph room, and α the temperature coefficient. Several years' data have been analysed in this manner. The mean value of α for H. F. based on the data for the years 1922-31 is 5·3γ/°F. The adopted value is thus seen to be considerably smaller than that obtained by this method. For V. F. the value of α appears to be negligible.

Absolute Instruments.

Two magnetometers have been in regular use during the period for determining the absolute values of horizontal force and declination. Magnetometer No. 7 by Messrs. T. Cooke and Sons, which is the standard instrument at Alibag, is of the ordinary Kew pattern but is modified and improved in several details. The other instrument is Magnetometer No. 137 by Dover Charlton and is of the usual Kew pattern. Instrument No. 7 is observed on the second floor of the magnetometer building, while instrument No. 137 with its own magnets is observed on the first floor. A pair of new magnets for No. 7 with their constants determined at the Greenwich Magnetic Observatory (Abinger) was received from Messrs. Cooke, Troughton and Sims in 1929 and observations of Horizontal Force and Declination were taken once every four weeks with these magnets and magnetometer No. 7 on the second floor throughout the year for comparative purposes. The results show close agreement with those obtained with the old magnets No. 7.

The value of the correction, $\text{Log}_{10}(1+\frac{P}{r^3}+\frac{Q}{r^4})^{-1}$ used in the reduction of the horizontal force observations was obtained for a given month by taking the mean for seven months including the given month as fourth of the seven. The values of this correction for the different months of the year for the standard instrument at the deflection distance 22·5 cm. were as follows:—

January	.. 9·99304	May	.. 9·99297	September	.. 9·99278
February	.. 9·99307	June	.. 9·99295	October	.. 9·99278
March	.. 9·99302	July	.. 9·99293	November	.. 9·99279
April	.. 9·99299	August	.. 9·99288	December	.. 9·99281

Earth Inductor No. 41 by Schulze of Potsdam and galvanometer No. 200 by Plath are installed on specially constructed pillars in the second floor, while Inductor No. 108 by Otto Toepfer and its galvanometer are installed in the first floor of the magnetometer building. Both these instruments were in regular use.

*V. F. Magnetograph was adjusted on the 4th and the 26th October.

†Memoirs of the India Meteorological Department, Vol. XXV, Part VII.

System of observation at Alibag.

Eye observations of the instruments mentioned below were taken daily, Sundays included, shortly before 6, 10, 14, 16 and 22 hrs. (Local Time) at the instants specified against them. These instants have been chosen so that they may approach as nearly as possible to the full hour of Greenwich Mean Time, which corresponds to 51 mins. of local time.

At 19 minutes to the hour	.	Kew Horizontal Force Magnetometer and attached thermometer.
„ 17 „ „ „	.	Kew Vertical Force Magnetometer and attached thermometer.
„ 15 „ „ „	.	Declination Magnetometer.
„ 10 „ „ „	.	Watson's Vertical Force Magnetograph and attached thermometer.
„ 8 „ „ „	.	Watson's Horizontal Force Magnetograph and attached thermometer.
„ 6 „ „ „	.	Thermograph and the standard thermometer in the Magnetograph room (read twice daily at 6 and 16 hrs. only).

Observations of absolute horizontal force were made with the Observatory standard instrument No. 7 and magnets No. 7 (old) on Wednesdays. Observations of absolute horizontal force were also taken with—

(1) magnetometer No. 137 and magnets No. 137 on Mondays once every four weeks,
(2) the standard magnetometer No. 7 and magnets No. 7 (new) on Fridays once in four weeks.

Observations of absolute declination were made with the standard magnetometer No. 7 and magnet No. 7 (old) on Thursdays. Observations of declination were also taken for comparative study with—

(1) magnetometer No. 137 and magnets No. 137 on Thursday once in eight weeks,
(2) standard magnetometer No. 7 and magnet No. 7 (new) on Thursday once in four weeks.

Observations of inclination were made with the Schulze's Inductor, which is the Observatory standard instrument, and another inductor by Otto Toepfer every day in the year with the exception of Sundays and holidays. Each of the two inductor instruments was ordinarily observed on alternate days, but for check both the instruments were observed on the same day one after the other on Saturdays.

Transit observations of stars for the determination of time were made generally on Tuesdays and Fridays in the dry months; during the monsoon months no opportunity was lost of observing the sun or stars whenever visible. The adjustment of the transit instrument was frequently tested by reference to the fixed collimator mark and by level observations; the errors of collimation, level and azimuth were determined once every month except during the monsoon months. A complete set of observations of all the meteorological elements was taken at Alibag at 8 hrs. (local time) throughout the year.

General Review.

1. *Weather.*—The southwest monsoon rains commenced at Bombay on the 4th June and practically ended on the 13th September. The total rainfall recorded during the year amounted to 58·43″ and was 12·11 below the normal of 72 years. The mean temperature of the year was 80°·0 which was 0°·7 above the normal. The greatest maximum temperature recorded was 96°·3 on the 12th March and the lowest minimum was 62°·2 on the 8th January. The mean temperature of all the months in the year was within 1° of the normal of the season. The mean velocity of wind during the year was 8°·1 miles per hour. The greatest daily mean velocity was 20·4 miles per hour on the 26th June and the lowest was 3·0 miles per hour on the 20th November. The greatest mean hourly velocity and the maximum velocity of a single gust of wind as recorded by the New Dines' anemometer reached 30 miles and 61 miles per hour respectively on the 26th June.

2. *Magnetic conditions.*—The mean and the extreme values of the magnetic elements at Alibag during 1936 are given below along with the corresponding values for the previous fifteen years :—

Year.	H						D						V						I
	Mean.	Maximum.		Minimum.		Absolute annual range.	Mean.	Maximum.		Minimum.		Absolute annual range.	Mean.	Maximum.		Minimum.		Absolute annual range.	Mean
		Value.	Date.	Value.	Date.			Value.	Date.	Value.	Date.			Value.	Date.	Value.	Date.		
	γ	γ		γ		γ	′	′		′		′	γ	γ		γ		γ	° ′
1921	36935	37069	13th May.	36381	15th May.	688	15·9 E.	41·9 E.	15th May.	9·5 E.	7th July.	32·4	17227	17320	15th May.	17144	20th Jan.	176	25 0·3
1922	36946	37037	10th Mar.	36777	14th Sept.	260	12·6 E.	18·0 E.	16th Feb.	6·6 E.	31st Aug.	11·4	17293	17351	12th Aug.	17222	5th Apr.	129	25 5·0
1923	36985	37071	27th Nov.	36854	24th Mar.	217	8·9 E.	13·6 E.	26th Jan.	3·6 E.	24th Sept.	10·0	17372	17432	3rd July.	17270	25th Jan.	162	25 9·0
1924	37029	37142	16th Oct.	36854	10th June.	288	5·6 E.	10·5 E.	29th Jan.	0·4 E.	15th Sept.	10·1	17452	17514	26th Dec.	17379	19th Jan.	135	25 14·1
1925	37065	37170	9th Mar.	36899	28th Dec.	271	3·4 E.	8 2 E.	24th May.	2·0 W.	4th Sept.	10·2	17527	17589	25th Dec.	17421	21st Jan.	168	25 18·5
1926	37079	37227	26th Jan.	36755	15th Apr.	472	0·8 E.	9·9 E.	15th Apr.	4·9 W.	24th Aug.	14·8	17590	17654	15th Oct.	17504	4th Jan.	150	25 22·7
1927	37119	37350	22nd Oct.	36802	12th Oct.	548	1·9 W.	6·0 E.	22nd July.	8·6 W.	21st Aug.	14·6	17650	17710	24th Sept.	17565	14th Sept.	145	25 25·9
1928	37152	37463	7th July.	36718	8th July.	745	3·8 W.	11·6 E.	8th July.	9·0 W.	19th Sept.	20·6	17698	17778	28th May.	17608	30th April.	170	25 36·3
1929	37209	37316	11th Aug.	36988	12th Mar.	328	5·9 W.	0·5 W.	16th Apr.	11·1 W.	5th Sept.	10·6	17736	17797	24th Nov.	17655	29th Jan.	142	25 29·1
1930	37253	37373	14th Oct.	37021	16th June.	352	8·0 W.	2·6 W.	31st May.	12·7 W.	25th Aug.	10·1	17777	17836	6th Oct.	17692	12th Jan.	144	25 30·6
1931	37328	37417	17th Oct.	37097	29th Oct.	320	10·5 W.	5·7 W.	15th Apr.	15·8 W.	30th June.	10·1	17806	17869	11th Nov.	17726	20th May.	143	25 30·2
1932	37364	37460	25th Nov.	37223	30th May.	237	12·7 W.	7·0 W.	30th May.	18·1 W.	23rd July.	11·1	17830	17895	5th Nov.	17756	29th April.	139	25 30·6
1933	37408	37486	18th Nov.	37206	1st May	280	14·5 W.	10·3 W.	1st May	18·8 W.	27th July	8·5	17848	17913	16th Dec.	17759	18th May	154	25 30·4
1934	37462	37564	7th Nov.	37314	16th Feb.	250	16·2 W.	12·1 W.	11th May	21·3 W.	9th Sept.	9·2	17867	17914	4th Dec.	17793	25th July	121	25 29·9
1935	37524	37651	11th Sept.	37394	24th Oct.	257	17·7 W.	12·3 W.	6th April.	23·4 W.	15th Sept.	11·1	17892	17957	23rd Aug.	17804	21st Aug.	153	25 29·5
1936	37593	37710	21st Sept.	37407	19th June	303	19·9 W.	13·7 W.	19th June	26·4 W.	2nd Oct.	12·7	17902	17978	24th Oct.	17786	27th May.	192	25 27·8

The value of H has been steadily increasing since 1916. The increase from 1935 to 1936 is 69γ and is greater than the average rate of increase, namely 47γ, during the last 10 years. The Westerly Declination increased during the year by 2·2′ which is nearly at the same rate as during the last ten years. The vertical force continued to show a gradual increase, but the inclination which has been slowly decreasing since the year 1933 showed a further decrease of 1′·7.

The following table gives the character figure assigned to each day according to the method adopted by Colaba. The classification which is in eight grades is convertible to the present International classification 0, 1 and 2 according to the following scales :—

C, Ca = 0 ; S, Sa = 1 ; M, Ma, G, VG = 2

Date.	Jany.	Feby.	March.	April.	May.	June.	July.	Augt.	Septr.	Octr.	Novr.	Decr.
1	Ca	C	Ca	Sa	Ca	Sa	Ca	Ca	C	Ca	Ca	Ca
2	Ca	S	C	S	C	Sa	Ma	Ca	C	Ca	S	Ca
3	Ca	Ca	C	Sa	Ca	Ca	S	Ca	C	Ca	S	Ca
4	C	Ca	Ca	Ca	S	Ca	Ca	Ca	Ca	Ca	Ca	S
5	Ca	Ca	Ca	C	Ca	C	Sa	Ca	S	S	Ca	Ca
6	Ca	C	Ca	Ca	Ca	C	Sa	S	C	S	Ca	Ca
7	Ca	Ca	Ca	Ca	C	Ca	S	Ca	Ca	S	S	Ca
8	Sa	C	S	Ca	C	S	Ca	Ca	Ca	S	S	Ca
9	S	S	Ca	Ca	C	M	C	Ca	Ca	Sa	S	C
10	S	S	Ca	C	S	S	Sa	Ca	Ca	S	S	C
11	S	Ca	C	Ca	Sa	Ca	Sa	Ca	S	S	M	C
12	S	Ca	C	Ca	S	Ca	Ca	Ca	Ca	C	Ca	S
13	S	C	Ca	S	Ca	Ca	Ca	Ca	Ca	S	C	S
14	Ca	S	Ca	Ca	Ca	S	C	Ca	Ca	Sa	Ca	Ca
15	Ca	Ca	Ca	S	Ca	S	Ca	Ca	Ca	S	M	Ca
16	C	Sa	Ca	Ca	S	Ca	Ca	Ca	C	M	S	Ca
17	Ca	S	Ca	Ca	Ca	Ca	S	Ca	Ca	Sa	S	Ca
18	S	Ca	Ca	S	S	S	Ca	Ca	S	Sa	S	Ca
19	Ca	S	Ca	S	S	Ma	Ca	C	Ca	Ca	S	C
20	Ca	Ca	S	S	Ca	Sa	Ca	Ca	Ca	S	Ca	Ca

Date.	Jany.	Feby.	March.	April.	May.	June.	July.	August.	Septr.	Octr.	Novr.	Decr.
21	Ca	Sa	Sa	Sa	Ca	C	C	C	Ca	C	C	Ca
22	S	S	S	Sa	C	C	C	C	S	C	C	Ca
23	S	S	Sa	S	C	C	C	Ca	S	Ca	C	Ca
24	M	Ca	Sa	Ca	C	Ca	C	Ca	C	Sa	C	C
25	Sa	S	S	Ca	Ca	C	Ca	Ca	C	S	Ca	Ca
26	S	S	S	C	Ca	S	C	Ca	M	Ca	Ca	Ca
27	Ca	S	S	Ca	C	Ca	Ca	S	S	C	Ca	S
28	Ca	C	Ca	C	Ca	Ca	S	Ca	Ca	C	Ca	M
29	Ca	Ca	C	C	S	C	M	Ca	S	C	Ma	S
30	Ca		C	Ca	S	C	Ca	S	C	Ca	Ca	Ca
31	Ca		Ca		S		Ca	Ca		G		Ca
Mean character figure according to international scheme.	0·42	0·45	0·29	0·37	0·32	0·43	0·61	0·23	0·30	0·71	0·67	0·35

The annual mean character figure, as assigned by the Observatory, for the year 1936 is 0·43, while that assigned for the year 1935 is 0·47 and for 1934, 0·46. The corresponding De Bilt figures are 0·70, 0·70 and 0·56 respectively. October was the most active and August the least active month in the year.

Magnetic Storms.

In plates I, II, III, IV and V are reproduced the magnetic records on disturbed days which have been recommended for publication by the International Commission of Terrestrial Magnetism. The base-line values and scale co-efficients are shown with each curve. The hourly breaks last for 2 to 3 minutes and the time shown against a break is the time at the middle of the break expressed in Greenwich Mean Time. Increasing ordinates for H. and V. curves mean increase in force, and for the declination curves decrease in *westerly* declination.

Absolute observations and Base Line Values.

Declination.

Absolute observations of declination were made once a week on Thursdays with the standard magnetometer No. 7 and Magnets No. 7 (old). For comparative purposes, observations of declination were taken with the auxiliary magnetometer No. 137 and magnetometer No. 7 with No. 7 (new) magnets as already indicated.

Base-line values are derived by converting the ordinates corresponding to absolute observations with instrument No. 7 and magnet No. 7 (old) into angles and subtracting the converted ordinates from the observed absolute declination. The values so obtained of the base-lines of the declination magnetograph denote westerly declination.

The adopted values are derived by taking overlapping means of 5 successive observations and reducing them to the proper epoch, values for intermediate days being obtained by simple interpolation.

Declination base-line values, 1936.

(0° *plus tabular minutes.*)

Date.	Observed.	Adopted.	Date.	Observed.	Adopted.	Date.	Observed.	Adopted.
	′	′		′	′		′	′
January 2 .	68·4 W	68·3 W	May 1 .	68·2 W	68·4 W	September 3	68·3 W	68·2 W
,, 9 .	68·4	68·3	,, 7 .	68·5	68·3	,, 10 .	68·2	68·0
,, 16 .	68·0	68·4	,, 14 .	68·6	68·3	,, 17 .	68·2	68·1
,, 23 .	68·1	68·3	,, 21 .	68·1	68·3	,, 24 .	67·6	68·2
,, 30 .	68·8	68·2	,, 28 .	68·2	68·3			
						October 1 .	68·4	68·2
February 6 .	68·2	68·3	June 4 .	68·2	68·3	,, 8 .	68·5	68·2
,, 13 .	68·0	68·2	,, 11 .	68·5	68·3	,, 17 .	68·5	68·4
,, 20 .	68·1	68·1	,, 18 .	68·4	68·4	,, 22 .	68·0	68·4
,, 27 .	68·0	68·0	,, 25 .	68·4	68·4	,, 29 .	68·7	68·4
March 5 .	68·1	68·1	July 2 .	68·3	68·2	November 5 .	68·4	68·4
,, 12 .	67·9	68·1	,, 9 .	68·3	68·2	,, 12 .	68·4	68·5
,, 19 .	68·2	68·2	,, 16 .	67·8	68·1	,, 19 .	68·4	68·5
,, 26 .	68·1	68·2	,, 23 .	68·2	68·1	,, 26 .	68·7	68·6
			,, 30 .	68·1	68·1			
April 2 .	68·5	68·3				December 3 .	68·6	68·7
,, 9 .	68·2	68·3	August 6 .	68·3	68·2	,, 10	68·8	68·6
,, 16 .	68·5	68·4	,, 13 .	68·1	68·1	,, 17 .	68·9	68·7
,, 23 .	68·3	68·3	,, 20 .	68·3	68·2	,, 24 .	68·0	68·7
			,, 27 .	68·0	68·2	,, 31 .	69·4	68·5

Horizontal Force.

Absolute observations of horizontal force were made every week, on Wednesdays with the standard magnetometer No. 7 and magnets No. 7 (old). Observations with the auxiliary magnetometer No. 137 and magnets No. 137 were taken every four weeks on Mondays and also with magnetometer No. 7 and magnets No. 7 (new) on Fridays once in four weeks as already indicated. A day's observations comprise a double set of vibration and deflection experiments at three distances which for No. 7 are 22·5 cm., 30 cm. and 40 cm. In calculating the base-line values the mean of the observed values at all the three distances has been used.

Base-line values are derived by converting the mean ordinates corresponding to absolute observations with instrument No. 7 in terms of γ and subtracting the converted ordinates from the mean observed absolute horizontal force. They are further reduced to a uniform temperature of 85°F. to make the series comparable from month to month and year to year.

The adopted values are derived by taking overlapping means of 5 successive double sets of observations and reducing them to the proper epoch, values for intermediate days being obtained by interpolation.

Horizontal force base-line values at 85°F., 1936.

Date.	Observed.	Adopted.	Date.	Observed.	Adopted.	Date.	Observed.	Adopted.
	γ	γ		γ	γ		γ	γ
January 2 .	37,274	37,282	May 1 .	37,286	37,292	September 2 .	37,285	37,291
„ 8 .	282	281	„ 8 .	294	291	„ 9 .	289	291
„ 15 .	289	281	„ 13 .	289	288	„ 16 .	295	289
„ 22	281	283	„ 20 .	295	290	„ 23 .	287	291
„ 29 .	277	280	„ 28	275	289	„ 30 .	286	290
February 5 .	37,284	37,277	June 3 .	37,298	37,289	October 7 .	37,296	37,290
„ 12 .	269	275	„ 10 .	289	286	„ 20 .	284	293
„ 19 .	273	276	„ 17 .	287	289	„ 22 .	295	294
„ 26 .	275	275	„ 24 .	280	287	„ 28 .	295	293
March 4 .	37,281	37,278	July 1 .	37,292	37,287	November 4 .	37,297	37,295
„ 11 .	278	282	„ 8 .	288	287	„ 11 .	295	294
„ 18 .	284	284	„ 15 .	290	290	„ 18 .	294	293
„ 25 .	291	285	„ 22 .	284	287	„ 25 .	291	292
			„ 29 .	297	287	December 2 .	37,289	37,291
April 1 .	37,285	37,289	August 5 .	37,276	37,287	„ 9 .	294	291
„ 8 .	287	291	„ 12 .	287	289	„ 16 .	288	290
„ 15 .	296	290	„ 19 .	291	287	„ 23 .	292	288
„ 22 .	295	291	„ 26 .	296	290	„ 30 .	286	286

Vertical Force.

Inclination observations with inductors were made on every day in the year, with the exception of Sundays and holidays, each of the two instruments being observed on alternate days except on Saturdays when both were observed for comparative study.

Base-line values are derived by expressing the mean ordinates of V. F. magnetograms at the time of the inclination observations in terms of γ and subtracting these from the values of vertical force obtained by multiplying the value of H. F. at the time by the tangent of inclination given by Inductor observations. Values derived from Inductor No. 108 are reduced to those derived from Inductor No. 41 (which is the Observatory standard) by applying the mean correction for the month which was deduced from the comparative observations taken on Saturdays of every week.

The adopted values were derived by taking overlapping means of 7 successive observations and reducing them to the proper epoch; values for other days were obtained by interpolation.

As already remarked the V. F. magnetograph showed frequent changes of zero and it became necessary to adjust it once in the beginning of October and again towards the end of the same month. After readjustment the sensitiveness was reduced to about two-thirds of its former value.

Vertical force base-line values, 1936.

Date.	Observed.	Adopted.	Date.	Observed.	Adopted.	Date.	Observed.	Adopted.
	ϒ	ϒ		ϒ	ϒ		ϒ	ϒ
January 1 .	17,790	17,802	May 2 .	17,851	17,848	September 2 .	17,916	17,904
„ 8 .	765	780	„ 8 .	820	817	„ 9 .	977	931
„ 15 .	814	803	„ 13 .	839	838	„ 16 .	901	896
„ 22 .	833	823	„ 20 .	797	815	„ 23 .	902	905
„ 29 .	786	805	„ 28 .	831	838	„ 30 .	* 966	945
February 5 .	17,834	17,831	June 2 .	17,841	17,833	October 7 .	17,725	17,714
„ 12 .	850	842	„ 10 .	840	827	„ 20 .	671	660
„ 19 .	848	846	„ 17 .	837	833	„ 22 .	* 657	661
„ 26 .	860	850	„ 24 .	822	863	„ 28 .	915	919
March 4* .	17,819	17,832	July 1 .	17,886	17,875	November 4 .	17,900	17,904
„ 11 .	810	817	„ 8 .	924	903	„ 11 .	985	948
„ 18 .	833	833	„ 15 .	925	910	„ 18 .	990	988
„ 25 .	872	861	„ 22 .	915	894	„ 25 .	892	896
April 1 .	17,868	17,849	„ 29 .	899	887	December 2 .	17,888	17,881
„ 8 .	859	842	August 5 .	17,896	17,887	„ 9 .	899	900
„ 15 .	827	827	„ 12 .	904	897	„ 17 .	853	849
„ 22 .	834	841	„ 19 .	894	891	„ 23 .	829	834
„ 29 .	881	871	„ 26 .	891	887	„ 31 .	836	825

*V. F. Magnetograph was adjusted on the 4th and the 26th October.

Seismographs.

Two Milne-Shaw Seismographs (N-S and E-W components), were in continuous action in the underground constant temperature room, and both gave excellent records of earthquakes and microseisms during the year. The earthquakes recorded by these instruments will be found tabulated at the end of the volume. The magnification of the N-S instrument was 250 : 1 and that of the E-W instrument 350 : 1. The locally constructed seismograph of the Omori type (N-S and E-W components) was kept in continuous operation during the year as an auxiliary instrument.

The total number of seismic disturbances recorded at Bombay during the year was 241 of which the distance could be determined in 66 cases; the epicentre is available in 49 cases. The number of earthquakes in India, Burma and their neighbourhood (the area lying between latitude 0° N. to 40° N. and longitude 60° E. to 110° E.) was 10; besides these there were 9 instances in which though the phases were not definite, the recorded movements could be identified as due to shocks recorded by voluntary observers in the area. The number of shocks designated as great was 3 in which the maximum earth-movements ranged between 112μ and 446μ. There were 5 cases in which the amplitudes reached values ranging between 170μ and 432μ. There were thus 8 instances in which the earth-movements at Bombay exceeded an amplitude of 0·1 mm. the highest value being 0·4 mm.

Atmospheric Electricity.

Systematic registration of atmospheric potential gradient was continued during the year. A photographic electrograph by the Cambridge Scientific Instrument Co., as described in the Journal of Scientific Instruments, Vol. V, May 1928, pages 145-152, was received in May 1930 and installed on the 13th June 1930 in the old Milne seismograph room. It was removed to a specially constructed room in the open space near the sea coast on the 28th February 1931 and the radium collector was exposed through a hole in the western wall at a height of 168 cm. above ground and on undisturbed days at a distance of 40 cm. from the wall. The reduction factor required to convert the potential gradients recorded by the instrument to those that would be observed in an open plain was determined by taking a number of observations on the neighbouring sea coast with a long horizontal stretched wire at a height of about a meter from the ground, an ionium collector and a Wulf bifilar electrometer. The mean factor obtained was 1·92 as against the value 1·50 previously adopted. All the values in this volume have been corrected by the new factor. In tables I, II, and III are given the mean values of the potential gradients for one hour intervals centred at half hours of Indian Standard Time. The means in table I have been derived from all the positive readings. The daily means given in Table II are based on all the complete days using both positive and negative values while Table III gives values based on ten electrically quiet days in each month. This selection was made as nearly as possible from ten complete days in the months. In Table IV are given the electrical character figures and the duration of negative potential gradients on different days. In assigning these figures the same convention has been adopted as those followed by the Kew Observatory (please see The Observatories Year Book, 1935, p. 365). That is, figure 0 means that there was no negative potential, 1 means that the total duration of negative potential gradient was less than 3 hrs. and 2 that the duration of negative gradient was 3 hrs. or more.

K. R. RAMANATHAN,
Meteorologist, Bombay.

Colaba Observatory, Bombay,
The 22nd November 1937.

STATION—COLABA OBSERVATORY, BOMBAY.

Lat. 18° 54′ N *Long.* 72° 54′ E. *Height above M. S. L.* 6 metres.

Lithologic foundation : Trap Rock.

Instruments :—Milne-Shaw seismographs, North-South (N) and East-West (E) components, installed in an underground constant temperature room. Photographic registration.

INSTRUMENTAL CONSTANTS.

Component.	Steady mass (Kg.)	T. (sec.)	Vm	ε	Paper speed (mm./min.).
N	0·45	12	250	20 : 1	8
E	0·45	12	350	22 : 1	8

TABLE D_2.

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Jan. 1	N,E	e	4 1 ...	...	...	...	Tremors.
	N,E	F	4 16 ...	...	...	...	
, 2	N	e	0 48 20	...	...	...	Slight, distant.
	E	Mn	1 16 20	23	10	...	
	N,E	F	2 0 ...	...	...	...	
,, 2	N,E	e	17 36 2	...	...	...	Slight.
	N,E	i	43 36	...	...	...	
	E	Mn	18 4 32	15	5	...	
	N,E	F	54 ...	...	...	...	
,, 2	N,E	iP	22 40 55	...	...	3355	Moderate. Epc: 1° S., 97° N., North Sumatra.
	N,E	iS	46 2	...	...	...	
	N,E	SR_1	47 32	...	...	...	
	N,E	L	49 47	...	...	...	
	N	Mn	54 8	15	37	...	
	N,E	F	2 5 ...	...	...	...	
,, 4	N,E	i	1 13 5	...	...	...	Feeble near.
	N,E	F	30 ...	...	...	...	
,, 7	N,E	i	12 0 24	...	...	...	Feeble. Felt at Drosh.
,, 8	N,E	e	11 5 ...	...	...	...	Tremors.
	N,E	F	38 ...	...	...	...	
,, 8	N,E	e	12 39 ...	...	...	...	Tremors.
	N	F	13 20 ...	...	...	...	
	E	F	14 ...	...	...	...	
,, 13	N,E	eP	18 15 49	...	...	2810	Slight.
	N,E	iS	20 19	...	...	...	
	E	SR_1	21 11	...	...	...	
	E	L	22 27	...	...	...	
	N	Mn	27 19	...	...	...	
	E	Mn	26 49	...	...	...	
	N,E	F	19 56 ...	...	...	...	
,, 14	N,E	e	5 55 20	...	...	...	Slight, distant.
	N,E	i	6 4 49	...	...	...	
	N,E	F	8 28 ...	...	...	...	
1936.							
Jan. 14	N,E	e	14 30 33	...	...	...	Slight, distant. Deep focus. L-waves poor.
	N,E	i	34 16	...	...	...	
	N,E	F	16 18 ...	...	...	...	
,, 14	N,E	e	17 55 ...	...	...	...	Slight, distant.
	N,E	i	18 5 30	...	...	...	
	E	Mn	44 14	15	5	...	
	N,E	F	19 56 ...	...	...	...	
,, 15	N,E	e	14 57 ...	...	...	...	Slight, distant.
	N,E	F	16 41 ...	...	...	...	
,, 17	N,E	e	12 19 11	...	...	...	Slight, near.
	N,E	e	22 3	...	...	...	
	N	Mn	26 44	...	...	...	
	E	Mn	26 30	10	3	...	
	N,E	F	59 ...	...	...	...	
,, 20	N	eP	17 5 43	...	...	5720	Moderate. Focal depth = 100 km. from Brunner chart.
	E	iP					
	N,E	iS	13 8	...	...	...	
	N,E	PS	13 42	...	...	...	
	N,E	SR_1	18 6	...	...	...	
	N,E	L	22 ...	...	...	...	
	N,E	F	19 19 ...	...	...	...	
,, 22	N,E	e	9 32 35	...	...	...	Seismic activity.
	N,E	F	10 18 ...	...	...	...	
,, 24	N,E	e	16 56 4	...	...	...	Seismic activity.
,, 27	N,E	e	10 41 ...	...	...	...	Feeble. Felt at Purnea, (Bihar).
	N,E	F	11 1 ...	...	...	...	
,, 27	N,E	e	16 27 28	...	...	...	Seismic movement.
	E	e	29 35	...	...	...	
,, 27	N,E	e	19 36 35	...	...	...	Slight.
	N,E	e	41 29	...	...	...	
	N,E	F	20 21 ...	...	...	...	

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Feb. 4	E	e	12 22 18	...	...	...	Feeble, near. Felt at Mukteswar.
	E	i	22 36	...	...	...	N-time uncertain.
	E	M	24 17	...	...	...	
	E	F	36 ...	...	...	...	
,, 6	E,E	e	4 11 ...	...	...	...	Slight, very distant.
	N,E	e	16 9	...	...	...	
,, 6	N,E	e	20 51 ...	...	...	...	Feeble, distant.
	N,E	e	55 20	...	...	...	
	N,E	F	21 55 ...	...	...	...	
,, 7	N,E	M	2 2 30	...	...	...	Seismic activity.
,, 7	N,E	iP	9 2 53	...	...	3310	Moderate. Epc 32° N-102° E. (Manila), South China.
	N,E	iS	7 57	...	...	...	
	E	SR_1(?)	9 20	...	...	...	
	N,E	L	11 ...	...	...	...	
	N	Mn	13 56	10	69	...	
	E	Mn	16 8	10	55	...	
	N,E	F	11 27 ...	...	...	...	
,, 8	E	i	12 23 0	...	...	...	Slight. N-time uncertain.
	E	i	32 30	...	...	...	
	E	F	13 47 ...	...	...	...	
,, 10	E	e	18 24 15	...	...	...	Seismic activity. N-time uncertain.
	E	F	19 43 ...	...	...	...	
,, 11	N,E	eP	4 51 20	...	...	1440	Moderate. Felt at Dumka, Motihari.
	N,E	iS	53 54	...	...	...	
	N,E	SR_1	54 16	...	...	...	
	N,E	L	55 ...	...	...	...	
	N	Mn	55 53	3	30	...	
	E	Mn	55 53	4	11	...	
	N	F	5 39 ...	...	...	...	
	E	F	35 ...	...	...	...	
,, 11	E	e	20 11 52	...	...	...	Feeble, near. Felt at Cooch Behar, Dhubri, Gauhati and Saloma.
	E	i	15 13	...	...	...	
	E	F	21 41 ...	...	...	...	
,, 12	N,E	i	9 42 30	...	...	...	Feeble, very distant.
	N,E	i	48 53	...	...	...	
	N,E	i	51 18	...	...	...	
	N,E	F	11 51 ...	...	...	...	
,, 14	N,E	e	14 47 ...	...	...	...	Feeble, near. Felt at Shillong.
,, 15	N,E	iP	12 57 32	...	...	6880	Moderate. Epc. 4·5° S., 133°·0 E. (J. S. A.), Dutch New Guinea.
	N,E	PR_1	59 53	...	...	...	
	N,E	iS	13 6 3	...	...	...	
	N,E	PS	6 37	...	...	...	
	N,E	sS	7 5	...	...	...	
	N,E	SR	10 24	...	...	...	
	N,E	SR_1	12 44	...	...	...	
	N,E	L	13 17 ...	...	...	...	

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
	N	Mn	25 5	19	37	...	
	E	Mn	25 20	23	74	...	
	N	F	17 5 ...	...	...	...	
	E	F	36 ...	...	...	...	
Feb. 16	N,E	e	14 31 ...	...	...	...	Tremors.
	N,E	F	15 36 ...	...	...	...	
,, 19	N,E	eP	14 35 3	...	...	2153	Slight.
	N,E	iS	38 38	...	...	...	
	N,E	L	40 36	...	...	...	
	N	Mn	43 1	7	15	...	
	E	Mn	43 10	7	11	...	
	N,E	F	15 35 ...	...	...	...	
,, 19	N,E	e	8 32 ...	...	...	...	Tremors.
	N,E	F	48 ...	...	...	...	
,, 21	N,E	e	1 18 ...	...	...	...	Feeble.
	N,E	i	25 52	...	...	...	
	N	Mn	45 47	...	...	...	
	E	Mn	45 37	...	...	...	
	N	F	2 19 ...	...	...	...	
	E	F	2 25 ...	...	...	...	
,, 21	N,E	iP	6 25 41	...	...	2330	Slight.
	N,E	iS	29 49	...	...	...	
	E	SR_1	30 44	...	...	...	
	N,E	L	32 38	...	...	...	
	N	Mn	37 20	...	...	...	
	E	Mn	37 16	11	7	...	
	N,E	F	7 56 ...	...	...	...	
,, 21	N,E	e	11 0 ...	...	...	...	Feeble, distant.
	N	Mn	35 18	...	...	...	
	E	Mn	35 32	...	...	...	
	N,E	F	12 56 ...	...	...	...	
,, 21	N,E	e	17 9 ...	...	...	...	Feeble, distant.
	N	Mn	53 34	...	...	...	
	E	Mn	53 27	...	...	...	
	N,E	F	18 55 ...	...	...	...	
,, 21	N,E	e	19 29 ...	...	...	...	Tremors.
	N,E	F	55 ...	...	...	...	
,, 22	N,E	e	15 46 32	...	...	11615	Moderate.
	N,E	PR_1	50 39	...	...	...	
	N,E	ScPcS	56 55	...	...	...	
	N,E	PS	59 15	...	...	...	
	N,E	SR_1	16 5 30	...	...	...	
	N,E	SR_2	9 21	...	...	...	
	N,E	L	15 0	...	...	...	
	N	Mn	27 9	...	...	...	
	E	Mn	24 41	23	27	...	
	N,E	F	18 33 ...	...	...	...	

TABLE D_2—*contd.*

Date.	Compt.	Phase.	G. T. M.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Feb. 22	N,E	e	19 41 24	...	...	...	
	N,E	i	47 45	...	...	...	
	N,E	i	50 35	...	...	...	
	N	Mn	20 25 42	...	...	...	
	E	Mn	22 41	...	...	...	
	N,E	F	21 55	...	...	...	
„ 24	N,E	e	5 32 ...	...	...	...	Feeble, near.
	N,E	F	6 2 ...	...	...	...	
„ 24	N,E	e	7 5 ...	...	...	...	
	N,E	i	9 30	...	...	...	
	N	Mn	15 12	...	...	...	
	E	Mn	16 39	...	...	...	
	N,E	F	54 ...	...	...	...	
„ 24	N,E	e	16 35 ...	...	...	...	Feeble, near.
	N,E	i	39 40	...	...	...	
	N,E	F	17 5 ...	...	...	...	
„ 26	N,E	e	2 46 ...	...	...	...	Tremors.
	N,E	F	3 55	...	...	...	
„ 27	N,E	iP	10 14 2	...	...	6235	Slight.
	N,E	iS	21 56	...	...	...	
	N,E	i	22 56	...	...	...	
	N,E	F	11 55 ...	...	...	...	
„ 28	N	Mn	4 3 24	...	...	...	Seismic activity.
	E	Mn	3 34	...	...	...	
„ 28	N,E	eP	16 24 3	...	...	5045	Slight.
	N,E	S	30 55	...	...	...	
	N,E	SR_1	33 54	...	...	...	
	N,E	L	38 ...	...	...	...	
	E	Mn	44 22	15	7	...	
	N,E	F	17 56 ...	...	...	...	
Mar. 1	N	eP	10 32 3	...	...	6455	Moderate. Epc: South of Sakhal in Island. (Chiufeng).
	N,E	iS	40 10	...	...	...	
	N,E	SR_2	47 20	...	...	...	
	N	Mn	11 1 24	22	34	...	
	E	Mn	2 48	19	23	...	
	N,E	F	13 9 ...	...	...	...	
„ 2	N,E	iP	3 29 7	...	...	7245	Moderate. Epc : East off Hokkaido, Japan. (Manila).
	N,E	iS	38 27	...	...	...	
	N,E	SR_1	43 00	...	...	...	
	N,E	L	51 ...	...	...	...	
	N	Mn	4 0 30	15	14	...	
	E	Mn	0 37	15	15	...	
	N,E	F	6 34 ...	...	...	...	
„ 9	N,E	e	20 41 ...	...	...	...	Tremors.
	N,E	F	1 54 ...	...	...	...	
„ 10	N,E	e	20 46 28	...	...	...	Slight, distant.
	E	Mn	21 17 21	...	...	...	
	N,E	F	22 1 ...	...	...	...	
1936.							
Mar. 11	N,E	e	0 40 ...	...	...	...	Tremors.
	N,E	F	2 2 ...	...	...	...	
„ 11	N,E	i	11 9 2	...	...	...	Seismic activity.
„ 13	E	e	4 24 ...	...	...	...	Tremors.
	N,E	F	5 13 ...	...	...	...	
„ 17	E	e	18 19 ...	...	...	...	Tremors.
	E	F	51 ...	...	...	...	
„ 17	N,E	eP	19 55 54	...	...	3170	Slight. Epc.: North Sumatra (Batavia).
	N,E	iS	20 0 40	...	...	...	
	N,E	i	3 4	...	...	...	
	E	Mn	14 27	...	...	...	
	N,E	F	21 36 ...	...	...	...	
„ 18	N,E	e	12 5 ...	...	...	...	Tremors.
	N,E	F	13 14 ...	...	...	...	
„ 18	N,E	e	22 30 ...	...	...	1665	Tremors.
	N,E	F	23 8 ...	...	...	...	
„ 19	E	M	1 5 30	...	...	...	Seismic activity.
„ 21	N,E	e	1 59 28	...	...	...	Slight.
	N	i	2 5 0	...	...	...	
	E	Mn	13 23 ...	13	7	...	
	N,E	F	3 35 ...	...	...	...	
„ 22	N,E	P	12 28 58	...	...	9390	Slight. Epc. : South-West Solomon Islands. (Chiufeng).
	N,E	S	39 26	...	...	...	
	N,E	F	14 56 ...	...	...	...	
„ 25	N,E	e	9 11 ...	...	...	...	Tremors.
	N,E	F	10 15 ...	...	...	...	
„ 25	N,E	e	14 29 ...	...	...	...	Tremors.
	E	e	32 13	...	...	...	
	N,E	F	54 ...	...	...	...	
Apr. 1	N,E	eP	2 18 46	...	...	6090	Great. Epc. : 3°N. 123° (J. S. A.) O : 2 9m. 16s. G. M. T.
	N,E	iP	18 52	...	...	...	
	N,E	PR_1	21 01	...	...	...	
	N,E	PR_2	21 56	...	...	...	
	N,E	S	26 28	...	...	...	
	N,E	PS	27 1	...	...	...	
	N,E	SR_1	30 3	...	...	...	
	N,E	SR_2	32 0	...	...	...	
	N,E	L	35 ...	...	...	...	
	N	Mn	39 45	18	95	...	
	E	Mn	38 20	26	446	...	
	N	F	6 14 ...	...	...	...	
	E	F	6 17 ...	...	...	...	
„ 1	N	iP	20 20 32	...	...	5950	Moderate. Preced by tremors.
	N	iS	28 8 ...	...	...	...	Apparently aft shock of previo great shock.

TABLE D_2—*contd.*

Date.	Compt.	Phase.	G.M.T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
	N	Mn	48 17	...	...	...	
	N	F	22 10 ...	...	...	...	
Apr. 2	N	eP	6 29 8	...	...	8230	
	N	iS	38 45	...	...	...	
	N	F	8 59 ...	...	...	...	
„ 5	N	Mn	13 14 37	...	...	...	Seismic activity.
	E	Mn	14 45	...	...	...	
„ 9	N,E	e	0 56 ...	...	...	...	Tremors.
	N,E	F	1 18 ...	...	...	...	
„ 9	N	e	16 16 ...	...	...	...	Tremors.
	N	F	17 56 ...	...	...	...	
„ 9	N,E	e	20 17 ...	...	...	...	Slight, near.
	N	Mn	24 45	...	...	...	
	E	Mn	24 30	...	...	...	
	N,E	F	45 ...	...	...	...	
„ 11	N	e	4 1 ...	...	...	...	Feeble, near.
	E	i	0 52	...	...	...	
	E	Mn	7 29	...	...	...	
	N	F	32 ...	...	...	...	
	E	F	47 ...	...	...	...	
„ 11	E	i	23 46 9	...	...	...	Feeble, near.
	N,E	e	47 53	...	...	...	
	E	F	53 16	...	...	...	
	N	F	0 29 ...	...	...	...	
			25 ...	...	...	...	
„ 12	N,E	P	21 1 29	...	...	6980	Slight. Epc: 10° N., 140° E. (Manila).
	N,E	iS	10 5	...	...	...	
	N,E	SR_1	14 33	...	...	...	
	N,E	SR_2	16 41	...	...	...	
	N,E	L	22 ...	...	...	...	
	N	Mn	34 33	15	7	...	
	E	Mn	34 9	22	16	...	
	N,E	F	23 55 ...	...	...	...	
„ 17	N,E	i	22 19 28	...	...	...	Seismic activity.
„ 19	N,E	iP	5 20 0	...	...	9520	Great. Epc: 9° S., 156° E. (J. S. A.). O: 5h. 7m. 12s. G. M. T.
	N,E	iS	30 34	...	...	...	
	N,E	PS	31 20	...	...	...	
	N,E	SR_1	36 20	...	...	...	
	E	SR_2	39 38	...	...	...	
	N,E	L	49 ...	...	...	...	
	N	Mn	6 1 23	19	47	...	
	E	Mn	57 53	25	112	...	
	N,E		Masked by the following shock.				
„ 19	N,E	iP	9 8 50	...	...	2535	Moderate.
	N,E	PR_1	9 14	...	...	...	Epc: Probably Gulf of Martaban.
	N,E	iS	12 59	...	...	...	
	N,E	SR_1	13 59	...	...	...	
	N,E	L	15 29	...	...	...	
	N	Mn	21 10	15	50	...	
	E	Mn	21 38	15	38	...	
	N,E	F	12 5 ...	...	...	...	
Apr. 20	N,E	e	18 10 ...	...	...	...	Tremors.
	N,E	F	19 1 ...	...	...	...	
„ 21	N,E	i	1 41 40	...	...	...	
	N,E	F	3 2 ...	...	...	...	
„ 23	N,E	P	23 27 5	...	...	9550	Slight. Epc: 51°N., 178° E. (J. S. A.).
	N,E	PR_1	30 30	...	...	...	
	N,E	S	37 40	...	...	...	
	N,E	F	0 36 ...	...	...	...	
„ 27	N,E	eP	0 5 15	...	...	3265	Slight.
	N,E	iS	10 16	...	...	...	
	N,E	SR_1	11 44	...	...	...	
	N,E	F	Masked by the following tremors.				
„ 27	N,E	e	3 48 ...	...	...	...	Tremors.
	N	F	4 13 ...	...	...	...	
„ 27	N,E	e	5 51 ...	...	...	...	Tremors.
	N	e	59 ...	...	...	...	
	N,E	F	6 11 ...	...	...	...	
„ 27	N,E	e	8 16 ...	...	...	...	Feeble, near.
	N,E	F	28 ...	...	...	...	
„ 28	N,E	i	5 52 5	...	...	...	Feeble, distant.
	E	i	6 2 34	...	...	...	
	N,E	F	7 27 ...	...	...	...	
„ 28	E	i	13 45 42	...	...	...	Slight.
	E	i	48 2	...	...	...	
	N,E	i	53 41	...	...	...	
	N,E	F	14 56 ...	...	...	...	
„ 28	N,E	e	18 38 ...	...	...	...	Tremors.
	N,E	F	19 8 ...	...	...	...	
May. 2	N,E	e	7 26 ...	...	...	...	Tremors.
	N,E	F	40 ...	...	...	...	
„ 4	N	M	18 45 15	...	...	...	Seismic activity.
	E	M	45 18	...	...	...	
„ 5	E	e	19 55 ...	...	...	...	Feeble.
	N,E	e	20 5 5	...	...	...	
	N,E	F	20 58 ...	...	...	...	
„ 6	N,E	e	19 0 30	...	...	...	Feeble, near.
	E	Mn	5 18	...	...	...	
	N	Mn	5 21	...	...	...	
	N,E	F	26 ...	...	...	...	

TABLE D_2—*contd.*

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
May. 8	N,E	e	2 56 0	...	...	...	Feeble seismic activity.
	N,E	e	59 32	...	...	...	
„ 8	N,E	i	9 21 00	...	...	...	Feeble, distant.
	N,E	i	25 18	...	...	...	
	N,E	F	10 11 ...	...	...	...	
„ 8	N,E	e	15 30 30	...	...	...	Feeble, distant.
	N,E	e	35 28	...	...	...	
	N,E	F	16 11 ...	...	...	...	
„ 10	E	i	6 1 30	...	...	...	Slignt, distant. N-record disturbed.
	E	e	5 37	...	...	...	
		F	34 ...	...	...	...	
„ 11	N,E	eP	17 39 45	...	...	9055	Slight. Epc : 4°S., 154°E. (Manila).
	N,E	eS	49 58	...	...	...	
	E	SR_1 (?)	55 49	...	...	...	
	N,E	L	18 8 ...	...	...	...	
	N	F	19 31 ...	...	...	...	
	E	F	41 ...	...	...	...	
„ 16	N,E	e	6 56 ...	...	...	...	Foreshock of the following shock?
	N,E	F	Mixed up with the following stock.				
„ 16	N,E	P	7 11 53	...	...	3155	Moderate.
	N,E	PR_2	13 0	...	...	...	Epc: Western China. (Manila).
	N,E	iS	16 47	...	...	...	
	N,E	SR_1	18 11	...	...	...	
	N,E	L	21 ...	...	...	...	
	N	Mn	25 1[illegible]	...	...	...	
	E	Mn	24 7	12	45	...	
	N,E	F	9 21 ...	...	...	...	
„ 19	N,E	eP	20 59 49	...	...	6170	Slight. Epc : 1°N., 141° E. (Manila).
	N,E	S	21 7 39	...	...	...	
	N,E	F	23 13 ...	...	...	...	
„ 20	N,E	eP	3 18 15	...	...	9620	Slight. Epc : 8°S., 160° E. (J. S. A.).
	E	PR_1	22 0	...	...	...	
	N,E	S	28 53	...	...	...	
	N,E	PS	29 36	...	...	...	
	N,E	L	50 ...	...	...	...	
	E	Mn	4 7 33	16	6	...	
	N,E	F	6 24 ...	...	...	...	
„ 22	E	Mn	1 30 31	...	...	...	Seismic activity.
„ 27	N,E	iP	6 22 24	...	...	1455	Great. Epc : Bihar, 28°N., 82°E. Felt throughout Bihar including Monghyr, Bhagalpur, Muzaffarpur, Arrah, Chapra, Cawnpore, Ranchi, New Delhi, Lucknow, Patna.
	N,E	P•	22 58	...	...	...	
	N,E	P	23 36	...	...	...	
	N,E	S	24 49	...	...	...	
	N,E	S•	25 34	...	...	...	
	N,E	S	26 19	...	...	...	
	N	Mn	28 17	9	441	...	
	E	Mn	28 ...	...	...	...	
	N,E	F	Masked by mic roseisms.				

Date.	Compt.	Phase.	G. T. M.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec	μ	Km.	
May 28	N	Mn	20 19 28	18	7	...	Slight, very distant
	E	Mn	15 28	21	13	...	
	N,E	F	Masked by mic roseisms.				
„ 30	N	e	7 15 37	...	...	...	Felt at Dhubri, Serajganj, Jamelpur, Siliguri, Gaibandha, Berhampur, Mymensingh, Maldah and Jalpaiguri.
	N	F	8 4 ...	...	...	...	
June 3	E	M	3 38 30	...	...	...	Seismic activity.
„ 3	E	M	10 28 30	...	...	...	Seismic activity.
„ 9	N,E	e	00 7 ...	...	...	1270	Slight. After shock of the Great shock of 27th May. Felt at Khatmandu, Darjeeling, Patna, Purnea.
		S	9 7	...	...	...	
		S•	9 43	...	...	...	
		S	10 23	...	...	...	
		F	Mixed up with mic roseisms.				
„ 9	N	M	8 35 29	...	...	...	Feeble, near.
	E	M	35 44	...	...	...	
	N,E	F	Mixed up with mic roseisms.				
„ 9	N,E	P	16 42 56	...	...	3310	Slight. Epc : Near 3°S, 95°E (Manila).
	N,E	S	48 00	...	...	...	
	N,E	SR_1	49 37	...	...	...	
	N,E	L	51 39	...	...	...	
	N	M	57 47	15	4	...	
	E	Mn	58 15	14	4	...	
	N	F	18 21 ...	...	...	...	
	E	F	Overlapping of lines.				
„ 10	N	Mn	3 11 37	...	...	...	Seismic activity
	E	Mn	11 16	...	...	...	
„ 10	E	e	3 27 30	...	...	2665	Slight.
	N,E	S	31 45	...	...	...	Beginning doubtful.
	E	SR_1	32 45	...	...	...	
	E	L	34 ...	...	...	...	
	E	Mn	37 17	15	28	...	
	N,E	F	4 44	...	...	...	
„ 10	N,E	i	8 35 45	...	...	...	Slight, distant.
	N,E	i	44 34	...	...	...	Deep focus.
	N,E	i	45 49	...	...	...	
	N	F	10 58 ...	...	...	...	
	E	F	11 0 ...	...	...	...	
„ 10	N,E	e	14 46 ...	...	...	...	Tremors.
	N	F	15 13 ...	...	...	...	E-congestion of lines.
„ 10	N,E	e	17 11 ...	...	...	...	Feeble.
	N	F	18 01 ...	...	...	...	
„ 11	N,E	e	9 46 35	...	...	...	Slight, near.
	N,E	e	48 47	...	...	...	
	N,E	F	10 31 ...	...	...	...	
„ 14	N	Mn	3 14 30	...	...	...	Seismic activity.
	E	Mn	15 35	...	...	...	

TABLE D 2—*contd.*

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
June 14	N	i	17 8 51	...	...	...	Feeble, distant.
	N	I	14 35	...	...	...	
	N	F	18 8 ...	...	...	...	
„ 16	N	Mn	15 32 52	...	...	...	Seismic activity.
	N	Mn	33 13	...	...	...	
„ 18	N, E	eP	15 00 32	...	...	1745	Slight. Felt locally at Jalpaiguri.
	N, E	eS	03 35	...	...	...	
	N, E	L	5 23	...	...	...	
	N	Mn	5 51	3	18	...	
	N, E	F	Masked by microseisms.				
„ 19	N, E	iP	16 39 58	...	...	2520	Slight.
	N, E	PR_1	40 20	...	...	...	
	N, E	iS	44 6	...	...	...	
	N	L	46 ...	...	...	...	
	N	Mn	50 30	10	10	..	
	N, E	F	Masked by microseisms.				
„ 29	N, E	iP	14 34 04	...	...	1880	Slight. Epc : North-West Frontier. Focal depth 80 km. and △ = 18° from Brunner chart.
	N, E	P*	35 04	...	...	...	
	N, E	iS	37 19	...	...	...	
	N, E	S	39 36	...	...	...	Felt locally at Lahore.
	N	Mn	41 39	7	12	...	
	E	Mn	41 42	7	9	...	
	N, E	F	15 44 ...	...	...	...	
„ 30	N, E	iP	15 18 22	...	...	8100	Moderate. Deep focus. Epc : 51°N., 161°E. (J. S. A.)
	N, E	PR	21 1	...	...	...	
	E, E	PR_2	22 50	...	...	...	
	N, E	fS	27 53	...	...	...	
	N, E	PS	28 26	...	...	...	
	N, E	SR_1	33 0	...	...	...	
	N, E	L	42 ...	...	...	...	
	N	Mn	48 23	22	432	...	
	E	Mn	53 4	22	223	...	Time uncertain on account of faint trace.
	N, E	F	18 34 ...	...	...	...	
„	N, E	iP	19 30 18	...	...	2165	Slight. Epc : Persia, 33°N., 59°E.
	N, E	PR_2	30 46	...	...	...	
	N, E	eS	33 57	...	...	...	
	N, E	SR_1	34 46	...	...	...	
	N, E	L	36 ...	...	...	...	
	N	Mn	40 34	11	13	...	
	E	Mn	41 13	10	12	...	
	N, E	F	Masked by microseisms.				
July 1	N	M	17 0 33	...	...	...	Feeble, near.
	E	M	0 52	...	...	...	
„ 4	N	i	9 7 44	...	...	...	Slight, near.
	N	i	9 53	...	...	...	
„ 5	N, E	P	19 4 37	...	..	5680	Moderate. Surface waves poor. Depth of focus about 80 Km.
	N, E	pP	4 58	...	...	...	
	N, E	PR_1	6 57	...	...	...	Epc : 4·0°N., 124·9° E. (J. S. A.)
	N, E	iS	12 0	...	...	...	

Date.	Compt	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
	N, E	sS	12 37	...	...	...	
	N, E	ScS	14 18	...	...	...	
	E	SR_2	17 0	...	...	...	
	N, E	L	20 ...	...	...	...	
		F	Masked by microseisms.				
July. 6	N, E	e	18 38 30	...	...	...	Feeble, distant.
	E	M	57 23	...	...	...	
„ 13	N, E	PR_2	11 38 55	...	...	16445	Moderate. Epc : 23·0°S., 70 2° W. (J. S. A.) Beginning lost due to failure of electric current.
	E	ScPc PcS	42 21	...	...	...	
	E	P ScPcS	45 37	...	...	...	
	E	PPS	48 13	...	...	...	
	E	SR_1	54 11	...	...	...	
	N, E	L	12 22 ...	...	...	...	
	N	Mn	44 30	23	104	...	
	E	Mn	32 53	23	170	...	
	N	F	16 4 ...	...	...	...	
	E	F	8 ...	...	...	...	
„ 15	E	M	12 32 7	...	...	...	Seismic activity.
„ 22	N, E	e	9 3 ...	...	...	...	Feeble, near. Felt locally at Jacobabad.
„ 23	N, E	e	7 19 ...	...	...	...	Tremors.
	N, E	F	8 20 ...	...	...	...	
„ 26	N, E	P	7 56 52	...	...	15780	Slight.
	E	PR_1	59 50	...	...	...	
	E	PR_2	8 3 14	...	...	...	
	E	ScPc PcS	6 37	...	...	...	
	N, E	P ScPcS	10 8	...	...	...	
	E	PPS	12 44	...	...	...	
	E	SR_1	19 15	...	...	...	
	N, E	L	46 ...	...	...	...	
	N	Mn	9 0 23	21	13	...	
	E	Mn	8 59 8	21	27	...	
	N, E	F	Masked by microseisms.				
„ 28	N	e	5 30 ...	...	...	...	Feeble, very distant.
	E	e	29 53	...	...	...	
	N	i	39 15	...	...	...	
„ 28	E	i	8 4 8	...	...	...	Feeble, distant.
	N, E	i	13 24	...	...	...	
„ 31	N	e	11 36 15	...	...	...	Seismic activity.
Aug. 1	N, E	eP	6 32 0	...	...	3780	Slight. Epc : Kansu, China (Nanking).
	N, E	S	36 21	...	...	...	
	N, E	SR_1	38 12	...	...	...	
	N, E	L	40 46	...	...	...	
	N	Mn	43 1	11	18	...	
	E	Mn	43 53	15	13	...	
	N, E	F	6 40 ...	...	...	...	
„ 2	N	e	2 23 ...	...	...	...	Tremors.
	N	F	43 ...	...	...	...	

TABLE D_2—*contd.*

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
Aug. 4	E	e	14 19 52	...	...	...	Sight, distant.
	N	e	20 ...	...	...	...	
	N, E	l	24 37	...	...	...	
	N	Mn	39 32	...	...	...	
	E	Mn	42 5	15	5	...	
	N, E	F	15 8 ...	...	...	...	
,, 8	N	M	4 41 30	...	...	...	Seismic activity.
	E	Mn	46 37	...	...	...	
,, 9	E	Mn	16 39 28	...	...	...	Seismic activity.
,, 13	N, E	iP	20 11 57	...	...	6010	Moderate. Epc : 8° N., 127° E. (Manila).
	N, E	PR_1	13 50	...	...	...	
	N, E	S	19 38	...	...	...	
	N, E	L	27 0	...	...	...	
	N	Mn	39 50	19	16	...	
	E	Mn	39 12	19	23	...	
	N	F	22 16 ...	...	...	...	
,, 14	N, E	e	22 44 15	...	...	...	Slight, distant.
	N, E	e	51 50	...	...	...	
	E	Mn	23 11 26	...	...	...	
	N, E	F	56 ...	...	...	...	
,, 16	N, E	e	16 51 ...	...	...	...	Tremors.
	N, E	F	17 12 ...	...	...	...	
,, 16	N, E	e	21 44 53	...	...	...	Seismic activity.
	N, E	F	22 4 ...	...	...	...	
,, 17	N, E	e	14 13 0	...	...	...	Slight, distant.
	N, E	e	22 45	...	...	...	
	N, E	F	15 52 ...	...	...	...	
,, 18	N, E	e	13 23 37	...	...	...	Seismic activity.
,, 20	E	e	2 15 ...	...	...	...	Tremors.
	N, E	F	51 ...	...	...	...	
,, 20	N	e	23 37 7	...	...	...	Feeble, near.
	E	i	39 57	...	...	...	
	N	i	40 3	...	...	...	
,, 22	N, E	P	6 59 54	...	...	4865	Moderate, Epc : 22°·3 N., 121°·5 E. (J-S.A.), Formosa Island.
	N, E	S	6 31	...	...	...	
	N	SR_1	9 43	...	...	...	
	N, E	SR_2	10 35	...	...	...	
	N, E	L	13 ...	...	...	...	
	N	Mn	19 17	15	75	...	
	E	Mn	20 37	15	56	...	
	F		Mixed up with the following tremor.				
,, 22	N, E	e	11 24 ...	...	...	...	Tremors.
	N, E	F	56 ...	...	...	...	
,, 23	N, E	e	20 51 ...	...	...	...	Feeble shock.
	N, E	i	55 12	...	...	...	
	E	F	Mixed up with the following shock.				

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
1936.			H. M. S.	Sec.	μ	Km.	
Aug. 23	N, E	iP	21 17 35	...	...	2810	Moderate. Epc : 5°·8 N., 95°·0 E. (J. S. A.) Off North Sumatra.
	N, E	PR_1	18 11	...	...	...	
	N, E	iS	22 5	...	...	...	
	N, E	SR_1	23 13	...	...	...	
	N, E	L	25 ...	...	...	...	
	N	Mn	27 19	17	226	...	
	E	Mn	27 37	14	145	...	
	N,E	F	01 09 ...	...	...	...	
,, 24	N	e	22 46 0	...	...	...	Feeble, distant.
	N	Mn	23 10 46	...	...	...	
	N	F	0 7 ...	...	...	...	
,, 26	E	Mn	22 58 22	...	...	...	Seismic activity.
	N	Mn	23 1 14	...	...	...	
,, 27	E	i	3 10 15	...	...	...	Feeble, near.
	N,E	i	13 26	...	...	...	
	N	F	40 ...	...	...	...	
	E	F	43 ...	...	...	...	
,, 28	N,E	e	7 2 ...	...	...	...	Seismic activity.
,, 29	N,E	e	12 46 23	...	...	...	Feeble, near.
	N,E	e	50 12	...	...	...	
	N,E	F	13 11 ...	...	...	...	
,, 29	N,E	i	22 25 59	...	...	...	Slight.
	N,E	i	29 30	...	...	...	
	E	Mn	32 35	15	5	...	
	N,E	F	23 25 ...	...	...	...	
Sept. 4	N, E	eP	8 20 00	...	...	6950	Slight, Epc : Japan (Manila).
	N,E	S	28 35	...	...	...	
	N	Mn	51 43	...	...	...	
	E	Mn	51 35	...	...	...	
	E	F	10 21 ...	...	...	...	
	N	F	18 ...	...	...	...	
,, 6	N,E	e	18 5 ...	...	...	...	Feeble, distant.
	E	M	51 25	...	...	...	
	N,E	F	19 32 ...	...	...	...	
,, 7	N,E	i	2 35 18	...	...	...	Slight, near.
	N,E	i	38 50	...	...	...	
	N,E	L	41 ...	...	...	...	
	N	Mn	44 15	7	6	...	
	E	Mn	42 39	8	3	...	
	N,E	F	Masked by microseisms.				
,, 7	N	M	9 6 11	...	...	...	Seismic activity.
	E	M	4 13	...	...	...	
,, 8	N,E	e	8 18 34	...	...	...	
	N,E	i	18 59	...	...	...	
	N,E	F	Masked by microseisms				
,, 12	N, E	e	18 18 ...	...	...	...	Slight.
	N	Mn	26 10	...	...	...	
	E	M	28 7	...	...	...	
	N, E	F	46 ...	...	...	...	

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Sept. 18	N,E	e	18 49 ...	...	...	...	
	E	e	57 29	...	...	...	
	N,E	e	59 ...	...	...	...	
	N	M	23 12	...	...	...	
	E	M	23 14	...	...	...	
	N,E	F	20 26 ...	...	...	...	
„ 19	N,E	eP	1 7 43	...	...	3145	Moderate. Epc : North Sumatra 4·3° N., 97·8 E. (J. S. A.).
	N,E	PR_1	8 33	...	...	...	
	N,E	PR_2	8 53	...	...	...	
	N,E	PcP	11 3	...	...	...	
	N,E	S	12 37	...	...	...	
	N,E	SR_1	13 2	...	...	...	
	N,E	L	15 ...	...	...	...	
	N	ScS	17 26	...	...	...	
	N	Mn	20 8	15	104	...	
	E	Mn	18 56	19	165	...	
	N,E	F	5 21 ...	...	...	...	
„ 19	N,E	eP	6 36 19	...	...	3035	Slight.
	N,E	PR_1	36 59	...	...	...	
	N,E	IS	41 5	...	...	...	
	N,E	SR_1	42 31	...	...	...	
	N,E	L	45 ...	...	...	...	
	N	Mn	55 22	14	12	...	
	E	Mn	51 36	12	8	...	
	N,E	F	8 37 ...	...	...	...	
„ 21	N,E	e	11 49 ...	...	...	...	Slight, distant.
	E	Mn	12 7 11	...	...	...	
	N,E	F	47 ...	...	...	...	
„ 24	N,E	e	8 39 ...	...	...	...	Slight.
	N,E	F	9 19	...	...	...	
„ 25	N,E	e	13 13 ...	...	...	...	Slight, distant.
	N	F	14 27 ...	...	...	...	
	E	F	52 ...	...	...	...	
Oct. 3-4	N,E	iP	21 59 25	...	...	5700	Moderate. Epc : Celebes Sea. O: 21h. 50m. 20s. G. M. T.
	N,E	PcP	22 0 40	...	...	...	
	N,E	IS	6 49	...	...	...	
	N,E	PS	7 02	...	...	...	
	N,E	SR_2	11 16	...	...	...	
	N	Mn	27 32	15	10	...	
	E	Mn	28 2	15	17	...	
	N	F	23 56 ...	...	...	...	
	E	F	00 16 ...	...	...	...	
„ 4	E	e	7 47 ...	...	...	...	Slight, distant.
	E	Mn	8 13 27	...	...	...	
	E	F	42 ...	...	...	...	
„ 5	N,E	e	0 13 22	...	...	...	Slight, very distant
	N,E	i	0 23 0	...	...	...	
	N	Mn	1 3 18	23	9	...	
	E	Mn	2 8	19	11	...	

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Oct. 5	N,E	e	6 17 23	...	...	...	Slight, distant.
	N,E	i	24 27	...	...	...	
	N	Mn	41 22	...	...	...	
	E	Mn	41 30	...	...	...	
	N	F	7 00 ...	...	...	...	
	E	F	7 00 ...	...	...	...	
„ 5	E	iP	9 53 53	...	...	3810	Moderate. Epc: 3° N. 126·4° E. (J. S. A.). O: 22h. 44m. 38s. G. M. T.
	N	F					
	N,E	PR_1	56 60	...	...	...	
	E	PR_2	57 7	...	...	...	
	N,E	IS	10 1 25	...	...	...	
	N,E	ScS	2 39	...	...	...	
	E	SR_1	5 11	...	...	...	
	E	SR_2	6 30	...	...	...	
	N,E	L	11 00	...	...	...	
	N	Mn	19 30	15	14	...	
	E	Mn	16 30	23	138	...	
	N	F	11 53 ...	...	...	...	
	E	F	13 24 ...	...	...	...	
„ 10	N,E	e	3 18 ...	...	...	...	Tremors.
		F	4 15 ...	...	...	...	
„ 13	N,E	e	6 42 ...	...	...	...	Tremors.
	E	F	7 39 ...	...	...	...	
	N	F	29 ...	...	...	...	
„ 14	E	e	22 33 ...	...	...	...	Tremors.
		F	23 46 ...	...	...	...	
„ 15	N,E	i	21 28 14	...	...	...	Slight, distant.
	E	Mn	22 31 23	15	5	...	
	E	F	23 24 ...	...	...	...	
„ 16	N,E	iP	12 8 56	...	...	9100	Slight.
	N,E	IS	19 11	...	...	...	
	E	PS	19 40	...	...	...	
		L	35 ...	...	...	...	
		F	13 51 ...	...	...	...	
„ 19	E	iP	12 14 9	...	...	6080	Slight. Epc : Off Celebes.
	N	eP					
	N,E	IS	21 45	...	...	...	
	N,E	PS	22 15	...	...	...	
	E	ScS	23 49	...	...	...	
	N,E	L	30 ...	15	7	...	
	N	F	14 17 ...	...	...	...	
	E	F	15 15 ...	...	...	...	
„ 20	N,E	e	22 14 30	...	...	...	Slight.
	N,E	i	15 10	...	...	...	
	N,E	i	18 5	11	6	...	
	N	F	45 ...	...	...	...	

TABLE D_2—*contd.*

Date.	Compt.	Phase.	G. T. M.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Oct. 21	E	i	1 7 24	...	...	....	Slight.
	E	i	2 4 8	...	...	....	
	E	F	30 ...	...	...	....	
,, 21	N,E	e	5 32 45	...	...	...	Feeble, distant.
	N,E	F	6 26 ...	...	...	...	
,, 22	N,E	e	10 20 ...	...	...	...	Tremors.
	N,E	F	40 ...	...	...	...	
,, 22	N,E	e	22 5 45	...	...	...	Tremors.
		F	23 9 ...	...	...	...	
,, 23	N,E	e	0 20 ...	...	...	...	Tremors.
	N,E	F	1 3 ...	...	...	...	
,, 23	E	eP	6 37 27	...	...	10220	Moderate, N-Boom was not free.
		PR_1	41 13	...	...	...	Epc: 60·8° N., 149·4° W. (J. S. A) Alaska.
		e	45 4	...	...	...	O: 6h. 24m. 24s. G. M. T.
		ScPcS	48 0	...	...	...	
		PPS	50 21	...	...	...	
		SR_1	55 07	...	...	...	
		L	7 8 0	...	...	...	
		Mn	15 58	21	31	....	
		F	10 13 ...	...	...	...	
,, 25	N,E	e	15 40 30	...	...	...	Seismic activity.
	N,E	i	48 42	...	...	...	
,, 26	N,E	P	19 38 35	...	...	3500	Moderate, Epc: West of Malay Peninsula. O: 19h. 32m. 18s. G. M. T.
	N,E	iS	43 51	...	...	...	
	N,E	SR_1	45 22	...	...	...	
	N,E	L	48 ...	...	...	...	
	N	Mn	53 29	14	16	...	
	E	Mn	52 44	15	17	...	
	N,E		Mixed up with microseisms.				
,, 26	N,E	e	23 17 ...	...	...	...	Slight, distant.
	N,E	e	26 ...	...	...	...	
,, 29	N,E	eP	18 50 0	...	...	7500	Slight. Epc: 13·5°N., 145°E. Damage in Guam, O: 18h. 39m. 8s. G. M. T.
	E	PR_1	52 11	...	...	...	
	N,E	S	59 2	...	...	...	
	N,E	ScS	59 53	...	...	...	
	N,E	SR_1	19 3 16	...	...	...	
	E	Mn	20 24	15	8	...	
	N	F	21 38 ...	...	...	...	
	E	F	53 ...	...	...	...	
,, 30	N,E	e	14 27 20	...	...	...	Seismic activity.
,, 31	N	M	16 10 37	...	...	...	Seismic activity.
	E	M	16 8 37	...	...	...	
Nov. 1	N,E	e	17 20 ...	...	...	...	Feeble.
	N,E	F	18 8 ...	...	...	...	

Date	Compt.	Phase.	G. T. M.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Nov. 2	N,E	IP	15 9 4	...	...	7690	Moderate. Epc: 48·5° N., 1 E: Near K Islands. O: 14h. 58m. G. T.
	N,E	PcP	9 20	...	...	...	
	N,E	1S	18 14	...	...	...	
	N,E	SR_1	23 22	...	...	...	
	N,E	L	32 ...	...	...	...	
	N	Mn	41 33	16	40	...	
	E	Mn	41 54	15	54	...	
	N	F	18 32 ...	...	...	...	
	E	F	39 ...	...	...	...	
,, 2	N,E	IP	20 56 19	...	...	6710	Moderate. Epc: 41°N., 189 Destructive in F jama, Japan. Kew △ = 83·5° O: 20h. 46 m. G. M. T.
	N,E	PcP	57 7	...	...	...	
	N,E	S	21 4 40	...	...	...	
	N,E	PS	5 6	...	...	...	
	N,E	ScS	6 4	...	...	...	
	N,E	SR_1	8 52	...	...	...	
	N,E	L	16 ...	...	...	...	
	N	Mn	23 16	21	131	...	
	E	Mn	23 46	23	207	...	
	N	F	0°37 ...	...	...	...	
	E	F	1 00 ...	...	...	...	
,, 3	N,E	e	5 3 ...	...	...	...	Feeble.
	E	M	25 34	...	...	...	
	N,E	F	50 ...	...	...	...	
,, 4	N,E	e	7 29 ...	...	...	...	Feeble.
	N,E	e	36 ...	...	...	...	
	E	M	46 44	...	...	...	
	N,E	F	8 35 ...	...	...	...	
,, 4	N	e	9 19 ...	...	...	...	Feeble.
	E	M	33 28	...	...	...	
	N,E	F	50 ...	...	...	...	
,, 4	N,E	e	13 55 ...	...	...	...	Feeble.
	N	F	14 25 ...	...	...	...	
	E	F	41 ...	...	...	...	
,, 5	N,E	e	23 38 ...	...	...	...	Feeble.
	N,E	e	40 ...	...	...	...	
	N,E	F	48 ...	...	...	...	
,, 9	N,E	e	14 10 ...	...	...	...	Feeble.
	N,E	F	55 ...	...	...	...	
,, 10	N	M	13 30 43	...	...	...	Seismic activity.
	E	M	31 15	...	...	...	
,, 10	N,E	M	17 49 30	...	...	...	Seismic activity.
,, 10	N,E	e	17 57 ...	...	...	...	
	N,E	e	18 1 ...	...	...	...	
	N,E	F	Masked by microseisms.				
,, 11	N	M	1 28 36	...	...	...	Seismic activity.
	E	M	28 27	...	...	...	
,, 11	N,E	e	4 50 ...	...	...	...	Feeble.
	N,E	F	Masked by microseisms.				

TABLE D — cont.

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Nov. 11	N,E	e	17 19 ...	...	...	...	Feeble.
	N	M	23 51	...	...	...	
	E	M	22 44	...	...	...	
	N,E	F	Masked by microseisms.				
,, 12	N,E	i	20 24 1	...	...	...	Feeble.
	N,E	F	57 ...	...	...	...	
,, 13	N,E	M	0 13 48	...	...	...	Seismic activity.
,, 13	N,E	iP	12 43 9	...	...	8370	Moderate. Epc: 56°·N., 165° E., (Strasbourg) O : 12h. 31m. 29s. G. M. T.
	N,E	PR_1	45 58	...	...	...	
	N,E	iS	52 52	...	...	...	
	N,E	PS	53 16	...	...	...	
	N,E	SR_1	57 40	...	...	...	
	N,E	SR_2	13 1 14	...	...	...	
	N,E	L	8 ...	...	...	...	
	N	Mn	13 24	22	23	...	
	E	Mn	17 28	19	31	...	
	N,E	F	16 23 ...	...	...	...	
,, 14	N,E	e	4 34 19	...	...	...	Feeble, near.
	N,E	e	38 30	...	...	...	
	N,E	F	5 47 ...	...	...	...	
,, 14	N,E	e	14 51 ...	...	...	...	Feeble.
	N,E	F	15 41 ...	...	...	...	
,, 14	N,E	e	19 50 ...	...	...	...	
	N,E	F	20 38 ...	...	...	...	
,, 15	N,E	e	22 11 ...	...	...	...	Feeble.
	N,E	F	23 39 ...	...	...	...	
,, 16	N,E	e	23 41 ...	...	...	...	Feeble.
,, 17	N,E	i	49 29	...	...	...	
	N,E	F	0 10 ...	...	...	...	
,, 18	N,E	e	15 56 ...	...	...	...	Feeble.
	N,E	F	16 49 ...	...	...	...	
,, 19	N	P_1	21 30 0	...	...	16020	Slight. Epc: 14° N, 91° W. (U. S. C. G. S.).
	E	e	30 12	...	...	...	
	N	PR_2	33 11	...	...	...	
	N,E	$\overline{ScPcP}$	33 34	...	...	...	
	N,E	SR_2	58 24	...	...	...	
	N	Mn	22 40 30	...	...	...	
	E	Mn	43 53	...	...	...	
	N,E	F	23 46 ...	...	...	...	
,, 22	N,E	P_1	18 38 52	...	...	16080	Slight. Epc: 14° N, 90° W., (U. S. C. G. S.). O : 18h. 19 m. 17s. G. M. T.
	N	PR_1	42 7	...	...	...	
	N	$\overline{ScPcP}$	42 29	...	...	...	
	E	SR_2 (?)	19 7 15	...	...	...	
	E	M	49 28	...	...	...	
	E	M	52 44	...	...	...	
	N,E	F	20 48 ...	...	...	...	

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Nov. 23	N,E	eP	1 34 5	...	...	1710	Slight. Epc : 28°·5 N., 85° E. North of Nepal. O : 1h. 30m. 23s. G. M. T.
	N,E	eS	37 5	...	...	...	
	N,E	SR_1	37 28	...	...	...	
	N,E	L	38 ...	...	...	...	
	N	Mn	41 35	6	9	...	
	E	Mn	41 28	6	8	...	
	N,E	F	2 13 ...	...	...	...	
,, 24	N,E	e	13 42 ...	...	...	...	Feeble, distant.
	E	F	14 30 ...	...	...	...	
,, 29	N,E	e	4 15 ...	...	...	...	Feeble, near.
	N,E	F	37 ...	...	...	...	
,, 29	N,E	e	8 44 ...	...	...	...	Slight, distant.
	E	Mn	9 25 37	...	...	...	
	N,E	F	10 20 ...	...	...	...	
,, 29	N,E	e	22 58 ...	...	...	...	Slight.
	N,E	F	23 43 ...	...	...	...	
,, 30	N	eP	23 55 32	...	...	6010	Slight. Epc ; Near Celeves Islands. O : 23h. 46m. 6s. G. M. T.
Dec. 1	E	iP					
	N,E	PeP	56 42	...	...	...	
	N,E	iS	00 3 13	...	...	...	
	N,E	ScS	5 13	...	...	...	
	E	SR_1	7 00	...	...	...	
	N,E	L	13 ...	...	...	...	
	E	Mn	20 8	...	...	...	
	N,E	F	1 29 ...	...	...	...	
,, 1	N	eP	6 18 0	...	...	5290	Slight. Epc : 30°5 N, 122° H. O : 6h. 9 m. 27s. G. M. T
	N	iS	25 1	...	...	...	
	N	F	7 11 ...	...	...	...	
,, 3	N,E	e	00 54 15	...	...	...	Seismic activity.
	N	M	00 56 22	...	...	...	
	E	M	56 31	...	...	...	
,, 3	E	e	20 12 ...	...	...	...	Feeble.
	N	e	13 ...	...	...	...	
	E	M	17 35	...	...	...	
		F	46 ...	...	...	...	
,, 4	N,E	e	22 51 ...	...	...	...	Feeble, distant.
	N,E	F	00 21 ...	...	...	...	
,, 5	N,E	e	19 27 ...	...	...	...	Feeble, near.
	N,E	F	20 34 ...	...	...	...	
,, 9	N,E	e	14 54 ...	...	...	...	Tremors.
	N,E	F	15 13 ...	...	...	...	
,, 13	N,E	P	21 41 59	...	...	7470	Slight. Epc. : 10°N., 141°E., Near Caroline Islands. O : 21 h. 31 m. 5 s G. M. T. Hong tong △ = 28°, 9.
	N,E	S	50 59	...	...	...	
	N,E	F	22 47 ...	...	...	...	

TABLE D_2—*concld.*

Date.	Compt.	Phase.	G. M. T.	Period.	Amplitude.	△	Remarks.
			H. M. S.	Sec.	μ	Km.	
1936.							
Dec. 14	N	iP(?)	4 12 0	...	...	4810	Slight.
	E	i	13 42	...	...	...	
	N,E	iS	18 34	...	...	...	
	E	i	22 8	...	...	...	
	N,E	F	Obliterated by microseisms.				
,, 20	N,E	P	18 36 58	...	...	4280	Slight. Epc: South Sumatra. O: 18h. 29m. 35s. G. M. T.
	N,E	PR_s	38 35	...	...	...	
	N,E	S	43 3	...	...	...	
	N,E	SR_s	46 4	...	...	...	
	N,E	L	49 ...	...	...	...	
	N,E	F	19 58 ...	...	...	...	
,, 21	N,E	e	19 19 ...	...	...	...	Slight, distant.
	N,E	F	21 26 ...	...	...	...	
,, 22	E	e	8 1 2	...	...	...	Slight, near. N-trace lost.
	E	i	1 56	...	...	...	
	E	F	11 ...	...	...	...	
,, 26	E	P_1(?)	23 11 0	...	...	12953	Slight. Epc: North off New Zealand. (Chieu-feng).
,, 27	E	PR_1	12 0	...	...	...	
1936. Dec. 26 ,, 27	E	PR	14 22	...	...	...	
	N,E	PS	21 45	..	...	...	
	N,E	PPS	23 15	..	...	...	
	E	SR_1	28 30	...	...	...	
	E	Mn	57 30	24	11	...	
	N	Mn	00 1 30	19	6	...	
	N,E	F	Masked by following shock.				
,, 27	E	i	16 19 45	...	...	...	Slight, distant. Preliminary portion mixed up with coda of earlier shock.
	E	M	50 15	17	6	...	
	N	M	49 50	16	5	...	
	N,E	F	1 49 ...	...	...	...	
,, 29	N,E	iP	15 0 10	...	...	9010	Slight. Epc: 6° 5 149°E.
	N,E	iS	10 21	...	...	...	
	N,E	PS	11 13	...	...	...	
	E	SR_1	16 5	...	...	...	
	N,E	L	26 ...	...	...	...	
	N,E	F	17 40 ...	...	...	...	

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