M.O. 360
(Richmond)

Air Ministry

METEOROLOGICAL OFFICE

THE OBSERVATORIES' YEAR BOOK 1932

Comprising the meteorological and geophysical results obtained from autographic records and eye observations at the observatories at Lerwick, Aberdeen, Eskdalemuir, Cahirciveen (Valentia Observatory), and Richmond (Kew Observatory), and the results of soundings of the upper atmosphere by means of registering balloons.

RICHMOND (KEW OBSERVATORY)

Published by the authority of the
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LONDON
HIS MAJESTY'S STATIONERY OFFICE
1934

RICHMOND (KEW OBSERVATORY).

Latitude..	51° 28′ N.
Longitude	0° 19′ W.
G.M.T. of Local Mean Noon	12h. 1m.

"Heights in Metres above Sea Level."

Barometer	10·4
Raingauge Site	5·5
Dines Tube Anemograph	28

"Heights in Metres above Ground"

Thermometer Bulbs	3·0
Sunshine Recorder	13·3
Dines Tube Anemograph	23
Beckley Raingauge Rim	0·53

INTRODUCTION.

The Observatory was built in 1769 as the private observatory of King George III. Since 1842 it has been devoted to physics and meteorology. The meteorological records are continuous from 1854. The Observatory is in the Old Deer Park, Richmond (Surrey), about 10 miles (16 km.) to the west of the City of London. The Observatory stands on a low artificial mound whose level is about 1½ metres higher than than that of the surrounding park. Round the Observatory a golf course has been laid out. The river Thames is distant about 300 metres on the north and west. Kew Gardens, which are extensively wooded, lie to the east-north-east, the nearest point of the Gardens being about 600 metres away. The town of Richmond, to the south-east, is about 1,100 metres distant. On the east side of the Park is the main road from Richmond to Kew; on the south side the railway from Richmond to Twickenham. An open area partly wooded, Syon Park, lies to the north-north-east across the river. Richmond Park is about 1½ miles (2½ km.) to the south-east. General views of the Observatory building and the exposure lawn are to be found in the 1928 volume. The photographs were taken in 1925, but the only changes (before the end of 1932) which need be noted are the substitution of other experimental screens for the small marine screens which were being tested in 1925, the removal in 1929 of the hedge near the North Wall Screen and the igation carried out for the Atmospheric Pollution Committee by Mr.J.G.Clark.† When the normal volume of air, 2 litres, is aspirated (it is drawn through a hole 3·2 mm. in diameter) shade number 1 answers to 0·32 milligrams per cubic metre. The Owens apparatus was designed in the first place for dealing with the air of cities, and the amount of pollution at the Observatory is usually so small that the shade recorded when the 2 litres are aspirated is either 0 or 1.

Preliminary experiments with a spare recorder having justified the assumption that increasing the volume of air would increase the shade number in proportion, an auxiliary tank was brought into use at the beginning of July, 1928. With this tank in operation each spot on the filter paper corresponds with 6·4 litres of air. The unit shade is therefore equivalent to 0·1mg/m^3. When fog prevails the auxiliary tank is put out of action and the unit shade reverts to the value 0·32 mg/m^3.

Special attention is now paid to the maintenance of consistency in the standard of shades. Each new scale of shades is compared directly with the standard preserved by Dr. Owens. New scales of shades were taken into use on the following dates:-

June 7, 1925; July 1, 1926; (retrospectively) January 1, 1928; August 1, 1930; January 1, 1931; and June 1, 1931.

During 1932 the highest estimate of pollution was 3·5 mg/m^3, this value occurring on March 14th from 10h to 11h. There were 39 days on which the pollution reached 1·0 mg/m.^{3}; the number of hours credited with 1·0 mg/m^3. or more being 209. The months in which these days and hours occurred are given in the accompanying table.

	days	hours
Jan.	10	47
Feb.	8	47
Mar.	9	51
Oct.	2	5
Nov.	6	37
Dec.	4	22
Year	39	209

Table 544 gives for each month mean hourly values derived from all the days for which complete records were obtained. There were 357 such days in the year. The highest and lowest of these hourly values are in heavy type.

Table 545 gives diurnal inequalities derived from the data in Table 544 after the application of non-cyclic corrections. The principal reason for computing the diurnal inequalities was to facilitate comparision with the corresponding diurnal variations in barometric pressure and in the potential gradient of atmospheric electricity.

The mean values computed for recent years are given in the following table, together with the means for successive pairs of months. The unit is 1 mg/m^3.

†"Report of the Advisory Committee for Atmospheric Pollution," 3rd Report, 1916-1917, p. 20

	1926	1927	1928	1929	1930	1931	1932
Jan.-Feb. ..	·29	·25	·22	·40	·18	·24	·32
Mar.-Apr. ..	·30	·10	·18	·27	·13	·15	·26
May-June ..	·08	·07	·09	·05	·05	·06	·09
July-Aug. ..	·07	·05	·05	·06	·07	·07	·05
Sept.-Oct. ..	·19	·17	·15	·10	·13	·25	·15
Nov.-Dec. ..	·26	·21	·25	·21	·29	·33	·29
Year	·20	·14	·15	·18	·14	·18	·19

The nature of the diurnal variation is most easily recognised in Table 545. There is always a well defined minimum during the night and another in the early afternoon. The first maximum of the day usually occurs about 9h and the second one follows about 12 hours later. This double oscillation is apparently due to two causes, the variation in human activity in producing pollution and the variation in the wind which disperses it. In 1932 the principal maximum was in the evening from February to May and from October to December; in the forenoon in the remaining months. The principal minimum occurred in the afternoon from May to August; in the early morning in the remaining months. Curves illustrating the diurnal variation of atmospheric pollution will be found in the Annual Reports of the Advisory Committee on Atmospheric Pollution and in a paper by Dr. Whipple on the relation between Atmospheric Pollution and Potential Gradient.‡

SEISMOLOGY.

Notes on Instruments.—The seismographs, three Galitzin pendulums with galvanometric registration, were transferred from Eskdalemuir Observatory during the latter part of 1925 and have been in regular operation since the beginning of 1926. Earth movements in the north, east and vertical directions are recorded. The pendulums, which are in the old magnetograph room, are mounted on a massive concrete pillar, separated from the floor. The galvanometers and recording apparatus are accommodated on slate slabs in the old seismograph room, which housed the Milne instrument until it was put out of action on June 17th, 1925. To eliminate temperature variation as far as possible, the windows of the pendulum room are provided with triple glass and also shielded by louvred screens from direct sunshine which might fall on them morning and evening. The annual range of temperature variation is about 10°C. and the mean daily range about 0·2°C. To diminish the sensitivity of the vertical pendulum to temperature changes the steel controlling spring was replaced in May, 1928, by one made of elinvar, an alloy which has a temperature coefficient of elasticity about one-tenth that of steel*. A detailed report on the behaviour of the spring has been published in a paper† by F.J. Scrase. The difficulties usually associated with the operation of the vertical pendulum have been greatly diminished.

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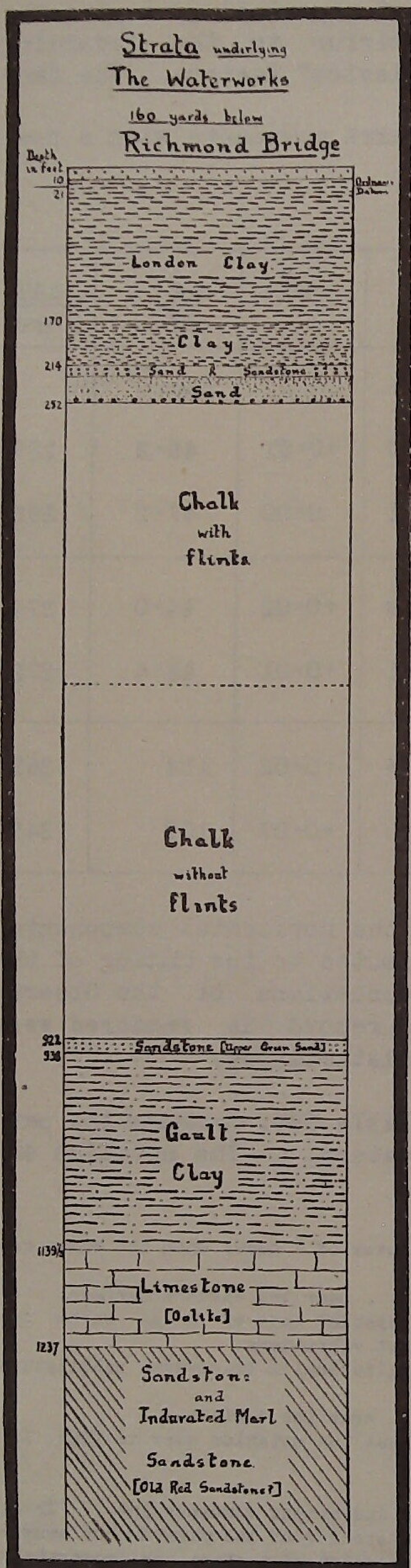
‡ London, Roy. Met. Soc., Q.J., Vol. 55 (1929) No. 231.

* Y. Dammann. "Contribution à l'étude des propriétés élastiques de l'élinvar. Son utilisation dans les séismographes," "Publ. Bur.Cent.Seis. Int., Strasbourg," Ser. A, Fasc. No. 5, 1927, pp. 122-129.

† "London, Inst. Physics, J. Sci. Instr.," 6, 1929, p. 385.



A. Strahan
Prof. Paper No 10, Survey of India

The concrete pillar rests on gravel. The underlying geological strata are shown in the diagram on this page. The diagram is based on the results obtained* in sinking a well near Richmond Bridge. The Richmond boring terminated at a depth of 440 metres in Old Red Sandstone. At Stonebridge Park, 8 km. to the north, a boring was carried down† to a depth of 600 metres, the last 280 metres being in Old Red Sandstone. There is no information as to deeper strata near Richmond. It may be noted, however, that the sandstone beds dip at about 30° and that a boring at Little Missenden, Bucks, entered Silurian rocks at a depth of 370 metres with no evidence of the presence of Old Red Sandstone.

For detailed description of the Galitzin seismograph and for particulars of interpretation of the records, reference may be made to Fürst B Galitzin's "Vorlesungen über Seismometric (Leipzig, 1914), or to G.W. Walker's "Modern Seismology" (London, 1913). ††

Timing is controlled by a half-seconds clock (Morrison 8587) which is rated daily by comparison with the Greenwich wireless time-signal relayed from Daventry. Time breaks are made electro-magnetically every minute and seismometric readings can be determined to the nearest second.

The free periods of the Galvanometers (T_1), were determined in November, 1925, and were found to have suffered very little change since the original determinations at Eskdalemuir were made. The lengths of the simple equivalent pendulums(l) are assumed to have remained unaltered.

The values of the other constants which are used for deriving the scale values were re-determined in September 1932. In the case of the horizontal instruments it was found that the magnifications agreed closely with those obtained from the previous tests in October 1931. Some adjustments to the vertical pendulum were carried out on September 7th.

The table given below summarises the values of the constants. T is the free period of the pendulum, μ is a damping coefficient which van-

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* "London. J. Geol. Soc"., 40, 1884, 41, 1885, p.523.
† Records of London Wells, "Mem. Geol. Surv. Eng., London", 1913.
†† The graphical method adopted at Kew for determining the constants of the pendulums is explained in a memoir by F. J. Scrase, "Geophysical Memoirs",

ishes when the free movement of the pendulum is just aperiodic, A is the length of the beam of light from the galvanometer mirror to the recording drum (usually about 1100 mm), and k is the "transmission" factor. The factor $\frac{kAT}{4\pi l}$ determines the magnification for regular earth movements with a period equal to that of the pendulum.

Component	l	T	1932	T	μ^2	$\frac{kA}{\pi l}$	$\frac{kAT}{4\pi l}$
	mm.	sec.		sec.		$sec.^{-1}$	
N	118	24·68	Jan. 1 to Sept. 6	25·0	+0·01	46·2	289
			Sept. 6 to Dec. 31	25·1	0·00	47·2	296
E	118	24·80	Jan. 1 to Sept. 5	24·9	+0·02	44·0	274
			Sept. 5 to Dec. 31	25·1	+0·01	43·4	272
Z	360	13·04	Jan. 1 to Sept. 7	12·6	+0·02	114	359
			Sept. 7 to Dec. 31	12·8	+0·07	109	349

In windy weather the seismographs, especially the horizontal components, are affected by slow oscillations, which are attributed to the tilting of the ground, the movement being conveyed through the foundations of the Observatory. On occasions the reading of an earthquake record is rendered very difficult, if not impossible, by these irregular disturbances.

Notes on Tables.—The "Seismological Diary", Table 546, contains the particulars of the earthquakes recorded at the Observatory. The notation employed is as follows:—

P is the normal first phase (longitudinal waves). Special cases of P occur when the waves are reflected from (P_cP) or penetrate (P′) the earth's central core.

PR_1, PR_2 . . . are longitudinal waves reflected once, twice . . . near the earth's surface.

S is the normal second phase (transverse waves). S_cP_cS is a special case of S in which the waves penetrate the central core and pass through it as longitudinal vibrations.

PS and PPS are waves which suffer a change or changes from longitudinal to transverse oscillation or vice versâ, on reflection near the surface.

SR_1, SR_2 . . . are transverse waves reflected once, twice . . . near the surface.

For the supplementary reflected waves from deep focus earthquakes the notation used is that introduced by F. J. Scrase. London, Proc. Roy. Soc., A. 132 (1931).

L indicates long waves (surface waves).

i is the sudden commencement of a phase. e means a gradual or indistinct commencement. These letters are used as prefixes to the phase symbols, but where the character of the phase is not assignable the letters are used as independent symbols. When the commencement of a phase is moderately clear the prefixes are not used.

The suffixes N, E, Z indicate that the estimates refer to the records from the north-south, east-west and vertical seismographs respectively. The absence of all these suffixes indicates that the estimates refer to all three records.

All times entered against the above phases are the times of arrival of the phases at the station.

m_1, m_2 . . . are successive prominent maxima of sinusoidal waves occurring in the preliminary phases. M_1, M_2 . . . are successive prominent maxima occurring during the principal or surface phase.

The period is the duration of a double oscillation (to and fro movement).

A_N, A_E, A_Z are the amplitudes, in microns (=0·001 mm.), of the components of the true displacement of the ground from the position of rest. Displacements to the north, east and upwards are regarded as being positive. When successive positive and negative displacements have the same magnitude the time of occurrence is given for the positive one. When no sign is given the measurement refers to a long group of waves the amplitudes of which are the same.

The following formulæ, due to Galitzin, are employed for computing the times of the maxima and the amplitudes of sinusoidal waves:—

(1) Lag of the displacement shown by the galvanometer after the maximum displacement of the ground

$$\tau + \tau_1 = \frac{T_p}{2\pi}\left[\tan^{-1}\frac{2u\,(1-\mu^2)^{\frac{1}{2}}}{u^2-1} + \tan^{-1}\frac{2u_1}{u_1^2-1} + \frac{\pi}{2}\right]$$

each inverse tangent being taken as between 0 and π

(2) Magnification of record =

$$\frac{kA\,T_p}{\pi\ell}\cdot\frac{1}{(1+u^2)(1+u_1^2)\left\{1-\mu^2 f(u)\right\}^{\frac{1}{2}}}$$

where T_p is the period of the earth wave considered,

$$u = \frac{T_p}{T},\quad u_1 = \frac{T_p}{T_1},\ \text{and}\ f(u) = \left[\frac{2u}{1+u^2}\right]^2 .$$

Δ is the distance in kilometres of the epicentre measured along the arc of a great circle. For earthquakes located within 10,000 km. of Kew the distance is generally derived from the interval between P. and S. by the tables, due to Zeissig, given in Klotz's "Seismological Tables" (Publication of the Dominion Observatory, Ottowa, Vol. III, No. 2). For greater distances other phases are considered and Δ is obtained from the travel curves given by Gutenberg.* The azimuth of the epicentre (0° to 360°) is measured from north through east. When an estimation of the azimuth is possible, it is used, together with Δ, for provisional determination of the co-ordinates of the epicentre. The co-ordinates given in the Diary have generally been received at a later date; the authorities for these determinations are inserted in brackets. Here the letters J.S.A. signify the Jesuit Seismological Association of America, and U.S.C.G.S., the United States Coast and Geodetic Survey.

Brackets enclosing figures or phase symbols indicate that the information is uncertain.

The total number of shocks recorded during the year was 246. The phases being sufficiently well defined, estimates of the epicentral distances were obtained for 57 shocks, whilst in 8 cases the records of the initial impulses were sufficiently sharp to allow of computations of azimuth and so of estimates of the co-ordinates of the epicentres. There were 8 earthquakes which produced a disturbance at the observatory with an amplitude exceeding 0·1 mm. in a horizontal component. These earthquakes originated in Celebes (May 14th.), in the Pacific Ocean south of Fiji (May 26th), in Mexico (June 3rd. and 18th), in Greece (September 26th and 29th), in Nevada (December 21st.) and in China (December 25h).

For comparison the statistics for all the years in which the Galitzin seismographs have been in operation at Kew Observatory are given:—

YEAR	Shocks recorded.	Epicentral distances.	Azimuths. estimated	Shocks exceding 0·1 mm.
1926	306	55	—	10
1927	314	76	6	9
1928	339	97	19	18
1929	320	74	6	12
1930	301	56	6	8
1931	274	53	11	16
1932	246	57	8	8

* Handbuch der Geophysik, Berlin, 1929, p. 212.

"Microseisms".—In Table 547 are given the amplitude (A) and period (T_p) of the microseisms shown by the north component seismograph on each day at 0h, 6h, 12h, and 18h. On a few occasions (less than 2 per cent. of the total number) when the north component record was not available measurements of the east component record have been included. The group of waves of greatest amplitude occurring in the 30 minutes centring at the hour in question is selected, and the amplitude tabulated is the mean obtained from the three largest complete waves in that group. The period is derived from a measurement made on the same group*. The total time, to the nearest second, for a number of complete consecutive waves is measured, the number of waves being chosen so that the time is between 23 and 30 seconds. The period is then derived from the following division table:—

Number of Waves		Time interval in seconds.						
	30	29	28	27	26	25	24	23
3	10	9·7	9·3	9·0	8·7	8·3	8·0	7·7
4	7·5	7·3	7·0	6·7	6·5	6·3		
5	6	5·8	5·6	5·4	5·2			
6	5	4·8	4·7	4·5				
7	4·3	4·1	4·0	3·9				
8	3·7	3·6	3·5					
9	3·3	3·2	3·1					
10	3·0	2·9	2·8					
11	2·7	2·6						
12	2·5							

In computing the mean period occasions of zero amplitude are omitted. The mean values of amplitude and period for each month of 1932 and for the year, together with the corresponding mean values for the period 1926 to 1932, are given below:—

MICROSEISMS—MONTHLY AND ANNUAL MEANS.

1926 to 1931	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
Amplitude (μ)	2·3	1·8	1·4	0·9	0·5	0·5	0·4	0·6	0·7	1·1	1·9	2·1	1·2
Period (sec.)	6·5	6·2	5·8	5·4	4·8	4·6	4·3	4·4	5·0	5·4	6·0	6·4	5·4
1932													
Amplitude (μ)	2·3	0·5	1·4	1·2	0·3	0·1	0·2	0·0	0:8	1·0	1·3	2·0	0·9
Period (sec.)	6·5	5·9	5·9	6·0	4·7	5·0	4·6	5·4	5·1	5·4	6·1	6·5	5·6

The means for the several hours are as follows:—

MICROSEISMS—MEANS AT SPECIFIED HOURS.

1926 to 1931	0h.	6h.	12h.	18h.
Amplitude (μ)	1·20	1·19	1·15	1·19
Period (sec.)	5·41	5·41	5·37	5·41
1932				
Amplitude (μ)	0·94	0·95	0·94	0·92
Period (sec.)	5·55	5·64	5·59	5·53

These figures indicate that there is no regular diurnal variation in amplitude or period of the microseisms recorded at Kew Observatory.†

* F.J.W. Whipple and F.J. Scrase, "On the Frequency of Microseisms of Different Periods at Eskdalemuir and at Kew," "London, Mon. Not. R.Astr.Soc.Geophys. Supp." **2**, No. 2, 1928.

† F.J.W. Whipple and A.W. Lee, "Studies in Microseisms," "London, Mon. Not. R. Astr. Soc. Geophys. Supp." **2**, No. 7, 1931.

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres. 1932.

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae.	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
Jan. 1	eL	17 9	...	...	...	...	...	
	F	15	...	...	...	...	...	
2/3	eL	23 45	...	...	...	...	...	Felt in Calabria, Southern Italy. 38·5° N., 17·5° E. (U.R.S.S.).
	M_1	47 24	16	+20	...	...	...	
	M_2	49 21	17	...	−37	...	...	
	M_3	49 29	16	...	...	−46	...	
	M_4	49 41	14	+21	...	...	...	
	F	0 0	...	...	...	...	...	
5	eL	2 53	...	...	...	...	...	
	F	3 20	...	...	...	...	...	
9	iz	10 40 13	...	...	...	...	...	Possibly deep focus or more than one shock.
	e	42 32	...	...	...	...	...	
	i	43 4	...	...	...	...	...	
	iNE	43 38	...	...	...	...	...	
	eNE	52 32	...	...	...	...	...	
	eL	11 2	...	...	...	...	...	
	M	28 54	14	...	−12	...	...	
	F	12 45	...	...	...	...	...	
13	eL	16 58	...	...	...	...	...	Confused by microseisms.
	F	17 30	...	...	...	...	...	
18	eL	13 20	...	...	...	...	...	
	M	23 59	16	...	−10	...	...	
	F	35	...	...	...	...	...	
20	eL	3 8	...	...	...	...	...	
	F	30	...	...	...	...	...	
24	eP[1]	4 3 58	...	...	...	...	(16000)	Greater deviation.
	iP^1_2z	4 14	...	...	...	...	...	
	eScPcSPNE	25 11	...	...	...	...	...	By path > 180°.
	ePSSE	26 3	...	...	...	...	...	
	eL	5 2	...	...	...	...	...	Tonga Islands. 17° S., 169° E. (Wellington).
	M_1	8 45	22	−8	...	...	...	
	M_2	9 29	22	...	+7	...	...	
	F	6 25	...	...	...	...	...	
25	e	3 14	...	...	...	...	...	Very small.
	F	35	...	...	...	...	...	
27	iPZE	19 45 10	...	...	...	...	2030	Dilatation.
	eS	48 36	...	...	...	...	...	
	L	49						
	M_1	49 57	18	−21	...	...	...	
	M_2	50 22	17	...	+9	...	...	
	M_3	51 39	13	...	...	+9	...	
	F	20 30	...	...	...	...	...	
29	eP[1]z	14 0 37	...	...	...	...	(15000)	Solomon Islands. 7° S., 156° E. (J.S.A.).
	ePcPcS	3 56	...	...	...	...	...	
	ePSE	14 18	...	...	...	...	...	
	eSR_1N	20 53	...	...	...	...	...	
	LNE	37	...	...	...	...	...	
	M_1	42 48	36	−65	...	...	...	
	M_2	43 8	38	...	−95	...	...	
	Lz	45	...	...	...	...	...	
	M_3	50 25	29	+56	...	...	...	
	M_4	54 33	20	...	+52	...	...	
	M_5	15 0 50	22	+35	...	...	...	
	M_6	24 15	19	...	...	+43	...	
	F	18 10	...	...	...	...	...	
30	eL	4 5	...	...	...	...	...	
	F	5 25	...	...	...	...	...	
31	eL	5 55	...	...	...	...	...	
	F	6 10	...	...	...	...	...	
31	e	17 7	...	...	...	...	...	Very small.
	F	40	...	...	...	...	...	
Feb. 1	e	8 10	...	...	...	...	...	Very small.
	F	30	...	...	...	...	...	
3	iPEZ	6 26 45	...	...	...	...	7350	Compression.
	iEZ	26 49	...	...	...	...	...	Azimuth about west.
	eS	35 32	...	...	...	...	...	Destructive in Santiago de Cuba.
	L	43	...	...	...	...	...	19°N., 76°W. (J.S.A.).
	M_1	46 36	17	−17	...	...	...	
	M_2	57 55	18	...	+24	...	...	
	M_3	57 58	17	...	...	−23	...	
	F	8 35	...	...	...	...	...	
Feb 3	e	9 59	...	...	...	...	...	
	F	10 10	...	...	...	...	...	
3	e	13 21	...	...	...	...	...	
	F	45	...	...	...	...	...	
5	eL	14 24	...	...	...	...	...	
	F	35	...	...	...	...	...	
12	e	1 17	...	...	...	...	...	
	F	25	...	...	...	...	...	
13	e	8 22	...	...	...	...	...	
	F	25	...	...	...	...	...	
16	eL	14 55	...	...	...	...	...	Fiji Islands. 13° S., 180° (J.S.A.).
	M	15 6 26	23	−6	...	...	...	
	F	16 20						
17	e	16 41	...	...	...	...	...	Very small.
	F	17 5	...	...	...	...	...	
21	e	12 59	...	...	...	...	...	
	F	13 5	...	...	...	...	...	
22	e	1 28	...	...	...	...	...	
	F	35	...	...	...	...	...	
23	ePR_1z	0 32 40	...	...	...	...	(12300)	South Atlantic Ocean. 56°S., 30°W. (J.S.A.).
	ePR_2	35 17	...	...	...	...	...	
	e(S)E	40 35	...	...	...	...	...	
	ePSN	42 15	...	...	...	...	...	
	eSR_1NE	48 10	...	...	...	...	...	
	eSR_2N	52 17	...	...	...	...	...	
	L	58	...	...	...	...	...	
	M_1	1 1 18	35	−28	...	...	...	
	M_2	1 34	41	...	−57	...	...	
	M_3	4 6	29	...	+34	...	...	
	M_4	17 18	17	...	...	+9	...	
	eL_2	2 16	...	...	...	...	...	Via Antipodes.
	F	50	...	...	...	...	...	
23	$e(PR_1)ZN$	20 33 2	...	...	...	...	...	Solomon Islands. 10° S., 161° E. (Stuttgart).
	eL	21 18	...	...	...	...	...	
	M	27 51	26	+5	...	...	...	
	F	23 25	...	...	...	...	...	
27	e	1 40	...	...	...	...	...	
	F	55	...	...	...	...	...	Very small.
Mar. 3	—	— — —	...	...	...	...	...	No records, 9h 30m to 17h 40m.
4/5	ePz	23 30 54	...	...	...	...	...	
	eL	52	...	...	...	...	...	
	F	0 10	...	...	...	...	...	
5	eN	2 15	...	...	...	...	...	Southern Spain. 37° 34′ N., 2° 45′ W. (Toledo).
	eL	17	...	...	...	...	...	
	M	18 31	15	...	−10	...	...	
	F	25	...	...	...	...	...	
5	e	3 15	...	...	...	...	...	Very small.
	F	40	...	...	...	...	...	
8	e	5 7	...	...	...	...	...	
	F	50	...	...	...	...	...	
8	eP[1]z	18 20 56	...	...	...	...	(17000)	Between Tonga and Kermadec Islands. 23° S., 179° W. (Stuttgart).
	$e(SR_2)NE$	48 42	...	...	...	...	...	
	eL	19 17	...	...	...	...	...	
	M	21 38	20	−3	...	...	...	
	F	20 15	...	...	...	...	...	
9	e	3 27	...	...	...	...	...	
	F	35	...	...	...	...	...	
9	ePz	10 21 29	...	...	...	...	2020	Destructive in Greek Island of Cephalonia.
	eSNE	24 54	...	...	...	...	...	
	L	27	...	...	...	...	...	
	M	31 32	10	...	...	+4	...	
	F	40	...	...	...	...	...	

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres. **1932.**

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
Mar. 10	ez	5 45	...	...	...	...	...	
	eL	6 32	...	...	...	...	...	
	F	7 45	...	...	...	...	...	
14	eLNE	4 44	...	...	...	...	...	
	eLZ	49	...	...	...	...	...	
	F	5 10	...	...	...	...	...	
14/15	iP	22 54 19	...	...	...	...	8100	Northern Columbia.
	iZE	54 25	...	...	...	...	...	10° N., 72° W.
	eSE	23 3 44	...	...	...	...	...	(J.S.A.).
	eE	4 31	...	...	...	...	...	
	L	15	...	...	...	...	...	
	M$_1$	18 36	27	...	−11	...	...	
	M$_2$	25 5	18	...	...	−11	...	
	F	0 10	...	...	...	...	...	
15	iPZ	4 51 26	...	...	...	...	...	Felt in Guam.
	eLNE	5 23	...	...	...	...	...	12·6° N., 146·3° E.
	eLZ	30	...	...	...	...	...	(Manila).
	M	37 39	23	−6	...	...	...	
	F	6 0	...	...	...	...	...	
18	e(S)NE	5 40 14	...	...	...	...	...	Indian Ocean.
	eL	53	...	...	...	...	...	13° S., 66° E.
	F	6 30	...	...	...	...	...	(Tananarive).
19	ePR$_1$	11 18 24	...	...	...	...	...	Felt in Guam.
	eSPZ	27 38	...	...	...	...	...	16·5° N., 149° E.
	eLNE	54	...	...	...	...	...	(Manila).
	M	55 31	27	+9	−5	...	...	
	eLZ	56	...	...	...	...	...	
	F	13 35	...	...	...	...	...	
20	eL	0 5	...	...	...	...	...	
	F	55	...	...	...	...	...	
26	iPZN	0 9 11	...	...	...	...	(7100)	Confused by micro-
	iPSN	18 37	...	...	...	...	...	seisms.
	eSR$_1$ZE	22 11	...	...	...	...	...	Alaska.
	LE	25 25	...	...	...	...	...	61° N., 151° W.
	LN	30 3	...	...	...	...	...	(J.S.A.).
	M$_1$	30 13	35	−50	−70	...	...	
	LZ	31	...	...	...	...	...	
	M$_2$	31 6	31	...	+87	...	...	
	M$_3$	33 43	27	+46	...	...	...	
	M$_4$	36 22	22	−42	...	...	...	
	M$_5$	38 14	20	...	...	−36	...	
	eL$_2$	2 30	...	...	...	...	...	Via Antipodes.
	F	3 0	...	...	...	...	...	
26	e	10 21	...	...	...	...	...	Confused by micro-
	eLNE	46	...	...	...	...	...	seisms.
	eLZ	56	...	...	...	...	...	Banda Sea.
	M	11 7 14	22	−24	...	...	...	4° S., 120° E. (Kôti).
	F	12 15	...	...	...	...	...	
28	e	1 37	...	...	...	...	...	
	F	45	...	...	...	...	...	
Apr. 3	eNE	21 23	...	...	...	...	...	Kermadec Islands.
	eL	23 3	...	...	...	...	...	33° S., 177° W.
	M	11 42	20	+6	...	...	...	(Strasbourg).
	F	40	...	...	...	...	...	
4	ez	19 34	...	...	...	...	...	South of Hatidyo
	eNE	38 46	...	...	...	...	...	Island.
	iNE	39 12	...	...	...	...	...	Focal depth about
	eN	41 46	...	...	...	...	...	300 km. (Kôti).
	eE	42 3	...	...	...	...	...	30° N., 141° E.
	eLNE	20 1	...	...	...	...	...	(Pasadena).
	eLZ	8	...	...	...	...	...	
	F	35	...	...	...	...	...	
6	e	9 57	...	...	...	...	...	
	F	10 10	...	...	...	...	...	
8	e	13 20	...	...	...	...	...	
	F	30	...	...	...	...	...	
13	ez	0 14 (53)	...	...	...	...	...	Solomon Islands.
	LNE	57	...	...	...	...	...	5° S., 152° E.
	LZ	1 0	...	...	...	...	...	(Manila).
	M	2 11	26	−10	...	...	...	
	F	35	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
Apr. 14	ePZE	1 42 49	...	...	...	...	2250	Compression.
	iZE	42 53	...	...	...	...	...	
	iSNE	46 (33)	...	...	...	...	...	In minute break.
	SZ	46 42	...	...	...	...	...	
	L	48	...	...	...	...	...	Atlantic Ocean.
	M$_1$	48 23	19	+12	...	...	...	56° N., 34° W.
	M$_2$	48 56	16	...	+12	...	...	(Stuttgart).
	F	2 20	...	...	...	...	...	
18	eL	12 0	...	...	...	...	...	
	F	15	...	...	...	...	...	
22	e	5 50	...	...	...	...	...	
	F	6 15	...	...	...	...	...	
24	eL	6 45	...	...	...	...	...	Lower California.
	M	59 24	19	+5	...	...	...	26° N., 112° W.
	F	7 15	...	...	...	...	...	(J.S.A.).
26	e	8 39	...	...	...	...	...	Chile.
	eL	44	...	...	...	...	...	25° S., 70° W.
	M	47 17	27	...	−7	...	...	(J.S.A.).
	F	9 10	...	...	...	...	...	
29	e	18 59	...	...	...	...	...	Aleutian Islands.
	eLNE	19 3	...	...	...	...	...	52° N., 177° W.
	eLZ	10	...	...	...	...	...	(Stuttgart).
	F	40	...	...	...	...	...	
30	ePZ	1 16 10	...	...	...	...	...	South Atlantic Ocean.
	eL	31	...	...	...	...	...	3° S., 20° W.
	F	55	...	...	...	...	...	(Stuttgart).
May 1	e	2 47 45	...	...	...	...	...	Felt in Southern
	F	53	...	...	...	...	...	France. 42·5° N., 6° W. (Strasbourg).
3	e	0 8	...	...	...	...	...	
	eL	21	...	...	...	...	...	
	F	40	...	...	...	...	...	
14	eL	3 55	...	...	...	...	...	
	F	4 5	...	...	...	...	...	
14	eP	13 25 38	...	...	...	...	(12000)	Compression.
	iPR$_1$Z	30 16	...	...	...	...	...	
	iPR$_2$Z	32 53	...	...	...	...	...	Destructive in Celebes.
	iScPcSE	36 6	...	...	...	...	...	1° N., 127° E.
	iScPcSN	36 14	...	...	...	...	...	(Strasbourg).
	i(S)E	37 52	...	...	...	...	...	
	i(S)N	37 58	...	...	...	...	...	
	iPSNE	39 34	...	...	...	...	...	
	iSPZ	39 40	...	...	...	...	...	
	iNE	41 22	...	...	...	...	...	
	iE	44 46	...	...	...	...	...	
	iSR$_1$	46 5	...	...	...	...	...	
	iSR$_2$	51 17	...	...	...	...	...	
	iNE	53 37	...	...	...	...	...	
	iZ	53 45	...	...	...	...	...	
	LQ	58	...	...	...	...	...	
	LR	14 6	...	...	...	...	...	
	M$_1$	6–8	(44)	...	(760)	...	...	
	M$_2$	7 24	36	(−740)	...	...	...	Amplitudes doubtful;
	M$_3$	13 10	35	(−640)	...	...	...	traces very faint and
	M$_4$	15 40	17	...	...	(+130)	...	confused by over-
	M$_5$	16 2	30	(+280)	...	...	...	lapping.
	M$_6$	22 59	27	...	(350)	...	...	
	M$_7$	23 11	19	(−280)	...	...	...	
	M$_8$	23 18	12	...	...	(+110)	...	
	F	17 30	...	...	...	...	...	
18	eL	20 4	...	...	...	...	...	
	F	35	...	...	...	...	...	
21	iPEZ	10 22 3	...	...	...	...	8520	Amplitudes of iP as
	iPcPEZ	22 26	...	...	...	...	...	read in mm.:—
	ePR$_1$EZ	25 3	...	...	...	...	...	N. E. Z.
	iSE	31 49	...	...	...	...	...	0·0 +1·7 +3·0
	eSR$_1$E	37 20	...	...	...	...	...	giving azimuth about
	eSR$_2$E	40 27	...	...	...	...	...	west.
	LN	43	...	...	...	...	...	
	LEZ	46	...	...	...	...	...	Destructive in Central America.
	M$_1$	47 34	31	−68	...	...	...	
	M$_2$	49 26	26	...	−52	...	...	13° N., 88° W.
	M$_3$	49 31	24	...	...	−72	...	(U.S.C.G.S.).

SEISMOLOGICAL DIARY.—*continued.*

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres. **1932.**

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. A_N	A_E	A_Z	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
May 21	M_4	50 15	26	−54	...	...	...	
	M_5	51 58	23	...	...	+56	...	
	M_6	56 49	18	...	−38	...	...	
	M_7	56 55	25	−39	...	...	...	
	F	13 20	...	...	...	...	...	
21	e	16 3	...	...	...	...	...	
	F	40	...	...	...	...	...	
22	eL	1 50	...	...	...	...	...	
	F	2 5	...	...	...	...	...	
22	eP^1_Z	11 49 9	...	...	...	...	(16000)	Tonga Islands. 20° S., 174° W. (Manila). By path of greater deviation.
	eP^1_{2Z}	49 35	...	...	...	...	...	
	L	12 51	...	...	...	...	...	
	F	13 50	...	...	...	...	...	
22	e_Z	17 9 24	...	...	...	...	...	Felt in Calabria, Italy.
	eL	12	...	...	...	...	...	
	F	30	...	...	...	...	...	
22	eL	23 17	...	...	...	...	...	Central America. 14° N., 88·5° W. (J.S.A.).
	F	30	...	...	...	...	...	
26	eL	5 50	...	...	...	...	...	
	F	6 10	...	...	...	...	...	
26	eP^1	16 28 26	...	...	...	...	(16500)	
	iP^1_{2Z}	28 35	...	...	...	...	...	By path of greater deviation.
	isP^1_{2NZ}	30 50	...	...	...	...	...	South of Fiji Islands.
	iPR_{1N}	32 50	...	...	...	...	...	23° S., 180°, with
	$iScPcS_{NE}$	35 27	...	...	...	...	...	with focal depth
	$eScPcPcS_{NE}$	38 45	...	...	...	...	...	about 600 km.
	iSP_N	42 25	...	...	...	...	...	(J.S.A.).
	$isSP_N$	45 32	...	...	...	...	...	
	eSR_1	50 14	...	...	...	...	...	
	L_E	51	...	...	...	...	...	
	L_N	55	...	...	...	...	...	
	M_1	57 30	25	...	−59	...	...	
	M_2	17 1 45	28	+115	+54	...	...	
	L_Z	3	...	...	...	...	...	
	M_3	5 4	30	+90	...	...	...	
	M_4	12 28	33	...	+155	...	...	
	M_5	17 13	30	+84	...	...	...	
	M_6	32 28	22	...	...	+31	...	
	F	20 15	...	...	...	...	...	
26	e	22 40 39	...	...	...	...	...	
	F	23 5	...	...	...	...	...	
28	eP_Z	2 34 14	...	...	...	...	(9500)	Pacific Ocean. 28°N., 133° E. (U.R.S.S.).
	ePR_1	37 49	...	...	...	...	...	
	$eScPcS_{NE}$	44 38	...	...	...	...	...	
	L_{NE}	3 3	...	...	...	...	...	
	M_1	7 29	35	...	+22	...	...	
	L_Z	10	...	...	...	...	...	
	M_2	10 29	28	+21	...	...	...	
	M_3	13 8	23	...	−40	...	...	
	M_4	20 16	17	...	...	+18	...	
	M_5	20 22	17	+15	...	...	...	
	F	4 10	...	...	...	...	...	
28	e	6 1	...	...	...	...	...	
	F	15	...	...	...	...	...	
31	e	8 54	...	...	...	...	...	
	eL	9 0	...	...	...	...	...	
	F	30	...	...	...	...	...	
June 2	e	20 20	...	...	...	...	...	
	F	35	...	...	...	...	...	
3	e_Z	0 31 26	...	...	...	...	...	
	eL	1 7	...	...	...	...	...	
	F	25	...	...	...	...	...	
3	eP_{EZ}	10 49 17	...	...	...	...	9730	Amplitudes of iPcP as read in mm.:—
	iP_{EZ}	49 24	...	...	...	...	...	N. E. Z.
	iPcP	49 41	...	...	...	...	...	−4·3 +10·0 +
	iPR_{1E}	53 4	...	...	...	...	...	giving azimuth about
	i_E	58 45	...	...	...	...	...	293.°
	iS_E	11 0 3	...	...	...	...	...	
	i_Z	6 31	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. A_N	A_E	A_Z	Δ	Remarks.
June		h. m. s.	s.	μ	μ	μ	km.	
	eL	11	...	...	...	...	...	Destructive in South-west Mexico. 16° N., 104° W. (J.S.A.).
	M_1	19–38	...	...	>200	...	...	
	M_2	17 22	19	−150	...	...	...	
	M_3	21 8	15	−145	...	...	...	
	M_4	23 28	14	−165	...	...	...	Maxima doubtful; traces very faint and confused by over-lapping.
	M_5	25	22	...	...	−670	...	
	M_6	32	24	...	...	−790	...	
	M_7	35	11	...	...	−220	...	
	F	16 20	...	...	...	...	...	
3	e	17 12	...	...	...	...	...	Very small.
	F	25	...	...	...	...	...	
3	eP_Z	17 52 28	...	...	...	...	9330	Mongolia. 45·9° N., 100·9° E. (U.R.S.S.).
	eS_{NE}	18 2 55	...	...	...	...	...	
	eL	26	...	...	...	...	...	
	F	19 0	...	...	...	...	...	
3	eL	21 0	...	...	...	...	...	
	F	5	...	...	...	...	...	
4	eL	2 49	...	...	...	...	...	Very small.
	F	3 0	...	...	...	...	...	
4	e	19 49	...	...	...	...	...	
	F	55	...	...	...	...	...	
4	eL	22 21	...	...	...	...	...	
	F	45	...	...	...	...	...	
5	eP_Z	9 17 11	...	...	...	...	(10700)	
	$eScPcS_{NE}$	27 38	...	...	...	...	...	
	eL	50	...	...	...	...	...	
	F	10 35	...	...	...	...	...	
5	e	14 4	...	...	...	...	...	Very small.
	F	20	...	...	...	...	...	
6	eP_Z	8 56 8	...	...	...	...	8550	Northern California. 42° N., 123° W. (U.S.C.G.S).
	eS	9 5 56	...	...	...	...	...	
	eL_{NE}	18	...	...	...	...	...	
	eL_Z	23	...	...	...	...	...	
	M_1	28 49	20	+20	...	...	...	
	M_2	29 0	18	...	...	+15	...	
	F	10 30	...	...	...	...	...	
6	e	12 28	...	...	...	...	...	
	F	50	...	...	...	...	...	
8	e_Z	4 53	...	...	...	...	...	
	F	5 0	...	...	...	...	...	
8	e	7 8	...	...	...	...	...	
	F	15	...	...	...	...	...	
8	e_Z	8 3	...	...	...	...	...	Very small.
	eL	30	...	...	...	...	...	
	F	9 0	...	...	...	...	...	
8	e	11 25	...	...	...	...	...	
	F	12 0	...	...	...	...	...	
8	e	15 53	...	...	...	...	...	
	F	16 10	...	...	...	...	...	
9	eP_Z	4 48 11	...	...	...	...	(9800)	
	$eScPcS_{NE}$	58 27	...	...	...	...	...	
	eL	5 20	...	...	...	...	...	
	F	45	...	...	...	...	...	
9	eL	7 22	...	...	...	...	...	
	F	40	...	...	...	...	...	
10	e	4 0	...	...	...	...	...	Very small.
	F	5	...	...	...	...	...	
10	e_Z	20 39	...	...	...	...	...	
	e_{NZ}	49 25	...	...	...	...	...	
	eL	21 20	...	...	...	...	...	
	F	50	...	...	...	...	...	
10	eL	22 17	...	...	...	...	...	
	F	25	...	...	...	...	...	

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres.

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae.	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
June 11	ez	8 42 43	...	...	...	...	...	
	eL	9 1	...	...	...	...	...	
	F	40	...	...	...	...	...	
11	ez	17 18	...	...	...	...	...	
	eL	54	...	...	...	...	...	
	F	18 35	...	...	...	...	...	
12	e	23 34	...	...	...	...	...	
	F	50	...	...	...	...	...	
13	ez	21 11	...	...	...	...	...	
	eLNF	44	...	...	...	...	...	
	eLz	51	...	...	...	...	...	
	M_1	57 24	14	...	...	−7	...	
	M_2	57 27	16	...	−8	...	...	
	F	22 35	...	...	...	...	...	
14	iPz	6 12 48	...	...	...	...	10200	Japan. (Strasbourg).
	iPcPz	13 18	...	...	...	...	...	
	iPR_1z	16 34	...	...	...	...	...	
	iScPcSNE	23 16	...	...	...	...	...	
	iSNE	23 55	...	...	...	...	...	
	LNE	45	...	...	...	...	...	
	Lz	48	...	...	...	...	...	
	M	57 34	23	+6	...	...	...	
	F	7 30	...	...	...	...	...	
14	e	12 10						
	eL	15	...	...	...	...	...	
	F	45	...	...	...	...	...	
16	iPz	1 31 52	...	...	...	...	9770	Indian Ocean.
	iPcPz	32 11	...	...	...	...	...	1·5° N., 93·5° E.
	iScPcSE	42 18	...	...	...	...	...	(U.R.S.S.).
	eSNE	42 40	...	...	...	...	...	
	LNE	2 9	...	...	...	...	...	
	Lz	17	...	...	...	...	...	
	F	45	...	...	...	...	...	
18	e	1 3	...	...	...	...	...	
	F	10	...	...	...	...	...	
18	e	2 19	...	...	...	...	...	
	F	35	...	...	...	...	...	
18	eP	10 24 34	...	...	...	...	9850	Amplitudes of iPcP
	iPcP	25 0	...	...	...	...	...	as read in mm.:—
	iNZ	25 55	...	...	...	...	...	N. E. Z.
	iPR_1	28 21	...	...	...	...	...	−1·7 +6·1 +15
	iSE	35 25	...	...	...	...	...	giving azimuth about
	iPSNZ	35 55	...	...	...	...	...	286°.
	iE	40 25	...	...	...	...	...	Destructive in Mexico.
	iSR_1NE	41 49	...	...	...	...	...	19° N., 104° W.
	iSR_2E	44 53	...	...	...	...	...	(U.S.C.G.S.).
	L	49	...	...	...	...	...	
	M_1	11 1–3†	(22)†	...	>210	...	...	†Doubtful; trace very faint.
	M_2	1 27	23	...	...	−590	...	
	M_3	1 47	17	−300	...	...	...	
	M_4	3 59	16	...	...	−360	...	
	M_5	4 21	16	−270	...	...	...	
	M_6	6 34	11	...	...	−250	...	
	F	15 15	...	...	...	...	...	
18	e	22 14	...	...	...	...	...	
	F	23 10	...	...	...	...	...	
20	ez	4 7 36	...	...	...	...	...	
	eL	5 3	...	...	...	...	...	
	F	55	...	...	...	...	...	
20	e	6 38	...	...	...	...	...	
	F	7 20	...	...	...	...	...	
20	ePz	9 38 16	...	...	...	...	...	
	eL	10 5	...	...	...	...	...	Pacific Ocean off Ore-
	F	50	...	...	...	...	...	gon. 44° N., 126° W. (J.S.A.).
20	eL	20 20	...	...	...	...	...	
	F	35	...	...	...	...	...	
21	e	4 57	...	...	...	...	...	
	eL	5 20	...	...	...	...	...	
	F	40	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae.	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
June 21	e	7 57	...	...	...	...	...	Very small.
	F	8 15	...	...	...	...	...	
21/22	e	23 49	...	...	...	...	...	
	F	0 10	...	...	...	...	...	
22	ePNZ	0 48 41	...	...	...	...	...	
	eL	1 20	...	...	...	...	...	
	F	50	...	...	...	...	...	
22	ePz	13 11 56	...	...	...	...	9430	Destructive in Mexico.
	iz	12 31	...	...	...	...	...	19° N., 104° W.
	iz	12 47	...	...	...	...	...	(U.S.C.G.S.).
	iz	13 42	...	...	...	...	...	
	iSE	22 28	...	...	...	...	...	
	SR_1E	28 54	...	...	...	...	...	
	iSR_2E	32 53	...	...	...	...	...	
	LN	37	...	...	...	...	...	
	LEZ	39	...	...	...	...	...	
	M_1	41 18	35	+35	...	...	...	
	M_2	43 21	33	...	...	−78	...	
	M_3	43 32	29	...	+76	...	...	
	M_4	48 22	21	...	−38	...	...	
	M_5	50 24	16	...	...	+32	...	
	F	16 10	...	...	...	...	...	
23	e	2 32 20	...	...	...	...	...	Very small. (23–25)
	F	4 20	...	...	...	...	...	
25	e	3 17	...	...	...	...	...	
	F	30	...	...	...	...	...	
25	e	12 30	...	...	...	...	...	
	F	40	...	...	...	...	...	
26	eP	19 31 18	...	...	...	...	8670	Kurile Islands.
	eSE	41 (12)	...	...	...	...	...	48° N., 151° E.
	eL	59	...	...	...	...	...	(J.S.A.).
	F	20 55	...	...	...	...	...	
29	ez	2 33	...	...	...	...	...	Mediterranean Sea.
	e(S)NE	39 59	...	...	...	...	...	35° N., 27° E.
	ez	40 12	...	...	...	...	...	(U.R.S.S.).
	eL	42	...	...	...	...	...	
	M	44 22	15	+6	...	...	...	
	F	3 10	...	...	...	...	...	
29	eEZ	18 43 29	...	...	...	...	...	Japan.
	eN	46 57	...	...	...	...	...	40° N., 142·5° E.
	eL	58	...	...	...	...	...	(U.R.S.S.).
	M	19 3 52	20	...	−6	...	...	
	F	45	...	...	...	...	...	
July 2	e	3 12	...	...	...	...	...	
	F	35	...	...	...	...	...	
2	ez	12 26	...	...	...	...	...	Very small. (2–3)
	F	30	...	...	...	...	...	
3	e	18 16	...	...	...	...	...	
	F	25	...	...	...	...	...	
5	ez	10 54	...	...	...	...	...	
	F	11 0	...	...	...	...	...	
5	e	11 49	...	...	...	...	...	
	F	12 20	...	...	...	...	...	
7	eP	16 28 10	...	...	...	...	8800	Lower California.
	eSNE	38 10	...	...	...	...	...	28° N., 113·5° W.
	eSR_1NE	43 20	...	...	...	...	...	(J.S.A.).
	eSR_2NE	46 56	...	...	...	...	...	
	LNE	48	...	...	...	...	...	
	Lz	53	...	...	...	...	...	
	M_1	55 43	25	...	+37	...	...	
	M_2	56 11	25	+65	...	...	...	
	M_3	59 56	19	+69	...	...	...	
	M_4	17 2 6	21	...	+46	...	...	
	M_5	2 32	16	...	...	+34	...	
	M_6	5 52	16	...	...	+36	...	
	F	19 35	...	...	...	...	...	

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres.

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Amplitudes. Ae.	Amplitudes. Az.	Δ	Remarks.
July		h. m. s.	s.	μ	μ	μ	km.	
8	e	11 26	...	...	...	...	...	
	F	40	...	...	...	...	...	
9	ez	11 45	...	...	...	...	...	
	F	55	...	...	...	...	...	
9	eP^{1}z	13 15 25	...	...	...	...	(16000)	New Hebrides. 15° S., 167° E. (Manila).
	ePR$_1$	18 23	...	...	...	...	...	
	eScPcPcSNE	25 19	...	...	...	...	...	
	eL	14 4	...	...	...	...	...	
	F	15 5	...	...	...	...	...	
10	e	1 16	...	...	...	...	...	
	LNE	21	...	...	...	...	...	
	Lz	29	...	...	...	...	...	
	F	2 0	...	...	...	...	...	
10	eNE	8 7	...	...	...	...	...	Japan. 39° N., 142° E. (Stuttgart).
	eLNE	25	...	...	...	...	...	
	M$_1$	32 6	25	...	+11	...	...	
	M$_2$	33 5	23	+5	...	...	...	
	F	9 15	...	...	...	...	...	
11	e	9 15	...	...	...	...	...	Very small.
	F	45	...	...	...	...	...	
12	eP	19 36 23	...	...	...	...	9070	Lower California. 25·6° N., 110·5 W. (J.S.A.).
	eS	46 37	...	...	...	...	...	
	LNE	58	...	...	...	...	...	
	Lz	20 3	...	...	...	...	...	
	M$_1$	4 9	26	+64	...	...	...	
	M$_2$	4 31	25	...	+41	...	...	
	M$_3$	6 39	21	−62	...	...	...	
	M$_4$	11 49	16	...	...	+53	...	
	M$_5$	11 54	16	...	−88	...	...	
	F	22 45	...	...	...	...	...	
13	e	4 43	...	...	...	...	...	
	F	5 5	...	...	...	...	...	
13	e	9 25	...	...	...	...	...	
	F	35	...	...	...	...	...	
15	e	16 43	...	...	...	...	...	
	F	17 0	...	...	...	...	...	
16	e	21 15	...	...	...	...	...	Very small.
	F	22 15	...	...	...	...	...	
17	ez	12 10	...	...	...	...	...	
	F	15	...	...	...	...	...	
20	e	5 21	...	...	...	...	...	
	F	45	...	...	...	...	...	
20	eP^{1}z	20 25 24	...	...	...	...	(17000)	East of Kermadec Islands. 28° S., 170° W.
	ePR$_1$	29 25	...	...	...	...	...	
	eScPcPcS	35 29	...	...	...	...	...	
	ePR$_1$	38 31	...	...	...	...	...	By path >180°.
	eScPcSP	39 25	...	...	...	...	...	
	eL	21 25	...	...	...	...	...	
	F	22 0	...	...	...	...	...	
21	ePR$_1$	13 0 6	...	...	...	...	(13000)	New Guinea. 2° S., 140° E. (Manila).
	LNE	35	...	...	...	...	...	
	Lz	42	...	...	...	...	...	
	M$_1$	52 48	22	+6	...	...	...	
	M$_2$	56 14	20	...	...	+7	...	
	F	15 10	...	...	...	...	...	
21	ez	16 46 28	...	...	...	...	...	
	eL	17 24	...	...	...	...	...	
	F	18 45	...	...	...	...	...	
23	e	1 35	...	...	...	...	...	
	F	2 5	...	...	...	...	...	Very small.
24	e	19 29	...	...	...	...	...	
	F	40	...	...	...	...	...	
July 25	ePz	8 36 36	...	...	...	...	8570	Japan (Stuttgart).
	eSNE	46 25	...	...	...	...	...	
	e	47 32	...	...	...	...	...	Overlapped by next shock.
	F	— — —	...	...	...	...	...	
25	iP	9 25 17	...	...	...	...	9500	Compression.
	ez	27 58	...	...	...	...	...	Pacific Ocean off Central America. 17° N., 104° W. (J.S.A.).
	iS	35 52	...	...	...	...	...	
	SR$_1$	42 9	...	...	...	...	...	
	eN	44 27	...	...	...	...	...	
	eE	45 21	...	...	...	...	...	
	LNE	50	...	...	...	...	...	
	Lz	55	...	...	...	...	...	
	M$_1$	10 2 48	17	−45	...	...	...	
	M$_2$	2 51	17	...	...	+94	...	
	F	12 25	...	...	...	...	...	
27	e	21 39 45	...	...	...	...	...	Banda Sea. 5° S., 130° E. (Stuttgart).
	F	22 50	...	...	...	...	...	
29	e	2 24	...	...	...	...	...	
	F	30	...	...	...	...	...	
29	e	21 17	...	...	...	...	...	Celebes. 1° S., 123° E. (Manila).
	eL	22 5	...	...	...	...	...	
	F	20	...	...	...	...	...	
30	ez	12 42 2	...	...	...	...	...	Celebes. 1° S., 118° E. (U.R.S.S.).
	eL	13 20	...	...	...	...	...	
	F	35	...	...	...	...	...	
Aug. 1	eL	11 8	...	...	...	...	...	
	F	45	...	...	...	...	...	
2	ePz	4 40 5	...	...	...	...	(11800)	Molucca Islands. 1° N., 125·5° E. (U.R.S.S.).
	e(PPS)	54 0	...	...	...	...	...	
	LNE	5 21	...	...	...	...	...	
	Lz	28	...	...	...	...	...	
	F	6 0	...	...	...	...	...	
3	e	11 51	...	...	...	...	...	Felt at Brindisi.
	L	54	...	...	...	...	...	
	F	12 5	...	...	...	...	...	
5	eLNE	1 37	...	...	...	...	...	
	eLz	46	...	...	...	...	...	
	F	55	...	...	...	...	...	
5	eL	21 33	...	...	...	...	...	Destructive in the Azores.
	F	50	...	...	...	...	...	
10	e	1 20 32	...	...	...	...	...	
	F	3 10	...	...	...	...	...	
10	e	17 20	...	...	...	...	...	
	F	40	...	...	...	...	...	
12	iP	3 35 46	...	...	...	...	8540	Compression.
	eS	45 33	...	...	...	...	...	
	eL	54	...	...	...	...	...	
	M$_1$	4 15 9	19	...	...	+21	...	Aleutian region. 52° N., 167° W. (J.S.A.).
	M$_2$	15 11	19	−15	...	...	...	
	M$_3$	17 7	17	...	+16	...	...	
	F	6 55	...	...	...	...	...	
13	ez	21 16	...	...	...	...	...	No. "N" record.
	eL	22 19	...	...	...	...	...	
	M$_1$	34 31	22	...	−8	...	...	New Zealand. 42·5° S., 173·0° E. (U.R.S.S.).
	M$_2$	39 6	19	...	...	−11	...	
	F	23 45	...	...	...	...	...	
14	ePZE	4 50 58	...	...	...	...	8040	Compression.
	iZE	51 26	...	...	...	...	...	No. "N" record.
	ePR$_1$ZE	53 57	...	...	...	...	...	Eastern Himalayas. 27·5° N., 95° E. (Strasbourg).
	ePR$_2$ZE	55 50	...	...	...	...	...	
	iSE	5 0 20	...	...	...	...	...	
	eL	9	...	...	...	...	...	
	M$_1$	20 36	31	...	−58	...	...	
	M$_2$	24 58	17	...	...	−21	...	
	F	8 0	...	...	...	...	...	

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres. **1932.**

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. AN.	AE.	AZ.	Δ	Remarks.
Aug.		h. m. s.	s.	μ	μ	μ	km.	
14	eZ	12 46	...	...	...	...	...	
	F	13 35	...	...	...	...	...	
15	eZE	4 39	...	...	...	...	...	
	F	5 0	...	...	...	...	...	
15	e	15 30	...	...	...	...	..	Very small.
	F	50	...	...	...	...	...	
16	e	22 25	...	...	...	...	...	
	F	35	...	...	...	...	...	
17	eL	9 26	...	...	...	...	...	
	F	10 0	...	...	...	...	...	
18	e	20 49	...	...	...	...	...	
	F	21 15	...	...	...	...	...	
19	e	3 53	...	...	...	...	...	Very small.
	F	4 5	...	...	...	...	...	
19	e	18 30	...	...	...	...	...	
	F	50	...	...	...	...	...	
20	e	17 3	...	...	...	...	...	
	F	25	...	...	...	...	...	
21	iPZ	4 28 31	...	...	...	...	9350	Compression.
	ePR$_1$	32 2	...	...	...	...	...	
	eSNE	38 59	...	...	...	...	...	Formosa.
	eL	58	...	...	...	...	...	22·5° N., 119° E.
	M_1	5 12 20	19	...	+24	...	...	(U.R.S.S.).
	M_2	12 46	18	...	...	−21	...	
	M_3	12 51	18	−22	...	...	...	
	F	7 5	...	...	...	...	...	
22	ePZ	11 24 47	...	...	...	...	(8800)	Yellow Sea.
	eLNE	54	...	...	...	...	...	36·5° N., 123·0° E.
	eLZ	58	...	...	...	...	...	(U.R.S.S.).
	M_1	12 4 8	16	−14	...	...	...	
	M_2	4 19	15	...	...	−16	...	
	F	50	...	...	...	...	...	
24	e	4 23	...	...	...	...	...	Very small.
	F	5 5	...	...	...	...	...	
24	eLNE	12 56	...	...	...	...	...	
	eLZ	13 3	...	...	...	...	...	
	F	45	...	...	...	...	...	
25	e	8 40	...	...	...	...	...	Pacific Ocean off Mexico. 18° N., 106° W.
	F	9 25	...	...	...	...	...	(J.S.A.).
28	e	11 40	...	...	...	...	...	Very small.
	F	12 0	...	...	...	...	...	
Sept. 3	e	12 12	...	...	...	...	...	Sea of Japan.
	e(S)NE	21 30	...	...	...	...	...	42°N., 138° E.
	LNE	37	...	...	...	...	...	(Stuttgart).
	LZ	44	...	...	...	...	...	
	M_1	44 44	27	...	+16	...	...	
	M_2	53 21	19	+15	...	...	...	
	M_3	58 1	17	...	...	+14	...	
	F	13 20	...	...	...	...	...	
5	e	3 51	...	...	...	...	...	
	F	4 10	...	...	...	...	...	
5	—	— — —	...	...	...	...	$9^h 39^m$ to $15^h 9^m$	No records during standard-
6	—	— — —	...	...	...	...	$8^h 32^m$ to $15^h 56^m$	isation,
7	—	— — —	...	...	...	...	$9^h 6^m$ to $14^h 52^m$	etc.
8	iPZE	1 53 41	...	...	...	...	9270	Pacific Ocean off
	eSE	2 4 5	...	...	...	...	...	Mexico.
	eSR$_1$E	10 10	...	...	...	...	...	18° N., 105° W.
	eSR$_2$E	13 36	...	...	...	...	...	(J.S.A.).
	eLNE	21	...	...	...	...	...	
	eLZ	26	...	...	...	...	...	
	M_1	31 9	16	...	+12	...	...	
	M_2	31 11	16	...	...	+10	...	
	F	3 5	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. AN.	AE	AZ.	Δ	Remarks.
Sept.		h. m. s.	s.	μ	μ	μ	km.	
8	e	7 44	...	...	...	...	...	
	F	8 25	...	...	...	...	...	
9	e	13 58	...	...	...	...	...	Celebes.
	eLNE	14 33	...	...	...	...	...	6° S., 122·5 E.
	eLZ	41	...	...	...	...	...	(U.R.S.S.).
	F	16 5	...	...	...	...	...	
11	e	14 38	...	...	...	...	...	Disturbed by wind
	F	15 5	...	...	...	...	...	and microseisms.
12	—	— — —	...	...	...	...	...	$9^h 25^m$ to $11^h 56^m$ no records.
14	e	9 16	...	...	...	...	...	
	F	30	...	...	...	...	...	
15	e	11 38	...	...	...	...	...	Felt in Mindanao
	eLNE	12 3	...	...	...	...	...	(Manila).
	eLZ	9	...	...	...	...	...	6·5° N., 122·0° E.
	F	50	...	...	...	...	...	(U.R.S.S.).
15	e	14 15	...	...	...	...	...	Destructive around Gis-
	eLNE	15 9	...	...	...	...	...	borne and Hawke's
	eLZ	14	...	...	...	...	...	Bay, New Zealand.
	M_1	30 27	24	+31	...	...	...	
	M_2	38 42	19	...	...	−30	...	41·5° S., 176° W.
	M_3	47 30	18	...	+20	...	...	(U.R.S.S.).
	F	16 55	...	...	...	...	...	
18	e	14 47	...	...	...	...	...	Very small.
	F	55	...	...	...	...	...	
23	iP	14 33 39	...	...	...	...	8600*	Compression. Focus
	epPZ	34 49	...	...	...	...	...	about 250 km. below
	iS	43 5	...	...	...	...	...	normal. Sea of Japan.
	iSPNE	43 29	...	...	...	...	...	42·9°N., 138°E. (J.S.A.)
	eNE	54 1	...	...	...	...	...	*Distance & focal depth
	L	— — —	...	...	...	...	...	from diagrams by
	F	16 15	...	...	...	...	...	F. J. Scrase. L waves poorly developed.
25	e	23 1	...	...	...	...	...	
	F	20	...	...	...	...	...	Amplitudes in mm.:— N. E. Z.
26	eP	19 25 18	...	...	...	...	2270	− 1·0 + 2·2 −2·2
	iP	25 22	...	...	...	...	...	+ 7·3 −14·3 +9
	i	25 38	...	...	...	...	...	+15·8 −33·2 —
	iS	29 4	...	...	...	...	...	
	i	29 23	...	...	...	...	...	Azimuth = 114° ± 2°,
	LE	30 42	...	...	...	...	...	giving epicentre
	LZ	30 56	...	...	...	...	...	near 40° N., 24° E.
	LN	31 10	...	...	...	...	...	
	M_1	32 15	18	...	>210	...	...	Destructive in Chalci-
	M_2	34 3	20	+210	...	...	...	dice Peninsula,
	M_3	34 9	15	...	...	+280	...	Greece.
	M_4	34 12	15	...	>200	...	...	
	M_5	36 23	13	...	...	−220	...	
	M_6	36 26	16	+150	...	...	...	
	F	— — —	...	...	...	...	...	Overlapped by next shock.
26	iP	21 31 32	...	...	...	...	2250	Repetition of preceding shock.
	eSNE	35 16	...	...	...	...	...	
	eSZ	35 24	...	...	...	...	...	
	L	37·6	...	...	...	...	...	
	M	38 31	13	...	−26	...	...	
	F	23 10	...	...	...	...	...	
27/28	—	20^h to 8^h	...	...	...	...	...	Numerous small disturbances, probably further repetitions.
28	eP	16 56 42	...	...	...	...	2200	Repetition from the
	eS	17 0 22	...	...	...	...	...	Greek epicentres.
	eL	2	...	...	...	...	...	
	M_1	3 25	13	+23	...	...	...	
	M_2	4 34	9	...	+10	...	...	
	F	45	...	...	...	...	...	Amplitudes in mm.:— N. E. Z.
29	eP	4 1 52	...	...	...	...	2200	−0·5 +0·9 −1
	iP	1 55	...	...	...	...	...	+2·2 −3·9 +5
	i	1 59	...	...	...	...	...	−4·2 +6·9 −12
	iS	5 32	...	...	...	...	...	
	eL	6	...	...	...	...	...	
	M_1	8 30	14	...	−125	...	...	

546. Richmond (Kew Observatory). Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres. **1932.**

Date.	Phase.	Time. G.M.T.	Period	Amplitudes.			Δ	Remarks.
				An.	Ae.	Az.		
Sept.		h. m. s.	s.	μ	μ	μ	km.	
29	M_2	9 3	12	−40	...	...	...	Azimuth = 118° ± 2°,
	M_3	9 50	8	...	...	+42	...	giving epicentre near
	F	5 30	...	...	...	...	...	40° N., 23° E.
								Felt in Salonica.
29	e	7 2	...	...	...	...	...	
	F	15	...	...	...	...	...	
29	e	12 12	...	...	...	...	...	
	F	35	...	...	...	...	...	
29	e	14 34	...	...	...	...	...	
	F	50	...	...	...	...	...	
29	eP	17 58 40	...	...	...	...	8830	Kurile Islands.
	eSNE	18 8 42	...	...	...	...	...	47° N., 154° E.
	eLNE	22	...	...	...	...	...	(J.S.A.).
	eLz	31	...	...	...	...	...	
	M_1	29 25	27	...	+9	...	...	
	M_2	39 42	20	...	...	+7	...	
	M_3	40 5	18	+7	...	...	...	
	F	19 55	...	...	...	...	...	
29	e	21 55	...	...	...	...	...	
	F	58	...	...	...	...	...	
30	e	6 21 15	...	...	...	...	...	
	eL	24	...	...	...	...	...	Further repetitions
	F	35	...	...	...	...	...	from the Greek
								epicentres.
30	e	7 41	...	...	...	...	...	
	F	44	...	...	...	...	...	
30	e	7 48	...	...	...	...	...	
	F	51	...	...	...	...	...	
Oct. 1	e	13 47	...	...	...	...	...	
	F	50	...	...	...	...	...	
2	ePZE	3 11 12	...	...	...	...	9310	Pacific Ocean off
	ePR_1ZE	14 (0)	...	...	...	...	...	Central America.
	eSE	21 38	...	...	...	...	...	10·9° N., 86·5° W.
	iPSE	22 4	...	...	...	...	...	(J.S.A.).
	iPPSE	22 22	...	...	...	...	...	
	eSR_1	26 16	...	...	...	...	...	
	eSR_2NE	29 56	...	...	...	...	...	
	eL	32	...	...	...	...	...	Long waves on "Z"
	M_1	40 55	21	−37	...	...	...	and "E" very regu-
	M_2	43 3	19	...	−88	...	...	lar from 3^h 41^m to
	M_3	43 9	17	...	...	−77	...	47^m.
	F	5 20	...	...	...	...	...	
9	e	6 35	...	...	...	...	...	Repetition, Greece.
	F	45	...	...	...	...	...	
9	eLNE	13 33	...	...	...	...	...	
	M	38 29	25	−6	+5	...	...	
	eLz	40	...	...	...	...	...	
	F	14 0	...	...	...	...	...	
11	e	19 45	...	...	...	...	...	Gulf of California.
	F	20 5	...	...	...	...	...	25° N., 110·5° W.
								(J.S.A.).
12	e	3 10	...	...	...	...	...	
	F	20	...	...	...	...	...	
12	e	20 30	...	...	...	...	...	Very small.
	F	35	...	...	...	...	...	
15	e	22 32	...	...	...	...	...	Repetition, Greece
	F	38	...	...	...	...	...	
16	iPZN	12 19 31	...	—	...	+	8150	Compression.
	iSE	28 58	...	...	...	...	...	
	iE	29 12	...	...	...	...	...	Azimuth about North.
	iE	29 52	...	...	...	...	...	
	eSR_1N	33	...	...	...	...	...	Alaska.
	eSR_2NE	37	...	...	...	...	...	54° N., 158° W.
	eL	43	...	...	...	...	...	(U.S.C.G.S.).
	M_1	46 43	28	...	−28	...	...	
	M_2	51 16	22	+38	...	...	...	
	M_3	51 32	22	...	...	+25	...	
	M_4	52 15	19	...	+28	...	...	
	eL_2	14 44	...	...	...	...	...	Via Antipodes.
	F	15 0	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes.			Δ	Remarks.
				An.	Ae.	Az.		
Oct.		h. m. s.	s.	μ	μ	μ	km.	
17	e	14 37	...	...	...	...	...	
	F	15 10	...	...	...	...	...	
23	ez	13 45	...	...	...	...	...	
	eL	51	...	...	...	...	...	
	F	14 10	...	...	...	...	...	
23	eLNE	22 10	...	...	...	...	...	
	eLz	17	...	...	...	...	...	
	M_1	24 27	19	...	+9	...	...	
	M_2	24 58	16	−9	...	...	...	
	M_3	26 10	16	...	...	−11	...	
	F	45	...	...	...	...	...	
29	ePR_1z	11 19 (45)	...	...	...	...	...	
	eSNE	25 4	...	...	...	...	...	
	e(SR_1)NE	28 44	...	...	...	...	...	
	LNE	34	...	...	...	...	...	
	Lz	38	...	...	...	...	...	
	M_1	38 1	20	−16	...	...	...	
	M_2	41 43	15	...	+16	...	...	
	M_3	41 45	15	...	...	−16	...	
	F	12 10	...	...	...	...	...	
30	iPz	20 58 26	...	...	...	...	8130	Compression.
	ePR_2	21 3 4	...	...	...	...	...	
	eSE	7 52	...	...	...	...	...	Alaska Region.
	eL	22	...	...	...	...	...	54° N., 155° W.
	M	25 40	28	...	−17	...	...	(J.S.A.).
	F	22 15	...	...	...	...	...	
Nov. 1†	ePNE	16 24 6	...	...	...	...	2100	Destructive in Greece.
	eSNE	27 38	...	...	...	...	...	
	LNE	29 (47)	...	...	...	...	...	
	M	31 0	12	+15	...	...	...	
	F	50	...	...	...	...	...	
2†	e(PS)E	11 33 51	...	...	...	...	...	Disturbed by wind.
	e(SR_1)NE	39 44	...	...	...	...	...	Pacific Ocean,
	eL	54	...	...	...	...	...	23° S., 111° W.
	F	12 40	...	...	...	...	...	(J.S.A.).
3†	eLNE	20 33	...	...	...	...	...	†No. "Z" record,
	F	21 5	...	...	...	...	...	Nov. 1^d to 11^d.
6†	eNE	17 12	...	...	...	...	...	
	F	20	...	...	...	...	...	
9†	eNE	19 10	...	...	...	...	...	
	F	25	...	...	...	...	...	
13	iP	4 58 24	...	...	...	...	8600*	Dilatation. Focus
	ipP	59 37	...	...	...	...	...	about 250 km. below
	esPZN	5 0 11	...	...	...	...	...	normal.
	iPR_1z	1 28	...	...	...	...	...	Sea of Japan.
	iS	7 50	...	...	...	...	...	43·4° N., 137° E.
	iE	8 6	...	...	...	...	...	(J.S.A.)
	iZE	8 26	...	...	...	...	...	*Distance and focal
	iNE	9 21	...	...	...	...	...	depth from diagrams
	eSR_1N	12 50	...	...	...	...	...	by F. J. Scrase.
	eE	18 12	...	...	...	...	...	
	eZN	18 32	...	...	...	...	...	L waves poorly de-
	eE	18 52	...	...	...	...	...	veloped.
	eN	22 36	...	...	...	...	...	
	eN	26 18	...	...	...	...	...	
	eE	29	...	...	...	...	...	
	F	4 30	...	...	...	...	...	
13	e	16 50	...	...	...	...	...	
	F	17 30	...	...	...	...	...	
17	iPZE	6 15 25	...	...	...	...	9150	Pacific Ocean off
	eS	25 43	...	...	...	...	...	Mexico.
	eLNE	45	...	...	...	...	...	18° N., 104° W.
	eLz	48	...	...	...	...	...	(J.S.A.).
	M_1	52 55	16	...	+13	...	...	
	M_2	53 2	17	+6	...	...	...	
	M_3	53 7	16	...	...	−11	...	
	F	7 30	...	...	...	...	...	

Galitzin Seismographs, three components.

546. Richmond (Kew Observatory) Lat. 51° 28′ N. Long. 0° 19′ W. Height above M.S.L. 5 metres.

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae.	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
Nov. 20	ePzE	23 37 56	...	...	...	...	550	Felt in Western Germany and the Netherlands.
	eP*	38 12	...	...	...	...	...	
	ezE	38 44	...	...	...	...	...	
	S	38 57	...	...	...	...	...	
	eN	39 2	...	...	...	...	...	
	eS*NE	39 14	...	...	...	...	...	
	eE	39 20	...	...	...	...	...	
	eN	39 26	...	...	...	...	...	
	eNE	39 35	...	...	...	...	...	
	F	41	...	...	...	...	...	
23	e	3 10 6	...	...	...	...	...	Very small; repetition of 20d 23h.
	F	10·6	...	...	...	...	...	
23	e	4 22 14	...	...	...	...	...	
	F	22·5	...	...	...	...	...	
26	ePz	4 36 37	...	...	...	...	8330	Disturbed by wind and microseisms.
	eSNE	46 13	...	...	...	...	...	Sea of Japan.
	eL	5 4	...	...	...	...	...	41°N., 135° E.
	M	7 45	28	...	+23	...	...	(J.S.A.).
	F	45	...	...	...	...	...	
28	e	5 43 30	...	...	...	...	...	Very small; repetition of 20d 23h.
	e	43 47	...	...	...	...	...	
	e	44 7	...	...	...	...	...	
	F	44·3	...	...	...	...	...	
29	e	3 6	...	...	...	...	...	
	F	20	...	...	...	...	...	
29	eL	7 17	...	...	...	...	...	
	F	30	...	...	...	...	...	
29	e	8 44	...	...	...	...	...	
	F	55	...	...	...	...	...	
29	eScPcSNE	11 35 32	...	...	...	...	(11000)	Confused by microseisms.
	eScPcPcSNE	36 6	...	...	...	...	...	
	eSR$_1$NE	44 9	...	...	...	...	...	
	ez	46 52	...	...	...	...	...	Argentina.
	LNE	58	...	...	...	...	...	28° S., 68° W.
	Lz	12 5	...	...	...	...	...	(J.S.A.).
	M_1	6 57	23	...	−20	...	...	
	M_2	7 13	23	...	...	+25	...	
	M_3	9 39	21	+17	...	...	...	
	F	50	...	...	...	...	...	
Dec. 4	eSNE	4 15 16	...	...	...	...	...	Atlantic Ocean, west of Azores.
	eL	17	...	...	...	...	...	38° N., 35° W.
	M_1	17 55	20	+42	...	...	...	(J.S.A.).
	M_2	20 0	13	...	+31	...	...	
	M_3	20 4	12	...	...	+18	...	
	F	5 15	...	...	...	...	...	
4	ePzE	8 25 32	...	...	...	...	11750	Sea of Celebes.
	ePR$_1$	30 5	...	...	...	...	...	2°N., 122° E.
	eSN	37 43	...	...	...	...	...	(Strasbourg).
	eSPz	38 46	...	...	...	...	...	
	iPPSNE	39 26	...	...	...	...	...	
	iz	40 43	...	...	...	...	...	
	eSR$_1$	44 44	...	...	...	...	...	
	eNE	46 3	...	...	...	...	...	
	eSR$_2$	49 34	...	...	...	...	...	
	eNE	55 15	...	...	...	...	...	
	LNE	57	...	...	...	...	...	
	Lz	9 3	...	...	...	...	...	
	M_1	11 8	27	+57	...	...	...	
	M_2	11 26	28	...	−79	...	...	
	M_3	16 18	23	+56	...	...	...	
	M_4	16 45	25	...	...	+75	...	
	M_5	17 17	24	...	+57	...	...	
	M_6	20 35	20	+54	...	...	...	
	M_7	21 26	19	...	...	+54	...	
	M_8	22 31	20	+74	...	...	...	
	M_9	24 4	19	...	+45	...	...	
	F	— — —	...	...	...	...	...	Overlapped by next shock.
4	eLNE	11 27	...	...	...	...	...	
	eLz	33	...	...	...	...	...	
	M	42 53	21	+10	...	...	...	
	F	12 5	...	...	...	...	...	

Date.	Phase.	Time. G.M.T.	Period	Amplitudes. An.	Ae.	Az.	Δ	Remarks.
		h. m. s.	s.	μ	μ	μ	km.	
Dec. 7	iPZN	16 34 43	...	...	...	...	9370	Pacific Ocean off Mexico.
	iSNE	45 12	...	...	...	...	...	18° N., 103° W.
	eSR$_1$NE	51 28	...	...	...	...	...	(J.S.A.).
	eSR$_2$NE	54 16	...	...	...	...	...	
	LNE	17 2	...	...	...	...	...	
	Lz	4	...	...	...	...	...	
	M_1	12 12	16	...	+90	...	...	
	M_2	12 19	17	+36	...	...	...	
	M_3	12 23	17	...	...	+85	...	
	F	18 10	...	...	...	...	...	
9	eL	9 21	...	...	...	...	...	
	F	35	...	...	...	...	...	
15	eL	20 20	...	...	...	...	...	Confused by microseisms.
	F	50	...	...	...	...	...	
19	e	7 6	...	...	...	...	...	
	F	40	...	...	...	...	...	
21	iPz	6 21 50	...	...	...	...	8540	Compression.
	iz	22 43	...	...	...	...	...	
	iSNE	31 37	...	...	...	...	...	Nevada, U.S.A.
	SR$_1$	36 31	...	...	...	...	...	38·1° N., 118·5° W.
	SR$_2$	39 14	...	...	...	...	...	(J.S.A.).
	LNE	41	...	...	...	...	...	
	Lz	45	...	...	...	...	...	
	M_1	48 30	29	...	+165	...	...	
	M_2	48 49	27	+145	...	...	...	
	M_3	48 55	31	...	...	−240	...	
	M_4	52 3	20	...	+135	...	...	
	M_5	52 43	19	...	...	+170	...	
	M_6	52 58	21	−195	...	...	...	
	M_7	54 31	20	...	+98	...	...	
	M_8	56 50	19	−90	...	...	...	
	M_9	58 54	17	...	+77	...	...	
	M_{10}	7 1 47	15	...	...	+92	...	
	F	9 25	...	...	...	...	...	
24	eE	7 9	...	...	...	...	...	Confused by microseisms
	eLNE	27	...	...	...	...	...	
	eLz	34	...	...	...	...	...	
	M_1	30 6	37	+15	−27	...	...	
	M_2	37 45	25	...	+20	...	...	
	M_3	43 48	21	+19	...	...	...	
	F	8 45	...	...	...	...	...	Amplitudes in mm.:— N. E. Z.
25	iP	2 15 4	...	...	...	...	7320	−2·4 −3·4 + 5·5
	i	15 9	...	...	...	...	...	+5·4 +7·6 −26·2
	i	15 14	...	...	...	...	...	giving azimuth about
	iPcPZN	15 53	...	...	...	...	...	57°. Epicentre near
	iE	16 2	...	...	...	...	...	39° N., 99° E.
	iPR$_1$	17 28	...	...	...	...	...	(Kan Su, China).
	iPR$_2$	18 54	...	...	...	...	...	
	iSNE	23 49	...	...	...	...	...	
	iz	23 58	...	...	...	...	...	
	iNE	24 45	...	...	...	...	...	
	iNE	24 52	...	...	...	...	...	
	iNE	26 52	...	...	...	...	...	
	iSR$_1$NE	28 14	...	...	...	...	...	
	iE	30 24	...	...	...	...	...	
	iN	30 31	...	...	...	...	...	
	iz	30 39	...	...	...	...	...	
	eLNE	2 34	...	...	...	...	...	
	eLz	39	...	...	...	...	...	
	M_1	44	(22)	...	>330†	...	...	†Off lower edge of chart.
	M_2	46 55	14	...	...	−220	...	Maxima doubtful;
	M_3	48 37	18	...	−195	...	...	traces faint and confused by overlapping.
	M_4	49 17	14	−230	...	...	...	
	M_5	49 28	14	...	...	−260	...	
	M_6	52 10	18	+210	...	...	...	
	M_7	57 15	17	...	−220	...	...	
	F	6 30	...	...	...	...	...	
26	e	19 16	...	...	...	...	...	
	F	25	...	...	...	...	...	
26	eNE	21 39 15	...	...	...	...	...	
	F	22 20	...	...	...	...	...	
31	e(S)NE	6 54 13	...	...	...	...	...	Confused by microseisms.
	eLNE	7 9	...	...	...	...	...	Widely felt in South Africa.
	eLz	15	...	...	...	...	...	
	M_1	20 16	20	+36	...	...	...	
	M_2	20 30	16	...	+39	...	...	
	F	50	...	...	...	...	...	

MICROSEISMS OF NORTH COMPONENT: AMPLITUDE (μ=·001 mm.) AND PERIOD (seconds).

Derived from readings for the period of thirty minutes centring at the exact hours, Greenwich Mean Time.

547. Richmond (Kew Observatory).

Month	January.								February.								March.							
Hour.G.M.T.	0h.		6h.		12h.		18h.		0h.		6h.		12h.		18h.		0h.		6h.		12h.		18h.	
	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.
Day.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.
1	0·6	5·6	1·7	5·6	2·0	6·5	2·2	5·6	0·2	6·5	0·4	5·8	1·2	6·0	0·9	7·0	2·0	6·5	2·2	6·3	2·1	6·0	2·3	5·2
2	2·0	6·3	2·1	6·0	2·2	5·4	2·1	5·8	0·8	6·0	0·8	6·5	0·8	6·5	0·4	6·5	1·7	5·8	1·6	5·2	0·7	5·4	0·5	4·8
3	2·2	5·8	3·0	5·8	3·8	6·3	4·1	6·0	1·1	5·8	0·4	5·8	0·8	6·0	0·6	6·3	0·6	4·0	0·3	4·0	...	...	0·0	---
4	2·4	6·0	2·1	5·8	1·5	5·6	2·0	5·4	0·4	6·0	0·8	6·5	0·9	7·0	0·6	6·7	0·3	4·3	0·3	4·0	0·0	---	0·2	5·6
5	2·1	6·0	1·6	5·4	1·9	6·0	1·5	5·6	0·6	6·5	0·6	6·5	0·4	6·0	0·8	6·5	0·4	6·0	2·0	7·3	4·0	7·7	5·1	8·0
6	1·4	6·3	2·0	5·4	3·1	6·5	3·5	6·5	0·8	5·8	1·9	7·0	0·9	7·5	1·2	6·5	4·7	8·0	4·0	7·5	3·7	7·0	3·8	6·7
7	4·9	6·5	3·9	6·5	4·9	6·7	3·1	6·5	1·6	6·5	0·8	6·0	0·9	7·0	0·8	6·0	1·9	6·7	2·0	6·3	2·0	6·5	1·6	6·3
8	2·5	5·8	2·1	6·0	1·7	5·8	1·5	5·6	0·4	6·0	0·4	6·0	0·4	6·5	0·6	6·3	1·7	6·0	0·5	5·2	0·3	3·7	0·3	3·5
9	1·2	6·0	1·3	5·8	1·2	5·2	1·9	5·2	0·2	6·0	0·2	6·0	0·2	4·7	0·3	4·5	0·3	3·7	0·5	5·0	0·3	4·3	1·0	4·7
10	2·3	5·6	3·9	6·0	3·9	6·0	4·8	6·0	0·3	4·1	0·3	4·3	0·3	4·0	0·5	4·8	0·3	4·3	0·3	3·9	0·2	4·7	0·2	5·0
11	5·8	6·0	3·7	6·0	3·1	6·0	2·1	6·0	1·2	6·0	1·3	6·7	1·4	6·0	0·4	5·8	0·3	4·3	0·3	3·7	0·0	---	0·3	4·0
12	2·1	6·0	2·1	6·0	1·7	5·8	1·7	5·8	0·6	6·0	0·4	6·5	0·6	6·5	0·4	6·5	0·9	7·0	1·3	7·0	1·9	7·0	1·9	7·0
13	2·2	6·0	2·2	6·0	3·9	6·5	3·3	7·5	0·2	6·5	0·2	5·4	0·2	6·5	0·2	5·8	2·0	6·3	1·9	7·0	1·9	6·7	1·9	6·7
14	3·5	7·5	3·6	6·7	5·0	8·3	5·3	8·0	0·2	5·0	0·2	5·6	0·2	4·7	0·2	4·7	1·8	7·3	1·8	6·5	0·8	6·0	0·5	4·7
15	4·2	8·0	5·0	7·7	4·1	8·0	5·2	8·3	0·2	4·8	0·2	5·2	0·5	4·7	0·5	5·2	0·5	5·2	...	...	0·3	4·3	0·5	4·3
16	3·4	8·0	3·5	7·7	2·8	6·7	3·3	7·0	0·5	4·8	0·2	5·0	0·2	5·8	0·2	7·3	0·6	4·0	0·3	4·0	0·3	3·9	0·0	---
17	2·9	6·0	2·5	6·5	2·5	6·5	2·0	6·5	0·2	5·0	0·7	5·0	0·6	5·8	0·4	6·0	0·2	4·8	0·3	4·5	0·0	---	0·3	4·5
18	3·2	6·3	3·3	7·0	3·5	7·0	3·3	7·5	0·4	5·6	1·1	5·8	0·6	5·8	0·6	6·0	0·2	4·7	...	...	0·0	---	0·0	---
19	3·2	7·3	2·4	7·0	1·9	6·7	1·8	6·5	0·6	6·0	0·5	5·0	0·2	5·4	0·3	4·5	0·0	---	0·2	5·2	...	...	0·2	6·0
20	1·8	6·5	1·6	6·5	1·3	7·0	1·0	6·3	0·2	5·8	0·4	5·6	0·3	4·5	0·2	5·8	...	...	0·2	5·2	0·2	6·0	0·2	6·0
21	1·5	6·7	1·7	6·7	2·2	7·0	2·2	7·0	0·2	5·0	0·4	6·7	0·5	5·0	0·4	5·6	0·6	6·3	1·2	6·5	1·8	6·5	1·6	7·3
22	1·9	7·0	1·7	7·0	1·9	6·7	1·4	6·5	0·8	6·3	0·2	6·0	0·3	4·0	0·2	5·6	1·4	7·5	1·9	7·0	1·8	7·3	1·9	7·0
23	1·0	6·5	1·0	6·5	1·4	6·3	2·0	6·5	0·2	5·2	0·2	6·0	0·2	5·6	0·2	6·0	1·6	6·5	1·4	6·5	0·4	6·0	0·4	6·0
24	1·4	6·3	1·4	6·4	1·8	6·5	1·8	6·5	0·2	5·4	0·2	6·0	0·4	6·5	0·4	6·3	0·2	6·0	0·0	---	0·0	---	0·0	---
25	1·9	6·7	1·9	6·7	1·9	7·0	1·8	6·3	0·4	6·3	0·6	6·0	0·4	7·5	0·4	6·7	0·3	4·0	0·2	4·7	0·5	4·3	1·2	4·7
26	2·0	6·5	1·8	6·3	1·0	6·3	1·4	6·0	0·2	6·0	0·4	7·5	1·3	8·3	1·2	7·7	1·6	4·3	1·8	8·3	4·3	8·3	3·3	9·0
27	1·4	6·5	2·0	6·5	0·8	6·0	1·6	6·5	1·3	7·3	0·6	6·7	0·9	6·7	0·4	6·7	4·3	8·7	3·3	7·7	3·5	7·5	3·7	7·5
28	1·4	6·5	1·6	6·3	1·7	7·0	2·0	6·3	0·2	5·2	0·9	5·2	0·3	4·0	0·5	5·2	3·3	7·5	3·4	7·3	2·5	7·3	1·8	7·5
29	1·9	6·7	1·9	6·7	2·7	6·7	1·8	7·3	0·5	5·0	1·8	5·8	2·2	5·4	1·8	5·4	3·3	7·0	1·8	7·3	2·3	6·7	2·0	6·5
30	1·9	6·7	1·9	7·0	1·8	7·3	1·4	6·5									2·0	6·7	1·9	7·0	1·5	5·8	2·0	6·3
31	0·4	6·0	0·4	6·0	0·2	6·5	0·2	5·6									2·3	6·0	3·6	5·2	2·1	5·8	2·1	6·0
Mean.	2·3	6·5	2·3	6·4	2·4	6·5	2·4	6·4	0·5	5·7	0·6	5·9	0·6	5·9	0·5	6·0	1·4	5·8	1·4	5·9	1·4	6·0	1·3	6·0
Mean for Day.	A =2·3 μ; Tp =6·5 s								A = 0·5μ; Tp = 5·9 s.								A = 1·4μ; Tp = 5·9 s.							

Month.	April.								May.								June.							
Hour G.M.T.	0h.		6h.		12h.		18h.		0h.		6h.		12h.		18h.		0h.		6h.		12h.		18h.	
	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.	A	Tp.	A	Tp.
Day.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.	μ	s.
1	2·0	6·5	1·8	6·5	1·7	6·0	1·4	6·0	0·2	5·4	0·2	4·7	0·3	3·9	0·2	4·7	0·6	4·0	0·5	4·7	0·3	4·3	0·3	3·5
2	1·9	6·0	1·8	5·4	1·9	6·0	1·9	6·7	0·2	4·7	0·3	4·5	0·0	---	0·3	3·2	0·0	---	0·0	---	0·0	---	0·0	---
3	2·0	6·5	2·0	6·5	1·6	6·3	2·1	6·0	0·3	3·2	0·3	3·2	0·0	---	0·0	---	0·0	---	0·0	---	...	...	0·0	---
4	1·9	6·0	2·1	6·0	1·2	6·0	1·4	6·0	0·3	3·6	0·3	3·5	...	...	0·3	4·1	0·2	4·7	0·2	5·8	0·2	6·0	0·2	5·0
5	0·6	6·3	0·5	5·0	0·2	5·0	0·2	5·0	0·3	3·7	0·3	4·3	0·3	4·7	0·3	4·3	0·2	5·2	0·0	---	0·0	---	0·0	---
6	1·1	7·5	1·0	6·3	0·6	5·6	1·8	6·3	0·3	4·3	0·3	4·7	0·3	4·8	0·3	4·1	0·0	---	0·0	---	0·0	---	0·0	---
7	1·9	6·7	2·5	6·7	2·1	6·7	2·2	6·3	0·3	3·7	0·0	---	0·0	---	0·0	---	0·0	---	0·0	---	0·0	---	0·0	---
8	3·2	6·3	2·1	6·0	2·4	4·8	1·1	5·2	0·0	---	0·0	---	0·2	5·6	0·2	5·0	0·0	---	0·0	---	0·0	---	0·0	---
9	2·2	5·6	2·2	5·6	3·7	7·0	3·5	6·0	0·2	5·0	0·2	5·4	0·3	4·0	0·3	4·3	0·0	---	0·0	---	0·0	---	0·0	---
10	3·3	7·0	3·1	7·5	2·3	6·7	2·0	6·3	0·3	3·6	0·3	3·3	0·3	3·3	0·3	4·5	0·0	---	0·0	---	0·0	---	0·0	---
11	2·1	6·0	2·1	6·0	1·9	5·8	2·1	6·0	0·3	4·5	0·3	4·3	0·2	5·0	0·7	6·0	0·0	---	0·0	---	0·0	---	0·0	---
12	1·4	5·0	1·9	5·6	1·6	6·5	1·1	5·2	0·5	5·6	0·2	5·2	0·8	4·5	1·2	6·5	0·0	---	0·0	---	0·0	---	0·0	---
13	0·7	5·2	0·9	5·6	1·8	5·4	1·1	5·6	1·1	5·2	1·2	6·3	1·5	6·7	1·0	6·0	0·0	---	0·0	---	0·0	---	0·0	---
14	1·6	5·2	1·8	5·4	1·7	5·6	2·3	8·3	1·0	6·5	1·0	6·0	0·6	5·8	0·7	5·4	0·0	---	0·0	---	0·0	---	0·0	---
15	3·0	8·0	2·3	6·7	1·6	7·7	1·8	7·5	0·4	5·6	1·0	6·0	0·5	5·2	0·5	5·0	0·0	---	0·2	7·5	0·4	7·5	0·4	7·5
16	2·4	8·0	1·5	7·0	0·9	3·6	0·6	4·0	0·2	5·0	0·5	4·5	0·3	4·3	0·3	4·0	0·4	7·0	0·4	6·5	0·2	6·0	0·2	5·0
17	0·6	4·0	0·3	4·3	0·3	4·1	0·2	5·0	0·3	3·7	0·3	4·0	0·3	3·7	0·3	4·5	0·2	4·7	0·2	5·6	0·0	---	0·0	---
18	0·0	---	0·0	---	...	...	0·0	---	0·3	4·0	0·3	4·5	0·3	4·3	0·3	4·3	0·0	---	0·0	---	...	...	0·0	---
19	0·0	---	0·0	---	0·2	5·4	0·2	5·0	0·2	4·7	0·4	6·5	0·8	6·7	0·7	7·0	0·0	---	0·2	4·7	0·0	---	0·0	---
20	0·5	4·8	0·4	5·4	0·4	5·4	0·6	5·6	0·6	6·0	0·4	5·6	0·3	4·5	...	...	0·0	---	0·0	---	0·0	---	0·0	---
21	1·0	6·0	1·8	6·5	1·3	6·7	1·4	7·5	0·2	5·0	0·0	---	...	...	0·0	---	0·0	---	0·0	---	0·0	---	0·0	---
22	0·8	6·7	1·1	7·3	0·2	6·3	0·4	6·5	0·2	5·0	0·0	---	0·4	3·0	0·3	3·6	0·0	---	0·0	---	0·2	5·0	0·2	5·6
23	0·4	6·5	0·9	5·6	0·4	6·0	0·5	5·2	0·3	4·3	0·3	3·6	0·3	3·6	0·5	5·0	0·2	6·0	0·2	6·0	0·0	---	0·0	---
24	0·4	6·0	0·4	5·4	0·2	4·7	0·4	5·6	1·1	5·6	0·7	5·4	0·2	5·0	0·3	3·5	0·0	---	0·0	---	0·0	---	0·0	---
25	0·4	5·4	1·3	7·0	1·6	7·3	1·7	6·0	0·2	5·0	0·2	4·8	0·3	4·0	0·3	4·7	0·0	---	0·0	---	0·0	---	0·0	---
26	1·3	7·0	1·4	7·3	0·8	6·0	0·4	6·5	0·2	4·7	0·3	4·3	0·3	4·3	...	...	0·0	---	0·0	---	0·0	---	0·0	---
27	0·4	5·6	0·2	5·0	1·1	5·6	0·2	6·0	0·0	---	0·3	4·3	0·0	---	0·0	---	0·3	4·0	0·3	4·0	0·3	4·0	0·3	4·3
28	0·7	5·2	0·5	5·0	0·4	5·4	0·5	4·7	0·0	---	0·0	---	0·0	---	0·0	---	0·0	---	0·3	4·3	0·0	---	0·0	---
29	0·4	5·6	0·6	5·8	0·4	5·4	0·4	6·0	0·0	---	0·0	---	0·0	---	0·0	---	0·2	5·4	0·3	4·3	0·3	3·6	0·3	3·7
30	0·4	6·3	0·5	5·0	0·2	5·2	0·3	4·5	0·0	---	0·0	---	0·0	---	0·3	4·3	0·3	4·3	0·3	3·7	0·3	3·9	0·3	4·0
31									0·3	4·0	0·3	4·0	0·5	4·5	0·5	4·8								
Mean.	1·3	6·1	1·3	6·0	1·2	5·8	1·1	5·9	0·3	4·7	0·3	4·7	0·3	4·6	0·3	4·7	0·1	5·0	0·1	5·2	0·1	5·0	0·1	4·8
Mean for Day.	A= 1·2μ; Tp= 6·0 s.								A = 0·3μ; Tp = 4·7 s.								A= 0·1μ; Tp = 5·0s.							

Note.- The Symbol ... indicates that microseisms were not measured, either by reason of occurrence of earthquakes or lack of record.

MICROSEISMS OF NORTH COMPONENT: AMPLITUDE (μ = 001 mm.) AND PERIOD (seconds).

Derived from readings for the period of thirty minutes centring at the exact hours, Greenwich Mean Time.

547. Richmond (Kew Observatory).

Month.	July.							
Hour. G.M.T.	0h.		6h.		12h.		18h.	
	A.	Tp	A.	Tp	A.	Tp	A	Tp
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	0·3	4·1	0·5	4·8	0·5	4·5	0·5	4·8
2	0·5	5·0	0·7	5·0	0·7	4·8	0·7	5·2
3	0·5	5·0	0·5	4·8	0·3	4·5	0·3	4·5
4	0·3	4·1	0·3	4·3	0·3	4·3	0·3	4·3
5	0·2	5·0	0·5	4·5	0·2	5·0	0·2	5·0
6	0·2	5·0	0·2	5·0	0·2	4·7	0·2	5·0
7	0·2	5·0	0·2	5·0	0·2	5·0	...	...
8	0·2	4·8	0·3	4·5	0·2	5·0	0·3	4·3
9	0·2	4·8	0·3	4·5	0·2	5·0	0·3	4·5
10	0·2	5·2	0·2	5·0	0·3	4·3	0·3	4·5
11	0·2	4·8	0·2	4·7	0·0	---	0·0	---
12	0·0	---	0·0	---	0·0	---	0·0	---
13	0·0	---	0·0	---	0·3	3·5	0·0	---
14	0·0	---	0·0	---	0·0	---	0·0	---
15	0·3	3·7	0·0	---	0·0	---	0·0	---
16	0·0	---	0·0	---	0·0	---	0·0	---
17	0·0	---	0·0	---	0·0	---	0·0	---
18	0·2	5·0	0·3	4·3	0·3	4·3	0·3	4·5
19	0·2	5·4	0·5	5·0	0·3	4·5	0·0	---
20	0·0	---	0·0	---	0·0	---	0·0	---
21	0·2	4·7	0·2	5·0	0·2	5·0	0·2	5·0
22	0·3	4·3	0·3	4·3	0·0	---	0·3	4·5
23	0·3	4·1	0·0	---	0·2	4·7	0·3	4·3
24	0·2	4·7	0·2	4·7	0·2	4·7	0·3	4·3
25	0·3	4·3	0·2	5·0	0·2	5·0	0·4	5·6
26	0·2	4·7	0·2	4·7	0·3	4·0	0·2	4·8
27	0·3	4·3	0·3	4·3	0·2	5·0	0·3	3·6
28	0·3	3·6	0·3	4·1	0·2	5·0	0·3	4·3
29	0·2	4·7	0·3	4·5	0·3	4·3	0·3	4·0
30	0·3	4·5	0·3	4·3	0·3	4·1	0·3	4·0
31	0·0	---	0·0	---	0·0	---	0·0	---
Mean	0·2	4·6	0·2	4·7	0·2	4·6	0·2	4·5
Mean for Day.	A = 0·2μ , Tp. = 4·6 s							

Month.	August.							
Hour. G.M.T.	0h.		6h.		12h.		18h.	
	A.	Tp	A.	Tp	A.	Tp	A.	Tp
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	0·0	---	0·0	---	0·0	---	0·0	---
2	0·0	---	0·0	---	0·0	---	0·0	---
3	0·0	---	0·0	---	0·0	---	0·0	---
4	0·0	---	0·0	---	0·2	6·0	0·2	5·0
5	0·2	6·0	0·2	5·6	...	...	0·0	---
6	0·0	---	0·2	6·7	0·0	---	0·2	5·0
7	0·2	4·7	0·2	5·0	0·2	4·7	0·0	---
8	0·0	---	0·0	---	0·0	---	0·0	---
9	0·0	---	0·0	---	...	...	0·0	---
10	0·0	---	0·0	---	0·0	---	0·0	---
11	0·0	---	0·0	---	0·0	---	0·0	---
12	0·0	---	0·0	---	...	...	...	...
13	...	...	...	...	0·0	---	0·0	---
14	0·0	---	0·0	---	0·0	---	0·0	---
15	0·0	---	0·0	---	0·0	---	0·0	---
16	0·0	---	0·0	---	...	...	...	...
17	...	...	...	...	0·0	---	0·0	---
18	0·0	---	0·0	---	0·0	---	0·0	---
19	0·0	---	0·0	---	0·0	---	0·0	---
20	0·0	---	0·0	---	0·0	---	0·0	---
21	0·0	---	0·0	---	0·0	---	0·0	---
22	0·0	---	0·0	---	0·0	---	0·0	---
23	0·0	---	0·0	---	0·0	---	0·0	---
24	0·0	---	0·0	---	0·0	---	0·0	---
25	0·0	---	0·0	---	0·0	---	0·0	---
26	0·0	---	0·0	---	0·0	---	0·0	---
27	0·0	---	0·0	---	0·0	---	0·0	---
28	0·0	---	0·0	---	0·0	---	0·0	---
29	0·0	---	0·0	---	0·2	5·8	0·2	5·8
30	0·2	5·4	0·2	5·0	0·2	5·2	0·2	5·0
31	0·2	5·2	0·2	5·0	0·2	6·0	0·5	5·2
Mean	0·0	5·3	0·0	5·5	0·0	5·5	0·0	5·2
Mean for Day.	A = 0·0μ , Tp. = 5·4 s.							

Month.	September.							
Hour. G.M.T.	0h.		6h.		12h.		18h.	
	A.	Tp	A.	Tp	A.	Tp.	A.	Tp
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	0·5	5·2	0·5	5·2	0·4	5·4	0·6	5·6
2	0·6	5·6	0·8	5·8	1·1	5·6	1·0	6·3
3	1·0	6·3	1·2	6·3	1·2	6·0	1·4	6·0
4	1·9	6·0	1·2	6·0	1·4	5·2	0·6	5·6
5	0·6	6·0	0·2	5·2	...	...	0·3	4·0
6	0·3	4·3	0·0	---	...	...	0·2	4·5
7	0·3	4·3	0·3	4·3	...	...	0·2	4·8
8	0·2	4·7	0·5	4·0	0·5	4·5	0·6	3·9
9	1·6	4·3	1·3	4·1	0·5	4·7	0·7	5·2
10	0·4	5·6	0·2	5·4	0·2	5·0	0·4	5·2
11	0·7	5·2	0·9	4·8	0·7	4·5	0·5	4·3
12	0·5	5·0	0·7	5·0	0·7	4·8	0·8	4·3
13	0·9	5·0	0·9	5·4	0·9	5·2	1·0	5·8
14	1·2	5·8	1·8	5·8	1·2	7·0	1·2	7·0
15	1·8	7·0	1·8	6·7	1·2	6·0	1·0	6·3
16	0·7	6·7	0·4	5·2	0·6	6·5	0·2	6·0
17	0·2	4·7	0·2	4·7	0·2	4·7	0·2	5·0
18	0·2	5·0	0·5	5·0	0·6	6·0	0·9	7·0
19	1·6	6·7	0·7	6·7	1·1	5·4	0·2	4·7
20	0·4	5·8	1·2	4·8	1·4	5·8	2·7	5·2
21	3·3	4·8	2·6	4·8	2·1	4·3	2·6	4·3
22	2·4	4·7	2·1	4·8	1·4	4·7	1·2	4·7
23	0·8	4·1	0·6	3·9	0·8	4·1	0·5	4·8
24	1·0	4·7	0·5	4·7	0·3	4·1	0·5	5·0
25	0·5	4·1	0·7	5·2	1·2	4·7	0·9	5·0
26	0·5	4·1	0·6	5·6	0·2	5·0	0·3	4·0
27	0·5	5·0	0·5	5·0	0·5	4·5	0·2	5·4
28	0·3	4·0	0·3	4·3	0·3	3·9	0·3	4·0
29	0·5	4·1	0·2	4·8	0·2	5·0	0·3	4·1
30	0·5	5·0	1·9	4·1	1·1	4·0	0·5	4·8
31								
Mean	0·9	5·1	0·8	5·1	0·8	5·1	0·7	5·1
Mean for Day.	A = 0·8μ , Tp. = 5·1 s,							

Month.	October.							
Hour G.M.T.	0h.		6h.		12h		18h.	
	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	1·0	4·7	0·5	4·3	0·5	5·0	0·8	4·3
2	1·4	4·0	0·8	4·3	0·5	4·3	0·5	4·3
3	0·6	3·9	0·3	4·3	0·2	5·0	0·2	4·7
4	0·3	4·3	0·0	---	0·0	---	0·2	5·0
5	0·0	---	0·0	---	0·0	---	0·0	---
6	0·0	---	0·0	---	0·2	5·0	0·5	5·0
7	0·6	5·6	0·5	5·0	0·7	5·2	0·5	4·0
8	1·3	5·4	1·9	6·5	1·9	6·3	1·8	6·0
9	1·9	5·6	1·9	5·6	2·1	5·6	1·6	5·2
10	1·3	6·5	1·5	6·3	1·0	6·0	0·9	6·7
11	0·8	6·5	0·4	7·0	0·2	5·2	0·2	4·7
12	0·3	4·3	0·2	6·5	0·2	5·0	0·2	6·0
13	0·9	6·7	1·7	7·5	1·4	7·0	1·6	7·0
14	1·2	6·0	1·1	6·3	1·0	4·5	1·1	5·0
15	1·1	5·0	1·6	5·0	0·9	5·0	1·1	5·4
16	0·4	5·2	0·7	5·2	0·4	5·6	0·5	4·0
17	0·2	5·2	0·7	5·2	0·5	5·0	0·2	5·0
18	0·4	5·6	0·5	4·0	1·8	3·7	1·0	4·3
19	1·0	4·5	0·2	5·0	0·5	4·8	0·9	5·0
20	0·8	6·0	1·3	5·4	1·5	5·4	4·4	7·5
21	2·1	7·3	2·0	7·0	2·0	6·7	1·5	5·6
22	2·0	5·2	2·7	5·6	2·0	5·2	1·7	5·4
23	2·2	4·5	1·6	5·0	1·0	5·8	1·0	6·0
24	1·0	4·5	1·2	4·8	1·3	5·2	1·9	5·6
25	0·9	5·2	0·6	6·0	1·6	6·0	1·3	5·4
26	1·4	6·0	1·4	6·0	1·0	6·0	1·5	5·4
27	0·8	5·6	1·2	6·0	1·1	5·2	1·1	5·6
28	1·5	5·4	1·3	4·3	1·1	5·0	0·6	6·5
29	0·4	5·2	0·4	5·6	...	...	1·2	4·8
30	1·9	4·8	3·0	7·0	1·9	6·3	1·9	6·5
31	2·2	5·4	1·1	5·0	1·2	6·0	0·9	5·0
Mean	1·0	5·3	1·0	5·6	1·0	5·4	1·1	5·4
Mean for Day.	A = 1·0μ , Tp = 5·4 s.							

Month.	November							
Hour G.M.T.	0h.		6h.		12h.		18h.	
	A.	Tp.	A.	Tp.	A.	Tp.	A.	Tp.
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	0·6	5·8	0·5	6·7	0·4	5·4	0·6	6·0
2	0·4	5·8	1·1	7·0	1·0	7·5	1·0	6·3
3	0·8	5·8	1·0	5·8	0·6	5·6	0·5	4·0
4	0·3	4·1	0·5	4·3	0·3	3·9	0·3	3·9
5	0·3	4·0	0·3	3·7	0·6	3·7	1·0	4·7
6	0·5	4·0	0·8	4·3	0·4	5·6	0·4	6·0
7	0·6	6·3	1·0	6·3	0·5	4·7	2·0	3·9
8	0·4	5·4	0·6	6·0	0·2	5·6	0·5	5·0
9	0·4	6·5	0·4	6·0	0·4	6·3	1·5	6·7
10	0·9	6·7	0·6	6·0	0·8	6·0	1·3	6·3
11	1·8	7·0	2·5	7·0	3·2	6·5	2·4	7·3
12	3·1	7·3	3·6	7·5	2·3	7·0	1·9	6·5
13	1·9	6·5	1·0	5·6	0·7	5·2	0·2	5·0
14	0·5	5·0	0·5	4·3	0·5	5·0	0·3	3·7
15	...	...	...	...	0·0	---	0·0	---
16	0·0	---	0·0	---	0·0	---	0·0	---
17	0·0	---	0·0	---	0·0	---	0·0	---
18	0·3	4·0	0·0	---	0·0	---	0·2	6·0
19	0·2	5·0	0·2	6·0	1·2	7·0	1·1	7·0
20	1·6	6·7	1·6	6·7	1·7	6·5	1·8	7·0
21	1·7	7·5	1·7	7·5	1·7	7·3	1·8	6·0
22	1·8	6·0	1·4	7·0	2·0	6·0	1·8	6·0
23	2·7	6·3	4·1	8·3	4·1	7·5	3·3	8·0
24	3·4	7·5	1·9	7·5	1·9	6·5	1·5	6·3
25	1·5	5·4	1·6	5·0	0·7	5·0	0·5	5·0
26	1·5	5·4	1·6	5·0	3·6	6·0	4·8	7·0
27	4·6	6·7	4·8	6·7	4·1	7·0	2·9	6·3
28	2·0	6·0	2·1	6·5	2·0	6·0	1·5	6·7
29	1·8	7·0	0·9	6·7	3·2	7·0	2·5	7·0
30	2·7	7·7	3·0	7·7	2·5	7·5	1·8	6·7
31								
Mean	1·3	6·0	1·4	6·2	1·3	6·1	1·3	5·9
Mean for Day.	A = 1·3μ , Tp. = 6·1 s.							

Month.	December							
Hour G.M.T.	0h.		6h.		12h.		18h.	
	A.	Tp.	A.	Tp	A.	Tp.	A.	Tp.
Day.	μ	s.	μ	s.	μ	s.	μ	s.
1	1·7	5·7	1·9	6·5	1·8	6·0	1·3	6·3
2	1·9	6·5	1·9	6·5	1·9	6·5	1·9	6·3
3	3·5	7·3	3·4	7·5	3·6	7·5	3·1	8·0
4	1·9	6·3	1·9	6·3	1·4	7·0	1·7	6·5
5	0·9	5·4	0·5	4·0	0·9	5·0	2·2	5·4
6	2·0	6·0	1·5	5·4	2·2	5·2	2·2	5·4
7	3·8	6·3	4·7	6·5	4·7	6·5	4·5	6·5
8	5·4	6·0	3·6	6·5	1·8	6·0	2·0	5·2
9	1·5	5·6	1·3	6·5	1·3	5·6	0·4	6·0
10	0·9	6·7	1·6	6·7	1·8	6·0	2·0	6·0
11	1·8	6·0	1·7	5·6	1·1	5·2	1·0	5·8
12	0·7	4·7	0·5	4·5	0·2	4·5	0·3	4·0
13	0·2	4·7	0·3	4·3	0·0	---	0·3	4·3
14	0·0	---	0·0	---	0·2	6·0	0·4	7·0
15	0·8	6·0	1·3	6·3	1·9	7·5	1·6	7·0
16	4·9	9·0	4·4	9·0	2·9	8·3	4·4	8·0
17	3·3	8·0	2·4	7·7	2·5	7·0	3·6	7·0
18	4·0	7·3	3·2	7·5	2·8	7·0	1·9	7·3
19	1·8	7·0	1·5	7·5	1·9	6·5	1·7	6·3
20	1·6	5·2	2·1	5·6	1·7	6·5	1·8	7·0
21	2·5	7·0	1·7	7·5	1·8	7·0	1·8	6·7
22	1·3	8·3	2·2	7·3	2·4	7·7	1·8	6·7
23	2·1	7·0	1·9	6·5	1·9	6·5	2·1	6·3
24	3·0	6·5	2·2	7·5	3·5	8·0	2·2	7·5
25	1·9	7·3	2·2	6·7	1·8	7·0	1·8	7·0
26	2·0	7·0	2·7	7·5	2·4	7·5	1·8	7·0
27	1·3	6·3	0·8	6·5	0·6	6·5	0·7	7·0
28	1·1	6·5	0·9	6·7	1·8	6·7	1·7	7·5
29	1·8	7·0	2·0	6·7	1·6	7·0	1·3	6·5
30	1·6	6·7	2·0	6·0	1·9	7·0	2·0	6·7
31	2·1	7·0	4·6	6·7	6·4	7·0	5·6	7·5
Mean	2·0	6·5	2·0	6·5	2·0	6·6	2·0	6·5
Mean for Day.	A = 2·0μ , Tp = 6·5 s.							

Note.- The Symbol ... indicates that microseisms were not measured, either by reason of occurrence of earthquakes or lack of record.