THIRD

ANNUAL REPORT OF THE SEISMOGRAPH STATION AT HILL VIEW, WOODBRIDGE HILL, GUILDFORD, ENGLAND

YEAR 1912

A. C. CURTIS, PRINTER, GUILDFORD

The Seismograph Station at Elm View, Woodbridge Park, Guildford, England.

POSITION. $\lambda = 0^\circ\ 35'\ 47''$ longitude West from Greenwich; $\phi = 51^\circ\ 15'\ 1''$ North latitude. Booms 187 feet (57 metres) above mean sea-level at Liverpool (Ordnance datum).

BASE. London Clay (Eocene, marine). Bottom of instrument-column 5 feet (1·52 metres) below surface of ground.

TIME KEPT. Greenwich Mean, from midnight (0 hrs.). Expressed in hours, minutes, and decimal parts of a minute.

INSTRUMENT USED, originally one of the Milne principle, having an iron mast, 4ft. 2in. (1.27 metres) in height from the centre of the Booms to the top of the mast, and two horizontal Booms, one facing North and one West. Each Boom is 3ft. (91.4 cms) long, and has a weight of 100 lbs. (45.36 kilogrammes) at the extreme outer end. The record is made photographically by two crossed slits, of which the one is cut in a movable shield or "vane." This vane is fixed to the end of a pivotted and balanced grass-stem, which is the multiplying lever, giving a magnification of 45 :1. The natural period of swing of the Booms is 9 seconds of time. Magnetic friction damping renders the Booms fairly, but by no means completely, dead beat. The photographic recording paper travels at a linear rate of 10 ins. (25 cms) per hour.

ABBREVIATIONS used in the following Register :—

h = hour
m = minute
sec = second
} of Mean time.

i = impetus; that is, a sudden marked wave-front, of whatever phase (iN, iS, denote impetus of the West Boom towards the North, and South, respectively; iE, iW, denote impetus of the North Boom towards the East, and West, respectively. Thus iSs denotes a Southward impetus of the West Boom at the commencement of the Second Phase of an earthquake.
e = a gradual, indefinite arrival of waves of whatever Phase.
a = displacement from the position of rest of the Boom; aN, aS, denote a displacement of the West Boom towards the North, and South, respectively, and aE, aW, denote a displacement of the North Boom towards the East, and West, respectively.
d = duration.
mm = millimetres.
micro = microscopic, and is applied to movements which have a Range of less than 0.02 mm.
Range = the Range of motion of the Boom in response to a complete wave.
N = the Boom which faces North, the North component.
W = the Boom which faces West, the West component.
P = arrival of the First Preliminary Phase, at this Station.
S = arrival of the Second Preliminary Phase, at this Station.
L = arrival of the Long Waves, at this Station.
M = a maximum of the Long Waves.
C = an aftershock maximum.
F = end of movement, that is to say either the end of movement of a Phase, or the end of the whole earthquake.
T = the duration, in seconds of time, of a complete wave (crest to crest), as shown by the instrument.
E = the position on the world of the Epicentre of the earthquake.
α = Azimuth of the Epicentre from this Station.
Δ = distance, in kilometres, of the Epicentre from this Station, deduced from the interval of time elapsing between P and S.
λ = longitude measured from Greenwich.
ϕ = latitude.
Ψ = distance, in arc measure, of the Epicentre from this Station, deduced from the interval of time elapsing between P and L.

EXPERIMENTS. During the first part of the year, experiments on multiplying levers were continued, and in March a satisfactory arrangement was made. A dead flower-stem of grass was picked from the hedge, and a steel needle (sharpened at both ends) was stuck through the grass at 220 mm from its thinner end. This needle formed a vertical pivot upon which the grass-stem lever could swing horizontally, and it was set in a small support. At the thinner end of the grass was fixed horizontally the travelling "vane" with the slit cut in it. The vane was of Biotite, rubbed with sand-paper until it became very thin, and then rendered opaque with Indian ink. Next, on to the grass-stem (on the opposite side of the pivot from the travelling vane) a little sliding collar was placed, made of "German-Silver," and on the *top* of the collar a fragment of soft iron was soldered. A stout, magnetised steel wire, rigidly connected with the Boom, touched the *side* of the little collar; and, by attracting the fragment of soft iron without actual contact of the magnetic substances, caused the lever to follow faithfully the movements of the Boom. The lever was balanced by a larger tube of grass-stem, sliding on to the thicker end of the lever. The distance between the pivot and the point where the wire touched the collar determined the magnification, and was easily adjustable. Only heavy winds are able to blow the lever about, its tenacity being, of course, ruled by the strength of the magnetism in the wire.

THE REGISTER is given as carefully as possible. During January, February and March it suffered considerably from the varous unsuccessful multiplying levers which were tried. With better levers, better records have been taken, and wave lengths of the maximal Phase (M) have been given. The Preliminary Phases have been sought carefully, but tremors (especially when the wind blows) are sometimes a great hindrance. I ask pardon, therefore, if I am found to have made wrong interpretations.

The form in which the Register now appears has been adopted in order to conform better to the usage of other places; but I do not attempt to give details which I do not honestly believe it possible for me to give. It will be seen that the "warning Phase" noticed at this Station during the years 1910 and 1911 has disappeared. There are, as it seems to me, various causes for the phenomenon; and it is best to give the details under the heading of the cause to which they seem due. Thus, in some earthquakes there seems to be a persistence of waves of the S Phase after the L Phase has begun. This may be due (1) to a real overlap, in a simple earthquake, or (2) to the S Phase of a second shock continuing to arrive after the L Phase of a previous shock has begun. In other earthquakes it seems to have represented simply the very long waves which often herald the L Phase. Then there might possibly be wave-echoes of some sort, arriving, from within the earth, between the end of the S Phase waves and the arrival of the L Phase. And in the case of undamped Booms it may at times have been due to the continuance of instrumental movement in conflict with the freshly arriving waves. This is suggested by the diminution of entries under the "warning Phase" in my 1911 Report after magnetic damping had been applied. I have also wished not to confuse the conventional symbols.

Records are only printed in this Register when a certain amount of detail can be given. Other small corroborated shocks which have been recorded at this Station are printed in the Circulars of the British Association for the Advancement of Science, where my complete lists are printed through the kindness of Professor Milne. At certain times of seismic activity, however, every record received is printed in this Report. Epicentral distances are given in accordance with the tables kindly distributed by Prince Boris Galitzin at the Manchester Conference of the Strassburg Bureau of Seismology. It is easy, however, to fail to see emergences of the P or S Phase on the records, especially if they are followed by impetus. I hope next year to give the impetus-values on both Booms whenever possible, at the commencement of a Phase.

MOST GRATEFUL THANKS are offered to every Observer who has sent me the lists or Bulletins from his Observatory. By this help I have been able to identify many small movements, and to rectify several errors of interpretation.

THE OCCURRENCES OF JUNE 6, 7, 8. The knowledge that one has probably made many errors is no excuse for refusing to try and analyse movements of this sort. It seems that on April 7, 8 and 9, seismic movements took place in Alaska; but no Long Waves can be found on the Guildford records for those days. And on September 24 and 25 there were similar disturbances which did not reach this Station. But on June 6, 7 and 8 waves, strong enough to be recorded at Guildford, proceeded from the neighbourhood of the Aleutian Islands. On June 6, from 6 hours there arrived continual indications of earthquakes, for the most part small, but occasionally stronger. At 9 hours on June 7 there commenced a series of strong shocks, which (except for certain intervals of rest) continued until 14 hours on June 8. The principal earthquake, or culmination, appears to have been a triple shock shortly after $7\frac{1}{2}$ hours on June 8. There is little doubt that the phenomenon was a series of deep-seated volcanic explosions possibly connected with an access of sea-water. Certain considerations are appended.

Firstly, in a *mêlée* of Phases from several earthquakes arriving simultaneously, a Seismologist must expect the form of the waves as given him by his instrument to be quite different from their usual aspect. They will reinforce or hinder one another, and in fact will show every sort of combination from complete accord to complete antagonism. Varying wave periods will conflict together, and a succession of strong waves which has completely overcome a smaller antagonistic succession of waves will appear at its maximum as a weak movement, and will probably grow stronger again if its antagonist dies down rapidly. Curious distorted shapes and fictitious wave-periods will be produced, and short waves will be seen gaily riding on the backs of the Long Waves. But if the Long Waves are once discovered, and the time of their arrival elucidated, the dis-entangling of the remainder can usually be accomplished by some expenditure of time. The meanings of the various changes in the character of the record appear one by one, and one learns that in such cases a sudden diminution, or even cessation, of movement often indicates the arrival of a Phase.

Secondly, a study of the Epicentral distances, as given by such of the shocks as can be disentangled in this manner during the movements under consideration, shows that there were probably two main centres of disturbance. Ten shocks gave the distance as 7725 kilometres from this Station (one other giving 7785 km); seven shocks gave it as a little more or less than 8000 km; and five shocks gave distances ranging from 8200 km to 8435 km. There was one shock (unlike all the others by reason of the great proportionate range of its S Phase), which gave 8555 km, and one shock which gave 7845 km; and there were two shocks which gave 7600 km. Apparently, therefore, there was one centre of disturbance at a distance of 7725 km, and another at about 8000 km, from Guildford. Possibly the distance of 8200-8400 km may have been the correct one for all the movements of 8000 to 8400 km, or else there may have been a third centre of disturbance. Or, again, all the differences in the distance may be due to wrong reading of the seismograms, or to peculiarities of the individual Phases as propagated; and there may only have been one centre. But the distinct grouping suggests one or two centres of activity, accompanied by an occasional relief of strain at further points along a line of weakness.

In addition to the shocks given above, there also arrived during the progress of the disturbances eight independent shocks from closer distances.

Thirdly, an area of vulcanism bordering on the great sea—in a region of islands and of sea-filled clefts between islands—is a good place for the generation of earthquakes due to adjustment under strains, and of deep-seated volcanic explosions which will shake the world. The ordinary

from afar. It will be well to expect such explosions in other similar parts of the world, especially if there are any indications of orogenic activity beneath the sea.

Fourthly, the explosions which accompanied the rise of the Island of Ioanna Bogoslova in North lat. 53° 58′ and West long. 168° took place in May of A.D. 1795, and the volcanoes of both Unalaska and Unimak were then active; the Yakutat Bay earthquakes took place in September of A.D. 1899, shook the world, and were many in number. There are, therefore, precedents both for the season of the year and for the widespread activity and numerous shocks of the movements in A.D. 1912.

Fifthly, the following items of news, in regard to the disturbances, have been received by me: (1) from the *Morning Post* of June 10, 1912, "Sitka, June 9.—Volcanic ashes from the Aleutian Range, 700 miles distant, are falling here, and the sunshine is discoloured. Cabled reports say that more than one volcano is in eruption. The region is very thinly populated, but at Katmai there are hundreds of salmon catchers and canners and numerous Indian villages.—REUTER." (2) From the *Morning Post* of June 11, 1912, "New York, June 10.—A message from Seward (Alaska) says: 'The steamer *Dora* arrived here on Sunday [June 9] covered with ashes. Those on board witnessed the volcanic eruption at Katmai, in the Aleutian Islands. They believe that several fishing villages on Shelihof Strait have been destroyed. A steady stream of rocks and ashes followed a terrific explosion, spreading over the countryside. The sun was obscured. Although the *Dora* was seventy miles distant, at four o'clock [local time] on Thursday afternoon [June 6] complete darkness set in, and ashes fell in a thick layer on the decks. The stifling atmosphere made the passengers violently ill. It is estimated that volcanic ash covers three hundred square miles [*sic*] of fertile country.' According to a telegram from Seattle (Washington State) the volcanic disturbance is rendering wireless telegraphic communication with Kodiak, Rospberry and Afognak, three of the most important islands of south-western Alaska, impossible. Three earthquakes were registered at Seattle yesterday [June 9].—REUTER." (3) Later on in the summer the New York correspondent of the *Standard* said: "A general scarcity of whales has been reported all along the North Pacific coast this summer, the average kill being only 51 for each vessel, as against 187 last year. Captain Thomas Wilkinson, commander, and Captain Henry Anseb, gunner, of the steam whaler *Patterson* . . . attribute the present lean conditions to the recent volcanic disturbances in the neighbourhood of Behring Sea. They say that the seismic upheavals have made many changes in the ocean currents of the North Pacific, which for a time have probably diverted the small fish that form the favourite food supply of the leviathans."

REPEATED SHOCKS. Arising indirectly from the study of the seismograms of June 7 and 8, an idea suggests itself. The Preliminary Phases of an earthquake sometimes seem impossible to decipher, on account of movements which begin before what would otherwise be the commencement, or break in during the course of a Phase. It will often be found, however, that in such cases the secondary movements would correspond with waves arriving from another shock at the same Epicentre, occurring within a minute or two of the main shock. Persistence of the S Phase, and distortion or hindering of the maximal waves, can often be attributed to the same cause. Almost every account of a strong earthquake in an inhabited area mentions these subsidiary shocks. In the following Register several seismograms have been interpreted on this principle.

AIR TREMORS have again caused study and tribulation. It was established in 1910-11 here that with a slow Boom-period (T = 17.5 sec) a drop of the air temperature was a frequent source of tremors. Magnetic friction-damping considerably impeded the continuity and Range of these tremors. Wind, unless heavy, did not disturb the Booms, and it was essential to keep a current of air passing through the instrument-case. But when a quicker swing (T = 10 or 9 sec) was adopted, the tremors were profoundly altered. It became necessary to *prevent* air currents from passing through the case, as they caused the Booms to swing continuously. Even a moderate wind also caused heavy tremors. Tremors caused by a drop in the air temperature continued in some measure to occur, but they revealed a most unexpected form. Waves of about the natural period of the Booms appeared with interpositions with waves of a long period (T = 15 to 30 sec). Then, also, there have been noticed small, gentle, slow waves (T = 28 sec), for which I have suggested no cause, unless they be due to seiches in the London clay. Heavy winds blow the vanes about slightly.

SLOW PERIOD TILTINGS. I hope to take observations on the slow wanderings of the vertical. The effect of changes in humidity on the London clay rock will provide a difficulty, for sudden rain after drought will sometimes throw the recording vane out of position during the night.

THUNDER-CLAPS, although not frequent in the South of England, may possibly affect the seismograph, and a wireless telegraphy "receiver" is to be used to catch the "x.'s" of the lightning-flashes and facilitate research on this point.

TRAFFIC is hardly ever known to affect these Booms.

F. EDWARD NORRIS.

HILL VIEW,
WOODBRIDGE HILL,
GUILDFORD, ENGLAND,
January 1st, 1913.

No.	Date 1912	Boom	Phase	Instrument h.	Instrument m.	h.	m.	mm.	sec.	Origin Δ	End (?) h.	End (?) m.	Notes.
	Jan. 4	W	e	4	12·6	4	13·7	micro		?			
							17·4	micro					
			L,M		20·2		26	micro		?		?	
													* Displacement.
	Jan. 4	W	P	16	3·8	16	4·8	*0·5		?			
			S		13·2		18·6	0·02					
							29	0·02					
			L,M		39·1		44·3	0·5					
			C				56 6	0·03					
						17	10 3	0·03					
							18·3	0·03					
							23·7	0·03					
							30	0·02					
							37·2	0·03					
							53	micro			17	59	
	Jan. 20	W	P	4	20	4	25·7	0·03		?			Time signal not working, figures approximate.
			S		28·8		37	0·03					
							41·3	0·04					
							46·3	0·03					
							50·1	0·03					
			L,M		55·2	5	8	0·1					
							14	0·1					
			C				25·3	0·03			5	35	
	Jan. 21	W	P	3	3·3	3	3·7	micro		?			
			S		6·4		7·7	0·02					
			L,M		10·6		15·3	0·02					
			C				23·7	0·02			3	25·5	
	Jan. 24	W	P	16	27·7	16	28·8	0·3		Δ			
			S		31·2		32	1·0		2080			
			L,M		33·4		35·7	1·5					Intermaximal lull, 16 35·9, (0·0 mm).
							36·3	2·6					
			C				38·8	0·5					
							42	0·1					
							44·7	0·03					
							54·9	0·03					
						17	16	0·03					
							28·6	0·05					
							51·2	0·03					
						18	10·3	0·02			18	15	
	Jan. 25	W	P	19	58·4	19	58·8	0·02		?			
			S	20	0·4	20	1·1	micro					
			L,M		2·7		4·7	micro					
							6	micro			20	8·5	
	Jan. 26	N	S?	15	9·5	15	13	0·02		?			
							16·4	micro					
			L,M		20·7		25·3	0·03					
			C				35·4	0·02			15	41·5	
	Jan. 31	N	eP	20	28·9	20	29·5	0·02		?			
			eS		32·3		32·6	0·5					
							33·1	0·4					
							33·9	0·2					
							35·1	0·1					
			L,M		39·8		43·3	0·04					
							48·4	0·1					
							50·3	0·15					
							53·6	0·1					
			C			21	6·6	0·04					
							14·7	0·02					
							44·7	0·02					
						22	11·1	micro					
							22·4	micro			22	30	
	Feb. 10	N	eP	18	10·5	18	10·7	*0·1		?			* Displacement.
			eS	?	21		25·3	0·05					
			L,M	?	41·8		47·2	0·1					
							51	0·05					
			C			19	3·3	0·05			?		
	Feb. 13	N	iP	8	9·8	8	10·6	0·03		Δ			Perhaps preceded by eP.
			S		12·9		13·4	0·1		1810?			
			L,M		14·2		15·3	0·8					
							16·7	0·8					
							17·3	0·8					
			C				36·5	0·02					
							43·1	0·03					
							46·6	0·03			8	49	
	Feb. 20	N	P	13	31·6	13	33·2	0·6		4670			Magnification 25:1.
			S		38		39·4	1·0					
			L,M		49·7		53·4	1·7					
							57·2	1·9			In ats.		
	Mar. 8	N	P?	15	11	15	11·3	1·1					During heavy tremors.
							12·2	1·2					
			S?		12·6		13·8	1·5					
							14·7	1·3					
			L,M		15·8		17·5	2·2					Intermaximal lull.
							18	2·3					15 19 (0·8 mm).
							21·5	3·0			?		

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.	No.
2022	Mar. 11	W	e	10	36·4	10	36·8	0·15						2211
			i		37·5		38·4	0·3						
			e		43·6		45·9	0·9						
							46·3	0·8						
							48·2	0·75						
							51·3	0·4						
							52·5	0·7						
							54·6	0·85						
							56·6	0·95						
			L,M		56·9		57·4	0·6						2214
							57·7	0·7						
							58·1	0·9						
							58·5	1·1						
							58·8	1·05						
							59·3	0·6						
							59·7	1·0						
						11	0·3	0·9						
							0·6	1·0						
							1·7	2·3						
							3·7	2·2						
							7·6	2·1						
							9·5	1·9						
							10·4	1·6						
						(	14·0)							
			C				16·0	0·75						224
							17·2	0·9						
							19·2	0·7						
							21·6	0·6						
							24·5	0·5						
							33·6	0·4						
							36·8	0·2						
							39·5	0·25						
							41·6	0·3						
							43·6	0·35						
							48·0	0·3						
						12	1·3	0·1			12	3·4		
2068	Mar. 22	W	P	18	46·9	18	50·3	0·2		2590				235
			S		51·1		51·9	0·2						
							52·2	0·2						
			L,M		53·2		54·7	1·15						
			C				56·9	0·1						
						19	1·0	0·15			19	10·0		
2111	Mar. 31	N	P?	16	24·2	16	24·8	0·03		?9400				
							31·0	0·02						
			S?		34·7		38·9	0·03						
							42·9	0·04						235
							44·0	0·04						
							52·7	0·04						
			?L,M	17	0·2	17	6·6	0·1	20					
			?C				22·3	0·02			17	35·2	Tremors on April 6th, 8th, 9th may be seismic, but c be deciphered at this stat	
2178	Ap. 9	W	iP	14	15·1	14	16·3	0·2		1870				
							16·7	0·2						
			iS		18·3		19·2	0·25						
			iL,M		19·5		20·3	0·4						
							21·0	0·35						
							21·2	0·35						
			C				24·9	0·3						
							28·6	0·2						
							33·3	0·15			14	35·0		
2196	Ap. 13	W	P	2	50·2	2	51·0	0·2						
			S		52·9		54·0	0·05						
			L,M		59·4	3	0·7	0·07						
							6·4	0·05			In Ats.			
2202	Ap. 14-15	W	iP	22	56·5	22	57·2	0·05		10050				
						23	4·1	0·03						241
			iS	23	7·5		9·0	0·05						
							15·0	micro						
			iL,M		46·3		47·2	0·02	24					
							56·2	0·05	24					
			C			0	13·7	0·02						
							24·8	micro			0	33·5		
2210	Ap. 15	W	iP	16	25·4	16	25·6	0·2		8080				
							27·3	0·1						242
							29·2	0·1						
			S		34·8		43·1	0·05						
							51·0	0·05						255
			L,M		54·4		56·0	0·03						
						17	0·8	0·03			?			
		W	P	16	? 31·1	16	32·8	0·2		?7850			Probably a second concuss the previous movement.	
			S		? 40·3		41·0	0·04						
							44·6	0·1						
							58·7	0·1						
			M			17	9·0	0·05						
							12·7	0·05						257

Notes	No	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
	211	Ap. 15	W	iP	23	32·8	23	33·0	0·06		2010			
								34·1	0·03					
				iS		36·2		36·5	0·1					
				iL,M		37·2		37·6	0·15					
								38·1	0·2					
								39·6	0·9					
				C				43·7	0·1					
								49·1	0·03			23	52·8	
	214	Ap. 17	W	iP	4	3·6	4	3·9	0·05		5090			
				iS		11·1		11·2	0·1					
								12·0	0·1					
								14·2	0·2					
								15·7	0·2					
				iL,M		26·2		34·0	0·1	21·8				
								36·3	0·1	21·8				
								38·8	0·07					
				C				47·7	0·03					
								50·3	0·05					
								56·6	0·05					
							5	3·7	0·02					
								8·3	0·02					
								14·8	0·03			5	18·6	
	224	Ap. 19	W	iP	0	23·2	0	23·6	0·04		3290			
				iS		27·0		27·2	0·25					
								28·3	0·15					
				iL,M		30·4		30·7	0·2					
								31·8	0·4					
								32·5	0·6	11 to				
								34·0	0·75	12				
				C				36·8	0·15					
								37·9	0·3					
								39·0	0·2					
								43·7	0·1					
								47·8	0·07					
								54·0	0·05			0	58·2	
	225	Ap. 19	W	iP	1	4·6	1	5·0	0·05		2510			
								8·2	0·02					
				iS		8·7		8·7	0 1					
								9·6	0·1					
								10·3	0·07					
				iL,M		10·8		12·0	0·4					
				C				14·2	0·1					
								15·3	0·1					
								16·5	0·07			1	20·6	
	235	Ap. 20	W	iP	1	53·1	1	53·7	0·25		7730			
								55·4	0·1					
								58·4	0·15					
April 6th, 8th, e seismic, but ca ered at this stat				iS	2	2·2	2 ?	10·0	0·4					
								14·3	0·25					
								14·9	0·2					
								22·4	0·07					
								27·6	0·1					
				L,M	2	? 31·0		41·3	0·4	19				
								42·5	0·3	20				
								48·6	0·4	19				
								50·0	0·5	19				
								52·7	0·25					
								55·6	0·15					
				C			3	5·0	0·1					
								11·0	0·1					
								23·8	0·05					
								31·6	0·05					
								39·8	0·1					
								54·4	0·05					
							4	4·0	0·05			4	5·1	
	241	Ap. 21	W	iP	2	40·1	2	40·6	0·15					
				S	?	45·3		50·0	0·15					
				iL,M	3	1·2	3	1·7	0·4					
								2·7	0·4					
								5·7	0·9					
								7·1	0·8					
								8·0	0·75					
				C				10·1	0·5					
	242	Ap. 21	W	iL,M	3	18·0	3	19·7	0·75					
				C				28·0	0·05			3	30·0	
cond concussio as movement.	255	Ap. 23	W	eP?	22	0·95	22	1·3	0·02		?6275			Trace-not very clean.
				iP		1·6		2·8	0·03					
				iS		8·8		9·5	0·07					
								17·2	0·05					
								22·7	0·03					
				iL,M		31·8		34·8	0·1	18·5				Perhaps eL at 22 h. 28 m.
				C				41·5	0·03					
								44·4	0·04			22	47·6	
	257	Ap. 24	W	P	3	15·5	3	16·0	0·1		2900			
				S	3	20·1								
				L,M		24·9		30·8	0·1					
				C				36·8	0·03					
								40·7	0·05			3	47·5	

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2263	Ap. 25	N	eP	11	45·0	11	46·7	0·1		3200			
			S		49·95		50·2	0·25					
			L,M	12	1·5	12	5·0	0·2			12	15·0	
2303	May 1	N	P	12	56·4					6000			
			S	13	4·0	13	4·5	0·03					
			L,M		19·2		23·3	0·03	15·0			?	
2304	May 1	N	iP	13	27·9	13	28·4	0·03		1940			
			iS		31·2		31·4	0·03					
			iL,M		35·0		39·0	0·2	14·5				
			C				43·2	0·05					
							48·3	0·03			13	51·0	
2311	May 3	N	eP	19	27·0	19	30·1	0·03		8100			
			iS		36·4		36·6	0·04					
			eL,M	20	1·2	20	8·9	0·1	20·7				
			C				15·0	0·05					
							23·0	0·05					
							33·0	0·03			20	35·0	
2320	May 6	W	iPs	19	4·4			2·6		2155			Intermaximal lulls. 19 h. 12·2 m. 2·6 mm; 16·4 2·4; 18·2 2·2; 24·2 1·5; 25·9 —; 34·1 2·1 and between aftershocks
						19	5·0	3·7	6·5				
							5·2	4·3	6·5	$\alpha = 28° 18'$ to W. of N			
			iS	19	7·0					$\lambda = 20° 30'$ W.			
							7·3	2·2	6·7				
							7·5	7·1	6·7				
							8·3	8·35	6·7	$\phi = 60° 33'$ N.			
							8·6	5·9	6·7				
			iL		9·3								
			M				9·5	11·1	7·5				
							9·7	21·0	7·5				
							11·0	18·0					
							12.9	37·6					
							13·5	36·0					
							15·0	36·6					
							15·8	34·4					
							16·8	34·6					
							17·4	34·4					
							19·2	32·0					
							21·4	23·0					
							24·5	23·0					
							27·0	25·9					
							30·8	13·4					
							32·0	21·75					
							32·7	21·5					
			?C				35·0	10·0					
							36·5	8·7					
							37·1	6·1					
							38·0	6·2					
							38·9	4·6					
							40·0	9·2					
							41·4	13·7					
							43·9	8·0					
							46·3	7·6					
							48·5	6·7					
							50·5	7·7					
							51·0	9·65					
							53·7	5·1					
							54·2	1·8					
							55·5	1·55					
							56·0	3·0					
							57·3	6·0					
							58·1	5·3					
							59·3	2·5					
						20	0·5	2·5					
							2·1	2·8					
							3·0	1·05					
							3·6	2·35					
							4·8	3·4					
							6·4	1·4					
							7·7	2·9					
							8·2	3·8					
							9·7	1·6					
							10·0	1·2					
							11·3	1·35					
							13·1	1·15					
							14·4	2·65					
							16·6	2·8					
							17·6	1·0					
							18·7	0·85					
							20·8	1·1					
							23·4	0·9					
							24·1	0·9					
							25·8	1·0					
							26·6	0·8					
							27·7	0·95					
							28·7	1·3					
							30·3	0·5					
							32·3	1·15					
							33·5	0·9					
							35·7	0·9					
							37·2	0·75					
							38·6	0·65					
							40·4	0·4					

The maximum of aftersho 22 h. 21 m. coincides w theoretical time of arri a wave travelling by th path of 349° on the c circumference.

The maximum of aftersho 23 h. 34·7 m. is half an later than the theoretica of the second arrival of mal waves by the fo path, after travelling 3 the S.E. direction.

If the times given are later they ought to be, the time clock here must been in error.

Notes.	No.	Date 1912	Boom	Phase	Commencement h. m.	Maximum h. m.	Range mm.	T sec.	Origin Δ	End (F) h. m.	Notes.
	(ctd.)					42·3	0·25				
						43·4	0·3				
						44·2	0·25				
						52·3	0·4				
						56·9	0·15				
						21 6·7	0·1				
						11·2	0·07				
						24·5	0·07				
						35·7	0·15				
						49·0	0·07				
						55·5	0·1	36			
						56·7	0·1				
						22 0·6	0·07				
						3·0	0·1	25			
						10·4	0·2				
						16·2	0·2				
						21·0	0·15	20			
						41·4	0·07				
						50·0	0·1				
						55·0	0·1				
						59·0	0·1				
al lulls.						23 4·8	0·06				
12·2 m. 2·6 mm						6·2	0·03				
16·4 2·4						9·7	0·05				
18·2 2·2						27·2	0·03				
24·2 1 5						29·4	0·05				
25·9 —						34·7	0·03	72·0			
34·1 2·1						39·5	0·02				
tween aftershocks						54·6	0·03				
		May 7				0 5·5	0·05				
						12·5	0·03			0 14·5	
ıum of aftersho											
1 m. coincides w		May 6	N	iPE	19 4·4		1·4				
ical time of arri				iS	7·2						
travelling by th				iL,M	?	19 10·7	40·6				
of 349° on the						11·1	97·4				
ference.						11·6	43·4				
						12·4	51·2				
num of aftersh						13·8	64·0				Recording lever detached at this point.
34·7 m. is half a		May 7	W	iP?	10 0·3	10 0·5	0·1		?4880		Doubtful.
han the theoretic				iS?	6·9	8·6	0·15				
second arrival of				iL?	19·1						
vaves by the fo				i	21·9						
after travelling				M?		24·7	0·2				
E. direction.				C?		41·7	0·5			10 45·8	
es given are late		May 11	N	eP	5 5·9	5 9·4	0·02		8675		
ought to be, the				eS	15·8	17·7	micro				
clock here must						25·8	micro				
n error.				eL,M	39·7	44·3	0·15	24			
				C		54·1	0·02				
						57·3	0·03			6 2·4	
		May 11	N	iP	17 39·6	17 41·2	0·4				Although the figures are given from the record as it appears, there were evidently two separate movements which cannot be distinguished at this station.
						42·7	0·3				
						43·6	0·35				
						45·3	0·8				
						48·0	0·65				
				iS?	49·8	50·9	1·2				
						54·0	0·85				
						56·0	0·75				
						58·0	0·65				
						18 0·8	0·7				
						3·8	0·4				
						4·1	0·3				
						6·0	0·3				
						7·6	0·55				
						8·8	0·35				
						9·9	0·25				
						11·1	0·3				
						13·9	0·1				
				iL,M	18 14·4	15·0	0·15				
						16·6	0·2				
						18·8	0 3	15			
						21·0	0·3				
						22·7	0·15				
						23·8	0·2				
						25·3	0·1				
						28·0	0·3				
						29·2	0·2				
						30·6	0·25				
						34·7	0·35				
						37·8	0·2				
				C		39·8	0·15				
						42·4	0 1				
						46·7	0·1				
						52·6	0·1				
						55·2	0·15				
						57·9	0·08				
						19 11·3	0·05				
						27·5	0·2				
						36·5	0·05				
						40·7	0·05				
						48·8	0·03				
						20 23·9	0·05				
						39·0	0·03	33		20 40·6	

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date	Boom	Phase	Commencement h.	Commencement m.	Maximum h.	Maximum m.	Range mm.	T sec.	Origin Δ	End (F) h.	End (F) m.	Notes.
	1912												
2369	May 11	N	iP	18	31·7	18	32·0	0·15		3330			
			iS		36·8		37·2	0·05					
			iL,M		44·3		46·4	0·1					
							47·0	0·15	7·6				
							48·4	0·15	7·6				
			C				56·7	0·05					
						19	4·5	0·03			19	5·7	
2370	May 11	N	P	20	31·0	20	32·4	micro		8200			
							36·0	micro					
			S		40·5		42·0	0·02					
							44·4	micro					
							46·1	micro					
			L,M	21	8·3	21	10·2	0·02					
							17·6	0·03					
							20·2	0·05					
							20·6	0·06					
							22·3	0·03					
							24·6	0·07	14·0				
							25·3	0·05					
			C				32·0	0·03					
							35·7	micro					
							49·0	0·02					
							53·1	micro			21	57·7	
2407	May 14	W	eP	15	7·0	15	7·8	0·03		3240			
			eS		12·0		12·3	0·05					
			eL,M		16·6		19·3	0·15					
			C				26·3	?					
							31·1	?			15	32·0	
2409	May 15	W	eP	0	34·7	0	35·7	micro		4335			No second movement can be rated out on the record at Guildford. Shide gives at 0 h. 22·5 m.
			eS		40·8		42·0	0·02					
			eL,M		50·8		55·6	0·03					
						1	3·3	0·03					
			C				10·0	0·03					
							14·0	0·03					
							32·0	micro			1	36·7	
2441	May 16	W	P	15	9·3	15	9·6	0·35		1240			
							10·3	0·35					
			S		11·5		12·0	1·05					
							12·4	1·05					
							12·7	0·95					
			L,M		12·9		13·8	1·25					
							17·0	6·4					
			C				19·8	1·0					
							22·0	1·05					
							23·3	0·5					
							25·0	0·5					
							27·1	0·75					
							30 2	0·9					
							32·6	0·8					
							33·7	0·5					
							34·9	0·3					
							36·7	0·6					
							38·6	0·6					
							41·3	0·7					
							42·0	0·6					
							44·1	0·6					
							51·2	0·4					
							54·0	0·35					
						16	3·3	0·2					
							11·2	0·25					
							12·9	0·2					
							19·0	0·2					
							24·5	0·05					
							26·6	0·15					
							34·8	0·25					
							45·2	0·04					
							58·8	0·05					
						17	4·2	0·05			17	10·0	
2465	May 17	W	iP	16	44·0		46·5	0·1		2740 Crete			Occurred at 16 h. 42 m. Intermaximal lulls. 16 h. 54·3 to ·4 m., 0·0 m. 55·3 0·25
			iSN		48·4	16	48·6	1·05					
							49·7	1·25					
							50·2	1·0					
							50·6	1·0					
			i		51·0			0·7					
							51·2	1·1					
							52·0	1·1					
			iL		53·0			1·4					
			M				53·2	1·8					
							53·5	1·8					
							54·1	1·95					
							54·7	1·85					
							55·6	1·4					
							56·5	2·7	12·0				
							57·9	1·7					
							59·9	0·8					
			C			17	0·7	0·7					

	1912			h.	m.	h.	m.			Δ	h.	m.	
							10·9	0·15					
2465 (ctd.)							14·2	0·04					
							17·0	0·03					
							24·2	0·02					
2486	May 18	W	P	22	6·2	22	7·0	0·03		4670			
							10.1	0·03					
			S		12·6		13·2	0·03					
							18·1	0·05					
			L,M		28·6		33·1	0·1	17				
							34·4	0·1	17				
			C				43·0	0·03			22	45·2	
2503	May 20	W	P		?					?			
			eS	7	58·8	7	59·7	0·02					
			eL,M	8	6·9	8	8·0	0·05				?	
2515	May 21	W	eP	8	44·3	8	46·0	0·02		5320			
							47·5	0·02					
							48·6	0·03					
			iS		51·3		52·6	0·3					
							56·3	0·05					
						9	2·6	0·06					
							4·7	0·23					
			L,M	9	8·7		13·8	0·3	24				
							15·2	0·2	18				
						(	16·4)	0·5					
						trimming of lamps.							
			C				32·3	0·1					
							34·5	0·1					
							39·0	0·1					
							47·8	0·1					
							51·3	0·07					
							57·4	0·05					
						10	1·5	0·05					
							5·0	0·03			10	5·3	
2516	May 21	W	eP	10	? 2·9	10	4·0	0·05		?			
							7·3	0·05					
			S		9·7		11·1	0·03					
							17·6	0·03					
							23·2	0·05					
							27·8	0·05					
			L,M		30·5		33·8	0·15					
							39·8	0·1					
							41·4	0·2	20				
			C				48·4	0·07			11	6·4	
2524	May 22	W	iP?	23	16·0	23	16·1	0·1		5330?			Preceded by a very small movement, which might be the P. Phase, or that of another shock.
			iS?		23·0		23·1	0·3					
							25·4	0·2					
							28·8	0·15					
			iL,M		32·7		32·8	0·15					
							41·2	0·1					
							42·8	0·1					
			C				49·6	0·07					
							54·7	0·07					
						0	11·0	0·05					
							25·0	0·05			0	28·0	
2525	May 23	W	iP	2	36·0	2	37·5	0·2		8200 Maymyo, Burmah.			The record of the Maximal Phase is hard to read.
			i		40·2		40·2	0·4					
							42·2	0·4					
							43·2	0·5					
							44·1	0·6					
			S		45·5		46·0	2·15					
							46·6	2·0					
							47·3	5·0					
							48·3	2·3					
							49·9	2·8					
							50·6	2·7					
							52·5	1·4					
							53·1	2·0					
							55·0	3·9					
							56·9	5·2					
							57·8	4·05					
							58·6	6·0					
							59·7	3·15					
						3	0·5	3·3					
							1·6	5·7					
							4·0	5·3					
							5·0	3·7					
							5·6	5·0					
			L,M	3	6·1		7·1	8·8					
							8·2	11·0					
							9·0	17·8					
							12·1	11·0					
							13·0	17·0					
							18·0	10·4					
							20·5	10·0					
							23·8	10·0					
							25·5	10·5					
							28·0	4·9					
							30·3	2·9					

ovement can be
t on the record
ord. Shide giv
2·5 m.

16 h. 42 m.
l lulls.
·3 to ·4 m., 0·0 m
·3 0·25

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m	Notes.	No.
2525 (ctd.)							32·0	2·9						2559 (ct
							32·8	3·0						
							34·8	4·4						
							36·2	6·0						
							38·3	2·3						
							40·5	3·8						
			C				42·4	2·1						
							44·6	1·2						2597
							46·6	2·6						
							47·1	3·0						
							49·0	1·4						
							49·8	1·4						
							56·7	1·4						
						4	2·0	0·7						
							4·6	0·5						
							7·5	0·6						
							13·0	0·3						
							20·0	0·4						
							26·6	0·2						
							41·5	0·15						
						5	6·0	0·15						
							20·5	0·1						
							35·0	0·1						
							44·0	0·07						
						6	9·0	0·07						
							33·0	0·05						2601
						7	15·0	0·07			7	16·5		
2538	May 25	N	eP	15	59·0	16	4·0	0·1		6000				
							5·3	0·07						
			iPw	16	6·6			0·3						
							10·3	0·65						
							11·8	1·0						
							14·1	0·3						
			L,M		27·0		27·9	0·25						
							29·6	0·1						
							31·8	0·4						
							34·0	0·35			?			
2539	May 25	N	iP	16	9·05	16	9·3	0·35		5050				2610
			?S		15·8		17·0	0·35						
							19·3	0·3						2611
							24·6	0·25						
			?L,M		35·0		36·2	0·45						2612
							39·5	0·5	13					
							43·2	0·35						
			C				46·9	0·3						
							49·0	0·2						
							58·5	0·15			?			
														2620
2540	May 25		iPE	18	6·7			0·63		2300				
						18	6·8	0·7						
							7·5	0·3						
			iSE		10·5			?0·4						
							10·7	2·6						
							11·7	1·9						
							12·6	2·0						
			iLw		13·65			0·7						2621
			M				13·9	1·2						
							15·2	4·7						
							16·9	5·1						
							19·1	4·0						
							20·1	2·3						2624
							21·3	1·3						
			C				23·6	1·1						
							24·2	1·4						
							25·5	0·8						
							26·9	0·5						
							31·0	0·9						
							34·1	0·3						2625
							37·0	0·3						
							44·2	0·1						
							48·2	0·05						
							54·3	0·07			18	56·7		2626
2559	May 28	N	eP?	12	58·5	13	2·2	0·05					Unfortunately preceded by artificial disturbance; commence probably earlier.	2627
							4·0	0·05						
							8·4	0·07						
							9·6	0·1					Osaka gives P. at 12 h. 49·65 m.	2628
			iSw		10·9			?0·08					Zikawei ,, 12 50·3	
							11·7	0·6					Shide ,, 12 57·0	2629
							16·0	0·4						
							19·2	0·25						2630
							21·0	0·25						
							25·6	0·2						
							27·5	0·35						
							28·9	0·3						2631
			eL,M		39·0		41·0	0·2						
							44·0	0·65	25					
							46·3	0·3						2631
							49·2	0 4						
							50·7	0·45						2632
							55·0	0·5						
							57·2	0·5						
						14	1·9	0·5						

No.	Date 1912	Boom	Phase	Commencement h. m.	Maximum h. m.	Range mm.	T sec.	Origin Δ	End (F) h. m.	Notes.
2559 (ctd.)					3·0	0·6				
					6·2	0·3				
					9·1	0·35				
			C		19·0	0·2				
					31·0	0·1				
					45·0	0·1			14 57·2	
2597	June 1	N	iP	0 47·4		micro		3520		
					0 51·4	0·7				
			iS	52·7	54·1	0·5				
					56·2	0·4				
					1 2·2	0·7				
			iL	1 4·4						
			M		4·7	1·15				
					5·3	1·3				
					7·0	1·45				
					8·8	0·8				
					10·9	1·0				
			C		13·3	0·35				
					15·7	0·35				
					17·5	0·3				
					24·5	0·15				
					30·3	0·15				
					32·7	0·15			1 34·1	
2601	June 1	N	iP	11 29·7	11 30·6	0·04		3155		
					32·5	0·04				
			eS	34·6	41·3	0·1				
			iL, M	44·4	45·3	0·2				
					48·1	0·25				
					50·1	0·25				
					52·5	0·8				
			C		55·0	0·2				
					56·8	0·25				
					58·8	0·35				
					12 1·9	0·3				
					2·6	0·25				
					10·5	0·1				
					17·6	0·05			12 20·0	
2610	June 2	N	M		11 37·0	0·2			?	
2611	June 2	N	M		12 24·5	0·5			?	
2612	June 2	N	?P	12 45·3						During wind tremors
			?S	12 54·2						
			M		13 18·8	0·2	20			
					21·7	0·4				
					23·7	0·3				
2620	June 3	W	eP	12 46·0	12 48·0	0·03		10040		
			iS	57·0		0·03				
			L, M	13 24·0	13 33·0	0·1	17			
					37·5	0·15				
					39·4	0·1				
			C		48·3	0·07				
					51·7	0·05			13 56·2	
2621	June 3	W	iP	13 21·0	13 21·1	0·1		3700		
			iS	26·5	26·6	0·25				
			iL, M	35·6	? 41·5 (obscured)				13 ? 56·2	
2624	June 5	N	iPE	11 24·9		0·1		8085		
					11 25·0	0·2				
			S	34·3	35·8	0·2				
					42·5	0·5				
					48·6	0·3				
			M		? 57·2	0·85	10			Maximum reinforced?
2625	June 5	N	P	11 49·85				7785		
			S	59·0						
			L, M	12 21·0	12 30·0	0·1	20			
2626	June 6	W	S		4 16·0	0·02	10			
2627	June 6	N	L, M	6 35·4	6 36·0	0·03	15			
					6 41·0	0·02	18			
2628	June 6	W	M		8 13·5	0·02	?15			
2629	June 6	W	M		8 29·2	0·02	18			
2630	June 6	W	i s	8 36·2		0·2				
					8 45·3	0·1				
			eL, M	48·0	52·2	0·2	18			
			iC?		59·0	0·15				
2631	June 6	W	i N	9 10·4		0·17				
			eL, M	?21·2	9 25·6	0·1	15			
2631	June 6	W	i s	10 20·0		0·3				
2632	June 6	W	P	11 52·85	11 53·4	0·05		8265		Probably a multiple shock.
					55·2	0·06				

es.

:ceded by arb
ice; commence
r.
at 12 h. 49·65 m.
12 50·3
12 57·0

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2632 (ctd.			S	12	2·4	12	2·5	0·35					
			i N		4·9			0·15					
							6·7	0·3					
			i S		7·5			0·3					
							9·0	0·25					
							13·6	0·35					
							15·7	0·25					
			L,M		20·7		22·5	0·2	16				
							28·2	0·1					
2633	June 6	W	i S	12	55·7			0·1					Difficult to interpret.
			iPs	13	4·3			0·06					
			iSs		12·25			0·07					
			L,M		24·7	13	30·0	0·07	19				
2634	June 6	W	M			13	58·4	0·15	23				
2635	June 6	W	eP	13	56·5	13	57·4	0·1	?6·0				
			iSs	14	4·5			0·15					
			L,M		30·0	14	34·3	0·07	14·0				
2636	June 6	W	M			15	12·5	0·05					
2637	June 6	W	L,M	15	42·3	15	48·7	0·1	14·0				
2638	June 6	W	e	16	7·7	16	9·3	0·4	7·5				
			i N		11·9			0·2					
			i N		19·3			0·15					
			i S		21·7			0·1					
			M				25·0	0·03	18·0				
2639	June 6	W	i N	16	48·1			0·1	7·0				
			i N		54·3			0·1	15·0				
2640	June 6	W	eP	16	58·1					8200			
			iSN	17	7·6			0·25					
						17	14·0	0·1					
							17·0	0·1					
			eLN		28·5		32·3	0·13	14·0				
2641	June 6	W	M			18	3·0	0·03	30·0				
2642	June 6	W	M			18	44·3	0·02	30·0				
						18	52·0	0·02	16·0				
2643	June 6	W	M			20	15·0	0·02	16·5				
2644	June 6	W	M			20	42·8	micro	17?				
2645	June 6	W	i N	20	48·8			0·03					
2646	June 7	W	eL,M	0	11·2	0	18·3	micro	18?				
2647	June 7	W	M			1	16·6	micro	20				
2648	June 7	W	L,M	1	32·8	1	34·0	micro					
							38·7	0·02	20				
2649	June 7	W	M			2	8·9	micro					
2650	June 7	W	L,M	2	44·0	2	53·3	0·03	25?				
2651	June 7	W	P	3	5·4	3	6·0	micro		?7725			
			S	?	14·5		15·4	0·03					
							16·0	0·02					
			L,M		33·0		37·7	0·05	20				
							46·0	0·05	20				
			C			4	0	0·05			4	6·5	
2652	June 7	W	M			4	17·0	0·04	24?				
2653	June 7	W	M			4	39·0	0·02	15				
2654	June 7	W	M			5	18·7	micro					
2655	June 7	W	M			6	15·8	micro	14				
2656	June 7	W	M			7	19·7	micro					
2657	June 7	W	M			7	34·9	0·02	18				
2658	June 7	W	i S			7	49·4	0·1	12·5				
2659	June 7	W	P	8	16·9	8	18·5	0·02		6440			
			S		24·9								
			L,M		42·5		45·2	0·1					
			C				54·0	0·05					
2660	June 7	W	P	?8	59·5	9	1·3	0·03					
							5·5	0·03					Care of instrument and adjustment
2661	June 7	N	P,S	lost									Natural period of booms, 9s.
			eL,M	10	27·3	10	30·5	0·5	18				
							34·3	0·3	24				
							38·8	0·5	18				

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2661 (ctd.)			C				43·5	0·3					
							46·2	0·2					
2662	June 7	N	P	?10	17·1	10	?19·3	0·7		?8085			
							20·9	0·2					
							24·9	0·3					
			iS		26·5		27·0	0·7					
							28·1	0·45					
							30·0	0·6					
			iL,M		47·2		50·2	0·3	18				
							50·7	0·3	18				
							52·5	0·25	18				
							53·4	0·3	16·5				
							57·9	0·3	18				
2663	June 7	N	iP	10	32·5	10	33·2	0·2		7600			
							34·8	?					
			S		41·5		42·3	0·5					
							43·1	?					
							48·6	0·2					
							49·8	0·25					
			L,M	11	3·4	11	5·6	0·9	*15				* A reinforced wave.
							8·7	0·3	17				
			C				15·5	0·15					
2664	June 7	N	iP	10	45·2	10	45·4	0·15		7725			
							47·0	0·1					
							48·4	0·15					
			eS		54·3		55·1	0·25					
							59·4	0·2					
						11	0·5	0·65					
							2·6	0·4					
			L,M	11	15·0		17·0	0·35	18				
							18·2	0·3	17				An artificial disturbance from 11 h. 21·7 m. to 11 h. 46 m.
							19·6	0·3	?19				
2665	June 7	N	iP	10	55·0	10	55·7	0·4		7845			
							56·2	0·4					
			iS	11	4·2	11	6·5	0·6					
							7·3	0·45					
							9·2	0·3					
							10·0	0·45					
							11·8	0·6					
			L,M		?25·2		26·5	0·35	15				
							30·5	0·2	18				
			C				38·8	0·2					
2666	June 7	N	P	11	?25·3	11	25·5	0·2		?7725			
							25·8	0·25					
			S		?34·4								
			iL,M		55·3		56·9	0·15	16				
						12	3·3	0·1	18				
			C				11·5	0·07					
							18·0	0·07					
2667	June 7	N	eP	11	50·0	11	52·0	0·1		8085			
			eS		59·4	12	1·4	0·1					
			eL,M	12	20·0		21·6	0·05	18				
							23·3	0·07	18				
							27·7	0·07	18				
			C				34·0	0·07					
2668	June 7	N	P	12	13·3					435			
			S		14·1								
			L,M		14·4	12	14·9	0·1			12	16·8	
2669	June 7	N	eP	12	?28·9	12	33·0	0·02		?7725			
							34·9	0·03					
							36·3	0·04					
			eS		38·0		38·6	0·05					
							41·3	0·07					
							42·0	0·1					
							43·2	0·07					
							48·0	0·1					
			L,M		57·8		59·2	0·1	18				
						13	5·6	0·1	18				
2670	June 7	N	iP	12	44·0	12	44·2	0·15		?			
							45·0	0:25					
							46·1	0·35					
			iS		54·2		?54·5	0·15					Probably eS earlier.
							57·3	0·15					
			L,M	13	13·3	13	15·1	0·15	18				
							17·2	0·15	20				
							19·1	0·2	18				
							21·2	?					
2671	June 7	N	iP	12	50·4	12	51·5	0·2		8315			
			eS	13	0	13	1·5	0·8					
							2·5	0·4					
							3·8	0·1					
							12·6	0·15					
			L,M		20·5		25·5	0·15	18				
							26·9	0·2	17				
							28·0	0·25	18				
							30·0	0·15	18				
			C				34·7	0·1					

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	Commencement m.	Maximum h.	Maximum m.	Range mm.	T sec.	Origin Δ	End (F) h.	End (F) m.	Notes.
2672	June 7	N	iP	13	5·8	13	6·6	0·15		7965			
							8·0	0·1					
			eS		15·1		17·8	0·15					
							18·6	0·1					
							*29·2	0·1					*Perhaps a wind tremor.
			eL,M		35·5		37·7	0·1	17				
							41·0	0·15	18				
							42·3	0·1	18				
			?C			14	25·4	0·05	10				
2673	June 7	N	iP	14	26·4	14	26·9	0·03		6225			
			iS		34·2		35·0	0·05					
							39·7	0·15					
							42·0	0·07					
							44·1	0·1					
							45·2	0·07					
							47·6	0·1					
			L,M		49·5		53·2	0·1	? 17				
							56·9	0·1	15				
						15	2·4	0·15	17				
							5·0	0·2	15				
			C				10·4	0·15					
							18·8	0·05					
							29·3	0·07					
							34·7	0·07			15	36·6	
2674	June 7	N	M			16	46·3	0·1	? 15				Artificial movements, 17 h. 15 to 35 m.
2675	June 7	N	iP	18	36·1	18	36·4	0·05		7015			
							36·9	0·05					
							38·3	0·03					
							40·6	0·05					
			iS		44·4		45·1	0·6					
							47·3	0·4					
							48·0	0·4					
							49·9	0·5					
							52·2	0·5					
			L,M		58·6	19	0·8	0·25	? 20				
							8·7	0·4	16				
							11·4	0·35	16·5				
2676	June 7	N	iP	18	49·2	18	49·4	0·3		7965			
							51·4	0·15					
							53·0	0·5					
							53·8	0·2					
							55·5	0·1					
			iS		58·5		59·4	0·8					
						19	3·0	0·65					
							5·2	0·9					
							6·3	0·7					
			L,M	19	? 20·0		22·2	0·35	17				
							23·2	0·35	17				
			C				27·6	?					
							37·2	0·2					
							41·2	0·25					
2677	June 7	N	P	19	10·2	19	11·8	0·15		1490			
			iS		12·8		13·6	0·4					
							15·1	0·25					
			L,M		15·6		15·8	0·7	? 10				
							18·3	1·0	7·5				
							18·7	0·95					
							19·1*	0·8					
			C				25·8	0·6					
							27·6	?					
							28·5	0·3					
2678	June 7	W	iP	19	20·8	19	21·5	0·15		7725			
			S		29·9		32·4	0·2					
							37·8	0·2					
							40·8	0·2					
		N	L		51·4								
		W	M				52·1	0·7	18				
							57·0	0·3	18				
						20	3·7	0·1	18				
		N									21	23·0	
2679	June 7	N	M			23	34·3	0·03	? 15				
2680	June 8	N	iP	0	39·3	0	39·7	0·07		7725			
							40·6	0·07					
			iS		48·4		49·0	0·07					
							51·6	0·07					
			L,M	1	9·6	1	11·5	0·07	19				
							16·6	0·07			1	22·3	
2681	June 8	N	M			1	57·9	0·07	18				
2682	June 8	N	M			2	19·7	0·07	15				
2683	June 8	N	iP	2	32·7	2	32·8	0·07		4775			
							34·2	0·03					
			iS		39·2		39·9	0·1					
			L,M		46·3		51·1	0·1	17				
							53·5	0·15	18				

tes.	No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
	2684	June 8	N	iS	3	10·2	3	11·0	0·05					
								13·0	0·1					
								13·5	0·15					
								*15·1	0·5					*Perhaps a wind tremor.
ıor.								*18·2	0·65					
								23·5	0·3					
								25·6	0·25					
				L,M		28·0		30·8	0·1	18				
								35·0	0·2	18-20				
								36·5	0·2	18				
								39·3	0·2	17				
								42·3	0·15	14·5				
				C				51·1	0·1					
	2685	June 8	N	M			5	15·0	0·07	19				
	2686	June 8	N	iP	4	53·7	4	54·4	0·15		8555			
				iSE	5	3·5			0·85					S phase peculiarly strong.
							5	4·0	1·6					
								4·7	1·7					
				L,M		?24·0		28·0	0·15	21				
			W	iSN		3·5			0·4					
								3·6	0·8					
				L,M		25·5		36·0	0·1	?15				
				C				44·5	0·1					
s,	2687	June 8	N	M			5	48·0	0·1	18				
	2688	June 8	N	iP	5	29·1	5	31·0	0·5		7725			
								32·3	0·3					
								34·0	0·4					
				iS		38·2		39·2	0·4					
								43·4	0·4					
								47·0	0·4					
				eL,M	6	1·0	6	4·7	0·05	*13				*Hindered by tremors.
	2689	June 8	N	P	6	?18·0	6	21·3	0·03		?7965			
								24·5	0·05					
				S		27·3		27·8	0·05					
								32·9	0·6					
								35·8	0·07					
								38·0	0·2					
								44·0	0·2					
				L,M		47·6		49·0	0·2	18				
								56·4	0·2	18-20				
			W	C			7	2·0	0·05					
	2690	June 8	N	iP	6	52·5	6	52·6	0·07		8435			
								57·7	0·1					
				iS	7	2·2	7	2·7	0·15					
								6·0	0·2					*Perhaps a wind tremor.
								*10·8	0·95					
				iL,M		22·7		23·5	0·25	20				
								26·9	0·25	18				
								33·0	0·3	18				
								36·0	0·3	17				
				C				41·8	0·2					
								45·2	?					
	2691	June 8	N	P	7	36·3	7	38·1	0·2		7725			
								39·1	0·2					
				iS		45·4		45·5	0·7					
								46·2	0·4					
				L,M.	8	6·0	8	? 9·4	?0·5					The strong S phases of the next earthquakes concealed these maxima very much.
								?10·5	?0·7					
								?11·7	?1·0					
								?13·2	?1·0					
	2692	June 8	N	iP	7	42·2	7	44·8	0·4		7725			
				iS		51·3		53·5	1·1					L, M, entirely concealed.
								53·8	1·0					
	2693	June 8	N	iP	7	46·7	7	48·2	0·95		7725			
				iS		55·8		55·9	1·3					The maxima of the S phase given here, may belong partly to the two preceding shocks.
								56·6	4·3					
								57·2	2·65					
							8	0	2·65					
								4·0	2·8					
								6·5	1·4					
				eL,M	8	?17·0		18·5	2·0					Value of T cannot properly be determined on the N boom.
								19·5	1·8					
								20·5	2·95					
								21·9	1·9					
								22·5	2·2					
								24·9	2·0					
								?28·0	2·6					
								30·2	2·6					
								30·8	2·1					
								32·2	1·6					
								33·5	1·7					
								35·9	2·05					
				C				38·7	1·8					
								39·8	1·9					
								42·0	1·1					
								43·2	1·95					

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2693 (ctd.)							44·0	1·35					
							44·6	1·3					
							46·0	1·2					
							48·8	1·2					
							49·7	1·6					
							50·7	1·25					
							53·3	1·05					
							55·7	1·2					
							56·8	1·0					
							58·0	1·0					
							58·7	1·05					
						9	3·7	0·95					
							4·5	1·0					
							11·5	0·8					Attention to instrument.
							39·0	0·9					
							46·5	0·9					
							47·1	0·9					
							58·0	0·7					
						10	3·6	0·75					
							26·0	0·1					
							32·4	0·2					
							35·0	0·1					
		W	iP	7	46·4	7	48·2	0·35		7725			
			iS		55·5		55·8	0·8					
							56·7	1·3					
							57·2	0·9					
							58·9	1·0					
						8	1·2	2·15					
							2·0	1·9					
							5·7	1·2					
							15·6	2·0					
							16·3	2·3					
			L,M	8	17·0		17·2	2·0	18				
							18·2	2·0	18				
							18·6	2·2					
							19·3	2·0					
							20·5	1·8					
							21·5	2·0					
							22·2	1·8					
							23·4	2·3					
							24·8	2·3					
							26·3	2·1					
							31·3	1·35					
							32·2	1·2					
							34·4	1·3					
							35·3	1·8					
			C				36·9	2·0					
							38·1	1·5					
							38·7	1·6					
							39·7	1·2					
							41·3	1·6					
							42·2	2·0					
							44·2	1·0					
							etc.						
2694	June 8	N	iP?	8	?59·0					?			
			iS	9	7·6	9	8·7	0·6					
			M				41·0	0·7	18				L during attention to instrument.
2695	June 8	N	P	10	6·7	10	7·4	0·1		7600			
							9·3	0·25					
			S		15·7		19·2	0·6					
							28·0	0·2					
			L,M		36·4		42·3	0·3	18				
							44·2	0·25	18				
							45·3	0·2	18				
			C				48·3	0·1					
2696	June 8	N	P	10	29·9	10	30·2	0·1		8085			
			S		39·3		50·2	0·15					
							?57·0	0·4					
			L,M	11	0	11	1·3	0 2	15				
							6·0	0·2	?				
							14·0	0·2	18				
							26·8	0·15	18				
			C				42·8	0·1					
							46·8	0·1					
							56·5	0·07					
						12	11·6	0·05			12	19·6	
2697	June 8	W	P	10	46·0	10	46·5	0·1		4655			
			S		52·4		53·7	0·5					
							57·2	0·1					
						11	0·6	0·1					
			L,M	11	8·7		10·5	0·15	13				
							13·2	0·15	12				
							24·5	0·07					
2698	June 8	N	P	13	11·0	13	12·5	0·03		8205			
							17·7	0·05					
			S		20·5		21·2	1·0					
							22·5	0·7					
							24·9	0·7					
							27·7	0·8					
							29·2	0·8					

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2698 (ctd.)							33·0	0·5					
							37·5	1·0					
			L,M		40·6		41·6	0·8	·17				* A reinforced wave.
							42·7	0·6					Values of T very uncertain.
							44·3	0·9					
							45·6	0·7					
							50·6	0·7					
			C				57·3	0·6					
							58·8	0·4					
						14	3·1	0·6					
							7·3	0·5					
							8·7	0·4					
							12·3	0·4					
							30·3	0·3					
							38·0	0·1			14	43·3	
2699	June 8	N	P	13	13·6	13	14·0	0·07		4665			
			iS		20·0		20·1	0·15					Maxima of S phase inseparable from those of the preceding shock.
			L,M		31·0		?34·0	?0·5	30				
		W	M				34·4	0·25	20				Maximum delayed.
2700	June 8	N	P	15	19·0	15	19·6	micro		5440			
			S		26·1		26·3	0·03					
			L,M		43·4		47·0	0·03					
2701	June 8	N	M			23	1·0	0·05	25				
2702	June 8	N	M			23	38·0	0·05	17				
2704	June 9	N	M			2	43·5	0·03	17				
2705	June 9	N	M			3	45·0	0·03					
2706	June 9	N	M			7	38·5	0·02	20				
2707	June 9	N	M			7	52·8	0·03	16				
2708	June 9	W	eP	8	30·4	8	30·8	0·02					*A dip to the south for 0·5 m.
			S		*39·65								
			i s		40·15			0·03					
							42·0	0·02					
			eL,M	9	2·1	9	4·7	0·02	16·7				
2710	June 9	N	P	17	29·7	17	31·7	0·07		4225			
			S		35·7		36·0	0·1					
							38·6	0·15					
							42·0	0·3					
							45·8	0·15					
							49·0	0·2					
			L,M		50·3		56·0	0·2					
							58·7	0·25					
						18	2·0	0·2					
							7·2	0·2					
			C				31·7	0·1					
							42·0	0·07					
2711	June 9	N	eS	21	55·0	21	59·0	0·1					
						22	2·8	0·15					
			L,M	22	15·2		22·0	0·05	15				
2712	June 9	W	S		?	22	43·3	0·03					
			L,M	22	52·0		52·5	0·03					
2716	June 10	W	iP	16	17·1	16	17·2	0·4	6·7	6550			
							18·4	0·3					
							19·6	0·4					
							20·1	0·4					
							21·0	0·5					
							21·4	0·8					
							22·7	1·0					
			iS		25·2		27·4	1·5	8				
							28·8	0·7					
							30·2	0·7					
							31·5	0·9					
							36·2	0·8					
			L,M		?40·0		50·0	2·1	17·1				
							52·0	1·2	17				
							53·2	1·0	17				
							57·3	0·9	17				
						17	0·6	0·8	10				
							3·4	0·8	15				
			C				7·8	0·6					
							13·5	0·6					
							17·9	0·7					
							20·0	0·65					
							30·0	0·4					
							41·5	0·2					
							58·0	0·1					
						18	3·6	0·1					
							29·5	0·07					
							43·6	0·1					
							49·5	0·15					
							51·3	0·2					
						19	4·0	0·15					
							15·0	0·03			19	19·0	

tes.	No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
	2734	June 18	N	iP	12	30·3	12	33·6	0·6					
				S		38·7		39·6	0·4					
								42·0	0·4					
								46·4	0·3					
								47·6	0·5					
				L,M	13	5·6	13	7·6	0·5	18·5				
								10·0	0·7	17·5				
								20·7	0·7	16·0				
				C				41·5	0·25					
								49·2	0·25					
								55·6	0·2					
							14	6·4	0·2			14	29·0	
	2743	June 26	N	i	17	11·1	17	11·6	0·15					P in tremors, possibly at 17 h. 7 m.
				i		20·2		20·5	0·1					
				L,M		40·5		42·2	0·2	*15-18				*Distorted.
	2744	June 26	N	P?	17	15·7	17	16·4	0·15		4780			The interpretation of this and of the following movement is most uncertain, but it is given as it appears to be.
								17·8	0·07					
				S?		22·2		24·3	0·3					
								28·2	0·5					
				L,M		28·5		29·7	1·2	9·0				
								31·1	1·3	9·0				
								32·7	1·4	9·0				
								35·4	0·95					
earthquake.								37·1	0·95					
								41·8	0·8					
	2745	June 26	N	iP?	17	44·0	17	44·5	1·0		? 2900			T is uncertain, and the whole movement may belong to No. 2744.
								47·4	1·1					
				S?		48·6		49·7	0·8					
								50·6	1·3					
								51·4	1·0					
								52·0	1·15					
				L,?M		53·0		53·7	1·0					
								55·9	0·95					
								58·8	1·7					
				C			18	7·0	0·75					
								16·3	0·25					
								27·0	0·15			18	29·0	
	2747	June 27	N	eP	21	33·2	21	36·7	0·05		?			
								39·1	0·1					
				iS		44·0			0·1					Perhaps eS earlier.
								44·5	0·1					
								46·5	0·1					
:n, and record d.								53·0	0·1					
								59·0	0·15					
				L,M	22	6·3	22	12·2	0·3	19				
								25·5	0·07					
11 h. 7·3 mm. remors having ·15 mm.								30·0	0·05			22	40·0	
	2748	June 29	N	iP	8	8·0	8	8·5	0·07		9150			During tremors.
								14·0	0·1					
				S		18·3		23·0	0·25					
								26·0	0·8					
								33·0	0·5					
								36·6	0·35					
				L,M		47·8		50·8	0·3	24				
								55·5	0·35	19			?	
	2753	July 1	N	iP	1	6·8	1	7·1	0·35		2500			The relative times are correct, but the absolute Greenwich time may be incorrect, as the time signal was not in action.
				iS		10·6		11·0	0·4					
								13·6	0·8					
				L,M		14·2		14·6	0·9					Intermaximal lull, 1 h. 20 m. (0·3 mm).
								16·3	1·5					
								17·0	1·7					
								21·7	1·5					
								24·3	0·25					
								25·6	0 8					
								27·4	0·6					
								29·0	0·3					
				C				36·0	0·2					
								41·0	0·1					
								44·5	0·07					
								51·9	0·05			1	52·8	
	2757	July 7	W	iP	8	8·3	8	8·5	1·4		?			The Cylinder was travelling irregularly during the first phase, which should be of longer duration than it appears.
								?10·7	1·4					
								?12·1	1·4					
								?13·5	1·0					
								?14·1	1·0					
								?15·0	0·9					
								?15·8	1·0					
				iS		?16·3		?16·8	6·5					
								?17·3	8·9					
								?18·6	3·3					
								?19·8	2·6					
				L,M		24·4		28·0	2·3					
								28·3	3·1					
								33·0	2·5					
								39·2	2·6					
								47·0	2·0					
								48·2	1·9					
								50·0	2·3					

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2757 (ctd.)							52·8	1·9					
							56·5	1·7					
						9	2·2	1·4					
							4·0	1·8					
							5·5	2·0					
							8·1	2·3					
							10·0	2·6					
2758	July 7	N	iP	23	1·0	23	1·5	0·25		9150			
							4·0	0·15		but Ψ			
							5·4	0·07		gives			
							7·5	0·07		6750			
							9·3	0·07					
			iS		11·3			0·8					
							11·4	2·1					
							12·3	1·9					
							13·2	2·1					
							17·9	1·1					
							23·3	0·65					
							25·7	0·6					
							27·5	0·6					
			L, M		28·0		29·3	0·1	25				
							31·0	0·15	36				
							33·4	0·1	16				
							38·9	0·05	38·9				
			C				47·0	0·03					
							53·9	micro					
							58·2	0·02					
						24	5·6	0·02			24	7·5	
2759	July 8	N	e	16	55·0								
			P?	17	? 2·2	17	2·8	0·5		?			Zi-ka-wei gives P at 16 h. 41 m.
			iS?		?11·7		19·0	0·2					Irkutsk gives P at 16 h. 45·7 m.
			M				29·3	0·05	29				Very possibly two earthquakes.
			L, M		32·6		37·8	0·35	18				
			C				45·0	0·05					
							51·8	0·07			17	56·7	
2760	July 8	N	iP	22	4·5	22	5·0	0·5		4350			Very possibly a double shock.
							7·2	0·5					
							8·0	0·5					
			iS		10·6		11·7	1·1					
							14·8	1·0					
							15·8	1·4					
							18·0	0·95					
			L, M		24·3		25·2	0·6	29				
							26·5	0·7	9				
							32·0	0·4	24				
							35·0	0·95	14				
							40·3	1·65	10				
							45·4	1·75	9				
							46·8	1·65	9				
							49·4	1·2					
			C				54·8	0·7			23	49·0	
2761	July 9	N	iP	8	36·3	8	38·2	0·15		4670			Double shock?
			i		40·2		40·9	0·5					
			S		42·7		44·2	0·95					
							47·7	0·6					
			L, M		52·2		53·1	0·8					
							55·0	1·55					
							55·9	1·1					
							57·3	3·5					
							58·3	2·8					
						9	0·4	2·3					
							1·7	2·1					
							3·2	1·0			9	55·6	
2763	July 9	N	P?	18	39·7	18	40·8	0·03		?			
			S?		48·1		49·0	0·03					
							56·0	0·02					
						19	2·5	0·02					
			L, M	19	4·3		10·6	0·02	16				
							16·6	0·03	16			?	
2769	July 11	N	iP	7	20·7	7	20·9	0·03		1060			
			eS		22·6		23·5	0·05					
			iL, M		24·2		25·0	1·85					
							26·5	5·25					
							27·8	3·8					
			C				46·2	0·2			8	1·0	
2775	July 13	N	P	14	46·3	14	52·6	0·02		9515			
			iSE		56·9			0·2					
							57·1	0·6					
							57·35	0·7					
						15	4·6	0·03					
			e	15	12·1		16·8	0·05					
							20 0	0·1					
			L, M		27·0		28·5	0·05	18				
							33·8	0·03					
2777	July 14	N	S	9	2·75	9	3·7	0·03					P during tremors.
							17·1	0·05					
			L, M		24·0		28·4	0·05	20				
							29·7	0·2	12				

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2800	July 23	W	eP?	16	7·5	16	8·0	0·03					
			iSN		14·7		15·4	0·03					
			eL, M		?32·8		34·7	0·02	25				
							39·2	0·03	22				
							41·3	0·03	20				
							47·3	0·04	13·5				
2803	July 24	W	eP	12	12·5	12	13·2	1·05		9515			
							14·4	0·8					
							17·3	1·05					
							18·25	0·8					
							19·25	0·67					
							20·6	0·85					
			iSN		23·1			2·15					
							23·2	6·1					
							24·6	3·8					
							25·5	2·6					
							28·2	4·7					
							29·3	3·35					
							31·0	2·35					
							32·65	2·15					
							34·0	1·9					
							34·65	1·4					
							*36·1	0·6					*Distorted.
							38·3	1·0					
							40·3	0·95	13				
							41·4	0·95	11				
			L, M		?42·4		44·1	?0·75	20				
			C				49·0	0·6					
							53·7	0·7					
						13	2·3	0·6	18		14	31·0	
41 m. 5·7 m. lakes.	2815	July 25	W	eP	23	26·3	23	29·2	0·07		10600			Osaka gives P at 23 h. 15·15 m.
							30·3	0·5					
							30·7	0·8					
			eS		37·7		46·1	0·5	14				
		July 26	eL, M	0	6·5	0	9·0	0·3	32				A wave, commencing 0 h. 10·15 m. has range 0·3 mm, T = 55 sec.
ock.							12·0	0·5	42				
							15·6	1·0	28				
			C				26·5	0·25	20				
							28·8	0·35	25				
							32·0	0·35	24				
							36·6	0·3	20				
						1	1·7	0·02	?				
							31·8	0·02	?22				
						2	8·0	0·02	40				
							34·8	0·03	?				
							48·3	0·02	25				
							53·5	0·03	20				
						3	5·5	0·02	40				
							9·2	0·03	30				
							19·5	0·03	35		?3	28·0	
2816	July 26	W	e	3	7·0					?			
			S	3	?13·7	3	14·6	0·02					
							26·3	0·02					
			L, M		33·0		34·2	0·3	18				
							39·4	0·25					
							42·8	0·6					
							45·1	0·35					
			C			4	13·0	0·04	20		5	17·0	
2817	July 26	W	iPs	7	53·3			?0·01		9400			
						7	54·3	0·04					
			eS	8	3·8	8	4·6	0·15					
							8·9	0·35					
							11·7	0·25					
							19·1	0·3					
			L, M		?28·0		32·1		19-20				
2818	July 26	W	eP	8	11·2	8	12·8	0·1		5665			
			iSs		19·5			0·3					
							26·2	0·3					
			L, M		42·3		56·7	0·25	16				
						9	2·4	0·25	18		10	1·8	
2830	July 31	N	iP	10	39·0	10	40·9	0·2		5550			
							42·5	0·2					
			iS		46·2		47·2	0·8					
							48·7	0·75					
							50·3	0·85					
							52·3	0·6					
			iL, M		56·3		59·1	1·15					
			C			11	8·3	0·65					During wind tremors.
2847	Aug. 4	N	iP	21	50·2	21	50·3	0·15		7370			
							51·2	0·1					
			iS		59·0		59·2	0·6					
						22	3·6	0·4					
							5·6	0·25					
							12·0	0·7					
							12·8	0·65					
			iL, M	22	13·1		14·0	0·9	11				
							14·4	0·8					
							16·3	1·05					

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2847 (ctd.)							17·9	1·0					
							19·2	1·0					
							21·8	0·9					
			C				27·3	0·3					
							33·3	0·5					
							41·2	0·15					
							52·5	0·1			23	9·0	
2854	Aug. 6	N	P	13	40	13	40·7	0·6					
			iS		49·4		49·7	0·6					
							51·1	0·75					
							52·2	0·5					
							54·2	0·6					
						?14	3·0	0·6					
			L,M	14	?15·5		18·0	0·2	20				
							27·7	0·25	20				
							31·0	0·15	20				
			C				41·7	*0·3			15	4·0	*Re-inforced by wind tremor.
2861	Aug. 6	N	eP	18	50·3	18	51·1	0·2		830			
			iS		51·8		52·2	0·35					
			iL,M		53·3		53·7	0·8					
							54·8	2·8	10·5				
							56·1	1·4					
							57·1	1·65					
							58·0	1·8					
							58·3	1·0					
							58·9	0·85					
						19	0	0·7					
			C				2·9	0·6					
							6·0	0·9					
							9·0	0·55					
							15·7	0·45					
							31·0	?					
							32·5	0·2					
		W	L,M	18	53·7	18	54·5 etc.	0·5	8·5	830	19	31·0	
2865	Aug. 6	W	? S	21	22·7	21	30·5	0·1					Osaka gives S at 21 h. 20·75 m.
			e		33·0		34·1	1·8					
							35·0	1·1					
							35·8	1·0					
							38·2	0·7					
							52·3	0·4					
			L,M		58·6	22	2·0	0·3	20				
							19·0	0·2	30				
							21·8	0·35	24				
							37·2	0·5	22				
							39·8	0·3	20				
			C				44·7	0·15					
							50·0	0·2					
							52·8	0·1					
						23	12·3	0·1					
							25·0	0·1			23	35·2	
													The cylinder was not revolving between 1 h. 15·8 m., and 9 h. 25 m. on Aug. 9th.
2878	Aug. 9	W	iP	18	16·8					6780			
			S		25·1	18	25·3	0·03					
							31·3	0·03					
			L,M		40·6		48·4	0·05	17				
			C			19	1·7	0·03					
							10·5	0·03					
							23·3	0·03			19	27·0	
2884	Aug. 10	W	iP	9	28·4	9	29·4	0·1		2440			
							29·7	0·15					
							30·4	0·15					
							31·3	0·2					
			iS		32·4		32·6	1·0					
							33·0	1·7					
							33·5	1·95					
							34·0	1·8					
							34·5	2·0					
							35·0	3·3					
			L,M		35·6		36·2	6·4					
							37·3	11·0					
							38·4	15·0					
							40·0	6·8N 6·0?S					
							41·6	6·6					
							42·3	9·7					
							43·0	5·2					
							45·3	3·9					
							47·6	2·0					
							48·5	3·0					
							50·6	1·4					
							52·0	1·7					
							52·8	1·6					
							54·6	1·0					
			C			10	0·8	0·8					
							3·0	0·5					
							6·0	0·3					
							11·3	0·2			10	30·0	

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
1887	Aug. 10	W	eP	18	39·5	18	40·0	0·07		Ψ=9°?			
							41·1	0·1					
			iS?		42·1			0·07					
			iL,M		43·4		44·3	1·05					
							45·0	1·5					
							46·0	1·4					
							46·5	1·4					
							47·4	1·75					
							48·4	0·75					
							49·1	0·4					
			C				50·5	0·15					
							54·5	0·1					
						19	0	0·07					
							9·7	0·05					
							11·2	0·1			19	13·5	
1889	Aug. 10	W	iP	22	48·0	22	48·4	0·03		5660			
							49·3	0·02					
			iS		55·3			0·03					
							57·6	0·05					
						23	3·9	0·05					
							5·7	0 05					
			L,M	23	9·1		11·0	0·2	19				
							14·9	0·25	19				
							19·3	0·1	17				
							22·0	0·1	18				
			C				28·5	0·07					
							45·1	0·07			23	50·5	
1921	Aug. 17	N	P?	1	31·45			micro		? 30			This is possibly a local tremor, and corresponds with simultaneous stoppage of several watches at Farley Castle, Reading, Eng.
			S?		31·5			micro					
			?L,M		31·6	1	32·2	0·04					
			C				34·1	0·03					
							36·8	0·03			1	38·0	
		W	M			1	31·9	0·05					
1927	Aug. 17	N	iPw	19	26·7					9900			Manila gives P at 19 h. 14·95 m.
						19	27·0	0·1					Zi ka wei ,, ,, 19 h. 17·6 m.
							28·4	0·05					Osaka ,, ,, 19 h. 18·4 m.
m.							30·4	0·07					Irkutsk ,, ,, 19 h. 21·0 m.
			i w		31·3		31·7	0·25					Simla ,, ,, 19 h. 22·0 m.
							32·5	0·1					
			i w		33·2		33·2	0·4					
							34·4	0·25					
							35·2	0·25					
							35·8	0·35					
							36·7	0·8					
							37·0	0·9					
			iSE		37·6								
							37·9	2·65					Intermaximal lulls at
							39·0	4·0					19 h. 41·3 m. 0·7 mm
							40·0	3·0					49·9 0·25
							43·0	2·1					20 2·1 0·0
							44·3	1·65					5·0 0·1
							45·4	2·1					14·2 0·55
olving							46·2	2·3					19·6 0·3
d 9 h.							47·4	2·7					23·0 0·3
							47·8	2·0					24·3 0·05
							50·7	2·25					29·1 0·0
							55·0	1·95					
							56·1	1·1					
							58·3	1·0					
						20	3·0	1·2					
							6·7	1·0					
							9·2	?0 8			20	10·2	
			iLw	20	8·3								
			M				13·5	1·3	20				
							15·5	2·3	20				
							17·1	2·6	17				
							21·7	2·6	19				
							23·9	1·85	22				
							25·2	2·6	17·5				
							28·1	1·5	15-20				
							29·8	1·6	18				
							32·0	1·0	19				
							35·0	1·1	19				
							36·4	0·95	21				
							42·5	1·0	16				
			C				50·0	0·5					
							54·3	0·5					
						21	3 0	0·25					
							11·4	0·25					
							23·4	0·2					
							25·0	0·25					
							39·7	0·1			22	22·0	
1934	Aug. 18	W	?S	8	6·2			0·03					Zi ka wei gives P at 7 h. 46·4 m.
			e		19·7	8	20·4	0·03					
							22·0	0·02					
			M				28·0	0·02					
							37·0	0·02					
							39·8	0·02					
							45·6	0·03					
							48·0	0·05	18				
							52·7	0·03					

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
2934 (ctd.)							56·2	0·03					
			C			9	1·7	0·03					
							8·0	0·02			9	13·0	
2938	Aug. 18	N	eP?	18	54·3	18	58·0	0·04		?6340			
			i	19	0·4	19	0·4	0·04					
			iS		2·2			0·05					
							4·5	0·03					
							6·3	0·05					
							19·3	0·03					
			L,M		24·3		28·3	0·04	?				
							33·3	0·06	17				
2939	Aug. 18	N	iPE	21	43·3	21	43·4	0·05		9400			
			e		47·9		48·5	0·03					
			eS		53·8		57·8	0·07					
						22	1·9	0·05					
			L,M	22	16·8		20·8	0·4	28				
							25·6	0·25					
							50·0	micro					
						23	26·0	0·04			23	52·8	
2944	Aug. 19	W	iPN	16	?36·2	16	36·3	0·4					
			iS		?43·9		44·7	0·8					
			?L,M		?58·0		59·2	0·25	16*8				
2945	Aug. 19	N	eL,M	17	?27·4	17	41·0	0·1	25				
2956	Aug. 21	N	eP	17	52·0	17	52·3	0·1		8650			
			i		55·0			0·1					
							55·9	0·07					
							56·7	0·05					
			eS	18	1·9	18	2·7	0·1					
							4·1	0·2					
							23·7	0·07					
			L		24·0								
					or 25·3								
			M				27·2	0·05	16*5				
							29·5	0·2	18				
							31·0	0·1	17				
							35·0	0·3	15*5				
							39·0	0·15	13				
							41·3	0·2	18				
							50·8	0·05			19	15·0	
								0·25		11025			L and M hidden by the next quake.
2973	Aug. 23	W	iPN	13	56·1	14	3·7	0·25					
			eS	14	7·8		10·0	0·3	?10*5				
2974	Aug. 23	W	iP	14	16·3	14	16·4	0·3		4770			
							17·5	0·5					
							19·2	0·25					
							21·0	0·5					
			S		22·8		23·4	0·3					
							23·9	0·45					
							26·5	0·2					
							27·8	0·25					
							29·7	0·9					
			?L,M		30·2		30·7	0·8	9				
			or										
			L,M		31·7		32·6	1·3	10				
							34·4	1·0	11				
							36·8	1·9	10				
							37·7	2·1	10·5				
							38·5	1·65	14				
							39·4	1·95	12				
							40·2	3·0	11				
							41·6	1·6	11				
							42·7	1·0	12				
			C				45·4	0·95					
							49·7	0·6					
							50 4	0·45					
							54·9	0·3					
						15	3·8	0·2					
							18·4	0·15			15	37·5	
2976	Aug. 23	N	eP?	21	50·4			0·6					
			i W		51·4	21	52·3	0·95					
							53·0	0·45					
							54·7	0·25					
							57·6	0·25					
								0·6					
			iSE		58·2		58·3	1·4					
							59·6	1·0					
						22	0·9	0·5					
							2·2	1·05					
								0·85					
			i E	22	3·2		3·3	1·1					
							3·9	2·3					
							7·4	0·9					
							8·2	1·2					
								0·85					
			iL		8·7		9·4	1·7					
			M				10·4	1·7					

Intermaximal lulls at
21 h. 58·8 m. to 59·0 m., 0·0 mm
22 1·4 to 1·7 0·1
6·4 0·0
7·05 0·15
8·6 0·15

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
							14·0	1·0					
976 (ctd.)							14·4	1·1					
								0·63					
		W	iSs	21	58·2			0·4			22	45·0	
			i N	22	3·15								
								micro		10180			
2985	Aug. 30	N	eP	18	24·2	18	24·7	micro					
							25·9	0·02					
							26·4						
			eS		35·3								
			i		35·8		36·2	0·1					
							39·2	0·05					
							40·0	0·05					
							45·5	0·05					
			L,M	19	4·5	19	5·1	0·03					
							10·0	0·05	24				
							14·8	0·2	20				
			C				20·4	0·04	18		19	40·0	
										520			
2988	Aug. 31	N	eP	21	1·1	21	1·7	0·1					
			iS		2·05		2·4	0·2					
							3·5	0·2					
			L,M		3·8		4·1	0·5					
							5·9	0·5			21	15·1	
			C				10·9	0·1					
										8085			
2989	Aug. 31	N	eP	22	36·6	22	37·5	0·1					
							42·7	0·15					
			iS		46·0		46·05	0·1					
							49·0	0·15					
							50·9	0·2					
							52·2	0·15					
							58·0	0·1					
			L,M	23	9·2	23	12·2	0·5	?19				
							14·0	0·3	?19				
							14·7	0·2	20				
							16·1	0·45	15				
							18·0	0·6	17				From 23 h. 23·0 m. to 23 h. 23·9 m. the record is difficult to read, on account of the superimposed movement.
							20·0	0·4	17				
			C				27·0	0·2	22				
							40·0	0·1					
							43·7	0·07			?24	0	
2990	Aug. 31	N	P?	22	59·0								
			iS?	23	5·8								
						23	8·5	0·15					
t quake.			L,M		?22·0		23·3	0·4	?0				
							24·05	0·3	11				
							26·3	0·25	10				
			C				31·9	0·15					
							34·3	0·25			24	24·0	
2992	Sep. 1	N	eP?	4	28·1			0·04					
			i E		31·1	4	32·0	0·6					
							33·5	0·1					
								0·2					
			i W		35·0		35·95	0·55					
								0·55					
			iSE		36·85		37·05	0·8					
							37·7	0·7					
								0·35					
			i W		39·9		40·0	0·6					
							40·7	0·85					
							43·2	0·3					
							47·6	0·4					
							49·1	0 65					
							50·3	0·8					
							50·8	0·8					
							53·2	0·7					
							53·9	0·8					
								0·25					
			i E		56·65		57·1	0·65					
							59·1	0·13					
						5	0·4	0·1					This overlap possibly indicates a second shock.
			L,M		58 8		1·3	0·05	?30				
							15·3	0·1	30				
							18·0	0·1	20				
							21·0	0·1	20				
			C				30·8	0·05					
							42·0	0·03			5	54·0	
										?9280			
n., 0·0 mm	2985	Sep. 1	W	eP?	23	3·5							
0·1				iS?		13·9	23	28·3	0·02			?	
0·0				L,M		44·8		54·3	0·02	16			
0·15										5445			
0·15	3013	Sep. 10	N	P	16	7·8							
				iS		14·9							
				i		18 6						?	
				L,M		33·4	16	37·5	0·2	17			
										?8265			
	3016	Sep. 11	N	eP?	1	2·1							
				i		3·0	1	10·3	0·13				
				iS		11·65		?12·6	1·0				
								19·2	0 35				
				eL,M		32·3		43·2	0·15	20			
								46·0	0·3	21			

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
3016 (ctd.)							50·9	0·2	18				
							58·2	0·3	15				
			C			2	9·3	0·15	15		?		
3025	Sep. 12	N	eP	20	29·2	20	30·3	micro		6110			
			eS		36·9		37·5	0·02	6				L and M during change of record.
			C			21	0·4	micro	12		21	7·5	
3027	Sep. 13	W	iPs	23	36·8			0·73		2330			Intermaximal lulls at
			i S			23	37·2	1·0	2·3				23 h. 38·7 m., 0·0 mm
			i N				37·9	1·05					43·1 0·9
			i N				38·35	1·05					45·0 0·0
							38·7	1·2	3·0				the latter being at 1·0 mm south of
							39·1	1·1					the assumed position of rest.
							39·4	1·35	4·0				23 h. 51·8 m. 0·3 mm
							40·15	0·9					53·8 0·6
			iSs		40·65			1·75					56·6 to ·7 0·0
							40·7	4·0	13·0				57·3 0·0
							41·2	7·5					58·1 to ·3 0·0
							41·8	10·6	8·0				
							42·1	9·15					
							43·05	8·7					
			iLN		44·1			?					
			M				44·6		9·2				
							45·5						
							45·8						
							46·3		9·2				
							47·4						
							47·8						
							49·2		10·0				
							51·8	9·3					
							52·4	13·0					
							52·9	13·3	10·0				
							53·3	12·6					
							54·1	10·4					
							55·2	5·15					
							56·1	7·9	10·0				
							57·2	3·4					
							57·8	4·65					
							59·1	4·2					
							59·7	2·1					
	Sep. 14		C			0	0·3	1·9					
							1·7	1·6					
							2·3	1·2					
							2·8	1·2					
							3·5	1·1					
							4·7	0·9					
							6 3	0·95					
							8·8	0·8					
							9·7	0·95	13				
							12·2	0·7					
							16·0	0·8					
							27·9	0·25					
							32·8	0·25					
							34·5	0·25					
							42·1	0·03					
						1	9·2	0·03	15				
							11·6	0·02	15		1	12·2	
	Sep. 13	N	iPw	23	36·7			0·95		2260			
			iSE		40·45			3·1			1	12·6	
3030	Sep. 15	N	eP	2	3·0					110			
			iSw		3·2			0·1					
						2	3·6	0·4					
			iLw		4·1			0·3					
			M				4·2	0·95					
			C				6·0	0·02			2	8·5	
3031	Sep. 15	W	eP?	17	50·6	17	53·2	micro		?10040			
			eS	18	1·6	18	6·8	micro					
							22·3	micro					
			iLs		33·8			0·02					
			M				37·3	0·02	30		?		
3032	Sep. 16	N	iPE	21	12·0			0·15					
			eS		13·6	21	14·7	0·2					
			iLw		15·0			0·7					
			M				15·3	0·95					
							16·1	1·0					
							16·6	1·6					
			C				18·4	0·3					
3046	Sep. 29	W	eP	21	5·5	21	6·0	0·2		11700			Osaka gives P at 20 h. 57·5 m.
			e		11·75		12·1	0·6					
							12·3	0·7					
							12·6	0·7	4				
							13·2	0·7					
							14·0	0·65					
							16·1	0·85					
			iSN		?17·65			0·5					
							17·7	0·85	7				
							18·0	1·0	10				
			i s		18·5			0·73					
							19·0	1·4	7·5				
							19·7	1·15					

No.	Date 1912	Boom	Phase	Commencement h. m.	Maximum h. m.	Range mm.	T sec.	Origin Δ	End (F) h. m.	Notes.
46 (ctd.)					20·1	1·0				
			iSs	21·2		0·92				
			i	21·35		1·55				
					21·4	2·15	7·5			
					22·0	2·05				
					23·8	1·2				
					24·2	1·0				
					24·9	1·4	7			
					25·3	1·4				
					27·85	1·4				
					30·75	1·1				
					34·2	0·9	7			
					35·4	0·9	8			
					38·5	0·8	10			
					39·2	0·7	18			
					43·3	0·35	16			
			eL?	45·0						
			M		49·0	0·6	30			
					53·9	1·4	18			
					58·4	1·9	20			
					22 3·15	5·95	17·5			
					6·0	2·1	17·5			
					6·7	2·0	14·5			
					8·3	2·4	15			
					10·4	1·6	14			
					11·0	1·4	13			
			C		19·2	0·9	14·5			
					29·6	0·5	15			
			i N	22 53·2		0·9	?15			
					23 22·0	0·2	17			
					29·2	0·2	11			
					59·4	0·15	16·5		24 8·7	
		N	iSE	21 21·15		0·45	? 6·6			
			i	21·4						
			eL	44·7						
			M		22 3·6	4·5	16			
					3·8	4·5	19		22 4·5	
			F. of M						24 8·3	
			C		4·8	0·7	19			
947	Sep. 29	N	iP	21 ? 7·8		0·4		?5825		
		W	iPN	? 7·93	21 8·7	0·35				
					16·0	0·7				
			S?	15·4						
			?L, M	32·0	33·3	0·85	28?			
					39·2	0·7	16?		?	
956	Oct. 8	N	?P	11 33·8	11 34·4	0·25				Intermaximal lull 11 h. 57·3 to 58·0 m.
			?S	?	50·5	0·4				Rather doubtful movement.
			L, M	55·3	57·0	0·3	12·9			
					58·3	0·35	13·0			
957	Oct. 8	W	P	14 48·9	14 49·0	0·1		410		
			S	49·65	49·7	0·13				
			iL, M	50·25	50·6	0·8	?6		14 52·0	
						0·3			15 26·6	Perhaps P of a quake.
964	Oct. 12	N	i W	15 24·7		0·15		8550		Probably two quakes.
			iPW	33·8	15 34·1	0·6				
						0·2				
			iSE	43·6						
					49·5	0·7				
					56·1	0·1	17·5			
			?M		16 0·7	0·15	14			
					10·2	0·45	?20			
			L, M	16 8·4	12·5	0·65	18			
					16·3	0 4	16·5			
					21·7	0·55	13			
					22·4	0·55	14			
					24·3	0·45	16			
					29·35	0·6	?11			
			iC		34·7	0·5	?			
			i		36·6	0·25	15			
			C		40·3	0·2	17			
					44·5	0·25	15			
					51·1	0·25	17			
					59·0	0·2	15			
					17 8·7	0·1	17			
					16·4	0·04	16 5		17 17·3	
966	Oct. 12	N	eP (1)	20 0·5	20 0·7	0·05		?3150		
					1·7	0·1				
			P (2)	2·65	3·5	0·15		?2860		Probably a double shock.
					4·3	0·2				
			S (1)	5·4	6·2	0·25				
					6·7	0·15				
			S (2)	7·2	7·75	0·3				
					8·65	0·5				
					9·0	0·55				
					10·2	0·7				
					10·7	0·55				
			L, M	11·3	12·0	0·7				
					12·8	0·7				
			L, M	14·2	14·7	0 55				
					18·0	0·4				
					19·8	0·8	10			

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
3066 (ctd.)			C				23·3	0·1					
							25·3	0·15					
							27·0	0·2					
							29·75	0 2					
							32·95	0·07			20	34·4	
3070	Oct. 14	N	i	1	34·1			0·06					
			iPE	1	43·05			0·03		6785			
						1	44·7	0·1					
			iSE		51·35			0·15					
							54·2	0·1					
			?L,M	2	10·3	2	17·8	0·1	18				
							19·1	0·07	12				
							21·0	0·03	15		?		
3073	Oct. 14	N	e	8	15·8								I cann t understand this earthquake.
			M			8	30·7	0·75	7·5				
			i E		37·3			0 05					
			i W		42·2			0·1					
			M				50·0	0·35	8·0				
							58·2	0 1	10				
						9	1·5	0·5	12				
							5·4	0·2	12				
							10·5	0·35	9				
			C				18·7	0·2	5				These short waves may be air tremors.
							24·7	0·15	5				
							30·6	0·2	5				
							35·1	0·1	18		9	50·0	
3089	Oct. 17	N	eP	10	15·3	10	18·35	0·2		11325			Commencement uncertain.
			eS		27·2		28·1	0·1					If P = 10 h. 2·1 m., then S = 10 h. 27·2 m. and Δ = 13300.
							29·7	0·05					Zi-ka-wei gives P at 9 h. 57·1 m.
							35·25	0·15					
			L,M		53·6		54·3	0·1	20				
							55·6	0·15	25				
							58·2	0·25	20				
						11	5·8	0·25	22				
							15·2	0·15	19				
			C				28·0	0·05	21				
							49·0	0·05	18				
						12	11·6	0·05	17		12	19·7	
3091	Oct. 18	N	eP	12	?7·0	12	8·0	0·5					
							13·6	0·5					
							15·0	0·5					
			eS		16·4								
			i W		16·6			0·5					
							17·7	1·0					
							18·7	0·8					
							20·1	1·9					
							23·8	1·2					
							24·8	0·9					
			i E		29·3			0·4					
							29·35	0·85					
							30·3	0·7					
							32·5	0·7					
							33·5	0·25	19				
							34·4	0·8					
							36·0	0·3					
							37·7	0·35					
							40·6	0·6					
			iLw		41·1			?					
			M				42·0	0·6	16				
							43·1	0·65	16				
							45·5	0·65	7				
							47·0	0·5	16				
							48·3	0·8	16				
							50·0	0·8	15				
							54·2	0·65	16				
							56·0	0·9	16				
							59·8	0·4	12				
						13	2·0	0·35	12				
			C				9·6	0·3	15·5				
							12·2	0·35	14				
							13·9	0·3	12·5				
							18·2	0·3	16·5				
							21·7	0·3	16				
							28·5	0·2	14				
							46·0	0·07	17		13	47·0	
3108	Oct. 26	N	eP?	9	13·3	9	14·8	0·5		10115?			Attention to instrument, 9 h. 16·4 to 21·0 m.
							21·3	0·6					
							22·0	0·6					
							23·6	0·4					
			iSw		? 24·35			0·2					
							24·8	0·4					
			i W		25·1			0·1					
			i W		25·4			0·55					
							25·5	0·75					
							27·8	0·8					
							28·7	0·6					
							29·9	0·65					
							33·5	0·7					
							36·3	0·65					
							42·6	0·15	17·5				

EART

No.	Dat 191
108 (ctd.)	
109	Oct.
120	Oct.
121	Oc

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
							48·4	0·7					
108 (ctd.)			L,M		55·4		57·8	0·17	18				
							59·5	0·2	30				
			C			10	7·5	0·1	14		?		
109	Oct. 26	N	e	11	8·3	11	11·4	0·5					
			i		17·0								
							17·7	0·6					
							23·0	0·4					
							25·3	0·4					
							28·4	0·5					
			?L,M		36·1		41·5	0·25	25		?		
								?0·25					
3120	Oct. 31	W	iPs	12	20·7	12	22·25	0·6					
								0·48					
			iSN		25·35			0·6					
			i s		27·2								
							28·2	0·6					
							29·0	0·5					
							29·5	0·8					
							30·0	0·95					
								0·6					
			iLs		31·05		31·4	1·4	7				
			M				31·8	1·7	9				
							32·25	2·3	12				Intermaximal lulls at
							33·2	4·6	8				12 h. 32·65 m., 0·5 mm
							33·7	5·0					33·9 0·5
							35·0	12·8					39·2 0·0
							37·1	11·7					40·85 0·3
							40·0	5·0					46·95 0·3
							41·25	1·9					51·0 0·0
							42·3	3·6	8·5				
							43·2	2·0					
							45·9	3·3					
							46·3	3·3	8·5				
			C				47·9	1·9					
							48·8	1·1					
							49·7	1·4					
							50·6	1·2					
							52·1	2·0					
							52·7	2·25					
							53·8	0·95					
							54·6	1·15					
							55·4	1·65					
							56·6	1·5					
							59·1	0·7					
						13	0·4	1·3					
							1·8	1·2					
							5·15	0·9					
							8·45	0·7					
							10·3	0·75					
							11·55	0·9					
							13·0	0·75					
							14·2	0·8					
							16·65	0·85					
							18·9	0·5					
							21·8	0·6					
							22·8	0·6					
							24·4	0·6					
							30·3	0·4					
							43·1	0·3			13	44·3	
								0·38	?3	9400			
121	Oct. 31	W	iPs	17	42·05	17	44·6	0·25					P during tremors.
							45·7	0·5					
							46·2	0·35					
							49·3	0·65					
							50·0	0·65					
							50·7	0·8					
							51·3	0·45					
								0·6					
			iSN		52·55		52·8	0·75					
							53·9	0·65					
							54·7	0·85					
							53·3	0·65					
							55·65	0·5					
							57·3	0·75					
							59·1	0·4					
						18	1·2	0·4					
3·4							1·6	0·6					
							2·2	0·9					
							7·15	0·45					
							10·65	0·65					
							11·2	0·6					
							11·7	0·57					
							21·25	0·6					
							22·4	0·7					
							23·0	0·4	12				
							23·3	0·6					
			L,M	18	24·7		25·2	0·6	20				
							30·0	0·85	19				
							35·0	1·1	19				
							38·7	1·0	14·5				
							40·1	0·7	14·5				
							44·0	0·55	14·5				
							46·75	0·6	10				
							51·3	0·35	16		19	9·3	

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h. m.	Maximum h. m.	Range mm.	T sec.	Origin Δ	End (F) h. m.	Notes.
3127	Nov. 2	W	i N	3 14·7	3 14·7	0·9		?		During tremors.
					14·9	0·8				
					20·1	0·9				
						0·2				
			i S	25·4						
					26·25	0·75				
			i S	27·2		0·7				
					27·25	0·95				
					28·0	1·0				
					29·3	1·0	10			
					31·3	0·7				
					32·1	0·7			?	
3139	Nov. 7	W	ePN	7 51·45				7905		Irkutsk gives iP at 7 h. 49 m. 26 s.
			i S	51·55		0·7				Osaka ,, P ,, 7 49 29
					7 52·0	2·5				Zi-ka-wei ,, eP ,, 7 50 34
					52·2	3·3				Bidston ,, P ,, 7 51 12
					54·0	1·4				Stonyhurst iP ,, 7 51 30
					54·5	1·95				
					55·4	1·9				
					55·8	1·9				Intermaximal lulls at
			i N	56·5	56·6	2·1				7 h. 52·15 m. 0·2 mm.
					57·2	2·0				52·8 0·1
					57·4	2·0				8 3·55 0·0
					57·9	1·6				14·6 0·0
					58·8	1·7				22·0 0·5
					59·2	1·6				27·3 0·0
					59·6	1·7				
			iSN	8 0·7		3·8				
					8 1·7	9·3				
					?2·7	?9·3				
					3·7	2·05				
					5·0	3·6				
					5·95	8·65				
					6·9	2·6				
					8·6	4·3				
			N		9·1	5·0				
					10·0	3·4				
					11·2	3·75	7·6			
					12·1	2·6				
					12·4	1·95				
			N		12·7	1·6				
			N		13·0	1·4				
			N		13·2	1·9				
					13·8	3·15				
					14·3	3·6	8			
					15·0	2·3	8			The Long Waves evidently commenced to arrive before the cessation of the S phase waves, and appear jagged at the apices until 8 h. 19·1 m. Some shorter-period waves then follow, and are succeeded by a second series of Long Waves, of different shape from the first series.
			N		16·1	3·0	8·5			
			S		16·3	2·6	8·7			
			N		16·7	2·0	8·5			
			S							
			?L	15·0	15·6	?0·7	?30			
		N	iLN	16·75		1·1				
			M		16·9	?1·6	19			
					17·5	?2·0	30			
					18·05	2·1	30			
					18·55	?2·8	28			This appears to indicate a second earthquake at a different Epicentre.
					19·05	2·0	?18			
					19·65	?2·2	9			
			i N	20·3		1·35	9			
					20·4	2·3	9			
			i S	21·3		1·9	10			
					21·4	2·4	10			
			i S	21·7		2·1	9			
			?LN	22·7	22·75	2·0	13			
			M		23·05	3·0	9			
					23·5	20·0	20			
					24·0	3·1	20			
					24·3	3·6	18			
					24·7	3·0	18			
					25·7	2·0	14·5			
					26·0	1·6	15			
					26·3	1·1	16			
			C		28·4	1·3	11			
					29·5	1·5	10·5			
			i		30·3	1·3	10·5			
			i		31·4	1·4	10			
			i		32·2	0·95	9			
					33·5	1·05	9·5			
					35·0	1·0				
					35·5	1·0				
					38·2	1·0				
			i		41·75	1·2	9			
					45·0	0·8	14			
					51·1	1·0	9			
					52·0	0·5	20			
					54·0	0·95	10			
					57·0	0·7	20			
					59·4	0·7	9			
					9 2·6	0·8	17			
			i N		6·6	0·35	10			
					12·0	0·5	15			
					15·3	0·3	25			
					28·0	0·15	17			
					36·6	0·2	18			
					57·0	0·05	18			

No.	Date 1912	Boom	Phase	Commencement h.	m.	Maximum h.	m.	Range mm.	T sec.	Origin Δ	End (F) h.	m.	Notes.
3139 (ctd.)							13·1	0·25	27				
							18·2	0·2	20				
							25·0	0·2	20				
							36·0	0·1	20				
							46·8	0·02	16		10	59·0	
3140	Nov. 7	W	iP?	16	50·5	16	50·65	0·07	4	?8555			Irkutsk gives P at 17 h. 4·1 m., and Δ = 8250 k; and L of a second quake at 17 h. 35·5 m.
							58·8	0·03	4				
			eS	17	0·3	17	1·0	0·3	4				
							1·7	0·25	6				
							3·5	0·15	6				
							6·0	0·25	4				
							8·1	0·15	6				
							10·3	0·07	7				
							11·4	0·3	8				
							11·8	0·2	6·5				
			eL,M		19·3		20·0	0·07	16				
							22·7	0·1	19				
							23·9	0·07	22				
							26·4	0·4	21				
							30·1	0·3	18				
			C				37·0	0·15	20				
							45·8	0·07	18				
							52·2	0·07	18				
							57·4	0·07	19				
						18	4·5	0·1	17		?		
3141	Nov. 7	W	e	17	39·0								
			eS		47·4	17	48·35	0·25	?6				
							49·3	0·25	6				
							53·3	0·25	6				
			i N	18	5·0			0·3	7				
			i S		6·1			0·25					
			?L,M		6·25	18	7·1	0·15	19				
							8·2	0·25	25				
							9·6	0·2	19				
							11·1	0·5	19				
							14·7	0·4	19				
							15·6	0·4	20				
			C				19·0	0·2	18				
							31·0	0·13	18·5		19	4·0	
3142	Nov. 7	W	eP	20	1·7	20	2·0	micro		800			
			eS		3·15		3·5	0·1					
							3·75	0·2					
			iL N		4·3			0·1					
			i N		4·7			0·15					
			M				4·8	0·3					
							5·15	0·95					
							5·7	0·4					
			C				6·85	0·1					
							9·2	0·02			20	9·8	
3145	Nov. 8	W	iP s	8	16·0	8	16·7	0·01		7375			Irkutsk gives P at 8 h. 1 m. 20 s.
							21·3	0·02					
			iS N		24·8			0·01					
							27·5	0·03					
							33·7	0·02					
							41·7	0·02					
			eL,M		44·0		49·3	0·05	19				
							54·2	0·05	?14				
			C			9	0·9	0·03	18				
							18·1	micro			9	21·0	
3147	Nov. 14	W	eP?	13	32·6	13	33·0	0·1		?9280			
							35·3	0·07					
			e		40·8		41·3	0·05					* ?S
			i * N		43·0			0·02					
							43·1	0·03					
			i S		50·75			0·06					
							50·9	0·15					
							52·0	0·2					
							57·3	0·07					
						14	2·0	0·2					
			?L,M	14	5·2		9·5	0·3	20		14	17·3	
3152	Nov. 19	W	?P	13	55·05					?9335			During very heavy tremors, and therefore very uncertain.
			?S	14	5·5								
			L		29·0								
			M N			14	36·2	2·0	?				
3158	Dec. 1	W	?P	8	44·7	8	44·9	0·75		?8085			During tremors.
			? S		54·1		54·4	0·95					
			L,M	9	15·2	9	18·0	0·7	18				
							21·3	?1·0	?18				
							21·6	?1·0	?22				
							22·2	1·6	18				
							23·1	1·0	16				
			C				33·0	0·45	25			?	
3161	Dec. 2	N	iP	18	6·9	18	7·0	0·9		1400			
							8·8	0·6					
			iS		9·35		9·8	0·8					
			L,M		10·4		10·9	2·1					
							12·9	3·7					
							15·1	?5·0					
			C				20·2	0·9			18	21·0	

EARTHQUAKES recorded at Hill View, Woodbridge Hill, Guildford, England.

No.	Date 1912	Boom	Phase	Commencement h.	Commencement m.	Maximum h.	Maximum m.	Range mm.	T sec.	Origin Δ	End (F) h.	End (F) m.	Notes.
3169	Dec. 5	N	eP	12	39·7					7015			
			iS		48·2								
			L,M	13	1·3	13	5·0	0·15	18				
							7·9	0·15	17			?	
3178	Dec. 6	N	i	9	43·0	9	52·5	1·3		?			Doubtful.
			L,M	10	15·0	10	17·5	0·5	15			?	
3182	Dec. 6	N	P	14	2·8	14	3·0	0·5		350			
			S		3·45		3·7	0·4					
			L,M		4·3		5·2	1·7					
			C				7·65	0·7			14	8·0	
3188	Dec. 7	N	eP?	22	57·3		?			?			A multiple earthquake.
			iS?	23	5·9	23	6·05	?					
			i E		9·6		9·7	?					
			i E		10·0		10·05	0·9					
		-	e		11·6		11·85	1·0					
			i E		18·3		18·35	1·2					
			L,M		25·1		28·6	0·1	35				
							32·6	0·2	20				
3190	Dec. 9	N	iP w	0	3·9	0	4·1	0·65		7725			
			i w		7·35		7·4	0·8					
			S		13·0		13·55	1·4					
			L,M		35·7		38·3	0·5	18				
							41·7	0·7	17				
			C				45·7	0·2	15				
3191	Dec. 9	N	eP	8	15·6	8	19·7	0·5		10600			
			S		27·0		29·8	0·8					Attention to apparatus, 9-6 to 9-14·3.
		W	eL,M		59·4	9	15·35	1·9	19				Irkutsk gives e at 8 h. 46 m. 59 s.
							16·2	1·8	27				Stonyhurst gives iP at 8 h. 43 m. 30 s.
							17·0	1·9	19				Discordant figures at Guildford may be due to air tremors.
							19·2	2·5	20				
							22·3	2·3	20				
							22·9	2·6	16				
			C				25·0	0·9	14·5				
							25·9	1·3	16				
							28·1	0·9	13				
							29·6	1·3	17				
							30·8	?0·6	19				
							34·9	0·8	15				
							49·8	0·4	16		?10	3·5	
3209	Dec. 24	W	?P	0	23·2					?6675			During tremors.
			i?Ss		31·4								Irkutsk gives iP at 0 h. 5 m. 48 s.
			?L,M		49·5	0	55·2	0·2	17				
							58·2	0·35	15·5				
							59·7	0·2	17				
						1	0·6	0·25	?17				
							8·3	0·35	19·5			?	
			C				16·9	0·1	14				

Note.—This instrument was very much afflicted with tremors of various kinds during November and December.

1′ arc tilt = 4·93 mm.

1 mm. displacement = 0·2″ tilt.