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No. 3, pp. 49-67 October 19, 1912

THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION AND AT THE LICK OBSERVATORY STATION FROM OCTOBER 1, 1911, TO MARCH 31, 1912

BY

H. O. WOOD

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* The writer wishes to make grateful acknowledgment to Mr. E. F. Davis for much assistance in the preparation of this report and the reading of proof.

THE BERKELEY STATION

Installation of the Omori Seismograph

The small two-component horizontal-pendulum tromometer of Omori's design, constructed in Japan, which was mentioned in the first number of this Bulletin, was remounted late in September, 1911, after a thorough cleaning and mechanical overhauling. The constants for each of these components are tabulated below.

This tromometer has proved less sensitive to local seismic motion than the European seismographs owing, probably, to an inferior design for the suspension of the heavy masses. Also—as was to be expected—it has far less sensitive to teleseismic motion.

CONSTANTS

Latitude and longitude of the center of the seismographic room:

$\phi = 37° 52' 15''.9$ N. Lat.
$\lambda = 122° 15' 36''.6$ W. from Greenwich.

Time. All determinations are reduced to Greenwich mean civil time.

Altitude, 85.4 meters (280 feet) above mean sea level.

Constants of the Seismographs

	Period	Magnif.	Damping
Bosch-Omori Tromometer N-S component	15s	80	8–1
Bosch-Omori Tromometer E-W component	15s	80	8–1
Wiechert Seismograph Vert. component	6s	80	8–1
Omori Tromometer N-S component	2s	60	.....
Omori Tromometer E-W component	2.5s	60	.....

Symbols and Notation

1. *Character of the Earthquake*—

I. Perceptible	II. Moderately strong.	III. Strong.
d (terrae motus domesticus)	Local shock (origin nearby, perceptible at the station).	
v (terrae motus vicinus)	Near shock (origin less than 1,000 kilometers distant).	
r (terrae motus remotus)	Distant shock (origin from 1,000 to 5,000 kilometers distant).	
u (terrae motus ultimus)	Very distant shock (origin more than 5,000 kilometers distant).	

2. *Phases of the Seismogram*—

P (undae primae)	First phase, or first preliminary tremors.
PR_n	Waves n-times reflected at the earth's surface.
S (undae secundae)	Second phase, or second preliminary tremors.
SR_n	Waves n-times reflected at the earth's surface.
PS	Waves changed from longitudinal to transverse oscillation, or vice versa, through reflection at the earth's surface.
L (undae longae)	Long waves, chief phase, or principal part.
M (undae maximae)	Greatest motion in the chief phase.
C (coda)	Tail or end portion.
F (finis)	End of discernible movement.

3. *Nature of the Motion*—

i (impetus)	Sudden beginning of the motion.
e (emersio)	Gradual beginning of the motion.
T (period)	Time of one complete oscillation.
A	amplitude of the motion, measured from the median line in microns ($\mu = 1/1000$ mm.).

A_E E-W component of A.

A_N N-S component of A.

A_V vertical component of A.

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
1	4 Oct.	I v	i_N	6 39 40	½				
			i_{EV}	39 52	½-1				
			iL_N	39 52	¾-1				
			iL_{EV}?	40 05					
			C_N	39 59					
			C_E	40 11	1-1½				
			F	41 09					
2	6 Oct.	II u	i P	10 24 55	5				Chief phase consists of relatively simple sinusoidal waves.
			eS_E	35 59	10–15				
			eS_N	36 01					
			eL_N ?	40 04	40				
			eL_E	42 59	20–30				
			M_N 1	43 53	21		24		
			M_N 2	45 29	13		30		
			M_N 3	46 38	13		27		
			M_E 1	47 25	19	110			
			M_V	47 52				5	
			M_E 2	50 27	15	108			
			C_N	49 11	20				
			C_E	51 30					
			C_V	53 43	12				
			F_E	11 27±					
3	10 Oct.	II u	eP_N	13 20 57					Early phases confused by small microseismic waves. Vertical record illegible, time magnet not operating; chief phase plainly marked but not measurable.
			S	indefinite					
			eL_N	35 18	22				
			eL_E	35 32	23				
			M_N	39 24	18		6		
			M_E 1	39 40	20	21			
			M_E 2	41 13	20	22			
			C_E	46 48					
			F	14 27±					
4	13 Oct.	I u	eP	2 43 14					
			eS_V	50 57					
			eS	51 12	5-8				
			eL_E ?	3 01 10	12				
			eL_N	00 59	12				
			eL_V	01 50	21				
			C	15.5 —					
			F	4 12					
5	14 Oct.	I u	e	16 37.5 —					Beginning confused with small microseismic waves.
			S	indefinite					
			eL_E	54 36	20				
			eL_N	54 58	25				Waves of chief phase relatively simple.
			M_E	7 02 29	10	12			
			C	05 30					
			F	indefinite					Recording of shock interrupted by changing of sheets.
									Vertical record illegible, through overscoring.

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
6	17 Oct.	I d	i P	21 25 39	< 1				Not reported felt in Berkeley.
			i L	25 50	1				Waves of shock superposed upon microseismic waves.
			$i L_V$	25 53	1				
			M_N	25 55	1		3		
			C	26 04					
			F	38±					
7	20 Oct.	I u	eP*	17 55 32	3-5	1			*Vaguely marked.
			i P	56 08	3-5				Sharply marked.
			S_N ?	18 07 27					
			eS_E	07 51	8-10	2			North-South record feebly written as though motion in this component were just about dying out.
			eL_V	21 11	15-20				
			eL_E *	21 19	25-30	2			
			eL_N	23± —					
			F	47 11					
8	29 Oct.	I u	e_N	18 10 57					Motion in E-W component barely perceptible. This behaviour is unusual.
			e_V	15 52					
			e_N	16 54					
			L_N	24 28	30				
			L_V	?) 25 04					
			C	indefinite					
			F	"					
9	1 Nov.	I u	e_E	9 34 36					Vertical record illegible, time magnet not working.
			L_E	49 38	23				
			L_N	50 12	24				
			F	10 36.5					
10	18 Nov.	I u	e_E	7 35 03					
			L_N	47 00	25				
			L_V	47 19					
			L_E	47 56	28				
			M_N 1	50 11	13		9		
			M_N 2	51 02	13		11		
			M_E 1	52 06	13	22			
			M_E 2	52 51	10	19			
			M_E 3	53 39	9	20			
			C	8 00 21					
			F	indefinite					
11	20 Nov.	I d	i	20 24 17					Measurably registered only in E-W component.
			M	24 18					
			F	24 29					
12	20 Nov.	I r	eS_E	14 02 29					Vertical record spoiled.
			L_N	07 11	30				
			eL_E	07 19	25				
			C	indefinite					
			F	14 35.5					

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
13	16 Dec.	III r	eP_V	19 20 09					Megaseismic district in Central Mexico.
			eP_N	20 25					
			eP_E	20 27					
			eS_E	25 13					Owing to a locking action by its damping device the amplitude registered by the E-W seismometer was much smaller than the natural value.
			i S_N	25 17					
			eL_E	28 15	26				
			i L_N	28 21	23				
			$M_{N\,1}$	31 36	16		597		
			$M_{N\,2}$	32 35	13		602		
			$M_{N\,3}$	34 24	11		430		
			$M_{N\,4}$	35 03	12		494		Vertical record unmeasurable because time magnet did not work after first phase was registered.
			C_E	35 29					
			F	21 25± —					
			$M_{V\,1}$					210	
			$M_{V\,2}$					144	Shock barely recorded by Omori Seismograph.
			$M_{V\,3}$					200	
									No characteristic phases distinguishable; much friction.
14	17 Dec.		?	22 03 —					Suggestion of feeble local shock at $22^h\ 03^m$ but very dubious; may be microseismic waves.
15	19 Dec.	I d	I_N	12 40 07					No shock on vertical seismogram.
			I_E	40 10					
			M_N	40 08					
			M_E	40 12					
			C_E	40 14					
			F	40 22					
16	20 Dec.	I	P_E	indefinite					Obscured by microseismic waves.
			S	6 04 28					Waves of second phase and of chief phase merge without significant change of amplitude while the waves are too complex to judge the transition point by means of change in period. No significant maxima. F lost in microseismic motion.
17	22 Dec.	I r	eP_E ?	13 01 00					Vertical seismogram illegible because of overscoring.
			eS_E ?	05 48					
			eS_N	05 51					
			L_E	13 04	14				
			L_N	13 19	11				
			$M_{E\,1}$	13 36	12	19			
			$M_{E\,2}$	14 19	10	22			
			$M_{E\,3}$	15 41	9	34			
			C_E	19 12					
			F	54.5					
18	23 Dec.	I	L_E	19 54 24	20				Very feebly registered with early and late phases hopelessly confused with microseismic motion.
19	23 Dec.	I u	i	21 16 39					Measurably recorded in E-W component only.
			L	28 40	25				
			F	54 16					
20	26 Dec.	I d	e_N	3 18 32					Not reported felt at Berkeley.
			e_E	18 34					
			L_N	18 44	1-1½				Vertical time magnet not working.
			L_E	18 45	1				
			C	19 21					
			F	21.5					
21	31 Dec.	I-II d	i P	21 41 00					Feebly but unmeasurably registered by Omori Seismograph in E-W component only.
			i L_N	41 11					
			i L_E	41 12					
			i L_V	41 13					
			M	41 13					
			M_V	41 15					
			C	41 25					
			F	43+ —					
	1912								
22	4 Jan.	I d	i P	1 38 37					E-W measurements do not agree in time but parallax was indeterminate.
			L	38 58	¾-1				
			C	39 05					
			F	indefinite					
23	4 Jan.	I u	eP_E	15 54 47					F interrupted by changing of record sheets.
			eP_V	54 51					
			e P_N	54 53					
			eS_N	16 04 23					
			eS_E	04 29					
			L_V	10 26	15				
			eL_E	10 29					
			$M_{E\,1}$	11 20	10	22			
			$M_{E\,2}$	11 55	10	25			
			C	indefinite					
			F	"					

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
24	5 Jan.	I v	i P_E	3 52 59					Shock of moderate strength in northern Inyo County, California.
			i P	53 01					
			S	53 26					
			i L_E ?	53 41					Waves complex in character.
			L_V	53 45					
			i L_N	53 46	2		12		Recorded by Omori Seismograph Phase beginning indistinguishable owing to friction.
			C	56 13					
			F	4 09+					
25	15 Jan.	I d	eP_E	18 34 05					Times in E-W component uncertain owing to indeterminate parallax.
			i P_V	34 28					
			i_N	34 31					
			L_E	34 23					
			C_E	36 16					
			C_N	36 43					
			F	indefinite					
26	15 Jan.	I d	i P_N	19 08 14					Very feeble unmeasurable record on Omori Seismogram in E-W component.
			eP_E	08 17					
			i P_V	08 22					
			i S	08 40	2				
			L_V	08 47					
			i L_E	08 49	6				
			i L M_{N1}	08 53			6		
			M_E	08 58	6	20			
			M_{N2}	09 05			6		
			M_{N3}	09 13	5		9		
			C	09 34					
			F	18± —					
27	21 Jan.	I d	i P_N	14 07 34					Recorded measurably by N-S seismometer only.
			i L_N	07 44	1				
			M	07 46	1		6		Driving clock of E-W instrument stopped.
			C	07 53					
			F	09 43					Vertical slackened against safety stop with change of temperature.
28	31 Jan.	I d	e_E	2 04 04					Time approximate; time magnets dragging markers.
			e_N	04 16					
			F	04 49					
29	31 Jan.	I r	i P_N	20 17 35					
			i P_V	17 36					
			i P_E	17 38					
			S_N ?	23 15					
			L_E ?	24 25	20				
			L_V	25 16	24				
			M_E	27 13	12				
			C	indefinite					
			F	21 22± —					

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
30	20 Feb.	I d	i P_V	6 15 09					Felt by several persons in Berkeley II-III R-F.
			i P_E	15 10					
			i P_N	15 11					Registered by Omori Seismograph in both components but friction vitiates records.
			i L_V	15 19					
			i L	15 21	1-1½				
			M_V	15 21	—			—	
			M	15 23	1-1½	9	9		
			C	15 25					
			F	22 13					
31	23 Feb.		e	6 41 45					Probably motion of the chief phase only.
		I	F	42 10					
32	8 Mar.		i P_N	9 47 56					Time differences probably due to disturbance of parallax.
		I d	eP_E	48 05	1				
			e L_N	48 07	1				
			i L_E	48 17					
			C	48 27					Registered by Omori Seismograph in N-S component. Sharp registration of chief phase. Bad friction.
			F	50 56					
33	11 Mar.		eP_N	10 20 48	2-3				
		II r	i P_E	21 02					Driving clock of E-W seismograph stopped before end of shock.
			i S_E	23 51	6				
			i S_N	23 52	6-8				
			L_N	25 33	10				
			L_E	26 09	13				Vertical component showed marked motion which was illegible because of overscoring.
			M_{N1}	26 18	9		62		
			M_{E1}	26 25	10	92			
			M_{E2}	27 02	9	69			
			M_{N2}	27 09	8		50		
			M_{E3}	28 04	8	62			
			M_{E4}	29 22	8	64			
			M_{N3}	29 33	8		45		
			C	33 13					*Lost in microseismic motion.
			F*	12+					
34	12 Mar.		e	12 27 27					Barely perceptible vibration of very rapid period registered only in E-W component.
		I d	F	27 36					
35	12 Mar.		eP_E	13 41 59					
		I d	eL_E	42 07	½-1				*Lost in microseismic motion. N-S writing pen out of order. Vertical steady mass settled against safety stop.
			M_E	42 10		5			
			C	42 13					
			F*						

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
36	17 Mar.	I d	i P_V	22 27 04					Barely recorded in E-W component of Omori Seismograph. Bad friction in N-S component.
			i P_N	27 06	½				
			i P_E	27 09					
			i L_N	27 17	¾-1				
			i L_V	27 19	1			3	
			i L_E	27 22	½				
			M_N	27 19	¾-1		6		
			M_E	27 24	½	6			
			C_N	27 25	2				
			F	29.5 —					
37	25 Mar.	I	e_E	5 01 35					Characteristic phases not distinguishable, probably because of small initial energy.
			e_N	01 54					
			M_E	01 58	3-4	4			
			M_N	02 00					

THE LICK OBSERVATORY STATION

Readjustments and Revision of Constants

In the late middle part of November, 1911, some days were employed in readjusting the seismographs so as to increase their sensitiveness, and in making changes in the periods, magnification factors and damping-ratios in order to bring these, so far as practicable, into conformity with the corresponding constants on the seismographs at the Berkeley Station. This work interrupted the routine registration in the horizontal components for several days. After the completion of these readjustments routine registration was resumed on November 23, 1911. Both the old and the new values of these constants are included in the tabulation below, with mention also of the date when the change took effect.

CONSTANTS

Latitude and longitude of the center of the seismographic room:

$\phi = 37° 20' 24''.5$ N. Lat.
$\lambda = 121° 38' 34''$ W. from Greenwich.

Time. All determinations are reduced to Greenwich mean civil time.

Altitude, 1281.7 meters (4202.25 feet) above mean sea level.

Constants of the Seismographs

	Period	Magnif.	Damping
From October 1, 1911, to November 22, 1911—			
Wiechert Seismograph N-S component	4–5	40	Total
Wiechert Seismograph E-W component	4–5	40	Total
Wiechert Seismograph Vert. component	4–5	80	Total
From November 23, 1911, to March 31, 1912—			
Wiechert Seismograph N-S component	7	80	8:1
Wiechert Seismograph E-W component	7	80	8:1
Weichert Seismograph Vert. component	5	80	8:1

Symbols and Notation

1. *Character of the Earthquake*—

I. Perceptible II. Moderately strong. III. Strong.

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P (undae primae)	First phase, or first preliminary tremors.
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S (undae secundae)	Second phase, or second preliminary tremors.
SR_n	Waves n-times reflected at the earth's surface.
PS	Waves changed from longitudinal to transverse oscillation, or vice versa, through reflection at the earth's surface.
L (undae longae)	Long waves, chief phase, or principal part.
M (undae maximae)	Greatest motion in the chief phase.
C (coda)	Tail or end portion.
F (finis)	End of discernible movement.

3. *Nature of the Motion*—

i (impetus)	Sudden beginning of the motion.
e (emersio)	Gradual beginning of the motion.
T (period)	Time of one complete oscillation.

A amplitude of the motion, measured from the median line in microns (μ=1/1000 mm.).

A_E E-W component of A.

A_N N-S component of A.

A_V Vertical component of A.

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
1	1 Oct.	I d	i P	00 54 56	1	2	6		
			M_V	54 56				4	
			i LM	54 59	$\frac{3}{4}$	14	17.5	3	
			C	55 02					
			F	55 26					
2	1 Oct.	I d	i P	8 11 58	1	4	5	2.5	
			i LM	12 00	$\frac{1}{2}$-$\frac{3}{4}$	17	9	4	
			C	12 04					
			F	12 20					
3	4 Oct.	I-II d	i P	6 39 37					No record in vertical component.
			i LM	39 39	1	44	44		
			C	39 43					
				40+ —					
4	6 Oct.	I-II v	eP	10 24 53					Waves of chief phase, in E-W component, visible for few minutes shortly before 11^h.
			S	31 54	8				
			L	40 03	30				
			M	45 16	15		44		
			C	56 24					No trace of motion in the vertical component.
			F	11 25+ —					
5	10 Oct.	I u	e_V	13 20 10					No motion discernible in E-W component.
			eL_N	32 37	30				
			L_V	34 37	30				No definite maximum in N-S component.
			M	39+ —	15				
			C	indefinite					
			F	14 05± —					
6	14 Oct.	I u	L_N	16 54+					In E-W component there was only a slight shifting of the pen trace shortly after 17^h; no waves and no phases.
			F_N	18+ —					In N-S component the early phases are confused with microseismic motion. Pendulum unstable.
									No motion in vertical component.
7	17 Oct.	I-II d	i P	21 25 24	$\frac{1}{2}$				
			i LM	25 27	1	69	63	22	
			C	25 30					
			F	26 45					
8	18 Oct.	I	e	19 12.5 —	2-3				Barely perceptible sharp waves differing from microseismic, in N-S component only.
			F	14+					No phases distinguishable

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
9	20 Oct.	I u	e	17 56 15					N-S component only.
			S ?	18 07 29					Large waves at about 18 25 L, C, F, all indefinite.
10	29 Oct.	I	e	18 20 51					N-S component only.
			eL	22 51	20				Waves of chief phase distinctly perceptible for several minutes.
			C	indefinite					
			F	"					
11	1 Nov.	I	eL	9 50 —					Shock registered in E-W as irregular offsettings of the two. No phases distinguishable. Vague motion perceptible both before and after the times given.
			F	10 08 —					
12	11 Nov.	I d	i P	14 54 04					
			i LM	54 05		19	29	85	
			C	54 08					
			F	indefinite					
13	20 Nov.	I d	i P	20 24 00					No records in horizontal components.
			i LM	24 02				11	
			C	24 07					
			F	24 57					
14	25 Nov.	I d	i P	17 33 19					No record in N-S component, friction.
			i LM	33 21		8		4	
			C	33 23					
			F	33 51					
15	30 Nov.	I d	eP	5 52 07					Vertical record is illegible owing to thickness of smoke film.
			i LM	52 08	¼				
			C	52 12					
			F	52 25					
16	16 Dec	II-III r	i P	19 20 14	3-5				Megaseismic area in central Mexico.
			$i S_N$	25 08					Waves of first phase are complex and the trace is ragged.
			$i S_E$	25 11					
			eL_E	28 21	26				
			eL_N	28 23	22				
			$M_{E\,1}$	29 05	21	176			No reflected phase could be distinguished.
			$M_{N\,1}$	29 14	21		135		
			$M_{E\,2}$	30 51	18	219			Vertical record is illegible owing to overscoring.
			$M_{N\,2}$	31 14	14		205		
			$M_{E\,3}$	32 50	12	205			End is confused in microseismic motion shortly before 22^h.
			$M_{N\,3}$	32 59	12		233		
			C	41 53					
			F	22 — —					This is the first distant earthquake well registered at this station.

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
17	17 Dec.	I d	eP	22 02 44					
			i LM	02 47	¾	30	15	3	
			C	02 55					
			F*	indefinite					*Microseismic motion.
18	19 Dec.	I d	i P	12 39 41					Vertical pen out of order.
			i LM	39 43	¾	30	30		
			C	39 51					
			F	40 19					
19	20 Dec.	I	?	5 50±					In the E-W component the motion of a distant earthquake was registered during two hours. Phases are not well distinguished and the times cannot be determined at all because of the stopping of the time clock. Motion is barely perceptible in the N-S record at about time of maximum.
20	23 Dec.	I r	eL	19 51 23					Barely discernible long flat waves, dying energy of the chief phase of a distant shock. Registered in N-S component only.
			F	20 03 23					
21	23 Dec.	I d?	i P	21 15 55					Sharp beginning of rapid waves dying away and merging in longer waves on N-S seismogram.
			i LM	21 16 02					
			C	indefinite					
			F	21 16 54					
22	23 Dec.	I r	i P	21 15 55					Record exhibits the appearance of a seismogram of a feeble local shock but if this is true it masks the beginning of very feeble distant shock. The writer thinks that two shocks were registered for the beginning seems too sharp for a distant shock of so feeble energy. The distant shock was registered, in the later phases, only in the N-S component.
			S ?	15 57					
			L	25 27					
			F	22+ — —					

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1911			h m s	s	μ	μ	μ	
23	26 Dec.	I d	i P	3 18 10					In vertical component shock merely caused a shift of the pen; no phases discernible.
			i LM	18 12	½	12	10		
			C	18 15					
			F	19 26					
24	31 Dec.	II-III d	i P_V	21 40 39					This shock was too energetic to be recorded perfectly by this seismograph. The pen performed a series of chattering swings for about ten seconds following the beginning of strong motion. N-S record is defective.
			i P_E	40 43					
			i L_V	40 42					
			i L_E	40 45					
			M	40 46		250+			
			C	40 58					
			F	42± —					
	1912								
25	4 Jan.	I d	i P	1 38 31					No record in vertical component, sheet being changed.
			i LM	38 34	½	19	20		
			C	38 40					
			F	39 —					
26	4 Jan.	I u	e	15 54 42					Only the dying waves of the chief phase recorded in the E-W component. Feeble motion cut off by changing of sheets. No record in vertical component.
			eL	16 04 05					
			F	17 33±					
27	5 Jan.	I d	i P_E	3 52 50	¾				Vertical record defective.
			i P_N	52 51	½				
			i S	53 08	1½				
			i LM_1	53 26	3-4	24			
			M_{E2}	53 30	3-4	29			
			M_{N2}	53 45			—		
			C	53 53					
			F	4 02 —					
28	15 Jan.	I v	e_N	18 34 27	2-4				Vague thickening of pen trace from beginning to end. Sharp motion but very small amplitude.
			e_E	34 41					
			F	38+					
29	15 Jan.	I-II d	i P_V	19 08 04					
			i P_E	08 05					
			S_{VN}	08 08					
			i S_E	08 10					
			i LM_{E1}	08 15	2	33			
			i L_V	08 16					
			i L_N	08 17					
			M_V	08 17				6	
			M_{N1}	08 19	2-4		20		

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
29	15 Jan.	I-II d	M_{E2}	19 08 25	2	34			
			M_{N2}	08 27	2-4		29		
			M_{E3}	08 30	2	24			
			M_{N3}	08 40	2-4		34		
			C	08 55					
			F	14.5 —					
30	15 Jan.	I v	i_N	19 38 47					In E-W component only waves of chief phase are registered. No record in vertical component.
			e_E	38 58					
			i L_N	38 58	1½				
			C	indefinite					
			F	40± —					
31	21 Jan.	III d	i P	14 07 19					The maximum probably exceeded the range of the writing point: all the remainder of the chief phase consists of chattering swings limited in amplitude by the safety stops.
			i LM	07 22	½-¾	445	571	50	
			C	07 30					
			F	08+ —					
32	21 Jan.	I d	i P	14 49 52					
			i LM	49 55	½	6	6		
			F	50 03					
33	21 Jan.	I d	i P	16 54 41					
			i P_V	54 42					
			i LM	54 43	½	12	11		
			i LM_V	54 45	½				
			C	54 47					
			F	55+ —					
34	31 Jan.	I d	e_N	2 04 03					Not registered in vertical component.
			e_E	04 08					
			i L_N	04 10					
			F	04 52					
35	31 Jan.	I r	i P_N	20 17 41					In the E-W component barely visible long waves of the chief phase begin about 20^h 26^m and end about 20^h 40^m.
				20 46 26					Larger motion.
			F	21 25±					No motion in vertical component.

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
36	9 Feb.	I d	i P	17 27 20					
			i P_V	27 22					
			i LM	27 22	½	11	11		
			i LM_V	27 24				3	
			C	27 28					
			F	27.7					
37	12 Feb.	I d	eP	4 13 50					No record in vertical component.
			i LM	13 52	½	6	7		
			C	13 53					
			F	14 —					
38	20 Feb.	II d	i P	6 14 55					
			i LM	14 57	½-¾	180	177	31	
			C	15 11					
			F	16 19					
39	23 Feb.	I d	eP	6 41 27					Seen on the vertical seismogram simply as a displacement of the pen trace beginning at $6^h\ 44^m\ 27^s$. No phases.
			i L	41 33					
			C	41 45					
			F	indefinite					
40	28 Feb.	I d	i P	4 00 33					
			i P_V	00 31					
			i LM_V	00 34	½			4	
			i LM	00 35	½	18	23		
			C	00 38					
			F	01± —					
41	28 Feb.	I d	i P	4 07 44					Unmeasurable record in the vertical component.
			i LM	07 45.5					
			C	07 48					
42	29 Feb.	I d	i P	8 34 38					
			i LM	34 41	½	18	14	—	
			C	34 44					
			F	34 56					
43	8 Mar.	II-III d							Moderately severe shock felt at the Lick Observatory. The driving clocks have run down. The time was roughly $9^h\ 48^m$; reported by some at $9^h\ 40^m$.
44	11 Mar.	II r	eP	10 21 03					Probably later than true beginning of shock owing to friction.
			eS	24 19					
			L	26 10					
			M_1	27 27	12		52		Registered in N-S component only.
			M_2	28 15	12		45		
			F	11 43+					

No.	Date	Charac.	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_V	Remarks
	1912			h m s	s	μ	μ	μ	
45	12 Mar.	I d	eP	13 41 55					No record in vertical component.
			i LM	13 41 58	½				
			C	indefinite					
			F	13 42 33					
46	17 Mar.	II d	i P	22 26 48					
			i S ?	26 49					
			i LM	26 51	½-¾	54	57	10	
			C	26 58					
			F	27 38					
47	22 Mar.	I d	i M	2 20 29					Perhaps barely perceptible on vertical seismogram.
			i L	20 31					
			C	indefinite					
				"					
48	22 Mar.	I d	i P	7 56 18					
			i LM	56 19.5	½	30	16	6	
			C	indefinite					
			F	56 54					