THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

April 1, 1923, to September 30, 1923

BY

JAMES B. MACELWANE
AND
WILLIAM L. APPLEFORD

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CONTENTS

Symbols and Notations

1. *Character of the Earthquake—*

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

d (terrae motus domesticus)	Local shock (origin less than 100 kilometers distant).
v (terrae motus vicinus)	Near shock (origin from 100 to 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 or teleseism (origin more than 5,000 kilometers distant).

2. *Phases of the Seismogram—*

P (undae primae)	Normal first phase, or first preliminary tremors.
$\bar{P}$	Individual, or upper first preliminary tremors.
PR_n	Waves n-times reflected at the earth's surface.
S (undae secundae)	Normal second phase, or second preliminary tremors.
$\bar{S}$	Individual, or upper 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, at the beginning of the surface phase.
M (undae maximae)	Shorter waves of large amplitude in the surface phase.
M_n	Greatest motion in the maximum group.
C (coda)	Tail or end portion.
F (finis)	End of descernible 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.), + toward the north, east or zenith, − toward the south, west or nadir.
A_E	E-W component of A.
A_N	N-S component of A.
A_Z	Vertical component of A.

4. *Time—*

O (origin)	Time of shock at point of origin.

THE BERKELEY STATION

CONSTANTS

Latitude and longitude of the center of the seismographic room:

$\varphi = 37° 52' 15''.9$ 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

Date	Apparatus	Component	V	T_o	ϵ	$\frac{r}{T_o^2}$
1923						
Mar. 21	Bosch-Omori 100 kg	E	45	13.9	8.2	0.0050
	"	N	55	12.2	5.5	0.0035
	Wiechert 80 kg.	Z	43	5.4	5.2	0.0043
Apr. 20	B.-O. 100 kg.	E	45	13.6		
	"	N	58	12.8		
	W. 80 kg.	Z	43	5.6		
July 4	B.-O. 100 kg.	E	41	13.8	5.5	0.0029
	"	N	56	11.9	4.9	0.0041
	W. 80 kg.	Z	45	5.5	6.9	0.0030
Aug. 16	B.-O. 100 kg.	E	43	14.1	5.0	0.0031
		Changed	47	14.3	8.0	0.0026
	"	N	52	12.7	5.0	0.0033
	W. 80 kg.	Z	49	5.5	6.7	0.0040
		Changed			6.9	0.0033

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No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1923			h. m. s.	s.	μ	μ	μ	
1	Apr. 4	Id	P	00 59 53					Local shock.
			F	±00 59 57					
2	Apr. 13	Ir	P_E	15 40 05					Off east coast of Kamchatka.
			S_E	15 47 25					
			PS_E	15 47 37	20				
			SR_{3E}	15 53 25					
			L_E	15 57 45	24				
			iM_E	15 59 05					
			M_{E1}	15 59 14	18				
			M_{E2}	15 59 23	18				Sheets taken off instruments.
3	Apr. 29	IIv	iP_Z	2 34 12	02.5				△=578 km.
			eP_E	2 34 12					
			eP_N	2 34 13					
			eS_Z	2 34 37					
			eS_E	2 34 37					
			eS_N	2 34 37					
			S_{Z1}	2 34 39	02 5				
			S_{E1}	2 34 39	02				
			L_Z	2 35 12					
			L_{N1}	2 35 15	07		30		
			L_{N2}	2 35 17	07		15		
			F	3 00 ±					
4	May 4	IIr	eP_{EZ}	22 32 43					△=29°9; Alaska.
			eP_N	22 32 52					
			PR_{1Z}	22 33 24					
			PR_{2Z}	22 33 56					
			eS_E	22 37 38					
			iS_{N1}	22 37 42	18				
			iS_{E1}	22 37 46	20				
			iS_{Z1}	22 37 53	17				
			iS_{Z2}	22 38 10	17				
			eL_Z	22 40 19					
			eL_E	22 40 29					
			eL_N	22 40 32					
			M_{E1}	22 40 52	10	40			
			M_{N1}	22 40 56	09		20		
			M_{Z1}	22 40 58	09			50	
			M_{E2}	22 41 02	10	40			
			M_{N2}	22 41 05	09		20		
			M_{Z2}	22 41 07	09			75	
			M_{E3}	22 41 12	10	65			
			M_{Z3}	22 41 16	09			75	
			M_{E4}	22 41 22	10	55			
			M_{Z4}	22 41 25	09			50	
			F	23 29 ±					
5	May 5	IIr	P_{ENZ}	4 32 42					△=29°
			P_{E1}	4 32 43	03				Epicenter 158° W 54° N.
			PR_{1Z}	4 33 18					
			PR_{2EN}?	4 33 44					
			PR_{3Z}	4 33 58					
			S_{E1}	4 37 46	20				
			S_{E2}	4 38 06	20				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1923			h. m. s.	s.	μ	μ	μ	
5	May 5 (contd.)	IIr	eL_N	4 38 20					
			eL_E	4 39 42					
			L_{E1}	4 39 55	26				
			L_{E2}	4 40 08	28				
			iM_N	4 40 20					
			iM_E	4 40 26					
			iM_Z	4 40 33					
			M_{E1}	4 40 33	12	30			
			M_{E2}	4 40 38	12	40			
			M_{Z1}	4 40 38	10			65	
			M_{Z2}	4 40 43	10			65	
			F	5 57 ±					
6	May 5	Iv	eP_N	15 05 25					Probably off Cape Mendocino.
			eS_N?	15 06 27					
			eS_E	15 06 31					
			eL_E	15 06 35					
			L_{E1}	15 06 44	18				
			eL_N	15 06 47					
			L_{E2}	15 06 53	12				
			L_{N1}	15 06 55	16				
			L_{N2}	15 07 03	12				
			iM_E	15 07 49					
			M_{E1}	15 07 55	12				
			M_{E2}	15 08 01	08				
			M_{N1}	15 08 05	04		10		
			M_{N2}	15 08 09	04		10		
			F	15 22 ±					
7	May 23	Ir	P_Z	22 46 54					△=40°5
			P_{Z1}	22 46 58	03				
			P_{Z2}	22 47 01	03				
			PR_{3Z}?	22 50 19					
			PR_{3Z1}	22 50 20	02				
			PR_{3Z2}	22 50 21	02				
			S_E	22 53 08					
			S_N	22 53 14					Break in record.
			S_{E1}	22 53 18	20				
			S_{E2}	22 53 28	18				
			SR_{2E}	22 56 34					
			eL_E	22 59 06					
			eM_E	23 01 56					
			M_{E1}	23 05 14	18				
			M_{E2}	23 05 32	18				
			F	23 17 ±					
8	June 1	Iu	P_Z	16 27 15					△=73°
			eP_E	16 27 20					
			S_Z	16 36 40					
			S_{NE}	16 36 46					
			eL_N	16 46 20					
			L_{N1}	16 46 33	28				
			eL_Z	16 48 20					
			eM_N	16 50 40					
			M_{N1}	16 50 41	14				
			F						Merges with 9.

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1923			h. m. s.	s.	μ	μ	μ	
9	June 1	Iu	eP_Z	19 18 10					△=73°
			eL_Z	19 39 40					
			F						Merges with 10.
10	June 1	Iu	eP_Z	20 26 40					
			eL_Z	20 42 40					
			F	21 20 ±					
11–21, incl.	June 2	Id							Series of local shocks, for which the time determination cannot be made due to the fact that the timing device was out of order.
	June 3	Id							
	June 4	Id							
	June 4	Id							
	June 4	Id							
	June 6	Id							
	June 7	Id							
	June 7	Id							
	June 7	Id							
	June 18	Id							
	June 19	Id							
22	July 12	Iu	eP_Z	3 27 27					△=76°2
			eL_{NEZ}	3 50 04					
			F	4 30 ±					
23	July 13	I	iP_N	11 36 25					
			eP_E	11 36 35					
			i_N	11 36 43					
			e_N	11 48 43					
			e_N	12 20 34					
			F	12 50 ±					
24	July 16	I	e_N	14 01 29					Nothing appears on the vertical component.
			eL_{NE}	14 18 03					
			F	14 56 ±					
25	July 17	Id	iP_{NE}	1 03 03					Local.
			F	1 05 03					
26	July 22	Iu	eP_{NE}	14 26 56					
			eS_{NE}	14 33 23					△=45°; Epicenter Aleutian Islands.
			eL_N	14 38 35					
			M_{N1}	14 39 19	22		15		
			M_{N2}	14 43 53	09		10		
			F	16 30 ±					
27	July 23	IIv	iP_Z	7 31 43					△=600 km. ca.
			eP_E	7 31 43					
			eP_N	7 31 44					
			iP_Z?	7 32 09					
			iP_E?	7 32 11					
			i_N	7 32 41	03		15		
			SL_E?	7 32 49					
			SL_{NZ}	7 32 53					
			M_{E1}	7 33 12	04	60			
			M_{N1}	7 33 14	05		100		

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1923			h. m. s.	s.	μ	μ	μ	
	July 23 (contd.)	IIv	M_{E2}	7 33 15	06	105			
			M_{N2}	7 33 18	04		120		
			M_{E3}	7 33 19	06	95			
			M_{N3}	7 33 22	04		135		
			M_{E4}	7 33 25	05	120			
			M_{N4}	7 33 26	04		150		
			M_{N5}	7 33 31	07		65		
			M_{E5}	7 33 33	06	180			
			M_{E6}	7 33 44	11	195			
			M_{N6}	7 33 47	06		70		
			M_{E7}	7 33 55	11	170			
			M_{Z1}	7 33 56	04			60	
			M_{Z2}	7 34 12	06			70	
			M_{N7}	7 34 13	09		75		
			M_{Z3}	7 34 15	06			75	
			M_{Z4}	7 34 18	05			80	
			F	8 15 ±					
28	July 31	I	e_N	15 30 34					
			e_E	15 31 04					
			M_E	15 37 12	07	05			
			F	16 00 ±					
29	Aug. 16	II	eP_{NE}	18 44 49					
			eSL_E?	18 45 44					
			iSL_E?	18 45 48	03	10			
			M_N	18 46 01	04		07		
			F	18 52 ±					
30	Aug. 23	I	e_N	5 32 09					
			F	5 47 ±					
31	Aug. 25	Iv	eP_N	11 21 31					SL-P=20 sec.
			e_E	11 21 40					Lick △=95 km.
			iSL_N	11 21 51					These △s indicate San Benito.
			iSL_E	11 21 52					
			i_E	11 22 02					
			i_N	11 22 05					
			i_N	11 22 27					
			F	11 25 ±					
32	Aug. 28	IIIr	iP_N	23 19 08	05				△=17°6; western Mexico.
			eP_E	23 19 08					
			i_N	23 19 20					
			eS_E?	23 22 27					
			eL_E?	23 23 06					
			eL_N	23 23 28					
			M_{E1}	23 23 50	26	+ 80			
			M_{E2}	23 24 04	22	+ 135			
			M_{E3}	23 24 14	20	− 165			
			M_{E4}	23 24 22	17	+ 110			
			M_{E5}	23 24 32	18	− 110			
			M_{E6}	23 25 33	14	− 110			
			M_{E7}	23 25 40	14	+ 85			
			M_{E8}	23 25 47	12	− 85			

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No.	Date	Character	Phase	Time G. M. C. T. h.	m.	s.	Period	Amplitude AE μ	AN μ	AZ μ	Remarks
	1923						s.				
32	Aug. 28 (contd.)	IIIr	M_{N1}	23	26	12	15		75		
			M_{N2}	23	26	19	13		55		
			M_{E9}	23	26	19	13	130			
			M_{E10}	23	26	25	12	80			
			F	0	20	±					
33	Sept. 1	IIIu	P_{ENZ}	3	10	15					S-P = 9m 53s △ = 75° Destructive quake, Tokio and Yokohama, Japan.
			P_{Z1}	3	10	23	03			20	
			P_{E1}	3	10	31	03				
			P_{Z2}	3	10	35	07.5			10	
			P_{N1}	3	10	37	03				
			P_{N2}	3	10	40	03				
			P_{Z3}	3	10	43	02			10	
			P_{E2}	3	10	44	03				
			P_{Z4}	3	11	34	03			10	
			P_{N3}	3	11	41	06				
			P_{E3}	3	11	43	05				
			P_{N4}	3	11	47	04				
			P_{E4}	3	11	48	05				
			PR_{1N1}	3	13	20	08				
			PR_{1N2}	3	13	28	04				
			PR_{1Z1}	3	13	31	07			10	
			PR_{1N3}	3	13	32	08				
			PR_{1E1}	3	13	32	12				
			PR_{1Z2}	3	13	35	03			10	
			PR_{1E2}	3	13	44	10				
			PR_{1Z3}	3	13	50	03				
			PR_{2Z1}	3	15	15	10				
			PR_{2N1}	3	15	15	08				
			PR_{2N2}	3	15	23	10				
			PR_{2E1}	3	15	47	10				
			PR_{2EZ}	3	15	57	10				
			S_{N1}	3	19	59	16		15		
			S_{Z1}	3	20	00	12				
			S_{E1}	3	20	01	28	130			
			S_{Z2}	3	20	12	22				
			S_{N1}	3	20	15	18		65		
			S_{E2}	3	20	29	12	45			
			S_{N2}	3	20	33	12		10		
			S_{E3}	3	20	41	20	45			
			S_{N3}	3	20	45	24		110		
			S_{E4}	3	21	01	20	90			
			S_{E5}	3	21	21	12	12			
			S_{E6}	3	21	33	24	95			
			?E	3	23	27	12	10			
			?E	3	23	39	14	10			
			?Z	3	23	41	07				
			?Z	3	23	48	10				
			SR_{1Z1}	3	25	20	14				
			SR_{1N1}	3	25	23	22				
			SR_{1E1}	3	25	27	24				
			SR_{1N2}	3	25	45	24				
			iL_{N1}	3	29	15	18		17		
			L_{N2}	3	29	33	08		10		
			L_{N3}	3	29	41	15		65		

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T. h.	m.	s.	Period	Amplitude AE μ	AN μ	AZ μ	Remarks
	1923						s.				
33	Sept. 1 (contd.)	IIIu	iL_{E1}	3	30	01	14	25			
			L_{N4}	3	30	02	17		90		
			iM_{N1}	3	30	11					
			L_{E2}	3	30	15	22	110			
			M_{N2}	3	30	19	16		55		
			L_{E3}	3	30	37	14	25			
			L_{E4}	3	30	51	14	75			
			M_{N3}	3	30	35	12		90		
			M_{N4}	3	30	47	12		110		
			M_{N5}	3	30	49	10		130		
			M_{N6}	3	31	09	08		90		
			M_{N7}	3	31	31	14		280		
			M_{N8}	3	31	53	08		270		
			M_{N9}	3	32	02	14		75		
			M_{N10}	3	32	17	09		20		
			M_{N11}	3	32	25	15		120		
			M_{N12}	3	32	33	08		270		
			M_{N13}	3	32	41	08		380		
			W_{2E}	4	28	52	20	106			
			iE	4	29	02	20	114			
			iE	4	29	12	20	76			
			F	7	09	±					
34	Sept. 2	IIu	iP_Z	2	58	15					S-P = 9m 33s; whence △ = 75°. This is the distance from Berkeley to Tokio. From 7h 23m to 7h 35m and from 7h 38m to 7h 53m there appear on E and, to a less extent on Z, quite regular waves of period 17–19 seconds and of amplitude 10μ to 30μ.
			eS_E	3	07	48					
			iS_{NE}	3	07	58	14			07	
			i_N	3	08	05	15			20	
			i_N	3	08	13	18			31	
			eS_Z	3	08	15					
			SR_{1N}	3	12	51	18				
			eL_{NE}	3	17	49					
			M_{NE1}	3	18	45	18	20		37	
			M_{NE2}	3	18	54	19	20		37	
			M_{N3}	3	19	04	20			53	
			M_{E3}	3	19	05	18	12			
			M_{N4}	3	19	14	20			68	
			M_{E4}	3	19	14	18	31			
			M_{E5}	3	19	22	20	09			
			M_{N5}	3	19	23	18			32	
			M_{N6}	3	19	31	17			23	
			M_{E6}	3	21	15	18	23			
			F	5	32	±					
35	Sept. 2	Id	iP_{NE}	6	19	51					S-P = 7s. △ = 54 km.
			iSL_E	6	19	58					
			iSL_N	6	19	59					
			iM_Z	6	20	01					
			F_Z	6	20	±					
36	Sept. 2	I	e_N	10	58	50					
			i_E	10	58	54					
			i_N	10	58	55					
			F	11	13	±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1923			h. m. s.	s.	μ	μ	μ	
37	Sept. 9	Iu	ePR_{1EZ}	22 22 48					Waves of very small amplitude throughout the record. △=109°.5
			ePR_{1N}	22 22 53					
			$\overline{PcPcPc}$						
			P_{EN}	22 32 13					
			L_{NE}	23 00 13					
			M_{NEZ}	23 09 13					
			F	23 48 ±					
38	Sept. 19	Iv	iP_{ENZ}	22 54 00					S-P=13ˢ; △=110 km.=68 mi.=1°. The Epicenter was on the San Andreas Fault near Corralitos, Santa Cruz Co., Calif. See Bull. Seism. Soc. Amer., vol. 13, No. 3, Sept., 1923, pp. 109–112.
			iS_{EN}	22 54 13					
			iS_Z	22 54 14					
			L_{ENZ}	22 54 18					
			iM_N	22 54 20					
			iM_{EZ}	22 54 21					
			iM_{Z2}	22 54 23					
			F	22 57 ±					
39	Sept. 22	Iu	iPR_{1NZ}	21 07 09					△=111°.5; Persia.
			iPR_{1E}	21 07 31					
			eL_{EZ}	21 50 00					
			eL_N	21 52 00					
			M_{NEZ}	22 00 00					
			F	22 50 ±					
40	Sept. 25	I	eL_N	20 55 08					Preliminaries, if present, are masked by microseisms.
			e_E	20 59 08					
			F	9 28 ±					
41	Sept. 30	I	e_Z	1 31 07					
			i_Z	1 31 43	04				
			e_{E1}?	1 45 55	26				
			e_{Z1}	1 46 07	20				
			e_{Z2}	1 46 27	20				
			M_{Z1}	1 56 07	15				
			M_{Z2}	1 56 22	15				
			F	2 53 ±					

THE LICK OBSERVATORY STATION

CONSTANTS

Constants of the Station

Latitude and longitude of the center of the seismographic room:

$\varphi = 37° 20' 24''.5$ 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

Date	Apparatus	Component	V	T_o	ε	$\frac{r}{T^2}$
Apr. 3	Wiechert 160 Kg. H.	E	86	9.3	3.8	0.0052
	Wiechert 80 Kg. V.	Z	49	3.3	5.7	0.0065
Apr. 14	160 Kg. H.	E	86	9.8	4.1	0.0038
		N	86	8.0	3.1	0.0061
	80 Kg. V.	Z	49	3.3	5.7	0.0065
June 4	160 Kg. H.	E	87	9.0	4.0	0.0034
		N	78	8.0	2.6	0.0046
	80 Kg. V.	Z	50	3.3	3.8	0.0174
June 30	160 Kg. H.	E	76	9.5	3.7	0.0031
		N	88	7.5	5.0	0.0046
	80 Kg. V.	Z	43	3.5	7.2	0.0090
July 31	160 Kg. H.	E	102	10.5	4.3	0.0028
		N	82	9.0	4.8	0.0037
	80 Kg. V.	Z	56	3.2	6.7	0.0130
Aug. 29	160 Kg. H.	E	95	9.8	3.2	0.0033
		N	81	8.5	2.8	0.0055
	80 Kg. V.	Z	45	3.7	7.2	0.0085

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1923			h. m. s.	s.	μ	μ	μ	
1	Apr. 4	IIr	P_{ENZ}	16 35 49	03				△=31°.5.
			eS_{EN}	16 40 54					
			S_{E1}	16 41 06	10	10			
			S_{E2}	16 41 16	07	10			
			eL_{EZ}	16 43 09					
			L_{E1}	16 43 09	17				
			iM_{EZ}	16 44 05					
			M_{E1}	16 44 05	05	20			
			M_{Z1}	16 44 05	18				
			M_{E2}	16 44 41	08	65			
			F	19 36 ±					
2	May 1	Id	$i\bar{P}_{ENZ}$	00 46 20					Evidently a shock of local origin. $\bar{S}$, L, and M of approximately same amplitude and of such short period as to blur the record.
			F	00 46 27					
3	May 2	Id	$i\bar{P}_{EN}$	00 08 40					Local.
			F	00 08 44					
4	May 2	Id	$i\bar{P}_{EN}$	00 14 21					Local.
			F	00 14 26					
5	May 2	Id	$i\bar{P}_{EN}$	00 28 35					Local.
			F	00 28 40					
6	May 14	Id	$i\bar{P}_{ENZ}$	19 54 38					Local.
			F	19 54 43					
7	May 14	Id	$i\bar{P}_{EN}$	20 49 53					Local.
			F	20 49 55					
8	May 14	Id	$i\bar{P}_{EN}$	22 35 34					Local.
			F	22 35 38					
9	June 14	Id	$i\bar{P}_{EN}$	23 57 36					Local.
			F	23 57 45					
10	June 16	Id	$i\bar{P}_{EN}$	17 39 16					Local.
			F	17 39 21					
11	June 16	Id	$i\bar{P}_{EN}$	17 39 34					Local.
			F	17 39 36					
12	June 16	Id	$\bar{P}_{EN}$	20 41 54					
			$\bar{S}_{EN}$	20 42 17					
			F	20 44 00					
13	June 20	Id	$i\bar{P}_{EN}$	19 50 26					Local.
			F	19 50 28					
14	June 22		eP_E?	7 17 26					P and S phases obscured by microseisms.
			eL_E	7 23 26					
			L_N	7 42 26					
			F	8 43 ±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1923			h. m. s.	s.	μ	μ	μ	
15	June 22	Id	$i\bar{P}_{EN}$	21 37 46					Local.
			F	21 37 48					
16	June 23	Id	$i\bar{P}_{EN}$	7 41 40					Local.
			F	7 41 42					
17	June 23	Id	$i\bar{P}_{EN}$	9 15 36					Local.
			F	9 15 37					
18	June 23	Id	$i\bar{P}_{EN}$	13 05 22					Local.
			F	13 05 25					
19	June 24	Id	$\bar{P}_{EN}$	20 52 39					Local.
			F	20 52 41					
20	June 25	Id	$\bar{P}_{EN}$	00 35 01					Local.
			F	00 35 04					
21	June 25	Id	$\bar{P}_{EN}$	3 32 16					Local.
			F	3 33 18					
22	June 25	Id	$\bar{P}_{EN}$	14 45 30					Local.
			F	14 45 34					
23	June 26	Id	$\bar{P}_{EN}$	5 29 33					Local.
			F	5 2 35					
24	June 28	Id	$\bar{P}_{EN}$	16 10 46					Local.
			F	16 10 50					
25	July 3	Id	$\bar{P}_{EN}$	15 01 03					Local; large number of locals of swarm type recorded.
			F	16 01 07					
26	July 10	Id	$\bar{P}_{EN}$	00 57 53					△=14 km.; local.
			M	00 57 55					
			F	00 57 58					
27	July 18	Id	$\bar{P}_{EN}$	16 16 22					Local; △=23 km.
			LM	16 16 25					
			F	16 16 31					
28	July 19	Id	$\bar{P}_{EN}$	00 17 08					Local.
			F	00 17 10					
29	Aug. 3	Id	$\bar{P}_{EN}$	21 17 49					Local; △=14 km.
			M_{EN}	21 17 51					
			F	21 18 00					
30	Aug. 14	Id	$\bar{P}_{EN}$	16 25 33					Local.
			F	16 25 42					
31	Aug. 15	Id	$\bar{P}_{EN}$	16 23 15					Local; △=44 km.
			M	16 23 21					
			F	16 23 29					
32	Aug. 15	Id	$\bar{P}_{EN}$	16 33 15					Local.
			F	16 33 21					
33	Aug. 15	Id	$\bar{P}_{EN}$	16 36 34					Local; △=22 km.
			M_{EN}	16 36 57					
			F	16 37 07					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1923			h. m. s.	s.	μ	μ	μ	
34	Aug. 16	Id	$\bar{P}_{EN}$	1 21 21					Local.
			F	1 21 23					
35	Aug. 16	Id	$\bar{P}_{EN}$	19 00 00					Local.
			F	19 00 07					
36	Aug. 22	Id	$\bar{P}_{EN}$	16 49 51					Local; △=37 km.
			M_{EN}	16 49 56					
			F	16 49 57					
37	Aug. 24	Id	$\bar{P}_{EN}$	21 44 06					Local; △=22 km.
			M_{EN}	21 44 09					
			F	21 44 11					
38	Aug. 24	Id	$\bar{P}_{EN}$	23 19 50					Local; △=14 km.
			M_{EN}	23 19 52					
			F	23 19 56					
39	Aug. 25	Id	$\bar{P}_{EN}$	11 30 21					
			L_{EN}	11 30 31					
			M_{N1}	11 30 33		1	10		
			M_{E1}	11 30 33	01	05			
			F	11 33 13					
40	Aug. 26	Id	$\bar{P}_{EN}$	00 22 56					Local.
			F	00 22 59					
41	Aug. 26	Id	$\bar{P}_{EN}$	18 27 07					Local.
			F	18 27 14					
42	Aug. 26	Id	$\bar{P}_{EN}$	20 27 18					Local.
			F	20 27 20					
43	Aug. 26	Id	$\bar{P}_{EN}$	20 28 04					Local.
			F	20 28 13					
44	Sept. 1	IIIu	eP_E?	3 10 17					S-P=10m △=79°. This is too great a distance and too great an interval. The distance from Mt. Hamilton to the actual epicenter in the Bay of Sagami is only 76°. Hence it is probable that the slight movement preceding, is to be considered eS_{EN}. But it is so masked by movements beginning at 7h 9m 5s that it cannot be separated.
			eP_Z	3 10 21					
			eP_N	3 10 25					
			iP_{Z1}	3 10 29					
			iP_N	3 10 36					
			iP_{Z2}	3 10 39	02			06	
			iP_E	3 10 40	10	05			
			iP_{Z3}	3 10 48	02.5			06	
			PR_{1Z}	3 13 19					
			iS_{ENZ}	3 20 17	31	370	40		
			SR_{1EN}	3 25 15					
			iL_N	3 30 09					
			iL_E	3 30 21					
			eL_Z	3 30 36					
			iM_E	3 31 50					
			iM_N	3 31 52					
			M_{N1}	3 32 03	17		640		
			M_{N2}	3 32 12	17		600		
			M_{N3}	3 33 15	17		680		
			M_{E1}	3 33 18	15	220			
			M_{N4}	3 33 23	17		640		
			F	7 24 ±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1923			h. m. s.	s.	μ	μ	μ	
45	Sept. 2	Iu	eP_E	22 58 13					△=72°3.
			P_{E1}	22 59 15	06				
			S_{EN}	23 07 41	07				
			S_{E1}	23 07 51	02	10			
			F	23 39 ±					
46	Sept. 6	Id	$\bar{P}_{EN}$	6 46 13					Local; △=14 km.
			M_{EN}	6 46 15					
			F	6 46 20					
47	Sept. 9	Id	$i\bar{P}_{EN}$	17 11 55					Local.
			F	17 12 02					
48	Sept. 9	Id	$\bar{P}_{EN}$	18 09 02					Local.
			F	18 09 12					
49	Sept. 13	Id	$\bar{P}_{EN}$	2 50 54					Local.
			M_{EN}	2 50 57					
			F	2 51 07					
50	Sept. 19	IId	$i\bar{P}_{NZ}$	22 53 50					$\bar{S}$-$\bar{P}$=3m; △=0°3=33 km.
			$i\bar{P}_E$	22 53 51					
			$i\bar{S}L_{NE}$	22 53 53					
			iM_{E1}	22 53 56	04.5	15			
			iM_{N1}	22 53 56	04.5		07		
			M_{E2}	22 53 58	04.5	25			
			M_{N2}	22 53 58	04.5		15		
			M_Z	22 53 58				25	
			M_{E3}	22 54 00	04.5	15			
			M_{N3}	22 54 00	04.5		20		
			F	22 59 00					
51	Sept. 21	Id	$\bar{P}_{EN}$	2 11 23					Local.
			F	2 11 31					
52	Sept. 22	Id	$i\bar{P}_{EN}$	17 23 44					Local.
			F	17 23 55					
53	Sept. 27	Id	$\bar{P}_{EN}$	00 22 45					Local; △=22 km.
			M_{EN}	00 22 48					
			F	00 22 53					