THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

April 1, 1929, to September 30, 1929

BY

PERRY BYERLY

AND

ROBERT DYK

BULLETIN OF THE SEISMOGRAPHIC STATIONS, VOL. 2, NO. 18

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LICK OBSERVATORY STATION, MOUNT HAMILTON, CALIFORNIA

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VOLUME 1. 1912–1924

Records from October, 1910, to September, 1920 inclusive

THE REGISTRATION OF EARTHQUAKES—

AT THE BERKELEY STATION ONLY:

No. 1. From October 30, 1910, to March 31, 1911.
No. 2. From April 1 to September 30, 1911.

AT THE BERKELEY STATION AND THE LICK OBSERVATORY STATION:

No. 3. From May 23 to September 30, 1911.
No. 4. From October 1, 1911, to March 31, 1912.
No. 5. From April 1 to September 30, 1912.
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No. 19. From April 1, 1919, to September 30, 1919.
No. 20. From October 1, 1919, to March 31, 1920.
No. 21. From April 1, 1920, to September 30, 1920.

THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

APRIL 1, 1929, TO SEPTEMBER 30, 1929

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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 (longitudinal).
P′	First preliminary tremors which have penetrated the core of the earth.
PR_n	Waves n times reflected at the earth's surface.
S (undae secundae)	Second phase, or second preliminary tremors (transverse).
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.
PPS	Waves twice reflected at the earth's surface, having been longitudinal on two branches of the path and transverse on one branch.

In general a bar over two letters denoting types of waves indicates refraction. The subscript $_c$ denotes the boundary at about 2900 km. depth between the metallic core and the middle shell which surrounds it. Thus:

$\overline{S_cP_cS}$	Waves which have penetrated the core, having been transverse before entering and after leaving the core, and longitudinal within the core.
$\overline{P_cP_c}$ $\overline{P_cP}$	Waves refracted at the core boundary into the core, reflected once at this boundary while within the core and again refracted out of the core, having remained longitudinal on all branches of the path.
L (undae longae)	Long waves of surface phase preceding M.
M (undae maximae)	Shorter and more regular waves of large amplitude in the surface phase.
M_n	Greatest motion in the surface phase.
C (coda)	Tail or end portion.
F (finis)	End of discernible movement.

For local earthquakes a special notation is used:

$\overline{P}$	The longitudinal wave which has traveled its whole path in the surface layer or crust of the earth.
$\overline{S}$	The transverse wave which has traveled its whole path in the surface layer of the earth.
P^*	The longitudinal wave which has travelled the horizontal portion of its path in the intermediate layer.
S^*	The corresponding transverse wave.

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 earth motion, measured from the median line in microns ($\mu=\frac{1}{1000}$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_0	e	$\frac{r}{T_0^2}$
1929						
July	Bosch-Omori 100 kg.	E	48	11.7	3	0.002
	"	N	55	13.0	6	0.003
	Wiechert 80 kg.	Z	51	4.9	5	0.004

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
1	Apr. 7	I	eL$_N$	19 50 08	22				
			eL$_E$	19 50 08	22				
2	Apr. 8	I	e$_N$?	10 37 42					
			e$_{NZE}$	10 39 42					
3	Apr. 27	I	e$_{NE}$	12 06 22					Slight trace.
4	May 1	Iu	e$_N$	15 55 56					Destructive in Persia.
			e	16 02 19					
			e$_Z$	16 19 39					
			e$_E$	16 24 39					
			eL$_N$	16 29 09					
			e	16 34 09					Beginning regular group.
			e$_{NE}$	16 36 39					
			e$_Z$	16 41 39					Largest amplitude on z.
5	May 20	Iu	eP$_N$	05 00 28	4				Severe in Turkey.
			eP$_Z$	05 00 29	4				
			eP$_E$	05 00 29					
			e$_Z$	05 03 00	8				
			e$_E$	05 05 58					
			e$_N$	05 06 49					
			e$_N$	05 09 56					
			e$_E$	05 10 52	8				
			e$_Z$	05 11 29	20				
			e$_N$	05 11 55	10				
			e$_Z$	05 13 57					
			e$_N$	05 14 11	8				
			e$_E$	05 19 26	15				
			e$_Z$	05 19 46	20				
			e$_N$	05 26 07	6				
			e$_N$	05 57 11	10				
			e$_E$	06 09.8					
			e$_N$	06 10 35	8				
			e$_Z$	06 16 22	10				
			e$_Z$	06 21 26	10				
			F	06 52±					
6	May 26	IIIr	eP$_Z$	22 43 26	5				
			e$_N$	22 43 27	6				Very weak.
			e$_N$	22 43 45	4				
			e$_E$	22 43 45	4				Felt in British Columbia.
			i$_N$	22 43 49	4				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
6	May 26 (contd.)	IIIr	e$_E$	22 43 51	3				
			e$_E$	22 43 56	6				
			e$_Z$	22 43 56	6				
			i$_Z$	22 44 17	4				
			i$_N$	22 44 17					
			e$_N$	22 45 22	5				
			e$_Z$	22 45 23	7				
			e$_N$	22 46 08	6				
			i$_Z$	22 46 40	8				
			e$_N$	22 46 44	7				
			iS$_Z$	22 46 56	10			− 50	
			iS$_E$	22 46 59	8	+ 12 − 20			
			iS$_N$	22 47 01	12		− 15 + 25		
			i$_E$	22 47 21	15	− 70 +100			
			e$_N$	22 47 22	15		−130 +100		
			i$_Z$	22 48 10				+ 40	
			i$_E$	22 48 16					
			iL$_E$	22 48 52	15	∓100			
			i$_E$	22 51 22	15				
			i$_Z$	22 51 22	10				
			i$_N$	22 52 16	12				
			i$_Z$	22 52 34	8				
			i$_E$	22 57 22	8				
			F	01 38±					
7	May 30	Iu	eP$_Z$	09 56 16	2				Felt in Argentina. Begins in microseisms.
			e$_N$	09 56 17	3				
			e$_Z$	09 57 12	4				
			e$_N$	09 57 57	4				
			e$_Z$	10 05 00	5				
			e$_N$	10 05 08	3				
			e$_N$	10 06 49	8				
			e$_E$	10 06 57					
			e$_Z$	10 27 22	20				
			e$_N$	10 27 27	20				
			e$_E$	10 27 33					
			F	10 48±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
8	June 2	Iu	iP_Z	21 49 55	2				U. S. C. & G. S. epicenter at 41° N. 140° E.
			ePN	21 49 55	3				
			i_Z	21 49 57					
			e_Z	21 51 15					
			eS_E	21 59 16					
			eS_{NZ}	21 59 17					
			eL_E	22 12 25	10				V=3.8 km./sec.
			eL_N	22 12 25	10				
			F	22 28±					
9	June 3	I	e_{NZ}	20 47 22					Beginning in time mark.
			F	21 17±					
10	June 9	Iu	eP_Z	09 18 19					J. S. A. epicenter at 47° N. 154° E.
			ePN	09 18.4					
			e_N	09 24.6					
			eS_E	09 26 40	10				
			eS_N	09 26 40	15				
			eSR_{1E}	09 31.5	18				
			eSR_{2N}	09 33.8	25				
			e_N	09 35.6	10				
			eL_Z	09 36.5±	25				
			F	11 18±					
11	June 13	Iu	ePN	00 22.6					
			eS_N	00 31 01	8				U. S. C. & G. S. epicenter at 47° N. 153° E.
			eS_E	00 31 01	12				
12	June 13	Iu	iP_Z	00 36 20	6				U. S. C. & G. S. epicenter at 47° N. 153° E.
			ePR_{1N}	00 38 35	20				
			ePR_{2N}	00 40.6	10				
			eS_E	00 43 36	10				
			eS_Z	00 44 37	10				
			e_N	00 51.9	25				
			e_E	01 06 00	15				
			e_Z	01 06 00					
			F	02 30±					
13	June 13	Iu	eP_Z	09 38 35	3				J. S. A. epicenter at 14° N. 126° E.
			e_E	09 38 56					
			e_Z	09 41 47	4				
			e_Z	09 42 35	5				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
13	June 13 (contd.)	Iu	e_N	09 42 36	4				
			e_Z?	09 44 58	4				
			e_E	09 48 48	8				
			e_Z?	09 50 48	7				
			e_E	09 56.7					
			e_Z	10 10.8					
			e_E	10 11.2					
			e_Z	10 11.3					
			e_N	10 11.7					
			e_E	10 32.7					
			e_Z	10 35 32					
			e_Z	10 39.0					
			e_N	10 45 0	18				
			e_E	10 54.8	18				
			e_Z	10 55.0	15				
			e_N	11 03.3	15				
			e_E	11 03.5	15				
			F	11 25±					
14	June 16	Iu	e_Z	23 04.6					Microseisms obscure beginning.
			e_Z?	23 12 13	8				J. S. A. epicenter at 41° S 173° E.
			e_E	23 12 42	8				
			e_E	23 13 54	15				
			e_N	23 14 18	12				Destructive in New Zealand.
			e_Z?	23 14.4					
			e_Z	23 15 23					
			$eSR_3?_E$	23 27.1	35				
			e_N	23 28 31	25				
			e_{EN}	23 29.7	30				
			e_Z	23 33.0	35				
			e_E	23 33.1	30				
			eL_E	23 34.7	25	∓ 80			
			eL_Z	23 34.8	25			∓250	
			eL_N	23 34.9	25		± 25		
			e_N	23 37.5	20		± 25		
			e_E	23 37.6	25	−115 +170			
			eM_Z	23 42.1	15			∓ 75	
			eM_E	23 42.2	18	∓ 30			
			eM_N	23 42.7	15				
			e_Z	23 46.5	17				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
14	June 16	Iu	e_N	23 46.6	18				
			e_N	23 48.6	17				
			e_E	00 00.3	15				
			e_N	00 10.7	15				
			e_Z	00 11.2	15				
			e_{EZ}	00 14.4	15				
			e_N	00 17.6	15				
			F	01 50±					
15	June 27	I	ePz	13 06 02	2				May have begun earlier.
			e_E	13 06 10	3				
			e_Z	13 06 15	3				
			e_N	13 06 22					
			e_{EN}	13 07 40	7				
			i_Z	13 07 42	7				
			e_E	13 08 18	6				
			e_N	13 08 21	6				
			e_Z	13 17 57	15				
			e_N	13 18 28					
			e_E	13 24.8	40	∓150			
			e_N	13 24.8	35		± 90		
			e_Z	13 24.8	40ca				Underlying shorter period.
			e_E	13 32.5	20				
			e_N	13 32.6	18				
			e_E	13 38.0	45				
			e_N	13 48.4	15				
			e_Z	13 48.8	20				
			e_N	13 52.5	15				
			F	13 35±					
16	July 4	Ir	iPz	04 34 50	3				J. S. A. epicenter 64° N 149° W; begins in time mark.
			ePR_{1Z}	04 35 56	4				
			e_Z	04 37 05	3				
			e_Z	04 38 54					
			e_Z	04 40 52					
			e_E	04 46.5	15				
			eM_E	04 47 12	12				
			eM_N	04 47.2	10				
			eM_Z	04 47.2	10				
			F	05 10±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
17	July 5	Ir	eP_Z	14 26 51	9				U. S. C. & G. S. epicenter 51° N 178° W.
			eP_E	14 26 51±					
			eP_N?	14 26 51					
			e_Z	14 27 04	2				
			e_E	14 27 06	12				
			ePR_{1E}	14 28 25	8				
			ePR_{1Z}	14 28.5	7				
			e_Z	14 29 56	3				
			eS_E	14 33.0	12?				
			eS_N	14 33 02	12?				
			eS_Z	14 33 04±	30				
			e_N	14 36 14	12				
			e_Z	14 36.5	13				
			e_E	14 36.6	18				
			e_N	14 36.6	18				
			e_N	14 38.3	18				
			e_Z	14 38 12	30				
			e_Z	14 38.8	20				
			e_N	14 39.9	8				
			e_E?	14 41.6	20				
			e_Z	14 41.7	16				
			e_E	14 48.3	15				
			e_N	14 54.3	15				
			e_Z	14 54.3	20				
			e_E	14 55.5	16				
			e_N	14 56.9	10				
			e_E	15 00.9	16				
			F	17 15±					
18	July 5	Ir	eP_Z	22 44 19	2				Begins in microseisms.
			eP_E	22 44 20					
			e_E	22 44 32	2				U. S. C. & G. S. epicenter 51° N 178° W.
			e_Z	22 44 50	4				
			e_N	22 44 56	3				
			e_E	22 50 07	15				
			e_Z	22 50 25	20?				
			e_N	22 53.1	16ca				
			e_E	22 53.6	15				
			eL_E	22 55.1	25				
			eL_Z	22 55.2	25				
			e_Z?	22 56.0	20				
			e_N	22 59.3	8				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
18	July 5 (contd.)	Ir	e_E	23 01.0	17				
			e_Z	23 01.2	20				
			e_N	23 04.9	9				
			e_N	23 09.0	9				
			e_Z	23 10.8	15				
			e_E	23 14.5	15				
			e_Z	23 16.0	12ca				
			e_Z	23 17 39	4				
			e_E	23 19.8	12				
			e_E	23 23.4	12				
			F	23 59±					
19	July 6	Ir	eP_E	02 11 40	4				Microseisms obscure beginning on N-S.
			eP_Z	02 11 41	4ca				
			ePR_{2Z}	02 13 37	4				
			e_Z?	02 15 56	6				U. S. C. & G. S. epicenter at 51° N 178° W.
			e_E	02 17 34	8				
			e_Z	02 20 52	8				
			e_Z	02 21 00	10				Begins in time mark.
			eSR_{2N}	02 21.4					
			e_E?	02 21.5					
			e_Z	02 22.9	9				
			e_N	02 22 55	12				
			e_E	02 23.2					
			e_E	02 23 41	10				
			e_Z	02 25 05	10				
			e_N	02 25 24	10				
			e_E	02 27 06	8				
			e_Z	02 27 08	9				
			e_N	02 34 25	8				
			e_E	02 34 27	8				
			e_Z	02 37 15	15				
			e_E	02 40 48	10				
			e_N	02 41.6	8				
			e_Z	02 42.2					
			e_E	02 43 19	10				
			F	04 30±					
20	July 6	Iu	eP_Z	09 57 40	6				May have begun 1 wave earlier.
			e_Z	09 59 42	4				
			eS_E	10 06 54	12				
			eS_N	10 06 54	6				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
20	July 6 (contd.)	Iu	eL_E	10 21.9	30ca				
			e_Z?	10 22.3	30ca				
			eM_E	10 26.6	20				
			e_Z	10 29.5	12				
			F	10 45±					
21	July 7	IIr	eP_Z	21 30 57	13?				Shorter period superposed.
			e_E	21 30 58					
			i_Z	21 31 09	8				
			i_N	21 31 09	2				Beginning earlier but not definite.
			i_E	21 31 09	10				
			e_N	21 32 00	5				U. S. C. & G. S. epicenter at 51° N 178° W.
			e_E	21 32 43	9				
			e_Z	21 32 44	8				
			e_E	21 34 30	8				
			e_E	21 35 37	12				
			e_E	21 36 52					
			e_Z	21 36 52	10				
			e_E	21 36 59	7				
			iS_N	21 37 09	15		+ 8		
							− 10		
			iS_E	21 37 10	20	−110			
						+225			
			e_Z	21 38 40	8				
			i_E	21 40 04	20				
			i_N	21 40 20					
			e_Z	21 40 31	10				
			i_N	21 40 38	24		+650		
							−670		
			i_E	21 40 40	18				
			iL_E	21 42 07	16	∓ 85			
			eL_Z	21 42 17	25			∓500	
			eL_N	21 42 28	16		+ 35		
							−115		
			iM_E	21 47 02	15	∓ 75			
			eM_Z	21 47 04	12			− 15	
								+ 20	
			eM_N	21 47 08	14		+ 50		
							− 80		
			i_E	21 57 02	12				
			e_Z	22 00 04	15				
			i_E	22 00 08	12				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
21	July 7 (contd.)	IIr	e_Z	22 03 07	12				
			e_Z	22 09 07	8				
			e_Z	22 10 06	12				
			e_Z	22 20 11	12				
			e_Z	22 28 04	9				
			F	01 00±					
22	July 8	Iv	e_N	16 48 29	3				Destructive in Whittier, California.
			e_E	16 48 30	4				
			e_N?	16 48 38	4				
			e_E	16 48 59	5				
			e_Z	16 49 17	2				
			e_N	16 50 00	9				
			e_E	16 50 41	10				
			e_N	16 50 41	7				
			e_N	16 52 43	6				
			e_E	16 53 22	6				
			e_N	16 54 35	5				
			e_E	16 54 41	4				
			F	17 02±					
23	July 14	I	e_Z	09 09 24	7				
24	July 14	Iu	eP_Z	09 46 43	4				
			eP_N	09 46 45	4				
			eP_E	09 46 46	4				
			e_Z?	09 46 47	4				
			e_{EZ}	09 46 56	5				
			e_Z	09 48 49	4				
			e_N?	09 49 00	5				
			eS_N	09 54 49	8				
			eS_Z	09 54 51	8				
			eS_E	09 54 52	6				
			e_N	09 55 11	4				
			e_Z	09 55 16	5				
			e_N	09 55 27	6				
			e_Z	09 56 42	6				
			e_N	10 03.7	12				
			e_Z	10 03 43	8				
			e_Z?	10 04.0	30ca				
			eL_{EZ}	10 05.7	25				
			F	11 00±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
25	July 18	I	e_E	07 53.7	25?				Surface waves of distant quake.
			e_E	07 54.6	20				
			F	08 01±					
26	July 18	I	eP_Z	08 45 56	3				
			eP_E	08 46.0					
			eP_N	08 46.1					
			e_E	08 52 09					
			e_Z	08 52 38					
			e_Z	08 53 12	6				
			e_N	08 55.7	6				
			e_Z	08 57.6	25				
			e_N	08 57.2	10				
			e_E	08 58.0	30ca				
			e_Z	08 59.3	8				
			e_Z	09 00.9	18				
			e_N	09 01.0	10				
			e_E	09 01.5	15				May have begun earlier.
			F	10 05±					
27	July 23	I	e_E	19 12.8	30				
			e_N	19 13.5	30ca				
			F	19 41.5±					
28	Aug. 2	Id	$i\overline{P}_{NE}$	10 01 31	1				See note at end of Bulletin.
			$i\overline{S}_{NE}$	10 01 32	1				
			e_{EN}	10 01 36	1				
			e_N	10 01 41	2				
			F	10 02 13					
29	Aug. 12	I	e_Z	14 29 19	1				
			e_{NE}	14 29 21	1				
			e_{NE}	14 29 23	1				
			F	14 29 33					
30	Aug. 14	I	e_E	14 33 38	10				Surface waves of distant quake.
			e_N	14 34 15	10				
			F	15 18±					
31	Aug. 14	I	e_Z	19 05 40	3				Surface waves of distant quake.
			e_{NE}	19 08 37	9				
			e_Z	19 08 41	8				
			F	19 38±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
32	Aug. 15	Iu	eP_E	19 57 40	3				U. S. C. & G. S. epicenter at 5° N 82° W.
			e_Z	19 58 25	3				
			e_E	20 05 08	4				
			e_Z	20 05 08	3				
			e_Z	20 07 34	3				
			e_E	20 07 34	6				
			eL_N	20 12 14	14				
			eL_E	20 12 14					
			e_E	20 21 10	21				
			e_Z	20 21 40	20				
			e_N	20 21 59	25				
			F	20 36±					
33	Aug. 17	Ir	eP_Z	23 46 57	4				U. S. C. & G. S. epicenter at 14° N 99° W.
			eP_{NE}	23 46 59	4				
			e_{NE}	23 52 00	12				
			e_Z	23 52 12	13				
			e_N	23 54 51	20				
			e_E	23 54 51	24				
			e_N	23 57.8					
			e_Z	23 57.9	15				
			e_E	23 58 15	14				
			eM_E	23 59 29	11				
			eM_N	23 59 34	12				
			eM_Z	23 59 49	11				
			F	00 18±					
34	Sept. 17	Iv	eP_N	19 21 00	5		± 15		U. S. C. & G. S. epicenter at 52° N 133° W.
			eP_Z	19 21 01	8			∓ 30	
			eP_E	19 21 01	6	+ 20			
			e_E	19 22 00					
			e_Z	19 22 04					
			e_N	19 22 09					
			eS_E	19 23 44	10	−300			
						+250			
			eS_Z	19 23 49	9			−150	
								+200	
			eS_N	19 23 55	8		± 60		
			e_Z	19 24 14				−315	
								+140	

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
34	Sept. 17 (contd.)	Iv	e_N	19 24 16			+ 50		
							−140		
			e_Z	19 24 45				−350	
								+400	
			e_N	19 24 46			+ 90		
							−105		
			e_E	19 24 52	15	−270			
						+190			
			eL_N	19 25 40	8		+240		
							−210		
			eL_E	19 25 40	12	−650			
						+850			
			eL_Z	19 25 44	9			∓300	
			eM_E	19 27 10	9	−400			
						+600			
			eM_N	19 27 10	6		+330		
							−375		
			eM_Z	19 27 13	8			−130	
								+150	
			F	21 38±					
35	Sept. 26	I	e_Z	04 57 46	3				
			e_N	05 05 09	12				
			e_E	05 06 47	10				
			e_Z	05 06 52	4				
			e_Z	05 09 01	8				
			e_{NE}	05 09 05	9				
			F	05 21±					
36	Sept. 26	I	eP_Z	20 01 51	3				
			e_N	20 02 09	2				
			e_E	20 02 11	2				
			e_{EN}	20 03 03	3				
			e_N	20 03 23	3				
			e_E	20 03 29	3				
			e_Z	20 03 44	3				
			e_Z	20 04 35	5				
			e_E	20 05 05	6				
			e_N	20 05 09	7				
			F	20 09 30					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
37	Sept. 27	Ir	$ePR_1?_Z$	23 20 03	3				U. S. C. & G. S. epicenter at 24° N 111° W.
			e_N	23 20 05	3				
			e_E	23 20 05	4				
			e_E	23 23 23					
			e_Z	23 23 39	5				
			e_N	23 23 59					
			e_E	23 23 59	24	∓ 40			
			eM_E	23 26 39	10	∓ 15			
			eM_Z	23 26 56	8				
			eM_N	23 27 1	9				
			F	23 47.5±					

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_0	ε	$\frac{r}{T_0^2}$
1929						
March	Wiechert	E	97	6.3	10	0.005
	160 Kg. H.	N	88	6.3	4	0.01
	80 Kg. Vertical	Z	56	3.1	7	0.01
August	Anderson-Wood	E	3000	1	aperiodic	
	Torsion	N	3000	1	"	

In the following, the times measured from seismograms written by the Wiechert instruments are marked by an *.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
1	Apr. 3	Id	$e\overline{P}_{NE}$	16 00 07					
			i_N	16 00 11					
			$i\overline{S}_{NE}$	16 00 17					
			i_E	16 00 18					
			i_E	16 00 19					
			i_{NE}	16 00 21					
			F	16 00 59					
2	Apr. 7	Id	eP^*_{NE}	14 15 43					
			$i\overline{P}_N$	14 15 45					
			$i\overline{S}_{NE}$	14 15 55					
			i_E	14 15 56					
			i_{NE}	14 16 00					
			i_{NE}	14 16 02					
			F	14 16 30					
3	Apr. 7	Id	eP^*_{NE}	14 29 43					
			$i\overline{P}_N$	14 29 45					
			i_E	14 29 53					
			$i\overline{S}_{NE}$	14 29 55					
			i_{NE}	14 30 02					
			F	14 30 50					
4	Apr. 9	Id	$e\overline{P}_{EN}$	21 28 32*	1				
			$e\overline{P}_Z$	21 28 33*	1				
			$i\overline{P}_{EN}$	21 28 33					
			i_E	21 28 33	1				
			$i\overline{S}_{EZ}$	21 28 35*	1				
			$i\overline{S}_{EN}$	21 28 35					
			e_Z	21 28 37*	1				
			i_E	21 28 38					
			e_E	21 28 40*	1				
			i_{EN}	21 28 41					
			i_{EN}	21 28 42					
			i_{EN}	21 28 44					
			i_E	21 28 51					
			F	21 29 30					
5	Apr. 9	Id	$i\overline{P}_{NE}$	21 53 08					
			$i\overline{S}_{NE}$	21 53 10					
			F	21 53 20					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
6	Apr. 13	Id	$i\overline{P}_N$	19 30 01					
			e_E	19 30 01					
			$i\overline{S}_{NE}$	19 30 09					
			i_{NE}	19 30 11					
			F	19 30 34					
7	Apr. 15	I	e_N	02 07 21					
			i_{NE}	02 07 29					
			i_{NE}	02 07 31					
			F	02 08 05					
8	Apr. 17	I	e_{NE}	18 22 50					
			e_{NE}	18 23 25					
			i_N	18 23 27					
			F	18 24					
9	Apr. 22	I	i_N	03 25 39					
			e_E	03 25 39					
			i_N	03 25 40					
			i_N	03 25 42					
			F	03 25 55					
10	Apr. 22	Id	$i\overline{P}_{EN}$	23 49 13					
			$i\overline{S}_N$	23 49 14					
			F	23 49 25±					
11	Apr. 23	Id	$i\overline{P}_N$	09 10 12	0.6				
			$i\overline{P}_E$	09 10 13					
			$i\overline{S}_{EN}$	09 10 18					
			F	09 12±					
12	Apr. 23	Id	$i\overline{P}_{NE}$	18 35 12					
			i_E	18 35 16					
			$i\overline{S}_{NE}$	18 35 17					
			F	18 37					
13	Apr. 27	Id	$e\overline{P}e$	18 39 00					
			$e\overline{P}_N$	18 39 01	0.5				
			$i\overline{S}_N$	18 39 11	0.8				
			$i\overline{S}_E$	18 39 12	0.7				
			F	18 42±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
14	Apr. 29	Id	$i\overline{P}_{EN}$	19 10 20					
			$i\overline{S}_{EN}$	19 10 22					
			i_{EN}	19 10 23					
			i_{N}	19 10 24					
			F	19 11±					
15	May 1	Iu	e_{N}	15 56 06					
			e_{E}	15 56 10					
			e_{N}	15 56 30*					
			e_{N}	16 06 21*					
			e_{N}	16 18 18*					
			e_{N}	16 19 58					
			e_{N}	16 31 12*					
			e_{N}	16 34 06					
			e_{N}	16 34.4					
			e_{N}	16 35.8*					
			e_{Z}	16 37.6*					
			F	18 55					
16	May 3	I	$i\overline{P}$	06 36 08					
			F	06 36 16					
17	May 5	Id	$i\overline{P}_{N}$	17 58 40					Beginning poor on E-W.
			$i\overline{S}_{EN}$	17 58 42					
			F	17 59					
18	May 14	I	e_{EN}	15 16					Duration ca. 15 sec.
19	May 15	I	e_{EN}	00 49					Duration ca. 20 sec.
20	May 17	I	e_{EN}	05 21					Duration ca. 15 sec.
21	May 18	Id	$i\overline{P}_{EN}$	15 29 57					
			i_{N}	15 29 59					
			$i\overline{S}_{EN}$	15 30 02					
			F	15 31					
22	May 26	IIr	eP_{E}	22 43 47					
			e_{E}	22 43 56	3				
			e_{E}	22 44 09	3				
			eS_{E}	22 46 52	7				
			e_{E}	22 49 00	17	± 45			
			e_{E}	22 51 18	8				
			F	25 30±					

LICK OBSERVATORY STATION

No	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
23	May 28	Id	$i\overline{P}_{EN}$	19 53 42	0.5				
			i_{E}	19 53 44	0.9				
			$i\overline{S}_{EN}$	19 53 50	0.4				
			F	19 55±					
24	May 28	Id	$e\overline{P}_{EN}$	20 18 03					
			$e\overline{S}_{EN}$	20 18 11	0.5				
			F	20 19 00					
25	May 28	I	e_{EN}	20 20 10					Duration ca. 30 sec.
26	May 31	Id	$i\overline{P}_{N}$	16 46 14					
			$i\overline{S}_{N}$	16 46 26					
			F	16 46.5					
27	June 4	Id	$e\overline{P}_{E}$	18 30 24					
			e_{N}	18 30 26					
			$e\overline{S}_{E}$	18 30 33	0.5				
			e_{N}	18 30 36	0.5				
			e_{N}	18 30 43					
			e_{E}	18 30 46					
			F	18 30 55					
28	June 9	I	i_{EN}	03 32 28					Duration ca. 18 sec.
29	June 9	Id	$e\overline{P}_{E}$	10 02 20	0.5				
			$i\overline{S}_{E}$	10 02 28					
			F	10 03.1					
30	June 9	Id	$i\overline{P}_{EN}$	19 31 22					
			e_{N}	19 31 24*	1				
			iP^{*}_{EN}	19 31 25					
			$i\overline{S}_{EN}$	19 31 28					
			e_{N}	19 31 30*	2				
			$i\overline{S}^{*}_{EN}$	19 31 32					
			e_{N}	19 31 39*	3				
			F	19 32 06					
31	June 9	Id	$i\overline{P}_{EN}$	23 55 52					
			$i\overline{S}_{EN}$	23 55 54					
			i_{EN}	23 55 58					
			F	23 56 20					
32	June 10	I	i_{EN}	00 00 07					Duration ca 5 sec.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
33	June 10	Id	$i\overline{P}_{EN}$	00 13 46					
			$i\overline{S}_{EN}$	00 13 47					
			e	00 13 50					
			F	00 13 57					
34	June 13	Iu	eP_{EN}	00 18 41					
			e_N	00 22 43					
			e_E	00 22 44					
			e_E	00 24 41					
			e_N	00 24 44					
35	June 13	Iu	eP_E	00 31 06					
			e_N	00 31 09					
			e_N	00 36 19					
			e_E	00 36 21					
			eS_N	00 39 22					
			e_E	00 44 42	10	± 10			
			e_N	00 44 46	12		∓ 25		
			F	01 46 20					
36	June 13	Iu	eP_E	09 38 44					
			e_N	09 38 47					
			e_NPR_1?	09 42 29					
			e_E	09 42 40					
			eS_{NE}	09 49 31					
			e_N	09 54 49					
			e_N	09 56 29	7				
			e_E	09 57 06	5				
			e_NSR_2?	10 03 41	11				
			eL_E	10 11 42	23	+ 50			
						− 35			
			eL_N	10 12 11	26		± 45		
			F	11 02±					
37	June 15	I	e_{NE}	00 17 23					
			e_{NE}	00 17 25					
			F	00 17 36					
38	June 15	Iv	eP_E	01 47 31					
			e_E	01 47 40					
			eS_E	01 48 11					
			iS^*_E	01 48 18	0.6				
			e_E	01 48 29	0.5				
			F	01 50.3					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
39	June 15	Id	$i\overline{P}_E$	05 07 31					
			$i\overline{S}_E$	05 07 43					
			e_E	05 07 46					
			F	05 08 50					
40	June 16	IIIu	eP_N	23 01 16					
			e_N	23 03 25					
			e_E	23 04 40					
			e_EPR_1	23 05 29	5				
			e_NPR_1	23 05 33	4				
			e_{NE}	23 10 23	5				
			e_E	23 13 43					
			e_N	23 14 20					
			e_E	23 16 08	19				
			e_N	23 16 11					
			e_NSR_1	23 19 06					
			e_E	23 25 32	9				
			e_E	23 29 20	23				
			e_N	23 29 43	24				
			eL_E	23 34 47	21	± 20			
			eL_N	23 34 52	20		±130		
			e_N	23 36 55*	30ca				
			eM_N	23 42.2	13		± 15		
			eM_E	23 42.7	16	± 25			
			e_N	23 44.9*	30				
			e_N	23 56 45*	16				
			F	00 23±					
41	June 27	I	eP_E	13 06 04					
			e_Z	13 07 02*	3				
			e_E	13 07 40					
			e_Z	13 07 40*	3				
			e_E	13 10 24					
			e_E	13 16 05	1				
			e_E	13 17 28	9				Shorter period superposed.
			e_Z	13 20 04*	4				
			e_Z	13 22 44*	8				
			e_E	13 23 44					
			e_E	13 32 37					
			e_Z	13 48 23*	18				
			e_E	13 51 11	21				Shorter period superposed.
			e_E	14 04 32	17	∓ 80			
			e_Z	14 47 43*	14				
			F	15 08±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
42	July 4	IIr	eP$_{EN}$	04 34 57	1				
			e$_N$	04 36 41	1				
			e$_E$	04 36 45	1				
			e$_N$	04 38 11	3				
			e$_E$	04 38 58	2				
			e$_E$	04 45 26	4				
			e$_N$	04 46 16	3				
			e$_N$	04 47 15	11				
			e$_E$	04 48 09	9				
			e$_N$	04 48 48	9				
			F	04 56±					
43	July 5	Ir	eP$_E$	22 44 07	1				
			eS$_E$	22 50 18					
			eL$_E$	22 56 04	20				
			e$_E$	22 59 04	16				
			e$_E$	23 17 19	1				
			F	23 20 10					
44	July 5	Ir	eP$_E$	14 26 56	5ca				
			e$_E$	14 29 12					
			eS$_E$	14 33 10	13	± 30			
			eL$_E$	14 38 46	18				
			e$_E$	14 41 57	16	± 50			
			F	16 27 10					
45	July 6	Ir	eP$_E$	02 11 24	1				
			e$_E$	02 14 12	5				
			eS$_E$	02 17 50					
			e$_E$	02 21 44	5				
			eL$_E$	02 23 15	12				
			e$_E$	02 25 01	10				
			F	03 00					
46	July 6	I	e$_E$	15 54 47	0.6				
			e$_E$	15 58 20	1				
			F	15 59 08					
47	July 7	Ir	eP$_Z$	21 31 02*	3				
			eP$_N$	21 31 03	2				
			i$_N$	21 31 12	1				
			e$_Z$	21 33 02*	3				

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A$_E$	Amplitude A$_N$	Amplitude A$_Z$	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
47	July 7	Ir	e$_N$	21 33 20					
	(contd.)		e$_Z$	21 35 02*	8				
			eS$_N$	21 37 19					
			e$_N$	21 40.5					
			e$_Z$	21 40.5*	8				
			eL$_Z$	21 42 21*	27				
			eL$_N$	21 42 34	14		∓130		
			e$_N$	21 44 17	11		− 80		
							+120		
			eM$_Z$	21 47.7*	17				
			e$_N$	21 53.2	6				
			F	00 00+					
48	July 8	Id	eP$_N$	05 43 25	0.1				
			iS$_N$	05 43 30					
			e$_N$	05 43 32	0.6				
			F	05 44					
49	July 10	I	e$_E$	20 31 21					Duration ca. 52 sec.
50	July 12	Id	eP$_Z$*	13 08 04*	1				Felt at Coalinga and Bitterwater, California.
			iP*$_{NE}$	13 08 05	0.5				
			e$_N$	13 08 06*					
			iP$_{NE}$	13 08 08	1				
			iS*$_{NE}$	13 08 15	1				
			eS$_{ZNE}$	13 08 19*	1				
			iS$_{NE}$	13 08 19	1				
			e$_{ZN}$	13 08 28*	1				
			i$_{NE}$	13 08 37	1				
			e$_E$	13 08 45					
			e$_N$	13 08 52					
			F	13 10.3					
51	July 12	I	e$_N$	16 01 05					
			e$_E$	16 01 08					
			F	16 02 08					
52	July 14	I	e$_N$	09 09 23	2				
			e$_E$	09 09 31	3				
			F	09 11					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1929			h. m. s.	s.	μ	μ	μ	
53	July 14	Iu	eP_{NE}	09 46 48	2				
			e_N	09 51 35	4				
			e_N	09 53 54					
			eS_E	09 54 58	6				
			e_{NE}	10 03 35					
			e_N	10 06 05	22				
			e_E	10 06 09	23				
			e_N	10 10 31	8				
			F	10 27±					
54	July 14	Iv	eP_N	22 43 49	1				
			$e\overline{P}_N$	22 44 03	1				
			iS_N	22 44.5	0.8				
			i_N	22 44.7	0.7				
			i_N	22 44.8					
			F	22 46±					
55	July 16	I	e_N	21 36 35	0.6				
			e_E	21 36 46					May have begun earlier.
			e_N	21 37 33	1				
			e_E	21 37 35					
			i_N	21 37 44					
			e_E	21 37 55	1				
			F	21 39±					
56	July 19	I	e_E	03 35 56					
			i_E	03 36 00					
			F	03 37 20					
57	July 21	Iv	eP_{NE}	04 21 07	1				
			e_N	04 21 30	1				
			e_{NE}	04 21 42	1				
			iS_{NE}	04 22 04	1				
			i_{EN}	04 22 14	1				
			F	04 24					
58	July 24	I	e_N	11 56 25	1				
			e_N	11 56 58	1				
			e_N	11 57 52					
			F	12 00					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1929			h. m. s.	s.	μ	μ	μ	
59	July 25	Id	$e\overline{P}_{EN}$	05 01 49					
			$e\overline{S}_{EN}$	05 09 59	0.7				
			F	05 02 36					
60	July 28	Id	$e\overline{P}_{NE}$	01 09 43	0.6				
			$i\overline{S}_E$	01 09 46					
			$i\overline{S}_N$	01 09 47	0.7				
			i_{NE}	01 09 49					
			F	01 10±					
61	Aug. 2	Iv	eP_{NE}	10 01 42	0.5				
			iS_{NE}	10 01 54	0.4				
			e_N	10 01 56	0.3				
			e_E	10 01 57	0.4				
			F	10 02 30					
62	Aug. 3	I	e_{NE}	13 00 56	1				
			e_N	13 01 39	2				
			e_E	13 01 40	2				
			F	13 04 40±					
63	Aug. 4	I	e_N	02 10 12					
			e_E	02 10 14					
			e_{NE}	02 10 25	0.5				
			e_E	02 10 34					
			e_{NE}	02 10 39	0.4				
			e_{NE}	02 10 44	0.5				
			F	02 11 30					
64	Aug. 5	Id	$e\overline{P}_{NE}$	12 45 31	0.1				
			$i\overline{S}_{NE}$	12 45 33					
			i_N	12 45 35					
			F	12 46±					
65	Aug. 5	Id	$i\overline{P}_{NE}$	12 54 58					
			$i\overline{S}_{NE}$	12 55 00					
			e_E	12 55 03					
			e_N	12 55 04					
			F	12 55 20					
66	Aug. 5	Id	$e\overline{P}_{NE}$	13 12 19					
			$e\overline{S}_{NE}$	13 12 21					
			F	13 12 30					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
67	Aug. 5	Id	$i\overline{P}_{NE}$	13 30 23	0.1				
			$i\overline{S}_{NE}$	13 30 25	0.2				
			e_{NE}	13 30 26	0.6				
			F	13 30 50					
68	Aug. 5	Id	$i\overline{P}_{NE}$	13 32 12	0.2				
			$i\overline{S}_{NE}$	13 32 14	0.5				
			e_E	13 32 16					
			e_N	13 32 18	0.7				
			i_E	13 32 20					
			e_N	13 32 22	0.5				
			e_{NE}	13 32 27	0.6				
			F	13 32 30					
69	Aug. 5	Id	$i\overline{P}_{NE}$	13 36 21					
			$i\overline{S}_{NE}$	13 36 24					
			i_{NE}	13 36 27	0.7				
			i_N	13 36 35	0.8				
			e_E	13 36 37	0.7				
			e_N	13 36 43					
			i_{NE}	13 36 53	0.1				New shock?
			i_{NE}	13 36 54	0.2				
			e_{NE}	13 36 56	0.5				
			e_N	13 36 58	0.4				
			i_E	13 36 58	0.2				
			e_E	13 37 00					
			F	13 37 45					
70	Aug. 5	Id	$i\overline{P}_{NE}$	13 38 39	0.1				
			$i\overline{S}_{NE}$	13 38 41	0.4				
			i_{NE}	13 38 43	0.5				
			e_E	13 38 44	0.2				
			e_N	13 38 45	0.5				
			F	13 39					
71	Aug. 5	I	e_{NE}	13 40 51					Duration ca. 5 sec.
72	Aug. 5	Id	$i\overline{P}_{NE}$	13 41 30	0.2				
			$i\overline{S}_{NE}$	13 41 32	0.3				
			i_{NE}	13 41 34	0.5				
			e_N	13 41 36	0.4				
			e_E	13 41 37					
			F	13 42					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
73	Aug. 5	I	e_{NE}	13 42 40	0.1				Duration ca. 8 sec.
74	Aug. 5	Id	$i\overline{P}_{NE}$	13 45 15	0.2				
			$i\overline{S}_{NE}$	13 45 17					
			e_E	13 45 20					
			e_N	13 45 21					
			F	13 45.8					
75	Aug. 5	Id	$e\overline{P}_E$	13 48 13					
			$i\overline{P}_N$	13 48 14					
			$i\overline{S}_{NE}$	13 48 15	0.2				
			e_E	13 48 16					
			e_N	13 48 17	0.5				
			F	13 48.6					
76	Aug. 5	Id	e_{NE}	13 51 08					Duration ca. 6 sec.
77	Aug. 5	Id	$i\overline{P}_{NE}$	14 15 21	0.4				
			$i\overline{S}_{NE}$	14 15 23	0.5				
			i_E	14 15 25	0.5				
			i_N	14 15 27					
			i_E	14 15 28	0.6				
			e_N	14 15 30	0.7				
			i_{NE}	14 15 42	0.7				
			F	15 16.6					
78	Aug. 5	Id	$i\overline{P}_{NE}$	14 16 48					
			$i\overline{S}_{NE}$	14 16 50					
			e_{NE}	14 16 55	0.6				
			i_{NE}	14 17 08	0.1				New shock?
			e_{NE}	14 17 10					
			e_E	14 17 13	0.4				
			e_E	14 17 23	0.2				New shock?
			e_N	14 17 24	0.2				
			i_E	14 17 25					
			F	14 18					
79	Aug. 5	I	e_{NE}	14 18 34					Duration ca. 7 sec.
80	Aug. 5	I	e_{NE}	14 18 44					Duration ca. 4 sec.
81	Aug. 5	I	e_{NE}	14 19 41					Duration ca. 4 sec.
82	Aug. 5	I	e_{NE}	14 20 31					Duration ca. 5 sec.
83	Aug. 5	I	e_{NE}	14 20 40					Duration ca. 4 sec.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
84	Aug. 5	Id	$i\overline{P}_{NE}$	14 22 23					
			$i\overline{S}_{NE}$	14 22 25					
			i_N	14 22 28	1				
			e_E	14 22 29	1				
			e_{NE}	14 22 33					
			F	14 23.3					
85	Aug. 5	Id	$e\overline{P}_{NE}$	14 27 51					
			$i\overline{S}_{NE}$	14 27 53					
			e_{NE}	14 27 57					
			F	14 28.3					
86	Aug. 5	I	e_{NE}	14 46 32					Duration ca. 4 sec.
87	Aug. 5	Id	$i\overline{P}_{NE}$	14 45 39					
			$i\overline{S}_{NE}$	14 45 41					
			i_E	14 45 43	0.3				
			e_E	14 45 45	0.5				
			e_N	14 45 46					
			F	14 46.4					
88	Aug. 5	Id	$i\overline{P}_{NE}$	14 49 33					
			$i\overline{S}_{NE}$	14 49 35					
			e_N	14 49 39	1				
			e_E	14 49 40	0.5				
			i_E	14 49 46					
			e_E	14 49 47	0.5				
			F	14 50.2					
89	Aug. 5	Id	e_{NE}	14 57 57					Duration ca. 18 sec.
90	Aug. 5	Id	e_{NE}	18 57 57	1				
			e_{NE}	18 58 07	0.6				
			e_N	18 58 15	1				
			e_E	18 58 21	0.8				
			F	18 59.5					
91	Aug. 5	I	e_{NE}	20 41 46					Duration ca. 4 sec.
92	Aug. 6	Id	$i\overline{P}_{NE}$	06 44 12	0.1				
			$i\overline{S}_{NE}$	06 44 14	0.2				
			e_E	06 44 55	0.4				
			e_N	06 44 17	0.5				
			F	06 44.5					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
93	Aug. 6	Id	$e\overline{P}_{NE}$	08 09 30					Beginning poor.
			e_N	08 09 36	0.5				
			$e\overline{S}_{NE}$	08 09 41	1				
			e_N	08 09 45	1				
			e_E	08 09 46	0.5				
			e_E	08 09 53	0.6				
			F	08 10.5					
94	Aug. 6	I	e_N	08 18 28					Beginning poor.
			e_{NE}	08 18 32	0.7				
			e_N	08 18 36	0.6				
			e_E	08 18 37	0.7				
			e_E	08 18 44	0.6				
			F	08 19					
95	Aug. 6	I	e_N	09 37 26					
			e_E	09 37 27					
			e_N	09 37 34	0.3				
			e_E	09 37 35					
			e_E	09 37 42	0.5				
			F	09 38.3					
96	Aug. 7	Id	$e\overline{P}_N$	19 29 30					
			e_E	19 29 35					
			$e\overline{S}_{NE}$	19 29 38	0.7				
			e_{NE}	19 29 42	0.5				
			F	19 30					
97	Aug. 9	Id	$i\overline{P}_{NE}$	07 21 27	0.1				
			$i\overline{S}_{NE}$	07 21 29	0.3				
			e_{NE}	07 21 31	0.5				
			e_E	07 21 40	0.6				
			F	07 21.8					
98	Aug. 9	Iv	eP^*_N	10 37 45					
			eP^*_E	10 37 46					
			e_N	10 38 03					
			eS^*_E	10 38 12					
			eS^*_N	10 38 14					
			e_E	10 38 17					
			e_{EN}	10 38 27					
			F	10 39 00					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
99	Aug. 11	Id	$e\overline{P}_E$	12 27 10					
			eP^*_N	12 27 12					
			e_E	12 27 13					
			e_E	12 27 14					
			$e\overline{S}_E$	12 27 15					
			e_E	12 27 17					
			eS^*_N	12 27 18	0.5				
			e_N	12 27 20					
			e_E	12 27 21					
			e_N	12 27 29	0.4				
			e_E	12 27 31					
			e_E	12 28 00	4				
			e_N	12 28 09	4				
			F	12 28.5					
100	Aug. 12	I	e_E	13 07 50					Duration ca. 3 sec.
101	Aug. 12	Id	$i\overline{P}_E$	21 31 16					
			$i\overline{P}_N$	21 31 17					
			$i\overline{S}_E$	21 31 18					
			$i\overline{S}_N$	21 31 19	0.4				
			i_E	21 31 20	0.3				
			e_E	21 31 21					
			e_N	21 31 22					
			F	21 31 7					
102	Aug. 13	Id	$e\overline{P}_{NE}$	02 29 35	0.5				
			e_N	02 29 38	0.5				
			e_E	02 29 39	0.5				
			$e\overline{S}_{NE}$	02 29 46	0.6				
			e_E	02 29 50	0.5				
			e_N	02 29 55	0.5				
			e_E	02 29 58	0.5				
			F	02 30.3					
103	Aug. 13	Id	$e\overline{P}_{NE}$	16 38 13					
			$e\overline{S}_{NE}$	16 38 15					
			e_{NE}	16 38 16					
			F	16 38.6					
104	Aug. 14	I	e_E	13 40 21	1				
			e_E	13 42 01					
			e_E	13 42 29	6				
			e_E	13 45 07					
			F	14 00					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
105	Aug. 15	Ir	e_E	20 05 07					
			e_E	20 05 17					
106	Aug. 16	Id	$i\overline{P}_E$	15 36 20	0.1				
			e_E	15 36 22	0.1				
			$i\overline{S}_E$	15 36 23	0.3				
			i_E	15 36 25	0.5				
			e_E	15 36 26					
			e_E	15 36 30					
			F	15 36.9					
107	Aug. 16	Id	eP_E	22 23 27					
			eS_E	22 23 38	0.5				
			e_E	22 23 54					
			F	22 24.3					
108	Aug. 17	Ir	eP_E	23 46 52*	3				
			eP_N	23 46 52*	5				
			eP_N	23 46 53					Beginning poor.
			eP_E	23 46 57	2				
			e_E	23 47 38*	3				
			e_E	23 48 18					
			eS_E	23 51 43*	14				
			eS_N	23 51 56					
			e_N	23 52 00*	9				
			e_E	23 52 01	12				
			eL_N	23 55 25	21			± 85	
			eL_E	22 55 27*	25	∓220			
			eL_N	22 55 34*	22			± 60	
			eL_E	22 55 40	23	± 90			
			eM_N	23 59 07*	16			± 80	
			eM_E	00 00 06*	10	∓ 50			
			eM_E	00 00 12	12	± 50			
			eM_N	00 00 48	9			± 35	
			F	00 31±*					
109	Aug. 18	Id	$i\overline{P}_{NE}$	01 27 02					
			$i\overline{S}_{NE}$	01 27 04	0.3				
			e_N	01 27 05					
			e_E	01 27 06	0.4				
			F	01 27 15					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s	s.	μ	μ	μ	
110	Aug. 19	Id	$i\overline{P}_{NE}$	01 43 28					
			$i\overline{S}_{NE}$	01 43 30	0.3				
			e_N	01 43 31					
			e_E	01 43 32	0.5				
			F	01 43.7					
111	Aug. 18	Id	$i\overline{P}_{NE}$	02 19 26					
			$i\overline{S}_{NE}$	02 19 28	0.4				
			e_N	02 19 29					
			e_E	02 19 31	0.5				
			F	02 19 45					
112	Aug. 20	I	e_{NE}	17 44 55					
			e_N	17 45 24					
			F	17 49±					
113	Aug. 20	I	e_E	21 21 55					
			e_E	21 22 11					
			F	21 23					
114	Aug. 22	I	i_{NE}	02 53 36					
			i_{NE}	02 53 37					
			F	02 53 41					
115	Aug. 22	I	i_{NE}	19 17 23					
			i_{NE}	19 17 26					
			F	19 17 28					
116	Aug. 24	I	e_{NE}	03 06 12	2				
			e_E	03 06 13	1				
			F	03 08.1					
117	Aug. 25	Id	$e\overline{P}_E$	00 29 22	0.6				
			$i\overline{P}_N$	00 29 22	1				
			i_{NE}	00 29 27	0.4				
			$i\overline{S}_{NE}$	00 29 35	0.7	+ 40			
			i_{NE}	00 29 39	0.7	+ 25			
			F	00 31.1					
118	Aug. 29	I	e_{NE}	14 49 15	0.8				Duration ca. 28 sec.
119	Aug. 29	I	i_{NE}	18 28 08	0.5				Duration ca. 20 sec.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
120	Aug. 29	I	e_{NE}	16 44 57	0.5				Beginning poor—may be earlier.
			e_E	16 45 08	0.6				
			e_{NE}	16 45 28	0.1				
			F	16 47					
121	Aug. 29	I	e_E	16 49 45					
			e_{NE}	16 50 23					
			F	16 51					
122	Sept. 1	Id	$i\overline{P}_E$	20 18 09					
			$i\overline{S}_{NE}$	20 18 11	0.6				
			F	21 18.5					
123	Sept. 3	I	e_E	06 42 35	0.4				
			e_N	06 42 40					May begin earlier.
			e_E	06 42 53	0.6				
			e_E	06 42 59	0.8				
			F	06 44 15					
124	Sept. 3	I	e_{NE}	21 18 57					Duration ca. 7 sec.
125	Sept. 5	I	e_E	15 51 03					Duration ca. 7 sec.
126	Sept. 5	I	e_{NE}	16 34 48					Duration ca. 12 sec.
127	Sept. 5	I	i_{NE}	22 34 10					Duration ca. 10 sec.
128	Sept. 9	I	e_N	05 15 55					May begin earlier.
			e_N	05 16 32					
			F	05 19					
129	Sept. 17	Ir	eP_E	19 21 04*	2				
			e_Z	19 21 15*	2				
			e_E	19 21 36*					
			e_Z	19 21 49*					
			eS_E	19 24 03*					
			eS_Z	19 24 11*	8			− 60	
								+120	
			e_E	19 25 20*	14	∓120			
			e_Z	19 25 31*	12			∓ 85	
			e_E	19 26 37*	9				
			e_Z	19 28 41*	10			∓200	
			e_Z	19 29 43*	8			∓120	
			e_E	19 29 51*	8				
			e_Z	19 32 33*	12				
			e_E	19 34 33*	9				

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
130	Sept. 19	Id	$e\overline{P}_E$	01 10 54					
			$i\overline{S}_E$	01 10 58					
			F	01 11 15					
131	Sept. 21	I	e_E	05 40 11					
			e_E	05 40 31					
			F	05 41 20					
132	Sept. 21	I	e_E	21 11 00	0.7				
			e_E	21 11 32					
			e_E	21 11 42					
			F	21 13.5					
133	Sept. 22	I	e_E	16 43 18					Duration ca. 20 sec.
134	Sept. 22	I	e_E	21 11 56					Duration ca. 25 sec.
135	Sept. 23	I	e_E	08 16 34					Duration ca. 20 sec.
136	Sept. 26	I	e_E	05 57 54					
			e_N	05 58 02					
			e_N	05 07 44	8				
			e_E	05 08 54	8				
			F	05 20.5					
137	Sept. 26	Iv	eP_E	20 01 34	0.6				
			e_E	20 01 44					
			eS_E	20 02 44					
			e_E	20 02 55	0.5				
			e_E	20 03 06	1				
			F	20 06.3					
138	Sept. 27	Ir	eP_E	23 19 01*	3				
			eP_N	23 19 01					
			e_N	23 20 ?					
			eS_E	23 22 13*					
			e_E	23 23 16*	25				
			e_N	23 23 19					
			e_E	23 25 42*	16				
			e_N	23 26 19	9				
			e_N	23 29 20*					
			F	23 44±*					

THE BERKELEY EARTHQUAKE OF AUGUST 2, 1929

On August 2, 1929, at about 2h 01m A.M. Pacific Standard Time occurred an earthquake which attained an intensity of at least 4 and perhaps 5 in parts of Berkeley. Below are listed the Rossi-Forel intensities at points reporting the earthquake to this station.

Berkeley:
- Elk's Club 5
- Roosevelt Avenue (2400 block) 4–5
- San Miguel Avenue (600 block) 4
- City Hall 4
- Shattuck Avenue (1900 block) 4
- Santa Barbara Road (1900 block) 4
- Grove Street (2700 block) 4

Albany 4
El Cerrito 4
Richmond 4
San Francisco (Page and Baker Sts.) ..... 3?

The criterion for grade 5 was the awakening of all sleepers and the movement of beds, for grade 4, the rattling of doors and windows. The report from San Francisco was that a sleeper was awakened by sharp, quick motion. The earthquake was reported as not felt in Kentfield, Fairfax, Larkspur, Ross, San Rafael, Port Costa, Rodeo, San Pablo, Concord, Walnut Creek, La Fayette, Alamo, Alameda. No reports of its being felt in Oakland were received and only the one report from San Francisco. A study of the Berkeley records leads to the conclusion that the focus of this earthquake lay about 5 kilometers from the station. The velocities used in this computation were obtained from quarry blast records. From the field data it was evidently in a northerly direction. As to its depth nothing can be said except that it was probably considerably less than 5 km.

The newspapers reported a meteor in connection with this earthquake. The observer, when interviewed, was quite positive that he saw from his home in Stege a meteor fall in the bay at the time of the earthquake. However no other observer or evidence could be found. The Commandants at Angel Island and Goat Island as well as the Superintendent of Light Houses sought for observers but found none.

UNIVERSITY OF CALIFORNIA PUBLICATIONS—(Continued)

VOLUME 2. 1924–

Records from October 1920–

THE REGISTRATION OF EARTHQUAKES—

AT THE BERKELEY STATION AND THE LICK OBSERVATORY STATION:

No. 1. From October 1, 1920, to March 31, 1921.
No. 2. From April 1, 1921, to September 30, 1921.
No. 3. From October 1, 1921, to March 31, 1922.
No. 4. From April 1, 1922, to September 30, 1922.
No. 5. From October 1, 1922, to March 31, 1923.
No. 6. From April 1, 1923, to September 30, 1923.
No. 7. From October 1, 1923, to March 31, 1924.
No. 8. From April 1, 1924, to September 30, 1924.
No. 9. From October 1, 1924, to March 31, 1925.
No. 10. From April 1, 1925, to September 30, 1925.
No. 11. From October 1, 1925, to March 31, 1926.
No. 12. From April 1, 1926, to September 30, 1926.
No. 13. From October 1, 1926, to March 31, 1927.
No. 14. From April 1, 1927, to September 30, 1927.
No. 15. From October 1, 1927, to March 31, 1928.
No. 16. From April 1, 1928, to September 30, 1928.
No. 17. From October 1, 1928, to March 31, 1929.
No. 18. From April 1, 1929, to September 30, 1929.
Issued March 11, 1930.