THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

October 1, 1929, to March 31, 1930

BY

PERRY BYERLY
AND
ROBERT DYK

BULLETIN OF THE SEISMOGRAPHIC STATIONS, VOL. 2, NO. 19

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

UNIVERSITY OF CALIFORNIA PUBLICATIONS

Note.—The University of California Publications are offered in exchange for the publications of learned societies and institutions, universities and libraries. Complete lists of all the publications of the University will be sent upon request. For sample copies, lists of publications and other information, address the MANAGER OF THE UNIVERSITY PRESS, BERKELEY, CALIFORNIA, U. S. A. All matter sent in exchange should be addressed to THE EXCHANGE DEPARTMENT, UNIVERSITY LIBRARY, BERKELEY, CALIFORNIA, U. S. A.

Publications of the University of California Press may be obtained from THE CAMBRIDGE UNIVERSITY PRESS, FETTER LANE, LONDON, E. C. 4, ENGLAND, to which orders originating in Great Britain and Ireland should be sent.

BULLETIN OF THE SEISMOGRAPHIC STATIONS

BERKELEY STATION, UNIVERSITY CAMPUS

LICK OBSERVATORY STATION, MOUNT HAMILTON, CALIFORNIA

Editor, GEORGE D. LOUDERBACK. Volume 1 complete, Volume 2 in progress (1924–). Price per volume, $5.00. Single numbers, 25 cents.

Beginning in January, 1912, the records of the two seismographic stations have been published for two six-month periods of a year, namely April 1 to September 30, and October 1 to March 31. A list is here printed as a guide to the *Bulletin* covering each respective period since the records have been kept.

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.
No. 6. From October 1, 1912, to March 31, 1913.
No. 7. From April 1 to September 30, 1913.
No. 8. From October 1, 1913, to March 31, 1914.
No. 9. From April 1, 1914, to September 30, 1914.
No. 10. From October 1, 1914, to March 31, 1915.
No. 11. From April 1, 1915, to September 30, 1915.
No. 12. From October 1, 1915, to March 31, 1916.
No. 13. From April 1, 1916, to September 30, 1916.
No. 14. From October 1, 1916, to March 31, 1917.
No. 15. From April 1, 1917, to September 30, 1917.
No. 16. From October 1, 1917, to March 31, 1918.
No. 17. From April 1, 1918, to September 30, 1918.
No. 18. From October 1, 1918, to March 31, 1919.
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

OCTOBER 1, 1929, TO MARCH 31, 1930

BY

PERRY BYERLY

AND

ROBERT DYK

CONTENTS

	PAGE
Symbols and Notations Employed	400
The Berkeley Station	401
Constants	401
Tabulation of Shocks	402
The Lick Observatory Station	410
Constants	510
Tabulation of Shocks	411
Notes on Particular Shocks	434

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	ϵ	$\frac{r}{T_0^2}$
1929						
Dec. 5	Bosch-Omori 100 kg.	E	40	11.9	3	0.002
	"	N	52	8.7	3	0.003
	Wiechert 80 kg.	Z	44	4	5	0.005
1930						
Jan. 16	Bosch-Omori 100 kg.	E	45	14.0	10	0.0008
Jan. 28	Bosch-Omori 100 kg.	N	50	14.0	10	0.0014

Note.—On January 16, 1930, the air damping device on the East-West component of the Bosch-Omori seismographs was replaced by an oil damping device. On January 28, 1930, a similar change was made on the North-South component.

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
1	Oct. 5	Ir	eP_N	17 09 33					
			eP_Z	17 09 40					
			eP_E	17 09 41	4				
			eS_E	17 17 01					
			eS_{NZ}	17 17 03					
			eL_Z	17 25 03	25				
			eL_N	17 25.5	26				
			eL_E	17 25.6	28				
			F	17 36.9					
2	Oct. 6	Ir	eP_E	07 58 22	3				
			eP_{NZ}	07 58 23	2				
			e_N	08 00 56	3				
			e_Z	08 00 58	1				
			e_E	08 01 00					
			eS_E	08 03 43	12?				
			eS_N	08 03 51					
			e_N	08 05 55	16				
			e_E	08 05 55	13				
			e_E	08 07 47	19				
			e_N	08 07 49	9				
			e_Z	08 07 55	20				
			F	09 52±					
3	Oct. 8	I	e_E	17 28 18	3				
			e_Z	17 28 20	3				
			e_N	17 28 50					
			e_E	17 38 42					
			e_E	17 51 14					
			e_N	17 51 17	9				
			e_E	17 55 32	20				
			e_Z	17 55 58	20				
			e_N	18 01 07	16				
			e_Z	18 01 15	18				
			e_E	18 01 35	18				
			F	18 16±					
4	Oct. 15	I	e_Z	22 04 13					
			e_E	22 04 17					
			e_N	22 04 39					
			e_E	22 04 43	3				
			F	22 05 40					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
5	Oct. 19	Iu	eP_Z	10 24 47	4				U. S. C. & G. S. epicenter at 20.5° S 72.5° W.
			eP_{EN}	10 24 54					
			e_Z	10 24 54					
			e_N	10 25 30	8				
			eS_E	10 34 38					
			eS_N	10 34 38	11				
			eS_Z	10 34 38	8				
			e_N	10 35.4	5				
			e_E	10 38.6	6				
			e_E	10 40 38					
			e_E	10 46.5	20ca				
			e_N	10 46.7	10				
			e_Z	10 47.1	8				
			eL_Z	10 49.9					
			eL_N	10 50.3	8				
			eL_E	10 50.7	35ca				
			F	11 04±					
6	Nov. 9	Ir	e_N	01 56 36	9				Felt in Alaska.
			e_E	01 56 48	10				
			e_Z	01 58 24	9				
			e_Z	02 05 14	8				
			e_N	02 05 16	8				
			e_E	02 05 32	7				
			F	02 22					
7	Nov. 9	Iv	e_{EN}	02 32 02					Felt in Coalinga, California, and vicinity, R. F. IV at Bitterwater.
			e_Z	02 32 08					
			F	02 33 10					
8	Nov. 15	Iu	eP_E	19 03 24	3				J. S. A. epicenter at 3.5° N 143° E.
			eP_Z	19 03 25					
			eP_N	19 03 30					
			eS_E	19 13 52					
			e_N	19 14 12	9				
			e_N	19 15 14	6				
			e_E	19 15 16					
			e_E	19 19 28					
			e_E	19 22 52	13				
			e_N	19 27 06	15				
			e_N	19 31 44	12				

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
8	Nov. 15 (contd.)	Iu	e_Z	19 32 08	22				
			e_E	19 33 31	20				
			F	20 35±					
9	Nov. 17	I	e_E	04 08 12					
			e_E	04 10 38	30				
			e_E	04 15 28	25				
			e_E	04 29.8	28				
			e_N	04 29.9	22				
			e_Z	04 29.9	24				
			F	05 20±					
10	Nov. 18	IIr	eP_{EN}	20 40 49					U. S. C. & G. S. and J. S. A. epicenters at 47.5° N 58° W.
			iP_Z	20 40 49					
			e_Z	20 42 43	5				
			e_{EN}	20 42 47	5				
			e_E	20 44 01	4				
			eS_E	20 47 54	16				
			eS_Z	20 47 55	5				
			eS_N	20 47 56					
			e_E	20 51 21	13	−15			
						+15			
			e_Z	20 51 22	7				
			e_N	20 51 31					
			e_Z	20 52 35					
			e_Z	20 54 41	6				
			e_E	20 55 04	40?				
			e_Z	20 56 16					
			e_E	20 56 52					
			e_E	21 02 52	13	−60			
						+60			
			e_Z	21 02 52	15			−250	
								+165	
			e_N	21 02 52					
			F	21 56±					
11	Nov. 26	Iv	eP_N	08 04 46					Felt in Central California. See p. 434.
			e_{EN}	08 04 56					
			e_{EN}	08 05 00					
			eS_{EN}	08 05 09					
			e_N	08 05 12					
			e_{EN}	08 05 14					
			F	08 06 14					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
12	Nov. 28	IIv	eP_Z	19 49 42					Felt in East Central Calif. See p. 434.
			eP_E	19 49 43					
			e_Z	19 49 53					
			e_E	19 49 54					
			e_N	19 49 55					
			eS_{ENZ}	19 50 17					
			e_Z	19 50 22					
			e_{EN}	19 50 25					
			e_{ENZ}	19 50 47					
13	Nov. 28	IIv	eP_Z	19 53 05					
			e_E	19 53 06					
			e_N	19 53 07					
			e_{ENZ}	19 53 17					
			eS_{ENZ}	19 53 40					
			e_E	19 53 41					
			e_{EN}	19 53 46					
			e_{ENZ}	19 53 49					
			F	19 57 17±					
14	Dec. 4	Iv	eP_Z	12 29 28					Felt at Eureka, California, and vicinity. See p. 436.
			e_Z	12 29 43					
			e_N	12 29 44					
			e_E	12 30 02					
			e_E	12 30 10					
			e_N	12 30 13					
			e_Z	12 30 15					
			eS_N	12 30 28					
			eS_E	12 30 29					
			e_Z	12 30 35					
			e_N	12 30 46					
			e_E	12 30 48					
			e_E	12 31 25					
			F	12 35 31±					
15	Dec. 11	Iv	eP_{NZ}	09 15 03					Felt at Gilroy, California. See p. 437.
			e_{EZ}	09 15 08					
			eS_{ENZ}	09 15 16					
			e_{ENZ}	09 15 20					
			e_{EN}	09 15 24					
			e_Z	09 15 28					
			F	09 16.0					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
16	Dec. 17	IIIr	eP_N	11 07 02	4?				U. S C & G. S. epicenter at 53° N 171° E
			eP_E	11 07 02					
			e_E	11 07 08	12?				
			e_E	11 09 38	12				
			e_N	11 09 48	10		+ 9		
							− 9		
			e_Z	11 10 01					
			e_N	11 12 08	12				
			e_E	11 12 32	10	+10			
						−15			
			eS_E	11 13 58	20	+490			
						−490			
			eS_N	11 13 58	14		+150		
							−150		
			eS_Z	11 13 59					
			e_Z	11 15 10	10				
			e_E	11 16 32	18	+300			
						−300			
			e_N	11 16 44	22		+330		
							−330		
			e_Z	11 17 26	15			−190	
								+190	
			e_E	11 18 08	24	+650			
						−800			
			e_N	11 18 28					
			eSR_{3Z}	11 19 34	28			−1400	
								+1400	
			e_E	11 19 48	22	+950			
						−800			
			e_N	11 19 50	20		+770		
							−925		
			eL_Z	11 20 36	20			−1300	
								+1300	
			eL_E	11 20 09	22	+1100			
						−1400			
			eL_N	11 21 08	16		+380		
							−550		
			eM_Z	11 24 13	15			−700	
								+700	
			eM_E	11 24 06	18	+1300			
						−1200			
			F	14 37±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
17	Jan. 9	Iv	ePE_{NZ}	08 06 40					Felt at Bitterwater, California. See p 437
			eS_E	08 06 56					
			eS_Z	08 06 57					
			e_N	08 07 04					
			e_E	08 07 06					
			e_Z	08 07 16					
			e_N	08 07 19					
			F	08 09 20					
18	Jan. 9	Iv	ePE_{NZ}	08 16 00					
			iS_E	08 16 17					
			eS_{ZN}	08 16 24					
			e_E	08 16 32					
			F	08 16 50					
19	Jan. 9	Id	eP_N	09 55 49					
			eP_Z	09 55 50					
			S_{EN}	09 56 02					
			i_Z	09 56 06					
			F	09 58					
20	Jan. 14	I	e_E	22 33 06					Surface waves of distant quake.
			e_N	22 34 03					
			F	23 03±					
21	Jan. 16	IIv	eP_{EN}	00 26 06					R. F. VII at Big Bear City and Fawnskin, California. 33 shocks reported from Jan. 16 to Jan. 28.
			e_{EN}	00 26 31				2	
			eS_E	00 27 08					
			e_N	00 27 15				3	
			e_E	00 27 25				4	
			e_N	00 27 30				4	
			eM_{EN}	00 27 43					
			e_E	00 30 11				5	
22	Jan. 16	Iv	e_E	00 37 01					
			e_N	00 37 03					
			F	00 42 07					
23	Jan. 18	I	e_E	07 44 04				28	Surface waves of distant quake.
			F	07 50 08±					
24	Jan. 23	Id	iP_{EZ}	04 25 54					See p 438.
			iS_{ENZ}	04 25 55					
			F	04 26 38					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
25	Feb. 2	Ir	eP_N	15 03 57	3				
			eP_E	15 04 03	3				
			e_E	15 06 09	5				
			e_N	15 06 19	4				
			eS_{EN}	15 10 14	10				
			e_N	15 14 09	8				
			e_E	15 15 06	25				
			e_N	15 15 06	10				
			e_E	15 16 06	20				
			e_N	15 16 07	9				
			F	15 35 06					
26	Feb. 11	Id	eP_N	21 20 53					See p. 438.
			eP_Z	21 20 54					
			e_{EZ}	21 20 56					
			e_N	21 20 57					
			eS_{ENZ}	21 21 02					
			e_{ENZ}	21 21 05					
			F	21 23 08					
27	Feb. 14	I	e_E	21 15 00	12				
			e_N	21 15 04	10				
			e_Z	21 19 02					
			e_Z	21 22 07	20				
			e_N	21 23 06	16				
			e_E	21 23 08	18				
			F	21 50±					
28	Feb. 26	Iv	eP_{NZ}	02 31 42					VIII to IX Rossi-Forel at Westmorland, California. Felt throughout the Imperial Valley.
			e_N	02 33 05					
			e_E	02 33 06					
			iS_Z	02 33 18					
			i_{EN}	02 33 25					
			e_Z	02 33 31					
			i_{NZ}	02 33 57					
			i_E	02 34 06	12				
			iM_Z	02 34 26					
			iM_E	02 34 37	11				
			iM_N	02 34 37	10				
			e_E	02 35 27	6				
			e_N	02 36 17					
			F	02 50±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
29	Feb. 26	I	e_E	03 25 37					
			e_N	03 25 39					
			e_Z	03 25 47					
			e_Z	03 26 22					
			e_E	03 26 39					
			e_{EZ}	03 27 02					
			F	?					
30	Mar. 1	I	e_N	23 46 25					VIII to IX Rossi-Forel at Brawley, California. Felt throughout the Imperial Valley.
			e_N	23 47 35					
			e_Z	23 47 36					
			e_E	23 47 59					
			e_N	23 48 07					
			e_Z	23 48 09					
			eM_{EN}	23 48 51	10				
			eM_Z	23 48 59	4				
			F	23 57±					
31	Mar. 26	Iv	e_E	07 40 19	10				
			e_Z	07 40 27					
			e_Z	07 46 09					
			e_E	07 46 33	16				
			e_E	07 52 11	16				
			e_Z	07 57 05	9				
			e_E	07 57 39	24				
			F	08 40±					

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
1929 October	Wiechert 160 Kg. H.	E	90	6	5
		N	90	6	5
	80 Kg. Vertical	Z	56	3	7
October	Anderson-Wood Torsion	E	3000	1	aperiodic
		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. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
1	Oct. 1	Id	$i\overline{P}_{EN}$	08 45 42					
			$i\overline{S}_{EN}$	08 45 43					
			i_E	08 45 44					
			F	08 45 50					
2	Oct. 1	I	e_{EN}	09 09 09					
			i_{EN}	09 09 22					
			i_{EN}	09 09 26					
			F	09 09 38					
3	Oct. 5	I	e_{EN}	17 09 33*	4				
			e_{EN}	17 16 53*	5				
			e_E	17 26.4*	28				
			e_N	17 26.4*	24				
			F	17 35.2*					
4	Oct. 6	I	e_N	05 58 20					
			e_N	06 10 42					
			e_N	06 12 42					
			e_N	06 15 17	7				
			F	06 30±					
5	Oct. 6	Ir	eP_{EN}	07 58 19*					
			eP_E	07 58 23	1				
			eP_N	07 58 24					
			e_N	07 58 30*	4				
			e_E	07 58 33*	2				
			e_E	07 58 33					
			ePR_{2E}	07 59 41					
			eS_{EN}	08 03 50					
			eS_E	08 03 53*	10				
			eS_N	08 03 56*	7				
			e_E	08 04 10					
			e_N	08 05.8*	18				
			eSR_{1E}	08 05.9*	14				
			eSR_{1N}	08 05 55	9				
			e_E	08 06 08					
			e_E	08 07.3*	20				
			e_N	08 07.8*	9				
			eL_N	08 07 50	8				
			eL_E	08 07 50	20	+25 −25			

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
5	Oct. 6 (contd.)	Ir	eM_E	08 10.5	7				
			eM_N	08 10.6	8				
			e_E	08 17 15*	7				
			F	09 50±					
6	Oct. 7	Iv	eP_{EN}	07 59 53	1				
			e_N	08 00 01					
			e_E	08 00 02					
			e_E	08 00 08	0.5				
			e_N	08 00 14	0.5				
			eS_{EN}	08 00 22	0.5				
			e_{EN}	08 00 26	0.5				
			e_{EN}	08 00 36	1				
			F	08 01 47					
7	Oct. 8	I	e_E	17 28 18*	4				
			e_E	17 28 20	1				
			e_N	17 28 20	2				
			e_E	17 29 18*	5				
			e_N	17 38.6					
			e_E	17 51 22*	22				
			e_{EN}	17 52.5	10				
			e_E	17 55.7	30	−30 +30			
			e_N	17 55.7	22		−30 +30		
			e_N	17 58.3	8				
			e_E	18 00.2	18				
			e_N	18 01.2	17				
			e_E	18 01 13*	18				
			F	18 25±					
8	Oct. 9	Id	$e\overline{P}_{EN}$	20 43 59					
			$e\overline{S}_N$	20 44 05					
			e_E	20 44 09					
			e_E	20 44 12					
			F	20 44.6					
9	Oct. 11	Id	eP_E	22 43 46					
			e_N	22 43 51					
			iS_{EN}	22 43 57	0.4				May begin earlier.
			i_{EN}	22 43 58	0.4				
			F	22 44.5					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
10	Oct. 15	Iv	eP_{EN}	22 03 51*	1				IV to V Rossi-Forel at Coalinga, Oilfields, and Priest Valley, California.
			e_{EN}	22 03 59*					
			e_E	22 04 11*					
			e_N	22 04 13*					
			eS_N	22 04 21*	1				
			iS_E	22 04 23*					
			e_N	22 04 29*					
			i_E	22 04 32*	2				
			F	22 07 09					
11	Oct. 19	Iu	eP_E	10 24 42					U. S. C. & G. S. epicenter at 20°5 S 72°5 W.
			eP_N	10 24 44					
			eP_E	10 24 44*	1				
			e_{EN}	10 24 47					
			e_E	10 24 55*					
			e_N	10 24 56*					
			e_{EN}	10 25 21	2				
			e_N	10 25 37*					
			e_E	10 25 57					
			eS_{EN}	10 34 32	6				
			eS_E	10 34 35*	6				
			e_E	10 34 58	6				
			e_N	10 35 32	5				
			e_E	10 35 33*					
			eSR_{1E}	10 39 51	7				
			eSR_{1E}	10 39 52*	7				
			e_E	10 46 13*	40				
			eL_E	10 49.3*					
			eL_E	10 49.5	7				
			eL_N	10 49.7	8				
			F	11 00±					
12	Oct. 20	Id	$e\overline{P}_{EN}$	12 51 49					
			$i\overline{S}_{EN}$	12 51 57					
			F	12 52 20					
13	Oct. 21	I	e_{EN}	08 05 04					
			i_{EN}	08 05 41					
			e_{EN}	08 05 50					
			F	08 06.8					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
14	Oct. 22	Iv	eP_E	04 21 09					
			eS_{EN}	04 21 29					
			e_{EN}	04 21 32					
			F	04 22 18					
15	Nov. 3	Id	$e\overline{P}_E$	11 42 21					
			$i\overline{S}_{EN}$	11 42 23	.8				
			i_E	11 42 25	.7				
			e_N	11 42 30					
			F	11 43.0					
16	Nov. 5	I	e_{EN}	21 07 42					
			e_{EN}	21 07 52					
			F	21 08 24					
17	Nov. 7	Id	$e\overline{P}_{EN}$	20 52 36					
			$i\overline{S}_{EN}$	20 52 43	0.2				
			e_{EN}	20 52 48	0.7				
			F	20 53.4					
18	Nov. 8	I	e_{EN}	03 29 17	1				
			F	03 30 10					
19	Nov. 8	Iv	eP_{EN}	06 02 07					
			e_E	06 02 16					
			eS_N	06 02 35					
			eS_E	06 02 37	0.5				
			e_N	06 02 40	0.6				
			e_E	06 02 41	1				
			e_N	06 02 44					
			F	06 04.2					
20	Nov. 9	Ir	eP_{EN}	01 47 49					
			eS_{EN}	01 53 49					
			eL_E	01 57.0*	9				
			eL_{EN}	01 57.4	13				
			e_N	01 58.0	11				
			eM_E	01 59.4	9				
			eM_N	02 00 13	8				
			F	02 30±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
21	Nov. 9	Iv	eP_{EN}	02 31 13					R. F IV at Bitterwater, California.
			e_{EN}	02 31 18	0.4				
			e_{EN}	02 31 23	0.5				
			e_E	02 31 25*					
			e_{EN}	02 31 33	0.7				
			e_N	02 31 33*	1				
			$i\overline{S}_{EN}$	02 31 37	0.7				
			i_{EN}	02 31 42	1				
			e_{EN}	02 31 45*	2				
			i_{EN}	02 31 50	1				
			e_N	02 31 51*	2				
			i_{EN}	02 31 56	1				
			F	02 35					
22	Nov.12	I	e_{EN}	04 46 37					
			F	04 47 10					
23	Nov.15	Iu	eP_E	19 03 27*	4				
			eP_{EN}	19 03 27					
			e_N	19 03 37	3				
			e_E	19 07 32*					
			e_E	19 09 42*	9				
			eS_E	19 14 00*	8				
			eS_{EN}	19 14 26	7				
			ePS_N	19 15 26					
			ePS_E	19 15 30					
			ePS_E	19 15.5*	12				
			e_N	19 17 09	7				
			eSR_{1E}	19 19 52*	6				
			e_N	19 20 12	8				
			e_N	19 21 54	10				
			eSR_{3N}	19 27.4	24			+95	
								−95	
			eG_N	19 29.4	19			+35	
								−35	
			eL_E	19 30.4*	15				
			eL_E	19 30.9	8				
			e_N	19 32.2	12			+50	
								−50	
			e_E	19 32.5	15				
			e_N	19 35.2	9				
			e_E	19 36.1	9				

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
23	Nov. 15 (contd.)	Iu	eM_E	19 39 7	18	+40 −40			
			eM_E	19 40.7*	18				
			F	21 25±					
24	Nov. 17	I	e_E	04 01 22	4				
			e_E	04 08 17	5				
			e_E	04 10 51	15ca				
			e_E	04 15 52					
			eL_E?	04 30.0	32				
			eM_E?	04 41.6	18				
			F	05 30±					
25	Nov. 18	I	e_N	02 29 34					
			e_{EN}	02 29 52					
			F	02 31					
26	Nov. 18	Id	$i\overline{P}_{EN}$	18 27 28*					
			$i\overline{P}_N$	18 27 29					
			i_{ENZ}	18 27 29*					
			i_E	18 27 30*					
			i_N	18 27 31					
			$i\overline{S}_N$	18 27 32					
			$e\overline{S}_{EN}$	18 27 32*					
			e_N	18 27 37					
			e_N	18 27 50					
			F	18 28.5*					
27	Nov. 18	IIr	eP_E	20 40 ?*	4				
			eP_N	20 40 47	1				
			eP_N	20 40.8*					
			e_N	20 42 45					
			e_E	20 42.8*	5				
			eS_E	20 47 ?	10				
			eS_N	20 47 55					
			e_N	20 51 23					
			e_N	20 56 44					
			e_N	20 58 52	7		−30 +30		
			e_N	21 02 07					
			e_N	21 06 57					
			e_N	21 13 07					
			F	21 51±					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1929			h. m. s.	s.	μ	μ	μ	
28	Nov. 20	Id	$i\overline{P}_{EN}$	10 15 50					
			$i\overline{S}_{EN}$	10 15 51					
			F	10 16.2					
29	Nov. 20	Id	$i\overline{P}_{EN}$	10 24 49					
			$i\overline{S}_{EN}$	10 24 51					
			i_{EN}	10 24 53					
			F	10 25 23					
30	Nov. 20	I	e_{EN}	15 19 26					
			e_{EN}	15 19 40					
			e_{EN}	15 19 43					
			F	15 20 16					
31	Nov. 20	Id	$i\overline{P}_{EN}$	22 05 36					
			$i\overline{S}_{EN}$	22 05 38					
			F	22 06 0					
32	Nov. 20	Iv	e_{EN}	22 52 09					IV Rossi-Forel at Bitterwater, California.
			e_{EN}	22 52 21					
			F	22 53 01					
33	Nov. 21	Id	$i\overline{P}_{EN}$	03 51 07					
			$e\overline{P}_{EN}$	03 51 07*					
			$i\overline{S}_{EN}$	03 51 10					
			$i\overline{S}_{EN}$	03 51 10*					
			i_{EN}	03 51 11*					
			F	03 51 51					
34	Nov. 22	Id	$i\overline{P}_{EN}$	01 05 34		0.5			
			$i\overline{S}_{EN}$	01 05 37		0.5			
			i_{EN}	01 05 39		0.5			
			F	01 06.1					
35	Nov. 23	I	e_{EN}	03 06 4					Earthquake reported felt in Santa Margarita, California, at 02h 30m.
			e_{EN}	03 06 51					
			F	03 07 34					
36	Nov. 23	I	e_{EN}	05 38.3					
			e_{EN}	05 38 49					
			F	05 39 6					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
37	Nov.24	Iv	e_{EN}	09 56 19					IV Rossi-Forel at Bitterwater and Loneoak, Calif.
			e_{EN}	09 56 34					
			F	09 57 14					
38	Nov.24	Id	$i\overline{P}_N$	21 34 16					
			$i\overline{S}_N$	21 34 19					
			F	21 34 24					
39	Nov.25	I	i_N	04 30 11					
			F	04 30 34					
40	Nov.26	IIv	ePE_N	08 04 23					See p. 434.
			i_{EN}	08 04 24					
			e_E	08 04 25*					
			e_N	08 04 26*					
			i_E	08 04 30					
			e_{EN}	08 04 30*					
			iS_E	08 04 35					
			i_{EN}	08 04 37					
			e_{EN}	08 04 37*					
			i_E	08 04 41					
			i_{EN}	08 04 41*					
			i_E	08 04 55*					
			i_N	08 04 56*					
			F	08 09±					
41	Nov.28	IIv	ePE_N	19 49 35*	3				See p. 434.
			eP_E	19 49 35					
			eP_N	19 49 36					
			e_{EN}	19 49 37					
			e_{EN}	19 49 40					
			e_{EN}	19 49 43*	2				
			eS_{EN}	19 50 04*	2				
			iS_N	19 50 07					
			iS_E	19 50 09					
			e_{EN}	19 50 10*	2				
			e_{EN}	19 50 14*					
			e_N	19 50 35*					
			F	?					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
42	Nov.28	IIv	ePE_N	19 52 59*	2				
			eP_{EN}	19 52 59					
			e_{EN}	19 53 02					
			e_{EN}	19 53 05*	1				
			e_{EN}	19 53 08					
			e_N	19 53 09					
			e_E	19 53 10	1				
			eS_{EN}	19 53 28*	2				
			iS_{EN}	19 53 28					
			e_N	19 53 29					
			e_{EN}	19 53 33					
			e_{EN}	19 53 33*	1				
			e_E	19 53 38					
			e_N	19 53 38					
			F	?					
43	Nov.28	Iv	ePE_N	19 59 08					
			e_{EN}	19 59 15					
			iS_{EN}	19 59 37					
			e_{EN}	19 59 42					
			F						
44	Dec. 4	Iv	ePE_N	12 28 38					See p. 436.
			e_{EN}	12 28 44					
			e_{EN}	12 28 53					
			e_E	12 29 11					
			eS_{EN}	12 29 21					
			e_{EN}	12 29 32					
			e_{EN}	12 29 44					
			F						
45	Dec. 6	Id	$i\overline{P}_{EN}$	13 33 54					
			$i\overline{S}_{EN}$	13 34 05					
			e_{EN}	13 34 09					
			F	13 34 30					
46	Dec. 6	I	e_{EN}	19 23 55					
			e_{EN}	19 23 59					
			e_N	19 24 20					
			e_E	19 24 25					
			e_N	19 24 26					
			e_E	19 24 29					
			F	19 26 00					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
47	Dec. 7	I	e_N	11 43 39					
			F	11 44 14					
48	Dec. 10	I	eP_{EN}	14 22 6					Beginning poor, microseisms.
			F	14 23.2					
49	Dec. 10	Iv	eP_{EN}	14 23 34					
			e_{EN}	14 23 39					
			i_N	14 23 45					
			e_E	14 23 54					
			eS_E	14 24 33					
			iS_N	14 24 35					
			i_{EN}	14 24 37					
			i_{EN}	14 24 42					
			F	14 27 00					
50	Dec. 10	Id	$i\overline{P}_{EN}$	21 10 28					
			$i\overline{S}_{EN}$	21 10 30					
			F	21 11.0					
51	Dec. 11	Iv	eP_E	08 44 24					
			e_N	08 44 27					
			eS_{EN}	08 44 42					
			e_{EN}	08 44 47					
			F	08 45 40					
52	Dec. 11	Iv	$i\overline{P}_{EN}$	09 14 54					See p. 437.
			$e\overline{P}_N$	09 14 54*	2				
			e_N	09 14 57*	1				
			$i\overline{S}_{EN}$	09 14 58					
			$e\overline{S}_N$	09 14 59*	1				
			i_E	09 15 00					
			e_N	09 15 03*					
			F	09 17 45					
53	Dec. 15	Iv	$i\overline{P}_{EN}$	12 51 36					
			i_{EN}	12 51 47					
			$i\overline{S}_{EN}$	12 51 49					
			F	12 52 26					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1929			h. m. s.	s.	μ	μ	μ	
54	Dec. 17	Id	$i\overline{P}_E$	09 51 20					
			i_E	09 51 22					
			i_E	09 51 24					
			$i\overline{S}_E$	09 51 25					
			i_E	09 51 26					
			i_E	09 51 36					
			F	09 51 47					
55	Dec. 17	IIr	eP_E	11 07 09					
			eP_E	11 07 12*					
			e_E	11 07 15					
			ePR_{1E}	11 08 15					
			ePR_{2E}	11 09 08	11				
			e_E	11 10 05*	10				
			e_E	11 10 12					
			e_E	11 12 49					
			e_E	11 13 22*	10				
			eS_E	11 14 11					
			eS_E	11 14 14*	21				
			e_E	11 15 59					
			e_E	11 16 54					
			e_E	11 17 52					
			e_E	11 18.7*	30ca				
			e_E	11 19.1					
			eL_E	11 21.7	20	+650			
						−650			
			eL_E	11 22.0*	20				
			eM_E	11 26.0	17	+375			
						−375			
			eM_E	11 26.0	18				
			e_E	11 31.3	18				
			F	14 20±					
56	Dec. 17	I	e_E	16 37 42					
			e_E	16 37 57					
			e_E	16 38 01					
			F	16 38 32					
57	Dec. 20	I	e_{EN}	10 34 01	1				
			e_N	10 35 00	.6				
			F	10 36 34					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1929			h. m. s.	s.	μ	μ	μ	
58	Dec. 22	Id	$e\overline{P}_N$	18 00 09					
			$i\overline{S}_N$	18 00 15					
			i_N	18 00 17					
			F	18 01 00					
59	Dec. 22	Id	$e\overline{P}_N$	19 08 31					
			$i\overline{S}_N$	19 08 36					
			i_N	19 08 39					
			F	19 09 13					
60	Dec. 23	Iv	eP_{EN}	19 56 05					
			i_E	19 56 08					
			i_N	19 56 11					
			i_E	19 56 12					
			i_N	19 56 19					
			i_E	19 56 22					
			iS_{EN}	19 56 28					
			i_{EN}	19 56 39					
			i_{EN}	19 56 46					
			F	20 00±					
61	Dec. 23	I	e_{EN}	14 04 43					
			F	14 05 15					
	1930								
62	Jan. 8	Id	$i\overline{P}_{EN}$	18 00 39*					
			$i\overline{S}_{EN}$	18 00 40*					
			F	18 00 48*					
63	Jan. 9	IId	iP_E	08 06 27					Felt at Bitterwater, California. See p. 437.
			iP_{EN}	08 06 28*					
			i_E	08 06 29					
			e_E	08 06 31*					
			i_E	08 06 32					
			iS_{EN}	08 06 36*					
			iS_E	08 06 37					
			i_{EN}	08 06 39*	1				Longer underlying period.
			i_E	08 06 40					
			i_{EN}	08 06 43*					
			i_E	08 06 45					
			i_{EN}	08 06 58*					
			i_E	08 08 30	0.5				
			F	08 09.7					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1930			h. m. s.	s.	μ	μ	μ	
64	Jan. 9	I	i_E	08 11 00	1				
			F	08 11 20					
65	Jan. 9	I	e_E	08 15 04					
			i_E	08 15 12					
			F	08 15 21					
66	Jan. 9	Id	eP_{EN}	08 15 47*					
			iP_E	08 15 48					
			e_N	08 15 50*					
			e_E	08 15 52*					
			i_E	08 15 52					
			i_E	08 15 56					
			iS_{EN}	08 15 58*					
			iS_E	08 15 59					
			i_{EN}	08 16 04*					
			F	08 18 50					
67	Jan. 9	IId	iP_E	09 55 39					Felt at Gonzales, California.
			eP_E	09 55 40*					
			i_E	09 55 40					
			e_N	09 55 42*					
			iS_{EN}	09 55 44*					Longer underlying period.
			iS_E	09 55 45					
			i_E	09 55 48*					
			i_{EN}	09 55 52*					
			i_E	09 55 54					
			F	09 57 50					
68	Jan. 10	I	i_{EN}	19 10 34					
			F	19 10 35					
69	Jan. 11	Iv	eP_{ENZ}	07 18 06*					
			iP_E	07 18 06					
			i_E	07 18 09					
			i_E	07 18 11					
			e_{NZ}	07 18 12*					
			i_E	07 18 15					
			iS_{ENZ}	07 18 17*					
			iS_E	07 18 18					
			e_{NZ}	07 18 23*					
			e_E	07 18 25*					
			F	07 21 25					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	μ	μ	μ	
70	Jan. 11	Iv	eP_E	07 34 45					
			e_E	07 34 53					
			iS_E	07 35 05					
			F	07 35 40					
71	Jan. 12	I	e_{EN}	01 29 52	1				
			F	01 31 25					
72	Jan. 13	I	i_E	00 13 46					
			F	00 14 00					
73	Jan. 13	I	e_E	14 10 38					
			e_E	14 10 42					
			i_E	14 10 48	0.6				
			F	14 11 05					
74	Jan. 14	I	i_{EN}	19 53 38*					
			F	19 53 40*					
75	Jan. 14	Id	iP_{EN}	20 42 07*					
			iS_{EN}	20 42 08*					
			F	20 42 10					
76	Jan. 15	Id	iP_{EN}	10 41 29					
			i_{EN}	10 41 31					
			i_{EN}	10 41 34					
			iS_{EN}	10 41 38	0.7				
			i_{EN}	10 41 40	0.7				
			i_{EN}	10 41 43	0.6				
			i_{EN}	10 41 49	0.6				
			F	10 43 30					
77	Jan. 16	Iv	iP_E	00 25 54					See p. 407.
			i_E	00 26 03					
			e_N	00 26 07*					
			i_E	00 26 10					
			i_E	00 26 29					
			iS_E	00 27 00					
			iS_E	00 27 01*					
			e_E	00 27 06					
			e_N	00 27 08*					
			i_N	00 27 14*	4				

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	μ	μ	μ	
77	Jan. 16 (contd.)	Iv	i_E	00 27 18*	4				
			i_N	00 27 23*	3				
			i_N	00 27 32					
			i_E	00 27 37	1				
			i_E	00 28 18	3				
			F	00 35 13					
78	Jan. 16	Iv	iP_E	00 35 18					
			e_E	00 35 35					
			e_N	00 35 37*					
			i_E	00 35 43					
			i_E	00 35 58					
			iS_E	00 36 23					
			i_E	00 36 32					
			i_E	00 36 39					
			e_E	00 36 42*					
			i_E	00 36 48					
			e_{EN}	00 36 48*	3				
			F	00 43 33					
79	Jan. 19	I	e_{EN}	05 44 52					IV Rossi-Forel at Storrie, California.
			e_E	05 45 00					
			e_E	05 45 18					
			e_E	05 45 20					
			e_{EN}	05 45 28					
			e_N	05 45 37					
			F	05 47 08					
80	Jan. 19	I	e_{EN}	06 36 43					
			F	06 36 50					
81	Jan. 19	I	e_{EN}	06 43 31					
			F	06 43 45					
82	Jan. 19	Iv	eP_{EN}	20 52 16*					IV Rossi-Forel at Castroville, California.
			i_{EN}	20 52 18					
			e_{EN}	20 52 18*					
			i_N	20 52 20					
			e_{EN}	20 52 23*					
			eS_E	20 52 26*					
			iS_{EN}	20 52 27					
			F	20 53.9					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
83	Jan. 23	Iv	eP_{EN}	04 26 05					See p. 438.
			i_{EN}	04 26 06					
			i_{EN}	04 26 08					
			iS_{EN}	04 26 15					
			e_{EN}	04 26 16*					
			i_{EN}	04 26 17					
			e_N	04 26 25*					
			F	04 27 44					
84	Jan. 23	Id	$e\overline{P}_{EN}$	09 55 31					
			i_{EN}	09 55 32					
			$i\overline{S}_{EN}$	09 55 36					
			i_{EN}	09 55 38					
			F	09 56.8					
85	Jan. 23	Id	$e\overline{P}_{EN}$	10 01 02					
			$i\overline{S}_{EN}$	10 01 03	0.5				
			i_{EN}	10 01 04					
			F	10 01 22					
86	Feb. 2	Iu	eP_{EN}	15 03 59					
			e_E	15 04 03					
			e_E	15 06 04					
			eS_E	15 10 22	5				
			eS_N	15 10 22	4				
			ePS_E	15 10 31	4				
			e_E	15 13 50					
			eL_N	15 16.4	16				
			eL_E	15 16.7	23				
			eM_E	15 20.1	15				
			F	15 56±					
87	Feb. 4	I	i_{EN}	08 49 25					
			i_{EN}	08 49 27					
			i_E	08 49 28					
			F	08 49 33					
88	Feb. 4	I	e_{EN}	08 32 48					
			e_{EN}	08 32 50					
			F	08 33 12					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
89	Feb. 6	I	e_{EN}	10 50 30					
			e_N	10 50 34					
			e_E	10 50 36	0.5				
			e_{EN}	10 50 46	0.7				
			e_{EN}	10 50 50					
			e_E	10 50 57					
			F	10 53 05					
90	Feb. 6	Iv	eP_{EN}	12 52 07					
			eS_{EN}	12 52 23					
			e_{EN}	12 53 28					
			F	12 53 35					
91	Feb. 7	I	e_E	00 00 38					Faint trace.
			e_N	00 00 50					
			F	00 01 40					
92	Feb. 7	Iv	eP_E	23 24 55					
			e_E	23 25 14					
			e_N	23 25 15					
			e_E	23 25 59					
			e_E	23 26 10					
			e_N	23 26 25					
			eS_E	23 26 34					
			e_{EN}	23 26 39					
			e_E	23 26 57					
			F	23 30±					
93	Feb. 8	I	e_E	23 53 11					
			e_{EN}	23 53 36					
			i_{EN}	23 53 46	0.6				
			F	23 54 31					
94	Feb. 9	I	e_{EN}	02 08 12					
			e_{EN}	02 08 22					
			F	02 08 52					
95	Feb. 9	I	e_E	02 34 32					
			e_{EN}	02 34 39	0.7				
			F	02 34 57					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	μ	μ	μ	
96	Feb. 9	Iv	eP_{EN}	21 38 24					
			e_E	21 38 28					
			eS_{EN}	21 39 05					
			i_E	21 39 08					
			e_N	21 39 49					
			F	21 41±					
97	Feb. 10	I	e_E	11 48 08					
			e_{EN}	11 48 48					
			e_{EN}	11 48 58					
			F	11 50 08					
98	Feb. 11	Iv	eP_{EN}	09 55 54					
			e_E	09 56 14					
			iS_{EN}	09 56 39					
			e_{EN}	09 56 51					
			F	09 57 54					
99	Feb. 11	IId	$i\overline{P}_{EN}$	21 20 49					See p. 438.
			i_{ENZ}	21 20 50*					
			i_{EN}	21 50 51					
			i_{EN}	21 50 52*					
			$i\overline{S}_{EN}$	21 50 53					
			$i\overline{S}_{ENZ}$	21 50 54*					
			i_{ENZ}	21 20 57*					
			i_{EN}	21 21 00*					
			F	21 21 54					
100	Feb. 14	I	eP_{EN}	20 53 08					
			e_E	20 53 17					
			e_E	21 02 55					
			e_E	21 07 35					
			e_E	21 15.8	10				
			e_E	21 19.0					
101	Feb. 14	Iv	eP_{EN}	23 14 45					
			eS_{EN}	23 14 54					
			e_E	23 14 57					
			F	23 17 32					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	μ	μ	μ	
102	Feb. 17	IId	$i\overline{P}_{EN}$	22 08 24					
			$i\overline{P}_{ENZ}$	22 08 25*					
			i_{ENZ}	22 08 27*					
			$i\overline{S}_{EN}$	22 08 30					
			i_E	22 08 33					
			i_N	22 08 34					
			i_E	22 08 38					
			F	22 10 15					
103	Feb. 17	Id	$i\overline{P}_{EN}$	22 12 11					
			$i\overline{S}_{EN}$	22 12 13					
			F	22 12 20					
104	Feb. 17	Id	$i\overline{P}_{EN}$	22 14 48					
			$i\overline{S}_{EN}$	22 14 51					
			F	22 14 57					
105	Feb. 17	Id	$i\overline{P}_{EN}$	22 35 27					
			$i\overline{S}_{EN}$	22 35 31					
			F	22 35 41					
106	Feb. 24	Iv	iP_{EN}	19 57 07					
			e_{EN}	19 57 19					
			eS_{EN}	19 57 59					
			e_E	19 58 20					
			F	19 59 20					
107	Feb. 25	Id	$i\overline{P}_{EN}$	19 58 14					
			$i\overline{S}_{EN}$	19 58 16					
			i_E	19 58 17					
			F	19 58 35					
108	Feb. 26	Id	$i\overline{P}_{EN}$	01 13 39					
			i_E	01 13 41					
			$i\overline{S}_{EN}$	01 13 44					
			i_E	01 13 46					
			i_E	01 13 48					
			F.	01 14 40					
109	Feb. 26	Id	$i\overline{P}_{EN}$	01 44 58					
			$i\overline{S}_{EN}$	01 45 00					
			i_E	01 45 01					
			F	01 45 20					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
110	Feb. 26	Iv	eP_E	02 31 09					See p. 408.
			e_N	02 31 19					
			e_N	02 31 24					
			e_E	02 31 30					
			e_{EN}	02 31 45					
			e_E	02 31 59					
			e_N	02 32 11					
			eS_{EN}	02 32 40					
			eS_N	02 32 40*					
			i_{EN}	02 32 53	2				
			i_{EN}	02 33 03					
			e_N	02 33 04*					
			i_E	02 33 06	3				
			e_N	02 33 15*	3				
			i_N	02 33 21	2				
			i_E	02 33 34	3				
			i_E	02 33 55	3				
			e_N	02 35 28	4				
			F	02 47 20					
111	Feb. 26	Iv	eP_E	03 23 40					
			e_E	03 23 52					
			e_N	03 23 55					
			e_N	03 24 14					
			eS_{EN}	03 25 10					
			e_{EN}	03 25 20	2				
			i_{EN}	03 25 40	3				
			F	03 30 20					
112	Feb. 26	Iv	eP_E	04 25 34					
			e_{EN}	04 25 48					
			eS_{EN}	04 27 05					
			e_N	04 27 15					
			i_E	04 27 25					
			e_E	04 27 40	3				
			F	04 31 20					
113	Feb. 26	Iv	eP_E	07 39 40					
			e_{EN}	07 40 02					
			eS_{EN}	07 41 19					
			e_{EN}	07 41 30	2				
			e_N	07 41 40	2				

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
113	Feb. 26 (contd.)	Iv	i_E	07 41 41					
			F	07 45 20					
114	Feb. 28	Iv	iP_N	23 57 18					
			iS_N	23 57 38					
			$i\overline{S}_N$	23 57 44					
			F	23 57 56					
115	Mar. 1	Iv	iP_N	00 42 35					
			$i\overline{S}_N$	00 42 52					
			F	00 43 26					
116	Mar. 1	Iv	eP_N	23 46 02*					See p. 409.
			eS_N	23 47 31*					
			e_{EN}	23 47 32*	3				
			F	23 53 30*					
117	Mar. 4	I	i_{EN}	08 48 44					
			F	08 48 48					
118	Mar. 5	I	i_{EN}	19 47 23					
			F	19 47 30					
119	Mar. 6	Id	$i\overline{P}_{EN}$	08 03 07					
			$i\overline{S}_{EN}$	08 03 09					
			i_{EN}	08 03 14					
			F	08 03 49					
120	Mar. 10	Ir	eP_{EN}	16 26 38					
			eS_{EN}	16 34 43	4				
			e_{EN}	16 35 48	5				
			eL_E	16 43 43	6				
			F	16 51 40					
121	Mar. 11	Id	$i\overline{P}_{EN}$	06 53 32					
			$i\overline{S}_{EN}$	06 53 34					
			i_E	06 53 39					
			F	06 54 00					
122	Mar. 13	I	i_{EN}	23 43.7					
			e_E	23 43 45					
			F	23 43 47					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
123	Mar. 23	Id	$i\overline{P}_{EN}$	14 21 35					
			$i\overline{S}_{EN}$	14 21 37					
			i_E	14 21 40					
			F	14 22 01					
124	Mar. 24	I	e_{EN}	00 16 04					
			e_E	00 16 09	0.5				
			i_{EN}	00 16 11					
			e_E	00 16 17					
			F	00 16 44					
125	Mar. 24	I	e_{EN}	00 20 28					
			e_{EN}	00 20 33					
			e_{EN}	00 20 35					
			F	00 20 56					
126	Mar. 24	I	e_{EN}	02 35 59					
			e_E	02 36 04	0.5				
			e_{EN}	02 36 06					
			e_E	02 36 11					
			F	02 36 46					
127	Mar. 24	I	e_{EN}	06 16 49					
			e_{EN}	06 16 54					
			F	06 17 14					
128	Mar. 24	I	e_{EN}	06 43 38					
			e_E	06 43 42					
			i_{EN}	06 43 44					
			e_E	06 43 52					
			F	06 44 11					
129	Mar. 24	I	e_{EN}	12 10 40	0.7				
			F	12 10 55					
130	Mar. 25	Iv	eP_N	15 59 26					
			eP_E	15 59 27					
			e_{EN}	15 59 30					
			eS_{EN}	15 59 40					
			i_E	15 59 42	0.4				
			i_E	15 59 45					
			F	15 59 50					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	μ	μ	μ	
131	Mar. 25	Id	iP_{EN}	16 49 07					
			i_E	16 49 08					
			i_{EN}	16 49 09					
			iS_N	16 49 15					
			iS_E	16 49 16	0.4				
			i_N	16 49 17					
			i_E	16 49 19	0.6				
			F	16 50 28					
132	Mar. 26	Iv	eP_E	00 20 50					
			eS_E	00 21 13					
			e_N	00 21 14					
			e_E	00 21 16					
			e_E	00 21 19					
			F	00 22±					
133	Mar. 26	Iu	e_E	07 41 33*	12				Surface waves of distant quake.
			F	08 42±*					
134	Mar. 31	I	i_{EN}	11 31 57					
			e_E	11 31 59					
			F	11 32 01					

THE EARTHQUAKE OF NOVEMBER 26, 1929

In the early morning of November 26, 1929 (about 4 minutes after midnight, P. S. T.) an earthquake shook the California coastal region from Hollister to Paso Robles. It was felt as far inland as Mendota. The greatest intensity was at Bitterwater and San Ardo. Windows were cracked at San Ardo while dishes were broken at Bitterwater.

The following lists the intensities on the Rossi-Forel scale at towns reporting:

V–VI. Bitterwater, San Ardo.

IV. Bern, Big Sur, Bradley, Bryson, Carmel, Cayucos, King City, Lucia, Mendota, Metz, Paso Robles, San Benito, San Lucas, San Miguel, Santa Cruz, Santa Marguerita, Soledad, Templeton.

III. Chualar, Hernandez, Spreckles.

I–II. Annette, Hollister, Lockwood, Paloma, and Tres Pinos.

The following reported the earthquake not felt:

Adelaida, Atascadero, Bakersfield, Campbell, Cambria, Castroville, Earlimart, Firebaugh, Guadalupe, Helm, Idria, Jamesburg, La Panza, Lompoc, Los Alamos, Los Banos, Los Gatos, Lost Hills, Morgan Hill, Morro Bay, Newman, Orcutt, Paicines, San Joaquin, San Jose, San Juan, San Martin, San Simeon, Santa Maria, Sargent, Simmler, Taft, Tranquility, Tulare, Visalia, Wasco, Watsonville, Wrights, and Westhaven.

Instrumental data point to an epicenter on the San Andreas Fault near San Benito.

THE EARTHQUAKE OF NOVEMBER 28, 1929

At about 11h 49m A.M., P.S.T., on Nov. 28, 1929, an earthquake shook the Southern Sierra Region from El Portal and Benton on the north to Kernville on the south, and from Deep Springs on the east to Mendota on the west. The greatest intensity was at Big Pine and near Aberdeen. At the latter point concrete reservoirs were cracked and dishes were broken. This is not at the center of the felt area nor is it the locality of the instrumental epicenter.

An analysis of the instrumental records from Berkeley, Mt. Hamilton, Stanford, Santa Clara, Pasadena, Santa Barbara, La Jolla, Tinemaha, Haiwee, and Tucson indicates that the epicenter was near 37° 31′ north, 119° east. A full study of this earthquake will be published elsewhere.

The following lists the intensity on the Rossi-Forel scale of this earthquake at points reporting:

VIII. Aberdeen (5 mi. southeast).

VII. Big Pine.

V–VI. Benton, Bishop, Clovis, El Portal, Mocalno (?), Orange Cove, Porterville, Rector substation (near Visalia), Sugar Pine, Tulare.

IV. Academy, Big Creek Power Houses, Nos. 1, 2, 3, 8 (No. 1 reports 7 shocks), Carruthers, Coulterville, Deep Springs, Fresno, Hanford, Ivanhoe, Jerseydale, Kaweah, Kernville, Knights Ferry, Lida (Nevada), Mendota, Mt. Montgomery (Nevada), Sanger, Visalia.

III. Exeter, Kingsburg.

I–II. Chowchilla, Corcoran, Hollister, Oakdale, Santa Marguerita, Selma, Shandon, Stockton.

This earthquake was reported not felt at:

Allensworth, Alpaugh, Annette, Arlemont-Nevada, Bakersfield, Big Creek, Bodie, Bradley, Bridgeport, Camp Verde-Arizona, Cartago, Ceres, Cholame, Chowchilla, Coulterville, Corcoran, Coso Junction, Crow's Landing, Currant-Nevada, Cutler, Camp Sierra.

Darwin, Delano, Dinuba, Dos Palos, Ducor, Fairmead, Frazier Park, Goldfield, Hardwick, Hawthorne-Nevada, Hiko-Nevada, Hornsilver-Nevada, Hudson-Nevada, Hughson, Inyokern, Ione-Nevada, Jamestown, Lathrop, Lemoore, Little Lake, Livingston, Lone Pine, Los Banos, Lunning-Nevada.

Madera, McFarland, Merced, Metz, Millers-Nevada, Minden-Nevada, Modesto, Mojave, Mono Lake, Needles, Newman, Oakdale, Olancha, Owenyo, Paicines, Paso Robles, Patterson, Pioneer-Nevada, Porterville, Priest Valley, Randsburg, Rawhide-Nevada, Riverbank, Round Mountain-Nevada, San Ardo, San Benito, San Juan Bautista, Santa Maria, Silver Peak-Nevada, Simmler, Sonora, Stone Canon, Stoneman Lake-Arizona, Stratford, Sweetwater, Seligman-Arizona, Simon-Nevada.

Tehachapi, Tonopah-Nevada, Topaz, Tranquility, Tres Pinos, Trona, Turlock, Usona, Wasco, Wasioja, Wellington-Nevada, Yerington-Nevada.

THE EARTHQUAKE OF DECEMBER 4, 1929

On December 4, 1929, at about 4:28 A.M., Pacific Standard Time, the Northern California coast region experienced an earthquake which reached an intensity of 4 to 5, Rossi Forel Scale at Garberville, Beatrice and Miranda. At these points pendulum clocks were stopped or small objects were moved. This earthquake was felt as far north as Bayside (Humboldt County), as far south as Westport (Mendocino County), and as far east as Forest Glen (Trinity County). It was felt all along the coast line within these limits. From the form of the isoseismals it appears probable that the epicenter was at sea.

The following lists the intensities on Rossi Forel scale. This scale is printed above.

The ratings on this scale of the intensity of the shock are given for towns from which reports came to this station, either through the courtesy of the U. S. Coast and Geodetic Survey or directly.

V–VI. Beatrice, Garberville, Miranda.

IV. Blacksburg, Bridgeville, Capetown, Dyerville, Eel Rock, Ettersburg, Eureka, Fields Landing, Fortuna, McCann, Scotia, Westport, Zenia.

III. Alder Point, Bayside, Briceland, Harris, Yager.

I–II. Holmes, Forest Glen.

The following report the earthquake not felt: Black Bear, Caution, Cecilville, Cloverdale, Coffee, Dos Rios, Farley, Forks of Salmon, Hearst, Hoopa, Hopland, Hornbrook, Hunters, Longvale, Mendocino, Nashmead, Ono, Platina, Potter Valley, Red Bluff, Requa, Ruth, Trinidad, Trinity Center, Walker, Weitchpec, Weaverville, Willits.

It is to be noted that Ukiah reports an earthquake of intensity III as occurring between 2 and 3 A.M. Since Ukiah is out of this area and the hour is incorrect it was not listed above. However, it may have been that this earthquake was felt at Ukiah.

THE EARTHQUAKE OF DECEMBER 11, 1929

At about 1:14 A.M., P.S.T. on December 11, 1929, an earthquake was felt in the region of Gilroy and Watsonville, California. In Gilroy it was of sufficient intensity to shake several pairs of shoes from their display positions on the shelves in one store, and to be felt by almost everyone. In Watsonville it caused the creaking of walls in frame houses. It rattled windows in Santa Cruz.

From the instrumental data the epicenter appears to have been on the west side of the Santa Clara Valley some 20 kilometers northwest of Gilroy. It therefore seems probable that this earthquake centered on the San Andreas Fault.

THE EARTHQUAKE OF JANUARY 9, 1930

During the early morning hours of January 9, 1930, a number of earthquakes were felt in the neighborhood of Monterey Bay and to the south. A number of shocks were reported by observers. Three of these were recorded on the seismographs at Berkeley. They began at 00h 06m 40s, 00h 16m, 00s, and 01h 55m 49s, respectively, P.S.T. The Lick Observatory Station recorded two additional shocks beginning there at 00h 11m 00s and 00h 15m 04s, P.S.T.

In the reports by observers the various shocks are not distinguished. At the following points the earthquakes were of sufficient intensity to rattle windows and doors, cause creaking of house frames.

Aptos, Bitterwater, Camphora, Gonzales, Lone Oak, Metz, Salinas, Santa Cruz, and Watsonville; Soledad reports less intensity though strong enough for duration to be appreciable.

From the instrumental records the epicenters of the three quakes recorded at both Berkeley and Lick Observatory, appear to have been in Monterey Bay.

THE EARTHQUAKE OF JANUARY 22, 1930

At about 8h 17m P.M., January 22, 1930, P.S.T., the region about the Berkeley Seismographic Station was shaken by an earthquake which attained an intensity of IV, Rossi-Forel scale, in Oakland, Berkeley, Alameda, Concord, San Leandro, Canyon and Alvarado. In San Francisco the intensity was about III, as it was also in San Rafael. The intensity seemed to be slightly greater near the trace of the Hayward Fault. This earthquake was reported not felt in Antioch, Rodeo, Crockett, Pinole, Angel Island, Alcatraz, Richmond, El Cerrito, Newark, Niles, Livermore, Byron and Walnut Creek.

From the instrumental records the epicenter was within 5 k.m. of Berkeley, probably slightly to the south on the Hayward Fault.

THE EARTHQUAKE OF FEBRUARY 11, 1930

At about 1:20 P.M., Pacific Standard Time, on February 11, 1930, an earthquake was felt in the region about Santa Clara. It was felt as far north as San Rafael, as far south as Aptos. It was not felt in the Great Valley east of the Mt. Hamilton Range. It was felt along the coast in this region.

Reports from Los Altos indicate that knick-knacks were thrown down, trees were agitated, as well as the customary creaking of frames and rattling of doors and windows. At La Honda also the reports say, "moved small objects." Thus it seems that Los Altos and La Honda were shaken a little more intensely than the following towns at which the intensity must also be rated as IV Rossi-Forel scale since doors and windows rattled: Agnew, Alviso, Aptos, Bonny Doon, Brookdale, Colma, Cupertino, Los Gatos, Palo Alto, Pescadero, San Gregorio, Santa Clara, Santa Cruz, Swanton, Sausalito, Redwood City.

The intensity was about III Rossi-Forel at Milpitas, Redwood Estates, San Francisco (Custom House), San Rafael, Vallejo. It was reported as about I–II, Rossi-Forel at Antioch, Boulder Creek, Corte Madero, Pescadero, San Jose.

The following towns reported this earthquake not felt: Bay, Benicia, Bolinas, Brentwood, Burlingame, Concord, Coyote, Crows Landing, Danville, Dillon Beach, Fairfield, Felton, Half

Moon Bay, Hayward, Hollister, Livermore, Marshall, Morgan Hill, Napa, Niles, Novata, Point Reyes, Salinas, St. Helena, Pittsburg, Walnut Creek, Warm Springs, Watsonville.

From the seismograms the epicenter appears to have been near Los Altos and since this is in accord with the observed greater intensities in this region the location seems probable.

THE EARTHQUAKE OF MARCH 27, 1930

At about 1:30 P.M., March 27, 1930, Pacific Standard Time, an earthquake shook the region about Eureka. It was not of sufficient intensity to record on the seismographs at either Berkeley or Lick Observatory. However, it was sufficiently well reported to merit mention here.

The following towns reported an intensity of about IV, Rossi-Forel: Alton, Arcata, Bridgeville, Bucksport, Ferndale, Loleta, Petrolia. At Samoa and Fortuna the intensity as reported was about III, while at Capetown it was I to II.

The following towns reported the shock not felt: Blue Lake, Dyerville, Kneeland, Orick, Scotia, Trinidad and Yager.

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.
No. 19. From October 1, 1929, to March 31, 1930.

Issued September 18, 1930.