THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

Oct. 1, 1930, to March 31, 1931

BY

PERRY BYERLY

BULLETIN OF THE SEISMOGRAPHIC STATIONS, VOL. 2, NO. 21

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY, CALIFORNIA

UNIVERSITY OF CALIFORNIA PUBLICATIONS

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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.
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No. 8. From October 1, 1913, to March 31, 1914.
No. 9. From April 1, 1914, to September 30, 1914.
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No. 19. From April 1, 1919, to September 30, 1919.
No. 20. From October 1, 1919, to March 31, 1920.
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THE REGISTRATION OF EARTHQUAKES AT THE BERKELEY STATION

AND

AT THE LICK OBSERVATORY STATION

FROM

OCT. 1, 1930, TO MARCH 31, 1931

BY

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CONTENTS

Symbols and Notations

1. *Character of the Earthquake—*

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

d (terrae motus domesticus)	Local shock (origin less than 100 kilometers distant).
v (terrae motus vicinus)	Near shock (origin from 100 to 1,000 kilometers distant).
r (terrae motus remotus)	Distant shock (origin from 1,000 to 5,000 kilometers distant).
u (terrae motus ultimus)	Very distant shock or teleseism (origin more than 5,000 kilometers distant).

2. *Phases of the Seismogram—*

P (undae primae)	Normal first phase, or first preliminary tremors (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 traveled 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	Trace amplitude measured from the media line, + earth motion toward east, north, or zenith, − toward west, south, 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:

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

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

Altitude, 85 meters (280 feet) above mean sea level.

Constants of the Seismographs

Apparatus	Component	V	T_0	ϵ	$\frac{r}{T_0^2}$
Bosch-Omori 100 kg.	E	45	14	10	0.0008
	N	50	14	10	0.0014
Wiechert 80 kg.	Z	44	4	5	0.005
Wood-Anderson	E	3000	0.9	15	
	N	3000	0.9	15	
		K	T	T_1	μ_2
Galitzin	E	126	12	12	0
	N	125	12	12.1	0
	Z	121	12	11.8	0

The letter G before a reading designates that the seismogram was from the Galitzin instrument; W, Wiechert; B, Bosch-Omori; A, Wood-Anderson.

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
1	Oct. 1	I	e_N	G 14 06 47	6		+2		
			e_N	G 14 11 11	25		+2.5		
			e_Z	G 14 11 46	19			−0.8	
			F	14 30					
2	Oct. 2								N Galitzin recorded quake beginning about 02h and lasting about 40 minutes. The time marker failed.
3	Oct. 4	Iv	eP_N	G 17 50 45	5		+1.5		
			i_N	G 17 51 30	7		−2		
			e_N	G 17 52 22	9		2		
			eS_N	G 17 53 38	9		3		
			e_N	G 17 53 52	8		2		
			F	17 59					
4	Oct. 5	Iu	e_Z	G 19 16 54	19			1.5	
			e_N	G 19 16 58	20		2		
			F	19 36					
5	Oct. 8	IIu	iP_{ENZ}	G 10 31 44	3 & 6	1	1.5	5	J. S. A. epicenter at 16°S, 169°E. Probably several shocks
			e_E	G 10 32 16	3	1			
			e_N	G 10 32 43	5		5		
			ePR_{1E}	G 10 34 54	3	0.6			
			ePR_{1N}	G 10 34 56	8		3		
			e_N	B 10 35 25	4		0.2		
			ePR_{2E}	G 10 36 57	4	0.5			
			e_N	G 10 37 01	6		2		
			ePR_{3N}	G 10 38 18	7		4		
			eS_Z	W 10 42 41	8			0.3	
			eS_Z	G 10 42 49	8			3	
			iS_N	G 10 42 51	9		13		
			iS_E	G 10 42 52	7	3			
			eS_E	B 10 43 03	6	0.4			
			eSR_{1N}	G 10 47 14	10		6		
			eSR_{2N}	G 10 52 16	9		5		
			eSR_{3N}	G 10 54 30	4		6		
			eL_E	B 10 56 21	25	0.6			
			eL_E	G 10 56 25	24	4			
			eL_N	G 10 56 41	11		15		
			eL_Z	G 10 56 43	23			7	
			eM_E	G 11 02 20	18	3			
			F	13 09					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
6	Oct. 11	I	e_{EN}	G 3 40 13	18	0.5	3		
			e_Z	G 3 41 22	19			1	
			F	3 54					
7	Oct. 17	Iu	eP_E	B 8 59 09	3	<0.1			Barely perceptible.
			eP_Z	W 8 59 10	3			−<0.1	
			e_E	B 9 09 22	8	+0.2			
			e_Z	W 9 09 54	8			<0.1	
			e_E	B 9 09 59	8	0.3			
			e_N	B 9 10 06	6		−0.4		
			e_N	B 9 10 41	7		0.2		
8	Oct. 19	I	e_E	G 11 17 32	13	1.5			
			e_E	G 11 22 26	21	3			
			e_E	G 11 24 35	19	2			
			F	11 44±					
9	Oct. 21	I							An earthquake was recorded beginning at approximately 9h 44m and lasting about 20 minutes. Time marks failed.
10	Oct. 22	Iu	e_E	G 18 29 18	7	3			
			e_N	G 18 29 20	8		2		
			e_E	G 18 47 57	33	1			
			e_N	G 18 49 28	23		1		
			e_Z	G 18 49 31	21			0.6	
			M_{NE}	G 18 52 36	21				
			F	19 42±					
11	Oct. 23	IIu	eP_E	G 9 06 35	5	0.4			U. S. C. G. S. epicenter at 33°S, 72° W.
			eP_N	G 9 06 38	7		1		
			ePR_{1N}	G 9 10 29	6		2		
			eS_{EN}	G 9 17 05	10	3	3		
			eSR_{1N}	G 9 23 38	5		1		
			L_{EN}	G 9 26 57	19	5	4		
			M_N	G 9 27 44	13		3		
			eM_E	G 9 27 46	13	3			
			M_E	G 9 28 41	13	5			
			F	11±					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
12	Oct. 24	I	e_E	G 2 30 12	15	1			Surface waves. May begin earlier
			e_N	G 2 30 52	16		0.7		
			e_N	G 2 31 50	23		1		
			e_E	G 2 34 06	19	2			
			e_N	G 2 34 27	16		3		
			e_E	G 2 38 42	12	2			
			F	2 47±					
13	Oct. 24	IIu	eP_E	A 20 27 16					U. S. C. G. S. epicenter at 24° N 145° E.
			iP_E	G 20 27 17	8	−13			
			iP_Z	W 20 27 17	3			0.4	
			iP_N	B 20 27 19	3		+0.1		
			iPR_{1E}	G 20 30 24	8	8			
			iPR_{2E}	G 20 32 13	8	7			
			iPR_{3E}	G 20 33 23	8	7			
			eS_Z	W 20 37 12	10			0.1	
			eS_{EN}	G&B 20 37 17	9	38	6		
			eSR_{1N}	B 20 43 17	7		0.2		
			eSR_{2E}	G 20 48 24	20	12			
			eL_{NZ}	B&W 20 50 57	11 & 23		0.5	0.5	
			eL_E	B 20 51 14	24	−2			L and M groups have very sharp beginnings.
			eM_Z	W 20 58 07	15			0.3	
			iM_E	B 20 58 11	18	−2			
			eM_N	B 21 04 46	17		0.6		
			F	23 34					
14	Oct. 27	Iu	e_{EN}	G 14 53 17	21	0.8	1		Surface waves.
			F	15 24±					
15	Oct. 28 and 29	IIu	eP_{ENZ}	G 21 22 25	5 & 11	2	2	2	
			e_E	G 21 25 55	13	2			
			e_Z	G 21 26 08	5			2	
			iS_{EZ}	G 21 32 44	13 & 6	9		2	
			e_E	G 21 37 43	13	3			
			eL_Z	G 21 46 28	29			1	
			eL_E	G 21 46 57	35	5			
			eM_{EZ}	G 21 49 30	22	11		2	
			M_{EZ}	G 21 55 33	17	21		3	
			F	0 09					
16	Oct. 29	I	e_E	G 13 12 51	20	0.8			
			e_E	G 13 26 23	15	1			
			F	13 46					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
17	Oct. 30	I	e_E	G 13 23 02	10	−1			
			e_N	G 13 27 00	10		−1		
			e_N	G 13 32 20	12		+3		
			e_E	G 13 33 50	17	−2			
			F	13 50					
18	Oct. 31	Iu	e_E	B 11 03.1					Surface waves.
			e_Z	W 11 07					
			e_N	B 11 09					
			M_{EZ}	B&W 11 14	16	0.3		0.1	
			F	11 58					
19	Oct. 31	Iu	e_E	G 16 46 59	16	1			Probably surface waves of distant quake.
			e_E	G 16 51 01	16	2			
			F	17 21±					
20	Oct. 31	Iu	e_{EN}	G 18 58 31	18	1	0.7		
			e_E	G 19 08 32	39	1			
			e_E	G 19 18 20	18	3			
			e_N	G 19 18 30	20		2		
			M_E	G 19 19 56	17	4			
			F	20 04					
21	Nov. 1	Iu	e_E	G 13 01 19	18	1			
			eL_E	G 13 12 20	27	2			
			eM_E	G 13 20 48	17	3			
			M_E	G 13 22 26	17	4			
			F	14 14					
22	Nov. 2	I	e_E	G 6 16 21	15	2			
			e_N	G 6 16 22	6		1		
			e_E	G 6 17 38	10	2			
			e_N	G 6 17 47	10		3		
			F	6 25					
23	Nov. 2	I	e_E	G 16 52 14	15	2			
			e_N	G 16 52 49	21		2		
			e_N	G 16 54 46	14		3		
			e_E	G 16 55 06	14	2			
			e_E	G 16 55 52	16	2			
			F	17 19					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
24	Nov. 3	I	e_E	G 19 00 45	13	1			
			e_E	G 19 06 35	8	0.7			
			e_E	G 19 18 48	17	2			
			e_E	G 19 21 09	20	1			
			e_E	G 19 24 43	17	3			
			M_E	G 19 27 56	15	3			
			F	20 02					
25	Nov. 8	I	e_E	G 1 40 44	8	+3			
			e_E	G 1 41 39	17	−3			
			e_Z	G 1 42					
			F	1 49					
26	Nov. 9	III	i_E	G 19 32 14	14	7			May begin earlier.
			e_Z	G 19 32 43	14			0.6	
			i_E	G 19 34 20	11	6			
			e_Z	G 19 34 25	7			1	
			i_N	G 19 36 56	9		4		
			i_N	G 19 38 05	7		7		
			i_E	G 19 40 37	26	8			
			e_N	G 19 53 44	15		4		
			e_N	G 19 56 07	21		3		
			eL_E	G 19 57 30	22	5			
			M_Z	G 20 15 26	17			6	
			M_E	G 20 18 52	17	25			
			F	21 54					
27	Nov. 9	I	eL_Z	W 20 03.4	19			<0.1	
			eL_E	B 20 03.7	20	0.2			Gradual beginning.
			eM_E	B 20 07.2	16	0.4			
			eM_Z	B 20 07.8	15			<0.1	
			M_N	B 20 17	16		0.1		
			M_Z	W 20 18	16			0.1	
			M_E	B 20 19	16	0.5			
			F	20 50					
28	Nov. 10	II	i_E	G 14 08 29	8	4			
			e_N	G 14 25 13	23		4		Surface waves probably.
			e_E	G 14 30 21	23	5			
			e_Z	G 14 31 45	23			0.7	
			e_Z	G 14 39 49	17			2	
			e_E	G 14 39 54	19	10			
			M_N	G 14 41 49	19		5		
			M_E	G 14 49 40	17	17			
			F	15 34					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
29	Nov. 11	I	e_E	G 20 35 31	28	3			
			F	21 09					
30	Nov. 12	I	e_N	A 19 17 13	1		0.5		Gradual beginning.
			e_N	A 19 17 23					
			e_N	B 19 20 24	7		<0.1		
			e_E	G 19 22 48	11	+4			
			e_N	G 19 23 04	9		+3.5		
			e_{EN}	G 19 25 28	16	4	−3		
			e_{EN}	B 19 26 26	10	0.3	0.2		
			e_Z	G 19 27 16	8			−1	
			e_N	A 19 28 55	9		0.5		
			e_Z	G 19 34 00	16			−2	
			F	20 54					
31	Nov. 16	I	e_E	G 13 34 34	8	+2			
			e_N	G 13 34 55	14		+3		
			e_Z	G 13 36 03	8			+3	
			F	13 46					
32	Nov. 22	II	e_N	G 14 19 56	7		4		
			e_E	G 14 20 05	11	3			
			e_N	G 14 28 43	11		3		
			e_E	G 14 36 07	23	4			
			e_{EN}	G 14 41 05	19	4	5		
			M_E	G 14 50 46	17	8			
			eM_N	G 14 51 03	16		8		
			M_N	G 14 54 41	15		8		
			F	15 39					
33	Nov. 24	I	e_E	G 1 53 18	18	0.8			
			e_N	G 1 53 31	15		0.6		
			F	2 04					
34	Nov. 24	I	e_E	G 3 28 47	22	2			
			e_N	G 3 32 42	19		2		
			e_E	G 3 32 45	17	3			
			F	4 47					
35	Nov. 24	Id	e_E	A 22 38 05					Gradual beginning.
			e_E	A 22 38 13					
			e_E	A 22 38 20					
			e_E	A 22 38 29					
			F	22 38 49					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
36	Nov. 25	I	e_E	G 9 00 32	19	1			
			e_N	G 9 00 42	20		0.6		
			F	9 19					
37	Nov. 25	I	eP_N	B 19 24 18			+0.1		
			eP_E	B 19 24 19	5	0.2			
			e_N	B 19 24 29	7		0.2		
			e_E	B 19 24 32	9	0.6			
			e_N	B 19 26 28	6		0.1		
			e_E	B 19 27 00	9	0.1			
			i_N	B 19 35 53	16		0.6		
			e_E	B 19 35 55	13	0.2			
			e_{EN}	B 19 41.2	10				
			F	21 09					
38	Nov. 28	IIIr	iP_{ENZ}	G 7 38 04	6	+5	−4	−3	J. S. A. epicenter at 18°2 N, 108°4 W.
			i_E	G 7 38 42	8	4			
			e_Z	G 7 38 47	9			4	
			i_N	G 7 38 50	7		6		
			iS_E	G 7 42 28	16	+8			
			iS_N	G 7 42 40	13		−8		
			eS_Z	G 7 42 45	5			3	
			eL_E	G 7 43 44	15	8			
			eL_Z	G 7 44 18	28			3	
			eL_{EN}	B 7 45 08	17	+0.2	+0.9		
			eM_E	G 7 45 33	18	22			
			eM_N	G 7 45 59	20		10		
			eM_Z	G 7 46 42	15			6	
			M_N	G 7 46 53	14		38		
			M_E	G 7 48 56	12	34			
			M_Z	G 7 51 33	9			10	
			F	10 04					
39	Nov. 30	IIr	eP_E	B 21 35 53	4	<0.1			U S. C. G. S. epicenter at 18°N, 106°W
			iP_Z	G 21 35 53	4			2	
			eP_N	G 21 35 55	7		+2		
			eS_{EN}	B 21 40 16	6	0.1	0.1		
			eS_N	G 21 40 23	13		+5		
			eL_N	G 21 42 20	21		6		
			eL_E	G 21 42.4	26	6			
			eL_Z	G 21 43 33	21			2	
			eM_N	G 21 45 15	14		14		
			M_N	G 21 45 38	13		20		
			F	22 44					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
40	Dec. 3	IIIu	e_N	G 19 11 23	20		2		U. S. C. G. S. gives epicenter in Burma.
			e_E	G 19 11 34	24	2			
			i_{EN}	G 19 20 51	21	7	7		
			e_N	B 19 25 42	21		0.1		
			i_E	G 19 26 24	26	14			
			i_N	G 19 27 28	26		9		
			i_E	B 19 27 40	27		1		
			e_N	G 19 43 30	24		7		
			M_E	G 19 52 08	23	47			
			M_N	G 20 01 49			38		
			F	23 14					
41	Dec. 3	Iu	e_N	A 19 43 40					U. S. C. G. S. gives O=18h 52m0. Reported destruction in Burma.
			e_E	G 20 40 54		−2			
			e_N	G 20 41 10	9		−2		
			F	20 54					
42	Dec. 6	I	e_N	B 7 12 13	6		+0.1		
			i_E	G 7 16 12	8	+5			
			e_N	G 7 19 02	28		+3		
			e_E	G 7 20 41	22	+8			
			e_N	B 7 20 45			−0.1		
			F	8 19					
43	Dec. 8	I	e_N	A 1 26.3					
			F	1 28					
44	Dec. 8	IIu	e_E	G 17 33 33	7	2			Microseisms mask beginning of quake.
			e_N	G 17 34 01	7		0.6		
			e_Z	G 17 34 08	5			0.8	
			e_Z	G 17 34 39	5			2	
			iS_N	G 17 44 48	13		−5		
			eS_E	G 17 44 53	13	3			
			iS_Z	G 17 44 57	7			−1	
			eL_Z	G 18 03 42	19			1	
			eL_N	G 18 03 48	19		4		
			eL_E	G 18 03 58	21	5			
			eM_Z	G 18 04 33	19			2	
			eM_N	G 18 05 37	18		8		
			M_N	G 18 15 33	15		12		
			M_Z	G 18 15 55	17			3	
			F	19 03					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
45	Dec. 9	I	e_N	B 19 21 16	7		0.1		
			e_E	B 19 25 10					
			e_N	B 19 25 19					
			eL_{EN}	G 19 26 33	21	4	3		
			eM_E	G 19 29 30	13	9			
			M_N	G 19 30 10	12		12		
			M_E	G 19 30 10	12	15			
			F	19 48					
46	Dec. 9	I	e_E	G 21 16 41	22	2			
			F	21 30					
47	Dec. 11	Iv	?eP_E	B 8 59 28					See discussion, p. 529.
			i_{EZ}	G 8 59 41	7 & 2	2		11	
			i_N	B 8 59 41			+0.1		
			i_{EN}	B 8 59 51	4	−0.2	−0.1		
			i_E	B 9 00 02	4	−0.5			
			iS_{EN}	B 9 00 12	3	+0.7			Also a longer period.
			e_N	B 9 00 55	3		0.4		
			F	9 09					
									[seisms.
48	Dec. 11	Iv	e_E	G 12 28 31		6			Obscured by micro-
			e_Z	G 12 28 33				7	See discussion, p. 530.
			e_Z	G 12 29 18				5	
			F	12 34					
49	Dec. 12	Iv	iP_{NZ}	B&W 9 31 46	2		+0.1	−0.1	See discussion, p. 530.
			e_N	B 9 31 57	3		+0.2		
			e_N	B 9 32 08			+0.2		
			iS_N	A 9 32 15	1		+1.5		
			eS_Z	W 9 32 18	2			−0.1	
			iS_{EN}	B 9 32 19					
			e_N	B 9 32 29					
			e_{EZ}	B&W 9 32 30	2	0.1		0.2	
			i_N	A 9 32 33	1		−4		
			F	9 43					
50	Dec. 12	Iv	e_N	A 20 15 52	0.6		−0.6		See discussion, p. 530.
			e_N	A 20 16 26	0.9		−2		
			e_N	A 20 16 36	0.8		−1.3		
			e_E	G 20 16 55	1	0.1			
			e_Z	G 20 17 58	4			1	
			i_{EZ}	G 20 19 18	5	5		2	
			F	20 23					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
51	Dec. 14	Iv	e_Z	G 1 39 47	5			2	See discussion, p. 530
			e_{EN}	G 1 39 52	7	1	1.8		
			i_E	G 1 40 17	5	2			
			e_{EN}	G 1 40 27	5	3	2		
			F	1 44					
52	Dec. 15								The Wood-Anderson instrument began recording an earthquake at approximately $8^h\ 17^m$, which lasted 3 minutes. Time marker failed. See discussion, p. 531.
53	Dec. 21	I	e_{EZ}	G 15 04 38	8 & 4	−1		−3	
			e_Z	G 15 08 11	6			−1	
			e_{EZ}	G 15 08 33	8	−2		−2	
			e_N	G 15 09 29	7		+1		
			i_Z	G 15 10 14	4			−1	
			i_E	G 15 14 58	4	+5			
			e_E	G 15 16 19	7	+4			
			e_N	G 15 16 29	4		−3		
			e_E	G 15 16 58	9	+2			
			e_N	G 15 17 50	10		+2		
			F	15 33					
54	Dec. 24	Iv	e_E	G 9 11 07	4	+1			See discussion, p. 531
			e_N	G 9 11 16	4				
			F	9 18					
55	Dec. 26	Id	e_N	A 20 27 58	0.5	−0.3			
			e_E	A 20 27 59	0.7		−0.5		
			e_N	A 20 28 02	1		−0.7		
			e_E	A 20 28 19	0.6	−0.5			
			F	20 29.6					
56	Dec. 27	Id	e_N	A 5 30 16					
			e_N	A 5 30 37	0.7		−0.7		
			F	5 31 29					
57	Dec. 30	Id	e_N	A 3 01 38					
			e_N	A 3 01 52					
			F	3 02.9					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.		Period	Amplitude			Remarks
					h. m. s.	s.	A_E mm.	A_N mm.	Az mm.	
	1931									
58	Jan. 2	IIIv	iP_E	G	9 54 08					
			eP_N	A	9 54 08	2		−0.8		
			e_{EN}	A	9 54 12	3	−0.4	+2		
			PR_{1N}	B	9 54 46	8		2		
			iPR_{1E}	B	9 54 49					
			i_N	B	9 55 59	10		+0.8		
			iS_N	B	9 58 39	10		+2		
			iS_E	B	9 58 52	11	+2			
			iL_N	B	10 00 20	19		5		
			iL_E	B	10 00 27	18	5			
			iM_E	B	10 02 18	16	16			
			iM_N	B	10 02 30	15		17		
			e_N	A	10 02 32	15		−2		
			F		12 23					
59	Jan. 3	Id	e_E	A	11 19 11					
			e_N	A	11 19 13					
			i_{EN}	A	11 19 40	0.4	−0.5	+0.6		
			e_{EN}	A	11 19 41	0.8	+1	−0.7		
			e_E	A	11 19 45	0.5	−0.4			
			F		11 20 43					
60	Jan. 5	IId	iP_{EN}	A	9 43 52	0.4	−1			See discussion, p. 532
			iS_E	A	9 43 57	0.6	−6			
			iS_{NZ}	B&W	9 43 57					
			F		9 45 18					
61	Jan. 5	I	e_E	A	19 21 20					Times uncertain.
			e_N	A	19 21 23					
			e_E	A	19 21 41					
			F		19 23					
62	Jan. 6	Iv	iP_{NZ}	B&W	23 29 06					Galitzin and Wood-Anderson instruments not working. See discussion, p. 532.
			iP_E	B	23 29 10					
			i_Z	W	23 29 18					
			i_{EN}	B	3 29 24					
			i_Z	W	23 29 26	1				
			iS_Z	W	23 29 35	2				
			iS_E	B	23 29 38	2				
			iS_N	B	23 29 40	2				
			i_N	B	23 29 45	3		+0.5		
			e_E	B	23 30 20	5				
			F		23 32 23					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.		Period	Amplitude			Remarks
					h. m. s.	s.	A_E mm.	A_N mm.	Az mm.	
	1931									
63	Jan. 12	I	e_Z	G	20 43 13	3			−1	
			e_E	G	20 43 25	2	+1			
			e_N	G	20 43 28	3		+1.5		
			i_E	G	20 50 41	14	+5			
			e_{EZ}	G	20 58 44	23	−4		+3	
			F		21 54					
64	Jan. 14	I	e_{EN}	A	9 18 46	0.4	−0.2	−0.2		
			e_E	A	9 18 57	0.4	−0.3			
			e_N	A	9 18 59	0.9		−0.6		
			e_E	A	9 19 03	0.7	−0.3			
			F		9 19 30					
65	Jan. 15	IIIr	iP_{EN}	G	1 57 05	8	+24	−17		J. S. A. epicenter at 15° N. 97° W O = 1h 50m 20s.
			e_N	B	1 57 16	7		2		
			e_N	B	1 57 33	6		1.5		
			iPR_{1E}	B	1 58 06	5	2			
			e_E	B	1 59 06		1			
			i_N	B	1 59 07	6		1.5		
			iS_E	B	2 02 12	21	13			
			iS_N	B	2 02 15	16		12		
			e_N	A	2 02 24	8		−4		
			i_N	B	2 03 05	18		9		
			iL_E	B	2 06 13	25	69			
			iL_N	B	2 06.4	22		49		
			e_N	A	2 06 39	29		−5		
			M_N	B	2 09.4	17		63		
			M_Z	W	2 09.8	17			14	
			F		6 19					
66	Jan. 15	I	e_E	G	23 08 09	9	+1.5			
			e_N	G	23 22 27	9		−3		
			e_E	B	23 24.1					
			e_N	A	23 25 31	0.9		−0.3		
			e_E	G	23 27 24	25	+4			
			e_E	B	23 36.1	20	0.1			
			e_N	G	23 40 51	12		−13		
			F		24 23					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.		Period	Amplitude			Remarks
							A_E	A_N	A_Z	
	1931			h. m. s		s.	mm.	mm.	mm.	
67	Jan. 16	IIr	ePE	G	19 26 26	8	−6			J. S. A. Epicenter at 14°.5 N, 96° W, O=19h 19m 26s
			ePN	A	19 26.1					
			iS_{EN}	G	19 31 41	9 & 13	+12	+17		
			eL_E	B	19 35 25	20	2			
			iL_E	G	19 35 32	29	−3			
			iL_N	G	19 35 47	26		+20		
			eM_N	B	19 38 34	14		2		
			eZ	W	19 38 47	15			0.1	
			eM_E	B	19 39 11	13	3			
			eM_Z	W	19 40.5	12			0.5	
			M_{EN}	G	19 40±	14	81	73		
			F		20 45					
68	Jan. 17	IIIr	ePE	B	2 53 44		+0.4			J. S. A. epicenter at 25° N, 110° W., O=2h 49m 58s
			ePN	B	2 53 48			−0.4		
			ePZ	B	2 53 49				−0.1	
			iPR_{1N}	A	2 53 53	2		−1		
			iPR_{1E}	B	2 53 56	5	0.5			
			iPR_{1Z}	W	2 53 58	2			+0.4	
			i_{EN}	A	2 53 59	2	+0.7	+1		
			iS_E	B	2 56 51	9	+2			
			iS_Z	W	2 56 53	8			0.7	
			iS_N	B	2 57 05	10		+2.5		
			eL_E	B	2 57.4	30	8			
			eL_N	B	2 58 1	22		14		
			eM_E	B	2 58.3	16	42			
			eM_N	B	2 59.3	12		18		
			eW_{2E}	B	5 52.1	20	0.3			
			eW_{2Z}	W	5 53.0					
			eW_{2N}	B	5 54 40	5		0.2		
			F		6 13					
69	Jan. 17	I	e_{EN}	A	8 08 15					
			e_N	A	8 09 04					
			e_N	A	8 09 06					
			F		8 10					
70	Jan. 23	I	e_E	G	6 03 46	7	+2			
			e_E	B	6 06 33	5	−0.1			
			e_N	B	6 06 55	7		+0.1		
			e_E	G	6 07 57	27	+4			
			e_N	G	6 08 51	6		+3		
			e_E	G	6 09 38	8	−4			
			F		6 36					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.		Period	Amplitude			Remarks
							A_E	A_N	A_Z	
	1931			h. m. s.		s.	mm.	mm.	mm.	
71	Jan. 24	Iv	e_E	A	7 21 38	0.3	−0.3			See discussion, p. 532
			e_{EN}	A	7 21 42	0.6	−0.4	+0.8		
			e_{EN}	A	7 21 54	0.6	+0.5	−1		
			i_E	A	7 21 55	0.2	−1			
			i_E	A	7 22 01	0.4	−1			
			e_{EN}	A	7 22 02	0.9	−1	−1		
			e_E	A	7 22 11	0.8	+1			
			F		7 24.5					
72	Jan. 24	I	e_E	G	14 05 44	8	−4			
			e_E	G	14 29 09	22	+2.5			
			e_N	G	14 39 02	25		−2		
			F		14 50					
73	Jan. 25	II	e_N	G	12 44 56	9		−5		
			e_E	G	12 47 54	15	+5.5			
			e_Z	G	12 48 01	5			+2.5	
			eL_E	B	12 48.0	20	0.2			
			e_N	G	12 48 36	17		−9		
			e_Z	G	12 48 48	8			+2	
			e_Z	G	12 50 34	12			−7	
			e_E	A	12 50 44					
			M_N	G	12 50 44	14		26		
			eM_N	B	12 51 07	14		0.5		
			F		13 13					
74	Jan. 27	I								The Wood-Anderson instrument began recording an earthquake about 14h 19m which lasted 3 minutes. Time marker failed.
75	Jan. 27	II	e_N	G	20 27 03	9		−5		
			e_Z	G	20 27 34	11			−7	
			i_E	G	20 27 39	10	−5			
			i_E	G	20 32 47	10	+9			
			e_E	B	20 33 39	5	0.3			
			i_E	G	20 42 39	17	+13			
			M_N	B	21 12.6	19		0.6		
			M_E	B	21 13.9	17	3			
			M_E	G	21 14 49	17	86			
			F		23 14					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude Az	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
76	Jan. 28	IIu	eP_E	A 21 36 13	2	−0.4		+0.1	U. S. C. G. S epicenter at 15° N, 144° E. O = 21h 24m 25s.
			eP_Z	W 21 36 13	1			+6	
			iP_Z	G 21 36 17	6		−2		
			e_N	G 21 36 24	4				
			e_E	G 21 36 25	12	+6			
			e_{EN}	B 21 36 29	3	+0.1	+0.1		
			e_N	A 21 36 36	1		−0.8		
			i_E	G 21 46 40	11	+9			
			e_E	B 21 46 48	8	−0.5			
			i_N	G 21 46 54	10		+17		
			i_N	G 21 47 35	10		−8		
			i_N	G 21 59 31	24		+36		
			i_E	G 21 59 37	19	−15			
			M_N	G 21 59 51	20		51		
			M_E	G 22 08 29	20	39			
			F	23 54					
77	Jan. 29	I	e_E	G 17 24 25	5	−2			
			e_N	B 17 25 25	9		−0.1		
			e_Z	W 17 26.6				<0.1	Barely perceptible.
			e_N	B 17 26 46	5		0.1		
			e_E	B 17 26 57	6	0.1			
			e_Z	G 17 27 21	6			−2	
			e_E	B 17 27 26	15	0.4			
			e_N	G 17 28 23	14		−9		
			i_Z	G 17 30 15	10			+8	
			e_N	B 17 35 47	8		0.1		
			e_E	B 17 35 49	8	0.2			
			F	17 47					
78	Jan. 31	I	e_E	A 0 32.6					
			e_N	A 0 32.8					
			F	0 36					
79	Feb. 2	Id	e_{EN}	A 8 43 19					
			e_N	A 8 43 34	0.8		0.3		
			e_E	A 8 43 34	0.5	−0.5			
			F	8 44 10					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude Az	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
80	Feb. 2 and 3	IIu	eP_{NZ}	B&W 23 00 10	3		−<0.1	−<0.1	
			iP_{ENZ}	G 23 00 13					
			iPR_{IENZ}	G 23 04 05					
			iPS_{EN}	G 23 11 32					
			e_E	B 23 13 41	19	−0.8			
			e_N	B 23 32 10	24		−2		
			e_Z	W 23 32.2	25			−0.3	
			M_{EN}	G 23 37 30					
			F	4 00					
81	Feb. 7	I	e_E	G 3 54 12	9	+2			
			F	4 14					
82	Feb. 7	I	e_E	A 3 56 35	0.3	0.3			
			e_N	A 3 56 43	0.5		0.3		
			e_{EN}	A 3 56 50	0.4 & 0.7	−0.5	+0.4		
			F	3 57 42					
83	Feb. 7	I	e_E	A 6 57 21	0.2	0.2			
			e_N	A 6 57 27	0.4		0.3		
			e_{EN}	A 6 57 38	0.5	+0.5	−0.7		
			F	6 58					
84	Feb. 10	II	e_N	B 6 53 26	4		+0.1		
			e_Z	G 6 53 42	9			+4	
			e_E	G 6 55 36	8	+4			
			e_E	B 6 56 40	8	−0.1			
			e_N	G 6 57 26	9		+3		
			e_N	B 6 58 12	4		0.1		
			e_E	G 7 05 36	11	−5			
			e_N	G 7 06 18	10		+3		
			e_E	G 7 37 27	37	+6			
			e_Z	G 7 41 12	23			−7	
			M_N	G 8 36 02	19		19		
			F	9 29					
85	Feb. 12	I	e_E	G 6 44 19					
			e_Z	G 6 44 21	7			−1	
			e_N	G 6 44 28					
			e_Z	G 8 24 42	36				
			F	8 28					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
86	Feb. 13	IIu	e_E	G 1 40 08	2	+0.6			
			e_N	A 1 40 42	2		−0.4		
			e_Z	G 1 40 46	6			+2.5	
			e_E	G 1 41 04	7	−2			
			eS_{EN}	B 1 52 06	6 & 16	−0.2	+0.3		
			e_Z	G 2 10 38	32			+5	
			e_E	G 2 10 52	28	−10			
			eL_N	B 2 14 49	21		+0.3		
			eL_E	B 2 14 51	21	+0.3			
			F	4 50					
87	Feb. 14	I	e_E	G 14 59 52	32	+2			
			e_N	G 15 17 52	8		−1.5		
			e_Z	G 15 27 17	10			+2	
			F	16 17					
88	Feb. 16	I							A quake began recording on the Wood-Anderson instrument approximately 18^h 19^m. The time marker failed.
89	Feb. 16	I							The Galitzin instrument recorded a quake beginning at approximately 19^h 18^m and lasting about 52 minutes. The time marker failed.
90	Feb. 17	I	e_N	A 15 58 49	0.5		0.2		
			e_N	A 15 58 58	1		−0.5		
			e_N	A 15 59 05	1		−0.8		
			F	16 01					
91	Feb. 20	Iu	eP_{EN}	B 5 44 14	0.7	+0.4	−0.3		
			eP_Z	G 5 44 14	2.5			−3.5	Beginning obscured by microseisms on Galitzin instruments.
			e_N	B 5 44 32	2		−0.5		
			e_E	B 5 44 36	1.5	−0.6			
			iS_N	G 5 53 10	8		−23		
			iS_E	G 5 53 11	10	−12			
			F	7 00					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
92	Feb. 21	Id	eP_N	A 1 02 26	0.5		+0.4		
			eS_N	A 1 02 27	0.6		+1		
			F	1 02 32					
93	Feb. 21	I	e_N	A 8 10 47	0.4		+0.2		
			e_N	A 8 10 48	0.9		+0.3		
			e_E	A 8 10 55	0.5	−0.2			
			e_{EN}	A 8 11 15.5	0.8	+0.3	−0.4		
			e_N	A 8 11 24	1		−0.5		
			e_E	A 8 12 16	3	+0.3			
			F	8 13					
94	Feb. 23	Id	eP_N	A 1 08 06	0.7		−0.4		
			iS_N	A 1 08 07	0.5		−1		
			F	1 08 10					
95	Feb. 23	Iv	e_N	A 10 02 17	0.8		−0.3		Times uncertain. See discussion, p. 533.
			e_E	B 10 02 21	5	−0.1			
			e_{EN}	A 10 02 22	0.8		−0.5		
			i_N	A 10 02 27	0.7		−0.5		
			e_Z	G 10 02 31					
			e_N	A 10 02 44	1.4		−0.4		
			e_E	A 10 02 46	1	−0.8			
			i_{EN}	A 10 03 09	1	−1	−1		
			F	10 06					
96	Feb. 23	I	e_N	A 10 34 09					Times uncertain.
			e_E	A 10 34.4					
			F	10 36					
97	Feb. 25	Id	eP_N	A 0 58 57	0.5		+0.5		
			iS_N	A 0 58 59	0.6		+0.9		
			F	0 59 07					
98	Feb. 26	I	iP_N	A 1 17 36	0.2		−0.3		
			i_N	A 1 17 39	0.3		+0.5		
			iS_N	A 1 17 40	0.6		+1		
			F	1 17 49					
99	Feb. 27	I							The Wood-Anderson instrument began recording a quake about 0^h 39^m. The time marker failed

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
100	Feb. 27	I							The Galitzin instrument began recording a shock at about $10^h\ 10^m$, which lasted approximately 1 hour and 5 minutes. The time marker failed.
101	Feb. 28	I							The Wood-Anderson instrument began recording a shock at about $16^h\ 19^m$ which lasted 2 minutes. Time marker failed.
102	Mar. 1								The Wood-Anderson instrument recorded a quake about 21^h. Time marker failed.
103	Mar. 2								The Wood-Anderson instrument recorded a quake about 2^h. Time marker failed.
104	Mar. 2	II							The Bosch-Omori instrument recorded a quake beginning about $2^h\ 20^m$ and lasting approximately 1 hour and 20 minutes. Chronometer not working.
105	Mar. 7	IIr	iP_{EZ}	G 0 49 47	11 & 5	+3		−8	J. S. A. epicenter at 7°.5 N, 84° W.
			eP_N	G 0 49 48	9		−1.5		
			iS_{EN}	G 0 56 09	4 & 12	+1	+4.5		
			eL_E	G 1 02 35	13	+2.5			

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
105	Mar. 7 (contd.)	IIr	eM_E	G 1 05 54	20	−5.5			
			e_Z	G 1 06 00	22			−2	
			e_N	G 1 07 28	22		+6		
			F	2 00					
106	Mar. 7	I	e_Z	G 10 13 15	6			−4	
			e_E	G 10 23 47	6	+1			
			e_N	G 10 43 03	17		+2		
			e_E	G 10 43 39	23	+2			
			e_Z	G 10 45 00	20			−2	
			F	11 29					
107	Mar. 8	Id	iP_N	A 1 02 56	02		+0.2		
			eS_{EN}	A 1 02 57	0.7 & 0.4	+0.3	+0.3		
			eM_N	A 1 02 58	0.7		+1		
			F	1 03 05					
108	Mar. 8	IIu	i_Z	G 2 03 45	6			−4	J. S. A. gives epicenter probably on Greco-Serbian border.
			e_N	G 2 04 05	7		−3		
			i_E	G 2 15 04	9	+3			
			e_Z	G 2 15 38	8			−2	
			e_N	G 2 16 38	11		−3		
			e_E	G 2 20 00	13	+2			
			e_N	G 2 25 17	9		+3		
			e_E	G 2 35 50	12	−4			
			i_E	G 2 38 01	17	−6			
			e_N	G 2 38 31	15		+5		
			e_N	G 2 41 57	21		+6		
			e_E	G 2 42 00	22	−9			
			M_E	G 2 48 20	16	13			
			M_N	G 2 48 31	17		+12		
			F	3 29					
109	Mar. 9	IIu	iP_Z	G 4 00 09	6			−2	U. S. C. G. S. epicenter at 41°N, 142°E. $O = 3^h\ 48^m\ 40^s$
			eP_N	A 4 00 09	0.9		−0.1		
			e_E	A 4 00 12	1.5	−0.2			
			e_{EN}	B 4 00 19	4	−0.1	+0.1		
			iS_E	B 4 09 17	11	−0.5			
			iS_N	G 4 09 18	7		−6		
			eL_{EN}	B 4 20 21	12	−0.2	+0.2		
			e_Z	G 4 22 30	21			−7	
			F	6 30					

BERKELEY STATION

No.	Date	Character	Phase		Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931				h. m. s.	s.	mm.	mm.	mm.	See discussion, p. 533
110	Mar. 10	IIv	iP_{NZ}	G	3 29 45					
			iP_E	A	3 29 45.5					
			iP_N	B	3 29 46					
			i_N	A	3 29 49					
			i_E	B	3 29 49					
			i_E	A	3 29 50					
			i_N	A	3 30 05					
			i_N	A	3 30 17					
			iS_Z	G	3 30 21					
			i_N	A	3 30 21					
			i_N	G	3 30 38					
			iS_E	G	3 30 52					
			iM_Z	G	3 31 16					
111	Mar. 11	IIu	iP_E	G	12 38 48	8	+6			U. S. C. G. S. epicenter at 19° N 145° E O=12h26m 15s
			ePz	G	12 38 55	5			−3	
			e_E	B	13 03 11	26	−0.2			
			e_E	G	13 03 31	28	+8			
			M_Z	G	13 13 16	28			−3	
			F		14 30					
112	Mar. 12	I	e_E	G	10 45 54	6	+1.5			
			e_Z	G	11 02 44	8			−3	
			c_E	G	11 02 46	11	−4			
			eL_E	G	11 16 49	34	+2			
			eM_E	G	11 20.0	20	−6			
			M_Z	G	11 21	19			−4	
			F		12 26					
113	Mar. 12	I	e_E	G	19 32 01	7	−2			
			e_N	G	19 43 19	7		+3		
			e_Z	G	19 44 39	6			−3	
			e_E	G	19 48 09	20	−4			
			e_Z	G	19 48 31	17			−2	
			F		20 35					
114	Mar. 12	Id	iP_{EN}	A	20 14 56	0.3	−0.6	+0.7		
			iS_{EN}	A	20 15 00	0.9	−0.8	−0.8		
			i_{EN}	A	20 15 03.5	0.5	+0.7	+1		
			e_N	A	20 15 28	3		−0.3		
			F		20 15 51					

BERKELEY STATION

No.	Date	Character	Phase		Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931				h. m. s.	s.	mm.	mm.	mm.	
115	Mar. 13	I	e_N	A	16 08 12	0.7		−0.2		
			i_{EN}	A	16 08 23	0.5	+0.3	+0.5		
			e_N	A	16 08 29	0.9		−0.3		
			F		16 09					
116	Mar. 13	I	e_E	A	16 16 20	0.5	−0.1			
			e_N	A	16 16 32	0.5		−0.1		
			e_{EN}	A	16 16 44	0.5	+0.5	+0.3		
			e_N	A	16 16 50	0.9		−0.3		
			e_N	A	16 16 56	0.6		+0.3		
			F		16 17					
117	Mar. 14	I	iP_N	A	5 44 19	0.4		−0.4		
			iS_N	A	5 44 24	0.6		+0.5		
			i_N	A	5 44 27	0.5		+2		
			i_N	A	5 44 32	0.7		−1		
			F		5 46					
118	Mar. 14	I	e_N	A	17 29 20	0.3		0.1		
			i_{EN}	A	17 29 23	0.6	−0.6	+0.6		
			e_N	A	17 29 25	0.8		+0.4		
			F		17 29 41					
119	Mar. 15									The Wood-Anderson instrument recorded a quake beginning about 21h 25m and lasting approximately 2 minutes. The time marker failed.
120	Mar. 17	I	e_E	A	8 57 53	0.9	−0.3			
			e_N	A	8 57 54	1		+0.3		
			e_E	A	8 57 56	0.5	+0.3			
			e_N	A	8 57 58	0.5		−0.4		
			i_{EN}	A	8 58 22	0.5	−0.5	−1		
			F		9 01					
121	Mar. 18	IIu	iP_Z	G	8 15 00	13			−5	
			iP_{EN}	G	8 15 01	13	+2	+1.5		
			iS_N	G	8 25 27	16		+10		
			iS_Z	G	8 25 28	14			−9	
			eS_E	G	8 25 29	11	0.3			

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude Az	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
121	Mar. 18 (contd.)	IIu	eL_N	G 8 43 01	20		−5		
			eL_Z	W 8 43 01	15			0.1	
			M_E	G 8 43 21	15	59			
			M_Z	G 8 51 11	15			49	
			M_N	G 8 53 31	14		72		
			F	11 30					
122	Mar. 18	IIu	e_E	B 20 27 13	4	0.1			J. S. A. gives epicenter off the southeast ocast of Mindanao.
			e_E	G 20 32 23	6	−3			
			e_N	G 20 32 29	6		+2		
			$\overline{S_cP_cS_{EN}}$	G 20 38 08	13&25	−10	+4		
			$\overline{S_cP_c\ P_cS_E}$	G 20 38 48	7	−9			
			eL_E	B 21 00 22	34	−0.5			
			F	22 54					
123	Mar. 19	IIu	e_E	G 6 38 37	8	+2			U. S. C. G. S. epicenter at 20° N 120° E
			i_Z	G 6 38 43	7			−3	
			$\overline{S_cP_cS_{EN}}$	G 6 49 17	8	−5	+6		
			$\overline{S_cP_c\ P_cS_E}$	G 6 49 48	9	−12			
			ePS_N	G 6 51 15	7		+6		
			eL_N	G 7 10 21	28		−3		
			iL_E	G 7 10 41	30	−5			
			eL_Z	G 7 10 51	34			−4	
			F	8 53					
124	Mar. 19	Id	eP_N	A 20 25 38	0.7		−0.3		
			iS_N	A 20 25 49	0.3		−1		
			e_N	A 20 25 59	0.4		+0.3		
			e_N	A 20 26 06	1		+0.4		
			F	20 28					
125	Mar. 20	I	e_N	A 13 38 25	0.5		−0.4		
			e_N	A 13 38 29	0.7		−0.3		
			F	13 38 41					
126	Mar. 23	I	e_N	A 19 40 45	0.2		−0.2		
			e_N	A 19 40 59	0.6		+1		
			e_N	A 19 41 00	0.4		+0.7		
			F	19 42					
127	Mar. 23	I	e_N	A 19 57 09	0.6		−0.5		
			e_N	A 19 58 18	0.3		3		
			F	19 59					

BERKELEY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude Az	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
128	Mar. 28	IIu	e_E	A 12 52 59	2	−0.1			J. S. A. epicenter at 7° S 128° E
			e_N	A 12 53 07	1		−0 1		
			e_E	G 12 53 34	9	+2			
			e_Z	G 12 53 40	6			−4	
			e_Z	G 12 56 37	7			+3	
			e_Z	G 12 57 41	8			−4	
			e_N	G 12 58 01	4		+0.7		
			e_N	G 13 05 06	13		+8		
			i_Z	G 13 08 09	9			−12	
			i_E	G 13 12 51	12	+37			
			F	15 30					
129	Mar. 29	Ir	e_N	B 17 35 41	8		+0.1		J. S. A. epicenter at 16°5 S, 94° W.
			e_E	G 17 37 43	7	+3			
			e_E	G 17 42 09	8	+5			
			e_N	G 17 42 11	9		+8		
			e_Z	G 17 42 30	9			−3	
			e_Z	G 17 45 08	18			+5	
			e_E	G 17 45 41	16	+9			
			F	18 59					
130	Mar. 29	I	e_{EN}	A 18 02 40	1	−0.4	−0.3		
			e_N	A 18 03 09	1		+0.3		
			F	18 07.5					
131	Mar. 29	I	e_N	G 19 31 08	8		+4		This may be a continuation of quake No. 129.
			e_E	G 19 31 45	15	+4			
			e_Z	G 19 32 18	19			−3	
			F	19 45					
132	Mar. 31	Ir	e_N	G 16 25 31	15		+1		U. S. C. G. S. epicenter at 11°9 N, 86°W O = 16h 01.9m
			e_E	G 16 17 50	9	+1			
			e_E	G 16 20 05	12	+2			
			eL_E	G 16 22.0	28	+2			
			e_E	G 16 24 19	23	+6			
			eM_N	G 16 25 17	15	+1			
			eM_Z	G 16 25 31	6			+2	
			M_E	G 16 25.6	20	14			
			F	17 22					

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

Apparatus	Component	V	T_0	ϵ
Wood-Anderson	E	3000	1	15
	N	3000	1	15

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
1	Oct. 7	Id	iP_{EN}	0 06 38	0.5	0.8	0.8		
			e_N	0 06 39	0.4		0.5		
			e_E	0 06 40	0.4	0.4			
			e_E	0 06 43	0.5	0.2			
			iS_{EN}	0 06 46	0.6	0.9	0.9		
			e_E	0 06 50	0.6	0.8			
			e_N	0 06 51	0.5		0.5		
			e_E	0 06 54	1.0	0.5			
			e_N	0 06 56	0.6		0.8		
			e_E	0 07 02	0.7	0.4			
			e_N	0 07 04	0.5		0.4		
			e_E	0 07 05	0.6	0.4			
			F	0 07 49					
2	Oct. 7	Id	iP_N	0 34 02	0.4		0.4		
			iP_E	0 34 03	0.7	0.3			
			e_N	0 34 04	0.4		0.3		
			iS_{EN}	0 34 10	0.6	0.4	0.5		
			e_{EN}	0 34 14	0.4	0.3	0.4		
			e_{EN}	0 34 19	0.4	0.2	0.3		
			F	0 35 44					
3	Oct. 7	Id	e_N	0 38 11		0.4	0.3		
			e_{EN}	0 38 19		0.2	0.4		
			e_{EN}	0 38 29		0.1	0.2		
			F	0 38 49					
4	Oct. 7	Id	e_E	1 04 32		1			
			F	1 05 05					
5	Oct. 8	Iu	ePR_{EN}	10 31 46	1		0.4		J. S. A. epicenter at 16° S, 169° E
			e_N	10 32 25	2.5		0.2		
			e_E	10 34 31	3	0.2			
			e_E	10 35 01	3	0.2			
			ePR_{1N}	10 35 21	4		0.3		
			e_E	10 35 29	5	0.1			
			ePR_{2N}	10 36 16	3		0.1		
			eS_E	10 42 06	5	0.2			
			eS_N	10 42 14	8		0.2		
			e_N	10 44 12	7		0.2		
			e_E	10 55 57	11	0.1			
			e_N	10 56 27	11		0.2		
			F	11 32					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
6	Oct. 8	Id	eP_{EN}	15 55 07	0.8	0.5	0.2		
			e_{EN}	15 55 21	0.6	0.4	0.3		
			e_E	15 55 25	0.6	0.4			
			e_N	15 55 27	0.5		0.4		
			eS_N	15 55 30	0.7		0.8		
			iS_E	15 55 31	0.8	1.2			
			iS_N	15 55 32	0.9		1.3		
			e_E	15 55 34	0.5	1.2			
			e_N	15 55 39	0.8		1		
			e_E	15 55 41	0.5	0.5			
			e_E	15 55 44	0.6	0.6			
			e_N	15 55 46	0.7		0.6		
			e_E	15 57 20	3	0.1			May be surface waves
			F	15 58 34					
7	Oct. 11	Id	$i\overline{P}_N$	1 44 22	0.5		−0.4		
			$i\overline{P}_E$	1 44 23	0.5	−0.3			
			iP_N*	1 44 24	0.5		+0.4		
			$i\overline{S}_{EN}$	1 44 29	0.5	+0.9	−0.7		
			i_{EN}	1 44 31	0.7	−0.5	−0.7		
			eS_N	1 44 37	0.7		−0.5		
			e_E	1 44 46	0.7	+0.3			
			e_N	1 44 51	0.6		−0.4		
			F	1 45 14					
8	Oct. 12	Id	iP_{EN}	8 00 55	0.5	−0.3	−0.5		
			e_E	8 01 00	0.5	+0.3			
			e_N	8 01 01	0.3		+0.4		
			iS_E	8 01 03	0.6	−0.8			
			iS_N	8 01 04	0.6		−1		
			e_N	8 01 10	0.7		−0.5		
			e_E	8 01 32	0.6	−0.3			
			e_N	8 01 36	0.8		−0.3		
			F	8 02 23					
9	Oct. 15	Id	e_N	11 16 20	0.3		<0.1		
			e_E	11 16 22	0.9	−0.2			
			e_N	11 16 23	0.3		−0.5		
			e_N	11 16 26	0.4		+0.4		
			e_E	11 16 27	0.5	+0.2			
			eS_E	11 16 29	0.6	−0.2			
			eS_N	11 16 30	0.5		+0.3		
			F	11 16 38					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
10	Oct. 15	Id	$i\overline{P}_{EN}$	20 35 30	0.4 & 0.7	−0.2	−0.4		
			i_N	20 35 35	0.5		−0.5		
			e_E	20 35 37	0.5	+0.4			
			$i\overline{S}_N$	20 35 38	0.6		+0.7		
			$i\overline{S}_E$	20 35 39	?	0.6			
			iS_E	20 35 44	0.6	+0.4			
			iS_N	20 35 45	1		−0.5		
			i_E	20 35 55	0.7	+0.3			
			F	20 36 27					
11	Oct. 15	Id	e_{EN}	20 39 19	0.6	−0.2	−0.3		
			e_E	20 39 24		+0.1			
			e_E	20 39 28		+0.2			
			F	20 39 30					
12	Oct. 15	Id	3_E	23 42 23	0.7	−0.1			
			e_N	23 42 30	0.4		−0.2		
			e_N	23 42 38	0.4		+0.3		
			e_N	23 42 49	0.6		+0.5		
			e_E	23 42 57	0.7	−0.3			
			F	23 43 11					
13	Oct. 15	Id	e_{EN}	23 49 30	0.6	+0.1	+0.3		
			e_N	23 49 34	0.6		−0.2		
			F	23 49 43					
14	Oct. 15	I	e_N	23 58 50	0.5		−0.3		
			F	23 58 53					
15	Oct. 17	Id	$e\overline{P}_{EN}$	1 36 07	1	+0.1	−0.4		
			$e\overline{S}_E$	1 36 18	0.9	−0.3			
			$e\overline{S}_N$	1 36 20	0.8		+0.3		
			F	1 36 33					
16	Oct. 17	Id	$i\overline{P}_{EN}$	8 52 10	0.3	+0.5	−0.8		
			$i\overline{S}_E$	8 52 11	0.6	−0.3			
			$i\overline{S}_N$	8 52 12	0.3		−0.4		
			F	8 52 16					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
17	Oct. 17	Id	eP_N	8 59 05	2		−0.1		
			eP_E	8 59 07	1	−0.2			
			eS_E	8 59 29	2	+0.3			
			eS_N	8 59 33	1		+0.6		
			i_E	8 59 42	1	+0.4			
			e_N	9 00 35	1		+0.5		
			F	9 03 30					
18	Oct. 18	Id	$e\overline{P}_E$	7 14 38	0.6	−0.3			
			$e\overline{P}_N$	7 14 39	0.6		+0.4		
			$i\overline{S}_{EN}$	7 14 41	0.6	−0.7	+0.6		
			i_N	7 14 43	0.3		+0.4		
			i_E	7 14 44	0.7	−0.2			
			F	7 14 56					
19	Oct. 19	I	i_{EN}	3 50 23	0.7	+0.5	−0.4		
			e_E	3 50 25	0.8		−0.3		
			i_N	3 50 26	0.6		−0.4		
			F	3 50 31					
20	Oct. 19	Id	e_E	21 32 42	0.6	+0.3			
			e_N	21 32 43	0.5		+0.3		
			i_{EN}	21 32 44	0.5	+0.1	−0.5		
			e_E	21 32 47	0.6	+0.4			
			F	21 32 52					
21	Oct. 20	Id	e_{EN}	3 28 46	0.3	+0.1	+0.2		
			e_N	3 28 50	0.6		+0.5		
			e_E	3 28 52	0.6	+0.3			
			F	3 29 02					
22	Oct. 24	Iu	e_{EN}	20 27 20	1	−0.3	+0.3		See Berkeley report.
			e_N	20 27 23	0.7		+0.5		
			e_E	20 27 26	0.8	−0.3			
			e_N	20 50 04	12		−0.5		
			F	22 01					
23	Oct. 25	I	e_{EN}	12 09 40	1	−0.3	+0.3		
			e_E	12 10 22	1	+0.3			
			e_E	12 11 13	2	+0.3			
			F	12 19					End obscurbed by microseisms.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
24	Oct. 26	Id	e_{EN}	1 16 32	0.4	+0.1	+0.3		
			e_N	1 16 37	0.5		+0.3		
			e_E	1 16 44	0.5	+0.3			
			e_N	1 16 45	0.5		+0.4		
			F	1 17 07					
25	Oct. 27	Id	e_N	19 21 52	0.6		+0.3		
			e_E	19 22 35	?	+<0.1			Very faint.
			i_{EN}	19 22 45	0.5	+0.3	−0.5		
			F	19 23 54					
26	Oct. 28	I	e_E	13 58 18	?	<0.1			
			e_N	13 58 20	0.5		+0.2		
			e_E	13 58 54	0.7	+0.1			
			e_N	13 58 55	0.5		−0.3		
			e_E	13 59 07	0.5	−0.3			
			e_N	13 59 08	0.8		−0.5		
			F	14 00 21					
27	Oct. 28	I	e_N	21 22 29	0.6		+0.3		
			e_E	21 22 30	1	+0.3			
			e_E	21 22 34	0.7	−0.3			
			e_N	21 22 38	1		−0.3		
			e_E	21 22 43	0.8	+0.3			
			e_N	21 22 48	2		+0.3		
			F	21 25					
28	Oct. 29	Id	e_N	0 37 28	0.5		−0.3		
			e_E	0 37 30	0.5	+0.1			
			i_{EN}	0 37 54	0.6	+0.3	+0.4		
			i_{EN}	0 37 57	0.6	−0.9	+0.9		
			F	0 38 48					
29	Oct. 30	I	e_{EN}	4 28 52	0.5	+<0.1	+0.3		
			e_E	4 29 28	1	−0.1			
			e_N	4 29 33	0.6		−0.3		
			e_N	4 29 40	0.7		−0.4		
			e_E	4 29 41	0.5	+0.2			
			e_E	4 29 52	0.6	−0.3			
			e_N	4 29 59	0.7		−0.3		
			F	4 31.0					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
30	Oct. 30	Id	i_{EN}	23 03 50	0.5	−0.3	−0.5		
			F	23 04 03					
31	Oct. 31	Id	iP_{EN}	22 21 39	0.5	−0.3	−0.5		
			i_{EN}	22 21 46	0.6	+0.3	+0.5		
			iS_{EN}	22 21 51	0.8	+0.8	−0.5		
			e_N	22 22 04	0.5		−0.5		
			i_E	22 22 05	0.5	+0.6			
			e_{EN}	22 22 18	0.5	+0.3	+0.3		
			F	22 22 52					
32	Nov. 1	Id	e_N	5 39 39	?				
			i_{EN}	5 39 50	0.5	?	−0.7		
			i_N	5 39 51	0.4		+0.5		
			F	5 40 22					
33	Nov. 2	Id	e_N	3 08 12	0.4		−0.4		
			e_E	3 08 17	0.5	+0.2			
			e_N	3 08 19	0.7		−0.5		
			e_E	3 08 22	0.7	−0.3			
			e_N	3 08 23	0.6		−0.5		
			e_N	3 08 32	0.5		+0.3		
			e_E	3 08 38	0.7	+0.2			
			F	3 08 52					
34	Nov. 2	I	e_N	16 44 27	1.5		+0.3		
			e_E	16 44 28	1	+0.3			
			e_E	16 44 38	0.8	−0.3			
			e_N	16 44 39	0.9		0.3		
			e_E	16 44 50	0.9	−0.2			
			F	16 46 11					
35	Nov. 4	I	e_{EN}	7 27 54	0.6	+<0.1	−<0.1		
			e_E	7 28 30	1	−0.2			
			e_N	7 28 34	0.6		−0.3		
			F	7 30					
36	Nov. 6	Id	e_E	2 14 50	0.5	−<0.1			
			e_N	2 14 51	0.5		+<0.1		
			e_{EN}	2 15 00	0.6	+0.2	−0.3		
			e_N	2 15 09	0.6		+0.3		
			e_E	2 15 10	0.7	+0.1			
			F	2 16.0					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
37	Nov. 7	Id	i_{EN}	7 26 49	0.5	+1.0	−0.5		
			e_{EN}	7 26 51	0.6	1.3	−1.1		
			e_{EN}	7 26 54	0.5	−0.3	−0.5		
38	Nov. 8	Id	e_{EN}	0 29 07	0.8	−0.2	−0.3		
			e_E	0 29 20	0.7	−0.3			
			e_N	0 29 21	0.9		−0.5		
			e_E	0 29 26	0.7	−0.6			
			F	0 30 15					
39	Nov. 9	Id	e_{EN}	17 54 45	0.8	−0.3	−0.4		
			e_E	17 54 57		+0.6			
			i_N	17 54 58	0.6		+0.7		
			i_N	17 54 59	0.7		+0.9		
			e_N	17 55 03	0.5		−0.4		
			e_E	17 55 05	0.7	+0.5			
			e_E	17 55 10	0.8	+0.7			
			F	17 56 26					
40	Nov. 10	Id	e_{EN}	4 15 36	0.5	−0.1	+0.2		
			e_E	4 15 39	0.6	+0.6			
			e_N	4 15 40	0.4		−0.6		
			e_{EN}	4 15 42	0.3	−0.5	−0.7		
			e_E	4 15 48	0.7	+0.4			
			e_N	4 15 53	0.5		−0.4		
			F	4 16 27					
41	Nov. 10	Id	e_N	4 59 16	0.7		−0.2		
			e_E	4 59 44					
			F	5 01 34					
42	Nov. 10	Id	e_{EN}	18 42 56	0.4	0.4	−0.6		
			e_{EN}	18 42 57	0.3	1.2	−0.8		
			e_{EN}	18 42 58	0.5	+0.8	+0.5		
			e_E	18 43 00	0.6	−0.3			
			F	18 43 19					
43	Nov. 11	I	i_{EN}	17 52 35	0.4	−0.3	−0.6		
			e_{EN}	17 52 41	0.5	+1	−1		
			e_N	17 52 43	0.6		−1		
			e_N	17 52 55	0.5		−0.4		
			e_E	17 52 56	0.7	+0.5			
			F	17 54 14					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude Az	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
44	Nov. 11	I	e_{EN}	21 03 39	0.5	+0.2	−0.3		
			e_E	21 03 57	0.4	−0.7			
			e_N	21 04 03	0.5		+0.3		
			e_N	21 04 41	0.6		+0.3		
			F	22 05					
45	Nov. 11	I	e_N	21 33 30	0.5		0.3		
			F	21 33 56					
46	Nov. 11	I	e_N	22 24 15	0.8		−0.1		
			e_E	22 24 16	0.7				
			e_E	22 24 27	0.5	+0.2			
			e_N	22 24 28	0.5		−0.3		
			e_{EN}	22 24 30	0.7	+0.3	+0.4		
			F	22 25 09					
47	Nov. 12	I	e_E	19 17 19	0.8	0.1			May be microseisms.
			e_N	19 17 25	0.1		−0.3		
			F	19 21					
48	Nov. 13	I	e_{EN}	1 31 10	0.4	0.5	−0.5		
			F	1 31 43					
49	Nov. 13	Id	e_{EN}	21 51 43	0.5	−0.3	−0.4		
			i_{EN}	21 51 46	0.5	−1	+0.8		
			e_N	21 51 50	0.7		+0.6		
			e_E	21 51 52	0.6	−0.3			
			F	21 52 18					
50	Nov. 14	Id	i_{EN}	18 47 22	0.5		−3		Beginning very sharply defined.
			i_N	18 47 23	1		−5		
			F	18 48 13					
51	Nov. 14	Id	i_{EN}	18 53 45	0.5	+3	−1		
			i_{EN}	18 53 46	? 0.3	6	+2		
			e_N	18 53 49	0.6		+0.8		
			F	18 54 15					
52	Nov. 14	Id	e_{EN}	21 38 07	0.5	−0.3	+0.4		
			e_{EN}	21 38 10	0.6	−0.4	−0.4		
			F	21 38 20					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude Az	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
53	Nov. 15	I	e_N	0 24 39	1		+0.4		
			F	0 24 53					
54	Nov. 15	Id	e_{EN}	1 04 56	0.8	+0.2	+0.3		
			F	1 06 33					
55	Nov. 16	I	e_{EN}	14 39 16	0.5	+0.1	+0.1		
			e_E	14 39 36	0.6	+0.2			
			e_N	14 39 55	0.6		+0.4		
			e_E	14 40 03	0.7	+0.3			
			e_N	14 40 08	0.7		−0.3		
			F	14 40 54					
56	Nov. 16	Id	$i\overline{P}_{EN}$	20 32 28	0.4	+3	−3		
			$i\overline{S}_{EN}$	20 32 30	0.5	−3	+3		
			e_{EN}	20 32 40	0.7	+0.3	−0.4		
			F	20 33 14					
57	Nov. 19	Id	e_E	12 49 53	0.6	+0.2			
			e_N	12 49 54	?		<0.1		Very weak.
			e_{EN}	12 50 05	0.7	+0.3	−0.4		
58	Nov. 28	Ir	e_{EN}	7 37 58	2	−0.3	+0.5		U. S. C. G. S. epicenter at 18° N 105° W
			e_{EN}	7 38 04	1.5	+0.4	−0.4		
			e_N	7 38 21	2		−0.5		
			e_N	7 38 33	2		0.5		
			F	8 15					
59	Nov. 29	I	e_N	8 09 35	?		0.1		Record very dim.
			e_E	8 09 38	?	0.1			
			e_N	8 09 56	0.5		−0.3		
			e_{EN}	8 10 02	0.7	−0.3	−0.4		
			e_N	8 10 10	0.6		−0.5		
			F	8 10 51					
60	Dec. 1	Id	e_N	0 00 06	0.4		−0.3		
			e_E	0 00 08	0.5	−0.2			
			e_N	0 00 10	0.5		+0.6		
			e_E	0 00 15	0.6	+0.7			
			e_N	0 00 19	0.6		+0.4		
			e_E	0 00 26	0.7	−0.4			
			F	0 01 01					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
61	Dec. 3	Id	$e\overline{P}_N$	5 27 52	0.5		−0.1		
			$e\overline{P}_E$	5 27 53	0.5	+0.1			
			$e\overline{S}_E$	5 27 57	0.6	−0.2			
			$e\overline{S}_N$	5 27 59	0.4				
			F	5 28 17					
62	Dec. 6	I	e_N	7 10 34	0.5		−0.1		
			e_E	7 10 35	0.5	−0.1			
			e_E	7 10 46	0.9	+0.1			
			e_N	7 10 51	1		+0.5		
			F	7 14 33					
63	Dec. 7	Id	e_N	20 57 47	0.5		+0.4		
			e_E	20 57 48	0.6	−0.2			
			e_N	20 57 57	0.7		−0.4		
			F	20 58 21					
64	Dec. 7	Id	e_{EN}	21 07 29	0.7	+0.2	+0.4		
			e_N	21 07 39	0.7		+0.4		
			e_E	21 07 41	0.8	−0.3			
			F	21 09					
65	Dec. 8	I	e_N	1 24 49	0.5		0.1		
			e_E	1 24 55	0.5	+0.2			
			e_N	1 25 09	0.9		+0.5		
			e_E	1 25 19	1	+0.2			
			e_E	1 25 24	0.7	+0.2			
			e_N	1 25 48	2		−0.5		
			e_E	1 26 10	2	+0.3			
			e_N	1 26 27	2		−0.2		Surface waves.
			F	1 33					
66	Dec. 10	Id	iP^*_{EN}	0 08 15	0.7	−0.4	−0.8		
			iS^*_{EN}	0 08 28	0.4	+1	1		
			$i\overline{S}_{EN}$	0 08 30	0.6	+5	5		
			i_N	0 08 39	0.8		2		
			F	0 11					
67	Dec. 10	Id	$i\overline{P}_{EN}$	5 20 16	0.3	0.4	−0.6		
			iP_{EN}	5 20 17	0.4	0.5	−4		
			$e\overline{S}_N$	5 20 22	0.5		−0.5		
			F	5 20 55					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1930			h. m. s.	s.	mm.	mm.	mm.	
68	Dec. 11	Iv	eP_N	8 59 51.5	1.5		+0.7		See discussion, p. 529
			eP_E	8 59 51.7	1.4	−0.6			
			eP^*_{EN}	8 59 55	0.5	−0.4	−0.7		
			e_N	9 00 02	0.5		+0.8		
			e_N	9 00 11	0.8		−1.1		
			iS_{EN}	9 00 34	0.9	+5	−3		
			e_N	9 01 47	1.5		−2		
			F	9 12					
69	Dec. 11	Iv	e_{EN}	12 28 15	1	−0.3	−0.5		See discussion, p. 530
			e_{EN}	12 28 17	0.5	−0.1	−0.3		
			e_E	12 28 27	1	−0.3			
			e_E	12 28 33	0.4	+0.2			
			e_N	12 28 59	0.6		−0.5		
			e_N	12 30 08	2		+0.5		
			F	12 36					
70	Dec. 12	Id	$e\overline{P}_{EN}$	5 56 01	0.5	+0.3	−0.5		
			$e\overline{S}_{EN}$	5 56 03	0.6	−0.5	+1		
			F	5 56 27					
71	Dec. 12	Iv	e_{EN}	9 31 55	1.6	+0.3	−0.5		See discussion, p. 530
			e_N	9 31 59	0.5		+0.3		Period changes abruptly.
			e_E	9 32 01	0.7	+0.4			
			e_N	9 32 09	0.4		+0.7		
			e_{EN}	9 32 38	0.8	−4	−1.5		
			e_E	9 33 09	1	1			
			F	9 41					
72	Dec. 12	Iv	eP_{EN}	20 16 02	0.7	+0.2	−0.4		See discussion, p. 530
			e_N	20 16 06	0.6		+0.7		
			e_E	20 16 07	0.5	+0.3			
			$e\overline{P}_N$	20 16 10	0.5		−0.6		
			e_E	20 16 23	0.6	−0.5			
			eS_{EN}	20 16 44	0.7	−1	+1		
			$e\overline{S}_N$	20 16 54	0.5		+0.6		
			e_E	20 17 43	0.5	+0.2			
			e_{EN}	20 18 10	0.6	−0.8	−0.6		
			F	20 22					
73	Dec. 14	Iv	e_{EN}	1 39 11	1	+0.2	−0.5		See discussion, p. 530
			e_{EN}	1 39 17	0.5	+0.2	−0.5		
			e_E	1 39 25	0.7	+0.3			

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
73	Dec. 14 (contd.)	I	e_N	1 39 30	0.7		+0.5		
			e_E	1 40 01	0.4	+0.2			
			F	1 44					
74	Dec. 15	Iv	$i\overline{P}_{EN}$	8 39 04	0.8	+0.3	−0.5		See discussion, p. 531
			eP_E	8 39 08	0.5	−0.3			
			$e\overline{S}_{EN}$	8 39 10	0.5	−0.3	−0.7		
			e_E	8 39 13	0.4	−0.3			
			i_N	8 39 23	0.6		+0.9		
			e_N	8 39 31	0.4		+0.5		
			i_{EN}	8 39 47	0.7	+1	+1		
			F	8 42 27					
75	Dec. 15	Id	e_N	20 09 27			0.1		Motion very weak.
			e_E	20 09 28		0.1			
			e_{EN}	20 09 48	0.5	−0.2	−0.5		
			e_N	20 09 53	0.7		−0.5		
			e_{EN}	20 10 03	0.6	−0.3			
			F	20 10 32					
76	Dec. 16	Id	e_N	10 27 53	0.5		−0.3		
			e_E	10 28 05	0.6	+0.2			
			e_N	10 28 14	0.8		−0.4		
			e_N	10 28 16	0.6		+0.5		
			e_E	10 28 17	0.8	+0.4			
			e_N	10 28 22	0.5		−0.5		
			F	10 29.1					
77	Dec. 21	Id	iP_{EN}	9 49 07			−0.4		Time correction uncertain.
			iS_{EN}	9 49 09	0.3		−1.5		
			F	9 49 27					
78	Dec. 27	Id							An earthquake lasting 1.5 minutes began recording about $20^h\,30^m$. Time marker failed.
79	Dec. 28	Id							An earthquake lasting 1.5 minutes began recording about $5^h\,32^m$. Time marker failed.

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1930			h. m. s.	s.	mm.	mm.	mm.	
80	Dec. 28	Id	iP_{EN}	10 21 46	0.4	+1	−2		
			i_N	10 21 48	0.4		+3		
			iS_E	10 21 56					
			F	10 24.2					S_N builds up too gradually to measure.
81	Dec. 30	Id	iP_{EN}	3 01 25	0.5	+0.5	−0.8		
			i_{EN}	3 01 26	0.5	+1	+1		
			iS_{EN}	3 01 29	0.5	+1.5	−9		May begin later on E.
			F	3 03.2					
	1931								
82	Jan. 2	Ir	eP_N	9 54 02	2		−0.5		J. S. A. epicenter at 15° N, 108°5 W.
			eP_E	9 54 04	1.5	−0.4			
			e_N	9 54 05	3		+1		
			e_N	9 54 20	2.5		+2		
			eS_E	9 58 24	5	0.2			
			eS_N	9 58 25	7		+1		
			e_{EN}	10 00.6	18				
			eL_N	10 01.9					
			F	11 20					
83	Jan. 3	Id							An earthquake lasting about 1.5 minutes began recording at approximately $11^h\,20^m$. Time marker failed.
84	Jan. 5	Id	eP_{EN}	9 43 57	0.4	+0.2			See discussion, p. 532
			eP_N	9 43 58	0.5		+0.7		
			e_E	9 44 06		2			
			iS_N	9 44 08	0.4		+3		
			i_N	9 44 13	0.6		+2		
			F	9 45 45					
85	Jan. 5	I	e_N	19 28 14	0.5		−0.1		
			e_E	19 28 15	0.3	+0.1			
			e_E	19 28 48	0.7	+0.2			
			e_N	19 28 49	0.6		+0.4		
			F	19 30.1					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
86	Jan. 6	Id							Six earthquakes with comparable S-P intervals were recorded, the largest beginning about $23^h\ 29^m$. Time marker failed. See discussion, p. 532
87	Jan. 8	Id							An earthquake similar to those of Jan. 6 began recording about $19^h\ 45^m$. Time marker failed.
88	Jan. 11	Id	eP_{EN}	15 18 15					
			iS_{EN}	15 18 27	0.7		−0.3		
			F	15 18.9					
89	Jan. 14	Id	iP_E	9 18 32					
			iP_N	9 18 32.5					
			iS_N	9 18 36			+5		
			F	9 19.2					
90	Jan. 15	Id	iP_{EN}	1 26 45			+0.2		
			iS_N	1 26 47	0.4		+0.8		
			F	1 27.0					
91	Jan. 15	Ir	eP_{EN}	1 56 59	6	+0.5	−0.3		Also a short period. A definite change in period. U. S. C. G. S. epicenter at 16° N, 96° W. $O = 1^h\ 50^m\ 32^s$.
			e_N	1 57 14	1.5				
			e_E	1 58 43	4				
			eS_E	2 02 06	18				
			e_N	2 02 09	6		−0.5		
			eS_N	2 02 13	10		−2		
			e_N	2 02 18	13				
			eL_N	2 06.1	30				
			eL_E	2 06.2	25				
			e_E	2 08.3	20				
			e_{EN}	2 10.6	10				
			F	3 15					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude A_E	Amplitude A_N	Amplitude A_Z	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
92	Jan. 15	Id	eP_{EN}	8 07 24					May begin earlier.
			eS_E	8 07 37					
			eS_N	8 07 38	0.6				
			i_E	8 08 40	0.8	−0.5			
			F	8 08.3					
93	Jan. 15	I	e_{EN}	23 25 31					
			F	23 31					
94	Jan. 16	Id	eP_{EN}	2 44 45	0.7				
			eS_{EN}	2 44 56	0.7				
			e_{EN}	2 44 57	0.6	+0.5	−0.5		
			F	2 45.6					
95	Jan. 16	Ir	eP_E	19 26 10	3	+0.5			J. S. A. epicenter at 14°5 N. 96° W $O = 19^h\ 19^m\ 26^s$.
			eP_N	19 26 11	1		+0.5		
			e_E	19 35 44	22	−0.5			
			e_N	19 35 49	22		+0.5		
			F	19 52					
96	Jan. 17	IIIr	eP_E	2 53 41	1.5	0.5			U. S. C. G. S. epicenter at 26°N,111°W.
			eP_N	2 53 42	1.5		0.3		
			iPR_{1E}	2 53 59	2	0.8			
			iPR_{1N}	2 54 02	1.5		0.6		
			i_N	2 54 40	2		0.8		
			e_E	2 54 50	3	0.5			
			iS_{EN}	2 56 47	5	0.8	0.4		
			eL_E	2 57.1	16	6			
			eL_N	2 57.6	18		2		
			eM_E	2 59.1	16	4			
			eM_N	2 59.2	13		3		
			eW_{2N}	5 52.4	5		0.3		
			eW_{2E}	5 52.6	3	0.2			
			F	5 58					
97	Jan. 17	IIv	iP_E	8 08 10	0.5	+0.5			
			iP_N	8 08 11	0.6		+0.6		
			iP^*_{EN}	8 08 13.5	0.5	0.5	0.5		
			$i\overline{P}_N$	8 08 20	0.4		0.7		
			$i\overline{P}_E$	8 08 21	0.6	0.4			
			iS_{EN}	8 08 46	0.6	0.6	0.4		
			iS_E^*	8 08 49	0.5	0.9			
			iS_N^*	8 08 50	0.4		0.7		
			F	8 11 08					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
98	Jan. 18	Id	ePE_N	11 11 44					Very similar to record of 2h, Jan. 16.
			eS_{EN}	11 11 55					
			eS_{EN}	11 11 56	0.5	+0.4	−0.4		
			F	11 12.4					
99	Jan. 21	Id	iP_{EN}	21 32 57.5					
			iS_{EN}	21 32 59	0.4		+1		
			i_{EN}	21 33 00					
			F	21 33.5					
100	Jan. 23	I	e_N	5 58 23	1		−0.3		Doubtful beginning.
			e_E	5 58 25	1.5	+0.3			
			e_N	6 08 35	6		−0.3		
			F	6 15					
101	Jan. 23	IId	eP_N	8 09 15	0.4	−0.3	−0.2		May be two earthquakes.
			e_N	8 09 17	0.5		−1.2		
			e_N	8 09 20	0.5		−2		
			e_N	8 09 21	0.4		+0.8		
			e_N	8 09 26	0.6		−0.4		
			F	8 09 40					
102	Jan. 23	IId	eP_{EN}	8 09 53	0.4	−0.2	−0.3		
			iS_N	8 09 53.8	0 3		−0 7		
			e_N	8 09 54	0.4		−0.5		
			F	8 10 04					
103	Jan. 24	IId	iP_N	0 37 21	0.5		−0.4		
			e_E	0 37 22	0.6	−0.2			
			i_N	0 37 23	0.6		+0.6		
			i_N	0 37 28	0.5		+0.5		
			e_E	0 37 33					
			iS_N	0 37 35	0.6		−2.5		
			i_N	0 37 38	0.7		+1		
			i_N	0 37 49	0.8		+0.6		
			F	0 39 15					
104	Jan. 24	Id	eP_{EN}	5 39 12	0.5	−0.1	+0.3		
			iS_{EN}	5 39 14	0.6	+0.4	−0.6		
			F	5 39 36					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
105	Jan. 24	Iv	ePE_N	7 21 44	0.7	+0.2	−0.3		See discussion, p. 532
			e_E	7 21 53	0.6	+0.3			
			e_N	7 21 56	0.5		−0.4		
			e_E	7 22 06	0.5	−0.4			
			e_N	7 22 14	0.7		+0.8		
			F	7 25 26					
106	Jan. 25	Iu	e_N	12 40 08	1.6		+0.3		
			e_E	12 40 20	1.5	−0.3			
			F	12 58					
107	Jan. 27	Ir?	e_N	14 35 05	1.5		−0.3		
			e_E	14 35 11	1.2	−0.2			
			F	14 49					
108	Jan. 27	Iv	e_N	20 28 15	2		−0.2		
			e_E	20 28 19	1.5	+0.2			
			e_E	20 28 51	3.5	−0.3			
			e_E	21 03 19	20	−0.3			
			e_E	21 09 28	15	+0.5			
			F	21 50					
109	Jan. 28	Iu	e_{EN}	21 36 53	1.4 & 0.7	+0.2	−0.2		
			e_{EN}	21 37 09	0 8	+0.4	−0.5		
			e_N	21 47 38	0.9		+0.6		
			e_E	22 09 09	20	+0.5			
			F	22 49					
110	Jan. 29		e_N	17 16 40	1.3		−0.3		
			e_E	17 16 45	1	−0.2			
			e_N	17 27 05	30		−0.2		
			F	17 35					
111	Jan. 29	IId	iP_{EN}	23 51 14	0.5		−1.2		
			iS_{EN}	23 51 16	0.3		+3		
			i_N	23 51 17	0.4		−1		
			i_N	23 51 18	0.6		−1		
			F	23 51 45					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
112	Jan. 30	I	e_E	20 41 24	0.5	+0.2			
			e_N	20 41 25	0.6		−0.3		
			e_N	20 41 54	0.7		−0.5		
			e_E	20 41 58	0.7	+0.3			
			F	20 42.9					
113	Jan. 30	I	e_E	20 45 11	0.7	−0.2			
			e_N	20 45 12	0.8		−0.3		
			e_E	20 45 19	0.8	+0.2			
			e_N	20 45 42	0.7		+0.6		
			e_E	20 45 48	0.5	−0.7			
			e_N	20 45 53	1		−0.6		
			e_E	20 46 01	0.6	+0.3			
			F	20 47 11					
114	Jan. 31	Id	eP_{EN}	19 53 16	0.2		+0.2		
			iS_{EN}	19 53 17	0.3		+1		
			e_N	19 53 20	0.4		−0.5		
			F	19 53 28					
115	Feb. 2	Id	iP_{EN}	8 43 06	0.6	+0.2	−0.6		
			i_N	8 43 11	0.4		+0.5		
			iS_{EN}	8 43 15	0.6	−1.0	+1		
			e_N	8 43 20	0.5		−0.6		
			e_E	8 43 24	0.8	−0.4			
			F	8 44 12					
116	Feb. 2	IIu	eP_{EN}	23 00 12					
			e_E	23 00 20					
			ePR_{1EN}	23 03 59					
			ePS_{EN}	23 11 32					
			eSR_{1EN}	23 17 59					
			eL_{EN}	23 32 12					
			eM_{EN}	23 37 47					
			F	26 00					
117	Feb. 7	Id	eP_{EN}	3 50 23	0.5	+0.1	−0.2		
			iS_{EN}	3 50 32	0.4	−0.4	−0.6		
			F	3 51 04					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
118	Feb. 7	Id	eP_{EN}	3 56 19	0.5	−0.2	−0.3		
			e_N	3 56 23	0.4		−0.4		
			e_N	3 56 25	0.3		−0.4		
			iS_{EN}	3 56 28	0.5	−1	−1		
			e_N	3 56 31	0.5		−0.6		
			F	3 57 19					
119	Feb. 7	Id	iP_{EN}	6 57 08	0.4	+0.2	+0.4		
			e_N	6 57 11	0.4		+0.4		
			e_N	6 57 13	0.3		+0.5		
			iS_{EN}	6 57 16	0.5	−1	+0.6		
			e_N	6 57 19	0.6		+0.6		
			F	6 58 14					
120	Feb. 9	I	e_N	1 13 30	0.6		+0.4		
			e_E	1 14 04	0.8	+0.2			
			e_N	1 14 06	0.7		−0.4		
			F	1 14.9					
121	Feb. 10	Iu	e_E	8 28 31	20	+0.3			
			e_N	8 29 46	15		−0.3		
			F	8 47					
122	Feb. 11	Id	eP_{EN}	20 59 25	0.6	−0.3	−0.4		
			e_N	20 59 28	0.5		+1		
			e_E	20 59 36	0.5	−1			
			iS_N	20 59 38	0.5		+3		
			i_N	20 59 39	0.6		+4		
			i_N	20 59 44	0.6		+2		
			i_N	20 59 51	0.8		+2		
			e_N	21 00 08	1.2		+0.8		
			F	21 02					
123	Feb. 12	I	e_N	19 21 51	0.3		−0.3		
			e_E	19 21 55	0.8	+0.2			
			e_N	19 22 01	1		−0.4		
			e_N	19 22 39	0.9		−0.5		
			e_E	19 22 47	1.3	+0.3			
			F	19 28					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
124	Feb. 13	I	e_N	1 40 44	1		−0.3		
			e_E	1 40 46	1	+0.2			
			e_N	1 41 03	2		+0.5		
			e_E	2 13 44	10	+0.3			
			e_N	2 13 56	10		−0.3		
			F	3 01					
125	Feb. 13	IId	iP_{EN}	12 15 07	0.4		−0.3		
			iS_{EN}	12 15 09	0.5		+1		
			i_N	12 15 10	0.4		+0.8		
			e_N	12 15 16	0.8		+0.4		
			F	12 15 38					
126	Feb. 14	Id	e_N	2 33 47	0.4		+0.3		
			e_E	2 33 55	0.8	+0.2			
			e_N	2 33 56	0.8		0.4		
			F	2 35					
127	Feb. 15	Id	eP_E?	9 44 52					
			iP_N	9 44 53	0.5		+0.5		
			iS_{EN}	9 44 54	0.6		1		
			i_N	9 44 56	0.8		−0.7		
			i_N	9 45 02	0.6		−0.5		
			F	9 45 19					
128	Feb. 16	Id	eP_N	16 33 41	0.4		+0.3		
			e_E	16 33 48		<0.1			
			e_N	16 33 52	0.7		+0.4		
			iS_{EN}	16 33 54	0.5	0.5	+0.7		
			i_N	16 34 03	0.6		+0.4		
			F	16 34 25					
129	Feb. 16	IId	$i\overline{P}_{EN}$	18 19 44	0.5	+0.3	−0.5		
			$i\overline{S}_{EN}$	18 19 55	0.7	−2.5	−0.6		
			iS_N	18 19 57	0.6		−3		
			F	18 23					
130	Feb. 16	IId	iP_{EN}	18 40 33	0.5	+0.2	+0.5		
			iS_{EN}	18 40 44	0.7	1	−0.7		
			i_N	18 40 45	0.5		−2		
			e_N	18 40 47	0.4		+0.6		
			e_N	18 40 55	0.4		−0.7		
			F	18 42.0					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude			Remarks
						A_E	A_N	A_Z	
	1931			h. m. s.	s.	mm.	mm.	mm.	
131	Feb. 17	IId	i_E	15 59 37					
			e_E	15 59 44					
			i_E	15 59 49					
			F	16 01+					
132	Feb. 21	Id	eP_N*	8 10 36	0.8		+0.5		Doubtful time.
			iP_N	8 10 38	0.5		+0.6		
			iS_N*	8 10 58	0.7		+1		
			iS_N	8 11 01	0.6		+1		
			e_N	8 11 24	1		−0.5		
			F	8 14					
133	Feb. 23		e_N	10 01 08					See discussion, p. 533
			e_N	10 01 26	0.7		1.5		
			i_N	10 01 37	0.7		−3		
			i_N	10 01 46	1		−6		
			F	10 04					
134	Feb. 24	Id	eP_E	11 14 00.5	0.5	+0.1			
			eP_N	11 14 01	0.5		−0.3		
			iS_{EN}	11 14 02	0.5		−1		
			e_E	11 14 03	0.7	0.3			
			F	11 14 09					
135	Feb. 28	Id	eP_{EN}	17 20 19	0.5 & 1	+0.1	+0.1		
			e_E	17 20 50	1	−0.2			
			eS_N	17 20 56	1		+1		
			F	17 22					
136	Mar. 1	I	e_{EN}	14 33 27	0.7	+0.2	−0.4		
			e_N	14 33 36	1		−0.5		
			F	14 35.8					
137	Mar. 1	IIv	eP_{EN}	20 50 13	0.6	+0.2	−0.6		
			i_N	20 50 15	0.3		+0.7		
			i_N	20 50 18	0.3		−0 8		
			e_E	20 50 21		−1			
			e_N	20 50 22	0.4		−1		
			iS_N	20 50 30	0.6		+1		
			i_{EN}	20 50 34	0.8	+0.9	+0.7		
			F	20 52.8					
138	Mar. 2	I	e_E	2 31 05	0.9	+0.2			
			e_N	2 31 06	0.6		−0.3		
			e_N	2 31 10	0.7		−0.4		
			F	2 36.6					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T. h. m. s.	Period s.	Amplitude AE mm.	Amplitude AN mm.	Amplitude AZ mm.	Remarks
	1931								
139	Mar. 7	I	e_N	0 49 38	1		0.4		
			e_N	0 49 54	1		−0.5		
			F	0 52 59					
140	Mar. 7	Id	iP_N	5 22 45	0.3		+0.3		
			iS_{EN}	5 22 49	0.4		−0.7		
			e_N	5 22 51	0.6		−0.5		
			F	5 23 20					
141	Mar. 9	Iu	e_N	4 00 06	0.8		+0.3		J. S. A. epicenter at 47° N, 140° E, or perhaps at 40° N, 147° E.
			e_E	4 00 11	0.5	+0.1			
			e_E	4 00 24	3.5	+0.2			
			e_N	4 00 42	3		−0.5		
			e_N	4 09 21	6		−0.5		
			F	5 06					
142	Mar. 10	Id	iP_N	3 29 55					See discussion, p. 533
			P_N	3 30 00					
			$iS?_{EN}$	3 30 41					
			i_N	3 30 49					
			F	3 40					
143	Mar. 10	Id	eP_{EN}	3 40 48	0.3	<0.1	+0.4		
			i_N	3 40 57	0.6		−0.5		
			iS_{EN}	3 40 59	0.5	−0.7	−1		
			F	3 41 37					
144	Mar. 11	Id	eP_N	0 30 42	0.5		−0.4		
			e_E	0 30 43	0.5	−0.1			
			iS_N	0 30 53.7	0.3		−0.7		
			e_E	0 30 54	0.6	1.5			
			iS_N	0 30 54.4	0.5		−1.5		
			e_N	0 30 57	0.8		0.7		
			F	0 32 23					
145	Mar. 11	I	e_E	12 38 45	1	+0.1			
			e_N	12 38 58	1		−0.4		
			e_E	12 39 04	0.5	+0.2			
			e_N	12 39 13	3		−0.5		
			e_E	13 04 18	23	+0.2			
			F	13 21					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T. h. m. s.	Period s.	Amplitude AE mm.	Amplitude AN mm.	Amplitude AZ mm.	Remarks
	1931								
146	Mar. 12	Id	eP_N	7 04 35	0.4		−0.3		
			e_E	7 04 36					
			iS_N	7 04 36	0.5		−1		
			F	7 04 49					
147	Mar. 13	IId	iP_{EN}	16 07 58			−4		
			iS_N	16 08 00			−6		
			i_N	16 08 02					
			F	16 08 55					
148	Mar. 13	IId	iP_{EN}	16 16 20	0.4		−3		
			i_N	16 16 22			−5		
			i_N	16 16 27	0.5		−1		
			i_N	16 16 33	0.7		−1		
			F	16 17 35					
149	Mar. 14	IId	iP_N	5 44 19	0.6		+0.8		
			i_N	5 44 25	0.5		−0.8		
			iS_N	5 44 27	0.6		−2		
			i_N	5 44 29	0.7		−2		
			F	5 46 25					
150	Mar. 15	Id	eP_N*	21 10 03	0.8		−0.5		
			i_{EN}	21 10 09	0.6	+0.3	−0.5		
			e_N	21 10 14	0.7		−0.6		
			e_E	21 10 17	0.4	+0.2			
			iS_{EN}*	21 10 21	0.7	+0.5	+0.7		
			iS_{EN}	21 10 24	0.5	0.6	−1		
			F	21 12.5					
151	Mar. 17	II	e_N	8 57 48	0.5		+0.4		
			i_N	8 57 50	0.5		+0.5		
			i_N	8 57 58	0.5		+0.6		
			e_N	8 58 16	0.4		+0.5		
			i_N	8 58 19	0.6		−3		
			F	9 01.5					
152	Mar. 18	I	e_N	8 14 57	1.5		+0.3		
			e_N	8 25 27	10		+0.6		
			F	10 01					
153	Mar. 18	I	e_N	20 31 29	2.5		−0.4		
			e_N	20 38 11	2.5		+0.5		
			F	20 47					

LICK OBSERVATORY STATION

No.	Date	Character	Phase	Time G. M. C. T.	Period	Amplitude AE	Amplitude AN	Amplitude AZ	Remarks
	1931			h. m. s.	s.	mm.	mm.	mm.	
154	Mar. 19	IId	e_N	20 24 53	0.2		−0.5		
			i_N	20 25 23			−5		
			e_N	20 25 36	0.7		−2		
			F	20 26					
155	Mar. 23	Id	e_N	19 40 51	0.4		−0.4		
			e_E	19 40 56	0.6	+0.4			
			e_N	19 40 58	0.4		−0.5		
			i_N	19 41 00	0.8		−0.7		
			F	19 41 23					
156	Mar. 23	IId	i_N	19 57 08	0.3		−0.3		
			e_E	19 57 09	0.5	+0.2			
			e_E	19 57 15	0.7	−0.4			
			e_N	19 57 15 5	0.6		+0.5		
			i_N	19 57 16.5	0.4		−1		
			i_N	19 57 21	0.4		−2		
			F	19 58 15					
157	Mar. 24	Id	i_{EN}	13 53 46	0.5		−3		
			i_N	13 53 47	0.3		−1		
			i_N	13 53 49	0.7		+0.5		
			F	13 54 02					
158	Mar. 25	I	i_N	22 34 23	0.4		−0.3		
			e_E	22 34 28	0.8	+0.3	+0.6		
			e_N	22 34 37	0.9		+0.5		
			e_E	22 34 38	0.6	−0.4			
			F	22 35 13					
159	Mar. 28	I	e_N	12 52 07	0.9		+0.3		
			e_E	12 53 16	0.5	−0.2			
			F	14 09					
160	Mar. 29	I	e_E	18 02 44	1.5	+0.3			
			e_N	18 02 46	0.7		+0.3		
			F	18 12					
161	Mar. 31	I	e_N	16 09 58	1		−0.4		
			e_E	16 10 10	0.9		+0.2		
			F	16 42					

EARTHQUAKES IN NORTHERN CALIFORNIA

During the time covered by this Bulletin a considerable number of earthquakes were felt in Northern California, most of them in the general region of Humboldt County.

These Humboldt County earthquakes center off the coast and give a peculiar type of seismogram which is difficult to interpret. A special research is now under way to establish travel time curves which will fit these shocks. Location of epicenters for them must await the completion of this research.

Only those shocks are mentioned which were reported by more than one observer. Numerous shocks were reported by only one observer during the month.

The Earthquakes of October 29, 1930

Several earthquakes shook the southern part of Shasta County on this date. They were not recorded at Berkeley or Lick Observatory. Reports collected by the United States Coast & Geodetic Survey indicate the following Rossi-Forel intensities:

IV. La Moine, Kennett, Millville, Redding, Viola.

III. Baird, Ingot, Inwood, Whitmore.

These earthquakes were not felt at: Hayfork, Bayles, Pollock, Big Bend, Winthrop, Round Mountain, Hat Creek, Red Bluff or Platina. This outlines the region fairly well.

The reports are combined in the above list although different towns reported shocks at different hours. Apparently there were earthquakes at about 3:30, 8:30 and 11:40 A. M., P. S. T.

On December 10, Red Bluff reported a slight earthquake which was not recorded at Berkeley or Lick Observatory.

The Earthquakes of December 11, 1930

On this date three earthquakes were reported in the general region mentioned above.

The first was felt about 12:59 A. M., P. S. T. Reports indicate the following Rossi-Forel intensities:

V–VI. Beatrice, Bell Springs, Ferndale, Island Mountain, Willits.

IV. Alderpoint, Alton, Arcata, Blocksburg, Branscomb, Briceland, Bridgeville, Covelo, Cummings, Ettersburg, Eureka, Fernbridge, Forest Glen, Harris, Hydesville, Kneeland, Littleriver, McCann, Mina, Miranda, Samoa, Scotia, Shelter Cove, Spyrock, Waddington, Weott, Westport, Whitlow, Ukiah, Zenia.

Chico and De Sabla also report an earthquake at about this time, intensity IV.

This earthquake was recorded at Berkeley and Lick Observatory.

At about 4:28 A. M., another shock was felt, intensity IV, at: Alton, Eureka, Ferndale, Scotia, Samoa, Shelter Cove, Waddington.

This earthquake was recorded at Berkeley and Lick Observatory.

At about 8:50 P. M., a third earthquake was felt at Alton (IV) and at Ferndale (III), Hydesville (III), Scotia (III), Weott (III). This earthquake was not recorded at Berkeley or Lick Observatory.

The Earthquakes of December 12, 1930

At about 1:31 A. M., P. S. T., the same general region was shaken by an earthquake which attained intensity IV, Rossi-Forel, at: Bridgeville, Cummings, Fernbridge, Ferndale, Upper Mattole, Waddington, Weott; III at: Alderpoint, Blocksburg, Briceland, Eureka, Island Mountain, Scotia, Whitlow, Willits; I–II at Ukiah.

This earthquake was recorded at Berkeley and Lick Observatory.

At about 12:15 P. M. an earthquake of intensity IV was felt at: Alton, Ferndale, Scotia, Waddington, Weott, Westport, and III at Eureka.

This was recorded at Berkeley and Lick Observatory.

Briceland and Whitlow report a third quake at 9:20 P. M., intensity III and IV.

This was not recorded.

The Earthquake of December 13, 1930

Alton and Scotia report an earthquake of about intensity IV at 5:39 P. M. This shock was recorded at Berkeley and Lick Observatory.

The Earthquake of December 15, 1930

On December 15, 1930, at about 00:39 A. M. Blocksburg, Eureka, Scotia and Whitlow report an earthquake of intensity III to IV, Rossi-Forel. This shock was recorded at Berkeley and Lick Observatory.

The Earthquake of December 24, 1930

At about 1:11 A. M., P. S. T., on this date an earthquake of intensity IV, Rossi-Forel, was felt in Alton, Bridgeville, Ettersburg, Ferndale, Scotia, Whitlow, Upper Mattole.

This shock was recorded at Berkeley on the Galitzin pendulums but not on the Wood-Anderson instruments at either Berkeley or Lick Observatory. The periods were too long for the latter to record well.

The Earthquake of December 27, 1930

At about 2:15 P. M., P. S. T., on this date an earthquake of intensity IV, Rossi-Forel, was reported from Alton, Ferndale, Loleta.

This shock was not recorded at Berkeley or Lick Observatory.

The Earthquake of December 30, 1930

At about 5:30 A. M. an earthquake was reported which attained an intensity of V to VI, Rossi-Forel, near Hazel Creek, and an intensity of IV at Bayles and Castella.

This earthquake was not recorded at Berkeley or Lick Observatory.

The Earthquake of January 2, 1931

At about 9:50 P. M. on this date Alton and Scotia report a shock of intensity III to IV, Rossi-Forel. This was not recorded at Berkeley or Lick Observatory.

The Earthquake of January 5, 1931

At about 1:44 A. M., P. S. T., on this date occurred an earthquake which was felt from San Francisco on the north to Santa Cruz on the south, and as far east as the western boundary of San Mateo County. The intensities reported were, on the Rossi-Forel scale:

V–VI. Burlingame, Half Moon Bay, San Mateo.

IV. El Granada, Redwood City, San Bruno, Santa Clara.

III. Pescadero.

I–II. San Francisco.

It was not felt east of San Francisco Bay nor at Saratoga or Watsonville.

According to the seismograms from Berkeley, Lick Observatory and Palo Alto, the epicenter was probably within five miles of San Mateo and therefore probably on the San Andreas fault.

The Earthquake of January 6, 1931

At about 3:29 P. M., P. S. T., on this date an earthquake of intensity IV Rossi-Forel was reported from Chualar. Aptos and Santa Cruz report this shock as of intensity III.

According to seismograms from Berkeley, Lick Observatory, and Palo Alto, the epicenter was probably some five to twenty miles east of Chualar.

The Earthquake of January 20, 1931

At about 2:30 A. M., P. S. T., on this date an earthquake of intensity IV, Rossi-Forel was reported from Redwood Valley and Willits.

It was not recorded at Berkeley or Lick Observatory.

The Earthquake of January 23, 1931

At about 11:21 P. M., P. S. T., Las Plumas reported a shock of intensity VI–VII Rossi-Forel. At Chico and Orland the intensity was V–VI. At Biggs, De Sabla, Live Oak, and Oroville it was IV. At Red Bluff it was about I–II.

This shock was recorded at Berkeley and at Lick Observatory.

The Earthquake of February 23, 1931

At about 2:00 A. M., P. S. T., an earthquake shook the southern part of Monterey County and the northern part of San Luis Obispo County. It was felt from King City on the north to Atascadero on the south and from Cayucos on the west to Coalinga on the east.

The Rossi-Forel intensity ratings are as follows:

V. Cayucos.

IV. Bradley, Bryson, Jolon, King City, Lockwood, Parkfield, Paso Robles, Priest Valley, San Miguel, Stone Canyon, Templeton.

III. Coalinga, San Ardo.

I–II. Atascadero, Cholame.

The earthquake was reported not felt at Cambria, Harmony, Hernandez, La Panza, Lemoore, Metz, Morro Bay, Paraiso Springs, Port San Luis, San Benito, San Simeon.

It was recorded at Berkeley and Lick Observatory.

The Earthquake of March 9, 1931

At about 7:30 P. M., P. S. T., an earthquake of intensity IV, Rossi-Forel, was reported from: Alderpoint, Arcata, Bridgeville, Briceland, Ferndale, Humboldt Bay Fog Signal, Scotia, Upper Mattole, Weott, Whitlow.

At Alton, Miranda, and Shively the earthquake was felt with lesser intensity.

From the seismograms it appears probable that this earthquake centered some hundred miles west of Cape Mendocino.

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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.
No. 20. From April 1, 1930, to September 30, 1930.
No. 21. From October, 1930, to March 31, 1931.

Issued April 30, 1932