

EARTHQUAKES IN NORTHERN CALIFORNIA

AND

THE REGISTRATION OF EARTHQUAKES

AT

BERKELEY—MOUNT HAMILTON—PALO ALTO

SAN FRANCISCO—FERNDALE—FRESNO

FROM

January 1, 1939 to March 31, 1939

BY

PERRY BYERLY

AND

PHILLIP M. KLEIN

BULLETIN OF THE SEISMOGRAPHIC STATIONS

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## EARTHQUAKE INTENSITY SCALE

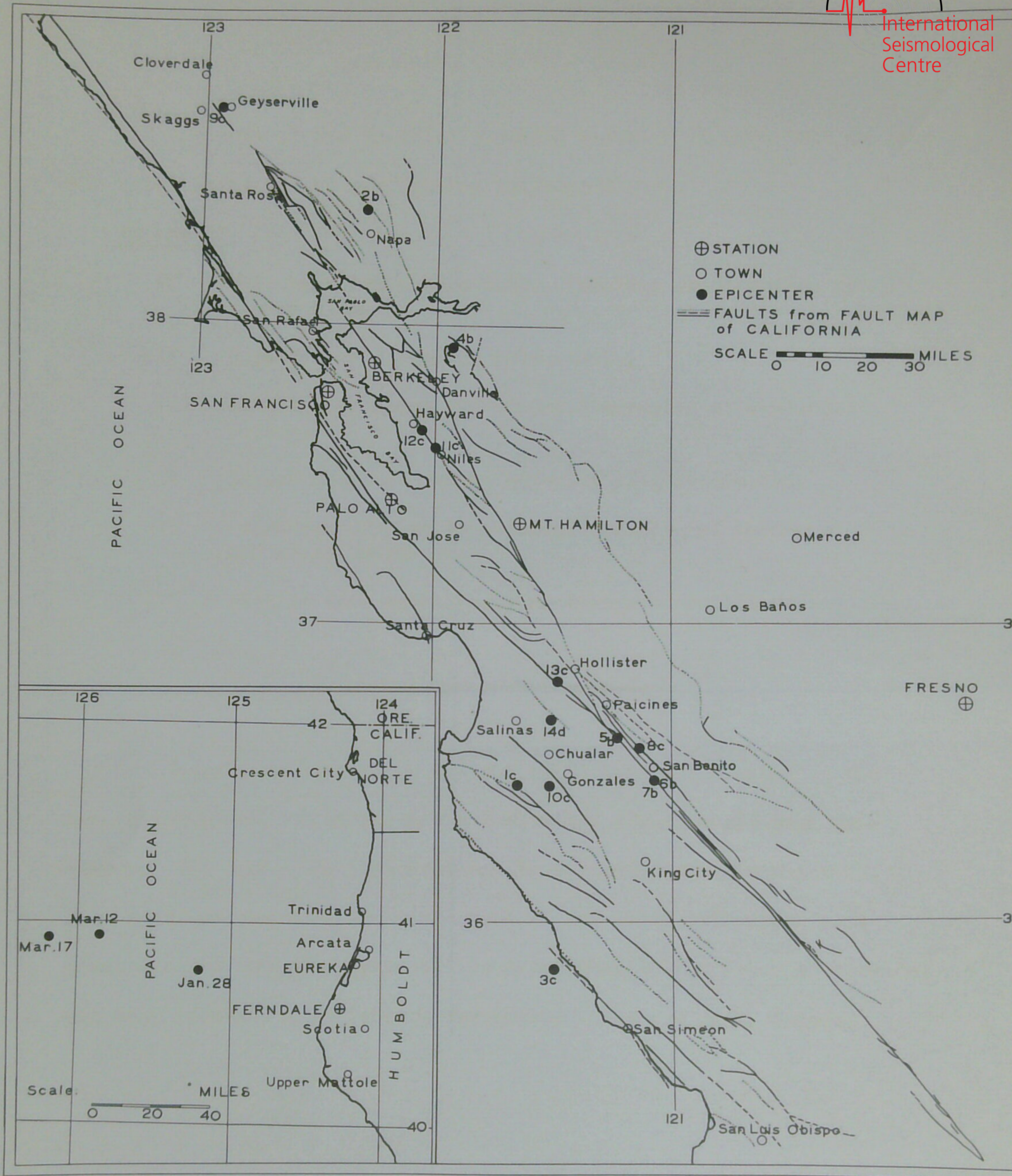
Criteria of the Modified Mercalli Scale which were used to rate the intensities of the earthquakes registered were:

### Intensity

- II Felt by a few people only. Duration or direction not appreciable.
  - III Duration or direction appreciable.
  - IV Rattling of doors and windows; swinging of suspended objects.
  - V Disturbance of movable objects; plaster cracked.
  - VI Overthrow of movable objects; cracking of chimneys and other brickwork.
  - VII Fall of some chimneys; some damage to buildings.
- 

Epicenters located in the following list are plotted on the accompanying map. A number and a letter are given beside each epicenter. The number is that assigned to the earthquake in the list. Only those earthquakes are given numbers for which epicenters were located. The letter represents the excellence with which the epicenter has been located, a indicating excellent, b good, c fair, d poor.





MAP SHOWING EPICENTERS, JANUARY 1, 1939 TO MARCH 31, 1939



## EARTHQUAKES IN NORTHERN CALIFORNIA

(All intensities given on Modified Mercalli Scale)

1939 -- PACIFIC STANDARD TIME

January 3, 7h 57m, a.m. Recorded at Palo Alto only; not reported felt; focus about 10 miles from Palo Alto station.

January 8, 12h, 25m, p.m. Recorded at Palo Alto and Mount Hamilton; III at Pinnacles; epicenter about 11 miles west of Gonzales. See map, epicenter 1c.

January 11, 2h 00m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Fresno, Ferndale. Intensities:

V Altaville, Coleville, Gardnerville (Nev.), Hudson, Mason (Nev.), Tuolumne

IV Bridgeport, Camino, Camp Cornell, Chinese Camp, Dayton (Nev.), Fiddletown, Markleeville, Minden (Nev.), Murphy, Salt Springs, Simpson (Nev.), Smith (Nev.), Sonora, Stanislaus, Tahoe Pines, Topaz, Weeks (Nev.), Westpoint, Yosemite

I-III Georgetown, Jackson, Long Barn, Mather, Meyers, Mountain Ranch, Pinecrest; felt at Carson City (Nev.), Wellington (Nev.), and Woodfords.

Epicenter about 10 miles southeast of Minden, Nevada.

January 12, 4h 40m, p.m. Recorded at San Francisco only; not reported felt; focus about 10 miles from the University of San Francisco.

January 14, 01h 09m, p.m. Recorded at Palo Alto only; not reported felt; focus about 13 miles from Palo Alto station.

January 17, 4h 41m, p.m. Recorded at Palo Alto only; not reported felt; focus about 15 miles from Palo Alto station.

January 20, 11h 08m, p.m. Recorded poorly at Mount Hamilton only; III at Pinnacles.

January 23, 4h 05m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco; not reported felt; epicenter about 8 miles north of Napa. See map, epicenter 2b.

January 24, 11h 27m, a.m. Recorded at Palo Alto only; not reported felt; focus about 10 miles from Palo Alto station.

January 28, 12h 20m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Ferndale; "felt throughout southern Humboldt County;" epicenter at sea about 50 miles west of Eureka. See insert on map.





1939 -- P.S.T.

- February 4, 01h 52m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; epicenter about 22 miles northwest of San Simeon. See map, epicenter 3c.
- February 4, 11h 45m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 6 miles from Lick Observatory. (One minute later is the S of a tiny aftershock.)
- February 5, 4h 51m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco; not reported felt; epicenter about 9 miles northeast of Danville. See map, epicenter 4b.
- February 5, 8h 46m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 6 miles from Lick Observatory.
- February 12, 9h 25m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 8 miles from Lick Observatory.
- February 14, 01h 11m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; epicenter about 9 miles south southeast of Paicines. See map, epicenter 5b.
- February 14, 2h 45m, p.m. Recorded at Palo Alto only; not reported felt; focus about 11 miles from Palo Alto station.
- February 15, 3h 10m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; epicenter about 3 miles south of San Benito. See map, epicenter 6b.
- February 15, 3h 20m, a.m. Recorded at Mount Hamilton, Palo Alto, Fresno; probably an aftershock of earthquake 10 minutes earlier.
- February 17, 7h 33m, p.m. Recorded at Ferndale only; "felt by many along the coast from Ferndale to Arcata;" III at Carlotta; focus about 20 miles from Ferndale.
- February 19, 11h 35m, a.m. Recorded at Berkeley only; not reported felt; focus about 9 miles from University campus.
- February 21, 01h 49m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; epicenter about 3 miles south of San Benito. See map, epicenter 7b, (same as epicenter 6b).
- February 23, 9h 27m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Fresno; IV at Chualar, King City; III at Pinnacles; epicenter about 9 miles northwest of San Benito. See map, epicenter 8c.
- February 26, 01h 53m, a.m. Recorded at Mount Hamilton only; not reported felt; focus about 6 miles from Lick Observatory.



1939 -- P.S.T.

- February 27, 12h 45 m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 5 miles from Lick Observatory.
- February 27, 5h 40m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 7 miles from Lick Observatory.
- March 2, 12h 13m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco; IV at Skaggs Springs; III at Cloverdale; epicenter very near Geyserville. See map, epicenter 9c.
- March 3, 9h 52m, p.m. Recorded at Mount Hamilton only; not reported felt; focus about 11 miles from Lick Observatory.
- March 5, 2h 13m, a.m. Recorded at Palo Alto only; not reported felt; focus about 15 miles from Palo Alto station.
- March 7, 00h 40m, a.m. Recorded at Berkeley only; not reported felt; focus about 12 miles from University campus.
- March 9, 11h 03m, a.m. Recorded at Palo Alto only; not reported felt; focus about 15 miles from Palo Alto station.
- March 10, 7h 40m, p.m. Recorded at Berkeley only; not reported felt; focus about 14 miles from University campus.
- March 12, 2h 05m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Ferndale, Fresno; "felt by a few in Ferndale," epicenter at sea about 90 miles west of Trinidad. See insert on map.
- March 15, 10h 28m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Fresno; not reported felt; epicenter about 4 miles southwest of Gonzales. See map, epicenter 10c.
- March 15, 11h 10m, a.m. Recorded at Palo Alto only; not reported felt; focus about 7 miles from Palo Alto station.
- March 17, 5h 09m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Ferndale, Fresno; IV at Scotia; III at Upper Mattole; epicenter about 100 miles west of Eureka. See insert on map.
- March 21, 7h 19m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; felt at Blue Canyon and Portola; epicenter probably about 5 or 10 miles north of Portola.
- March 21, 7h 31m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco; not reported felt; epicenter very near Niles. See map, epicenter 11c.
- March 23, 01h 21m, p.m. Recorded at Palo Alto only; not reported felt; focus about 11 miles from Palo Alto station.



1939 -- P.S.T.

March 26, 4h 45m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco; felt in Castro Valley; epicenter about 3 miles southeast of Hayward; depth of focus about 15 miles. See map, epicenter 12c.

March 28, 12h 32m, p.m. Recorded at Berkeley and Ferndale; IV at Sootia, Upper Mattole; III at Whitlow; felt at Fortuna and Bridgeville; epicenter about 25 miles from Ferndale.

March 29, 01h 01m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, Fresno. Intensities:

V Bieber, Dana, Fall River Mills, Lookout, Nubieber

IV Cassel, Glenburn, Hat Creek, McArthur, Pittville

I-III Adin, Montgomery Creek; felt at Big Valley, Burney.

Epicenter probably near Bieber from field data; instrumental data do not permit a location.

March 29, 01h 02m, p.m. Recorded at Palo Alto only; not reported felt; focus about 10 miles from Palo Alto station.

March 30, 00h 00m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; epicenter about 6 miles southwest of Hollister. See map, epicenter 13c.

March 30, 00h 31m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; an aftershock of previous quake (13c).

March 30, 00h 40m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, Fresno; not reported felt; another aftershock from 13c.

March 31, 01h 09m, a.m. Recorded at Mount Hamilton and Palo Alto; not reported felt; epicenter about 9 miles east of Salinas. See map, epicenter 14d.



## Summary of the Epicenters

No.	Rating	Date	Location
1	c	January 8	11 miles west of Gonzales
2	b	January 23	8 miles north of Napa
3	c	February 4	22 miles northwest of San Simeon
4	b	February 5	9 miles northeast of Danville
5	b	February 14	9 miles south southeast of Paicines
6	b	February 15	3 miles south of San Benito
7	b	February 21	3 miles south of San Benito
8	c	February 23	9 miles northwest of San Benito
9	c	March 2	Very near Geyserville
10	c	March 15	4 miles southwest of Gonzales
11	c	March 21	Very near Niles
12	c	March 26	3 miles southeast of Hayward
13	c	March 30	6 miles southwest of Hollister
14	d	March 31	9 miles east of Salinas





THE REGISTRATION OF EARTHQUAKES





## SYMBOLS AND NOTATIONS EMPLOYED

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 <sub>n</sub>	Waves n times reflected at the earth's surface.
S (undae secundae)	Second phase, or second preliminary tremors (transverse).
SR <sub>n</sub>	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 <sub>c</sub> denotes the boundary at about 2900 km. depth between the core and the middle shell which surrounds it. Thus:

$\overline{S_c P_c S}$

Waves which have penetrated the core, having been transverse before entering and after leaving the core, and longitudinal within the core.

$\overline{P_c P_c} \overline{P_c P}$

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<sub>n</sub>

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.
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## BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA  
BERKELEY, CALIFORNIA

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 CONSTANTS

## CONSTANTS OF THE STATION

Latitude and longitude:

$$\begin{aligned}\phi &= 37^{\circ} 52' 3 \text{ N.} \\ \lambda &= 122^{\circ} 15' 6 \text{ W.}\end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.--81 meters (266 feet) above mean sea level.

## CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V		$T_0$	$\epsilon$	$\frac{r}{T_0^2}$	
Bosch-Omori 100 kg. ....	E	45		12	10	0.001	
	N	45		12	10	0.001	
Wiechert 80 kg. ....	Z	44		4	5	0.005	
Wood-Anderson .....	E	3,000		0.9	15		
	N	3,000		0.9	15		
Galitzin .....		K	T	$T_1$	$\mu^2$	$A_1$ (cm)	$l$ (cm)
	E	112	12	11.8	0.00	100	11.3
	N	122	12	12.4	0.03	100	11.2
	Z	109	12	11.9	0.01	130	14.9
Benioff .....	Z	V		Coupled Period		$\epsilon$	
				0.7		5	

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





BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						AE	AN	AZ	
				h. m. s.	s.	mm.	mm.	mm.	
1	Jan. 3	I	eEN	A	17 21 37.6				
			iz	H	17 21 37.6				
			eE	A	17 24 06.6				
			eLEN	A	17 25.3				
			F		17 35.5				
2	Jan. 7	Iv	ePN	A	20 22 55.2				"Near Coso Hot Springs" according to Pasadena
			iPz	H	20 22 55.4				
			iNZ	G	20 23 06				
			iE	A	20 23 09				
			iN	A	20 23 10				
			iN	A	20 23 12.8				
			iE	A	20 23 23.3				
			iE	G	20 23.5				
			iN	A	20 23 56.7				
			iN	A	20 24 11.5				
			F		20 30.5				
			3	Jan. 11	Iv	ePN	A	22 00 51.3	
iPNZ	G	22 00 52							
iPEN	A	22 00 52.8							
iPz	H	22 00 52.8							
iSENZ	G	22 01 20							
iSE	A	22 01 20.4							
iSN	A	22 01 21.0							
F		22 05.5							
4	Jan. 14	I	eZ	H	15 37 41.6				
			F		15 38.2				
5	Jan. 16	I	eN	G	03 07 03				Surface waves.
			eZ	G	03 10.5				
			F		03 32.5				
6	Jan. 18	Iu	ePN	A	01 56 36.4	1.5	-2.5		J.S.A. epicenter: 29°3 S., 71°6 W.
			ePz	H	01 56 36.4				
			iPz	G	01 56 37				
			F		01 59.5				





BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks							
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>								
				h. m. s.	s.	mm.	mm.	mm.								
7	Jan. 19	IIu	iP <sub>N</sub>	A 10 07 56.6					J.S.A. epicenter: 18°4 N., 106°0 W.							
			iP <sub>Z</sub>	H 10 07 56.6												
			eP <sub>E</sub>	A 10 07 56.9												
			iP <sub>Z</sub>	G 10 07 57												
			i <sub>N</sub>	G 10 12.5												
			e <sub>E</sub>	G 10 13.1												
			i <sub>SN</sub>	G 10 14.8												
			eSE <sub>Z</sub>	G 10 15.5												
			e <sub>E</sub>	A 10 15 40.9												
			i <sub>E</sub>	G 10 17.5												
			eL <sub>N</sub>	A 10 17.5												
			MEN	G 10 18.5												
			F	10 32.5												
			8	Jan. 20						IIu	iP <sub>Z</sub>	G 20 47 27	2.5			-5
eP <sub>NZ</sub>	A&H 20 47 29.6															
iP <sub>E</sub>	A 20 47 30.1															
i <sub>Z</sub>	G 20 48 55															
i <sub>Z</sub>	H 20 51 01															
e <sub>SN</sub>	G 20 53 17															
e <sub>N</sub>	G 20 57.5															
eL <sub>E</sub>	A 21 00 43															
e <sub>Z</sub>	G 21 01.5															
e <sub>N</sub>	A 21 02 35															
M <sub>E</sub>	G 21 05.0															
F	22 22.5															
9	Jan. 22	I			e <sub>Z</sub>	G 14 19.5					Surface waves.					
					eEN	G 14 20.5										
			F	16.0												
10	Jan. 22	I	eEZ	G 19 26.5												
			F	19 52.5												
11	Jan. 23	IIId	iP <sub>Z</sub>	H 12 04 43.9	0.4			+<.1	See discussion, p. 5							
			iP <sub>N</sub>	A 12 04 44.1												
			i <sub>N</sub>	A 12 04 48.6												
			i <sub>SN</sub>	A 12 04 51.8												
			eS <sub>E</sub>	A 12 04 52.4												
			i <sub>N</sub>	A 12 04 53.6												
			e <sub>E</sub>	A 12 04 54.3												
			F	12 06.0												



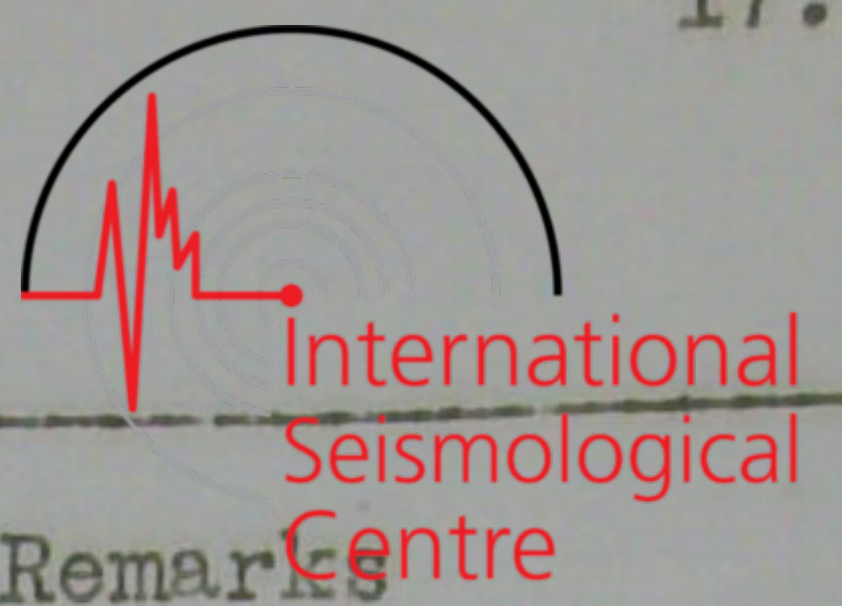


BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks			
						AE	AN	AZ				
						mm.	mm.	mm.				
						h.	m.	s.	s.			
12	Jan. 24	I	iz	H	04 13 12.0							
			eN	A	04 13 18							
			iz	H	04 13 26.4							
			F		04 13 44							
13	Jan. 25	IIIu	iPENZ	G	03 44 54.1	1.5			-5	U.S.C. & G.S. epicenter 37° S., 73° W. Destructive in Chile		
			ePZ	H	03 44 54.6	2.0			-1			
			iPZ	H	03 44 57.1	2.2			+3			
			ePN	A	03 44 57.1							
			ePE	A	03 44 58.3							
			iz	G	03 45 28	4				-24		
			iE	A	03 46 03.1							
			iz	H	03 48 56.6							
			eE	A	03 55 28							
			iSEN	A	03 55 35.6							
			iSz	G	03 55.5							
			eGE	A	04 08.3							
			eLN	A	04 13.8							
			eE	A	04 14.2						Surface waves	
			F		07.0							
14	Jan. 27	Iu	ePZ	H	14 19 08.0					J.S.A. epicenter: 13°4 N., 91°3 W. Surface waves		
			ePN	A	14 19 08.5							
			iEN	G	14 33.1							
			iz	G	14 34.5							
			F		15.0							
15	Jan. 28	Iv	iPZ	H	20 20 33.7					See discussion, p. 5		
			ePN	A	20 20 34.0							
			eSEN	A	20 21 14.0							
			F		20 25.5							
16	Jan. 29	Ir	eN	G	19 09.9					Surface waves.  J.S.A. epicenter: 13°5 N., 90°3 W.		
			eE	G	19 11 05							
			eZ	G	19 11.4							
			MEN	G	19 12.6							
			F		20.0							
17	Jan. 30	IIIu	iPEZ	G	02 31 17					U.S.C. & G.S. epicenter 7° S., 155° E. J.S.A. epicenter: 6°0 S., 155°8 E.		
			ePE	A	02 31 21							
			ePN	A	02 31 25							
			iPN	G	02 31.4							
			iPZ	H	02 31 27.3							
			eSEN	A	02 41 44							
			iN	G	02 44.4							
			eGN	A	02 54.4							
			eLN	A	02 59.5							
F		08.0										



BERKELEY



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>			
						mm.	mm.	mm.			
						h. m. s.	s.				
18	1939 Jan. 31	I	ePZ eEZ eNZ F	G G G 01 32.4	00 03.4 00 15.4 00 32.4						
19	Feb. 2	I	iz eN F	H A 01 57.1	12 56 13.9 12 56 14.1						
20	Feb. 3	IIu	iPN iPEZ iPE iPZ eSE iSN eE iSEZ iz eLE F	G G A H A G A G G A 08 17.4	05 38 39 05 39 01 05 39 07 05 39 07.4 05 49 29.4 05 49 32 05 49 48.4 05 50.1 05 51.6 06 09.4				May be a microseism U.S.C. & G.S. epicenter 10° S., 159° E.		
21	Feb. 3	I	eN iz F	A H 02 27.3	20 25.3 20 25 21.9						
22	Feb. 4	Iv	ePnz ePnN iz iN F	H A H A 09 53.7	09 52 32.4 09 52 35.0 09 53 02.5 09 53 02.7				See discussion, p. 6		
23	Feb. 6	Id	ePN iPZ iSN iSE F	A H A A 00 52.3	00 51 14.5 00 51 14.8 00 51 17.8 00 51 18.3	0.3	+6.5		See discussion, p. 6		
24	Feb. 8	I	iz iE iN F	G G G 07.5	06 43.8 06 44.5 06 44.8				Very poor record on Vertical (H) instrumen Microseisms mask beginning.		





BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks			
						AE	AN	AZ				
						mm.	mm.	mm.				
						h. m. s.	s.					
25	Feb. 9	I	iz	H	02 43 46.4							
			iz	H	02 43 59.9							
			F		02 45.0							
26	Feb. 9	Iu	iPz	G	15 38 28	2			+3	U.S.C. & G.S. epicenter 11°5 N., 88° W.		
			eP <sub>N</sub>	A	15 38 29.6							
			iP <sub>EZ</sub>	A&H	15 38 30.3							
			iP <sub>c</sub> Pz	H	15 40 24							
			eS <sub>c</sub> S <sub>N</sub>	G	15 48.3							
			eLN	G	15 53.3							
			eZ	G	15 54.3							
			eE	G	15 54.8							
									Surface waves. F lost in record change.			
27	Feb. 10	I	iz	H	04 24 33.5							
			e <sub>N</sub>	A	04 24 35.8							
			i <sub>N</sub>	A	04 24 44.4							
			i <sub>N</sub>	A	04 24 47.9							
			F		04 25 35							
28	Feb. 14	Iv	ePnz	H	09 11 17.8							
			ePn <sub>N</sub>	A	09 11 18.5							
			iz	A	09 11 20.9							
			iSnz	H	09 11 37.6							
			i <sub>N</sub>	A	09 11 59.8							
			F		09 12 25							
29	Feb. 15	Iv	iPnz	H	11 10 10.8							
			iz	H	11 10 12.3							
			iz	H	11 10 17.8							
			i <sub>N</sub>	A	11 10 34.6							
			iz	A	11 10 36.2							
			eE	A	11 10 44.8							
			F		11 11.6							
30	Feb. 16	Iu	iPz	G	19 02 22							
			eS <sub>ENZ</sub>	G	19 11.9							
			eLN	G	19 20.6							
			eE	G	19 24.1							
			F		20 32							
31	Feb. 19	Id	iPz	H	19 34 55.0							
			i <sub>N</sub>	A	19 34 56.4							
			iSz	H	19 34 56.9							
			F		19 35 07							





BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>			
						mm.	mm.	mm.			
						h.	m.	s.	s.		
32	Feb. 20	I	eL <sub>E</sub>	G	04 28.1						
			eZ	G	04 30.5						
			eE	G	04 31.1						
			eN	G	04 34.5						
			F		04 47						
33	Feb. 21	Iv	ePnZ	H	09 49 07.7				See discussion, p. 6		
			iz	H	09 49 37.9						
			F		09 50						
34	Feb. 23	Iv	ePZ	H	08 46 51.5				"Cuddy Valley" according to Pasadena.		
			eEZ	G	08 47.1						
			eE	A	08 47 16						
			iS <sub>N</sub>	A	08 47 39.0						
			iS <sub>E</sub>	G	08 47 48						
			iN	G	08 48 06						
			iE	G	08 48.2						
			iE	A	08 50 29						
			M <sub>N</sub>	G	08 50.6						
			F		08 57						
35	Feb. 23	I	eP <sub>NZ</sub>	A&H	09 19 46.5						
			iPZ	H	09 19 47.6						
			iz	H	09 19 56.0						
			eE	A	09 20.1						
			iN	A	09 20 27.3						
			eS <sub>E</sub>	A	09 20 34.3						
			F		09 23.6						
36	Feb. 24	Iv	ePnZ	H	05 27 24.5				See discussion, p. 6		
			ePnN	A	05 27 25.4						
			iz	H	05 27 34.1						
			iz	H	05 27 47.4						
			iN	A	05 27 51.2						
			eE	A	05 28 38.9						
			F		05 29.1						
37	Feb. 26	I	iz	H	14 05 23.8				No N-S record		
			iz	H	14 05 53.7						
			e <sub>E</sub>	A	14 05 54.8						
			F		14 06.6						
38	Feb. 26	I	eN	G	23 31.1				J.S.A. epicenter: 28°0 N., 114°5 W.		
			eEN	G	23 33.1						
			eZ	G	23 33 17						
			F		23 52						



BERKELEY



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939						mm.	mm.	mm.	
				h. m. s.	s.				
39	Feb. 27	I	eENZ F	G 08 08.8 08 19					Surface waves
40	Feb. 28	I	iz iz eN iN iE iz F	H 01 03 42.8 H 01 03 46.0 A 01 03 52.5 A 01 03 54.9 A 01 03 55.0 H 01 03 55.4 01 04.3					
41	Feb. 28	I	eEN eZ F	G 01 36.1 G 01 38.1 02.0					Surface waves
42	Feb. 28	I	eN eE eZ eN F	G 03 12.1 G 03 17.1 G 03 17.6 G 03 20.4 04.0					May be L
43	Mar. 2	I	eE eEN eEZ F	G 07 24.2 G 07 32 G 07 44.4 08.5					Trace of distant shock
44	Mar. 2	Iv	ePN iSEN iEN F	A 20 13 10.8 A 20 13 25.1 A 20 13 30.4 20 15.1					See discussion, p. 7 No vertical (H) component, record missing
45	Mar. 4	I	eZ eZ eE F	G 19 52.1 G 20 06.5 G 20 47 21.0					Surface waves
46	Mar. 5	I	eN eE F	G 10 07.1 G 10 09.6 10 32					
47	Mar. 6	I	iPz? eN iz F	H 08 55 38.0 A 08 55.8 H 08 55 57.0 08 59.0					



BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						AE	AN	AZ			
						mm.	mm.	mm.			
						h.	m.	s.	s.		
48	Mar. 7	I	ePz	G	02 07 22						
			eE	G	02 19.8						
			eE	G	02 25.0						
			eZ	G	02 37						
			eN	G	02 40						
			F		03 32						
49	Mar. 7	Id	iPz	H	08 59 42.5					See discussion, p. 7	
			iSz	H	08 59 45.0						
			iS <sub>N</sub>	A	08 39 45.2						
			F		08 40 17						
50	Mar. 7	I	eEZ	G	18 00.5					Trace of distant shock.	
			eN	G	18 04.0						
			eE	G	18 10						
			eZ	G	18 14						
			F		19.0						
51	Mar. 8	I	eEN	G	22 34.0					Surface waves.	
			eZ	G	22 39.0						
			F		23 17						
52	Mar. 11	Id	iP <sub>Z</sub>	H	03 40 18.7					See discussion, p. 7	
			iS <sub>N</sub>	A	03 40 21.5						
			F		03 40 38						
53	Mar. 12	Iv	iPz	H	22 05 24.7					See discussion, p. 7  False S. False S.	
			eP <sub>N</sub>	A	22 05 25						
			eEZ	G	22 05 34						
			iN	A	22 05 43.0						
			eN	G	22 05 44						
			iS <sub>N</sub>	A	22 06 05.5						
			iE	A	22 06 07.0						
			iN	A	22 06 08.1						
			iEN	G	22 06 12						
			iz	G	22 06 46						
			M <sub>N</sub>	G	22 07.0						
			F		22 17						
			54	Mar. 13	I	iz	G	05 22 08			
eNZ	A&H	05 22 11.9									
eN	A	05 22 12.4									
iz	G	05 22 13									
eEN	G	05 46									
F		06.5									



BERKELEY



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						AE	AN	AZ	
				h. m. s.	s.	mm.	mm.	mm.	
55	Mar. 15	Iv	iN	A	18 28 38				See discussion, p. 7
			iz	H	18 28 39				
			iSN	A	18 28 58				
			F		18 30.0				
56	Mar. 17	Iv	iPz	H	13 09 57.0				See discussion, p. 7
			iPN	A	13 09 57.5				
			iE	G	13 10.0				
			iEN	A	13 10 02.8				
			eNZ	G	13 10.1				
			iN	G	13 10 08				
			iz	H	13 10 20.5				
			iz	H	13 10 37.7				
			eN	A	13 10 43.6				
			iE	G	13 11 04.5				
			iz	G	13 11 10.5				
			F		13 22				
			57	Mar. 20	Iu	iPENZ	G	03 34 43	
iPz	H	05 34 43.2							
ePEN	A	05 34 43.7							
iENZ	G	03 34 58							
iSE	G	03 44 44				5	-4		
iSN	G	03 44 51				4.5		+3	
eLEN	G	03 57.0							
eZ	G	04 00							
ME	G	04 05							
F		05.0							
58	Mar. 20	I	iPz	G	13 05 06				
			eN	G	13 08.2				
			eSN	G	13 08 32				
			eEN	G	13 14.5				
			eZ	G	13 16.0				
			F		13.5				
59	Mar. 21	IIu	ePz	G	01 30 31				Epicenter: 3° S., 90°6 E., according to Strasbourg  J.S.A. epicenter: 3°0 S., 90°8 E. Indian Ocean
			ePE	A	01 30 33				
			ePE	G	01 30 41				
			eN	A	01 30 47				
			eE	A	01 30 52				
			iNZ	G	01 33 01				
			ePPEN	A	01 34 00				
			iPPENZ	G	01 34 15				
			eN	A	01 34 30				
			eSR <sup>?</sup> LEN	G	01 50.0				
			eLE	A	01 59.0				
			F		05.0				





BERKELEY

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>			
						mm.	mm.	mm.			
1939											
60	Mar. 21	I	iPz	G	08 06 57						
			eS <sub>EN</sub> <sup>?</sup>	G	08 17 23						
			iN <sub>EN</sub>	G	08 26						
			eL <sub>E</sub> <sup>?</sup>	G	08 34						
			F		10.5						
61	Mar. 22	Iv	iPnz	H	03 20 07.6				See discussion, p. 7		
			eN	A	03 20 11.9						
			eSn <sub>N</sub>	A	03 20 36.1						
			eE	A	03 20 40.1						
			F		03 21.5						
62	Mar. 22	I	eP <sub>ENZ</sub> <sup>?</sup>	G	04 02 32				Probably distant		
			eS <sub>E</sub>	G	04 09 16						
			eN	G	04 25						
			eE	G	04 29						
			eZ	G	04 32						
			F		05 17						
63	Mar. 22	I	iP <sub>ENZ</sub>	G	07 33 05	2			+1.2		
			iPz	H	07 33 04.4						
			eP <sub>E</sub>	A	07 33 05.4						
			eN	A	07 33 10						
			eS <sub>EN</sub>	G	07 42.8						
			eS <sub>E</sub> <sup>?</sup>	A	07 44 26.2						
			eL <sub>E</sub>	G	07 52.0						
			eE	A	07 54.0					Surface waves	
			eZ	G	07 55						
			F		10.0						
64	Mar. 22	Id	eP <sub>N</sub>	A	03 31 27.8				See discussion, p. 7		
			iPz	H	03 31 27.8						
			eS <sub>EN</sub>	A	03 31 33.5						
			iSz	H	03 31 33.5						
			F		03 32.3						
65	Mar. 23	I	eE	A	16 33 00.5	2.2			+2.5	Probably P. (?)	
			eENZ	G	16 33 01					Probably P. (?)	
			iz	H	16 33 03.0						
			iN	A	16 33 04.0						
			iz	H	16 33 17.3						
			iz	H	16 33 20.5	1.7			-4	pP ?	
			eE	A	16 33 35				sP ?		
			iEN	G	16 43 20						
			eEN	G	16 59						
			F		17 52						
										Probably S	
										Surface waves	



BERKELEY



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						AE	AN	AZ			
						mm.	mm.	mm.			
						h.	m.	s.	s.		
66	Mar. 27	IIId	iPEN	A	00 44 47.9	0.3		+0.7		See discussion, p. 8	
			iPz	H	00 44 48.1						
			iSEN	A	00 44 53.1						
			F		00 46.4						
67	Mar. 28	Iv	eN	A	20 32 10.2					See discussion, p. 8	
			iz	H	20 32 12.2						
			iN	A	20 32 45.2						
			eE	A	20 32.9						
			F		20 34.9						
68	Mar. 29	Iv	iz	H	21 01 54					See discussion, p. 8	
			eN	A	21 01 57						
			eE	A	21 02 26.5						
			iN	A	21 02 32						
			eE	A	21 02 34.5						
			F		21 03						
69	Mar. 30	Iv	iPnz	H	00 00 36.7					See discussion, p. 8	
			iz	H	00 00 38.4						
			eN	A	00 00 38.5						
			iSnN	A	00 00 54.0						
			iSEZ	A&H	00 00 54.8						
			F		00 02						
70	Mar. 30	Iv	iPz	H	08 31 30.5					See discussion, p. 8	
			ePN	A	08 31 30.6						
			eE	A	08 31 46.5						
			iz	H	08 31 46.5						
			iN	A	08 31 46.8						
			F		08 32.3						
71	Mar. 30	Iv	iz	H	10 40 10.7					See discussion, p. 8	
			eN	A	10 40 25.5						
			iz	H	10 40 29.7						
			F		10 42.0						





## MOUNT HAMILTON

THE LICK OBSERVATORY STATION, UNIVERSITY OF CALIFORNIA  
MOUNT HAMILTON, CALIFORNIA

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 CONSTANTS

## CONSTANTS OF THE STATION

Latitude and longitude:

$$\begin{aligned}\phi &= 37^{\circ} 20' 4'' \text{ N.} \\ \lambda &= 121^{\circ} 38' 6'' \text{ W.}\end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.--1281.7 meters (4205 feet) above mean sea level.

## CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V	T <sub>0</sub>	ε
Wood-Anderson .....	E	3000	1	15
	N	3000	1	15



MOUNT HAMILTON



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks	
						AE	AN	AZ		
						mm.	mm.	mm.		
						h.	m.	s.		
1	1939 Jan. 3	I	eEN F	17 21 49.1 17 33						
2	Jan. 7	Iv	iPN eN F	20 22 47.6 20 23 31.7 20 33					"Near Coso Hot Springs" according to Pasadena.	
3	Jan. 8	Iv	ePN iN iSE iSN iE F	20 25 28.2 20 25 35.4 20 25 40.5 20 25 40.8 20 25 42.3 20 28.1					See discussion, p. 5	
4	Jan. 11	IIv	iPEN iSEN F	22 00 52.4 22 01 18.3 22 08					See discussion, p. 5	
5	Jan. 18	Iu	eEN F	01 56 37.9 02 0					J. S. A. epicenter: 29°3 S., 71°6 W.	
6	Jan. 19	Iu	ePN eE F	10 07 48.5 10 08 10.5 10 29					J. S. A. epicenter: 18°4 N., 106°0 W.	
7	Jan. 20	Ir	ePEN eN F	20 47 23.7 20 47 35.3 21 29					J. S. A. epicenter: 13°0 N., 89°5 W.	
8	Jan. 21	Iv	eN F	07 07 51 07 10.0					See discussion, p. 5	
9	Jan. 23	Iv	ePnN iSnEN F	12 04 55.3 12 05 10.9 12 05.8					See discussion, p. 5	
10	Jan. 24	I	eN eE F	11 11 44.5 11 11 51.5 11 13						
11	Jan. 25	Iv	eN eE eE F	02 56 29.1 02 56 41.3 02 56 51.1 02 57.8					"Mineral County, Nevada" according to to Pasadena.	



## MOUNT HAMILTON



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939						mm.	mm.	mm.	
				h. m. s.	s.				
12	Jan. 25	IIu	ePE	03 44 54.4					U.S.C. & G.S. epicenter 37° S., 73° W. Destructive in Chile.
			eSEN	03 55 31.1					
			F	04 30					
13	Jan. 28	Iv	ePEN	20 20 44.5					See discussion, p. 5
			eSN	20 21 33.4					
			eSE	20 21 33.6					
			F	20 26					
14	Jan. 29	Ir	iEN	18 57 37.4				J.S.A. epicenter: 13°5 N., 90°3 W.	
			F	19 17					
15	Jan. 30	Iu	ePEN	02 31 23.2				J.S.A. epicenter: 7°0 S., 155°0 E.	
			eSEN	02 41 47.2					
			F	04 29					
16	Feb. 3	Iu	ePEN	05 39 09				U.S.C. & G.S. epicenter: 10° S., 159° E.	
			eSEN	05 49 46					
			F	06 44					
17	Feb. 4	Iv	ePnN	09 52 25.1				See discussion, p. 6	
			eSne	09 52 44.2					
			iN	09 52 45.3					
			F	09 54					
18	Feb. 5	Id	iPEN	07 45 12.5				See discussion, p. 6 F lost in aftershock	
			iSEN	07 45 13.7					
19	Feb. 5	Id	iSEN	07 46 08.2				See discussion, p. 6	
			F	07 46 15					
20	Feb. 6	Id	ePN	00 51 21.8				See discussion, p. 6	
			iSE	00 51 31.3					
			iSN	00 51 31.6					
			F	00 52.0					
21	Feb. 6	Id	iPEN	04 36 00.7				See discussion, p. 6	
			iSEN	04 46 01.9					
			F	04 47					
22	Feb. 8	I	eN	06 42 10.7					
			eE	06 42 28.3					
			F	06 50					





## MOUNT HAMILTON

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks		
						AE	AN	AZ			
						mm.	mm.	mm.			
						h. m. s.	s.				
23	Feb. 9	Iu	eN	15 38 23.5						U.S.C. & G.S. epicenter 11°5 N., 88°0 W.	
			eE	15 38 24.3							
			F	15 43							
24	Feb. 10	I	eN	22 44 38.0							
			iN	22 45 01.7							
			iN	22 45 08.7							
			F	22 45.8							
25	Feb. 13	Id	iP <sup>-</sup> EN	05 25 15.2						See discussion, p.6	
			iS <sup>-</sup> EN	05 25 16.9							
			F	05 26							
26	Feb. 14	Id	iP <sup>-</sup> N	09 11 07.3						See discussion, p.6	
			eS <sup>-</sup> N	09 11 18.1							
			eS <sup>-</sup> E	09 11 18.2							
			F	09 13							
27	Feb. 15	Iv	eP <sup>-</sup> nN	11 10 01.1						See discussion, p.6	
			eP <sup>-</sup> nE	11 10 01.2							
			iP <sup>-</sup> N	11 10 01.8							
			iS <sup>-</sup> nE	11 10 15.0							
			iS <sup>-</sup> N	11 10 16.3							
			eE	11 10 17.5							
			F	11 11.3							
28	Feb. 15	Iv	eP <sup>-</sup> EN	11 19 49.8						See discussion, p.6	
			iS <sup>-</sup> N	11 20 03.0							
			iN	11 20 04.7							
			F	11 20.7							
29	Feb. 20	Iv	eN	05 49 18						"Near Coso Hot Springs" according to Pasadena	
			eN	05 49 52.9							
			eN	05 49 59.9							
			F	05 52.6							
30	Feb. 21	Iv	iP <sup>-</sup> N	09 48 58.1						See discussion, p.6	
			iS <sup>-</sup> EN	09 49 11.8							
			F	09 51							
31	Feb. 23	Iv	eP <sup>-</sup> N	08 46 44.7						"Cuddy Valley" accord- ing to Pasadena	
			eS <sup>-</sup> EN	08 47 21.5							
			F	08 55							



## MOUNT HAMILTON

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939						mm.	mm.	mm.	
				h. m. s.	s.				
32	Feb. 23	Iv	ePN	09 19 38.7					
			eSEN	09 20 31.8					
			F	09 29					
33	Feb. 24	IIv	iPN	05 27 13.3					See discussion, p.6
			iSEN	05 27 25.2					
			F	05 31					
34	Feb. 26	Id	iPN	09 53 30.5					See discussion, p. 6
			iSEN	09 53 31.7					
			F	09 54					
35	Feb. 26	I	iEN	14 06 00.0					
			F	14 08					
36	Feb. 26	I	eN	23 33 35.6				J.S.A. epicenter: 28°0 N., 114°5 W.	
			eE	23 33 38.6					
			F	23 45					
37	Feb. 27	Id	iPEN	20 44 56.7				See discussion, p. 7	
			iSEN	20 44 57.8					
			F	20 46					
38	Feb. 28	Id	iPEN	01 40 05.1				See discussion, p.7	
			iSEN	01 40 06.5					
			F	01 41					
39	Mar. 2	Iv	ePEN	20 13 26.7				See discussion, p.7	
			iSE	20 13 51.0					
			iSN	20 13 51.7					
			iN	20 13 58.0					
			F	20 15.0					
40	Mar. 4	Id	iPN	05 51 59.8				See discussion, p.7	
			iSEN	05 52 02.0					
			F	05 53					
41	Mar. 12	Iv	iPEN	22 05 35.8				See discussion, p.7	
			iSE	22 06 24.6					
			iSN	22 06 25.6					
			F	22 11					
42	Mar. 15	Id	eEN	18 28 23.0				See discussion, p.7	
			iSN	18 28 34.6					
			iSE	18 28 35.0					
			F	18 30					





MOUNT HAMILTON

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						AE	AN	AZ	
				h. m. s.	s.	mm.	mm.	mm.	
43	Mar. 17	Iv	iPEN	13 10 08.9					See discussion, p. 7 False S.
			eE	13 10 55.9					
			F	13 17					
44	Mar. 21	I	eN	01 30 46.4					J.S.A. epicenter: 3°0 S., 90°8 E. Indian Ocean
			eEN	01 35 29					
			F	03.0					
45	Mar. 22	I	eE	01 43 21.9					
			eN	01 43 27.4					
			F	01 45					
46	Mar. 22	Id	iPnN	03 20 11.5					See discussion, p. 7
			iSnE	03 20 40.8					
			iN	03 20 46.2					
			F	03 22					
47	Mar. 22	Id	iSEN	07 31 33.4					See discussion, p. 7
			F	07 32.1					
48	Mar. 22	I	eN	07 54 02					Trace of distant shock.
			F	07 57					
49	Mar. 23	I	eEN	16 33 04.5					
			F	16 37					
50	Mar. 27	Id	iPEN	00 44 51.3	0.3 & 0.5	+<.1	-<.1		See discussion, p. 8
			iSN	00 44 56.7					
			iSE	00 44 58.1					
			iMN	00 44 58.8					
			F	00 47					
51	Mar. 29	Iv	eEN	21 01 59.9					See discussion, p. 8
			eE	21 05					
52	Mar. 30	Id	iPN	08 00 26.4					See discussion, p. 8
			iSE	08 00 34.5					
			F	08 03					
53	Mar. 30	Id	iPN	08 31 18.4					See discussion, p. 8
			iSE	08 31 26.6					
			F	08 32					



MOUNT HAMILTON



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1939			h. m. s.	s.	mm.	mm.	mm.	
54	Mar. 30	Id	$\overline{eP_N}$	10 39 59.7					See discussion, p. 8
			$\overline{eS_E}$	10 40 07.1					
			F	10 41					
55	Mar. 31	Id	$\overline{eP_N}$	09 07 54.2					See discussion, p. 9
			$\overline{eS_N}$	09 08 04.7					
			$\overline{eS_E}$	09 08 04.9					
			F	09 09					





PALO ALTO

THE BRANNER STATION, STANFORD UNIVERSITY  
PALO ALTO, CALIFORNIA



CONSTANTS

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Latitude and longitude:

$$\begin{aligned} \varphi &= 37^\circ 25'1 \text{ N.} \\ \lambda &= 122^\circ 10'8 \text{ W.} \end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.-- 83 meters (272 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V	T <sub>0</sub>	e
Wood-Anderson .....	E	3000	1	15
	N	3000	1	15



## PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939						mm.	mm.	mm.	
				h. m. s.	s.				
1	Jan. 3	Id	i $\bar{P}$ <sub>N</sub>	15 56 51.2					See discussion, p. 5
			e $\bar{P}$ <sub>E</sub>	15 56 51.4					
			i $\bar{E}$	15 56 52.4					
			i $\bar{S}$ <sub>N</sub>	15 56 53.4					
			i $\bar{N}$	15 56 55.2					
			F	15 57 13					
2	Jan. 7	IIv	e $\bar{P}$ <sub>EN</sub>	20 22 52.0				"Near Coso Hot Springs" according to Pasadena	
			i $\bar{E}$	20 23 02					
			i $\bar{S}$ <sub>E</sub>	20 24 03					
			F	20 27.8					
3	Jan. 8	Iv	e $\bar{P}$ <sub>nN</sub>	20 25 30.5				See discussion, p. 5	
			e $\bar{E}$	20 25 39.3					
			i $\bar{S}$ <sub>EN</sub>	20 25 46.5					
			F	20 26.4					
4	Jan. 11	IIv	e $\bar{P}$ <sub>E</sub>	22 00 55.9				See discussion, p. 5	
			i $\bar{P}$ <sub>N</sub>	22 00 56.6					
			i $\bar{S}$ <sub>N</sub>	22 01 24.1					
			i $\bar{S}$ <sub>E</sub>	22 01 24.8					
			F	22 04.5					
5	Jan. 15	Id	i $\bar{P}$ <sub>N</sub>	21 09 08.7				See discussion, p. 5	
			e $\bar{E}$	21 09 09.4					
			i $\bar{S}$ <sub>E</sub>	21 09 12.1					
			i $\bar{N}$	21 09 14.0					
			F	21 09.6					
6	Jan. 20	Ir	e $\bar{E}$ <sub>N</sub>	20 47.5				J.S.A. epicenter: 13°0 N., 89°5 W.	
			F	20 50.5					
7	Jan. 23	Iv	e $\bar{P}$ <sub>N</sub>	12 04 52.5				See discussion, p. 5	
			i $\bar{P}$ <sub>E</sub>	12 04 52.8					
			i $\bar{S}$ <sub>N</sub>	12 05 05.8					
			i $\bar{E}$	12 05 08.4					
			i $\bar{N}$	12 06 12.0					
			i $\bar{N}$	12 06 13.6					
			F	12 07					
8	Jan. 24	Id	e $\bar{P}$ <sub>N</sub>	19 27 05.0				See discussion, p. 5	
			e $\bar{E}$	19 27 05.8					
			i $\bar{S}$ <sub>EN</sub>	19 27 07.0					
			F	19 27 27					



## PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939				h. m. s.	s.	mm.	mm.	mm.	
9	Jan. 25	IIu	eP <sub>N</sub>	03 44 56.8					U.S.C. & G.S. epicenter: 37° S., 73° W. Destructive in Chile
			iP <sub>E</sub>	03 44 59.8					
			iS <sub>E</sub>	03 55 31					
			eS <sub>N</sub>	03 55.6					
			eG <sub>N</sub>	04 08.6					
			eG <sub>E</sub>	04 09.1					
			eL <sub>EN</sub> F	04 13.6 04 48.6					
10	Jan. 28	Iv	eP <sub>N</sub>	20 20 39				See discussion, p. 5	
			eP <sub>E</sub>	20 20 40.1					
			iS <sub>N</sub>	20 21 24					
			iS <sub>E</sub>	20 21 26.3					
			iN F	20 21 27.3 20 22.7					
11	Jan 30	IIu	eE	02 31.3				U.S.C. & G.S. epicenter: 7° S., 155° E.	
			eS <sub>EN</sub>	02 41.8					
			eG <sub>N</sub>	02 54.5					
			eL <sub>E</sub> F	03 01.8 04.0					
12	Jan. 31	Id	eP <sub>E</sub>	02 39 55					
			eS <sub>N</sub>	02 39 56.7					
			iS <sub>E</sub>	02 39 56.9					
			F	02 40.4					
13	Feb. 4	Iv	eP <sub>nN</sub>	09 52 28.0				See discussion, p. 6	
			eP <sub>nE</sub>	09 52 28.2					
			eS <sub>nEN</sub>	09 52 48.5					
			eE F	09 52 51.5 09 53.7					
14	Feb. 6	Id	eP <sub>N</sub>	00 51 20				See discussion, p. 6	
			eE	00 51 22.0					
			iS <sub>E</sub>	00 51 27.5					
			eS <sub>N</sub> F	00 51 28.1 00 52.1					
15	Feb. 9	Ir	eN	16 28 39				U.S.C. & G.S. epicenter 11°5 N., 88°W.	
			F	16 29 09					
16	Feb. 10	I	eN	04 24 50.9					
			F	04 25.3					





PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939				h. m. s.	s.	mm.	mm.	mm.	
17	Feb. 14	Id	e $\bar{P}$ EN	09 11 14.1					See discussion, p. 6
			eSnE	09 11 28.8					
			e $\bar{S}$ N	09 11 29.8					
			F	09 12.4					
18	Feb. 14	Id	e $\bar{P}$ EN	22 44 07.7					See discussion, p. 6
			i $\bar{S}$ EN	22 49 09.0					
			MN	22 49 09.8					
			F	22 49 34					
19	Feb. 15	Iv	eN	11 19 52.3					See discussion, p. 6
			eE	11 19 54.8					
			eSN	11 20 14.1					
			F	11 20.7					
20	Feb. 15	Iv	iPnEN	11 10 06					See discussion, p. 6
			iSnEN	11 10 26.7					
			F	11 11.5					
21	Feb. 21	Iv	ePnEN	09 49 03.0					See discussion, p. 6
			i $\bar{S}$ EN	09 49 23.7					
			F	09 50.1					
22	Feb. 23	IIv	ePN	08 46 47.5					"Cuddy Valley" accord- ing to Pasadena
			iEN	08 47 05					
			iE	08 47 39					
			iE	08 48 03.0					
			iN	08 48 11.5					
			F	08 53.8					
23	Feb. 23	IIv	ePN	09 19 42.6					"Aftershock of Cuddy Valley earthquake" according to Pasadena
			iPE	09 19 43.8					
			iE	09 19 57.9					
			iN	09 20 06					
			iN	09 20 52.6					
			F	09 23.8					
24	Feb. 24	IIv	iPnEN	05 27 18.3					See discussion, p. 6
			iEN	05 27 21.5					
			iSnEN	05 27 34.3					
			F	05 28.9					
25	Feb. 26	I	eE	14 05 34.1					
			iN	14 05 35					
			eN	14 06 00.1					
			iE	14 06 06.5					
			F	14 07.0					





PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
				h. m. s.	s.	mm.	mm.	mm.	
26	1939 Feb. 28	I	eE	01 03 51.5					
			eN	01 03 56.5					
			eEN	01 04 08.0					
			iN	01 04 18.5					
			F	01 05.0					
27	Mar. 2	Iv	e $\overline{PN}$	20 13 19.9					See discussion, p. 7
			e $\overline{PEN}$	20 13 20.7					
			i $\overline{SEN}$	20 13 45.7					
			eSN	20 13 40.2					
			F	20 14 48					
28	Mar. 5	Id	ePN	10 13 08.2					See discussion, p. 7
			eE	10 13 09.2					
			iSN	10 13 11.2					
			F	10 14.0					
29	Mar. 9	IIId	iPN	19 02 43.4					See discussion, p.7
			iPE	19 02 43.7					
			iN	19 02 44.5					
			iE	19 02 45.5					
			iSN	19 02 46.4					
			F	19 03.3					
30	Mar. 12	IIv	iPN	22 05 30.6					See discussion, p.7
			iPE	22 05 30.9					
			iN	22 06 14.1					
			iE	22 06 15.6					
			iN	22 06 18.6					
			F	22 10.6					
31	Mar. 15	Iv	i $\overline{PEN}$	18 28 27.4					See discussion, p. 7
			iN	18 28 43.4					
			i $\overline{SN}$	18 28 45.4					
			i $\overline{SE}$	18 28 46.0					
			iN	18 28 50.4					
			F	18 29.8					
32	Mar. 15	Id	i $\overline{PN}$	19 09 48.5					See discussion, p. 7
			i $\overline{PE}$	19 09 48.8					
			i $\overline{S?N}$	19 09 49.9					
			i $\overline{S?E}$	19 09 50.5					
			iE	19 09 51.8					
			F	19 10.2					





PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939				h. m. s.	s.	mm.	mm.	mm.	
33	Mar. 17	IIv	eP <sub>EN</sub>	13 10 03.1					See discussion, p.7
			i <sub>E</sub>	13 10 55.9					
			i <sub>EN</sub>	13 11 24.4					
			iS <sub>nE</sub>	13 11 48					
			F	13 15.8					
34	Mar. 20	I	e <sub>EN</sub>	03 34 46					False S
			F	03 50.9					
35	Mar. 21	I	e <sub>E</sub>	00 19 03.4					
			e <sub>N</sub>	00 19.2					
			F	00 40.9					
36	Mar. 22	I	e <sub>N</sub>	01 43 24.3					
			i <sub>EN</sub>	01 43 28.8					
			F	01 49.1					
37	Mar. 22	Iv	eP <sub>nEN</sub>	03 20 15.5					See discussion, p.7
			i <sub>EN</sub>	03 20 43.0					
			iS <sub>nE</sub>	03 20 46.3					
			i <sub>EN</sub>	03 20 47.3					
			F	03 21.9					
38	Mar. 22	Id	e <sub>P<sub>EN</sub></sub>	03 31 25.3					See discussion, p.7
			i <sub>E</sub>	03 31 32.3					
			F	03 32.7					
39	Mar. 22	I	e <sub>EN</sub>	07 57.0					Surface waves
			F	08 11					
40	Mar. 23	I	e <sub>E</sub>	16 33 03					Surface waves
			e <sub>E</sub>	16 33 15					
			e <sub>N</sub>	16 33 18					
			F	16 35.5					
41	Mar. 23	Id	i <sub>P<sub>E</sub></sub>	21 20 56.7					See discussion, p.7
			i <sub>EN</sub>	21 20 56.9					
			i <sub>SEN</sub>	21 20 58.9					
			F	21 21 14					
42	Mar. 26	IIId	iP <sub>EN</sub>	00 44 47.9	0.2		+1		See discussion, p.8
			i <sub>N</sub>	00 44 49.4					
			i <sub>EN</sub>	00 44 50.9					
			i <sub>N</sub>	00 44 52.3					
			F	00 47					



## PALO ALTO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks	
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>		
1939						mm.	mm.	mm.		
				h. m. s.	s.					
43	Mar. 29	Iv	e $\overline{EN}$	21 02 01.5					See discussion, p. 8	
			i $\overline{E}$	21 02 35.5						
			e $\overline{N}$	21 02 56.5						
			F	21 04						
44	Mar. 29	Id	i $\overline{P_N}$	22 02 38.7				See discussion, p. 8		
			i $\overline{N}$	22 02 39.5						
			i $\overline{SN}$	22 02 40.8						
			i $\overline{N}$	22 02 41.6						
			F	22 03.0						
45	Mar. 30	Id	e $\overline{P_{EN}}$	08 00 31.9				See discussion, p. 8		
			i $\overline{N}$	08 00 34.1						
			e $\overline{S^*_{EN}}$	08 00 43.1						
			i $\overline{SN}$	08 00 43.9						
			i $\overline{N}$	08 00 45.9						
			F	08 01.7						
46	Mar. 30	Id	e $\overline{P_{EN}}$	08 31 23.9				See discussion, p. 8		
			i $\overline{N}$	08 31 35.1						
			e $\overline{S_{EN}}$	08 31 36.1						
			F	08 32.7						
47	Mar. 30	Id	e $\overline{P_{EN}}$	10 40 06.2				See discussion, p. 8		
			i $\overline{N}$	10 40 16.2						
			i $\overline{E}$	10 40 16.6						
			i $\overline{SN}$	10 40 18.2						
			i $\overline{E}$	10 40 20.7						
			F	10 41.0						
48	Mar. 31	Iv	e $\overline{P_{EN}}$	09 07 59.4				See discussion, p. 8		
			i $\overline{SE}$	09 08 13.4						
			i $\overline{SN}$	09 08 14.7						
			F	09 08.3						



SAN FRANCISCO

THE SAN FRANCISCO STATION, UNIVERSITY OF SAN FRANCISCO  
SAN FRANCISCO, CALIFORNIA



CONSTANTS

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Latitude and longitude:

$$\begin{aligned} \phi &= 37^{\circ} 46' 4'' \text{ N.} \\ \lambda &= 122^{\circ} 27' 2'' \text{ W.} \end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.--100 meters (328 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V	T <sub>0</sub>	ε
Wood-Anderson .....	E 15°S	1500	1	15
	N	3000	1	15





SAN FRANCISCO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
				h. m. s.	s.	mm.	mm.	mm.	
1	Jan. 11	Iv	ePN	22 00 54.2					See discussion, p. 5
			ePE	22 00 54.5					
			iN	22 00 55.7					
			iN	22 00 58.2					
			iSN	22 01 23.2					
			iSE	22 01 23.7					
			F	22 04.1					
2	Jan. 13	Id	ePN	00 40 10.2					See discussion, p. 5
			iSN	00 40 12.2					
			F	00 40 22					
3	Jan. 18	Id	ePN	00 41 29.4					See discussion, p. 5
			iSEN	00 41 32.4					
			F	00 41 41					
4	Jan. 18	Iu	eEN	01 56 37					J.S.A. epicenter 29°3 S., 71°6 W.
			F	01 59.0					
5	Jan. 23	Id	iPN	12 04 46.2					See discussion, p. 5
			ePE	12 04 46.6					
			iSE	12 04 55.1					
			iN	12 04 56.1					
			iE	12 04 57.9					
			iN	12 04 58.1					
			F	12 06.0					
6	Jan. 25	Iu	ePE	03 44 56					U.S.C. & G.S. epicenter: 37°S., 73°W. Destructive in Chile
			ePN	03 45 02.2					
			iE	03 45 03.9					
			iN	03 45 11.3					
			eEN	03 55.5					
			F	04 30					
7	Jan. 28	Iv	ePN?	20 20 37					See discussion, p. 5
			iSN	20 21 14					
			F	20 29					
8	Jan. 30	Iu	ePEN	02 31.3					U.S.C. & G.S. epicenter: 7°S., 155°E. J.S.A. epicenter: G ? 6°0 S., 155°8 E.
			eSN	02 41 42					
			eE	02 43.3					
			eLE	02 53.7					
			F	03 30					





SAN FRANCISCO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939				h. m. s.	s.	mm.	mm.	mm.	
9	Feb. 6	Id	i $\bar{S}$ EN F	00 51 23.0 00 52.0					See discussion, p. 6
10	Feb. 10	I	iN eE iN F	04 24 46.2 04 24 47.3 04 24 49.0 04 25.3					
11	Feb. 23	Iv	eN iEN iE F	08 47 10.9 08 47 39.2 08 48.1 08 51.0					"Cuddy Valley" accord- ing to Pasadena
12	Feb. 23	Iv	iN iE iN F	09 20 04.5 09 20 05.2 09 21.0 09 23.0					"Aftershock of previous earthquake" according to Pasadena
13	Feb. 24	Iv	iPnN iE iSnN iE iN F	05 27 24.7 05 27 46.7 05 27 47.8 05 27 49.2 05 27 51.7 05 28.5					See discussion, p. 6
14	Feb. 26	I	eEN iN F	14 05 57.1 14 06 03.1 14 06 34					
15	Mar. 2	Iv	i $\bar{P}$ EN e $\bar{S}$ N iE F	20 13 11.5 20 13 25.2 20 13 26.2 20 14.4					See discussion, p. 7
16	Mar. 12	Iv	iPN eE iSN iEN iE F	22 05 26.9 22 05 45 22 06 05.8 22 06 09.4 22 06 14.9 22 11.1					See discussion, p.7
17	Mar. 15	Iv	e $\bar{P}$ N i $\bar{S}$ N F	18 28 35.3 18 28 56.8 18 29.5					See discussion, p. 7





SAN FRANCISCO

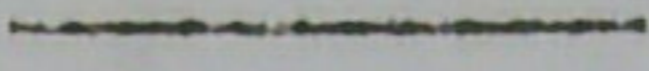
No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks	
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>		
						mm.	mm.	mm.		
						h. m. s.	s.			
18	Mar. 17	Iv	iP <sub>N</sub>	13 09 54.8					See discussion, p. 7	
			i <sub>N</sub>	13 10 10.3						
			e <sub>E</sub>	13 10 10.8						
			i <sub>E</sub>	13 11 32.8						
			i <sub>E</sub>	13 12 07.8						
			F	13 15.5						
19	Mar. 22	Id	i <sub>S</sub> <sub>N</sub>	03 31 33.8				See discussion, p.7		
			i <sub>E</sub>	03 31 34.4						
			i <sub>E</sub>	03 31 36.6						
			F	03 32.0						
20	Mar. 23	I	i <sub>N</sub>	16 34 15						
			e <sub>E</sub>	16 34 25						
			F	16 35.0						
21	Mar. 27	Id	iP <sub>E</sub> <sub>N</sub>	00 44 48.6				See discussion, p. 8		
			i <sub>S</sub> <sub>E</sub> <sub>N</sub>	00 44 53.8						
			F	00 45.4						
22	Mar. 29	Iv	e <sub>E</sub>	21 02.1				See discussion, p. 8		
			e <sub>N</sub>	21 02 32.1						
			F	21 05.0						





FERNDALE

THE FERNDALE STATION  
FERNDALE, CALIFORNIA



CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

$$\begin{aligned} \phi &= 40^{\circ} 34' \text{ N.} \\ \lambda &= 124^{\circ} 16' \text{ W.} \end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.--17 meters (55 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	T <sub>0</sub>	ε
Bosch-Omori 25 kg. ....	E	12	5
	N	11	6

The station is operated by Mr. Joseph Bognuda, of Ferndale, in cooperation with the University of California.





FERNDALE

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
				h. m. s.	s.	mm.	mm.	mm.	
1	Jan. 7	Iv	eE	20 25 32					"Near Coso Hot Springs" according to Pasadena
			eN	20 25 48					
			F	20 28					
2	Jan. 11	Iv	eN	20 02.0					See discussion, p. 5
			F	22 04.0					
3	Jan. 25	Iu	ePE	03 45 16					U.S.C. & G.S. epicenter 37° S., 73° W. Destructive in Chile
			ePN	03 45 20					
			eSEN	03 56.0					
			eE	04 09					
			eLN	04 13					
			F	04 53					
4	Jan. 28	Ii	iPE	20 19 53					See discussion, p. 5
			iPN	20 19 54					
			iSEN	20 20 04					
			iN	20 20 07					
			F	20 24.0					
5	Jan. 30	IIu	eEN	02.6					J.S.A. epicenter: 7°0 S., 155°0 E.
			MEN	03 17					
			F	05.0					
6	Feb. 18	Id	iPE	03 33 14					See discussion, p. 6 N - S record missing
			iSE	03 33 18					
			F	03 34 20					
7	Mar. 12	IIv	iPnEN	22 04 45					See discussion, p. 7
			iSnEN	22 05 02					
			iEN	22 05 06					
			iEN	22 05 09					
			F	22 11.0					
8	Mar. 17	IIv	ePEN	13 09 19					See discussion, p. 7  False S False S
			iPE	13 09 21					
			iN	13 09 28					
			iE	13 09 30					
			iSN	13 09 38					
			iSE	13 09 39					
			F	13 14.0					



FERNDALE



No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub> mm.	A <sub>N</sub> mm.	A <sub>Z</sub> mm.	
				h. m. s.	s.				
9	1939 Mar. 21	I	e <sub>EN</sub> F	01 33.0 02.0					J.S.A. epicenter: 3°0 S., 90°8 E.
10	Mar. 28	Id	e <sub>PN</sub> e <sub>PE</sub> i <sub>SN</sub> i <sub>SE</sub> F	20 31 34 20 31 36 20 31 39 20 31 42 20 33.5					See discussion, p.8
11	Mar. 29	I	i <sub>EN</sub> i <sub>EN</sub> F	21 02 57.5 21 03 02.8 21 03 16					



FRESNO

THE FRESNO STATION, FRESNO STATE COLLEGE  
 FRESNO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

$$\begin{aligned} \varphi &= 36^{\circ} 46'.1 \text{ N.} \\ \lambda &= 119^{\circ} 47'.8 \text{ W.} \end{aligned}$$

Time.--All determinations are reduced to Universal Time.

Altitude.--88.4 meters (290 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V	T <sub>0</sub>	ε
Wood-Anderson .....	N	3000	0.9	15





FRESNO

No.	Date	Character	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
				h. m. s.	s.	mm.	mm.	mm.	
1	1939 Jan. 3	I	e <sub>N</sub> F	17 22 06.7 17 28.5					
2	Jan. 3	Iv	iP <sub>N</sub> iS <sub>N</sub> F	20 59 16.8 20 59 40.6 21 02.5					"Near Coso Hot Springs" according to Pasadena
3	Jan. 7	IIv	iP <sub>N</sub> iS <sub>N</sub> F	20 22 22.4 20 22 46.4 20 37					"Near Coso Hot Springs" according to Pasadena
4	Jan. 11	IIv	iP <sub>N</sub> iS <sub>N</sub> F	22 00 49.8 22 01 14.0 22 09					See discussion, p. 5
5	Jan. 19	Iu	eP <sub>N</sub> e <sub>N</sub> F	10 07 36.4 10 12 27.4 10 30					J.S.A. epicenter: 18°4 N., 106°0 W.
6	Jan. 20	Iu	iP <sub>N</sub> F	20 47 10.6 20 49.5					J.S.A. epicenter: 13° N., 89°5 E.
7	Jan. 25	Iu	eP <sub>N</sub> eS <sub>N</sub> eL <sub>N</sub> F	03 44 47.0 03 55 31.0 04 13.0 05 32					U.S.C. & G.S. epicenter 37° S., 73° W. Destructive in Chile
8	Jan. 29	Ir	eP <sub>N</sub> e <sub>N</sub> F	18 57 22.8 18 57 46.4 19 01					J.S.A. epicenter: 13°5 N., 90°3 N.
9	Jan. 30	Iu	eP <sub>N</sub> eS <sub>N</sub> ePPS <sub>N</sub> F	02 31 30.2 02 42 14.7 02 44 30.7 03 41.5					U.S.C. & G.S. epicenter 7°S., 155°E.
10	Feb. 1	I	e <sub>N</sub> e <sub>N</sub> F	11 37 28.1 11 37 39.8 11 42					
11	Feb. 3	Iu	eP <sub>N</sub> eS <sub>N</sub> F	05 39.0 05 50.0 06.0					U.S.C. & G.S. epicenter 10°S., 159°E.





FRESNO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
1939				h. m. s.	s.	mm.	mm.	mm.	
12	Feb. 4	Iv	eP <sub>N</sub>	09 52 30.4					See discussion, p. 6
			iS <sub>N</sub>	09 52 51.1					
			i <sub>N</sub>	09 52 53.9					
			F	09 56					
13	Feb. 8	I	e <sub>N</sub>	06 42 46.3					
			F	06 44.5					
14	Feb. 9	Iu	e <sub>N</sub>	15 38 25.8					U.S.C. & G.S. epicenter 11°5 N., 88°0 W.
			F	15 42					
15	Feb. 14	Iv	eS <sub>N</sub>	09 11 30.7					See discussion, p. 6
			iS <sub>N</sub>	09 11 32.1					
			F	09 13					
16	Feb. 15	Iv	iS <sub>N</sub>	11 20 06.3					See discussion, p. 6
			F	11 20.8					
17	Feb. 15	Iv	iS <sub>N</sub>	11 10 15.3					See discussion, p. 6
			iS <sub>N</sub>	11 10 18.5					
			i <sub>N</sub>	11 10 23.9					
			F	11 13.8					
18	Feb. 20	IIv	iP <sub>N</sub>	05 48 43.0					"Near Coso Hot Springs" according to Pasadena
			iS <sub>N</sub>	05 49 08.4					
			i <sub>N</sub>	05 49 09.8					
			i <sub>N</sub>	05 49 14.9					
			i <sub>N</sub>	05 50 03.8					
			F	05 51.6					
19	Feb. 21	Iv	i <sub>N</sub>	09 49 13.2					Probably S of an after- shock superposed on main shock
			iS <sub>N</sub>	09 49 14.3					
			i <sub>N</sub>	09 49 17.0					
			F	09 51.6					
20	Feb. 23	IIIv	iP <sub>N</sub>	08 45 23.6					"Cuddy Valley" accord- ing to Pasadena
			i <sub>N</sub>	08 45 24.6					
			i <sub>N</sub>	08 45 30.1					
			iS <sub>N</sub>	08 45 48.6					
			F	08 57.6					
21	Feb. 23	IIv	iP <sub>N</sub>	09 18 19.5					Aftershock ?
			iS <sub>N</sub>	09 18 43.5					
			F	09 27.6					



FRESNO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						A <sub>E</sub>	A <sub>N</sub>	A <sub>Z</sub>	
				h. m. s.	s.	mm.	mm.	mm.	
22	1939 Feb. 24	Iv	e $\bar{P}$ <sub>N</sub> iS <sub>N</sub> <sub>N</sub> F	05 27 08.5 05 27 31.8 05 30.5					See discussion, p. 6
23	Feb. 26	I	iS <sub>N</sub> ? i <sub>N</sub> F	11 59 22.9 11 59 25.9 12 01.5					The minute measured is not sure
24	Feb. 26	I	i <sub>N</sub> i <sub>N</sub> F	14 06 10.9 14 06 15.7 14 07.5					
25	Feb. 26	II	e <sub>N</sub> e <sub>N</sub> F	23 29 59.8 23 32 47 23 43.5					J.S.A. epicenter: 28°0 N., 114°5 W.
26	Mar. 7	Iv	i $\bar{P}$ <sub>N</sub> eS <sub>N</sub> iS <sub>N</sub> F	19 54 04.9 19 54 28.4 19 54 29.9 19 56.0	0.8		+1		"Cuddy Valley" according Pasadena
27	Mar. 12	Iv	i <sub>N</sub> F	22 05 58.9 22 13.2					See discussion, p. 7
28	Mar. 15	Iv	e <sub>N</sub> e <sub>N</sub> iS <sub>N</sub> <sub>N</sub> F	18 28 33.4 18 28 46.4 18 28 49.5 18 32.1					See discussion, p. 7
29	Mar. 17	Iv	i <sub>N</sub> i <sub>N</sub> F	13 10 31.2 13 10 38.2 13 17.1					See discussion, p. 7
30	Mar. 20	Iu	e <sub>N</sub> F	03 34 57 03 43					J.S.A. epicenter: 33°4 N., 129°5 E.
31	Mar. 21	Iu	e <sub>N</sub> F	01 31.1 01 47.1					J.S.A. epicenter: 3°0 S., 90°8 E.
32	Mar. 22	Iv	e <sub>N</sub> e <sub>N</sub> iS <sub>N</sub> <sub>N</sub> F	03 20 18.6 03 20 21.1 03 20 57.4 03 25.0					See discussion, p. 7





FRESNO

No.	Date	Char-acter	Phase	Time U.T.	Period	Amplitude			Remarks
						AE	AN	AZ	
	1939			h. m. s.	s.	mm.	mm.	mm.	
33	Mar. 22	I	eP <sub>N</sub> eL <sub>N</sub> F	07 33 07 07 59.1 08 14					
34	Mar. 23	I	e <sub>N</sub> e <sub>N</sub> F	16 32.2 16 32 26.4 16 39.2					
35	Mar. 29	Iv	e <sub>N</sub> i <sub>N</sub> F	21 02 18 21 03 17.8 21 05.2					See discussion, p. 8
36	Mar. 30	Iv	e <sub>N</sub> i <sub>S</sub> <sub>N</sub> F	08 00 47.9 08 01 02.2 08 04					See discussion, p. 8
37	Mar. 30	Iv	i <sub>S</sub> <sub>N</sub> i <sub>N</sub> F	08 31 54.7 08 32 00.4 08 34					See discussion, p. 8
38	Mar. 30	Iv	i <sub>N</sub> F	10 40 46 10 41.2					See discussion, p. 8