

Bulletin of the Seismographic Stations

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EARTHQUAKES IN NORTHERN CALIFORNIA
AND
THE REGISTRATION OF EARTHQUAKES
AT
BERKELEY—MOUNT HAMILTON—PALO ALTO
SAN FRANCISCO—FERNDAL—FRESNO

From April 1, 1941, to June 30, 1941

BY
PERRY BYERLY
AND
JOHN E. MEEKER

UNIVERSITY OF CALIFORNIA PRESS
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CONTENTS

	Page
EARTHQUAKES IN NORTHERN CALIFORNIA	49
THE REGISTRATION OF EARTHQUAKES	54
Symbols and Notations Employed	55
BERKELEY	58
Constants	58
Tabulation of Shocks	59
MOUNT HAMILTON	74
Constants	74
Tabulation of Shocks	75
PALO ALTO	84
Constants	84
Tabulation of Shocks	85
SAN FRANCISCO	92
Constants	92
Tabulation of Shocks	93
FERNDALE	97
Constants	97
Tabulation of Shocks	98
FRESNO	101
Constants	101
Tabulation of Shocks	102

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.

Epcenters 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.

EARTHQUAKES IN NORTHERN CALIFORNIA

(All intensities given on Modified Mercalli Scale)

1941 -- PACIFIC STANDARD TIME

- March 31, 11h 07m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco, and Fresno; III at Sunol, epicenter about 3 miles southwest of Pleasanton. See map, epicenter 1a.
- March 31, 11h 42m, p.m. Recorded at Berkeley and Mount Hamilton and weakly at Palo Alto; not reported felt, probably an aftershock of previous quake.
- April 1, 01h 08m, a.m. Recorded at Berkeley and Mount Hamilton; another aftershock.
- April 1, 03h 35m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; felt at Sunol, another shock from epicenter 1a.
- April 5, 04h 41m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; IV near Markleville, epicenter probably in Nevada about 20 miles northeast of Markleville.
- April 5, 02h 55m p.m. Recorded at Mount Hamilton only; not reported felt, focus about 4 miles from Lick Observatory.
- April 5, 04h 11m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 7 miles from Lick Observatory.
- April 5, 08h 00m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 9 miles from Lick Observatory.
- April 13, 10h 15m, a.m. Recorded at Palo Alto only; not reported felt, focus about 12 miles from Palo Alto station.
- April 14, 08h 17m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; VI at Aptos, Capitola, Santa Cruz, Soquel; V at San Francisco, Saratoga, Watsonville; IV at Alma, Almaden, Ben Lomond, Big Sur, Boulder Creek, Carmel, Colma, Felton, Gilroy, Hollister, Holy City, Laurel, Los Gatos, Madrone, Moss Beach, Olympia, San Martin, Spreckels; I - III at Brookdale, Coyote, Hayward, Monterey, Pacific Grove, Salinas, San Bruno, San Juan Bautista, Seaside, Sunnyvale; epicenter halfway between Santa Cruz and Wrights. See map, epicenter 2b.
- April 14, 12h 56m, p.m. Recorded at Palo Alto only; not reported felt, focus about 8 miles from Palo Alto station.
- April 19, 11h 00m, a.m. Recorded at Palo Alto only; not reported felt, focus about 15 miles from Palo Alto station.
- April 20, 01h 54m, a.m. Recorded at Ferndale only; felt in Ferndale and Petrolia, epicenter about 30 miles from Ferndale.
- April 23, 03h 57m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 15 miles from Lick Observatory.



1941 -- P. S. T.

- April 24, 11h 28m, a.m. Recorded at Palo Alto only; not reported felt, focus about 15 miles from Palo Alto station.
- April 25, 08h 37m, a.m. Recorded at Palo Alto only; not reported felt, focus about 12 miles from Palo Alto station.
- April 27, 09h 06m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, epicenter about halfway between Antioch and Brentwood. See map, epicenter 3b.
- April 27, 12h 51m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, epicenter very near Colma. See map, epicenter 4b.
- April 28, 12h 27m, p.m. Recorded at Palo Alto only; not reported felt, focus about 5 miles from Palo Alto station.
- April 29, 05h 40m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 6 miles from Lick Observatory.
- May 1, 05h 29m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno (Mineral record failed); IV at Caribou, De Sabla, and Stirling City; epicenter near Butte-Plumas County line west of Quincy.
- May 5, 07h 12m, a.m. Recorded at Palo Alto only; not reported felt, focus about 7 miles from Palo Alto station.
- May 9, 11h 42m, a.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, epicenter about 5 miles west of Lick Observatory. See map, epicenter 5a. Depth of focus about 8 miles.
- May 10, 10h 01m, a.m. Recorded at Palo Alto only; not reported felt, focus about 6 miles from Palo Alto station.
- May 10, 11h 43m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 10 miles from Lick Observatory.
- May 12, 03h 49m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 8 miles from Lick Observatory.
- May 13, 02h 11m, a.m. Recorded at Ferndale only; felt slightly at Cape Mendocino, epicenter about 30 miles from Ferndale.
- May 13, 08h 02m, a.m. Recorded at all stations including Mineral at which the time of P was 08h 02m 41s, P.S.T. IV at Blue Lake, Carlotta, Ettersburg, Ferndale, Fort Bragg, Loleta, Rio Dell, Rockport, San Francisco, Santa Cruz, Scotia, Trinidad, Upper Mattole, Wildwood, Willits; III at Shively and Ukiah; felt also at Arcata, Ben Lomond, Bolinas, Eureka, Petrolia, Redwood City and at Defoe Bay and Knappa in Oregon. Epicenter at 40°3 N, 126°4 W, off coast of northern California.



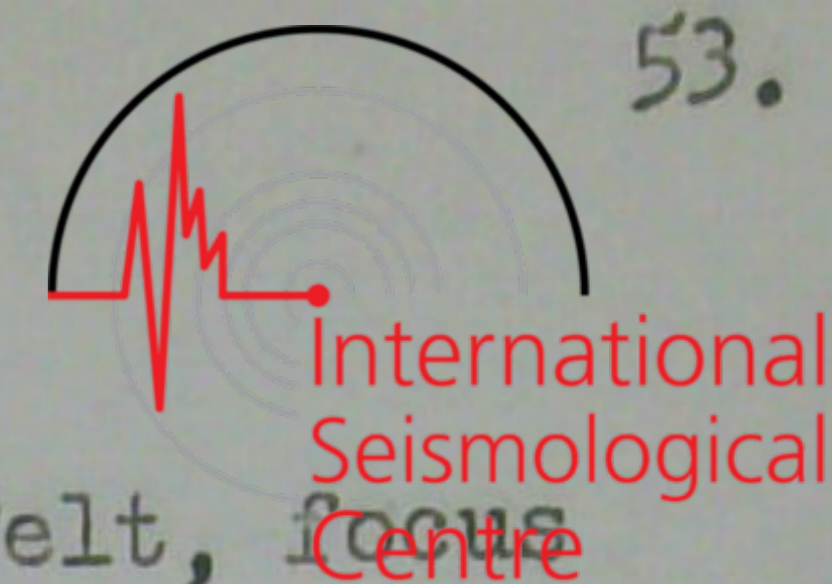
1941 -- P. S. T.

- May 13, 12h 33m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, no doubt an aftershock of quake at 08h 02m, a.m.
- May 13, 02h 01m, p.m. Recorded at Palo Alto only; not reported felt; focus about 10 miles from Palo Alto station.
- May 13, 08h 10m, p.m. Recorded at Ferndale only; not reported felt, focus about 20 miles from Ferndale station.
- May 14, 10h 10m, a.m. Recorded at Palo Alto only; not reported felt, focus about 10 miles from Palo Alto station.
- May 14, 05h 00m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 8 miles from Lick Observatory.
- May 14, 05h 29m, p.m. Recorded at Fresno and weakly at Mount Hamilton and Palo Alto; IV at Coalinga, epicenter probably about 20 miles north of Coalinga.
- May 14, 10h 00m, p.m. Recorded at Fresno, Mount Hamilton and weakly at Palo Alto; IV at Coalinga, epicenter probably about 15 miles east of Coalinga. The records are not very good for these two shocks and it may well be that they came from the same source.
- May 15, 07h 47m, a.m. Recorded at Mount Hamilton only; not reported felt, epicenter about 35 miles from Lick Observatory, no doubt southerly.
- May 15, 08h 16m, a.m. Recorded at Mount Hamilton only; not reported felt, epicenter about 45 miles from Lick Observatory, no doubt southerly.
- May 15, 06h 37m, p.m. Recorded at all stations; not reported felt, aftershock of earthquake at 08h 02m, a.m. May 13. There were probably other aftershocks on this day -- see readings.
- May 16, 10h 43m, a.m. Recorded at Ferndale only; not reported felt, focus about 30 miles from Ferndale station.
- May 17, 06h 20m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 10 miles from Lick Observatory.
- May 22, 05h 53m, p.m. Recorded at Palo Alto only; not reported felt, focus about 14 miles from Palo Alto station.
- May 23, 06h 34m, a.m. Recorded at Palo Alto only; not reported felt, focus about 5 miles from Palo Alto station.
- May 24, 06h 13m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 10 miles from Lick Observatory.
- May 24, 04h 25m, p.m. Recorded at Palo Alto only; not reported felt, focus probably about 20 miles from Palo Alto station.



1941 -- P. S. T.

- May 24, 08h 01m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 10 miles from Lick Observatory.
- May 26, 07h 54m, a.m. Recorded at Mount Hamilton and very weakly at Palo Alto; not reported felt, focus about 7 miles from Lick Observatory.
- May 27, 05h 58m, p.m. Recorded at Mount Hamilton only; felt in San Benito, epicenter near San Benito.
- May 27, 10h 24m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; VI at San Martin; V at Los Gatos, Manor, San Carlos; IV at Almaden, Aptos, Ben Lomond, Berkeley, Bolinas, Boulder Creek, Burlingame, Campbell, Corte Madera, Davenport, El Granada, Gilroy, Halfmoon Bay, Kentfield, Los Altos, Madrone, Mill Valley, Milpetas, Morgan Hill, Newark, Niles, Olympia, Petaluma, Redwood City, Ross, San Francisco, San Jose, San Mateo, Santa Cruz, Sausalito, Sunnyvale; I - III at Alameda, Coyote, Laurel, Montara, Moraga, Oakley, Pescadero, Pleasanton, San Gregorio, San Juan, Tiburon; epicenter about 7 miles west-southwest of San Martin. See map, epicenter 6b.
- May 28, 05h 05m, p.m. Recorded at Berkeley and weakly at Mount Hamilton and San Francisco; not reported felt, epicenter probably in San Pablo Bay or near it.
- May 29, 05h 54m, a.m. Recorded at Berkeley and weakly at Mount Hamilton; not reported felt, epicenter perhaps near Brentwood.
- May 29, 06h 20m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 15 miles from Lick Observatory.
- May 29, 07h 01m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 5 miles from Lick Observatory.
- May 30, 05h 03m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; epicenter very near Lick Observatory, depth about 6 miles. See map, epicenter 7a.
- May 31, 03h 19m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 22 miles from Lick Observatory, no doubt southerly.
- June 2, 03h 40m, p.m. Recorded at Palo Alto only; not reported felt, focus about 10 miles from Palo Alto station.
- June 8, 05h 21m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 8 miles from Lick Observatory.
- June 9, 09h 31m, a.m. Recorded at Palo Alto only; not reported felt, focus about 8 miles from Palo Alto station.
- June 12, 03h 49m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; not reported felt, epicenter about 6 miles south-east of Wrights. See map, epicenter 8c. (The rating c is given because P-0 at Palo Alto fails to check by 2 seconds although the check is excellent at other stations.)



1941 -- P. S. T.

- June 13, 07h 53m, a.m. Recorded at Palo Alto only; not reported felt, focus about 15 miles from Palo Alto station.
- June 13, 04h 43m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto, San Francisco and Fresno; not reported felt, epicenter about 4 miles south-east of Gilroy. See map, epicenter 9b.
- June 14, 09h 08m, a.m. Recorded weakly at Berkeley and Palo Alto (Mount Hamilton records not changed this day); IV at Santa Cruz, epicenter probably to the east of Santa Cruz.
- June 18, 04h 02m, p.m. Recorded at Palo Alto only; not reported felt, focus about 7 miles from Palo Alto station.
- June 20, 02h 35m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 9 miles from Lick Observatory.
- June 23, 06h 53m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, epicenter near Ryde, about 20 miles northeast of Antioch. See map, epicenter 10b.
- June 24, 12h 32m, p.m. Recorded at Mount Hamilton only; not reported felt, focus about 7 miles from Lick Observatory.
- June 25, 10h 01m, a.m. Recorded at Palo Alto only; not reported felt, focus about 5 miles from Palo Alto station.
- June 26, 01h 16m, p.m. Recorded at Palo Alto only; not reported felt, focus about 5 miles from Palo Alto station.
- June 26, 06h 16m, p.m. Recorded at Berkeley, Mount Hamilton, Palo Alto and San Francisco; not reported felt, epicenter very near Wrights. See map, epicenter 11b.
- June 27, 03h 50m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 15 miles from Lick Observatory.
- June 29, 10h 06m, a.m. Recorded at Mount Hamilton only; not reported felt, focus about 10 miles from Lick Observatory.
- June 29, 11h 00m, a.m. Recorded at Berkeley only; not reported felt, focus about 7 miles from University Campus.



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 _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 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 _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--

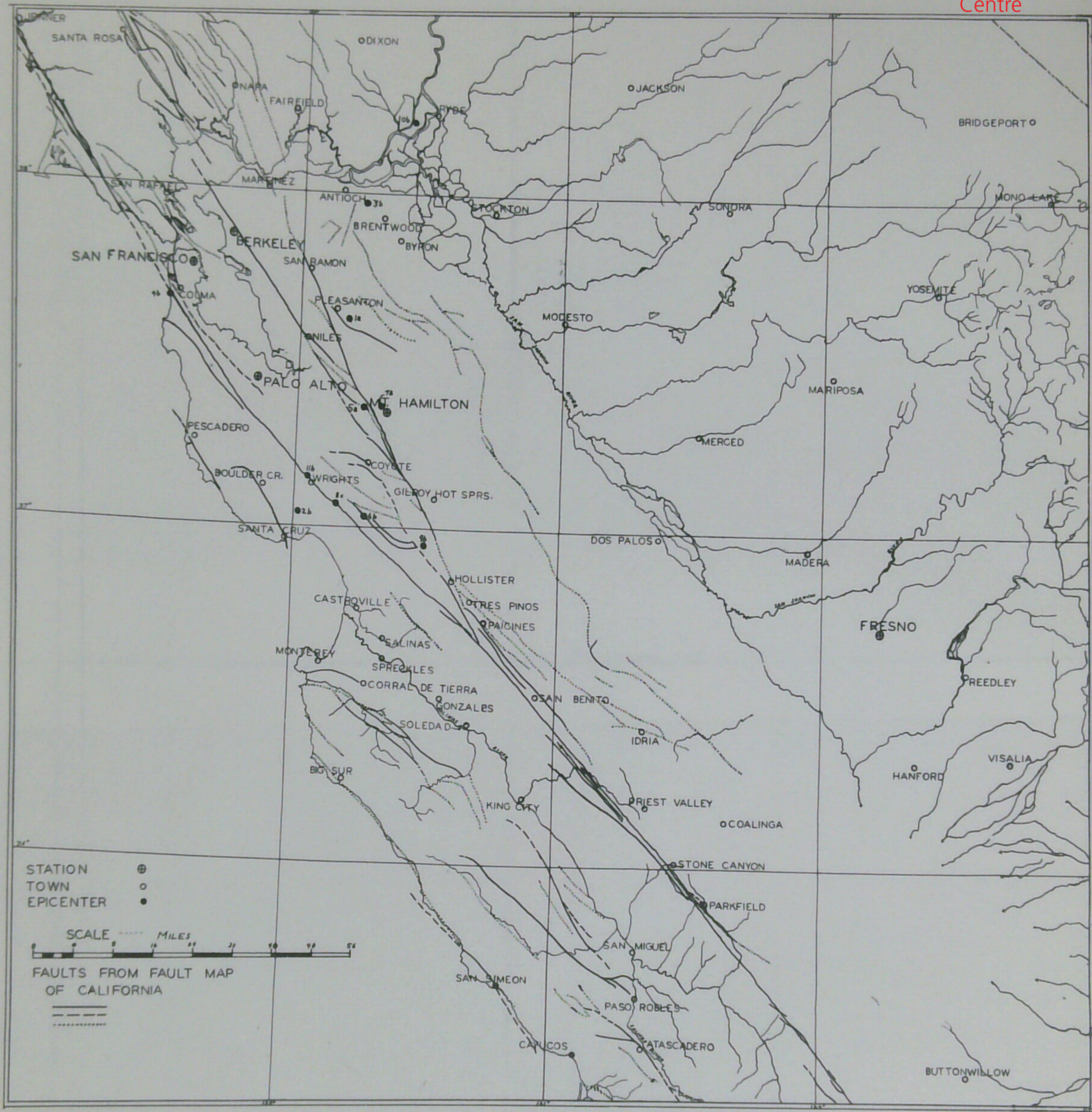
i (impetus)	Sudden beginning of the motion.
e (emersio)	Gradual beginning of the motion.
T (period)	Time of one complete oscillation.
A	Trace amplitude measured from the media line, + earth motion toward east, north, or zenith, - toward west, south or nadir.
AE	E-W component of A.
AN	N-S component of A.
AZ	Vertical component of A.

4. Time--

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

SUMMARY OF THE EPICENTERS

<u>No.</u>	<u>Rating</u>	<u>Date</u>	<u>Location</u>
1	a	March 31	About 3 miles southwest of Pleasanton.
2	b	April 14	Halfway between Santa Cruz and Wrights.
3	b	April 27	About halfway between Antioch and Brentwood.
4	b	April 27	Very near Colma.
5	a	May 9	About 5 miles west of Lick Observatory.
6	b	May 27	About 7 miles west-southwest of San Martin.
7	a	May 30	Very near Lick Observatory.
8	c	June 12	About 6 miles southeast of Wrights.
9	b	June 13	About 4 miles southeast of Gilroy.
10	b	June 23	Near Ryde, about 20 miles northeast of Antioch.
11	b	June 26	Very near Wrights.





BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$$\phi = 37^{\circ} 52!3 \text{ N.}$$

$$\lambda = 122^{\circ} 15!6 \text{ W.}$$

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 _o	ε	$\frac{r}{T_o^2}$	
		K	T				
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	3000		0.9	15		
	N	3000		0.9	15		
Galitzin	E	112	12	11.8	0.00	115	11.3
	N	122	12	12.4	0.03	119	11.2
	Z	109	12	11.9	0.01	131	14.9
Benioff	Z	V		Coupled Period		ε	
				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.)	Remarks
1941					
1	April 1	IIId	eZ iP _{NE} iP _Z iE iS _{NZ} iZ F	G 07 06 40.5 A 07 06 43.7 H 07 06 44.0 A 07 06 49.4 AH 07 06 50.8 G 07 06 59.4 07 09	See discussion, page 49
2	April 1	Id	iP _Z iS _Z F	H 07 42 28 H 07 42 34 07 43	See discussion, page 49
3	April 1	Id	iP _{NEZ} iS _{NZ} iS _E F	AH 09 07 52.3 AH 09 07 59.8 A 09 08 00.4 09 09	See discussion, page 49
4	April 1	IIr	eP _Z eP _Z eN eE eN eE ePP _Z eE eZ iS _E iS _N iSS _Z eL _N eL _Z eL _E F	G 10 46 46.5 H 10 46 51.8 A 10 46 54 A 10 46 58.2 G 10 46 58.5 G 10 47 07.5 G 10 48 13.0 A 10 51 09.1 G 10 51 27.5 G 10 51 40.5 G 10 51 46.5 G 10 52 35.5 A 10 53.7 G 10 53.9 A 10 54.4 12 31	U.S.C. & G.S. epicenter:- 56°0 N 153°0 W - Alaska
5	April 1	Id	iP _{NZ} iP _E iS _N iS _{EZ} F	AH 11 35 17.7 A 11 35 18.1 A 11 35 24.6 AH 11 35 25.0 11 36	See discussion, page 49
6	April 1	I	eN eE F	G 22 16.9 G 22 18 22 31	Surface waves.
7	April 3	Iu	iN _Z F	AH 15 06 59.1 15 07	"Foreshock of next." - (Pasadena)



BERKELEY

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
8	April 3	IIu	ePNZ	AHG 15 33 21.5	U.S.C. & G.S. epicenter:- 25°S 69°W h = 200 Km. Felt in Chile.
			iPE	G 15 33 24.5	
			iPN	G 15 33 26.5	
			iN	A 15 33 29.7	
			iz	H 15 33 31.7	
			ipPN	G 15 33 51.0	
			eZ	G 15 34 34.5	
			eSN	A 15 43 20.6	
			iSE	G 15 44 11.0	
			iSN	G 15 44 12.0	
			iSKSN	G 15 45 22.0	
			eN	G 15 50.9	
			eN	G 15 54.6	
			eE	G 15 54.7	
			iN	G 16 00 37.0	
F	17 41				
9	April 5	Iv	iPNZ	AH 12 41 36.5	See discussion, page 49
			iz	H 12 41 38.6	
			iN	A 12 42 02.8	
			iSN	A 12 42 09.0	
			F	12 44	
10	April 6	Iu	eE	G 23 14 35	JSA epicenter:- 13°3 N 89°4 W "Strong in El Salvador."
			eN	G 23 15 09	
			F	23 31	
11	April 7	IIr	ePNZ	G 23 37 18.0	U.S.C. & G.S. epicenter:- 17°6 N 78°3 W Strong in Jamaica.
			ePE	G 23 37 20.0	
			eN	A 23 37 22.4	
			eZ	H 23 37 23.0	
			iPPN	G 23 38 59.5	
			iPPZ	G 23 39 13.0	
			iz	G 23 43 37.0	
			iSN	G 23 43 59.0	
			eN	A 23 44 07.3	
			iz	G 23 47 27	
			eN	A 23 47.8	
			eZ	G 23 50.8	
			eN	A 23 55.5	
			F	02 41	
			12	April 9	
eN	G 17 11 31				
iN	G 17 12 33.0				
iz	G 17 12 44.0				
iSE	G 17 12 55.5				
eSN	A 17 13 29				
iz	G 17 13 44.5				
iE	G 17 13 49.5				
eLN	A 17 15.8				
F	17 26				



BERKELEY

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
13	April 14	IIv	iE iP _{NEZ} iNZ iZ iNE iZ iS _{NZ} F	G 16 17 06.5 AH 16 17 07.1 G 16 17 07.5 H 16 17 09.4 G 16 17 17.5 G 16 17 18.5 AH 16 17 19.5 16 20	See discussion, page 49
14	April 15	Iu	eP _E eP _Z eS _N eSSSE eSSSN eLE eLZ eLN F	G 03 56 36.5 G 03 56 37.0 G 04 06 22.0 G 04 15 48.0 G 04 16 00.5 G 04 23.3 G 04 23.8 G 04 24.8 05 26	"Near Apia" - Pasadena
15	April 15	Iu	eS? _N eE iN eE eLNZ eLE F	G 07 16 32.0 G 07 18 12 G 07 31 31.5 G 07 31 45.0 G 07 35.3 G 07 35.8 08 21	"Near Apia" - Pasadena
16	April 15	IIIr	iP _{EZ} iP _N eN eE eZ eSE eSN eLE eLN F	G 19 15 18.0 G 19 15 18.5 A 19 15 21.8 A 19 15 22.1 H 19 15 22.6 A 19 19 45 A 19 19 48 A 19 21.6 A 19 21.8 23 31	Tacubaya epicenter:- 18°17'N 103°19'W Destructive in Mexico.
17	April 15	I	eN eZ eE F	A 19 51 28.1 H 19 51 28.5 A 19 51 30.1 19 54	Superimposed on coda of preceding quake. Possibly an aftershock
18	April 16	I	eNE F	G 01 48.0 02 02	Surface waves?
19	April 18	Iu	iP _Z eP _N ip _{PZ} eN eE eN F	G 06 28 35.0 G 06 28 36.0 G 06 29 01.0 G 06 38 46 G 06 39 00.0 G 07 02 07 21	Deep Wellington epicenter:- 20°S 171°E h = 100 km.



BERKELEY

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
20	April 18	Iu	eZ eE eE eLE eLN F	G 13 47 55.5 G 13 47 59.0 G 14 26.9 G 14 45.7 G 14 47.7 15 06	
21	April 19	Iu	eN eE iE eN eE eLN eLE eZ F	G 08 17 06.5 G 08 17 21.5 G 08 17 45.5 G 08 18 26.5 G 08 18 27.5 G 08 40 00.5 G 08 40.7 G 08 47.7 09 21	URSS:- 38°7 N 97°0 E
22	April 20	Iu	eP ^{''} Z eP ^{''} N eE eZ iSKSE eSKSN iSZ eLE eLN F	G 17 56 41.0 G 17 56 42.0 G 17 56 51.5 G 18 03 01.0 G 18 03 05.0 G 18 03 06.0 G 18 04 44.5 G 18 25.7 G 18 27.7 20 11	U.S.C. & G.S.:- 37°N 69°E URSS:- 38°6 N 71°2 E
23	April 21	Iu	iPZ ePE ePPPN ePcSZ iPcSE eN eSN iSE eLE eLZ F	G 03 00 53.5 G 03 00 54.5 G 03 05 25.0 G 03 06 14.0 G 03 06 14.5 G 03 06 16.0 G 03 08 34.0 G 03 08 43.5 G 03 09.6 G 03 09.9 04 41	U.S.C. & G. S. epicenter:- 53°N 166°W
24	April 21	I	eNE F	G 15 58.2 16 15	Surface waves?
25	April 21	Iu	iSE eLN eLE eLZ F	G 18 44 15.5 G 18 46.7 G 18 46.9 G 18 47.8 19 51	URSS:- 51°5 N 170°0 W


 International
Seismological
Centre

BERKELEY

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
26	April 21	Iu	iPz iE eN iE eE eN eLE eLN eLZ F	G 22 40 28.0 G 22 40 36.0 G 22 41 16.0 G 22 41 39.0 G 22 52.0 G 22 56.9 G 23 06.4 G 23 07.2 G 23 08.2 24 21	Wellington epicenter:- 20°S 170°E
27	April 25	IIv	ePN eE eE eN eZ iN iMN eN F	A 12 14 51.8 A 12 14 52.0 G 12 17 35.5 G 12 17 51.5 G 12 18 10 G 12 18 12.5 G 12 18 50.5 A 12 18 56 12 46	JSA epicenter:- 27°N 115°W S?
28	April 26	Iu	eE eLE eLNZ F	G 18 06.7 G 18 27.1 G 18 29.6 18 51	
29	April 27	Iu	eE eN F	G 00 05.5 G 00 10.7 00 31	URSS:- 38°N 70°E
30	April 27	Iu	eN eE eLN eLE F	G 05 52 29.0 G 05 52 35.0 G 06 01.2 G 06 03.2 06 16	Pasadena:- "Roughly 18°N 79°W"
31	April 27	Iu	eN eE eZ F	G 13 44 57.5 G 13 50.7 G 14 01.2 14 26	Surface waves. URSS:- 39°5'N 34°0' E
32	April 27	Id	iP̄EZ iS̄EN F	AH 17 06 21.8 A 17 06 27.5 17 07	See discussion, page 50
33	April 27	Id	eP̄Z iS̄NZ F	H 20 50 50.8 AH 20 50 54.6 20 51	See discussion, page 50



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
34	April 28	I Ir	ePN ePE ePZ eN eE eSE iSN eLNE eLZ iMN F	G 19 49 07.5 G 19 49 08.0 G 19 49 08.5 A 19 49 12.1 A 19 49 14 G 19 53 44.0 G 19 53 55.0 G 19 56.1 G 19 56.9 G 19 58.2 20 51	"Damage in Mexico" - Pasadena
35	April 29	Iu	eZ eE iZ eNE eLN eLZ eLE eN eE F	G 01 54 48.0 G 01 58 22.0 G 01 58 29.0 G 02 14 35.5 G 02 41.1 G 02 41.2 G 02 41.7 G 03 07.4 G 03 07.7 04 16	P' ? SS?
36	April 29	Iu	eLE eLN eLZ F	G 16 12.7 G 16 15.2 G 16 19.7 16 41	
37	April 30	Iu	ePZ ePNEZ eSN eSE eSZ eLN eLE eLZ F	G 09 56 45.0 AH 09 57 15.5 G 10 06 43.5 G 10 06 50.5 G 10 06 54.5 G 10 16.3 G 10 16.6 G 10 19.6 11 51	URSS:- 33°0 N 143°5 E
38	May 1	Iu	iE iN eLN eLEZ F	G 07 19 54.0 G 07 20 35.0 G 07 21.3 G 07 22.6 07 46	S? Pasadena:- "Roughly 53°N 166°"
39	May 1	Iv	ePZ iSNE F	H 13 29 45.9 A 13 30 16.5 13 32	See discussion, page 50


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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
40	May 2	Iu	eE eLN eLE eLZ F	G 10 19 33 G 10 35.6 G 10 36.4 G 10 36.9 11 31	Wellington:- 6°S 153°E URSS:- 7.5 S 155.5 E
41	May 3	I	eE eN F	G 20 50.6 G 20 52.6 21 16	
42	May 5	Iu	iPZ eE eLE eLN F	GH 15 30 11.5 G 15 44 30.5 G 15 53.6 G 15 54.1 16 16	URSS:- 46.5 N 128° E
43	May 7	Iu	iPZ ePNEZ eE eE eN F	G 12 32 09.5 AH 12 32 11.5 G 12 42 43.0 G 12 43 30.5 G 12 43 31.5 13 21	Wellington epicenter:- 20°S 172°E
44	May 8	Iu	iPE ePZ iPEZ eN iN iPPZ ePPE iSE eSNE iSN iz iE iSSN iE F	G 10 32 44.0 H 10 32 44.2 AG 10 32 44.5 A 10 32 46.1 G 10 32 46.5 G 10 34 45.5 G 10 34 46.5 G 10 41 46.0 A 10 41 46.5 G 10 41 47.0 G 10 41 49.5 G 10 44 11.5 G 10 45 00.0 G 10 45 25.5 11 26	Wellington epicenter:- 18°S 178°W h = 550 km.
45	May 9	Iu	eSKSE eN eE iPSN eSSE iN iE iSSSE iN eLN eLE eLz F	G 05 57 11.0 G 05 58 30.0 G 05 58 36.5 G 05 59 13.0 G 06 04 28.0 G 06 04 32.0 G 06 05 40.5 G 06 09 15.5 G 06 09 33.5 G 06 14.1 G 06 14.3 G 06 15.1 07 36	Manila epicenter:- 14°25' N 123° 05' E Felt in SE Luzon



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
46	May 9	Iu	iPP _E ePPP _N eSS _N iSSS _E ez e _E F	G 09 52 01.0 G 09 53 54.5 G 10 02 19.5 G 10 06 33.5 G 10 11 09.0 G 10 12.7 10 51	URSS:-- 36°N 143°E
47	May 9	Id	eP _Z eS _{NE} F	H 19 42 28.3 A 19 42 38.0 19 44	See discussion, page 50
48	May 11	Iu	iP _Z e _E e _N e _E eL _N eL _E	G 05 18 52.5 G 05 18 54.0 G 05 27 49.0 G 05 27 55.0 G 05 43.3 G 05 43.8	JSA epicenter:-- 13°0 S 77°0 W
49	May 11	Iu	eL _E eL _N eL _Z F	G 13 48.0 G 13 48.1 G 13 53.5 14 11	
50	May 12	Iu	e _{NE} F	G 04 55 05 07	Surface waves.
51	May 13	IIIv	iP _E iP _Z iP _N i _E i _{NZ} i _N i _Z i _N F	G 16 02 44.0 G 16 02 44.5 G 16 02 45.0 A 16 02 46.4 AH 16 02 46.7 A 16 03 37.7 H 16 03 38.2 A 16 04 38.0 16 41	See discussion, page 50
52	May 13	Iv	eP _{NEZ} eS _{NEZ} F	AH 20 33 13 AH 20 34 04 20 35	See discussion, page 51
53	May 16	IIv	eP _{NEZ} ez e _E i _{NZ} i _Z i _{NZ} eS _{NZ} iS _E F	AH 02 37 32.0 G 02 37 33.0 G 02 37 34.0 G 02 37 39.0 G 02 38 10.5 G 02 38 22.0 AH 02 38 24.0 G 02 38 26.0 03 11	See discussion, page 51



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
1941					
54	May 16	Iv	eE eN F	A 02 41 17 A 02 41 20.8 02 44	Superimposed on trace of preceding quake. Aftershock?
55	May 16	Iv	eP ^{NEZ} ez e ^{NEZ} eN eE e ^{SN} ez iE F	G 04 51 59 G 04 52 41.0 AH 04 52 49 G 04 53 12 G 04 53 35.0 A 04 53 46 G 04 54 27.5 G 04 55 02.5 05 11	Aftershock? At Ferndale this shock and the previous one do not appear to be distinct. Perhaps both are part of a more distant earth quake.
56	May 16	Iu	eE ePP ^Z eE eSKS ^Z eE eN iPPS ^Z eE eN iE F	G 07 30 49 G 07 32 15.5 G 07 32 28.5 G 07 38 31.0 G 07 39 31.0 G 07 39 37.0 G 07 42 38.5 G 07 58 G 07 59.9 G 08 09.8 09 41	URSS:- 24.5 N 101.5 E SKKS
57	May 16	I	eE eN F	G 13 39.1 G 13 39.4 13 51	Surface waves.
58	May 17	IIu	eP ^{NEZ} iP ^{NE} iz ipP ^Z iE iE iz iSKS ^{NE} iSKS ^N eL ^Z eL ^N eL ^N F	AH 02 37 16 G 02 37 17.5 G 02 37 26.0 G 02 37 30.0 G 02 42 11.5 G 02 46 44.5 G 02 47 25.0 AG 02 47 33.0 A 02 47 38.0 G 02 55.9 G 02 57.4 A 02 58.1 06 51	U.S.C. & G.S. epicenter:- 12.9° S 166.7 E
59	May 17	I	eE eN F	G 09 21.4 G 09 23.4 09 46	Surface waves.
60	May 19	I	eL ^{NE} ez F	G 21 46.3 G 21 48.4 21 53	

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
61	May 20	I	eN F	A 06 27 14 06 28	
62	May 23	I	eZ eE eN F	G 20 09 42.5 G 20 42.2 G 20 42.7 21 06	"Strong at Smyrna" - Pasadena
63	May 23	I	eNE F	G 23 27.7 23 46	Surface Waves
64	May 24	Iu	eLE F	G 06 04.6 06 35	URSS:- 5°5 S 135°5 E
65	May 25	Iu	eN eE eLE eLN F	G 01 40 57.0 G 01 40 59.0 G 01 50.6 G 01 51.6 02 31	"Near Apia" - Pasadena
66	May 28	IIv	eP _{NEZ} iP _{EZ} i _{NEZ} i _{NE} iz F	AGH 06 23 46.5 AH 06 23 47.0 AH 06 23 54.0 G 06 24 09.0 G 06 24 10.0 06 26	See discussion, page 52
67	May 29	Id	iP _Z iS _{NEZ} F	H 01 04 39.0 AH 01 04 43.0 01 05	See discussion, page 52
68	May 29	Iu	eN eNE eLN eLE eZ F	G 11 33 09.5 G 11 41 59.5 G 11 56.0 G 11 56.5 G 12 02.5 13 30	S?
69	May 29	Id	iP _Z iS _{NEZ} F	H 13 53 43.5 AH 13 53 48.0 13 54	See discussion, page 52
70	May 30	I	eN F	A 00 43 30.4 00 44	
71	May 30	Iu	eP _Z eE eS _{NE} eL _{NE} eL _Z F	G 17 41 39.5 G 17 42 10.5 G 17 51 35.5 G 18 00.9 G 18 04.4 19 50	Pasadena:- "Roughly 15°S 178°W"



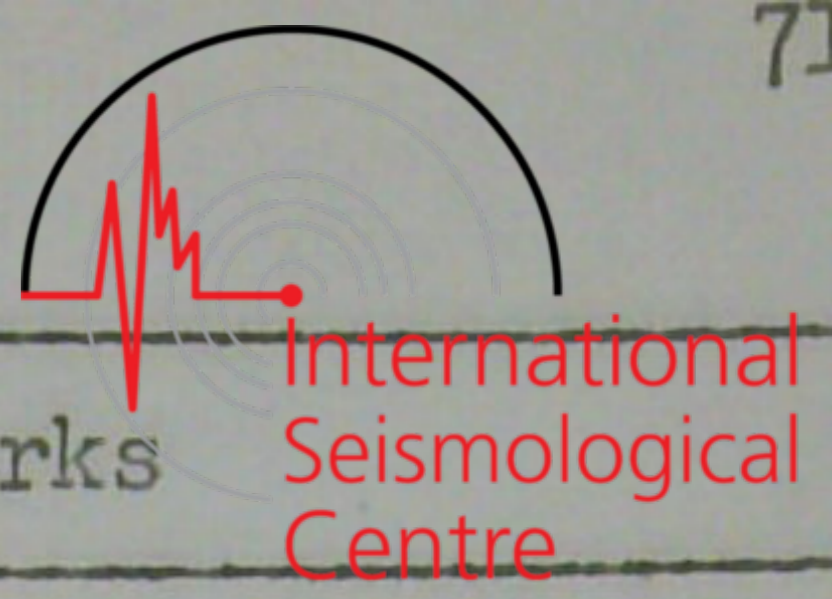
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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
72	May 30	Iu	ePE iPZ iSNE F	G 21 39 39.0 G 21 39 45.0 G 21 48 56.5 22 03	
73	May 31	Id	iPZ eN eSZ F	H 01 02 44.5 A 01 02 53.0 H 01 02 55.0 01 04	See discussion, page 52
74	May 31	Iu	ePNZ eLNE F	AGH 02 30 04 G 02 59.4 03 05	
75	May 31	Iu	eZ eE eSNE eLNE eLZ F	G 05 07 59.0 G 05 08 03.0 G 05 17 40.5 G 05 28.5 G 05 29.5 06 35	P?
76	June 1	Iu	eN eE eLE eLN eLZ F	G 03 35 40.5 G 03 35 46.5 G 03 45.0 G 03 45.9 G 03 48.4 04 20	
77	June 1	Iu	eZ eN eE eN eLN eLZ eLE F	G 07 09 25.5 G 07 09 27.5 G 07 09 46.0 G 07 11 30.5 G 07 19.9 G 07 20.6 G 07 20.9 07 58	
78	June 2	I	eNE F	G 02 26.5 02 33	Surface waves.
79	June 2	I	eE F	G 04 28.9 04 32	Surface waves.
80	June 3	I	eNE F	G 18 58.9 19 10	Surface waves.
81	June 4	I	eN eN F	A 08 48 37 A 08 48 42 08 50	



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
82	June 6	I	iz eLN eLE eLz F	G 21 21 55.5 G 21 36.7 G 21 37.7 G 21 40.7 21 47	
83	June 7	Iv	eSN eN F	A 01 32 48 A 01 32 54 01 34	Near Simpson, Nevada.
84	June 7	Iv	eN F	A 02 19 45 02 21	IV at Independence, California
85	June 9	IIIv	eN iE iz iSE iSNZ iNZ iMNE F	G 04 18 18 G 04 18 19.5 G 04 18 48.5 G 04 18 50.5 G 04 19 04.0 G 04 19 58.0 G 04 20 07.0 04 25	JSA epicenter:- 42°5 N 125°0 W
86	June 9	IIv	ePz eN eLN F	H 06 18 49 A 06 19 45 A 06 20 06 37	JSA epicenter:- 42°5 N 125°0 W
87	June 9	IIv	eN eE eNZ iNE iSN iN iz iLNE F	G 08 44 55 G 08 45 03 AH 08 45 10 G 08 45 23.0 A 08 46 10.0 G 08 46 26.0 G 08 46 30.5 AG 08 46 35.0 09 40	JSA epicenter:- 42°5 N 125°0 W
88	June 10	I	iz iz F	H 01 34 29.0 H 01 34 49.0 01 35	
89	June 10	Iu	ePz eLNE ez F	H 10 46 06.4 G 10 55.6 G 10 56.1 11 10	Florissant epicenter:- 17°5 N 104°2 W
90	June 11	Iv	eN eN eNZ eE F	A 06 33 40.0 A 06 34 21.0 G 06 34 47.0 G 06 34 52.5 06 50	



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
91	June 12	Iv	ePz iSNZ F	H 23 49 37.0 AH 23 49 49.0 23 51	See discussion, page 52
92	June 14	Iv	iPz eS _Z iS _Z F	H 00 43 16.0 H 00 43 31.0 H 00 43 32.0 00 45	See discussion, page 53
93	June 14	Id	eP _Z eS _Z eN F	H 17 08 32.0 H 17 08 44.5 A 17 08 48.0 17 10	See discussion, page 53
94	June 16	Iu	eE eN eZ F	G 21 43.4 G 21 44.4 G 21 45.2 21 50	Surface waves.
95	June 18	Iu	iPz eE eZ eN eN eS _N iS _E iSSSE iN eN iZ eL _E eL _N eL _Z eZ F	G 11 19 20.5 G 11 19 23.5 H 11 19 24.5 G 11 19 26.0 A 11 19 27.0 C 11 27 37.0 G 11 27 43.0 G 11 33 08.0 G 11 33 48.5 A 11 34 08.0 G 11 34 11.5 G 11 36.1 G 11 37.4 G 11 38.3 H 11 48 56.0 12 50	U.S.C. & G.S. epicenter:- 51.5 N 32.0 W P'P'
96	June 18	Id	eN eN F	A 23 29 59.0 A 23 29 59.1 23 31	See Mt. Hamilton report.
97	June 20	I	eE eN eZ F	G 09 21.0 G 09 21.3 G 09 22.8 09 35	Surface waves.
98	June 21	I	iPz F	H 00 48 06.0 00 49	



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
99	June 21	I	eN eE eZ F	G 09 21.8 G 09 23.3 G 09 29.3 09 45	Surface waves.
100	June 21	Iu	ePz eN iz eZ eN iS _{NE} iz eN F	G 17 52 34.5 A 17 52 40.0 H 17 52 41.5 H 17 54 47.0 A 17 54 50.0 G 18 01 54.5 G 18 01 56.5 A 18 02 14 18 15	Pasadena:- "Deep" 22°S 178°W
101	June 23	Iu	eNE eN eL _E eL _Z F	G 09 57.7 G 10 15.3 G 10 21.7 G 10 25.0 11 10	URSS:- 3.4 S 119° E
102	June 24	Id	iP _Z eS _N F	H 02 53 06.0 A 02 53 15.0 02 54	See discussion, page 53
103	June 26	IIIu	ePz eP ^{''} z iP ^{''} NZ eE eE eN ePPN iPPEZ iPPz iN eN eZ eN eSSN eSSE eGN eE eG ₂ E F	G 12 07 05.5 H 12 10 58.5 AG 12 10 59.0 A 12 11 00.0 G 12 11 04 G 12 11 06 A 12 12 23.0 GH 12 12 26.0 G 12 12 28.5 G 12 12 31.0 A 12 18 07.5 H 12 21 05.5 A 12 21 19 A 12 28 49.5 A 12 28 57.5 A 12 42.6 A 12 56.1 A 13 20.1 16 15	U.S.C. & G.S. epicenter:- 13°N 95°E Manila:- 8°N 91°E SKS?
104	June 26	Iv	iP _Z eS _N F	H 18 15 55.5 A 18 16 06.0 18 17	See discussion, page 53



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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
105	June 27	Iu	eN eE eZ F	G 08 44.1 G 08 49.6 G 08 55 09 50	Surface waves. Wellington:- 26°S 137°E
106	June 27	Iu	eNE F	G 14 21.6 14 50	Surface waves.
107	June 27	Ir	iSN iSE iScPE iN eLN eLE eLZ F	G 17 23 07.0 G 17 23 09.0 G 17 24 20.5 G 17 28 07.0 G 17 29.1 G 17 29.4 G 17 30.1 18 02	U.S.C. & G.S. epicenter:- 16°N 93°W ScS
108	June 29	I	eE eN eNEZ F	G 06 14 08.0 G 06 19 56.0 G 06 26.0 07 10	
109	June 29	Id	iPZ iSNZ F	H 18 59 41.0 AH 18 59 42.5 19 00	See discussion, page 53
110	June 29	Iu	iPZ iNE eN eLE eLN eLZ F	G 22 18 19.0 G 22 29 59.0 G 22 42 46.5 G 22 45.9 G 22 46.2 G 22 47.0 23 35	Wellington:- 20°S 168°E S?
111	June 30	Iu	ePZ eE eLN eLE eLZ F	G 16 54 42.5 G 17 03.6 G 17 09.5 G 17 10.8 G 17 11.7	Lost in next shock.
112	June 30	I	eN eE eEZ F	G 17 56.7 G 17 57.0 G 18 11.0 18 45	

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



CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

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

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 ₀	ε
Wood-Anderson	E	3000	1	15
	N	3000	1	15



MT. HAMILTON

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
1	April 1	IIId	iP _{NE} iN iS _{NE} F	07 06 40.5 07 06 41.0 07 06 45.5 07 08	See discussion, page 49
2	April 1	Id	e?N iP _{NE} iS _E iS _N F	07 42 23 07 42 24.0 07 42 26.0 07 42 28.0 07 43	See discussion, page 49
3	April 1	Id	eP _N eE iS _E iS _N F	09 07 49.5 09 07 51.0 09 07 54.0 09 07 54.5 09 09	See discussion, page 49
4	April 1	Ir	eP _{NE} eL _E eL _N F	10 47 02 10 54.1 10 55 11 27 ca	U.S.C. & G.S. epicenter:- 56°0 N 153°0 W
5	April 1	Id	eP _{NE} iP _{NE} iS _N iS _E F	11 35 14.5 11 35 16.0 11 35 19.0 11 35 19.5 11 37	See discussion, page 49
6	April 3	I	eN eN eNE F	00 37 57 00 38 11 00 38 18 00 40	
7	April 3	Iu	eP _{NE} eS _E eS _N F	15 06 59.5 15 16 05.5 15 16 39 15 19	
8	April 3	Iu	eP _{NE} eS _{NE} eN eE F	15 33 19.5 15 43 05.0 15 44 43.0 15 44 51.5 15 51	U.S.C. & G.S. epicenter:- 25°S 69°W h = 200 km.
9	April 5	IIv	eP _{NE} iS _{NE} F	12 41 35.5 12 42 03.0 12 45	See discussion, page 49
10	April 5	Id	iP _{NE} iS _{NE} F	22 55 22.5 22 55 24.5 22 56	See discussion, page 49



MT. HAMILTON

No.	Date	Character	Phase	Time (U.T.)	Remarks
	1941				
11	April 6	Id	iNE iNE F	00 11 02.5 00 11 03.0 00 12	See discussion, page 49
12	April 6	Id	iPN iPE iSN iSE F	04 00 28.5 04 00 29.0 04 00 30.5 04 00 31.0 04 01.2	See discussion, page 49
13	April 7	Ir	eP _{NE} eSN eSE eN eM _N F	23 37 16.0 23 43 57.5 23 43 58.0 23 49.2 23 56 00 37 ca	U.S.C. & G.S. epicenter:- 17.6 N 78°3 W Strong in Jamaica.
14	April 9	Ir	eNE eE iE iN eLE F	17 11 03.5 17 13 13.5 17 13 27.5 17 13 21.5 17 01.4 17 27	Pasadena:- "Roughly 31°N 114°W" "Felt slightly at San Diego."
15	April 9	Ir	eN eE F	17 44 34.0 17 44 37.0 17 46	Aftershock of previous quake.
16	April 11	Iv	eP _{NE} eSN F	20 33 15.0 20 34 18.0 20 38	
17	April 13	Iv	eN eE eN eE F	12 36 56.5 12 37 26.5 12 37 52.5 12 37 55.0 12 40	
18	April 14	IIId	iP _{NE} iNE iSE F	16 16 58.5 16 17 01.0 16 17 04.0 16 21	See discussion, page 49
19	April 15	IIr	eP _{NE} eSN eSE eLE eL _N F	19 15 15.5 19 19 29.5 19 19 38.5 19 21.4 19 21.6 20 27	Destructive in Mexico. Tacubaya epicenter:- 18° 17' N 103° 19' W



MT. HAMILTON

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
20	April 15	I	eNE F	19 51 23 19 54	Superimposed on coda of previous shock.
21	April 23	Id	ePN eSN iSE F	11 56 41.0 11 56 44.0 11 56 44.5 11 58	See discussion, page 49
22	April 25	Ir	eE eN eSN eSE F	12 14 46 12 14 49.0 12 18 41.0 12 18 44.5 12 24	J.S.A. epicenter:- 27°N 115°W
23	April 27	Id	ePN eE iSNE F	17 06 26.5 17 06 27.0 17 06 35.7 17 08	See discussion, page 50
24	April 27	I	eN eE eN eE F	19 05 51.5 19 05 55.5 19 06 00.2 19 06 01.7 19 07	
25	April 27	Id	ePE eN eSNE F	20 51 00.5 20 51 01.0 20 51 11.0 20 52	See discussion, page 50
26	April 28	Ir	ePE ePN eLE eLN F	19 49 00.5 19 49 01.0 19 57.4 19 58.7 20 05	Damage in Mexico according to Pasadena.
27	April 30	Id	ePNE iSE F	01 39 51.0 01 39 56.0 01 41	See discussion, page 50
28	April 30	Iu	ePN eNE F	09 57 19.4 10 23.1 10 33	URSS:- 33°0 N 143°5 E
29	May 1	Iv	ePNE iNE iSNE F	13 29 55.5 13 30 23.5 13 30 29.0 13 33	See discussion, page 50



MT. HAMILTON

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
30	May 3	Iv	eN F	14 40 49.0 14 43	
31	May 5	Iu	ePNE F	15 30 17.0 15 32	URSS:- 46°5 N 128° E
32	May 6	Iv	eE eN eN eE F	03 13 38.5 03 13 41.0 03 14 44.5 03 14 46.0	Boulder City epicenter:- 37° 25' N 114° 00' W Felt at Joseca and Caliente, Ne Lost in next shock
33	May 6	Iv	eE eN F	03 16 14.5 03 16 15.0 03 18	Aftershock of preceding quake.
34	May 7	Iu	eNE F	12 32 13.0 12 34	Wellington epicenter:- 20°S 172°E
35	May 8	Iu	ePNE eSN eSE F	10 32 44.5 10 41 48.0 10 41 49.5 10 47	Wellington epicenter:- 18°S 178°W h=550 km.
36	May 9	IIId	iPNE iSNE F	19 42 20.0 19 42 22.0 19 44	See discussion, page 50
37	May 11	Id	iPNE iSNE F	07 43 33.5 07 43 35.5 07 44	See discussion, page 50
38	May 12	Id	iPNE iSNE F	11 49 32.5 11 49 34.0 11 50	See discussion, page 50
39	May 13	IIv	ePNE iPN iPE eSNE eLNE F	16 02 56.5 16 02 57.5 16 02 58.0 16 03 57.5 16 05.6 17 03	See discussion, page 50
40	May 13	Iv	ePNE eSNE F	20 33 23.5 20 34 22.0 20 35	See discussion, page 51
41	May 15	Id	iPNE iSNE F	00 59 37.5 00 59 39.1 01 01	See discussion, page 51



MT. HAMILTON

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
42	May 15	Iv	ePNE iPNE eSNE iSNE F	03 29 43.0 03 29 45.0 03 29 59.0 03 30 03.0 03 31	See discussion, page 51
43	May 15	Iv	eP*NE ePNE iSN F	06 00 35.0 06 00 38.0 06 00 52.0 06 02	See discussion, page 51
44	May 15	Iv	ePN eSNE F	15 47 15.0 15 47 21.5 15 48	See discussion, page 51
45	May 15	Id	iPN iSNE F	16 16 15.0 16 16 23.5 16 17	See discussion, page 51
46	May 16	Iv	ePNE iSNE F	02 37 42 02 38 41 02 50	See discussion, page 51
47	May 16	Iv	ePNE eSNE F	04 50 35.0 04 51 34.0	Aftershock? Lost in next shock.
48	May 16	Iv	ePNE eSN eSE F	04 52 59.0 04 53 58.5 04 53 59.5 04 56	Aftershock?
49	May 17	Iu	ePNE iPN eSE eLNE F	02 37 15.5 02 37 18.0 02 47 37.5 03 01.5 04 01	U.S.C. & G.S. epicenter:- 12°9 S 166°7 E
50	May 17	Id	iPNE iSNE F	14 19 36.0 14 19 38.0 14 20	See discussion, page 51
51	May 23	Iv	eNE iSNE F	23 30 39.5 23 30 56.5 23 32	
52	May 24	Id	ePNE iSNE F	14 13 04.0 14 13 06.0 14 14	See discussion, page 51

MT. HAMILTON

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
53	May 24	Id	eP _E iS _{NE} F	04 01 05.5 04 01 07.0 04 02	See discussion, page 52
54	May 26	IIId	eP _{NE} iS _{NE} F	15 53 46.0 15 53 47.5 15 55	See discussion, page 52
55	May 28	Iv	eP _E eS _{NE} F	01 58 13 01 58 25.5 01 59	See discussion, page 52
56	May 28	IIId	iP _{NE} iS _{NE} F	06 23 37.5 06 23 42.1 06 27	See discussion, page 52
57	May 29	Iv	e _{NE} iS _{NE} F	01 04 55 01 05 07.0 01 06	See discussion, page 52
58	May 29	I	e _{NE} F	12 41 04 12 42	
59	May 29	Id	e _{NE} e _{SN} e _E F	13 53 52 13 54 00.5 13 54 01.5 13 55	Very weak. See discussion, page 52
60	May 29	Id	eP _{NE} iS _{NE} F	14 20 09.5 14 20 13.0 14 23	See discussion, page 52
61	May 29	I	e _N e _E e _N e _E F	22 21 04.5 22 21 07.5 22 21 18.0 22 21 19.5 22 22	
62	May 30	Id	iP _{NE} iS _N F	03 01 24.0 03 01 25.5 03 02	See discussion, page 52
63	May 31	IIId	iP _{NE} iS _N F	01 02 33.0 01 02 35.0 01 04	See discussion, page 52
64	May 31	Iu	eP _{NE} F	02 30 05 02 31	

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
65	May 31	Id	ePN eS _{NE} F	11 19 05.5 11 19 09.0 11 20	See discussion, page 52
66	June 4	Iv	eN eNE F	07 50 22 07 50 46 07 53	
67	June 4	I	eNE iNE F	08 36 47 08 36 59.5 08 38	
68	June 4	Iv	eP _{NE} eS _{NE} F	08 48 09.0 08 48 41.0 08 52	Pasadena epicenter west of Bakersfield
69	June 5	I	eE F	18 46 55.0 18 48	
70	June 6	Iv	eN eNE F	19 40 43 19 41 14 19 44	Nevada, Boulder City epicenter:- 37°1 N 115°7 W
71	June 7	Iv	eNE iS _{NE} F	01 32 19 01 32 45.0 01 34	Near Simpson, Nevada.
72	June 8	Iv	eP _{NE} eS _N iS _{NE} F	02 18 54 02 19 23.5 02 19 31.0 02 21	IV at Independence.
73	June 8	Id	iP _{NE} iNE F	01 20 32.5 01 20 34.0 01 21	See discussion, page 52
74	June 9	Iv	eE iNE eS _{NE} iS _{NE} eL _{NE} F	06 19 01 06 19 06.0 06 20 03.0 06 20 09.0 06 20.6 06 39	JSA epicenter:- 42°5 N 125°0 W
75	June 9	Iv	eNE eS _{NE} eL _{NE} F	08 45 17 08 46 26 08 47.1 09 02	JSA:- 42°5 N 125°W
76	June 9	I	eN eNE F	19 24 03 19 24 11 19 25	IV at Pinnacles.

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
77	June 9	Iv	eN eN eE F	21 35 33 21 35 46 21 35 50 21 37	
78	June 10	I	eN F	01 35 09 01 36	
79	June 10	Iu	eNE F	10 46 02.0 10 48	Florissant epicenter:- 17°5 N 104°0 W
80	June 11	Iv	eNE eNE eL _{NE} F	06 33 38 06 34 43.0 06 36 06 47	
81	June 12	Iv	eNE eN F	04 33 57 04 33 39 04 36	
82	June 12	IIId	iP _{NE} iS _{NE} F	23 49 27.0 23 49 32.0 23 51	See discussion, page 52
83	June 14	Id	iP _{NE} iS _{NE} F	00 43 03.0 00 43 08.0 00 45	See discussion, page 53
84	June 16	Iv	eNE iNE F	20 40 30 20 40 42.0 20 42	
85	June 18	Iu	eP _{NE} eS _N eL _{NE} eL	11 19 25.5 11 27 36 11 34.1 11 47 20.0	U.S.C. & G.S. epicenter:- 51°5 N 32°0 W P'P'?
86	June 18	I	eN F	11 33 24 11 35	
87	June 18	Iv	eP _N eS _{?NE} F	23 29 15 23 29 30 23 31	Epicenter probably about 75 miles from Lick Observatory.
88	June 19	I	eNE F	10 11 36.5 10 13	
89	June 20	Id	eP _{NE} iS _{NE} F	22 34 40.5 22 34 42.0 22 35	See discussion, page 53


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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
90	June 21	Iu	ePNE F	00 48 10.5 00 50	Felt in Guam according to Manila.
91	June 21	Iu	ePNE eSE eSN F	17 52 43.0 18 01 56.5 18 01 59.0 18 04	Pasadena epicenter:- 22°S 178°W
92	June 24	Iv	eP̄N eNE iNE F	02 53 10.5 02 53 27 02 53 31 02 55	See discussion, page 53
93	June 24	Id	eP̄NE iSNE F	20 32 28.5 20 32 31.0 20 33	See discussion, page 53
94	June 26	Iu	eP'NE ePPE ePPN eNE eN eE eN eSSE eLN eE eG ₂ N F	12 11 00.5 12 12 24.5 12 12 26.0 12 18 05.0 12 21 07.5 12 21 16.0 12 24 71.5 12 28 58.5 12 44.2 12 44.7 13 22.2 14 02	U.S.C. & G.S. epicenter:- 13°N 95°E PPS?
95	June 27	Id	eP̄NE iSNE F	02 15 48.0 02 15 53.5 02 17	See discussion, page 53
96	June 27	Id	eP̄N iSNE F	11 49 45.0 11 49 49.0 11 51	See discussion, page 53
97	June 29	Id	ePNE iSNE F	18 05 53.0 18 05 54.5 18 07	



PALO ALTO

THE BRANNER STATION, STANFORD UNIVERSITY
PALO ALTO, CALIFORNIA

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Latitude and longitude:

$$\phi = 37^{\circ} 25' 1'' \text{ N.}$$
$$\lambda = 122^{\circ} 10' 8'' \text{ W.}$$

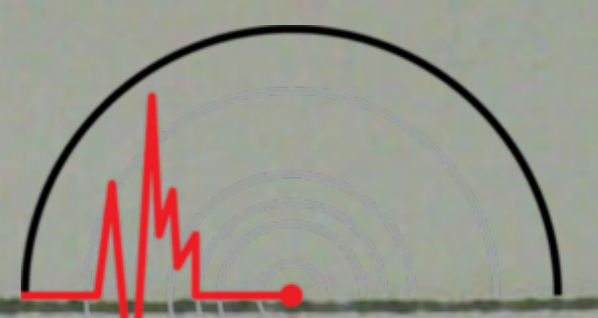
Time -- All determinations are reduced to Universal Time.

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

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Apparatus	Component	V	T ₀	ε
Wood-Anderson	E	3000	1	15
	N	3000	1	15

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
1	April 1	IIId	iP _E eP _N iNE iS _{NE} iN F	07 06 41.5 07 06 42.0 07 06 43.5 07 06 46.5 07 06 49.5 07 10	See discussion, page 49
2	April 1	Id	eE iE F	09 07 53.0 09 07 55.5 09 08	See discussion, page 49
3	April 1	IIId	eP _{NE} iP _N iE iS _{NE} F	07 06 41.0 07 06 43.5 07 06 44.0 07 06 46.0 07 08	See discussion, page 49
4	April 1	Ir	eNE F	10 54.5 11 07	U.S.C. & G.S. epicenter:- 56°0 N 153°0 W
5	April 1	Id	eP _{NE} iS _E iN iE F	11 35 16.0 11 35 19.5 11 35 21.0 11 35 21.5 11 36	See discussion, page 49
6	April 3	Iu	eP _{NE} iP _N iE iN eE eS _{NE} F	15 33 21.5 15 33 24.5 15 33 40.0 15 33 48.5 15 33 54.5 15 43 12.5 15 47	U.S.C. & G.S. epicenter:- 25°S 69°W h = 200 km. Felt in Chile.
7	April 5	Iv	eN eE iP _E iNE iE iN F	12 41 42.0 12 41 43.0 12 41 45.0 12 41 53.0 12 42 10.5 12 42 14.5 12 43	See discussion, page 49
8	April 7	IIr	eP _N eP _E eN iP _E iE eS _E eS _N eL _E eL _N eM _{NE} F	23 37 20.0 23 37 22.0 23 37 32.0 23 37 32.5 23 39 12.0 23 43 50.0 23 43 50.5 23 47.1 23 47.6 23 55.8 24 35 ca.	U.S.C. & G.S. epicenter:- 17°6 N 78°3 W Strong in Jamaica.

PALO ALTO

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
9	April 9	IIr	eSN eN eE iE iN iE iN eLE F	17 13 20.5 17 13 27.0 17 13 38.5 17 13 46.5 17 13 49.0 17 14 31.0 17 14 35.5 17 14 48 17 25	Pasadena epicenter:- "Roughly 31° N 114° W" Felt slightly at San Diego.
10	April 13	Id	ePNE iE iSN F	18 15 19.5 18 15 21.0 18 15 22.0 18 16	See discussion, page 49
11	April 14	IIId	iPNE iSNE F	16 16 58.5 16 17 04.5 16 21	See discussion, page 49
12	April 14	I	iPNE iSNE F	20 55 45.0 20 55 47.0 20 56	See discussion, page 49
13	April 15	IIr	iPE ePN eSNE eLNE F	19 15 19.0 19 15 20.0 19 19 41.0 19 21.3 20 20 ca	Tacubaya epicenter:- 18° 17' N 103° 19' W Destructive in Mexico
14	April 19	IIId	iPNE iNE iSN F	19 00 30.0 19 00 31.0 19 00 32.5 19 02	See discussion, page 49
15	April 24	Id	iPNE iN eSNE iSNE F	19 28 30.5 19 28 31.5 19 28 32.5 19 28 33.5 19 29	See discussion, page 50
16	April 25	I	eE eN F	12 14 46.0 12 14 46.5 12 15	
17	April 25	Id	ePNE iNE eSNE F	16 36 51.5 16 36 52.5 16 36 54.0 16 37	See discussion, page 50

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No.	Date	Char-acter	Phase	Time (U. T.)	Remarks
	1941				
18	April 27	Id	e _{NE} i _{SNE} F	17 06 28.5 17 06 35.5 17 08	See discussion, page 50
19	April 27	I	e _N e _E e _{NE} F	19 06 02.5 19 06 06.5 19 06 16.0 19 07	
20	April 27	Id	e _{SNE} i _{MNE} F	20 50 59 20 51 02.0 20 52	See discussion, page 50
21	April 28	Id	e _{PE} i _{SE} i _{ME} F	20 27 00.0 20 27 02.5 20 27 03.5 20 28	See discussion, page 50
22	May 1	Iv	e _{PE} i _{SN} F	13 29 53 13 30 28.0 13 32	See discussion, page 50
23	May 5	Id	e _{PE} i _{PE} i _{SNE} F	15 17 59.5 15 18 01.0 15 18 02.5 15 19	Very small. See discussion, page 50
24	May 7	Iu	e _E e _N e _N e _E F	12 32 21.5 12 32 22.5 12 38 27.5 12 38 29 12 40	Wellington epicenter:- 20° S 172° E h = 130 km.
25	May 7	Iv	e _{PN} e _{SN} F	16 18 22 16 18 51.5 16 21	Pasadena epicenter:- 34° 33' N 120° 47' W
26	May 8	Iu	e _{PNE} i _{PNE} e _{SN} e _{SE} F	10 32 43.0 10 32 54.5 10 41 54.5 10 41 55.5 10 46	Wellington epicenter:- 18° S 178° W h = 550 km.
27	May 9	Id	e _{PNE} i _{SNE} i _{MNE} F	19 42 24.0 19 42 29.5 19 42 38.0 19 45	See discussion, page 50

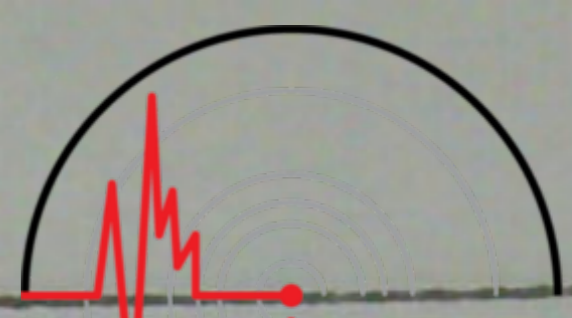
No.	Date	Character	Phase	Time (U.T.)	Remarks
	1941				
28	May 10	Id	ePE iPNE iSNE F	18 01 11.0 18 01 12.0 18 01 13.5 18 02	See discussion, page 50
29	May 13	IIv	iPNE iSE iSN iLNE F	16 02 50.0 16 03 46.0 16 03 46.5 16 07.9 16 16	See discussion, page 50
30	May 13	Iv	ePNE eSNE F	20 33 18 20 34 13 20 36	See discussion, page 51
31	May 13	IIId	iPNE iSNE F	22 00 57.5 22 00 59.5 22 02	See discussion, page 51
32	May 14	Id	ePNE iSNE F	18 09 36.0 18 09 38.0 18 10	See discussion, page 51
33	May 15	Iv	eE eE eN F	03 29 53 03 30 19 03 30 21 03 32	See discussion, page 51
34	May 15	Iv	eE eN eN F	06 00 55 06 01 11 06 01 15 06 02	See discussion, page 51
35	May 16	Iv	eNE iSNE F	02 37 39 02 39 34.0 02 50	See discussion, page 51
36	May 16	Iv	ePNE eSNE F	04 50 31 04 51 26 04 53	Aftershock?
37	May 16	Iv	ePNE eSNE F	04 52 57 04 53 50 04 56	Aftershock?
38	May 16	Iu	ePE eSNE eLN F	02 37 17 02 46 56 03 01 03 37	U.S.C. & G.S. epicenter:- 12°9 S 166°7 E

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
39	May 20	I	eN F	06 27 09.5 06 28	
40	May 22	Id	iPNE iNE iSNE F	17 53 30.0 17 53 31.5 17 53 33.0 17 56	See discussion, page 51
41	May 23	IIId	iPNE iSNE F	14 34 22.5 14 34 23.7 14 35	See discussion, page 51
42	May 25	Id	ePE iN iE iSNE F	00 25 08.0 00 25 09.5 00 25 10.0 00 25 12.0 00 26	See discussion, page 51
43	May 26	Id	eE eE F	15 54 00 15 54 09 15 55	See discussion, page 52
44	May 28	IIId	iPNE iSNE F	06 23 41.0 06 23 48.5 06 27	See discussion, page 52
45	May 29	I	eE eNE F	22 21 30 22 21 38 22 23	
46	May 30	I	eE F	00 43 36 00 45	
47	May 31	Iv	ePNE iNE F	01 02 39.0 01 03 54.0 01 04	See discussion, page 52
48	June 2	Id	ePNE iNE iSE F	23 39 52 23 39 53.5 23 39 54.5 23 41	See discussion, page 52
49	June 4	Iv	eNE eNE F	08 36 58 08 37 18 08 38	
50	June 4	Iv	eNE eNE F	08 48 40 08 49 12 08 51	Pasadena epicenter west of Bakersfield.

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
51	June 7	Iv	eE eSNE F	01 32 36.5 01 32 53 01 34	Near Simpson, Nevada
52	June 8	Iv	eE F	02 19 38 02 21	Felt in Independence, Calif.
53	June 9	Iv	eE eNE iSNE eLNE F	06 18 58 06 19 10 06 20 11 06 21.1 06 34	JSA epicenter:- 42°5 N 125°0 W
54	June 9	Iv	eE eSE iSE eN eLNE F	08 45 13 08 46 15 08 46 20 08 46 27 08 47.3 08 57	JSA epicenter:- 42°5 N 125°0 W
55	June 9	IIId	iP _{NE} iS _{NE} F	17 30 32.0 17 30 33.5 17 31	See discussion, page 52
56	June 11	I	eE eE F	06 33 37 06 34 35 06 36	
57	June 12	IIId	iP _{NE} iS _E iS _N F	23 49 31.0 23 49 37.0 23 49 38.0 23 51	See discussion, page 52
58	June 13	Id	eP _E iE iS _{NE} F	15 53 20.5 15 53 22.0 15 53 23.5 15 54	See discussion, page 53
59	June 13	Id	eE iNE F	23 11 40.0 23 11 44.0 23 12	
60	June 14	Id	e _{NE} iS _{NE} F	00 43 10.0 00 43 20.0 00 44	See discussion, page 53
61	June 14	Id	e _E e _E iS _E F	17 08 24.5 17 08 30 17 08 31.5 17 09	See discussion, page 53

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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
62	June 18	Iu	e _{NE} e _{NE} F	11 19 27 11 45 ca 11 51	U.S.C. & G.S. epicenter:- 51.5° N 32.0° W
63	June 18	Iv	i _E i _{NE} F	23 29 25.5 23 29 40.0 23 30	See Mt. Hamilton report
64	June 19	IIId	i _{P_{NE}} i _{S_{NE}} F	00 02 30.0 00 02 31.5 00 03	See discussion, page 53
65	June 21	Iu	e _{PN} F	00 48 08 00 49	Felt in Guam according to Manila.
66	June 24	Iv	e _{P_E} e _N F	02 53 12 02 53 30 02 54	See discussion, page 53
67	June 25	Id	e _{P_E} e _{S_{NE}} i _{S_{NE}} F	18 01 25.0 18 01 25.5 18 01 26.5 18 02	See discussion, page 53
68	June 26	Iu	e _{P'_{NE}} i _N i _{PP_N} e _N e _{NE} e _{SS_E} e _N e _E e _{G_{2N}} F	12 10 59.5 12 11 10.0 12 11 55.0 12 17 52.5 12 21 06 12 28 45 12 51.2 12 55.5 13 20.5 13 58	U.S.C. & G.S. epicenter:- 13° N 95° E. SKS?
69	June 26	Id	e _{P_E} i _{S_{NE}} F	21 16 14 21 16 15.0 21 17	See discussion, page 53
70	June 27	Id	e _{P_{NE}} i _{S_{NE}} F	02 15 48.0 02 15 54.0 02 17	See discussion, page 53

SAN FRANCISCO

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



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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.

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Apparatus	Component	V	T ₀	ε
Wood-Anderson	E 15° S	1500	1	15
	N	3000	1	15

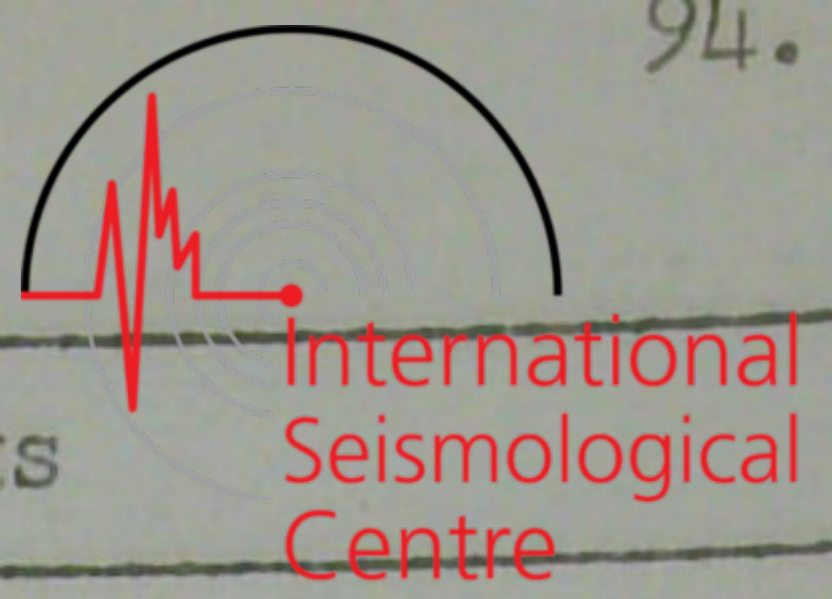
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No.	Date	Char-acter	Phrase	Time (U.T.)	Remarks
	1941				
1	April 1	IIId	i \bar{P}	07 06 ca	See discussion, page 49 S-P = 8 sec
2	April 1	I	e _{NE} F	11 00 ca 11 25 ca	Surface waves
3	April 1	Id	e \bar{P}	11 35 ca	See discussion, page 49 S-P = 8 secs.
4	April 3	Iu	e _{PNE} e _{SNE} F	15 34 ca 15 44 ca 15 47 ca	U.S.C. & G.S. epicenter:- 25°S 69°W
5	April 5	Iv	e _{PNE}	12 42 ca	See discussion, page 49 e-P = 30 secs.
6	April 7	Ir	e _{PNE} e _{SNE} F	23 37 ca 23 43 ca 24 14 ca	U.S.C. & G.S. epicenter:- 17°6 N 78°3 W S-P = 6m. 35s.
7	April 9	Ir	e _{NE} F	17 13 ca 17 20 ca	Pasadena:- Roughly 31°N 114°W
8	April 14	IIId	i \bar{P} _{NE}	16 17 ca	See discussion, page 49 S-P = 10 secs.
9	April 15	Ir	i _{PNE} e _{SNE} F	19 14 ca 19 18 ca 20 08 ca	Tacubaya epicenter:- 18° 17' N 103° 19' W
10	April 15	I	e _{NE} F	19 50 ca 19 54 ca	Superimposed on preceding shock
11	April 27	Id	e _E e _{SNE} F	17 06 29 17 06 32 17 08	See discussion, page 50
12	April 27	Id	e \bar{P} _E i \bar{S} _{NE} F	20 50 43.0 20 50 50.0 20 52	See discussion, page 50
13	April 28	I	e _N F	19 49 16 19 52	
14	May 1	Iv	e \bar{P} _N i \bar{S} _{NE} i _N F	13 29 49.0 13 30 21.0 13 30 30.0 13 32	See discussion, page 50

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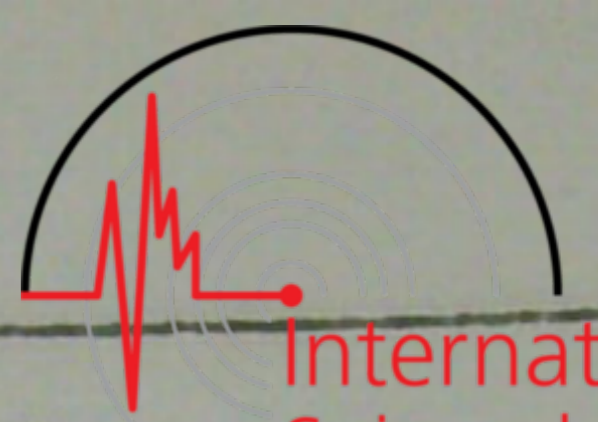
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No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
15	May 8	Iu	eP _N eP _E eS _{NE} F	10 32 43.0 10 32 45.5 10 41 44 10 44	Wellington epicenter:- 18°S 178°W
16	May 9	Id	eE eS _{NE} iM _E F	19 42 33 19 42 40.5 19 42 43.0 19 44	See discussion, page 50
17	May 13	IIv	eP _E iP _E iS _E F	16 02 45.0 16 02 47.0 16 03 37.0 16 17	See discussion, page 50
18	May 13	Iv	eP _{NE} eS _{NE} F	20 33 13 20 34 03.5 20 35	See discussion, page 51
19	May 16	Iv	eP _N eS _{NE} F	02 37 31 02 38 23 02 49	See discussion, page 51
20	May 16	I	eN eE F	02 40 55 02 41 00 02 42	Superimposed on trace of preceding quake.
21	May 16	Iv	eP _{NE} iS _{NE} F	04 50 24 04 51 15.0 04 52	Aftershock?
22	May 16	Iv	eP _N eS _{NE} F	04 52 46 04 53 38 04 56	Aftershock?
23	May 17	Iu	eP _N eS _N eL _N F	02 37 17 02 47 29 02 59 03 17	
24	May 23	I	eN F	21 37 48 19 39	Smyrna?
25	May 24	I	eNE F	19 35 25 19 36	
26	May 28	IIv	iP _{NE} iS _{NE} F	06 23 47.5 06 24 00.0 06 26	See discussion, page 52



SAN FRANCISCO

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
27	May 29	I	iE F	01 04 43.0 01 05	See discussion, page 52
28	May 30	I	eNE F	00 43 27 00 45	
29	May 31	I	eSNE F	01 02 55 01 03	See discussion, page 52
30	June 4	I	eE eN F	08 48 55 08 49 08 08 50	
31	June 7	Iv	eE eE F	01 32 50 01 32 57 01 34	Near Simpson, Nevada.
32	June 9	Iv	eNE eSNE eLNE F	06 19 02 06 19 46 06 20.2 06 36	J.S.A. epicenter:- 42°5 N 125°0 W
33	June 9	Iv	eNE eLN F	08 46 09 08 46.5 08 56	J.S.A. epicenter:- 42°5 N 125°0 W
34	June 11	I	eN eN F	06 33 51 06 34 30 06 36	
35	June 12	Iv	ePNE eSN iSNE F	23 49 37 23 49 49 23 49 50.5 23 51	See discussion, page 52
36	June 14	Id	eSE F	00 43 33 00 44	See discussion, page 53
37	June 18	Iu	ePN eE eN eN F	11 19 27 11 19 31 11 33 41 11 45 11 54	U.S.C. & G.S. epicenter:- 51°5 N 32°0 W
38	June 18	I	eNE F	23 29 46 23 31	See Mt. Hamilton report.
39	June 21	Iu	eN eE F	18 01 51 18 01 53 18 04	Pasadena epicenter:- 22°S 178° W



SAN FRANCISCO

No.	Date	Char- acter	Phase	Time (U.T.)	Remarks
	1941				
40	June 24	Id	eE iSE F	02 53 14 02 53 20.5 02 54	See discussion, page 53
41	June 26	Iu	eP'E ePPN eNE eNE eN eSSN eSSE eN eG ₂ N F	12 11 04 12 12 31 12 18 06.5 12 21 30 12 22 59 12 28 41 12 28 53 12 55.6 13 20.1 14 07	U.S.C. & G.S. epicenter:- 13°N 95°E SKS?
42	June 27	I	eNE iE F	02 15 58 02 16 09.5 02 17	See discussion, page 53



FERNDALE
THE FERNDAL STATION
FERNDAL, CALIFORNIA

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Latitude and longitude:

$\phi = 40^{\circ} 34' N.$
 $\lambda = 124^{\circ} 16' W.$

Time -- All determinations are reduced to Universal Time.

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

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Apparatus	Component	V	T ₀	ϵ
Bosch-Omori 25 kg.	E	12	11	5
	N	12	8	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.)	Remarks
	1941				
1	April 1	Ir	ePE ePN eSNE F	10 46 12 10 46 26 10 52.3 11 50	U.S.C. & G.S. epicenter:- 46°0 N 153°0 W
2	April 3	I	eNE eSE eN F	15 33 40 15 43 29 15 43 45 15 51	
3	April 7	Ir	ePE eN eSN eE eE iE F	23 37 45 23 37 47 23 44 20 23 44 30 23 56 08 23 59 48 24 40	U.S.C. & G.S. epicenter:- 17°6 N 78°3W Strong in Jamaica.
4	April 9	Ir	eSE eN eLNE F	17 15 30 17 15 36 17 17.5 17 25	Pasadena epicenter:- Roughly 31° N 114° W. Felt slightly at San Diego.
5	April	IIr	iPNE eNE eSN eSE eLNE iMNE F	19 16 02 19 17 01 19 20 20 19 20 22 19 23 19 28 20 45	Tacubaya epicenter:- 18° 17' N 103° 19' W Destructive in Mexico.
6	April 20	Id	iPNE eSN iSE iSN F	09 53 50 09 53 56 09 53 57 09 53 58 09 55	See discussion, page 49
7	April 25	I	eN F	12 20.5 12 27	
8	April 28	Ir	eN eN eNE F	19 57 49 19 58 48 20 00.7 20 15	
9	May 13	Id	iPNE iSNE F	10 10 47 10 10 53 10 12	See discussion, page 50



FERNDALE

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
10	May 13	IIIv	eP _{NE} iP _N iE iS _N iE iL _N F	16 02 14 16 02 20 16 02 35 16 02 37 16 02 38 16 02 49 17 15	See discussion, page 50
11	May 14	Id	eP _{NE} iS _{NE} F	04 09 44 04 09 48 04 11	See discussion, page 51
12	May 16	Id	eP _E eNE eS _{NE} eNE iM _E F	02 37 02 02 37 18 02 37 25 02 37 59 02 38 48 03 02	See discussion, page 51
13	May 16	I	eNE eN eE F	04 50 10 04 52 41 04 52 43 05 08	Aftershock? At the other stations there appeared to be two earthquakes in this interval.
14	May 16	Id	eP _{NE} iS _{NE} F	18 43 30 18 43 36 18 45	See discussion, page 51
15	May 17	Iu	eP _E eL _N eM _{NE} F	02 37 18 02 50.5 03 01.2 04 30	
16	June 9	IIv	eP _{NE} iS _{NE} iL _E F	06 18 06 06 18 30 06 18 35 07 02	J.S.A. epicenter:- 42.5 N 125.0 W
17	June 9	IIv	eE? eE iS _N ? iS _E ? iE F	08 44 30 08 44 42 08 44 48 08 45 02 08 45 28 09 10	
18	June 10	I	eNE F	16 23.0 16 33	



FERNDALE

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
19	June 11	Iv	eE eNE eN F	06 32 34 06 33 08 06 33 46 06 45	
20	June 21	Id	iNE F	09 15 30 09 16	Perhaps artificial?
21	June 26	Iu	eNE? eE eN eNE eSSE eSSN eN eE eE F	12 11 34 12 12 16 12 12 32 12 17 57 12 28 11 12 28 18 12 42.0 12 42.8 12 47.7 14 15	U.S.C. & G.S. epicenter:- 13°N 95°E } G?
22	June 29	I	eNE F	22 46.4 22 56	Surface waves.



FRESNO

THE FRESNO STATION, FRESNO STATE COLLEGE
FRESNO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

$$\begin{aligned} \phi &= 36^{\circ} 46' 11'' \text{ N.} \\ \lambda &= 119^{\circ} 47' 18'' \text{ W.} \end{aligned}$$

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 ₀	ε
Wood-Anderson	N	3000	0.9	15



FRESNO					
No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
1	April 1	Iv	eP _N eS _N iS [*] _N F	07 07 10.0 07 07 30.0 07 07 38.5 07 09	See discussion, page 49
2	April 1	Ir	eP _N e _N F	10 47 12.5 10 49 24.0 11 02	U.S.C. & G.S. epicenter:- 56°0 N 153°0 W
3	April 1	I	e _N F	11 36 14.5 11 37	See discussion, page 49
4	April 3	Iv	iP _N e _N F	00 37 20.5 00 37 49.3 00 39	
5	April 3	Iu	eP _N eS _N F	15 06 50.0 15 16 21.0 15 20	
6	April 3	Iu	eP _N eS _N F	15 33 10.0 15 43 43.5 15 52	U.S.C. & G.S. epicenter:- 25°S 69°W
7	April 5	IIv	iP _N iS _N F	12 41 33.5 12 41 58.5 12 46	See discussion, page 49
8	April 7	Ir	eP _N e _N eS _N e _N eL _N F	23 37 02.5 23 38 57.0 23 43 20.7 23 46 44.5 23 53.6 24 30	U.S.C. & G.S. epicenter:- 17°6 N 78°3 W Strong in Jamaica.
9	April 7	I	e _N F	23 49 22.0 23 50	Superimposed on trace of previous shock.
10	April 8	Ir	e _N F	10 14 13.5 10 16	JSA epicenter:- 17°8 N 79°0 W
11	April 9	I	e _N F	15 53 56.5 15 55	
12	April 9	I	e _N F	16 13 08.0 16 14	
13	April 9	IIv	eP _N iP _N eS _N iS _N F	18 10 40.5 18 10 57.5 18 12 26.5 18 12 35.0 18 32	Felt slightly at San Diego. Pasadena:- "Roughly 31°N 114°W"



FRESNO					
No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
14	April 9	Iv	ePN iSN F	18 42 03.5 18 43 42.5 18 48	Aftershock of previous quake.
15	April 11	Iv	ePN eSN F	20 33 10.5 20 34 21.5 20 36	
16	April 13	Iv	eN eN F	12 36 47.5 12 38 09.0 12 40	
17	April 14	IIv	ePN iSN F	16 17 21 16 17 39.0 16 24	
18	April 15	IIIr	iPN eSN eLN F	19 15 02.5 19 19 11 19 21.9	Tacubaya epicenter:- 18° 17' N 103° 19' W Lost in next shock.
19	April 15	I	eN F	19 51 09.0 20 21	
20	April 20	Iu	eP ^{II} N eN F	17 56 36 18 03 14 18 11	U.S.C. & G.S. epicenter:- 37° N 69° E
21	April 25	Ir	ePN eSN F	12 14 21.5 12 16 58.5 12 23	J.S.A. epicenter:- 27° N 115° W
22	April 28	Ir	iN eLN F	19 47 50.0 19 57.3 20 06	
23	April 29	Iu	eN eN F	01 53 54 01 57 10 02 06	Perth epicenter:- 26° 55' S 116° 15' E h = 60 km.
24	April 30	I	eN F	09 42.3 10 06	
25	May 1	Iv	ePN iSN F	13 30 10.5 13 31 02.5 13 34	See discussion, page 50
26	May 3	I	eN eN F	14 41 06.5 14 41 56.5 14 44	



No.	Date	Char-acter	Phase	FRESNO		Remarks
				Time	(U.T.)	
	1941					
27	May 5	Iu	eP _N F	15 30 19.5 15 34		URSS:- 46°5 N 12°8 E
28	May 5	Iv	eP _N eS _N iS _N F	16 21 26.0 16 21 40.5 16 21 45.5 16 23		
29	May 6	Iv	eP _N eS _N eL _N F	03 13 04.5 03 14 06.0 03 14 27.0		Boulder City epicenter:- 37° 25' N 114° 0' W Runs into next shock.
30	May 6	Iv	e _N iS _N F	03 14 39.5 03 15 29.5 03 17		Mixed up with end of previous shock.
31	May 8	Iu	e _N e _N F	10 32 50.0 10 41 56.5 10 51		Wellington epicenter:- 18°S 178°W
32	May 8	IIv	e _N i _N F	14 54 01.0 14 54 16.5 14 56		Pasadena epicenter:- 37° 30' N 118° 32' W
33	May 13	IIv	eP _N i _N i _N iS _N i _N iL _N F	16 03 20.0 16 03 21.0 16 03 25.0 16 03 26.0 16 03 39.0 16 06.7 16 51		See discussion, page 50
34	May 15	Id	eP _N iS _N F	03 29 28.0 03 29 35.5 03 33		See discussion, page 51
35	May 15	Id	eP _N iS _N F	06 00 19 06 00 29.0 06 04		See discussion, page 51
36	May 16	Iv	eP _N eS _N F	02 38 06 02 39 28.0 02 51		See discussion, page 51
37	May 16	I	e _N e _N F	04 51 30 04 52 19 04 53		Aftershock?



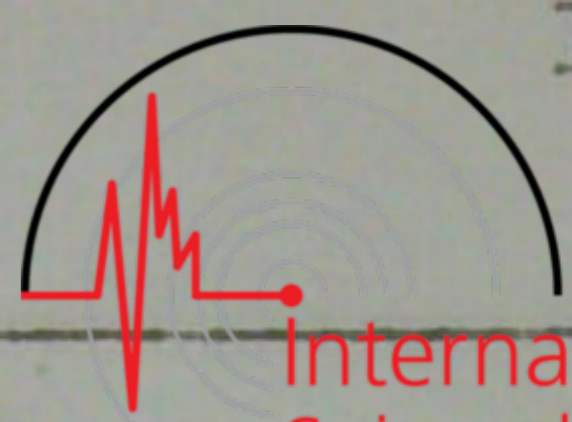
FRESNO

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
38	May 16	I	ePN eN F	04 53 24.5 04 53 57.0 04 56	Aftershock?
39	May 17	Iu	ePN eSN eLN F	02 37 23 02 47 51 03 02 04 06	U.S.C. & G.S. epicenter:- 12°9 S 166°7 E
40	May 20	I	eN F	06 26 42 06 28	
41	May 23	I	eN iSN F	23 30 56 23 31 05.5 23 32	
42	May 28	Iv	eN iN iSN F	06 23 58.5 06 24 02.0 06 24 15.0 06 30	See discussion, page 52
43	May 29	I	eN F	12 40 50 12 43	
44	May 29	I	iN eN F	22 21 02.5 22 22 07.5 22 24	
45	May 31	I	eP?N iSN F	02 27 06 02 27 21.0 02 28	Probably vicinus.
46	May 31	I	eN F	02 30 10 02 33	
47	June 1	I	iN F	22 54 07.0 22 56	
48	June 4	Iv	eN eN F	07 49 59.5 07 50 50.0 07 52	
49	June 4	I	iN F	08 37 06.5 08 38	
50	June 4	Iv	iPN iSN F	08 47 42.0 08 47 59.0 08 52	Pasadena epicenter west of Bakersfield.



FRESNO

No.	Date	Char-acter	Phase	Time (U.T.)	Remarks
	1941				
51	June 4	Iv	eN eN iN F	08 57 24.0 08 57 45.0 08 57 51.5 08 59	Orange County.
52	June 6	Iv	eN F	19 40 28 19 41	Nevada
53	June 7	Iv	ePN iSN iN F	01 32 14.5 01 32 39.0 01 32 48.5 01 34	Near Simpson, Nevada.
54	June 8	Iv	e ² N iSN F	02 18 25.5 02 18 42.0 02 20	IV at Independence, Calif.
55	June 9	Iv	ePN eN iN F	06 19 21 06 20 52 06 21 10.5 06 40	J.S.A. epicenter:- 42°5 N 125°0 W
56	June 9	Iv	eN eN F	08 45 48 08 47 12 09 00	J.S.A. epicenter:- 42°5 N 125° W
57	June 10	I	eN F	10 46 00 10 48	
58	June 11	I	eN eN F	06 33 57.5 06 35 31 06 44	
59	June 12	I	eN F	04 33 55 04 36	
60	June 12	Iv	eN iSN F	23 50 04.5 23 50 11.0 23 51	See discussion, page 52
61	June 14	I	eSN F	00 43 39 00 45	See discussion, page 53
62	June 16	I	iN F	20 40 40.5 20 44	
63	June 18	Iu	ePN eN eN F	11 19 17.5 11 27 13 11 44 20 11 53	S?



No.	Date	Char- acter	Phase	FRESNO		Remarks
				Time (U.T.)		
1941						
64	June 18	I	eN F	11 33 29.5 11 35		Superimposed on trace of preceding shock.
65	June 18	I	eN iN eN F	23 29 25.0 23 29 26.0 23 30 40.0 23 33		See Mt. Hamilton report.
66	June 21	Iu	eP _N eS _N F	17 54 48 18 02 03 18 08		Pasadena epicenter:- 22° S 178° W
67	June 26	Iu	eP' _N ePP _N iN eSS _N eL _N F	12 10 55.5 12 12 55.5 12 18 15.5 12 29 09 12 43.6 13 49		U.S.C. & G.S. epicenter:- 13° N 95° E SKS?