

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—MINERAL

From January 1, 1946, to March 31, 1946

BY
JOHN B. FARR

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY AND LOS ANGELES
1954

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EARTHQUAKE INTENSITY SCALE

Intensities are given by Roman numerals in the list of California earthquakes on the following page when sufficient information on the effects of the quake is available. Criteria of the Modified Mercalli Scale which are used to rate the intensity are:

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.

EARTHQUAKE MAGNITUDE SCALE

Richter magnitudes given in the list of epicenters on the next page are found from the Wood-Anderson amplitudes, using the nomogram by Nordquist, "Bulletin of the Seismological Society of America," 32: 164.

Latitude and longitude are given for each epicenter in the following 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

1946 - Pacific Standard Time

Table with 7 columns: No., Date, Origin Time, Richter Magnitude, Latitude North, Longitude West, Quality. Contains 8 rows of earthquake data with descriptive text for entries 3, 6, and 8.

WALKER PASS AFTERSHOCKS -- MARCH 15 to MARCH 30, 1946

Listing of first wave arrivals at the following stations
 B - Berkeley, F - Fresno, MH - Mount Hamilton,
 PA - Palo Alto, SF - San Francisco, M - Mineral

No.	Date	Station	Phase	P.S.T.
				h. m. s.
1946				
Following aftershocks were clearly recorded at Fresno on March 15				
1	March 15	F	ePN	06 08 46.2
2		F	ePN	06 13 45.1
3		F	ePN	06 14 32.6
4		F	ePN	06 20 27.6
5		F	ePN	06 22 03.1
6		F	ePN	06 24 10.6
7		F	ePN	06 25 24.3
8		F	ePN	06 30 45.0
9		F	ePN	06 41 20.0
10		F	ePN	06 51 21.0
11		F	ePN	14 07 30.6
12		F	ePN	14 38 04.1
13		F	ePN	15 43 01.8
14		F	ePN	16 58 57.0
15	March 16	F	iPN	01 46 49.6
		MH	iPN	01 47 10.7
		B	iPZ	01 47 19.9
		SF	eE	01 47 23.3
16	March 16	F	ePN	05 07 40.0
17	March 16	F	ePN	22 04 18.8
		MH	eN	22 04 45.0
		B	iPZ	22 04 50.7
		M	eE	22 05 18.3
18	March 17	F	ePN	00 17 01.3
		MH	ePE	00 17 31.0
		B	iPZ	00 17 39.1
		M	eE	00 18 14.6
19	March 17	F	ePN	00 26 11.3
20	March 17	F	ePN	01 26 24.7
		MH	eN	01 26 50
		B	iZ	01 26 19.2
	March 17	B	iPZ	13 09 06.6
	March 17	F	ePN	13 19 07.5
		B	iPZ	13 19 38.6
	March 17	F	ePN	17 15 42.0
		MH	eE	17 16 09
		B	ePZ	17 16 12.2

WALKER PASS AFTERSHOCKS (CONT.)

No.	Date	Station	Phase	P.S.T.
				h. m. s.
1946				
	March 17	F	ePN	19 00 52.5
		MH	eE	19 01 19.0
		B	ePZ	19 01 25.3
		M	eE	19 03 04.9
	March 18	F	ePN	02 06 26.7
		MH	ePN	02 06 48.5
		B	iPZ	02 06 58.7
		SF	ePNE	02 07 01.6
		M	ePE	02 07 13.0
	March 18	F	ePN	07 49 57.6
		MH	ePE	07 50 20.0
		B	iPZ	07 50 28.5
		SF	eEN	07 50 34.9
		M	eE	07 50 57.0
	March 18	F	ePN	07 51 13.0
		B	iPZ	07 51 44.3
	March 18	F	ePN	08 54 50.0
	March 19	F	ePN	00 46 13.5
	March 21	MH	eN	20 24 17
	March 22	MH	eN	02 09 33
	March 22	MH	eN	04 37 09
	March 23	F	ePN	18 57 18.0
		MH	eN	18 57 47
	March 25	F	ePN	15 37 16.7
		MH	ePN	15 37 38
		PA	ePNE	15 37 45.9
		M	eE	15 38 22.8
	March 25	F	ePN	22 07 42
		MH	eN	22 08 49

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. Nature of the Motion--

i (impetus)	Sudden beginning of the motion.
e (emersio)	Gradual beginning of the motion.

BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CONSTANTS

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Latitude and Longitude:

$\phi = 37^\circ 52' 3''$ N.
 $\lambda = 122^\circ 15' 6''$ 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	
		K	T	T ₁	μ ²	A ₁ (cm)	l (cm)
Bosch-Omori 100 kg. ..	E	45		12		10	
	N	45		12		10	
Wiechert 80 kg.	Z	44		4		5	
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.

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No.	Date	Char-acter	Phase	Time (G.C.T.)			Remarks
				h.	m.	s.	
	1946						
	Jan. 5	Ir	epPZ eSNE eSSE e(ScS)N F	H 01 23 00.0 G 29 39 G 31 23 G 32 55 02 00		U.S.C. & G.S.: 15.5°N 91°W O = 01 15.0	
	Jan. 5	Iu	epPZ ieZ eZ iZ eE iSN eE iZ iLZ iMZ eE eZ F	H 20 09 54.4 G 55.4 W 58 H 20 10 25.4 B 35 G 20 14.4 B 19 G 26.4 G 32 52.4 G 35.6 B 36.0 W 36.5 22 50		U.S.C. & G.S.: 16°S 167°E O = 19 57.3	
	Jan. 7	Iv	epPZ eNE eNE eZ eE eLNE eEN F	H 15 52 28.8 A 41.3 A 45.8 H 46.4 A 53 12.3 G 48.3 G 54 12.3 15 59			
	Jan. 8	Iv	iPZ eN eE iN eE eZ iSZ eNE iN eE eZ eZ F	H 18 56 08.5 A 11.3 A 17 A 57 44.4 B 48 W 49 H 58.8 G 58 03 A 04.6 B 09 W 20 G 59 04 19 04		Pasadena Epicenter: 33.1°N 116.0°W O = 18 54 20	
	Jan. 8	Iv	ePEZ eSE eSN F	AH 22 31 27.8 A 46.8 A 49.8 22 33		See list, page 5	
	Jan. 11	Iu	iPNEZ iPE eE iZ eN eSNE iSN eSZ iSEZ	AHG01 44 15.9 G 16.5 A 54.7 H 50 15.9 A 21.1 A 53 07.5 G 07.5 H 08.4 G 09.0		Pasadena Epicenter: 45°N 129°E O = 01 33 25 h = 550 km	

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No.	Date	Char-acter	Phase	Time (G.C.T.)		Remarks
				h.	m. s.	
	1946					
	Jan. 11 (cont'd)	Iu	iE iN F	G G	56 40.0 43.0	
	Jan. 12	Iir	ePENZ iZ eEZ eE iZ iZ iEN iSNZ iSE iLZ eZ eZ F	AW H G A W G G AH A G	02 00 20 31 20.1 20.4 20.5 21.5 22 23.0 23.6 36 11.5 12.0 38 50.5 59.0 39 12.0 21 15	U.S.C. & G.S.: 59°N 147.5°W 0 = 20 25.7
	Jan. 13	Id	ePZ eZ eSN eSE F		01 12 19.5 21.7 23.3 23.8 01 12	
	Jan. 13	Iv	iPZ ePN ePE iSNE eE F	GH AG A A G	16 32 01.2 01.7 01.9 43.2 33 23.2 16 37	Pasadena Epicenter: 37.3°N 118.7°W 0 = 16 31 15
	Jan. 15	Iv	ePNEZ eE eN eN eSE eN eZ eN F	AH A A G A A H A	22 33 04.5 08.5 09.5 11.5 55.0 55.5 56.5 34 01.5 22 35	See list, page 5 155 mi. west of Ferndale
	Jan. 17	Iu	ePZ iZ eZ ePPZ iZ eZ eSKSN eSSN eN eZ eLZ F	H H G H G G G G G G G G	09 52 49.0 53 29.5 33.5 56 52.0 52.5 10 03 15.0 59.0 10 37.0 17 53.0 22 15.5 26.7 11 20	Pasadena Epicenter: 6°S 145°E 0 = 09 39 27 h = 100 km

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No.	Date	Char-acter	Phase	Time (G.C.T.)		Remarks
				h.	m. s.	
	1946					
	Jan. 18	Iv	ePZ eN eSNE eZ F	H A A H	00 36 21.0 43.0 37 00.0 01.5 00 38	
	Jan. 18	Iu	ePZ epPZ F	H H	15 45 20.5 46 31.5 15 48	Pasadena Epicenter: Near Samoa? h = 300 km
	Jan. 20	Iu	ePZ eE iSE iN eE iZ eE eZ F	H G G G G H G H	17 07 00 13 46.0 18 53.5 29 24.0 33 25.0 34 13.5 43 48.0 45 03.0 18 35	Pasadena Epicenter: 15°S 166°E 0 = 16 54.2
	Jan. 26	Iu	ePN ePEZ eE eZ	A AH A H	02 42 03.7 09.5 43.7 48	
	Jan. 26	Iu	ePZ eN eE eNE	H A A A	04 38 29.2 30.2 31.7 57.2	
	Jan. 26	Iu	ePEZ eN eE	HA A A	16 54 21.5 22.1 55 01.1	
	Jan. 27	Iu	iPZ	H	01 24 11.3	
	Jan. 27	Iu	ePZ	H	15 09 37.3	
	Jan. 28	Iu	ePZ eNE eZ eN	H A H A	12 53 42.6 45.8 46.7 49.3	
	Jan. 29	Iu	ePZ eNE eE	H A G	06 34 13.5 17.5 38 28	
	Feb. 1	Iu	ePZ eN	H A	05 24 01.7 02.9	
	Feb. 1	Iv	eNE eZ eN eE eE eE eZ eN eE eE eNE eN F	A G AG G A G G A A A A A A	19 26 37.9 38.5 40.9 42 44.4 27 02 04 05.9 10.7 40.9 28 00.9 44.1 19 31	

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No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	Feb. 4	Iv	iPNEZ iPN eN epPNEZ eN esPE iPPZE eE eZ eZ eNE eN eZ eEZ eZ ePcSE eSNEZ eScSE eNE iPZ ePNE iZ eSNE eN eE F	AHGO3 52 13.7 A 14.2 G 43 AHG 47.4 A 53 10 A 15.2 HG 54.5 A 54 00 G 10 H 14.0 AG 19 G 23 G 55 36 GH 56 21.2 H 57 46.6 A 51.5 AHG 58 10 04 01 44.2 A 59.7 H 20 52 16.5 A 17.1 32.0 34.0 45.7 47.2 20 54	Pasadena Epicenter: Roughly 53°N 175°W h = 150 km O = 03 44 36
	Feb. 6	Iv	iPZ ePNE iZ eSNE eN eE F	H 20 52 16.5 A 17.1 32.0 34.0 45.7 47.2 20 54	See List, page 5
	Feb. 6	Iv	iPZ ePN iSZ eSE eN F	23 32 58.1 59.1 33 15.3 15.8 16.3	See List, page 5
	Feb. 10	IIv	iPNZ ePNEZ eN eN eN iSNE iE eE eZ eN eNZ eNE iZ iNZ eE eZ eH eN F	AH 11 01 47.5 GA 47.8 A 51.8 G 57 G 02 08 AB 09.3 A 10.5 G 15 G 19 G 24 G 31 A 42.8 H 46.8 AH 56.3 A 56.8 G 03 05 G 06 G 31 11 05	See List, page 5

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No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	Feb. 12	Iu	ePZ eZ eE eZ F	H 13 21 59.4 H 22 45.4 G 45 33 G 51 27 13 56	
	Feb. 14	Iu	ePZ F	H 12 03 25.2 12 04	
	Feb. 15	IIv	iPZ iZ eZ eN eZ eE eE iE iE iZ iSN iSE iZ iE iZ iLN eE eZ F	H 03 20 05.2 H 05.5 W 11 G 13.0 A 13.5 B 26 G 29.5 G 43.5 G 21 16.0 H 29.0 G 52.0 G 22 05.0 H 17.0 G 21.5 H 42.0 G 49.0 B 52 W 23 05 03 36	U.S.C. & G.S.: 47.3°N 122.7°W O = 03 17.8
	Feb. 15	Iu	ePZ eE eN F	H 16 01 18.7 19.9 20.9 16 02	
	Feb. 16	Iu	iPZ	H 07 08 00.2	
	Feb. 16	Iu	ePZ iZ eE eN	H 22 08 05.1 H 15.9 A 16.4 A 16.9	Near Apia
	Feb. 17	Iu	ePZ	H 17 47 47.1	
	Feb. 19	Id	iPZN eE eSN F	HA 06 08 07.9 A 13.4 A 15.6 06 09	See List, page 5
	Feb. 20	Iu	ePZ eE F	H 03 39 51.9 A 52.8 03 40	
	Feb. 22	Ir	eZ	A 17 32 12.6	Deep. Felt in Chiapas
	Feb. 24	Iu	iPZ	H 13 48 14.3	Tonga region h = 600 km
	Feb. 25	Iu	iPZ	H 01 59 03.0	
	Feb. 27	Iu	iPZ eN F	H 06 17 28.3 A 29.0 06 18	

BERKELEY

No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	Feb. 27	Iu	iPZ eNE F	H 16 44 04.6 A 05.2 16 45	
	March 2	Iu	iPZ eNE F	H 07 54 57.0 A 55 01.6 07 56	
	March 5	Iv	iPZ eE eN eN eZ iSE iSN eZ F	H 14 05 05.2 A 06.5 A 06.8 A 09.3 H 28.6 A 33.6 A 34.0 H 35.0 14 07	See List, page 5
	March 8	Iu	eZ eZ F	02 27 34.2 52 02 28	
	March 12	Iu	ePZ iZ eZ eE iSN iE eN iE eGE eLN eZ F	H 00 13 38.0 H 40.7 G 42.2 G 17 08.7 G 23 13.7 G 21.2 G 28 07.7 G 08.7 G 33.5 G 35.8 G 36.5 01 27	Pasadena Epicenter: Roughly 40°S 105°W
	March 15	Iu	iPZ iZ iZ eLE eZ F	H 03 15 11.5 G 12.0 G 22 56.0 G 40.3 G 41.1 04 32	
	March 15	IIu	ePZ iSE eZ iE eLE F	H 07 58 20.0 G 08 08 40.5 G 10 02.5 G 20 34.5 G 24.1 09 42	
	March 15	IIv	iPZ eN eE iN iE i(S)E iSE F	HG 13 22 03.2 A 03.4 A 03.8 A 04.4 A 05.6 A 50.9 B 55.9 13 42	Foreshock of following shock at 13 50 Magnitude 5.2

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No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	March 15	IIv	iPZ eN eE ePNEZ iE iSN iSE iSE iSZ F	H 13 50 38.2 A 38.9 A 39.9 BW 40 40.5 A 51 30.1 B 31 A 31.5 W 34.9 14 12	Pasadena: 35.7°N 118.0°W O = 13 49 36 Main shock, magnitude 6.4 Over 90 aftershocks between March 15 and March 31
	March 15	IIv	eN iPZ eE iE iSN iE F	A 14 01 39.4 H 39.9 A 40.4 A 02 26.9 A 29.9 A 40.9 14 09	Aftershock of 13 50 shock Magnitude 5.3
	March 15	Iv	iPNEZ ePNE eZ eSN iN iE iZ iLE F	AHB19 19 54.0 G 55 W 20 34 G 40 A 46.5 A 47.7 W 58 B 21 03 19 34	Aftershock of 13 50 Magnitude 5.4
	March 15	IIv	iPEZ ePZ ePN iSEZ eSE eN eSN iLE eZ eN	AH 21 55 35.0 W 35 AG 36.7 WB 56 25 A 27.0 A 29.7 G 33 B 45 G 57 49 G 59 09	Aftershock of 13 50 Magnitude 5.2 For succeeding aftershocks see List, page 5
	March 17	IIv	iPZ iZ eZ eZ eE eSZ eSZN iSE F	H 14 46 42.7 H 45.8 W 48 G 49.0 GB 51.0 G 47 27 WG 29.6 B 31 14 53	U.S.C. & G.S.: 38.3°N 117.9°W Near Hawthorne, Nevada. Felt over 12,000 square miles in Nevada and California.
	March 22	Iv	ePZ eZ F	H 12 51 20.8 H 39.8 12 53	
	March 22	Id	iPZ iSEZ F	H 04 32 56.6 H 33 06.8 04 34	

BERKELEY

No.	Date	Char-acter	Phase	Time (G.C.T.)	Remarks
	1946			h. m. s.	
	March 24	Iu	iPZ eN F	H 15 45 39.4 A 46 3 16 15	
	March 24	Iv	ePZ eN eE eZ eE F	H 20 05 06.5 A 54.6 A 55.1 H 06 05.6 A 10.6 20 07	
	March 25	Ir	ePZ eN eE eN eE F	H 23 41 46 A 55 A 42 36.6 A 43.6 A 49 23 44	
	March 26	Iu	ePZ eE eZ eN eN F	H 17 43 06.5 G 52 00 G 53 17.5 G 31 G 18 15 52.0 19 53	
	March 27	Id	iPZ iPN ePE iSN eSE F	H 14 11 04.2 A 04.6 A 05.3 A 15.3 16.1 14 13	
	March 27	Id	iPNEZ eSNE F	AH 16 45 14.9 A 27.5 16 46	
	March 29	Iu	ePZ ePZ iZ iZ iSE iSN iZ iSSSN eLN eLE F	H 07 35 29.0 H 40.0 H 50.5 H 55.5 G 42 28.5 G 34.5 H 43 21.0 G 46 58.5 48 40 49 30 09 08	Felt at Guayaquil, Ecuador
	March 29	IIId	iPNEZ ePE eSN iSE F	AH 10 40 15.8 B 17 A 18.6 B 20 10 41	See List, page 5

BERKELEY

No.	Date	Char-acter	Phase	Time (G.C.T.)	Remarks
	1946			h. m. s.	
	March 29	Id	ePN iPZ eSNEZ F	A 14 31 35.5 H 36.1 AH 47.1 14 14	
	March 30	Id	ePN e[S]N F	22 24 53.1 25 01.1 22 26	

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

CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

$$\phi = 37^{\circ} 20' 14'' \text{ N.}$$

$$\lambda = 121^{\circ} 38' 6'' \text{ W.}$$

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

MT. HAMILTON

No.	Date	Char-acter	Phase	Time	Remarks
				(G.C.T.)	
	1946			h. m. s.	
	Jan. 5	Ir	ePEA epPNE F	01 21 50 22 32 01 24	U.S.C. & G.S.: 15.5°N 91°W
		Id	ipNE iSNE F	06 04 01.2 02.4 06 05	
	Jan. 5	Iu	ePNE eE	20 09 59.6 10 37.4	U.S.C. & G.S.: 16°S 167°E O = 19 57.3
	Jan. 7	Id	ePNE eSNE F	23 13 55 59.0 15	
	Jan. 8	Iv	ePNE eE eN eSE eE eN eE eN F	18 56 00 10.5 17 57 14.5 31 35 40 42.5 19 03	Pasadena Epicenter: 33.1°N 116.0°W O = 18 54 20
	Jan. 8	Id	iPN iPE iSNE F	22 31 14.4 14.9 26.4 22 33	See List, page 5
	Jan. 11	Iu	iPNE eSNE F	01 44 19.4 53 15.0 01 56	Pasadena Epicenter: 45°N 129°E h = 550 km O = 01 33 25
	Jan. 11	Id	ePN eE eSEN F	14 14 22 14 14 34 49.4 14 15	
	Jan. 12	Ir	ePNE eN eE eSNE F	20 31 26 29 32 14 36 18.9 20 49	U.S.C. & G.S.: 59°N 147.5°W O = 20 25.7
	Jan. 13	IIv	ePE iPNE iN iN eSNE iNE iE iN F	16 31 54.3 55.7 32 02.5 05.6 25.5 39.5 45.0 46.8 16 36	Pasadena Epicenter: 37.3°N 118.7°W O = 16 31 15
	Jan. 15	Iv	iPN eN F	22 33 14.6 34 12.6 22 35	See List, page 5 155 miles west of Ferndale
	Jan. 18	Iv	ePE eSN F	00 36 11.8 42.5 00 38	

MT. HAMILTON

No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
Feb. 4	Ir	ePEN eN epPE eEN eE eSEN eE F		03 52 19.7 31.7 47.3 54 17.3 43.3 58 19.2 04 02 06 04 03	Pasadena Epicenter: 53°N 175°W h = 150 k O = 03 44.6
Feb. 4	Id	ePN eSE F		07 26 30 44 07 28	
Feb. 4	Id	eSE F		07 52 24 07 53	
Feb. 5	Id	ePN eSN F		23 55 57 56 00 23 57	
Feb. 6	Id	iPN eSE F		09 11 46.4 49.0 09 13	
Feb. 6	IIId	iPE iSE F		20 52 04.9 11.6 20 55	See List, page 5
Feb. 6	Id	ePN iSN F		23 32 45.5 52.2 23 34	See List, page 5
Feb. 10	IIId	iPN eSE F		11 01 36.4 49.0 11 08	See List, page 5
Feb. 14	Id	iPE iSN F		18 41 01.9 03.3 18 42	
Feb. 17	Id	ePN eSN F		11 39 41 44 11 40	
Feb. 19	Id	iPN iSN F		06 08 02.1 05.7 06 09	See List, page 5
Feb. 22	Ir	iPN F		17 31 14.1 17 34	Deep. Felt in Chiapas
March 4	Id	ePN eSN F		02 38 10 14 02 39	
March 5	Iv	ePE eSE F		14 05 05.8 33 14 07	See List, page 5
March 6	IIId	iPN eSN F		00 41 35.3 36.5 00 43	
March 9	Id	iPN iSN F		21 09 44.5 52.5 21 11	

MT. HAMILTON

No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
March 15	IIv	iPN eN F		13 21 54.2 57 13 45	Foreshock of 13 50 O = 13 20 01 M 5.2
March 15	IIv	ePE eE		13 50 29.5 33	Main shock Pasadena: 35.7°N 118.0°W O = 13 49 36 M 6.3
March 15	IIv	ePE eE eE F		14 01 31.5 35.8 04 02 14 12	Aftershock of 13 50 O = 14 00 37 M 5.3
March 15	IIv	ePN iSNE F		15 01 05 54 15 05	Aftershock of 13 50 O = 15 00 09 M 4.4
March 15	IIv	ePN eE F		19 19 47.1 20 29.1 19 23	Aftershock of 13 50 O = 19 18 55 M = 5.4
March 15	IIv	ePN eN iSE eN F		21 55 25.8 30.0 56 08 18 22 05	Aftershock of 13 50 O = 21 54 35 M = 5.2 Succeeding aftershocks listed on page
March 17	IIv	ePN eE eN eE F		14 46 42.5 46 50 50 51 08.5 14 54	U.S.C. & G.S.: 38.3°N 17.9°W Near Hawthorne, Nevada. Felt over 12,000 sq. miles in California and Nevada
March 20	Id	iPE iSE F		23 00 29.3 31.3 23 01	
March 21	Id	ePN eSN F		13 01 52.0 53.0 13 02	
March 27	IIId	iPN F		14 06 51.9 14 07	
March 27	IIId	iPN eSE F		16 41 04.0 08.0 16 43	
March 29	Ir	ePN F		07 35 41 07 40	Felt at Guayaquil, Ecuador
March 29	IIId	ePN eSN F		10 40 24.5 35.0 10 42	See List, page 5
March 29	IIId	ePN iSN eE F		14 29 20.0 25.4 51 14 30	
March 29	Id	ePN eSN F		22 52 50.0 52.5 22 53	

PALO ALTO
 THE BRANNER STATION, STANFORD UNIVERSITY
 PALO ALTO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

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 -- 82 meters (272 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V	T _o	e
Wood-Anderson	E	3000	1	15
	N	3000	1	15

PALO ALTO

No.	Date	Char-acter	Phase	Time	Remarks
				(G.C.T.)	
	1946			h. m. s.	
	Jan. 8	IIv	ePN ePE eN eE iN iE F	18 56 10.2 10.7 17.2 20.7 58 02 04 19 01	Pasadena epicenter: 33.1°N 116°W O = 18 54 20
	Jan. 8	Id	iPNE eSE eSN F	22 31 20.2 35.8 36.8 22 32	See List, page 5
	Jan. 11	Iu	ePNE eE eN eSEN F	01 44 18.0 45 07.9 48 23.3 53 10.8 01 56	Pasadena Epicenter: 45°N 129°E h = 550 km O = 01 33 25
	Jan. 11	Id	ePN ePE eSEN F	14 14 45 47.5 58.3 14 15	
	Jan. 12	IIv	iPN iPE eE eSN F	20 31 25.9 28.1 32 37.7 36 18 20 57	U.S.C. & G.S.: 59°N 147.5°W O = 20 25.7
	Jan. 13	IIv	iPNE iNE iSN iNE F	16 32 02.1 09.2 43.4 54.8 16 36	Pasadena Epicenter: 37.3°N 118.7°W O = 16 31 15
	Jan. 15	IIId	iPNE iSNE F	21 20 47.2 48.1 21 21	
	Jan. 15	Iv	iPE iPN iSNE F	22 33 10.1 22 33 11.1 34 14.6 22 36	See List, page 5 155 West of Ferndale
	Jan. 18	Iv	ePE eN eSNE F	00 36 21.9 23.9 58.1 39 00	
	Jan. 25	IIId	iPNE eSNE F	21 17 11.7 13.7 21 18	
	Feb. 1	Iv	ePNE eNE eE F	19 26 37.0 27 24.5 28 29.5 19 31	
	Feb. 4	Ir	iPNE eE eE eSNE F	03 52 17 28 53 17.5 58 15 04 03	Pasadena Epicenter: 53°N 175°W h = 150 km O = 03 44.6

PALO ALTO

No.	Date	Char-acter	Phase	Time (G.C.T.)			Remarks
				h.	m.	s.	
	1946						
	Feb. 4	Id	ePNE eN F	07 26	36.4 50.9		
	Feb. 4	Id	ePNE eSN F	17 19	10 14.1		
	Feb. 5	Id	ePNE eSNE F	08 21	55 22 01		
	Feb. 5	Id	ePNE eSNE F	16 47	52 48 02.7		
	Feb. 5	IIId	ePNE eSNE F	23 55	52.2 55.2		
	Feb. 6	IIId	iPNE eSN F	20 52	12.0 42.3	See List, page 5	
	Feb. 6	Id	ePNE eSN eE F	20 54 23 32	53.4 06.6 07.4	See List, page 5	
	Feb. 10	IIId	iPNE eN F	11 01	44.1 55	See List, page 5	
	Feb. 14	Id	ePNE eN F	18 33	09.8 23.3		
	Feb. 15	Ir	ePNE eN eN eN eSN F	03 20	15.9 22.9 45.8 21 17.9 54	U.S.C. & G.S.: 47.3°N 122.7°W O = 03 17.8	
	Feb. 19	IIId	ePN eE eN F	06 08	05.1 08.1 08.9	See List, page 5	
	Feb. 21	IIId	iPNE eN F	00 03	26.5 30		
	Feb. 27	Id	iPNE eSNE F	00 03	48.1 51.4		
	March 2	Id	ePNE	16 51	11.7		
	March 5	Iv	ePNE eSN eSE F	14 05	09.4 39.8 41	See List, page 5	
	March 6	IIId	iPNE e(S)N F	23 55	54.1 55.6		

PALO ALTO

No.	Date	Char-acter	Phase	Time (G.C.T.)			Remarks
				h.	m.	s.	
	1946						
	March 8	Id	ePNE eSE F	21 15	31.6 37.6		
	March 8	Id	ePNE eSN F	22 15	45.2 49.2		
	March 9	Id	iPNE eSE eSN F	21 09	50 59.6 10 01.1		
	March 19	IIId	iPNE eSNE F	00 02	49.4 52.1	Station out of operation except for short intervals from March 14 to March 31	
	March 22	Iv	ePNE eEN F	19 43	29.5 42.4		
	March 26	Id	iPNE eE eSNE F	00 02	25.3 27.8 28.8		
	March 29	IIId	ePNE eSE eSN F	10 40	24.4 32.4 33.4	See List, page 5	
	March 29	Id	ePNE eNE eN F	02 42 14 29	32.4 36.8 42.8		
			F	14 31			

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 (G.C.T.)			Remarks
				h.	m.	s.	
	1946						
	Jan. 5	Ir	ePN epPN iN F	01 21 39.0 22 24.0 35.1			U.S.C. & G.S.: 15.5°N 91°W
	Jan. 5	Iu	ePN eN ePPN eLN F	20 10 07.0 27.5 13.4 33.4			U.S.C. & G.S.: 16°S 167°E O = 19 57.3
	Jan. 8		ePN eN iSN F	18 55 37.5 47.2 56 46.2			Pasadena Epicenter: 33.1°N 116.0°W O = 18 54 20
	Jan. 8		eN eN F	22 31 36.9 33 18.4 22 34			See List, page 5 Fresno station out of operation from January 10 to February 13
	Feb. 15	Ir	ePN eSN F	03 21 38.5 24 24.0 03 36			U.S.C. & G.S.: 47.3°N 122.7°W O = 03 17.8
	March 5	IIv	ePN eN eN eSN F	14 05 09.4 12.5 14.4 35.9			See List, page 5
	March 12	Iu	ePN eN F	00 13 09 53.5 00 17			Pasadena Epicenter roughly 40°S 105°W
	March 15	IIv	iPN F	13 20 33.2 13 39			Foreshock of 13 50
	March 15	IIv	ePN eSN	13 34 46.1 35 08.0			Foreshock of 13 50
	March 15	IIv	iPN iSN	13 40 53.7 41 15.7			Foreshock of 13 50
	March 15	IIv	ePN F	13 50 08.0 14 15			Main shock Pasadena: 35.7°N 118.0°W Magnitude 6.4
	March 15	IIv	iPN F	21 55 05.5 22 07			Aftershock of 13 50
	March 15	IIv	iPN eSN F	22 54 29.7 54.1 22 58			For others, see List, page Aftershock of 13 50
	March 17	IIv	ePN eN eN eN F	14 46 28.9 29.9 31.8 56.0			U.S.C. & G.S.: 38.3°N 17.9°W
	March 17	IIv	ePN eSN F	14 56 14 49 59.0 50 25.5 14 52			Aftershock of above.

FRESNO

No.	Date	Character	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	March 29		ePN F	07 35 24.5 07 39	Felt at Guayaquil, Ecuador
	March 29	Iv	eN eN F	10 41 09.0 48.5 10 43	See List, page 5
	March 29	Iv	eN eN F	11 59 15.0 30.5 12 00	Felt in bay area

MINERAL

THE MINERAL STATION
MINERAL, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and longitude:

$$\phi = 40^{\circ} 21' \text{ N.}$$

$$\lambda = 121^{\circ} 35' \text{ W.}$$

Time -- All determinations are reduced to Universal Time.

Altitude -- 1495 meters (4906 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

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

MINERAL

No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	1946				
	Jan. 3	IIId	ipE iSE F	19 50 10.5 12.5 19 51	
	Jan. 5	Iu	ePE eE eSE eLE F	20 10 05.5 20 10 29.7 20 06 35.9 49	U.S.C. & G.S.: 16°S 167°E 0 = 19 57.3
	Jan. 8	Iv	ePE eE iSE F	18 56 45.6 18 57 06.1 18 57 44.1 19 03	Pasadena Epicenter: 33.1°N 116.0°W 0 = 18 54 20
	Jan. 11	Iu	ePE eSE F	01 44 06.4 52 51.8 01 57	Pasadena Epicenter: 45°N 129°E h = 550 km 0 = 01 33 25
	Jan. 12	Ir	ePE eSE F	20 31 02.7 20 36 12 20 57	U.S.C. & G.S.: 59°N 147.5°W 0 = 20 25.7
	Jan. 13	IIv	ePE eE eSE F	16 32 17.2 23.1 33 09.4 16 36	Pasadena Epicenter: 37.3°N 118.7°W 0 = 16 31 15
	Jan. 15	Iv	ePE eSE F	22 33 00.2 46.5 22 35	See List, page 5 155 mi. west of Ferndale
	Jan. 18	Iv	eSE F	00 37 30.4 00 38	
	Jan. 26	Id	ePE iSE F	03 46 11.8 13.8 03 47	
	Jan. 31	IIId	iPE iSE F	01 08 45.5 47.2 01 09	
	Jan. 31	Id	iPE iSE F	04 49 40.7 42.6 04 50	
	Jan. 31	Id	iPE iSE F	04 58 18.2 19.7 04 59	
	Jan. 31	Id	iPE iSE F	05 37 13.7 15.2 05 38	
	Feb. 4	Ir	ePE eSE F	03 52 03.5 57 51.6 04 00	Pasadena Epicenter: 53°N 175°W h = 150 km 0 = 03 41.6
	Feb. 6	IIId	ePE iE iSE F	08 43 19 21 21 08 45	Aftershocks at 08 44 53 and at 08 45 05

MINERAL

No.	Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
	Feb. 6	IIId	iPE iSE F	19 39 50 52 19 41	
	Feb. 10	Id	iPE iE iE	01 46 51 54 58	
	Feb. 10	Id	ePE iE iE iE F	01 47 19 21 24 26 01 49	
	Feb. 10	Iv	ePE eE iE iE	11 01 17 23 33 39	Runs into next quake
	Feb. 10	Iv	eE iE iE iE F	11 01 44 02 02 11 18 11 07	
	Feb. 10	Id	ePE iSE F	20 34 55 35 00 20 36	
	Feb. 10	IIv	iPE iE iE iSE F	21 29 41 44 54 30 11 21 32	
	Feb. 17	IIId	iPE iSE F	02 46 37.2 43.2 02 48	
	Feb. 20	Iv	ePE iSE F	11 22 39.5 24 12.2 11 27	
	Feb. 24	Id	iPE iSE F	18 15 59.5 16 02.7 18 17	
	Feb. 25	Id	ePE iSE F	09 09 03.1 07.2 09 10	
	Feb. 27	Id	ePE iSE F	16 53 44.5 46.5 16 59	
	March 5	Iv	e(P) ePE iE iSE F	14 05 03.6 10.9 24.7 26.0 14 07	See List, page 5
	March 6	IIId	ePE iSE F	00 27 50.1 53.0 00 29	

MINERAL

No.	Date	Char-acter	Phase	Time	Remarks
				(G.C.T.)	
				h. m. s.	
	March 10	Id	iPE	09 29 24.5	
			iSE	26.2	
			F	09 30	
	March 10		iPE	10 27 40.3	
			iSE	41.5	
			F	10 29	
	March 14	Id	ePE	23 22 41.0	
			iSE	22 43.9	
			F	23 24	
	March 17	Id	iPE	07 23 43.2	
			iE	45.3	
			iSE	51.6	
			iE	53.4	
			F	07 25	
	March 17	Id	iPE	07 28 34.3	
			iSE	40.4	
			iE	41.9	
			F	07 29	
	March 17	Id	iPE	09 25 50.2	
			iE	52.4	
			iSE	56.8	
			iE	26 00.5	
			F	09 27	
	March 17	IIv	ePE	14 46 41.5	U.S.C. & G.S.: 38.3°N 117.9°W Near Hawthorne, Nevada. Felt over 12,000 sq. miles in Nevada and California
			iE	49.6	
			eSE	47 32.2	
			eE	48 09.0	
			eE	50 14.4	
			eE	51 01.1	
			F	14 54	
	March 26	Id	ePE	12 15 59.8	
			iSE	16 01.6	
			F	12 17	
	March 26	Id	ePE	12 18 49.6	
			iSE	51.4	
			F	12 20	
	March 26	Id	ePE	12 22 13.9	
			iSE	15.6	
			F	12 23	
	March 29	IIId	ePE	11 57 14.0	
			iE	19.0	
			iSE	22.5	
			F	11 59	

Bulletin of the Seismographic Stations

Volume 16, No. 2, pp. 39-75



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

From April 1, 1946, to June 30, 1946

BY
BURL A. TULLER

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY AND LOS ANGELES
1954

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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.

Latitude and Longitude are given for each epicenter in the following list. Only those earthquakes are given 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.

EARTHQUAKE MAGNITUDE SCALE

Richter magnitudes given in the list of epicenters on the next page are found from the Wood-Anderson amplitudes, using the nomogram by Nordquist, "Bulletin of the Seismological Society of America," 32: 164.

EARTHQUAKES IN NORTHERN CALIFORNIA

1946 - Pacific Standard Time

<u>No.</u>	<u>Date</u>	<u>Origin Time</u>	<u>Richter Magnitude</u>	<u>Latitude North</u>	<u>Longitude West</u>	<u>Quality</u>
1	April 17	00-57-54	3.1	36.6°	121.2°	d
2	17	05-33-20	3.4	36° 55'	121° 45'	c
Felt by many in San Martin and Watsonville. Maximum intensity in these localities was IV.						
3	21	23-42-08	3.5	37° 43'	121° 34'	b
Felt in Hollister						
4	23	02-39-07	2.8	37° 17'	121° 44'	b
5	25	03-45-47	2.8	36° 47'	121° 36'	a
Motion rapid and of momentary duration at Watsonville. Intensity IV.						
6	25	13-50-38	3.8	37° 34'	121° 55'	a
Felt over approximately 400 square miles in vicinity of western Alameda County. The limits of the felt area included Oakland, southeast to Agnew and Milpitas, northward to Sunol, northwestward to Moraga and thence to Oakland. A maximum intensity of VI was reported from Milpitas and Pleasanton.						
7	28	07-50-58	2.7	37.7°	121.4°	d
8	29	11-39-09	2.2	37° 34'	121° 55'	b
9	May 1	17-26-12	4.6	37° 41'	121° 36'	a
Felt over an area of approximately 3000 square miles in west-central California. The outer limits of felt area were San Francisco to Stockton to Modesto to Pescadero to San Francisco. Tracy reported a maximum intensity of VI.						
10	1	18-11-37	3.2	37° 41'	121° 37'	a
11	2	11-09-35	2.4	37° 26'	121° 43'	b
12	25	04-01-30	3.6	36° 34'	121° 11'	a
13	29	09-51-03	4.5	36° 46'	121° 25'	c
Felt in a very small area in the vicinity of Salinas. The outer limits of felt area included San Martin to Hollister to Salinas to Watsonville and north to San Martin. A maximum intensity of V was reported in the vicinity of Hollister. This quake had a depth of about 10 km.						

THE REGISTRATION OF EARTHQUAKES

SYMBOLS AND NOTATIONS EMPLOYED

1. Character of the Seismogram--

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. Nature of the Motion--

- | | |
|-------------|----------------------------------|
| i (impetus) | Sudden beginning of the motion. |
| e (emersio) | Gradual beginning of the motion. |

BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$\phi = 37^\circ 52'13''$ N.
 $\lambda = 122^\circ 15'16''$ W.

Time -- All determinations are reduced to Greenwich Civil Time.

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

Apparatus	Component
Bosch-Omori 100 kg.	E
	N
Wiechert 80 kg.	Z
Wood-Anderson	E
	N
Galitzin	E
	N
	Z
Benioff	Z
Sprengnether	Z

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; S, Sprengnether.

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 1	Iir	iPE ePNEZ eZ eZ ePPZ eSZE eSE eLNE F	G 12 35 22.8 GAH 23.8 H 42 H 59.7 H 36 31.8 G 40 38.8 A 39.8 A 43 3.8 OBSCURED By	USCGS 54°N 164°W; 0-12:28.9 Pas: Depth - Normal Magnitude 7.3 Great Seismic Sea Wave Large at Hawaiian Islands and on South American Coast. Numerous Aftershocks.
April 1	Ir	ePN ePZ ePcP eSE eLN F	A 19 04 14 H 14 H 06 57 A 09 28 A 12 58 20 35	Largest Aftershock. Pas: Normal Depth. Additional List of Aftershocks; giving only 1st arrivals, are found on Page 55.
April 2	Ir	ePZ eSN eLN F	H 04 20 06 A 25 33.6 A 28 10 04 46	Aftershock
April 3	Ir	iPZ e(PcP)Z eSNEZ eLZ F	H 09 05 5.8 H 07 39.1 G 10 22.1 H 12 34.5 10 58	Aftershock. Aleutian earthquake.
April 3	Id	iPNEZ eSN F	HA 22 21 11.5 A 21 15.9 22 23	
	Id	iPZ e(s)NE F	H 22 25 12.8 A 25 12.6 22 26	
April 4	Ir	ePN iPNEZ eSE F	G 21 32 12.5 HA 13.8 G 37 42.5 23 22	Aftershock
April 5	I	ePZ eZ eN F	H 21 57 46.2 H 58 18.5 20 22 03	Pasadena: Deep, Japan?
April 6	Iir	ePZ eSZ eLN eScSZ F	H 04 59 16.8 G 05 04 18.6 G 06 21.6 G 09 41.6 05 34	Aftershock of April 1 - 12 h Aleutians Pasadena - Normal Depth.

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 6	Iu	ePZ F	H 14 05 7.8 14 14	
April 6	Iu	ePZ F	H 14 05 07.9 14 10	
April 6	Iu	ePZ eZ eZ F	H 14 28 12.9 H 28 24.5 H 30 49.4 14 32	
April 6	Iu	eZ F	H 14 45 9 14 48	
April 6	IIId	iPZ eSN F	H 23 59 0.1 A 07 24 00	
April 9	Iu	ePZ eZ F	H 10 41 38.5 H 50.5 10 53	Japan?
April 10	Id	ePZ eSNZ F	H 05 12 45.4 HA 13 1.2 05 14	S - P = 15.8
April 11	IIu	ePZ eP'DiFZ ePPN e(SKS)E e(PPS)N eSSNZ eLN eNEZ F	HG 02 06 51.6 H 10 54.7 A 11 21.1 G 17 34.1 G 21 39.1 G 26 3.1 G 36.2 G 42.3 05 38	Central Atlantic BCIS 4°S 12.8°W O = 01:52:06 Pasadena: Normal Depth Magnitude 7 1/4
April 11	I	ePZ eE F	H 13 33 33.5 G 14 02 16 14 20	
April 11	Id	iPZ eSN F	H 23 56 58.9 A 57 06.3 23 59	S - P = 7.4S
April 12	Iv	e(P)Z e(S)Z F	H 10 35 45.7 H 36 39.7 10 39	Pasadena: 35.7°N 118.0°W

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 13	I	ePZ eZ eE eE F	H 06 57 44.5 G 07 26 32 G 36 47 G 37.2 08 00	Pasadena: New Hebrides?
April 13	Id	ePZ e(S)N F	H 20 20 00.4 A 12.5 20 21	S - P = 12.1
April 15	Id	iPZ iSN F	H 02 09 26.3 A 36.1 02 10	S - P = 9.8s
April 17	Iv	ePZ eZN eSN F	H 08 58 20.3 HA 23.0 A 41.2 09 00	See list page 43
April 17	IIv	iPZN eSNE F	HA 13 33 39.6 A 54.3 13 35	See list page 43
April 18	Iu	ePZ e(S)NZ e(L)NE F	H 07 14 59.9 G 23 36 G 33.8 08 38	Pasadena: Southwest Pacific
April 22	IIId	iPNEZ eNE eSNE F	HA 07 42 19.9 A 25.9 A 28.8 07 46	See list page 43
April 22	Id	iPZ eSN F	H 13 11 42.6 A 53.6 13 13	S - P = 11s
April 23	Iu	e(P)Z eN eE eNE e(L)E F	G 05 16 37 G 30 50 G 33 26 G 48 09.2 G 53.3 07 48	Pasadena: In Region of 51°S 140°E according to Riverview.
April 23	Id	iPZN eSEN F	HA 10 39 21.8 A 32.8 10 41	See list page 43

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Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
April 23	Iu	iPZ eZ eSE eLNZ F	HG 10 51 17.8 G 36.3 G 11 00 35.8 G 11 12.1 12 24	Pasadena: Deep, Region of Samoa
April 25	Iv	ePZ eSNE F	H 11 46 9.3 A 11 46 24.2 11 48	See list page 43
April 25	Id	ePZ eSZN F	H 21 09 29.8 37.4 21 11	
April 25	IIId	iPZN iSN F	HA 21 50 46.4 52.3 21 54	See list page 43
April 26	Iu	e(P)Z eZNE F	H 08 18 48.8 HA 49.6 08 19	Japan?
April 27	I	e(P)Z eNE F	H 00 18 59.2 G 29.9 00 42	Pasadena: Deep
April 27	Iv	iPZ eZN eSN F	H 02 19 15.9 HA 19.6 A 58.6 02 21	Pasadena: Region of Mina, Nevada.
April 28	Id	iPZ eSN F	H 15 51 11.8 21.1 15 52	See list page 43
April 29	Id	iPZ iSNE F	H 19 39 17.3 A 23.3 19 40	See list page 43
May 2	IIId	iPNEZ eE eNE F	HA 01 26 23.1 A 32.6 A 27 54.7 01 35	See list page 43
May 2	Id	iPZNE eN eE eSNE F	HA 02 11 47.7 A 49.2 A 50.7 A 56.5 02 14	See list page 43

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Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
May 2	Id	iPZ eSNE F	H 09 53 38.2 A 38.5 09 54	
May 2	Id	iPZ eSNE F	H 19 09 46.8 A 57.6 19 10 30	See list page 43
May 3	IIIu	ePZ eE eZ eE eZ eLE e(P)Z F	H 22 14 30.0 G 29 20.6 H 36 47.0 A 37 45.6 H 40 15.1 A 45.5 H 47 15.1 02 54	Pasadena: First of series of shocks with overlapping seismograms, probably from same source. Magnitude about 7 1/4 USCGS: Largest shock of series: O = 22:23.4 9°S 153°E
May 7	Iv	ePNZ eN eSNE F	HA 04 53 21.2 A 44.9 A 54 1.8 05 00	About 50 km West of Ferndale. Magnitude 4.7
May 8	IIu	eP'Z eE ePPZ e(PKS)E e(SKS)N e(PS)Z eSSE F	H 05 39 27.8 G 34.1 G 41 12.1 G 42 58.2 G 47 0.1 G 53 02.6 G 59 07.2 08 49	Pasadena: Normal? Magnitude about 7 1/4 USCGS: 1°S 98°E O = 05:20.3
May 8	IIu	ePZ eSKSZ e(PS)E e(PPS)N eSSE e(SSS)Z eLE F	H 09 58 52.0 G 10 09 19.5 G 11 26.5 G 12 10.0 G 16 43.5 G 20 06.5 G 28.5 12 54	Pasadena: Normal New Britian
May 15	IIr	ePZ e(PP)NZ eSN iZ eLN eME F	H 22 16 59 G 18 36.4 A 22 21.0 G 23 12.5 G 25.7 G 26.3 00 39	USCGS: 16°N 96°W O = 22:10.6 Pasadena: Normal

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Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
May 16	Iu	iPEZ eE iN e(S)E eLN F	HG 05 38 02.1 G 44 28.8 G 48 38.1 G 49 55.5 G 06 01.7 07 04	Pasadena: Deep Magnitude 7 ?
May 18	Iv	eZ eZ eSN F	H 06 46 23.6 H 29.5 A 47 7.6 06 50.5	Pasadena: 37°22'N 118°50'W O = 06:45:48
May 18	Id	iPNEZ eSNE F	HA 13 43 27.4 A 30.7 13 44	
May 19	Iu	ePZ eSNE eL F	G 00 40 22.4 G 47 31 G 00 52.6 01 18	BCIS 58°N 167 1/2E
May 21	Iu	iPZ epPZ e(PP) e(PcS) eSE eScSN eLN F	H 09 26 41.8 G 52.6 G 28 55 G 31 25.6 G 34 45.0 G 36 11 G 44.5 10 34	USCGS 14.2°N 60.8°W. O = 09:16.6 Damage on Martinique Pasadena: Magnitude 7 Depth about 50 km.
May 22	Id	iPZ eSNZ F	H 22 59 44.1 52.7 23 0.4	
May 25	Iv	ePZ eZ eSNZ eNZ F	H 12 01 57.3 H 02 0.3 HA 18.0 HA 22.0 12 04	See list page 43
May 29	IId	ePNEZ eSNEZ F	HA 05 58 0.1 02.2 06 00	
May 29	IIV	iPZN eNE eSNE F	HA 17 51 24.4 A 26.3 A 42.0 17 55.6	See list page 43
May 31	Iu	iPZ iSN eE eIE	G 03 30 47.0 G 39 57.5 G 52 55.0 G 04 0.5	Destructive in Eastern Turkey. Region of 39°N 42°E

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Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
June 5	Iu	eN iE iE eLNE F	G 01 16 31.0 G 17 26.5 G 22 43.5 G 32.9 02 14	
June 6	Iu	eLE	G 11 24.8	Pasadena: Normal.
June 6	Id	iPNEZ eSNE F	HA 22 29 13.8 23.8 22 30.1	
June 7	IIR	iEZ ipPN iPcPZ iSE eZ eLN F	G 04 19 44.0 G 20 16.5 G 22 27.5 G 24 56.0 G 26 45.0 G 04 29.3 06 38	USCGS 17°N 94°W O = 04:13.3 Depth slightly greater than 100 km.
June 10	Id	ePZ eSN F	H 21 56 33.8 A 39.4 21 57.5	
June 12	Iu	iPZ eSE iE eLN F	G 16 20 58.6 G 31 9.0 G 30.0 G 43.7 18 13	USSR: 18°N 147.5°E Pasadena: 13°N 145°E O = 16:08.3 Normal Depth.
June 15	Iu	ePZE eE eE eLZ eN F	G 18 48 04.1 G 54 4.9 G 19 03 6.9 G 18.1 G 23.1 20 08	USSR 0°, 129°E Pasadena: Mag. 6 3/4 to 7 Normal Depth.
June 20	Id	iPZ eSNEZ F	H 21 26 25.4 HA 31.3 21 27	
June 21	Iv	ePNZ eN eSNZ eNEZ F	HA 03 34 54.1 A 35 04.3 HA 24.9 HA 26.9 03 37	About 25 km. North of Mineral. Magnitude 4.7

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Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
June 21	Iv	ePNZ eZ eSNEZ F	HA 09 23 43.8 H 52.5 HA 24 14.6 09 26	About 35 km. North of Mineral. Magnitude 4.5
June 21	Id	iPZN eSNEZ F	HA 22 59 14.4 HA 23 00 19.9	
June 23	Iir	ePE iN i(S)E iN eLNE F	A 17 16 14.9 A 17 23.4 A 18 0.4 A 17 19.6 18 28	USCGS: 49.9°N 125.3°W O = 17:13:20 Destructive on Vancouver Island Pasadena: Normal Magnitude about 7.
June 23	Id	iPZ eSNZ F	H 20 57 58.0 HA 20 58 07.5 20 58.6	
June 24	Ir	ePZ eSNE F	H 12 29 03.0 G 33 7.5 13 18	
June 24	Ir	iPZ eE eN iN F	H 15 56 01.5 G 57 55 G 16 00 34.0 G 16 02 04.0 16 28	USCGS: 14°N 91°W O = 15:48.0 J.S.A. 14.9°N 89.7°W O = 15:48:16 Depth = 200 km.
June 24	Id	iPZ iSNEZ F	H 21 18 40.1 HA 21 19.5 46.1	
June 25	Iu	ePZ ipPZ eZ eSNE eLN F	H 14 18 10.5 HG 23.0 H 27 35.5 28 52.0 47.3 15 08	
June 26	I	e(P)Z e(S)Z iN eIE F	H 04 43 46.9 H 49 20.4 G 50 02.0 56.4 05 28	

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Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
June 26	Ir	iPZ iPcPZ iSN iScSE eIE F	H 08 00 36.3 H 03 01.3 G 06 06.5 G 10 47.5 G 10.8 09 03	USCGS: 14°N 91°W O = 07:53.6 Pasadena: Deep
June 26	Iu	e(P)Z eZ eIE F	G 12 52 35.0 G 13 01 15.0 G 16.8 15 18	Padadena: Normal Wellington: 43.2°S 171.5°E O = 12:34.7 M = 6.
June 26	Id	ePZ eSN F	H 21 43 45.7 A 51.9 21 44.6	
June 27	Iu	ePE ipPZ eLNE F	G 21 52 18.5 G 33.0 G 22 18.5 22 55	Pasadena: Normal
June 28	Iu	eLN F	G 07 59.5 08 50	Padadena: South Island New Zealand.
June 28	Id	ePZ eSEZ eNZ F	H 21 18 40.5 HA 51.4 HA 52.0 21 19	
April 1	Ir	iZ	H 12 59 10.7	Aftershocks for Aleutian earthquake of April 1 at 12:35:22.8
"	Ir	iZ	H 13 02 18.1	
"	Ir	iZ	H 04 03.3	
"	Ir	iZ	H 08 46.4	
"	Ir	iZ	H 26 29.4	
"	Ir	iZ	H 35 18.1	
"	Ir	iZ	H 41 00.0	
"	Ir	iZ	H 47 03.3	
"	Ir	iZ	H 15 26 51.5	
"	Ir	iZ	H 57 05.5	
"	Ir	eNZ	AH 17 06 05.3	
"	Ir	eNZ	AH 18 36 05.5	
April 2	Ir	eZ	H 05 44 40.7	
"	Ir	iE	G 05 52 07.0	
"	Ir	eZN	HA 06 03 36	
"	Ir	iZ	H 12 41 39	
"	Ir	iZN	HA 13 10 52.9	
"	Ir	iZ	H 16 36 58.7	

MOUNT HAMILTON

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

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Latitude and longitude:

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

Time -- All determinations are reduced to Greenwich Civil Time.

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

Apparatus	Component
Wood- Anderson	E N

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 1	Ir	ePE eSNE eLN F	A 12 35 43.5 40 49.3 42 45.7	Aleutian Earthquake USCGS: 54°N 164°W O = 12:28.9 End Obscured by Aftershocks.
April 1	Ir	ePN eSN eLN F	19 04 17.6 08 47 12 19.5	Aftershock to Aleutian Earthquake Obscured by Aftershocks
April 2	Ir	eE F	16 37 4.1 17 16	Aftershock
April 11	Iu	eN eLE F	02 15 1.7 25.8 03 26	Central Atlantic BCIS 4.0°S 12.8°W O = 01:52:06 Pasadena: Normal Depth Magnitude 7 1/4
April 12	Iv	eE eNE F	10 36 08.9 40.6 10 38	
April 15	Id	iPNE F	02 09 16.6 02 11	
April 16	I	ePE eNE F	10 38 03.3 47.5 10 41	
April 17	Id	ePNE eSNE F	08 58 9.8 21.2 09 00	See list page 43
April 17	IIId	iPN eSE F	13 33 28.4 33.6 13 36	See list page 43
April 19	Id	ePNE iSNE F	20 04 46.3 49 20 05 30	S - P = 2.7
April 22	IIId	iPNE eSNE F	07 42 15.5 21.1 07 47	See list page 43
April 23	IIId	iPNE e(S)N F	10 39 9.0 10.3 10 41	See list page 43

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
April 25	Id	ePNE eSNE F	11 45 58.2 46 4.7 11 47	See list page 43
April 25	IIId	iPNE F	21 50 44.6 21 54	See list page 43
April 27	Iv	ePNE eSNE F	02 19 12.9 51.2 02 24	Pasadena: Region of Mina, Nevada.
April 28	Id	ePNE eSE F	15 51 06.6 12.2 15 53	See list page 43
April 29	Id	ePNE eSNE F	19 39 15.4 20.1 19 40	See list page 43
May 1	Iv	ePNE eSE F	19 31 0.2 43.7 17 35	Pasadena: East of Tinemaha.
May 2	IIId	iPE iE F	01 26 18.9 27 15.4 01 41	See list page 43
May 2	IIId	iPE eSE F	02 11 43.4 48.6 02 14	See list page 43
May 2	IIId	iPNE eSNE F	19 09 36.6 38.2 19 12	See list page 43
May 3	Id	ePNE iSNE	00 33 44.2 49.7	
May 3	Iu	eE eN eE eE eLE F	22 36 13.7 37 06.7 40 35.7 47 15.7 23 04.4 00 56	Pasadena: First of overlapping series of shocks. Magnitude about 7 1/4 USCGS: Largest shock. O = 22:23.4 9°S 153°E

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.) h. m. s.	Remarks
1946				
May 7	Iu	ePNE eNE eSE F	04 53 32.2 54 3.2 22.0 05 01	About 50 km. West of Ferndale Magnitude 4.7
May 9	Ir	ePE eE eSE F	23 38 48.8 42 22.8 43 38.8 00 11	USCGS: 22°N 108°W O = 23:34.4
May 15	Ir	ePN eIN	22 16 57.3 25.9	Pasadena: Normal USCGS: 16°N 96°W O = 22:10.6
May 15	Ir	ePN eLE eN F	22 30 39.8 40.3 41 06.3 22 56	Pasadena: Normal Near 16°N 96°W
May 18	Iv	ePNE eSNE eNE F	03 55 56.7 56 31.4 34.0 03 59	Pasadena: 37°22'N 118°50'W O = 03:55:00
May 18	Iv	ePNE eSN F	06 46 16 49.5 06 49	Pasadena: 37°22'N 118°50'W O = 06:45:48
May 21	Iu	ePE eNE F	09 26 37.5 55.3 09 41	USCGS: 14.2°N 60.8°W O = 09:16.6 Pasadena - magnitude 7 Depth about 50 km.
May 25	Id	ePN iSNE F	12 01 47.4 59.6 12 04	See list page 43
May 28	Id	ePN eSN F	04 09 3.1 3.6 04 10	
May 29	IIId	iPNE eSNE F	17 51 14.9 22.8 17 56	See list page 43
June 5	Iv	ePNE eSN F	22 00 22.7 01 8.7 22 04	

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
June 7	Ir	eNE eNE eLE F	04 19 45.6 20 5.1 31 51.6 04 46	USCGS: 17°N 94°W O = 04:13.3 Depth slightly greater than 100 km.
June 21	Iv	ePN eSN F	03 35 01.5 37.5 03 39	About 25 km. north of Mineral Magnitude 4.7
June 21	Iv	ePE eSN F	09 23 52.3 24 29.8 09 29	About 35 km. north of Mineral Magnitude 4.5
June 23	IId	iPNE iSNE F	20 57 46.7 48.5 20 59	
June 25	IId	iPNE iSNE F	21 22 16.1 17.3 21 24	

PALO ALTO

THE BRANNER STATION, STANFORD UNIVERSITY
PALO ALTO, CALIFORNIA

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Latitude and longitude:

$$\phi = 37^{\circ} 25' 11'' \text{ N.}$$

$$\lambda = 122^{\circ} 10' 18'' \text{ W.}$$

Time -- All determinations are reduced to Greenwich Civil Time.

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

Apparatus	Component
Wood-Anderson	E N

PALO ALTO

Date	Char-acter	Phase	Time(G.C.T.)		Remarks
			h.	m. s.	
1946					
April 1	Iir	eE eIE F	A 12 35 05 A 40 44.9		Aleutian Quake USCGS: 54°N 164°W O = 12:28.9 Obscured by Aftershocks
April 1	Ir	ePN eSN eLN F	A 19 04 10.4 09 38.5 12 52 19 30		Aftershock
April 6	IId	iPNE eSNE F	22 25 51 53.1 22 27		S - P = 2.1
April 8	IId	iPNE eSNE F	22 14 06.7 10 22 16		S - P = 3.3
April 11	Iu	eE eE eLN F	02 11 21 26 9.6 35.6 02 15		Central Atlantic BCIS 4°S 12.8°W O = 01:52:06 Pasadena: Normal Depth Magnitude 7 1/4
April 15	Id	ePNE eSN F	02 09 25.7 31.0 02 11		S - P = 5.3
April 17	Id	ePNE eSNE F	08 58 20.3 35.7 08 02		See list page 43
April 17	IId	ePN eSNE F	13 33 31.8 40.3 13 37		See list page 43
April 19	IId	iPNE eSE F	19 00 15.0 16.1 19 02		S - P = 1.1
April 22	IId	ePN iSN F	07 42 19.5 26.7 07 48		See list page 43
April 23	Id	ePE eSN F	10 39 14.7 25.3 10 42		See list page 43
April 25	Id	ePNE eSNE F	11 45 58.2 46 4.7 11 47		See list page 43

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)		Remarks
			h.	m. s.	
1946					
April 25	IId	iPNE iSNE eNE F	21 50 43.6 47.5 52 22.6 21 57		See list page 43
April 27	IIV	ePN eNE eSE F	02 19 17.5 28 20 01.0 02 24		Pasadena - Region of Mina, Nevada
April 28	Id	ePNE eSN F	15 51 12.1 18.2 15 54		See list page 43
April 29	IId	eSE F	19 39 18.3 19 41		See list page 43
April 29	IId	iPNE iSNE F	22 03 48.3 50.8 22 05		
May 1	Iv	ePNE eN e(S)NE F	17 31 07.0 49.4 57.9 17 34		
May 2	IIId	iPE eSN F	01 26 22.6 30.0 01 39		See list page 43
May 2	IId	ePNE eNE iSNE F	02 11 47.0 53.9 55.0 02 14		See list page 43
May 2	Id	ePNE eSNE F	19 09 41.9 47.8 19 11		See list page 43
May 3	IIu	e(P)NE eE eE eN eE eN eLE F	22 14 19.6 36 6.6 12.1 47 12.6 48 46.6 23 00 50.6 04.2 23 50		Pasadena: First of series of overlapping shocks. Magnitude about 7 1/4 USCGS - largest shock O = 22:23.4 9°S 153°E

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
May 7	Iv	ePNE eNE eSN F	04 53 27.7 54.8 54 12.3 05 02	About 50 km. West of Ferndale. Magnitude 4.7
May 7	IIId	iPNE eSE F	20 40 0.0 2.1 20 42	
May 9	Ir	ePE eN eN eLN F	23 38 14.1 53.1 39 30.8 43.7 24 00	USCGS 22°N 108°W O = 23:34.4
May 15	Ir	e(L)N	22 26.1	USCGS 16°N 96°W O = 22:10.6
May 15	Ir	e(P)N F	22 31 3.9 22 50	Near 16°N 96°W Pasadena: Normal
May 21	Iu	ePNE eE F	09 26 44.4 27 16.9 09 29	USCGS 14.2°N 60.8°W O = 09:16.6 Pasadena: Magnitude 7 Depth about 50 km.
May 21	Id	ePNE eSN F	22 59 42 52 23 02	
May 23	IIId	iPN iSN eN F	01 03 54.0 57.3 04 05.1 01 05	
May 25	Iv	ePN eNE eSE eE F	12 01 51.9 55.9 02 5.0 8.5 12 05	See list page 43
May 27	IIId	iPNE iSN F	22 31 0.2 1.7 22 32	
May 28	Id	ePNE eSN F	05 58 05.6 11.4 06 00	

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
May 29	IIId	iPNE e(S)E F	17 51 19.1 34.5 17 56	See list page 43
June 5	IIId	iPNE iSNE F	02 00 08 11.7 02 02	
June 5	I	ePNE eN eE F	22 00 30.4 01 10.4 13.1 22 04	
June 5	Id	ePN eSNE F	22 59 05.4 12.1 23 01	
June 7	Iu	ePNE eN eN eSE eLN F	04 19 43.4 51.6 20 21.1 24 55 30.1 04 48	USCGS 17°N 94°W O = 04:13.3 Depth slightly greater than 100 km.
June 13	Id	ePN eSE F	21 36 57.6 37 05.1 21 38	Blast ?
June 18	IIId	iPNE eSNE F	20 50 28.8 31.0 20 52	
June 21	Iv	ePNE eSE F	03 35 0.2 36.3 03 40	About 25 km. North of Mineral. Magnitude 4.7
June 21	Iv	ePN eN eSN F	09 23 49.2 52.1 24 25.7 09 29	About 35 km. North of Mineral Magnitude 4.5
June 28	Id	ePN eSE F	21 18 45.4 53.4 21 21	Blast ?
June 28	Id	ePNE eSE F	22 32 46.9 59.4 22 50	Blast ?

SAN FRANCISCO

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

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Latitude and longitude:

$\phi = 37^{\circ} 46' 14''$ N.
 $\lambda = 122^{\circ} 27' 12''$ W.

Time -- All determinations are reduced to Greenwich Civil Time.

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

Apparatus	Component
Wood-Anderson	E 15°S N

SAN FRANCISCO

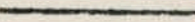
Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 1	IIr	eE eLN F	A 12 35 35.3 A 42 38.1	Aleutian earthquake USCGS 54°N 164°W 0 = 12:28.9 Obscured by Aftershocks.
April 17	Iv	ePNE e(S)NE F	08 58 23.2 41.0 09 00	See list page 43
April 17	IIv	eN eSN F	13 33 38.2 52.9 13 35	See list page 43
April 22	IIId	ePNE eNE eSNE F	07 42 21.8 31.6 32.3 07 46	See list page 43
April 22	Id	ePE eSE F	10 39 22.8 32.7 10 40 30	See list page 43
April 25	Iv	eSNE F	11 46 24.7 11 47	See list page 43
April 25	IIId	iPNE iSNE F	21 50 48 54.2 21 54	See list page 43
May 7	Iv	ePE eSE F	04 53 21.6 54 00.0 04 57	About 50 km. West of Ferndale. Magnitude 4.7
May 22	Id	ePNE eNE F	22 59 45 59 23 01	
May 29	IIId	iPNE iSNE F	05 58 3.5 7.0 06 00	
May 29	IIv	ePN eE eSNE F	17 51 25.0 28.9 41.0 17 55	See list page 43
June 11	Id	ePNE eSE F	21 57 53.3 59.3 22 00	

SAN FRANCISCO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
June 21	Iv	ePNE eSN F	03	34	57.4 30.7	About 25 km. North of Mineral Magnitude 4.7
June 21	Iv	ePNE eSNE F	09	23	46.4 19.5	About 35 km. North of Mineral Magnitude 4.5
June 28	Id	ePN eSN F	21	18	48 52	
			21	20		

FRESNO

THE FRESNO STATION, FRESNO STATE COLLEGE
FRESNO, CALIFORNIA



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Latitude and longitude:

$\phi = 36^{\circ} 46' 11''$ N.
 $\lambda = 119^{\circ} 47' 8''$ W.

Time -- All determinations are reduced to Greenwich Civil Time.

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

Apparatus	Component
Wood-Anderson	N

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
			h. m s.	
1946				
April 1	Ir	ePN eN eSN eN F	A 12 35 56.5 36 19.0 41 25.5 43 32.5 15 00 +ca	Aleutian earthquake USCGS 54°N 164°W
April 1	Ir	ePN eN e(L)N F	A 19 04 37 05 34.9 13 35.9 19 45	Aftershock
April 2	Ir	ePN F	A 13 11 14 13 20	Aftershock
April 2	Ir	ePN F	A 14 34 21.2 14 55	Aftershock
April 2	Ir	ePN F	A 16 22 19 16 58	Aftershock
April 3	Ir	ePN F	A 09 05 38 09 22	Aftershock
April 4	Iv	ePN eSN F	15 45 03 26 15 47	Pasadena: 35.7°N, 118.0°W. Magnitude 3.7
April 4	Ir	ePN eSN F	21 32 32 38 2.5 21 42	Aftershock
April 6	Ir	ePN ePPN eSN F	04 59 33 05 00 43 04 56.5 05 22	Aftershock
April 12	Iv	ePN eSN F	10 35 6.1 28.4 10 37	Pasadena: 35.7N 118.0W
April 17	Id	ePN e(S)N F	08 58 21.9 34.7 09 02	See list page 43
April 17	Iv	eN eSN F	13 34 5.6 7.9 13 39	See list page 43

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
			h. m. s.	
1946				
April 22	Iv	eN eSN eN F	07 42 48.4 59.1 43 6.1 07 48	See list page 43
April 24	Iv	ePN eSN F	07 46 38.7 47 2.2 07 53	Pasadena: 35.7N 118.0W
April 25	Iv	e(P)N eSN F	21 51 15.5 33.4 21 57	
April 27	IIv	ePN eSN F	02 19 0.1 25.5 02 29	Pasadena - Region of Mina, Nevada
April 27	Iv	ePN eSN F	22 38 04 16 22 41	
May 1	IIv	ePN eN e(S)N F	17 30 38.4 31 40 57 17 36	Pasadena: East of Tinemaha
May 2	IIv	ePN eN eN F	01 26 41.8 43.8 59.9 01 42	See list page 43
May 3	Iu	eN eLN F	22 37 23.6 23 1.6 23 52	
May 5	Iv	ePN eSN F	09 08 14.3 37.0 09 15	
May 7	Iv	ePN eN F	04 53 53 55 8.5 05 06	About 50 Km. West of Ferndale. Magnitude 4.7
May 15	Ir	ePN eN	22 16 51.8 27 39.8	Pasadena: Normal USCGS: 16°N 96°W 0 = 22:10.6
May 15	Ir	ePN e(L)N F	22 30 32 40 22 22 56	Near 16°N 96°W

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
May 18	Iv	ePN eSN F	03	55	37 54	Pasadena: 37°22'N 118°50'W 0 = 03:55:00
May 18	Iv	e(P)N eN eSN F	06	45	54.8 59.3 46 13.7	Pasadena: 37°22'N 118°50'W 0 = 06:45:48
May 25	Iv	ePN eSN eN eN F	12	01	51.3 02 07.0 03 49.8 04 14.8	See list page 43
May 29	Iiv	ePN eN eSN eN F	17	51	31.5 38.0 46.2 53 23.4	See list page 43
June 2	Iv	ePN eSN eN F	14	47	55 48 09.3 49.9	
June 4	Iv	ePN eSN F	22	06	43.6 07 43.6	
June 7	Iu	ePN eN eN eN F	04	19	24.7 39.7 20 0.4 23 51.7	USCGS 17°N 94°W 0 = 04:13.3 Depth slightly greater than 100 Km.
June 12	Iv	ePN eSN F	20	21	23.7 36.8	Pasadena: 35°46'N 118°01'W North of Walker Pass 0 = 20:20:42
June 21	Iv	e(P)N eN eSN eN F	03	35	19.1 36 6.3 36 09.0 12.4	About 25 Km. North of Mineral. Magnitude 4.7
			03	48		

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
June 21	Iv	eN eN eSN eN F	09	24	10.5 20.4 56.5 25 0.3	About 35 Km. North of Mineral Magnitude 4.5
June 25	Iv	ePN eN eSN F	20	25	50.4 58.9 26 16.4	Pasadena: 35°45'N 117°32'W 0 = 20:25:19 West of Searles Lake.
June 26	Iv	ePN eSN F	02	14	38.1 15 1.6	Pasadena: 35°45'N 117°32'W 0 = 02:14:04 West of Searles Lake.
June 26	I	ePN eN F	08	00	15.3 05 21.8	USCGS: 14°N 91°W 0 = 07:53.6 Pasadena: Deep
June 26	Iv	ePN eSN F	13	18	54.1 19 22.6	Pasadena: 34°38'N 118°51'W 0 = 13:18:14 West of Searles Lake.
			13	24		

MINERAL

THE MINERAL STATION
MINERAL, CALIFORNIA

CONSTANTS

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Latitude and longitude:

ϕ = 40° 21' N.
 λ = 121° 35' W.

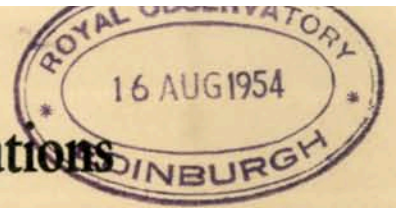
Time -- All determinations are reduced to Greenwich Civil Time.

Altitude -- 1495 Meters (4906 feet) above mean sea level.

Apparatus	Component
Wood-Anderson	E

MINERAL

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
April 1	Ir	ePE eSE eLE F	A 12 35 09.0 40 19.1 44.9 15 24	Aleutian earthquake USCGS 54°N 164°W 0 = 12:28.9
April 1	Ir	ePE e(S)E e(L)E F	19 04 04.7 09 10 11 12 19 35	Aftershock
April 4	Ir	ePE F	21 32 02.3 21 34	Aftershock
April 6	IId	iPE iSE F	04 00 33.9 37.8 04 01	S - P = 3.5 sec.
April 11	Iu	eE eE F	02 20.7 25.8 02 58	Central Atlantic BCIS 4.0°S 12.8°W 0 = 01:52:06 Pasadena: Normal Depth Magnitude 7 1/4



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—FERNDALE—FRESNO—MINERAL

From July 1, 1946, to September 30, 1946

BY
JOHN B. FARR
AND
BURL A. TULLER

UNIVERSITY OF CALIFORNIA PRESS
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EARTHQUAKE INTENSITY SCALE

Intensities are given by Roman numerals in the list of California earthquakes on the following page, when sufficient information on the effects of the quake is available. Criteria of the Modified Mercalli Scale which are used to rate the intensity are:

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.

EARTHQUAKE MAGNITUDE SCALE

Richter magnitudes given in the list of epicenters on the next page are found from the Wood-Anderson amplitudes, using the nomogram by Nordquist, "Bulletin of the Seismological Society of America," 32:164.

- - - - -

Latitude and longitude are given for each epicenter in the following 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

1946 - Pacific Standard Time

<u>No.</u>	<u>Date</u>	<u>Origin Time</u>	<u>Richter Magnitude</u>	<u>Latitude North</u>	<u>Longitude West</u>	<u>Quality</u>
1	July 6	22-55-15	5.0	40° 30'	121° 30'	b
Felt over an area of approximately 7000 square miles in Northern California. The outer limits of the felt area extended from Shasta Dam southeast to Susanville and Milford, south through Portola to Emigrant Gap, west through Grass Valley northerly through Gridley, Chico, Redding to Shasta Dam. A maximum intensity of VI was reported from Mill Creek and Mineral. Other intensities, V Caribou and Grass Valley; IV Chester, Chico, Dutch Flat, Gridley, Quincy, Redding, Susanville; III Marysville.						
2	July 13	15-12-20.4	3.4	37° 42'	121° 30'	a
3	July 14	02-16-43.5	2.4	37° 30'	121° 41'	b
4	Aug. 4	20-08-44.7	4.1	36° 51'	121° 47'	c
Intensity IV in Alma, Alviso, Aptos, Los Gatos, San Gregorio and Watsonville; III San Francisco.						
5	Aug. 14	13-57-58.7	3.2	37° 43'	122° 44'	b
Intensity IV Rockaway Beach; III San Francisco and Oakland.						
6	Sept. 24	16-03-45.5	2.2	37° 28'	121° 27' W	d

THE REGISTRATION OF EARTHQUAKES

SYMBOLS AND NOTATIONS EMPLOYED

1. Character of the Seismogram --

- 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. Nature of the Motion --

- i (impetus) Sudden beginning of the motion.
- e (emersio) Gradual beginning of the motion.

BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$$\phi = 37^{\circ} 52' 13'' \text{ N.}$$

$$\lambda = 122^{\circ} 15' 16'' \text{ W.}$$

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 ₀	ε	r	
		T ₀ ²				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	3000		0.9	15		
	N	3000		0.9	15		
Galitzin.....	E	K	T	T ₁	μ ²	A ₁ (cm)	l(cm)
		112	12	11.8	0.00	115	11.3
		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

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 1	Ir	eSE eN eZ eLN eZ eE iE eZN F	G 03 04 03.5 G 22.0 G 30.5 G 07 45.5 G 50.0 G 08 27 G 11.1 G 11.5 03 40	USCGS: 64°N 148°W O = 02- 52.4
July 1	Iu	ePN e(PP)Z eSN eN iGN eLZ F	G 22 48 22.5 G 51 54.5 G 58 42.1 G 23 04 37.5 G 12 10 G 15.2 00 50	Pasadena: Normal ? Southwest Pacific
July 7	IIv	ePZ eNE eSNE	H 06 55 57.2 A 56 18.0 A 28.4	Pasadena: Intensity VI in the region of Mt. Lassen Magnitude 5. See list page 77
July 7	IIv	ePZ eSEZ F	H 06 59 14 HA 45.6 07 04	Aftershock, same region as above
July 7	Iv	ePZ F	H 07 31 50.6 07 33.4	Aftershock of 06- 55- 57.2
July 8	Iu	e(P)Z e(S)ZE eE eLE	G 18 01 00.0 G 11 20.5 G 16 56.5 G 26.4	Pasadena: Normal Southwest Pacific
July 9	IIu	iPZ iSN eZ eSSN eIE F	H 01 20 13.5 G 30 04.5 G 31 28.0 G 34 54.5 G 39.9 04 34	Pasadena: Tonga Islands Approximately 20°S 175°W O = 01:08.2 Normal, Magnitude about 6 3/4
July 9	Iu	iPZ ipPZ iPPZ iE iSE e(PPS)E e(P'P')N F	H 13 26 14.1 G 59.0 G 29 36.5 G 30 43.5 G 36 22.5 G 38.5 G 53.3 15 29	Pasadena: 19°S 169°E O = 13- 13- 50 h = 170 km.

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 11	IIr	iPN ipPZ iSN i(sS)N e(SS)Z F	G 04 53 02.9 29.6 58 05.9 42.0 05 03 07 17	USCGS: 17°N 04°W O = 04:46.6 Felt at Mexico City Pasadena: Magnitude 7 h = 130 km.
July 12	Ir	ePZN epPZ e(sP)Z eZ eZ F	HG 22 03 17.3 H 39.8 H 04 0.8 H 27.8 H 08 49 22 19	Pasadena: 53 1/2°N 169°W O = 21:56:27 h = 100 km ± Magnitude = 6 3/4
July 13	Id	ePZ eZ eSNZ F	H 00 53 01.8 H 06.8 HA 7.8 00 54.4	Blast
July 13	IIId	iPNZ eN eSN F	HA 23 12 32.8 A 34.8 A 41.4 23 14.1	See list page 80
July 14	Id	ePZ e(S)NZ eNZ F	H 10 16 55.9 HA 17 04.6 HA 17 05.5 10 17.6	
July 18	Iv	e(P)Z eSNZ F	H 05 04 16.1 HA 22.1 05 04.9	
July 18	Ir	iPZ eSZE e(L)N eN F	H 06 10 03.5 HA 12 37.4 A 13 48.7 A 14 32.8 07 00	USCGS: 50°N 129°W O = 06:07.1 Pasadena: Normal
July 18	Ir	iPZ eSZN e(L)N eN F	H 07 19 24.0 HA 22 05.7 A 23.2 A 24.3 Last in next	Aftershock Quake.

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)		Remarks
			h.	m. s.	
1946					
July 18	Ir	iPZ iZ eSZ F	H 07 23 25 07 54	11.4 13.4 55.4	Aftershock
July 18	Ir	iPZ iSN iZN iN F	H 14 29 A 31 HA 23.1 A 32 14 42	27.6 05.2 23.1 04.9	Pasadena: Felt in and around the Mojave Desert. Maximum reported intensity VI 34°32'N 115°59'W O = 14:27:58 Magnitude about 5 3/4
July 19	Iu	iPZ eSZ eGE eLZ eME F	G 21 27 G 36 G 46.8 G 50.0 G 54.8 23 00	38.5 40.5 46.8 50.0 54.8	Pasadena: Normal ? Approximately 35°N 142°E O = 21:16.0 Off Japan
July 22	IId	iPNEZ F	HA 11 39 11 40.3	55.8 40.3	
July 22	Iv	ePZ eNZ F	H 15 20 HA 21 15 22	37.3 36.2	Pasadena: 35°44'N 118°02'W O = 15:19:33 Magnitude 4.1
July 23	Iv	ePZ eZ F	H 11 26 H 29 11 30	59.8 00	Pasadena: 35°50'N 118°00'W O = 11- 25- 58 Magnitude 3.4
July 23	Iu	iPZ iN eSN eLE eN F	H 17 26 G 28 G 37 G 53.3 G 59.6 18 29	57.8 00.8 42.5 53.3 59.6	New Hebrides
July 24	Iv	ePZ eZ e(S)NZ F	H 00 20 H 18.2 HA 51.7 00 30	13.6 18.2 51.7	Pasadena: 35°06'N 119°05'W O = 00- 19:08 Magnitude = 4.0 North of Wheeler Ridge. Felt at Taft.
July 24	Iu	eE eNE F	G 11 23 G 29 12 30	16 22	Pasadena: New Hebrides Deep ?

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)		Remarks
			h.	m. s.	
1946					
July 25	Ir	iPZ iPPZ iE eSN eGZ eLN eMZ F	G 16 50 G 51 G 55 G 59 17 01.7 6.0 18 29	04.4 08.3 55.0 45.0 11.3	USCGS 51°N 179°W O = 16:42:1 Pasadena: Normal Magnitude 6 3/4
July 26	Iu	iPN epPNZ iSN eSSN eLN eMN F	G 06 56 G 46 G 07 06 G 11 G 21.8 G 27.7 08 34	31.1 46 12.9 12.6 21.8 27.7	USCGS: 21.6°S 70.0°W O = 06:44.7 ISA: 19.8°S 70.9°W O = 06:44:53 h = 80 km. Pasadena: 18 1/2°S 70 1/2°W O = 06:44:50 h = 70 km. Magnitude 6 3/4 to 7
July 26	Iu	ePE epPZ eSN eE e(G)E e(L)N F	G 22 44 G 49.0 54 55 23 03 8.9 23 39	28 49.0 37.6 21.5 40.0	Pasadena: 21°S 170°E O = 22:31.9 h = 100 km.
July 27	I	eLN F	G 06 05.6 06 34		
July 27	Iu	ePZ eZ eSZ eLE eE F	H 21 55 G 19.8 G 22 05 G 20.3 G 25.6 22 39	07.8 19.8 30.1 20.3 25.6	Pasadena: New Hebrides
July 30	I	eLN F	G 18 50.0 19 30		Pasadena: Normal ?
July 31	I	eLE F	G 13 53.3 14 20		
Aug. 1	Id	ePZ eZ eNZ F	H 23 39 H 18.1 AH 19.6 23 40	13.6 18.1 19.6	
Aug. 2	Iv	eSN eE eNEL F	01 49.8 A 51.9 A 53.0 02 39		

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 2	IIu	iPNEZ iPN iE iPPE iZ iSE eSNE iSN eZ iSSE iN eLNE eMNEZ F	BH 19 30 59.0 A 59.5 A 31 00.0 A 34 00.0 H 12.5 A 41 02.0 B 03 A 04.0 H 05.5 G 46 22.0 G 27.0 G 51.8 G 58.0 22 14	USCGS: 27°S 70°W O = 19- 18.7 Magnitude 7.5 h = 50 km.
Aug. 3	Iu	iPZ eSE eNE F	H 13 17 55.5 G 26 59.0 G 39.7 13 44	BCIS: 37.6°N 141°E O = 13- 06- 20
Aug. 4	Iu	iPZ epPZ eSNE F	H 15 37 04.2 H 38 02.2 G 46 46 15 54	
Aug. 4	IIu	iPZ ePE eN ePPE eZ eSN eGN eLE F	H 18 00 01.6 A 02.6 H 03.8 02 34.6 H 36.6 A 07 12.6 A 13.2 A 15.7 20 29	USCGS: 19.3° 69.0°W O = 17- 51- 07 Magnitude 8.1
Aug. 5	Iv	iPZ eN eE iSNZ eE F	H 03 25 31.6 A 33.6 A 38.6 AH 49.4 eE 50.9 03 26.8	Foreshock
Aug. 5	IIv	iPZ iN eE iSN iE F	H 04 08 04.8 A 06.5 A 07.2 A 21.5 A 22.0	See list page 80
Aug. 5	Iv	ePZ eSNE F	H 07 58 28.2 AH 44.9 01 59	

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 6	Iu	ePZ eE eE eZ eIEZ F	H 02 59 49.5 A 51.5 A 03 10 19.5 H 11 22.0 G 28.7 05 00	BCIS: 11.5°S 165.5°E O = 02- 46.9
Aug. 6	Id	ePZ eSZ eSN F	H 17 42 31.5 H 34.5 35.0 17 43	
Aug. 6	Id	ePNZ eSNEZ F	AH 20 04 43.7 AH 49.5 20 06	
Aug. 7	Iu	iPZ eZ eN iSE eIEZ F	H 19 38 51.0 H 58.5 G 39 07.5 G 44 40.5 G 49.2 22 19	
Aug. 7	Id	iPZ eN eSNZ F	H 21 51 34.0 A 36.5 AH 40.5 21 52	
Aug. 8	Id	iPZ eSNZ F	H 09 42 10.1 AH 11.0 09 43	
Aug. 8	Iv	iPZ iZ eN eE eN iZ iE F	H 10 07 23.5 H 31.0 A 33.5 A 35.5 A 08 07.5 H 10.5 A 17.7 10 10	Pasadena: 38°10'N 119°17'W Magnitude 4.2
Aug. 8	IIu	iPE ePZ iPZ eN iN iSN eLNZ iMN F	G 13 37 21.0 H 21.7 H 22.5 G 34.5 G 40 18.0 G 44 30.5 G 51.2 G 13 55.4 18 15	Felt in Santa Domingo after shock of Aug. 4 17h O = 13- 28- 28 Magnitude 7.6

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 8	Iu	iPZ F	17 32 57.4 17 33	Aftershock of Aug. 4 17h
Aug. 8	Id	ePZ eSNZ F	H 21 16 06.5 AH 12.2 21 17	
Aug. 9	Id	iPZ eSNZ F	H 17 40 22.7 AH 28.7 17 41	
Aug. 9	Iu	ePZ eE eE iSE eN eE F	G 20 15 31.5 G 33.5 G 16 53.5 G 21 50.0 G 33.1 G 34.1 21 49	West Indies aftershock
Aug. 10	Id	ePZ eSN eZ F	H 00 32 09.4 A 19.9 H 20.2 00 33	
Aug. 10	Iu	iPZE eE eE eZ F	G 02 19 20.0 G 30.4 G 35.6 G 37.6 03 24	
Aug. 10	Iu	ePZ eSE eZ eE F	H 11 54 40.4 G 12 01 37 G 41 G 12 05.4 13 02	
Aug. 11	Iu	ePZ eZ i[PcP]E eZ iE iSE iZ iPSE eN eSSE eSSSZ eLE eZ F	H 02 07 22.5 H 23 G 48.5 G 02 09 50.5 G 17 52.5 G 18 08.0 G 09.5 G 02 18 59.0 G 19 08.0 G 23 33.0 G 27 09.5 G 33.7 G 34.1 05 09	USCGS: 8°S 155°E O = 01- 54.3 Magnitude 6 3/4

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 14	Iu	ePZ iZ eSE eE eE F	H 09 51 51.4 H 52 05.6 G 10 01 11 G 10 13.5 G 10 15.3 10 30	BCIS: 37.5°N 141.8°E O = 09- 40- 30 Deep
Aug. 14	IIId	iPNEZ iSNEZ F	AH 21 58 07.0 AH 10.9 22 00	See list page 80
Aug. 15	Iu	ePE ePZ eZ iZ iSKSZ iSE iPSZ iE eGE eLE eN F	A 15 36 48.0 H 49.5 H 50.5 H 55.0 H 46 56.0 G 47 43.0 G 48 33.0 G 41.0 G 16 01.6 G 03.7 G 04.4 17 39	USCGS: 22°S 170°E O = 15- 23.9
Aug. 16	Id	iPZ ePN eSZ eSNE F	H 21 56 08.0 A 08.7 H 13.4 A 13.9 21 56.9	
Aug. 18	Iu	ePNZ eZ F	A 06 59 00.0 H 08.0 07 00	BCIS: 37.6°N 141.8°E O = 06- 47.7
Aug. 18	Iv	ePZ eZ eZ eN F	H 21 31 29.9 H 34.5 H 32 06.2 A 09.2 21 32.7	
Aug. 20	Iu	ePZ eZ eE F	H 09 54 53.0 H 55 07.0 G 10 05 09 56	USSR: 30°N 127°E
Aug. 21	Iu	iPNEZ ipPZ iSNE eZ	A 18 12 12.5 H 46.0 G 22 27.0 G 31.5	Pasadena: 24°S 177°W O = 18- 00- 18 h = 100 km. Magnitude 7

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 21	IIu	iPZ eZ iNEZ iPcPN iPPN eSZ iSN iE iN iSSE iZ eLN eZ eE F	H 19 26 33.0 H 34.5 G 38.5 G 28 02.5 G 37.0 G 33 39.5 G 40.5 G 41.0 G 34 42.5 G 37 24.5 G 37.0 G 19 40.3 G 41.3 G 42.3 F 21 42.3	Large Aftershock of Aug. 4 17 h. Magnitude 6 1/2
Aug. 23	Id	iPZ eSNZ F	H 00 38 25.7 AH 29.3 00 38.7	
Aug. 24	Iu	ePZ eE eSNE eN eLNE F	H 02 49 42.5 G 43.5 G 56 12.5 G 59 58.5 G 03 05.8 F 03 38	
Aug. 24	Iu	eEZ eZ eSE eN eSSE eLN F	G 14 27 06.5 H 07.0 G 34 14.5 G 15.5 G 38 12.5 G 14 43.2 F 15 38	West Indies
Aug. 28	Iu	ePZ eN eSNE eLNE eZ F	H 20 18 32.5 G 36 G 28 28 G 20 39.1 G 43.1 F 21 53	
Aug. 28	Iu	iPZ iZ eE iSN eZ F	H 22 39 55.0 H 57.0 G 49 24.0 G 35.5 G 36.5 F 00 08	PAS! 26°S 63°W 0 = 22- 28- 15 h = 580 km.

BERKELEY

Date	Char-acter	Phase	Time (G. C. T.)	Remarks
1946			h. m. s.	
Aug. 31	Iv	ePZ eZ eZ	09 11 15.0 20.8 28.5	Pasadena: 35°37'W 118°00'W 0 = 09- 10- 13 Magnitude 4.2
Aug. 31	Iv	ePZ eN eZ eSZ eN eZ F	H 09 12 05.5 A 06.5 H 09.9 H 18.5 A 21.0 H 22.3 09 13.8	
Sept. 4	IIId	iPNEZ iSNE F	AH 05 04 51.3 A 54.6 05 06	S - P = 3.3
Sept. 9	Iu	iPZ iSKSE iN eIE F	H 10 49 58.3 G 11 00 31.5 G 11 01 02.0 G 11 20.9 12 17	BCIS: 23°N 121°E 0 = 10- 36- 36
Sept. 9	Iv	ePZ eN eSNEZ F	H 12 31 11.8 A 16.1 AH 30.9 12 34	
Sept. 12	Iu	iPZ ePZ eE eN iSKSE eN eIE eZ	H 14 08 41.5 H 42.5 A 43.5 G 19 16.0 G 28.0 G 32.5 G 36.0 G 47.2	BCIS: 5.5°S 152.2°E 0 = 13- 55.6
Sept. 12	IIu	e[P]Z iPZ iN iE iSN iE iZ F	H 15 36 03.0 H 24.5 G 25.0 G 30.0 G 42 25.0 G 30.0 G 45 54.0 F 19 30	USCGS: 25.5°N 89°E 0 = 15- 16- 09 Magnitude 7 1/2
Sept. 12	Iu	ePZ eZ F	H 17 48 18.6 H 46.3 17 50	West Indies

BERKELEY

Date	Char-acter	Phase	Time (G. C. T.)	Remarks
1946			h. m. s.	
Sept. 29	Iu	ePZ	H 03 14 55.0	USCGS: 5°S 154°E O = 03- 02.0 Magnitude 7 3/4
		iZ	H 15 06.5	
		eN	A 14.0	
		eE	A 26.0	
		iZ	H 03 15 41.1	
		eZ	H 18 37.5	
		iSZ	G 24 12.0	
		iE	G 14.0	
		iPSE	G 25 38.0	
		eSSSN	A 31 51.0	
		eE	A 32 05.5	
		eN	A 38.4	
		eLE	A 42.4	
		eZ	A 43.4	
		F	05 01	
Sept. 30	Iu	ePNZ	AH 01 10 27.1	USCGS: 12.5°S 76°W O = 00- 59.7 Magnitude 7
		ePNZ	AH 11 02.1	
		eSNE	G 19 22	
		eE	G 32.4	
		F	02 00	

MOUNT HAMILTON

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

CONSTANTS

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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.

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

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 23	Id	ePNE eSNE F	01 14 55.8 58.5 01 16	
July 23	Iv	ePN eN eSNE F	11 26 57.6 27 37.0 40 11 29	Pasadena: 35°50'N 118°00'W O = 11- 25- 58 Magnitude 3.4
July 24	Iv	ePNE eE eN eSNE eNE F	00 20 02.5 11.7 12.7 31 32.7 00 23	Pasadena: 35°06'N 119°05'W O = 00- 19- 08 Magnitude 4.0
July 26	Iu	ePE eE eSE F	06 56 22.5 24.9 07 06 00.2 07 08	USCGS: 21.6°S 70.0°W O = 06- 44.7 h = 70 km. Magnitude 6 3/4
Aug. 2	IIId	iPNE eSNE F	04 51 44.5 46.0 04 53	S - P = 1.5 sec.
Aug. 2	Iu	ePNE eNE eSNE eLNE F	19 30 55.5 31 07.4 40 50.3 56.4 20 03	USCGS: 27°S 70°W O = 19:18.7 Pasadena: Magnitude 7 1/2 Depth = 50 km. Destructive in Northern Chile.
Aug. 4	IIu	ePE ePPE eSE eE F	17 59 57.7 18 02 00.7 07 27.2 36.1 21 00	USCGS: 19.3°N 69.0°W O = 17:51:07 Pasadena: Magnitude 8.1 Normal Depth West Indies:
Aug. 4	Iu	e(P)NE F	21 02 14.5 21 05	Aftershock of 17 ^h 59 ^m
Aug. 5	IIId	iPNE eN eSNE F	04 07 54.7 58.3 08 00.4 04 10	See list page 80

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 8	IIv	ePNE iNE eSE F	10 06 04.2 08.8 38.2 10 10	Pasadena: 38°10'N 119°17'W Magnitude 4.2 North of Mono Lake
Aug. 8	Iv	ePN eSNE F	11 15 56.6 16 31.4 11 18	Aftershock Pasadena: 38°10'N 119°17'W Magnitude 3.6
Aug. 8	IIu	ePNE eNE eN eSE eLNE F	13 37 16.0 29.3 39 05.5 44 29 13 51.4 15 16	Large West Indies Aftershock of Aug. 4, 17 1/2 Pasadena: Magnitude 7.6 O = 13:28:28
Aug. 14	IIId	iPNE eNE iSNE F	21 58 16.5 19.4 27.2 22 00	See list page 80
Aug. 18	Iv	ePN eSNE eN F	21 31 30.5 32 03.5 07.4 21 33	
Aug. 30	Iv	ePNE eSNE F	11 17 49 20 04 11 22	Pasadena: 33°14'N 115°37'W Magnitude 3.7 O = 11:16:45
Sept. 7	Id	ePE eSNE F	01 29 20.4 31.9 01 31	S - P = 11.5
Sept. 12	Iu	ePE eNE F	15 39 16 16 11.0 17 00	USCGS: 25.5°N 89°E O = 15:16:9 Magnitude = ca 7 1/2
Sept. 20	IIId	iPNE eSN F	09 11 48.6 50.1 09 13	S - P = 1.5
Sept. 20	IIId	iPNE eSNE F	14 49 03.0 04.9 14 50	S - P = 1.9

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Sept. 23	Iu	ePNE e(PP)E eSE F	23 43 19.3 47 09 53 40 23 59	USCGS: 3°S 144°E O = 23:29.8 Pasadena: h = 100 km ? Magnitude = 7 1/4
Sept. 24	Id	ePNE eSNE F	00 03 56.5 04 03.3 00 04.6	S - P = 6.8 See list page 80
Sept. 26	Iu	ePNE eN eSNE F	11 04 47.1 57.6 14 16.1 11 16	Pasadena: 25°S 179°E O = 10:53:15 h = 600 km. Magnitude about 7
Sept. 28	Iv	ePNE eNE eSNE F	07 20 26.8 35.3 21 30.8 07 27.0	Pasadena: 33°57' 116° 51 O = 07- 19- 09 Magnitude 5.0
Sept. 29	Iu	ePN ePPN eSN eLN F	03 14 51.3 18 48.3 25 45.2 39.7 04 42	USCGS: 5°S 154°E O = 03:02.0 Pasadena: Normal depth Magnitude 7 3/4
Sept. 30	Iu	ePNE eNE F	01 10 22.1 35.6 01 12.5	USCGS: 12.5°S 76°W O = 00:59.7 Pasadena: h = 70 km. Magnitude 7

PALO ALTO

THE BRANNER STATION, STANFORD UNIVERSITY
PALO ALTO, CALIFORNIA

CONSTANTS

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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 _o	ε
Wood-Anderson.....	E	3000	1	15
	N	3000	1	15

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 2	Id	ePN eE eSN eE F	05 10 52 53 56.9 58 21 12	Blast
July 3	IId	iPNE iSNE F	00 59 28.6 31.4 01 01	
July 3	Id	iPNE iSNE iN eE F	23 43 59 44 06 12.0 19.5 23 45	Blast
July 4	Id	ePNE iE eE F	00 35 15 19.6 25.2 00 37	Blast
July 7	IIv	ePN eE iNE iN iE iE iN iN	06 56 04.4 05.0 06.6 33.7 35.9 40.5 41.0 57 26.7	Mt. Lassen Region Magnitude 5.0 See list page 77
July 7	IIv	iPE iN iSE iN iN F	06 59 21.2 22.2 56.7 58.7 07 00 28.4 07 02	Aftershock of above.
July 7	Iv	ePNE eSNE F	07 31 58.4 32 35.2 07 34	Aftershock of 06:56:04
July 8	Iv	ePNE eE eSNE F	12 04 28.8 05 03.1 03.9 13 05	Felt at Mineral (IV)

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 8	IId	iPNE iSNE F	18 36 26.4 27.9 19 36	S - P = 1.5 sec.
July 8	Id	ePNE eE eSNE F	23 59 27.0 34.7 36.1 24 01	Blast
July 9	Iv	ePNE eE eN eN eE eSE eN F	03 20 03.5 05.5 09.7 21.5 27 53 21 00 03 22	Pasadena: 35°40'N 118° 04'W 0 = 03- 19- 01 Magnitude 3.8
July 9	IIu	iPE iN iNE eE e(S)N F	13 26 14.4 15.1 39.1 36 20.6 36 21 13 40	Pasadena: 19°S 169°E 0 = 13- 13- 50 h = 170 km.
July 9	Id	iPN eE eEN eNE eN F	23 28 54.1 54.8 29 01.7 02.7 12.4 23 30	Blast
July 10	Id	ePN eE iN iE eSE iN eN F	17 55 12.9 13.9 14.6 15.1 20.5 21.7 33.0 17 57	Blast
July 11	Id	ePN eE eEα iSN F	00 43 03.4 04.4 10.9 12.4 00 45	Blast

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 11	Iu	ePN eE eN eE eN eSN eE eE eNE eN F	04 53 01 02 05 25 29 58 03 05 50 05 04 17.2 05 19 05 30	USCGS: 17°N 94°W 0 = 04 46.6 h = 130 km.
July 11	Id	ePNE eE eSN F	18 54 00.2 07 07.5 18 56	Blast
July 12	Id	ePNE eSNE eE F	17 39 54.9 40 01.2 05.5 17 41	Blast
July 13	Id	ePE iPN iSN eN eE F	00 53 01.9 03.1 10.3 20.4 21.7 00 55	Blast
July 13	IIId	iPNE eE iN iSNE F	23 12 32.9 33.7 34.4 39.3 23 14	See list page 80
July 15	Id	iPNE iE iNE iN F	17 43 14.3 15.2 21.2 22.7 17 45	Blast
July 15	Id	ePNE eSNE F	23 40 04.0 10.0 23 41	Blast
July 16	Id	ePNE eSNE F	17 36 59.0 37 06.7 17 37	Blast

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 18	IIId	iPNE iSN iN F	00 07 34.9 37.7 59.7 00 09	
July 18	Iu	ePN eE eNE eSE eLNE F	06 10 09.5 23.5 31.3 12 43.2 14.6 06 29	USCGS: 50°N 129°W 0 = 06:07.1 Pasadena: Normal
July 18	Iu	ePN eE eSNE eLNE F	07 19 38 46.5 22 20 23.7 07 35	USCGS: 50°N 129°W 0 = 07:16.5 Aftershock of 06 - 10
July 18	Iu	ePNE	07 23 31.5	Superimposed on previous quake. JSA: 50°N 130°W 0 = 07:21:10
July 18	IIv	ePNE e(S)N F	14 29 24.2 30 03.2 14 41	Pasadena: 34°32'N 115°54'W 0 = 14:27:58 Felt in and around Mojave Desert, Max. Intensity of VI Magnitude about 5 3/4
July 22	IIId	iPNE iN iSNE F	21 07 30.1 32.4 32.7 21 8 30	S - P 2.6 sec.
July 24	Iv	ePNE eSE F	00 20 04.3 40.4 10 23	Pasadena: 35°06'N 119°05'W 0 = 00- 19 - 08 Magnitude = 4.0
July 24	IIId	iPNE iNE iSE F	17 07 16.1 17.4 19.2 17 08	S - P = 3.1
July 25	Iv	ePE eNE eSNE eLE F	16 50 02.1 07.5 56 13.8 17 01 38 17 15	USCGS: 51°N 179°W 0 = 16:42:1 Pasadena: Magnitude 6 3/4

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 25	Iv	ePE eSNE F	22 21 34.4 22 09.9 22 24	
July 25	Iv	ePNE eSN F	23 11 08.9 36.0 23 15	
July 26	Iu	ePN eN eSNE eN F	06 56 27.5 07 00 39.5 06 07.5 36.0 07 11	USCGS: 21.6°S 70.0°W O = 06:44.7 Pasadena: Magnitude 6 3/4 to 7 h = 70 km.
July 31	IIId	iPNE iSE F	19 47 49.8 52.0 19 49	
Aug. 2	IIu	ePE epPNE eN ePPN eSE F	19 30 58.5 31 20.0 32 13.0 34 33.5 41 29.5 19 45	USCGS: 27°S 70°W O = 19:18.7 JSA: 25.5°S 71.1°W O = 19:19:0 h = 80 km. Destructive in Northern Chile Pasadena: Magnitude about 7 1/2 h = 50 km.
Aug. 4	IIu	ePNE ePcPN ePPN eSN e(SS)N eLE F	18 00 01.1 01 15.6 02 3.1 07 15.1 10 3.6 12.7 22 00	USCGS: 19.3°N 69.0°W O = 17:51:07 Great Earthquake West Indies Aftershocks numerous Pasadena: Normal depth Magnitude 8.1
Aug. 4	Ir	ePE	18 12 46.6	Aftershock
Aug. 4	Ir	eE	18 42 38.6	Aftershock
Aug. 5	IIId	iPE iE iSN F	04 07 59.7 08 00.5 10.6 04 11	See list page 80
Aug. 6	Id	eN eSNE F	20 04 44.9 51.9 20 06	

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 8	Iv	ePE eE eN e(S)NE F	10 06 10.5 47.8 52 55.5 10 08.5	Pasadena: 38°10'N 119°17'W Magnitude 4.2 North of Mono Lake
Aug. 8	IIu	ePE eNE e(PcP)N eSN eLN F	13 37 24 38 38 31 44 27.6 51 52 14 37	Aftershock of Aug. 4, 17h Pasadena: Magnitude 7.6 O = 13:28:28
Aug. 8	IIId	iPNE iSN F	19 56 0.6 03.0 19 57	S - P = 2.4 sec.
Aug. 9	IIId	iPNE iSNE F	00 05 23.8 26.9 00 06	Blast
Aug. 10	IIId	iPNE iSNE F	00 32 00.3 02.8 00 33	Blast
Aug. 14	IIId	iPNE iSNE F	21 58 10.0 15.1 22 00	See list page 80
Aug. 15	IIId	iPNE iN F	20 25 05.0 07.0 20 25 30	
Aug. 21	Iu	ePNE eN eSN F	18 12 23.7 46.0 22 54.5 18 30	Pasadena: 24°S 177°W O = 18- 00- 18 h = 100 km. Magnitude 7
Aug. 21	Iu	ePN eN eSE eLN F	19 26 32.5 40.0 33 39.5 44.5 19 50	Aftershock of West Indies earthquake of Aug. 4, 17h Pasadena: Magnitude about 6 1/2
Aug. 22	Id	iPNE iSN F	21 06 52.4 07 00.4 21 08	Elast ?

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)		Remarks
			h.	m. s.	
1946					
Aug. 24	IIId	iPNE iSN F	22 44	58.2 59.7	S - P = 1.5 sec.
Aug. 28	Iu	e(S)N F	22 49 22 52	33.2	Pasadena: 26°S 63°W O = 22:28:15 h = 580 km. West Indies
Aug. 30	IIId	iPNE iSNE F	22 12 22 13	22.7 24.7 30	S - P = 2.0 sec.
Aug. 31	Iv	ePNE eNE eNE F	09 11 12 15 12 58 09 14	13.9 15.8 58	Pasadena: 35°37'N 118°00'W Magnitude 4.2 O = 09:10:13
Sept. 12	Iu	eN eNE eNE eE eN eLN	15 36 39 14 41 12 45 01 46 28 52.1	11.5 14.5 12.5 01.5 28.0	Two shocks from same source 3 minutes apart. The second being the larger. USCGS: 25.5°N 89°E O = 15:16:9 Pasadena: Magnitude about 7 1/2 Normal depth
Sept. 12	Iu	ePNE eN F	17 48 17 52	19.1 32.1	Pasadena: West Indies Aftershock of Aug. 4
Sept. 13	Iu	ePN eNE eSNE F	19 08 16 19	36 41.1 25.6	Pasadena: Magnitude 6 3/4 Deep BCIS: 52 1/2°N 158 1/2°E O = 18:59.1
Sept. 20	Id	ePNE eSNE F	10 11 12 10	56.3 03.5 13	
Sept. 24	IIId	iPE iSE F	00 03 00 05	50.7 53.7	See list page 80
Sept. 25	Iu	eE eN F	10 14 10 37	29.2 41.5	Pasadena: Aftershock of Aug. 4, in West Indies USCGS: O = 10:05.5

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)		Remarks
			h.	m. s.	
1946					
Sept. 26	Iu	iPNE eNE eN eSN F	11 04	46.0 48 05 15 14 13.5 11 17	Pasadena: 25°S 179°E O = 10:53:15 Magnitude = 7 ca, h = 600 km.
Sept. 28	Iv	ePE eE e(S)E eE F	07 20 21 07	32.7 51.7 33.7 47.2	PAS 33°57'N 116°51'W O = 07 19 09 Magnitude 5
Sept. 29	Iu	ePNE ePPE eN eSKSN eSN eN eN eLN F	03 15 18 22 25 25 31 31 35 39 04 38	01.4 32.4 20 38 53 51 22 16	USCGS: 5°S 154°E O = 03:02.0 Pasadena: Normal Depth Magnitude 7 3/4
Sept. 30	Iu	ePNE eN eSNE F	01 10 11 01 19 01	26.4 08 15.7	USCGS: 12.5°S 76°W O = 00:59.7 Pasadena: h = 70 km. Magnitude 7
Sept. 30	Id	iPN iSN eN F	21 49 21 51	14.5 16.7 24.5	

SAN FRANCISCO

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

CONSTANTS

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Latitude and Longitude:

$$\phi = 37^{\circ} 46' \text{ N.}$$

$$\lambda = 122^{\circ} 27' \text{ W.}$$

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 _o	ϵ
Wood-Anderson.....	E 15° S	1500	1	15
	N	3000	1	15

SAN FRANCISCO

Date	Character	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 7	IIv	eN eE iSE F	06 56 00.1 04.1 31.4 06 59	See list page 80 Intensity VI in Mt. Lassen Region Magnitude 5
July 7	Iv	eN eSN F	06 59 16.7 50.2 07 02	Aftershock of 06 - 56
July 11	Ir	eN eN F	04 53 41.4 05 03 13.1 05 13	USCGS: 17°N 4°W O = 04:46.6 Pasadena: h = 130 km. Magnitude 7 Felt at Mexico City
July 13	Id	ePE eSE F	23 12 35.6 45.0 23 14	See list page 80
July 18	Ir	eNE e(S)E eLN F	06 10 06.6 13 40.8 46.8 06 28	USCGS: 50°N 129°W O = 06:07.1
July 18	Ir	eN eLN F	07 19 44.6 22.1 07 41	USCGS: 50°N 129°W O = 07:16.5 Pasadena: Normal depth
July 18	Iv	ePN eN F	14 29 28.8 53.5 14 36	Pasadena: 34°32'N 115°59'W O = 14:27:58 Normal depth Magnitude about 5 3/4
July 22	IIId	i(S)NE eE F	11 39 58.8 40 03.2 11 41	
Aug. 4	IIu	ePE ePN eE eSN eGN eE F	18 00 06.9 07.9 06 55.3 07 11.7 14.7 16 24 19 44	USCGS 19.3°N 69.0°W O = 17:51:07 Magnitude 8.1
Aug. 5	Iv	ePNE eSNE F	03 25 32.8 48.0 01 27	Foreshock

SAN FRANCISCO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 5	IIV	ePNE iSN iSE F	04 08 04.5 20.5 20.8 02 11	See list page 80
Aug. 5	Id	ePN eE eSN F	22 00 54.2 54.4 57.5 22 02	
Aug. 6	Id	ePN eE eSE F	18 04 43.6 44.2 48.3 18 06	
Aug. 8	Iv	ePN eN eSN F	10 06 15.5 52.0 55.5 10 08	Pasadena: 38°10'N 119°17'W Magnitude 4.2
Aug. 8	Iu	ePE eN eSN eN F	13 37 33.8 37.5 44 25.6 51 15 14 44	Aftershock of Aug. 4, 18 hrs. O = 13:28:28 Magnitude 7.6
Aug. 13	Id	ePE eSE F	21 22 35.9 38.6 21 23	S - P = 2.7 sec.
Aug. 14	IId	ipNE iSNE F	21 58 03.4 06.4 22 00	See list page 80
Aug. 26	Id	epE iSNE F	13 31 54.9 58.1 13 33	S - P = 3.2 sec.
Aug. 31	Iv	ePE eN eSE F	09 12 06.4 18.0 26.5 09 14	Pasadena: 35°37'N 118° 00'W Magnitude 4.2 O = 09:10:13

FERNDALE

THE FERNDALE STATION
FERNDALE, CALIFORNIA

CONSTANTS

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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	V	T ₀	ε
Boschi-Omori 25 kg	E	12	11	5
	N	12	18	6

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

FERNDALE

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 4	Iu	ePNE eSN eN eNE F	18 00 12 07 36 15.0 19 35 19 20	
Aug. 8	Iu	ePN eSE F	13 37 36 45 12 14 20	
Aug. 8	Id	ePN iSNE F	20 13 22 26.0 20 14	S - P = 4.0 sec.
Aug. 27	Id	iSNE F	00 20 26.0 00 21	
Aug. 28	Iu	eSNE F	22 50 12 22 53	
Sept. 28	Id	ePE iSNE F	07 00 24 29 07 01	S - P = 5.0 sec.
Sept. 29	Iu	ePNE eSNE eNE F	03 16 08 26 32 39.0 05 30	

FRESNO

THE FRESNO STATION, FRESNO STATE COLLEGE
FRESNO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$$\phi = 36^{\circ} 46.1' \text{ N.}$$

$$\lambda = 119^{\circ} 47.8' \text{ W.}$$

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

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 5	Iv	ipN iSN F	10 44 56.0 45 10.4 10 46	Pasadena: 37°20'N 119°05'W West of Bishop
July 7	IIv	ipN iN iN iSN eN iN	06 56 17.0 23.2 27.8 53.6 57 01.8 12.1	Mt. Lassen region See list page 80
July 7	IIv	ePN iN iN iSN F	06 59 58.5 07 00 13.8 29.0 33.0 07 06	Aftershock of above
July 7	Iv	epN iSN F	07 32 45.2 33 17.5 07 34	Aftershock of above
July 8	Iv	epN eN eN F	12 04 42.2 05 03.7 31.2 12 06	Felt at Mineral
July 9	Iu	epN eSN	01 20 20.4 30 14.9	20°S 175°W Tonga Islands O = 01:08.2
July 9	IIv	epN eN iSN F	03 19 32.5 35.5 54.5 03 23	Pasadena: 35°40'N 118°04'W O = 03:19:01 Magnitude 3.8
July 9	Iu	ipN ipPN iN eN eN F	13 26 20.9 27 01.5 28 59.0 35 08.9 36 43.3 13 41	Pasadena: 19°S 169°E O = 13- 13- 50 h = 170 km.
July 11	Ir	ePN eN epPN eN esPN ePPN eSN eLN F	04 52 46.5 52.5 53 14.0 18.0 33.5 04 54 01.5 58 36.8 05 02 08 05 10	USCGS: 17°N 94°W h = 130 km. O:04-46.6

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 11	Id	ePN eSN F	22 35 40.7 49.7 22 36	
July 12	Id	ePN eN eSN F	16 30 44.6 48.1 52.4 16 31	
July 13	Iv	ipN iSN F	12 01 05.2 29.5 12 02	
July 17	Iv	epN eSN F	16 38 42.1 39 06.6 16 39	
July 18	Iv	ipN iSN eN	05 02 40.1 03 06.8 23.3	
July 18	Ir	ipN eN eN F	06 10 30.1 12 52.1 13 42.6 06 30	USCGS: 50°N 129°W O = 06- 07.1
July 18	Ir	ipN eN eN e[S]N eN F	07 19 59.6 20 23.6 22 29.6 23 40.6 25 49.6 07 40	Aftershock of above
July 18	IIv	ipN eN eN eN F	14 28 58.3 29 09.8 32 03.8 35 17.3 14 45	Pasadena: 34°32'N 115°59'W O = 14- 27- 58 Magnitude 5 3/4 Felt in and around Mojave Desert Max. intensity VI
July 21	Iv	ipN iSN F	14 35 40.1 36 02.7 14 37	
July 21	Iv	ipN iSN F	22 56 03.3 25.3 22 57	

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
July 22	IIv	ipN eN iSN eN F	15	21	05.1 07.1 26.5 51.1	Pasadena: 35°44'N 118°02'W 0 = 15- 19- 53 Magnitude 4.1
July 23	Iv	ipN eN eSN F	11	26	29.7 37.3 51.6	Pasadena: 35°50'N 118°W 0 = 11- 25- 58 Magnitude 3.4
July 24	IIv	ipN eN eSN eN F	00	19	40.5 44.1 20 03.1 26.6	Pasadena: 35°06'N 119°05'W 0 = 00- 19- 08 Magnitude 4.0
July 24	Id	ipN eSN eN eN F	22	39	53.1 57 40 07.7 16.0	
July 25	Iv	epN eSN F	16	50	24.0 56 00.2 17 00	USCGS: 51°N 179°W 0 = 16- 42.1
July 25	Id	epN eN eN F	23	12	17.2 20.2 27.1	
July 26	Iv	epN eN eN eN ePPN eSN F	06	56	14.3 18.2 21.3 39.8 58 55.8 07 05 44.8 07 10	USCGS: 21.6°S 70.0°W h = 70 km. 0 = 06- 44.7 Magnitude 6 3/4
July 30	Id	ePN eN eSN eN F	16	45	23.1 26.7 30.7 33.2	
			16	46		

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
Aug. 3	Id	ipN eSN F	19	43	30.3 32.9	
Aug. 4	IIu	ePN eN eN eN eSN eL eN F	17	59	05.2 15.3 16.9 25.9 35.3 18 06 11.0 10 38.3 17 20.3	USCGS: 19.3°N 69.0°W 0 = 17- 51- 07 Magnitude 8.1
Aug. 4	IIv	ePN	18	11	46.6	Aftershock of above
Aug. 4	IIv	eN	18	36	24.4	Aftershock of above
Aug. 4	IIv	eN	18	41	46.4	Aftershock of above
Aug. 5	Iv	ePN eSN F	04	08	10.5 30.0	See list page 80
Aug. 8	IIId	ePN eSN F	10	05	49.0 51.7	Pasadena: 38°10'N 119°17'W Magnitude 4.2
Aug. 8	Iu	ePN eN eN eN eSN eLN eN F	13	37	07.9 17.9 36.3 39 33.4 41 09.0 43 22.6 48 44.0 54 33.4	Aftershock of Aug. 4, 17hrs. 0 = 13- 28- 28 Magnitude 7.6
Aug. 15	Iv	ipN eSN F	18	59	29.7 52.0	Pasadena: 35°44'N 18°02'W Magnitude 3.4 0 = 18- 58- 55
Aug. 21	Iu	ePN eN eN F	19	26	17.6 36 06.3 44 19.3	Aftershock of Aug. 4, 17hrs.
			19	59		

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 24	Id	ePN eSN F	12 18 59.4 19 23.1 12 20	
Aug. 24	Id	ePN eN eSN eSN F	17 55 45.9 47.9 53.2 56.8 17 56	
Aug. 28	Iv	e(P)N eN eN F	22 40 45.5 50 09.3 51 02.9 23 00	Pasadena: 26°S 63°W O = 22- 28- 15 h = 580
Aug. 30	Iv	ePN ePN eSN eSN F	11 18 18.1 24.6 19 22.4 25.6 11 24	Pasadena: 33°14'N 115°37'W Magnitude 3.7 O = 11- 16- 45
Aug. 31	IIv	ipN iSN F	09 10 45.2 11 06.4 09 15	Pasadena: 35°37'N 118°00'W O = 09- 10 13 Magnitude 4.2
Sept. 5	Iv	ePN eSN F	17 39 8.9 31.5 17 40	Pasadena: 35°59'N 117°23'W O = 17- 38- 33 Magnitude 3.7
Sept. 5	Iv	ePN iSN eN F	21 33 2.9 17.1 19.6 21 34	
Sept. 6	Id	e(S)N F	01 11 1.9 01 12	
Sept. 12	Iu	e(P)N eN eN F	15 35 48.5 38 47.1 39 26.9 16 55	USCGS: 25.5°N 89°E O = 15:16:9 Pasadena: Normal depth Magnitude about 7 1/2
Sept. 13	Iv	e(P)N e(S)N F	16 13 38 58.7 16 15	Pasadena: 35°36'N 117°40'W O = 08- 13- 04

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Sept. 13	Iu	ePN eN eN eSN eW F	19 08 49.8 09 33.7 11 30.3 16 49.4 17 34.2 19 36	BCIS: 52.5°N 158°5E O = 18:59.1 Pasadena: Deep Magnitude 6 3/4
Sept. 13	Iu	ePN F	19 47 6.6 20 02	Mexico
Sept. 14	Iv	ePN eN eSN eN F	09 03 57.4 58.6 04 20 28.5 09 07	Pasadena: 35°40'N 117°59'W O = 09:03:27 Magnitude 3.4 East of Walker Pass
Sept. 18	Id	ePN iSN F	06 10 47.7 11 2.3 06 13	
Sept. 18	Id	ePN iSN F	06 56 49.6 53.2 07 00	
Sept. 23	Iu	ePN eN F	23 43 27.6 47 28.4 24 04	USCGS: 3°S 144°E O = 23:30.0 Pasadena: h = 100 km ? Magnitude 7 1/4
Sept. 25	Iu	eN F	10 14 10.5 10 18	Aftershock of West Indies Quake of Aug. 4.
Sept. 26	Iu	ipN eN e(S)N F	11 04 51.6 56.5 14 40.3 11 30	Pasadena: 25°S 179°E O = 10:53:15 h = 600 km. Magnitude 7
Sept. 28	IIv	ePN eN iSN F	07 20 06.0 15.4 21 3.5 07 33	Pasadena: 33°57'N 116°51'W O = 07:19:09
Sept. 29	Id	ePN eSN F	02 01 46.4 02 08.4 02 03	

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
Sept. 29	IIv	ePN	03	15	13.2	USCGS: 5°S 154°E O = 03:02.2 Pasadena: Normal depth Magnitude 7 3/4
		eN		16	27.2	
		eSN		25	38.5	
		eLN			38.7	
		F	04	45		
Sept. 30	Iu	eN	01	10	12.3	USCGS: 12.5°S 76°W O = 00:59:7 Pasadena: h = 70 km. Magnitude 7
		eN		13	11.3	
		F	01	15		
Sept. 30	Id	ePN	03	48	11.0	
		eSN			27.6	
		F	03	51		

MINERAL

THE MINERAL STATION
MINERAL, CALIFORNIA

CONSTANTS

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Latitude and Longitude:

$$\begin{aligned} \phi &= 40^{\circ} 21' N. \\ \lambda &= 121^{\circ} 35' W \end{aligned}$$

Time -- All determinations are reduced to Universal Time.

Altitude -- 1495 meters (4906 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

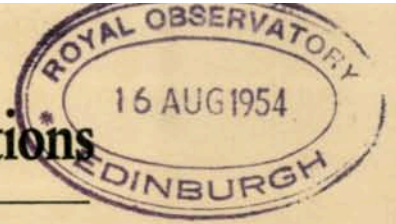
Apparatus	Component	V	T ₀	ε
Wood - Anderson.....	E	3000	1	15

MINERAL

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
July 18	Iu	ePE iE eE F	06 09 34.2 40.2 12 59.7 06 29	USCGS: 50°N 129°W O = 06:07.1 Pasadena: Normal depth
July 18	Iu	ePE iE eE	07 19 03.0 8.8 22 24.5	USCGS: 50°N 129°W O = 07:16.5
July 18	Iu	ePE eE F	07 22 45.0 52.8 07 39	Superimposed on trace of preceding shock
July 18	Iv	ePE iE i(S)E F	14 29 49.5 30 16.6 31 45.0 14 36	Pasadena: 34°32'N 115°59'W O = 14:27:58 Magnitude about 5 3/4 Normal depth
July 30	IIId	iPE iSE F	23 13 39.9 42.5 23 14	
Aug. 2	Iu	e[P]E eE F	18 51 07.2 40.2 18 53	
Aug. 4	Iu	ePE iE iE eE eE eE F	18 00 00.0 20.5 42.0 07 12.0 11 10.0 16 49.0 19 36	USCGS: 19.3°N 69.0°W O = 17- 51- 07 Magnitude 8.1
Aug. 5	Iv	ePE iSE iE F	04 08 46.7 09 30.3 39.7 04 10	See list page 80
Aug. 8	I	epE iE i(S)E iE F	10 06 05.8 17.2 42.4 07 00.8 10 08	
Aug. 8	Iu	epE eE eE F	13 36 22.3 43 43.8 55 10.3 14 30	

MINERAL

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Aug. 28	Iu	ePE eSE F	22 40 30.9 49 44.4 23 00	
Aug. 31	Iv	ePE eSE F	01 11 58.2 13 03.3 01 16	
Aug. 31	IIId	ipE iSE F	10 32 29.1 31.5 10 33	
Sept. 12	IIId	iPE iSE F	06 48 20.9 23.6 06 49	
Sept. 14	IIId	iPE iSE F	19 01 44.4 46.0 19 03	
Sept. 28	Iv	ePE eSE F	07 21 05.5 23 00.0 07 24	
Sept. 29	Iu	e(P)E e(S)E F	03 01 07.7 11 51 03 38	



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

From October 1, 1946, to December 31, 1946

BY
JOHN B. FARR
AND
BURL A. TULLER

UNIVERSITY OF CALIFORNIA PRESS
BERKELEY AND LOS ANGELES
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EARTHQUAKE INTENSITY SCALE

Intensities are given by Roman numerals in the list of California earthquakes on the following page, when sufficient information on the effects of the quake is available. Criteria of the Modified Mercalli Scale which are used to rate the intensity are:

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.

EARTHQUAKE MAGNITUDE SCALE

Richter magnitudes given in the list of epicenters on the next page are found from the Wood-Anderson amplitudes, using the nomogram by Nordquist, "Bulletin of the Seismological Society of America," 32:164.

- - - - -

Latitude and longitude are given for each epicenter in the following 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

1946 - Pacific Standard Time

<u>No.</u>	<u>Date</u>	<u>Origin Time</u>	<u>Richter Magnitude</u>	<u>Latitude North</u>	<u>Longitude West</u>	<u>Quality</u>
1	Oct. 1	11-23-03	3.5	37° 31'	121° 41'	b
2	Oct. 27	19-49-12	3.1	37° 09'	121° 35'	b
3	Nov. 4	09-17-01	2.9	37° 00'	121° 44'	d
4	Nov. 10	00-23-02	2.0	37° 57'	122° 16'	a
5	Nov. 14	19-23-58	2.0	37° 39'	122° 15'	c
6	Nov. 22	08-06-24	2.7	37° 22'	121° 33'	a
7	Nov. 24	23-16-44	2.9	36° 49'	121° 31'	b
		IV in Hollister.				
8	Dec. 18	06-20-28	4.7	40.3°	124.6°	c
		Felt over area of 3500 square miles in Northern California. Limits of felt area extended from Orick on the coast in northern Humboldt County, east to Orleans, southeast to Trinity Center in eastern Trinity County, southwest to Fort Bragg on the coast in northwestern Mendocino County. Intensity VI in Ferndale; V in Arcata, Blue Lake, Eureka, Fields Landing, Fortuna, Honeydew, Petrolia, Shelter Cove, Upper Mattole; IV in Benbow, Bridgeville, Colusa, Fort Bragg, Garberville, Orick, Scotia and Trinity Center.				
9	Dec. 23	17-39-50	3.4	37° 29'	121° 32'	c
		IV in San Jose.				
10	Dec. 29	16-46-26	2.6	37° 21'	121° 21'	c

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. Nature of the Motion --

i (impetus)	Sudden beginning of the motion.
e (emersio)	Gradual beginning of the motion.

BERKELEY

THE BERKELEY STATION, UNIVERSITY OF CALIFORNIA
BERKELEY, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$$\begin{aligned} \phi &= 37^{\circ} 52'13'' \text{ N.} \\ \lambda &= 122^{\circ} 15'16'' \text{ W.} \end{aligned}$$

Time -- All determinations are reduced to Greenwich Civil Time.

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

CONSTANTS OF THE SEISMOGRAPHS

Apparatus	Component	V		T ₀		ε	
		K	T	T ₁	μ ²	A ₁ (cm)	l(cm)
Bosch-Omori 100 kg. ..	E			12		10	
	N			12		10	
Wiechert 80 kg.	Z			4		5	
	E			0.9		15	
Wood-Anderson	N			0.9		15	
	E			11.8	0.00	115	11.3
Galitzin	N			12.4	0.03	119	11.2
	Z			11.9	0.01	131	14.9
Benioff	Z			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

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Oct. 1	IId	iPNZ iSNE F	HA 19 23 15.4 A 24.3 19 26	See list page 132
Oct. 2	Iu	iPZ iSZ eLN F	H 04 55 49.3 H 05 03 18.0 A 10.8 06 06	USCGS: 51°N 157°E O = 04:45.9 (Deep)
Oct. 2	Iu	iPZ iSE eLNE F	H 06 52 46.5 A 07 00 28.5 A 08.8 08 11	USCGS: 51°N 157°E O = 06:43.3
Oct. 3	Iu	ePNZ eSNZ eLE F	G 15 49 00.1 G 16 00 26 14.9 17 00	BCIS: 23°S 171 1/2°E O = 15:36:42
Oct. 4	IId	iPNZ iPPE eSN iN iE eLN F	G 14 54 23.0 G 56 25.0 G 15 01 34.5 G 04 17.5 G 06 25.5 G 08.2 16 36	JSA: 19.2°N 68.9°W O = 14:45:35 h = 50 km.
Oct. 7	Iu	eZ eZ F	G 07 15.6 G 49.2 08 00	
Oct. 8	Iu	iPZ iPPZ eSN iE F	H 14 07 51.3 G 11 04.5 17 00.0 G 18 27.5 14 44	Pasadena: 25°S 178°E O = 13:56:25 h = 670 km. Magnitude 6 3/4
Oct. 9	Iu	eLE F	G 06 04.5 06 30	
Oct. 10	Iu	e(S)E eLE F	G 04 46 35.5 G 05 03 48.5 06 00	
Oct. 13	Iu	ePZN F	H 23 24 53.2 23 26	BCIS: 24°S 66°W O = 23-13.0 h = 200 km.

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Oct. 14	IId	ePH eSNE eLE F	G 04 57 22.5 G 05 07 50.5 G 05 24.8 06 45	BCIS: 30 1/2°S 177 1/2°W O = 04:44.7
Oct. 21	Iu	ePZ e(S)E F	G 13 53 39.7 G 14 00.7 14 33	
Oct. 22	Iu	iPZ ipPZ iSN eGNE eLE F	H 10 12 26.0 G 13 15.4 G 22 33.5 G 10 35.0 G 10 38.0 12 35	BCIS: 15°S 167 1/2°E O = 10-00.5 Pasadena: h = 210 km. Magnitude 6.7
Oct. 25	Iu	ePZ eSNEZ F	H 21 59 31.5 G 22 06.9 22 10	Pasadena: 51°N 156°E O = 21:50.2 h = 150 km.
Oct. 26	Id	iPZ eSZ F	H 00 00 37.0 H 41.8 00 02	
Oct. 26	Iu	iPZ eNE eLE F	G 00 41 39.5 51 15.0 01 18.9 02 20	Approximately 57°S 27°W O = 00:20.9
Oct. 28	Id	iPNZ eSN F	H 03 49 28.7 39.4 03 51	See list page 132
Oct. 28	Iu	ePZ eN F	14 09 34.8 36.3 14 11	
Oct. 29	Id	iPNZ iSNZ F	HA 23 14 10.6 HA 12.1 23 16	Blast ?
Oct. 30	IId	ePN iSEZ eLZ F	G 07 54 09.5 G 59 30.5 G 08 02.5 11 20	USCGS: 54°N 164°W O = 07:47.6 Magnitude 6.9

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 1	IIu	ePZ iPPPN iSZ eLNE F	H 11 21 49.1 G 23 47.0 G 27 50.5 G 30.8 14 58	USCGS: 52°N 174°W O = 11:14.4 Magnitude 7.0 Normal depth
Nov. 1	Iu	ePZ	H 11 36.9	Aftershock of 11-21
Nov. 1	Iu	ePZ	H 11 50.2	Aftershock of 11-21
Nov. 1	Iu	ePZ	H 12 16.7	Aftershock of 11-21
Nov. 1	Iu	ePZ eZ eZ F	H 20 22 07.5 29.6 29 14 20 31	BCIS: 10°S 161 1/2°E O = 20-09.5 Solomon Islands
Nov. 2	IIu	iPZ eSN eLNE F	G 18 42 18.5 G 53 07.5 G 19 15.1 22 20	USCGS: 41°N 76°E O = 18:28.4 Magnitude 7.6 Normal depth
Nov. 3	IIId	iPNZ iSNE F	HA 18 42 36.9 A 39.0 18 44	
Nov. 4	IIId	iPZ eSN F	H 17 17 18.9 32.0 17 34	
Nov. 4	Iu	eE eNE F	G 22 06 34 G 12 26 23 55	USCGS: 40°N 53°E O = 21:47.6 Magnitude 7.5
Nov. 8	Id	iPEZ iSNE F	HA 00 26 18.9 A 21.8 00 31.8	
Nov. 10	IIId	iPNZ iSNE F	HA 08 23 03.2 A 04.2 08 24	See list page 132
Nov. 10	Iu	ePZ eZ F	H 13 07 19.3 58.0 13 44	South America

BERKELEY

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 10	IIu	iPZ iSN i (SS)Z F	G 17 53 18.0 G 18 01 56.0 G 06 38.5 21 10	USCGS: 9°S 77.5°W O = 17:42:8 Magnitude 7 1/4 Destructive in Peru
Nov. 12	IIu	ePZ iSE iN eLE F	H 06 02 57.2 08 12.0 10 24.0 11.4 07 30	JSA: 53° N 163.5°W O = 05:56:22
Nov. 12	Ir	ePNZ e(S)E eLNE F	HA 14 38 38.5 G 41 00 G 42.2 14 53	Region of Vancouver Island ?
Nov. 12	IIu	iPZ eSN eLN F	H 17 40 23.4 G 49 57.0 G 17 59.6 18 15	USCGS: 21°S 173°W O = 17:28.7
Nov. 14	Ir	ePZ eLN F	G 11 43 36.2 G 12 04.2 12 20	Central America ?
Nov. 15	Id	iPNZ iSNE F	HA 03 24 03.0 A 07.3 03 24.7	See list page 132
Nov. 21	Id	ePZ eSNE F	H 20 11 33.4 A 41.2 20 12.3	
Nov. 22	IIId	iPNZ eSNE F	H 16 06 38.3 A 49.1 16 07.3	See list page 132
Nov. 25	Iv	iPZ eSNE F	H 07 17 08.1 A 26.6 07 18.2	See list page 132
Nov. 27	Iv	ePN eNE e(S)E F	A 14 45 39.8 A 46 05.8 23.7 14 49	Pasadena: 35°30'N 120°55'W O = 14:44:51 Magnitude 4.3

BERKELEY

Date	Character	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 28	Iu	ePZ iSE iN eLN F	Sp 16 02 42.5 A 11 55.5 A 13 38.5 A 16 22.3 17 04	Pasadena: 18 1/2°S 174°W O = 15:51:35 h = 290 km. Magnitude about 6 3/4.
Dec. 18	Iv	ePN iZ F	A 14 21 14.6 Sp 50.2 14 31	Felt at Eureka, California See list page 132
Dec. 19	Iu	ePNZ eNE F	AG 03 10 24 21 24 04 30	BCIS: 25°N 123°E O = 02:57:22 h = 100 km.
Dec. 20	IIIu	ePE eSN eLE F	A 19 31 08.8 A 41 11.2 A 52.0 01 03	USCGS: 33.3°N 134°E O = 19:19.0 Magnitude 8.2
Dec. 21	IIu	ePN iSE iN eLN F	A 10 29 26.4 G 38 05.0 G 39 42.5 A 47.2 14 38	USCGS: 44°N 148°E O = 10:18.8 Magnitude 7
Dec. 21	Iu	ePZ iSNE F	G 19 59 22.5 G 20 08 02.5 22 38	BCIS: 43.4°N 148.3°E O = 19:48:37 Magnitude 6 3/4
Dec. 24	IIId	iPNZ eSN F	HA 01 39 04.1 A 13.9 01 43	See list page 132
Dec. 24	Iu	ePZ eLE F	G 04 13 11.8 42 20 06 00	USSR: 2.0°S 150.5°E
Dec. 25	Iu	iPNZ eNZ F	HA 11 21 00.8 30 38 12 00	
Dec. 27	Iv	ePZ eSNZ F	H 07 07 11.5 HA 44.5 07 10	Pasadena: 37°31'N 119°00'W Magnitude 3.8
Dec. 28	Iu	ePZ eSE eLN F	H 10 19 58 G 28.4 G 36.2 11 00	USSR: 39°N 146°E

BERKELEY

Date	Character	Phase	Time(G.C.T.)	Remarks
1946			h. m. s.	
Dec. 29	Id	iPZ eSN F	H 00 22 25.6 A 29.8 00 22.8	
Dec. 30	Id	iPZ eSZ F	H 00 45 44.6 56.6 00 46.7	See list page 132

MOUNT HAMILTON

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

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

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Oct. 1	IIId	iPNE F	19 23 06.5 19 27	See list page 132
Oct. 1	Id	ePNE eSNE F	23 30 17.6 19.4 23 31	
Oct. 2	Iu	ePN eSN F	04 55 57 05 03.3 05 08	USCGS: 51°N 157°E O = 04-45.9 deep
Oct. 2	Iu	ePN eSN F	06 52 53.3 07 00 39 07 04	USCGS: 51°N 157°E O = 06-43.3
Oct. 4	Iu	ePNE eSN F	14 54 19.4 15 01 24 15 06	JSA: 19.2°N 68.9°W O = 14-45-35 h = 50 km.
Oct. 6	IIId	iPNE eSNE F	16 41 14.7 16.2 16 42.0	
Oct. 13	Iv	ePN eN F	23 24 52.5 56.3 23 27	BCIS: 24°S 66°W O = 23-13.0 h = 200 km.
Oct. 22	Iu	ePNE eNE eSNE F	10 12 27.4 13 18.1 22 27 10 30	BCIS: 15°S 167 1/2°E O = 10-00.5 h = 200 km. Magnitude 6.7
Oct. 22	IIId	iPNE iSNE F	23 45 38.1 43.7 23 47.0	
Oct. 28	IIId	iPNE eSN F	03 49 15.1 17.6 03 51	See list page 132
Oct. 30	Ir	ePNE eNE eSNE eLNE F	07 54 16 28 59 39 08 02.0 09 30	USCGS: 54°N 164°W O = 07-47.6 Magnitude 6.9
Nov. 1	Iu	ePNE eN eSNE eLNE F	11 21 55.8 22 15.3 27 57 11 30.7 13 00	USCGS: 52°N 174°W O = 11-14.4 Magnitude 7.0

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 1	Iu	ePN	11 36 53	Aftershock of 11-21.9 GCT
Nov. 1	Iu	ePNE	11 50 19	Aftershock of 11-21.9 GCT
Nov. 1	Iu	ePNE	12 17.7	Aftershock of 11-21.9 GCT
Nov. 4	IIId	iPNE iSNE F	17 17 08.3 13.8 17 19	
Nov. 5	Id	iPN iSNE F	00 57 21.8 27.9 00 59	
Nov. 10	Iu	ePN eSN eN F	17 53 14.8 18 01 45 22 30 18 45	USCGS: 9°S 77.5°W O = 17-42-08 Magnitude 7 1/4
Nov. 12	Iu	ePNE eSNE eLN F	17 40 24.7 17 50.1 18 03 18 30	USCGS: 21°S 173°W O = 17-28.7
Nov. 15	Id	ePNE eSNE F	03 24 10.1 19.8 03 25	See list page 132
Nov. 22	IIId	iPNE eSNE F	16 06 25.1 26.2 16 08.0	See list page 132
Nov. 24	IIId	ePNE eSNE F	04 24 26.7 28.2 04 25	
Nov. 24	Iv	ePE eSN F	21 31 04 48 21 33.5	
Nov. 25	Id	ePN eSN F	07 16 55 17 04 07 18	See list page 132
Nov. 28	IIId	iPNE eSNE F	11 51 48.7 49.2 11 52.5	

MT. HAMILTON

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Dec. 1	Iv	ePN eSNE F	06 24 06 53 06 26	
Dec. 7	Iv	ePNE eSNE F	02 03 29 04 18.7 02 07	
Dec. 9	Id	ePN eSNE F	05 15 6.3 17.1 21 17.0	
Dec. 14	Id	ePN eSN F	09 21 28.9 34 09 23.5	
Dec. 18	Iv	ePNE eSNE F	14 21 25.3 22 10.0 14 33	See list page 132
Dec. 19	Id	iPNE iSNE F	04 07 58.5 08 02.5 04 09.0	
Dec. 20	Iu	ePNE eNE eNE eSNE F	19 31 15 20 33 21 41 17 20 00	USCGS: 33.3°N 134°E O = 19-19.0 Magnitude 8.2
Dec. 21	Iu	ePNE eSNE F	10 29 32 38 11 12 00	USCGS: 44°N 148°E O = 10-18.8 Magnitude 7
Dec. 24	IIId	iPE F	01 38 53.7 01 42	See list page 132
Dec. 27	Iv	ePNE eSNE F	07 07 04.4 32.9 07 09.0	Pasadena: 37°31'N 119°00'W Magnitude 3.8
Dec. 30	IIId	iPNE iSNE F	00 45 31.6 35.3 00 46.4	See list page 132

PALO ALTO

THE BRANNER STATION, STANFORD UNIVERSITY
PALO ALTO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

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

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

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
Oct. 1	IIv	iPN iSN iN F	19	23	10.6 27.6 42.9	
Oct. 2	Iu	ePN eN eSE F	04	55	53.5 56 06.5 05 03 27.5	USCGS: 51°N 157°E O = 04:45.9 Pasadena: Deep
Oct. 2	Iu	ePNE eNE eSNE F	06	53	00.5 23.0 07 00 31.5	USCGS: 51°N 157°E O = 06:43.3 Pasadena: Deep
Oct. 4	Iu	ePE ePPN eN eSE eE F	14	54	14 56 15.5 57 24 15 01 50 04 07	Pasadena: Magnitude 7 JSA 19.2°N 68.9°W O = 14:45:35 h = 50 km.
Oct. 7	IIId	iPNE iSN F	23	29	37.3 39.2	
Oct. 8	IIId	iPN eSE F	00	11	34.2 37.5	
Oct. 14	Iu	ePN e(S)N F	04	57	29.7 05 07 41.7	BCIS: 30 1/2°S 177 1/2°W Pasadena: Normal depth
Oct. 17	IIId	iPNE iSE F	20	03	20.1 21.3	
Oct. 22	Iu	ePNE epPNE eN eSNE eNE F	10	12	26.0 13 17.0 16 52.5 22 30.5 24 01.5	BCIS: 15°S 167 1/2° E Pas h = 150-200 km. Magnitude 6.7

PALO ALTO

Date	Char-acter	Phase	Time(G.C.T.)	Remarks
1946			h. m. s.	
Oct. 28	Id	iPNE iSNE iN iE F	03 49 22.3 29.9 44.6 47.4 03 50	See list page 132
Oct. 29	IIId	iPNE iSNE F	20 01 42.7 46.2 20 02	Blast ?
Oct. 30	Ir	ePN eE eSE eLE F	07 54 09.5 55 29.0 59 34.5 08 01.8 08 30	USCGS: 54°N 164°W O = 07:47.6 Pasadena: Magnitude 6.9
Nov. 1	Ir	ePE eSE eLE F	11 21 53.0 27 52.6 30.8 12 30	USCGS: 52°N 174°W O = 11:14.4 Pasadena: Magnitude 7.0
Nov. 2	Iu	ePN eN eLN F	18 43 08.6 55 33 19 04.7 21 00	USCGS: 41°N 76°E O = 18:28.4 Pasadena: Magnitude 7.6
Nov. 4	Iu	e(P)N eNE F	22 07 16.9 41 19.4 23 15	USCGS: 40°N 53°E O = 21:47.6 Pasadena: Magnitude 7.5
Nov. 12	Iv	iPNE eSN eN F	17 40 25.9 50 2.0 59 40.8 18 15	USCGS: 21°S 173°W O = 17:28.7 Pasadena: Magnitude 7 1/2
Nov. 14	Id	iPNE iSN F	00 01 51.2 54.7 00 30	Blast ?
Nov. 25	I	ePNE eNE F	18 15 12.4 16 4.7 18 19	

PALO ALTO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 27	IIv	ePE eSN F	14 45 31.0 46 06.7 14 49	Pasadena: 35°30'N 120°55'W O = 14:44:51 Magnitude = 4.3
Dec. 2	IIId	iPNE iSNE F	23 24 55.9 57.4 23 25	
Dec. 7	Iv	ePNE eSNE F	02 03 43.0 04 31.6 02 06	
Dec. 14	Id	iPNE eN eSNE F	09 21 34.4 41.6 43.7 09 24	
Dec. 16	IIId	iPNE eSNE F	21 31 26.4 27.8 21 32	
Dec. 18	IIv	ePE eSNE eE F	14 21 21.4 22 0.9 41.9 14 29	Felt strongly at Eureka, California
Dec. 20	IIu	ePN eN eE eSE eLN F	19 31 14.9 46.6 32 25.0 41 7.9 51.7 22 27	USCGS: 33.3°N 134°E O = 19:19.0 Pasadena: Magnitude 8.2
Dec. 21	Iu	ePE eE eSE F	10 29 27.9 45.7 38 17.3 12 01	USCGS: 44°N 148°E O = 10:18.8 Pasadena: Magnitude 7
Dec. 24	IIId	iPNE eE F	01 38 59.2 39 39.5 01 42	See list page 132

SAN FRANCISCO

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

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$\phi = 37^{\circ} 46' N.$
 $\lambda = 122^{\circ} 27' W.$

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 ₀	e
Wood-Anderson.....	E 15° S	1500	1	15
	N	3000	1	15

SAN FRANCISCO

Date	Char-acter	Phase	Time (G. C. T.)	Remarks
1946			h. m. s.	
Oct. 28	Id	ePNE iSE F	03 49 30.0 40.0 03 50	See list page 132
Nov. 1	Iu	ePNE eSE F	11 21 54.5 27 45.0 12 15	USCGS: 52°N 179°W O = 11:14.4 Magnitude 7.0
Nov. 10	Id	iSNE F	08 23 09.4 08 23.2	See list page 132
Nov. 10	I	ePNE F	17 53 22.0 18 35	USCGS: 9°S 77.5°W O = 17:42:8
Nov. 12	Ir	ePNE F	14 38 47.5 14 41	Region of Vancouver Islands
Nov. 21	Id	ePNE iSNE F	20 11 36.0 44.0 20 12	
Nov. 22	Id	e(P)E iSNE F	16 06 40.0 49.6 16 07.5	See list page 132
Nov. 25	Iv	ePE eSNE F	18 15 07.0 44.5 18 17	
Nov. 27	Iv	eE eSE F	14 45 51.4 46 18.5 14 47	Pasadena: 35°30'N 120°55'W O = 14:44:51 Magnitude 4.3
Dec. 18	IIv	ePE eSE eE F	14 21 17.7 49.1 22 01.0 14 27	See list page 132
Dec. 24	IIId	ePNE iSNE F	01 39 05.8 15.4 01 41	See list page 132

FERNDALE

THE FERNDAL STATION
FERNDAL, 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	V	T _o	ϵ
Boschi-Omori 25 kg	E	12	11	5
	N	12	18	6

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

FERNDAL

Date	Character	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 25	Iv	ePNE iSNE eNE F	18 14 28 42 16.0 18 22	S - P = 14 sec.
Dec. 18	Id	iPNE iSNE F	14 20 34 38 14 30	See list page 132
Dec. 20	Iu	e(P)NE e(S)NE F	19 31 24 40 54 21 30	USCGS: 33.3°N 134°E O = 19:19.0 Magnitude 8.2
Dec. 21	Id	iPNE iSNE F	04 23 40 23 46 09 27	S - P = 6 sec.

FRESNO

THE FRESNO STATION, FRESNO STATE COLLEGE
FRESNO, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$\phi = 36^\circ 46'11''$ N.
 $\lambda = 119^\circ 47'18''$ W.

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

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Oct. 1	Iv	ePN iSN F	19 23 33.6 53.6 19 29	
Oct. 2	Iu	ePN F	04 56 05.8 04 59	USCGS: 51°N 157°E O = 04:45.9
Oct. 2	Iu	ePN ePPN eSN F	06 53 01.5 55 27.0 07 00.9 00.0 07 05	USCGS: 51°N 157°E O = 06:43.3
Oct. 26	Ir	e(P)N F	00 21 13.8 00 22	
Oct. 30	Iu	e(PP)N eN eSN F	07 54 31.6 55 50.6 08 00 04.6 08 15	USCGS: 54°N 164°W O = 07:47.6 Magnitude 6.9
Nov. 1	Iu	ePN e(PcP)N eSN F	11 22 17.3 24 25.3 28 25.8 12 12	USCGS: 52°N 174°W O = 11:14.4 Magnitude 7.0 Normal depth
Nov. 2	Iv	ePN eN eSN F	18 42 37.3 46 33.8 51 05.8 19 52	USCGS: 41°N 76°E O = 18:28.4 Magnitude 7.6 Normal depth
Nov. 4	Iu	ePN e(PP)N e(S)N F	22 02 05.8 06 11.8 15 35.8 23 20	USCGS: 40°N 53°E O = 21:47.6 Magnitude 7.5
Nov. 10	Iu	ePN e(PcP)N ePPN eN eSN F	17 53 08.1 54 06.1 55 04.6 56 35.6 18 01 05.6 18 28	USCGS: 9°S 77.5°W O = 17:42.8 Magnitude 7 1/4 Destructive in Peru
Nov. 12	Iu	iPN eN eLN F	17 40 29.1 42 27.1 18 03 13.1 18 15	USCGS: 21°S 173°W O = 17:28.7

FRESNO

Date	Char-acter	Phase	Time (G.C.T.)	Remarks
1946			h. m. s.	
Nov. 24	IIv	iPN iSN F	21 30 42.5 31 01.5 21 33	Pasadena: 36°36'N 117°52'W O = 13:30:14 Magnitude 3.8
Nov. 27	IIv	iPN iSN eN F	14 45 23.2 42.7 47 24.7 14 50	Pasadena: 35°30'N 120°55'W O = 14:44:51 Magnitude 4.3
Nov. 28	Iu	ePN eSN F	16 02 46.9 11 04.9 16 17	Pasadena: 18 1/2°S 174°W O = 15:51:35 h = 290 km; Magnitude about 6 3/4
Dec. 7	Iv	ePN eSN iN F	01 58 40.7 59 02.2 59 04.2 02 01	Pasadena: 34°12'N 117°03'W O = 01- 02- 41 Magnitude 2.6
Dec. 7	IIv	iPN iSN iN F	02 03 09.5 32.5 57.0 02 08	Pasadena: 37.3°N 117.3°W O = 02- 02- 29 Magnitude 4.1
Dec. 10	Iv	ePN eSN eN	15 45 30.5 46 59.0 47 33.0	
Dec. 18	Iv	iPN iSN F	14 21 45.5 23 25.5 14 35	Felt at Eureka, California
Dec. 20	Iu	ePN eN e(PP)N iSN eLN F	19 31 24.5 47.5 32 17.0 19 41 41.5 19 52.8 21 45	USCGS: 33.3°N 134°E O = 19:19.0 Magnitude 8.2
Dec. 22	Iu	ePN F	19 59 37.4 20 04	
Dec. 24	Iv	ePN eSN F	01 39 26.3 42.8 01 45	See list page 132

MINERAL

THE MINERAL STATION
MINERAL, CALIFORNIA

CONSTANTS

CONSTANTS OF THE STATION

Latitude and Longitude:

$$\phi = 40^{\circ} 21' N.$$

$$\lambda = 121^{\circ} 35' W$$

Time -- All determinations are reduced to Universal Time.

Altitude -- 1495 meters (4906 feet) above mean sea level.

CONSTANTS OF THE SEISMOGRAPHS

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

MINERAL

Date	Char-acter	Phase	Time(G. C. T.)	Remarks
1946			h. m. s.	
Oct. 7	IId	iPE iSE F	15 01 16.4 18.7 15 02	S - P = 2.3 sec.
Oct. 7	Iv	ePE eSE F	19 58 33.8 59 14.4 20 00	
Oct. 8	IId	iPE iSE F	05 31 07.9 10.2 05 33	S - P = 2.3 sec.
Oct. 8	Id	iPE iSE F	13 44 45.3 47.7 13 46	S - P = 2.4 sec.
Oct. 8	Id	ePE eSE F	06 34 31.4 33.9 06 36	S - P = 2.5 sec.
Oct. 9	Id	iPE iSE F	07 57 13.6 15.7 07 59	S - P = 2.1 sec.
Oct. 10	Id	ePE eSE F	07 42 26.6 29.3 07 44	S - P = 2.7 sec.
Oct. 20	Id	ePE iSE F	08 53 13.0 15.1 08 55	S - P = 2.1 sec.
Oct. 20	Id	iPE eSE F	09 54 02.8 05.1 09 55	S - P = 2.3 sec.
Oct. 21	IId	iPE iSE F	22 59 25.3 27.5 23 00	S - P = 2.2 sec.
Oct. 21	IId	iPE iSE F	10 25 10.3 12.3 10 26	S - P = 2.0 sec.
Oct. 22	Iu	ePE eE F	10 12 33 13 24 10 28	

MINERAL

Date	Char-acter	Phase	Time(G. C. T.)	Remarks
1946			h. m. s.	
Oct. 24	Id	iPE iSE F	08 35 08.0 11.8 08 36	S - P = 3.8 sec.
Oct. 24	Id	ePE eSE F	08 37 21.0 24.0 08 38	S - P = 3.0 sec.
Oct. 25	Id	iPE iSE	00 26 41.2 43.5	Volcanic swarm from 1530 to 2200 GCT on 10-25-46.
Oct. 25	Id	iPE eSE	03 31 59.3 32 02.1	S - P = 3.8
Oct. 25	Id	iPE iSE F	03 46 41.8 44.4 03 48	S - P = 2.6
Oct. 26	IId	ePE iSE F	01 16 24.7 30.0 01 17	S - P = 5.3
Oct. 28	Id	iPE eSE F	00 09 44.0 46.3 00 11	S - P = 2.3
Oct. 28	Id	iPE iSE F	00 11 40.6 41.9 00 12	S - P = 1.3
Oct. 28	IId	ePE iSE F	05 36 15.6 18.1 05 37	S - P = 2.5
Oct. 29	Id	iPE iSE F	09 36 17.5 19.8 09 38	S - P = 2.3
Oct. 30	Iu	ePE eSE F	07 53 59.2 59 06.7 08 05	
Nov. 11	IId	ePE iSE F	02 55 30.9 33.1 02 57	S - P = 2.2
Nov. 11	Id	iPE iSE F	07 16 42.5 44.8 07 18	

MINERAL

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
Nov. 13	IIId	iPE iSE F	12	25	56.0 57.3	
			12	27		
Nov. 13	IIId	iPE eSE F	15	35	02.7 04.2	
				36		
Nov. 15	IIId	ePE eSE F	10	53	10.2 12.5	
			10	54		
Nov. 15	IIId	iPE iSE F	17	46	18.9 21.2	
			17	48		
Nov. 15	IIId	iPE iSE F	19	20	48.5 50.4	
			19	22		
Nov. 16	IIId	iPE iSE F	04	39	03.2 5.3	
			04	41		
Nov. 20	IIId	iPE iSE F	11	37	52.3 54.1	
			11	39		
Nov. 22	IIId	iPE iSE F	18	12	59.4 01.5	
			18	14		
Nov. 22	IIId	iPE iSE F	19	21	42.5 44.9	
			19	23		
Nov. 22	Iv	iPE iSE	01	02	28.4 55.0	
Nov. 23	IIId	iPE iSE F	05	27	48.6 50.7	
			05	29		
Nov. 25	IIId	iPE iSE F	20	31	36.8 41.0	
			20	33		
Nov. 28	Iv	ePE eSE F	15	18	51.4 57.1	
			15	24		

MINERAL

Date	Char-acter	Phase	Time (G.C.T.)			Remarks
			h.	m.	s.	
1946						
Nov. 29	IIId	iPE eSE F	08	45	50.6 53.0	
			08	47		
Nov. 30	IIId	iPE iSE F	21	00	10.0 12.2	
			21	02		
Dec. 1	IIId	iPE iSE F	00	34	12.8 15.0	
			00	36		
Dec. 25	Iu	ePE e(S)E F	11	20	52.0 08.5	
			11	30		