CLEVELAND

SEISMOLOGICAL OBSERVATORY

JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.

41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for January, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
January 1 No. 1	e n eM N F N	$03^h07^m06^s$ 03 07 30 03 21	
January 2 No. 2	eP Z iP n i e e n eS N e N F N	$00^h48^m05^s$ 00 48 05.1 00 48 10.9 00 48 14 00 52 27 00 54 48 01 30	Epicenter by U.S.C.G.S. 19° N. 67°5 W. Near west coast of Puerto Rico H = 00^h 42^m 26^s Δ = 25°5
January 2 No. 3	e N eSR_1 N e N M N F N	$15^h46^m16^s$ 15 50 16 16 04 05 16 24.7 16 59	Epicenter by U.S.C.G.S. 11°5 S. 165° E. Queen Charlotte Islands Region. H = 15^h 14^m 54^s Magnitude 7 by Pasadena. Δ = 111°8
January 3 No. 4	iP' e iPR_1 e i e eS E e N e N e E e E ePPS N e E e E eSR_1 N e N L N M N F N	$03^h10^m47.5^s$ 03 12 00.0 03 12 16.8 03 19 23 03 19 37 03 19 51 03 20 17 03 20 28 03 22 10 03 24 21 03 27 20 03 27 43 03 34 45 03 48.3 03 58.7 04 43	Epicenter by U.S.C.G.S. 18° N. 121° E. Northern tip of Luzon, Philippine Islands. H = 02^h 51^m 50^s Magnitude 6.5 by Pasadena. Δ = 117°5

Bulletin for January, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
January 3 No. 5	i E M E F E	$11^h29^m48^s$ 11 53.7 12 26	
January 4 No. 6	e E i E i N F E	$21^h46^m10^s$ 21 51 04 21 51 05 22 22	
January 5		04^h48^m to 05 06	Seismic activity
January 10 No. 7	eP n eP e eP Z iP e e(PR_1) N ePR_1 Z e N eS e L N F N	$03^h12^m50^s$ 03 12 50 03 12 52 dil 03 12 53 03 13 24 03 14 26 03 17 38 03 18 41 03 24.2 03 47	Epicenter by U.S.C.G.S. 11° N. 103°W. Pacific Ocean off southern coast of Mexico. H = 03^h 05^m 42^s Magnitude about 6-1/4 by Pasadena Δ = 35°.7
January 20 No. 8	eP n iP Z eP e eP e iP n e e eM NE F E	$18^h45^m47.0^s$ 18 45 48 dil 18 45 48 18 45 48.0 18 45 48.2 18 46 33.0 19 01 41 19 16	Epicenter by U.S.C.G.S. South- western Alaska H = 18^h 36^m 56^s
January 21 No. 9	eP Z eP n eP e epP e epP Z epP n esP n e n eS E F N	$14^h21^m38^s$ comp 14 21 39.2 14 21 39.7 14 21 55 14 21 56 14 21 57.6 14 22 02.6 14 22 07.1 14 31 44 15 04	Epicenter by U.S.C.G.S. 36° S. 73° W. Near west central coast of Chile. Felt in central Chile. H = 14^h 09^m 54^s h = 100 km. Δ = 78°.3 Record weak

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

January, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	47	44	38	27	32	30	23	20
2	23	14	16	10	13	11	10	07
3	09	07	11	NR	04	08	03	NR
4	NR	NR	NR	07	NR	NR	NR	08
5	08	10	10	NR	10	12	12	NR
6	NR	NR	NR	39	NR	NR	NR	26
7	33	24	28	21	21	21	28	33
8	32	43	34	42	33	41	23	31
9	56	54	67	63	40	46	40	30
10	45	42	47	32	32	31	32	23
11	31	32	26	24	30	23	16	15
12	26	32	32	40	22	29	32	29
13	33	32	42	41	33	21	25	28
14	38	32	22	NR	23	21	20	NR
15	NR	NR	NR	58	NR	NR	NR	58
16	123	110	36	24	105	76	44	20
17	20	22	18	17	17	12	20	19
18	18	23	30	30	22	18	20	20
19	21	20	33	35	14	16	24	29
20	32	33	34	30	30	25	32	23
21	27	22	20	16	19	17	19	10
22	13	10	09	08	10	05	09	04
23	09	08	08	04	07	04	05	07
24	07	10	10	08	06	05	07	04
25	12	13	11	10	09	11	10	09
26	11	09	09	08	07	08	07	03
27	06	08	10	08	05	09	07	06
28	10	10	11	12	07	10	12	11
29	12	19	22	19	12	20	11	12
30	19	13	18	24	12	09	14	17
31	28	29	30	32	19	29	20	24

NR = No Record

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

January, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	47	44	38	27	32	30	23	20
2	23	14	16	10	13	11	10	07
3	09	07	11	NR	04	08	03	NR
4	NR	NR	NR	07	NR	NR	NR	08
5	08	10	10	NR	10	12	12	NR
6	NR	NR	NR	39	NR	NR	NR	26
7	33	24	28	21	21	21	28	33
8	32	43	34	42	33	41	23	31
9	56	54	67	63	40	46	40	30
10	45	42	47	32	32	31	32	23
11	31	32	26	24	30	23	16	15
12	26	32	32	40	22	29	32	29
13	33	32	42	41	33	21	25	28
14	38	32	22	NR	23	21	20	NR
15	NR	NR	NR	58	NR	NR	NR	58
16	123	110	36	24	105	76	44	20
17	20	22	18	17	17	12	20	19
18	18	23	30	30	22	18	20	20
19	21	20	33	35	14	16	24	29
20	32	33	34	30	30	25	32	23
21	27	22	20	16	19	17	19	10
22	13	10	09	08	10	05	09	04
23	09	08	08	04	07	04	05	07
24	07	10	10	08	06	05	07	04
25	12	13	11	10	09	11	10	09
26	11	09	09	08	07	08	07	03
27	06	08	10	08	05	09	07	06
28	10	10	11	12	07	10	12	11
29	12	19	22	19	12	20	11	12
30	19	13	18	24	12	09	14	17
31	28	29	30	32	19	29	20	24

NR = No Record

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41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for February, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
February 3 No. 12	ePPS N eSR_1 N e N L N M NE F N	$00^h04^m29^s$ 00 09 36 00 19 13 00 29.4 00 39.4 02 16	Epicenter by U.S.C.G.S. 22° N. 100°.5 E. South-western Yunnan Province, China. Felt. H = 23^h 33^m 38^s Magnitude about 6 3/4 by Pasadena. Δ = 116°.7
February 3 No. 13	e N ePPS N eSR_1 N eSR_2 N L N eM N F N	$03^h16^m27^s$ 03 22 42 03 27 44 03 32 11 03 46.4 03 57 15 05 11	Epicenter by U.S.C.G.S. 22° N. 100°.5 E. South-western Yunnan Province, China. Felt. Aftershock of preceding quake. H = 02^h 51^m 46^s Magnitude about 6 by Pasadena. Δ = 116°.7
February 3 No. 14	e(SR_1) N L N M N F N	$17^h11^m49^s$ 17 18.9 17 26.0 17 49	Weak; interpretation doubtful.
February 4		02^h34^m to 03 08	Surface waves
February 5 No. 15	eP' Z iSKP n eSKP e iSKP E eSKP N	$01^h42^m52^s$ 01 46 22.7 01 46 24.8 01 46 25 01 46 25	Epicenter by U.S.C.G.S. 50°S. 164°E. Off S. coast of New Zealand H = 01^h 23^m 30^s Magnitude 6.8 by Pasadena. Δ= 135°.4 Record weak.

(continued on next page)

Bulletin for February, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
February 5 No. 15 (continued)	e e eSR_1 e L M F	N n N N N N N	$01^h47^m25^s$ 01 47 29 01 02 59 01 12 18 01 20.8 01 30.3 01 50	
February 7 No. 16	eS e(PS) M F	E N N N	$10^h59^m45^s$ 11 00 03 11 27.3 12 08	Epicenter by U.S.C.G.S. 46° N. 152° E. Kurile Islands Region. H = $10^h\ 37^m\ 22^s$ Δ = 80°.5 Record weak
February 8			18^h39^m to 18 55	Surface waves
February 10 No. 17	eS M F	N N N	$20^h34^m37^s$ 20 43.8 20 50	Epicenter by U.S.C.G.S. Off coast of El Salvador H = $20^h\ 23^m\ 25^s$ Δ about 29°.6
February 12 No. 18	eSKS iPS e e e M F	E E N N N N N	$22^h40^m44^s$ 22 43 55 22 47 01 23 02 41 23 06 28 23 12.1 00 05	Epicenter by U.S.C.G.S. 19° S. 178° E. Fiji Islands Region. H = $22^h\ 14^m\ 55^s$ Magnitude 6 1/2 by Pasadena. Δ = 110°.5
February 17 No. 19	eP e epP e eS esS $e(SR_1)$ e eL eM F	NZ n N N N N N N N N N	$03^h53^m17^s$ 03 53 23.3 03 53 41 03 53 49 03 58 35 03 59 12 03 00 23 03 01 34 03 04 18 03 06 38 03 29	Epicenter by U.S.C.G.S. 135° N. 91° W. Near coast of Guatemala. H=$03^h47^m21^s$ h = 100 km. Magnitude 6 1/4 to 6 1/2 by Pasadena. Δ = 29°.3 Agreement poor.

Bulletin for February, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
February 23 No. 20	eP Z iP n e N iS N	$08^h42^m35^s$ 08 42 36.4 08 49 09 08 51 53	Epicenter by U.S.C.G.S. 50° N. 148° E. Sea of Okhotsk $H = 08^h31^m23^s$ h = 500 km. Magnitude 6 by Pasadena. $\Delta = 79^\circ.7$
February 28 No. 21	eP Z eP n iP N iP e iP Z iP E ipP Z e N ePR_1 N iS n iS N eS E iSP N isS N M N F N	$10^h32^m54^s$ comp 10 32 54.2 10 32 54.2 10 32 54.4 10 32 54.5 dil 10 32 55 10 34 23 10 34 40 10 36 19 10 42 43 10 42 44 10 42 45 10 43 45 10 44 43 11 03.1 13 21	Epicenter by U.S.C.G.S. 46° N. 143°.5 E. Off N. coast of Hokkaido, Japan. Felt. $H = 10^h\ 20^m\ 58^s$ h about 350 km. Magnitude 7 3/4 by Pasadena. $\Delta = 84^\circ.3$

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

February, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	41	32	21	25	18	23	22	18
2	16	21	20	18	18	13	13	12
3	20	22	24	22	14	12	22	23
4	24	15	37	38	16	14	23	32
5	41	29	20	19	21	22	18	10
6	14	12	14	12	10	12	16	10
7	10	07	07	13	05	04	03	10
8	28	30	41	29	20	39	27	22
9	30	33	20	NR	29	20	16	NR
10	NR	NR	NR	13	NR	NR	NR	10
11	11	21	20	24	10	19	19	13
12	15	12	12	11	12	13	11	10
13	13	19	15	19	08	11	10	29
14	21	11	13	21	26	20	29	21
15	41	27	14	19	20	18	12	14
16	20	18	17	12	12	12	12	12
17	11	12	13	10	10	09	09	09
18	11	10	12	08	07	07	09	05
19	07	08	09	08	05	05	04	04
20	05	06	08	09	05	07	10	10
21	11	13	15	16	11	10	16	17
22	18	22	25	29	13	20	20	23
23	22	22	22	21	19	21	20	22
24	32	38	38	34	20	28	32	32
25	22	22	22	23	19	14	19	18
26	23	21	14	16	12	13	11	15
27	13	13	11	09	19	16	13	12
28	10	10	14	12	09	12	13	14

NR = No Record

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Two Sprengnether short-period horizontal.

Bulletin for March, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
March 2 No. 22	e N e E e N e E i E e N e E e E F - lost in microseisms	$08^h03^m32^s$ 08 03 34 08 14 32 08 14 33 08 17 41 08 18 21 08 19 13 08 20 24	
March 3		11^h33^m to 12 15	Surface waves
March 7 No. 23	ePR_1 Z ePR_1 N ePR_1 n ePR_1 E eSKS N eSKKS N iPS N M N F N	$02^h28^m30^s$ 02 28 30 02 28 33 02 28 33 02 33 48 02 35 27 02 38 33 03 16.8 04 31	Epicenter by U.S.C.G.S. 10° N., 124° E. Philippine Islands. H = 02^h 07^m 46^s Magnitude 6 3/4 by Pasadena. Δ = 123°6
March 11 No. 24	eP n eP e eP Z epP e epP n F N	$00^h48^m31^s$ 00 48 31 00 48 31.1 comp 00 48 48.1 00 48 48.3 01 16	Epicenter by U.S.C.G.S. 20° N., 99° W. Central Mexico. H = 00^h 42^m 51^s Δ = 26°3

Bulletin for March, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
March 14 No. 25	iP eP iP iP iP e epP eS i i e i esS esS eSR_1 e F	N Z Z n e n N NE n e Z n N E E E N	$03^h18^m44^s$ 03 18 44 dil 03 18 44.4comp 03 18 45.1 03 18 45.5 03 18 48.3 03 19 20 03 25 42 03 25 52.0 03 25 52.1 03 25 56 03 25 58.3 03 26 38 03 26 40 03 28 43 03 28 49 03 54	Epicenter by U.S.C.G.S. 8° S., 74° W. Eastern Peru H = 03^h 10^m 02^s h about 150 km. Magnitude 6 3/4 by Pasadena. Δ = 50°3
March 20 No. 26	M F	N N	$15^h38.4^m$ 15 52	Epicenter by U.S.C.G.S. 40°5 N., 121°5 W. North Calif- ornia, felt. H = 15^h 22^m 17^s Δ meas = 30°2
March 27 No. 27	iP eP iP i e eS iS ePS e eSR_1 M F	Z n e nZ n NE e N E N N N	$13^h14^m53^s$comp 13 14 53.8 13 14 54.0 13 15 08 13 23 40.8 13 23 42 13 23 43.3 13 24 10 13 24 51 13 28 37 13 38.8 15 02	Epicenter by U.S.C.G.S. 53°5 N., 173° E., Aleutian Islands Region H = 13^h 04^m 04^s Magnitude 6.7 by Pasadena. Δ = 67°0

Bulletin for March, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
March 27 No. 28	iP' Z	$21^h 38^m 06.9^s$ dil	Epicenter by U.S.C.G.S. 5°5 S., 103° E. Off southern coast of Sumatra. H = 21^h 18^m 32^s Slightly deeper than normal. Magnitude about 7 by Pasadena. Δ = 144°8
March 29 No. 29	e E e N e N	$01^h 48^m 38^s$ 01 56 56 02 00 24	Weak, obscured by wind. h = 500-550 km.
March 29 No. 30	eSR_1 N e E M E M N F E	$18^h 19^m 37^s$ 18 19 55 18 42.0 18 42.6 19 02	Epicenter by U.S.C.G.S. 3°S., 137°5 E. Northern New Guinea. H = 17^h 41^m 07^s Δ = 128°1

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
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Decimal point is dropped in recording the amplitude

March, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	12	14	13	22	16	11	11	22
2	22	21	23	32	21	20	20	18
3	22	22	23	26	23	19	16	18
4	30	34	46	48	28	37	40	22
5	34	24	14	19	20	13	10	16
6	15	14	13	13	11	10	06	13
7	17	19	21	31	17	19	14	22
8	50	34	31	37	34	40	39	30
9	38	27	30	23	29	19	21	24
10	22	21	20	18	14	17	16	15
11	15	14	12	10	12	12	13	10
12	12	12	13	18	10	10	11	16
13	35	26	15	11	19	13	15	09
14	14	14	20	25	08	10	19	28
15	42	35	30	36	27	23	20	34
16	42	46	39	32	24	29	26	19
17	16	24	30	33	18	22	24	23
18	29	29	25	34	20	23	20	26
19	40	44	40	24	28	30	28	19
20	19	22	15	17	12	13	12	13
21	15	22	25	23	15	22	22	21
22	22	19	12	11	19	15	12	09
23	11	13	13	25	10	10	12	16
24	36	32	35	NR	22	29	32	18
25	NR	NR	NR	29	22	19	17	15
26	20	13	17	19	12	12	11	11
27	19	22	22	14	22	19	15	14
28	15	13	12	07	07	12	12	05
29	10	10	08	08	06	08	06	03
30	09	10	11	12	05	08	08	12
31	07	07	10	10	10	06	09	10

NR = No Record

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Bulletin for April, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
April 4 No. 31	iP eP i e e eS eSKKS eSR_1 L M F	n Z n Z e E E E E N N	$18^h56^m59.5^s$ 18 57 05.1 dil 18 57 06.5 18 57 10.1 dil 18 57 14 19 07 34 19 07 43 19 13 27 19 22.9 19 32.0 20 39	Epicenter by U.S.C.G.S. 52° N., 101° E. Near border of U.S.S.R. and outer Mongolia, about 100 miles west of Lake Baikal. $H = 06^h\ 44^m\ 10^s$ Magnitude 6 1/2 by Pasadena. $\Delta = 87°.0$
April 5 No. 32	eSR_1 eSR_1 L M F	N E N E E	$01^h39^m42^s$ 01 39 53 01 48.4 01 53.9 02 36	Epicenter by U.S.C.G.S. 52° N., 177°W., Aleutian Islands region. $H = 01^h\ 17^m\ 15^s$ $\Delta = 61°.6$
April 10 No. 33	iP eP eP e(S) e	Z e n n E	$16^h55^m48^s$ dil 16 55 50 16 55 50.0 17 01 26 17 05 45	Epicenter by U.S.C.G.S. 5° N., 76°.5 W. Western Colombia. $H = 16^h\ 48^m\ 38^s$ $\Delta = 37.0$ Weak.
April 11 No. 34	e e e e e e F	Z E N N E N N	$11^h38^m09.3^s$ dil 11 43 45 11 47 16 11 52 59 11 53 05 11 59 06 12 54	

Bulletin for April, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
April 14 No. 35	eP	Z	$20^h12^m03.8^s$	Epicenter by U.S.C.G.S. 36° S., 103° W. Pacific Ocean 600 miles south of Easter Island. H = 19^h 59^m 58^s Δ = 80°0
	eP	Z	20 12 05.8	
	iP	n	20 12 06.6	
	eP	N	20 12 07	
	eSKS	N	20 22 04	
	iSKS	E	20 22 05	
	iS	E	20 22 11	
	iS	N	20 22 12	
	ePS	N	20 22 49	
	e	N	20 23 19	
	M	E	20 40.6	
	F	N	20 29	
April 15 No. 36	eS	N	$10^h54^m06^s$	Weak; possibly Mexico
	M	N	10 59.1	
	F	N	11 20	
April 15 No. 37	eP	Z	$14^h57^m17.9^s$ dil	Epicenter by U.S.C.G.S. 14° N., 91° W. Near coast of Guatemala. H = 14^h 51^m 25^s h = 100 km. Δ = 28°6
	iP	N	14 57 19	
	iP	n	14 57 19.8	
	eP	e	14 57 20	
	iP	Z	14 57 20.5 comp	
	epP	e	14 57 32	
	epP	N	14 57 33	
	epP	n	14 57 34.3	
	esP	n	14 57 39	
	isP	Z	14 57 41.5	
	esP	e	14 57 41.8	
	e	N	14 57 48	
	eS	N	15 02 06	
	eS	E	15 02 09	
	esS	E	15 02 33	
	L	N	15 07.6	
	F	N	15 53	
April 16 No. 38	eP	Z	$21^h54^m46^s$ dil	Epicenter by U.S.C.G.S. 49° N., 129° W. Off coast of Vancouver Island, British Columbia, Canada. H = 21^h 48^m 02^s Δ = 34°5
	iP	e	21 54 46.1	
	iP	n	21 54 48.7	
	e	N	22 01 34	
	e	N	22 02 46	
	M	N	22 05.9	
	F	N	22 38	

Bulletin for April, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
April 18 No. 39	e eS e M F	N E E N E	$14^h47^m55^s$ 14 48 07 14 50 33 15 01.7 16 26	Epicenter by U.S.C.G.S. 4°5 S., 106° W., Pacific Ocean, about 1100 miles S.W. of Galapagos Islands. H = 14^h 31^m 46^s Magnitude 6.5 by Pasadena. Δ = 51°4
April 20 No. 40	eP e e e eS eSKKS e eSR_1 M F	Z n Z n NE E N N E E	$10^h03^m11^s$dil 10 03 12.1 10 03 28 10 03 29.6 10 13 18 10 13 35 10 13 38 10 19 18 10 34.2 11 38	Epicenter by U.S.C.G.S. 45° N., 150° E. Kurile Islands Region. H = 09^h 50^m 44^s Magnitude 6.5 by Pasadena. Δ = 82°5
April 26 No. 41	eP e iSKS eSKKS iS ePPS ePPS e e eSR_1 L M F	Z N NE E N E N N E E E E E	$07^h18^m48.0^s$ dil 07 27 17 07 28 59 07 29 46 07 29 51 07 31 17 07 31 20 07 36 18 07 36 20 07 36 33 07 53.9 07 01.2 07 45	Epicenter by U.S.C.G.S. 34° N., 135° E., Near southern coast of Honshu, Japan. H = 07^h 04^m 48^s Magnitude 6 3/4 by Pasadena. Slightly deeper than normal. Δ = 97°7
April 30 No. 42	eP eP iP iP eP eS eS	E N Z n e N E	$10^h40^m31^s$ 10 40 31 10 40 34.0 comp 10 40 34.0 10 40 34 10 49 48 10 49 51	Epicenter by U.S.C.G.S. 24°5 S., 112°5 W., South Pacific Ocean, 250 miles N.W. of Easter Islands. H = $10^h29^m03^s$ Δ = 72°0

(continued on next page)

Bulletin for April, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 30 No. 42 (continued)	ePS NE iSR1 E M N F E	$10^h50^m38^s$ 10 54 40 11 06.6 12 58	
April 30 No. 43	iP N eS E eS N eM E F E	23 56 22 00 01 53 00 02 03 00 06 43 00 27	Epicenter by U.S.C.G.S. 4°5 S., 82°5 W. Pacific Ocean, off southern coast of Panama. $H = 23^h 49^m 22^s$ $\Delta = 37°0$

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

April, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	12	13	22	23	10	20	20	13
2	13	17	10	12	13	12	10	10
3	12	10	10	11	09	09	09	08
4	09	13	08	11	03	04	03	03
5	10	11	12	12	05	06	07	03
6	08	11	10	10	06	10	12	12
7	12	17	24	52	13	18	22	42
8	60	67	80	56	64	68	42	52
9	42	30	20	14	34	30	18	16
10	12	21	14	13	12	12	12	12
11	12	12	13	17	12	12	12	14
12	08	09	11	06	10	10	10	12
13	10	07	09	10	12	10	10	07
14	12	09	10	07	12	08	10	09
15	06	05	05	07	09	08	06	04
16	08	04	07	08	05	07	10	07
17	05	04	04	04	04	05	04	04
18	03	03	02	03	03	03	03	01
19	03	04	04	05	02	03	08	05
20	03	05	03	04	06	05	06	06
21	05	06	07	06	07	07	08	07
22	07	09	08	07	07	09	10	11
23	06	07	07	09	09	10	09	10
24	07	08	07	08	09	10	05	10
25	10	11	09	08	12	12	11	07
26	06	06	03	03	07	08	06	03
27	03	03	03	09	06	03	04	09
28	11	10	12	11	10	11	12	12
29	09	09	08	04	12	08	07	05
30	03	03	03	02	07	06	04	03

CLEVELAND

SEISMOLOGICAL OBSERVATORY
JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.
41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for May, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 7 No. 44	eP' Z eP' e iP' Z eP' n	$06^h 55^m 43.1^s$ dil 06 55 45.2 06 55 45.5 dil 06 55 46.1	Epicenter by U.S.C.G.S. 55° S., 158.5° E. Macquarie Island Region. H = 06^h 36^m 05^s Δ about 139°
May 9 No. 45	eSKS e iSKKS n iSKKS e L N M N F N	$11^h 40^m 40.7^s$ 11 41 11.5 11 41 11.6 12 02.1 12 09.6 12 50	Epicenter by U.S.C.G.S. 41° N., 58° E. Turkmen H = 11^h 17^m 10^s Δ = 90°
May 10 No. 46	iPR_1 Z ePR_1 E eSR_1 E M E F E	$00^h 00^m 26^s$ dil 00 00 27 00 17 16 00 46.6 01 56	Epicenter by U.S.C.G.S. 15° S., 43° E., near N. coast of Madagascar. H = 23^h 39^m 25^s Magnitude 6.5 by Pasadena. Δ = 126°
May 15 No. 47	M NE F N	$03^h 47.8^m$ 04 01	Epicenter by U.S.C.G.S. Gulf of California. H = $03^h 32^m 41^s$

Bulletin for May, 1950

Gnwch. Date and Number	Phase and	Component	G. M. C. T.	Remarks
May 17	iP	Z	$11^h59^m10.6^s$ dil	Epicenter by
No. 48	eP	n	11 59 11.2	U.S.C.G.S. 39° N.,
	iP	Z	11 59 11.8 comp	130°5 E. Sea of
	ipP	Z	12 01 19.6	Japan, off east
	ipP	n	12 01 20.2	coast of Korea.
	eSKS	N	12 08 47	H = $11^h46^m46^s$
	iSKS	n	12 08 47.8	h about 600 km.
	iSKS	e	12 08 48.0	Magnitude 6 3/4 to
	iSKKS	NE	12 09 29	7 by Pasadena.
	iSKKS	e	12 09 30	Δ = 95°0
	i	n	12 09 32	
	i	e	12 09 33	
	iS	E	12 09 35	
	iS	N	12 09 38	
	esS	E	12 13 15	
	eSR_1	E	12 16 13	
	iSR_1	N	12 16 15	
May 17	i(P)	Z	$18^h29^m11.5^s$ dil	Epicenter by
No. 49	iP'	Z	18 32 29.9 comp	U.S.C.G.S. 20° S.,
	iPR_1	n	18 33 03.7	169° E., New
	eSKS	E	18 38 46	Hebrides Islands
	eSKS	N	18 38 54	Region.
	ePS	E	18 42 54	H = 18^h 13^m 13^s
	iSR_2	e	18 53 25	Magnitude 7 by
	M	E	19 11.6	Pasadena.
	M	N	19 12.4	Δ = 117°6
	F	E	21 06	
May 19	ePR_1	E	$02^h58^m12^s$ comp	Epicenter by
No. 50	eSKS	e	03 03 49	U.S.C.G.S. 20°5 S.,
	eSKS	N	03 03 50	169° E. New Hebrides
	eSKS	E	03 03 51	Islands Region.
	eSKKS	E	03 04 51	H = 02^h 38^m 10^s
	ePS	N	03 07 52	Magnitude 6.8 by
	ePS	E	03 07 54	Pasadena.
	ePPS	E	03 09 21	Δ = 117°7
	eSR_1	E	03 14 11	
	e	N	03 14 43	
	M	E	03 38.0	
	F	E	06 11	

Bulletin for May, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
May 19 No. 51	ePR_1 eSKS eSKKS ePS ePS eSR_1 M F	E E E E N E E E	$07^h25^m32^s$ comp 07 31 14 07 32 31 07 35 15 07 35 18 07 41 28 08 12.3 10 06	Epicenter by U.S.C.G.S. 20°5 S., 169° E., New Hebrides Islands Region. H = 07^h 05^m 31^s Magnitude 6.5 by Pasadena. Δ = 117°7
May 20 No. 52	M F	NE E	$03^h24.7^m$ 03 40	Probable foreshock of following quake.
May 20 No. 53	eP iP eS eS M F	E Z N E E E	$09^h44^m07^s$ 09 44 08 dil 09 49 33 09 49 34 09 53.5 10 36	Epicenter by U.S.C.G.S. 29° N., 43°5 W., North Atlantic Ocean. H = 09^h 37^m 27^s Δ = 33°3
May 24			04^h40^m to 05 33	Surface waves.
May 25 No. 54	iP iP e e eSR_1 eSR_1 e iL F	Z Z n Z N E N E E	$08^h42^m55.2^s$ dil 08 43 02.6 dil 08 47 15 08 47 17 comp 08 52 46 08 52 50 08 52 56 08 58 08 09 42	Epicenter by U.S.C.G.S. 65°5 N., 151°5 W., about 100 miles northwest of Fairbanks, Alaska. Felt at College. H = 08^h 34^m 32^s Magnitude 6 by Pasadena. Δ = 45°1
May 25 No. 55	ePR_1 eSKS eSKS eSKKS ePS ePS ePPS	N NE n NE E N N	$18^h54^m11^s$ 19 00 01 19 00 04.3 19 00 59 19 03 33 19 03 35 19 04 28	Epicenter by U.S.C.G.S. 13° N., 142°5 E., about 150 miles west of Guam. H = 18^h 35^m 00^s h about 100 km. Magnitude 7 1/4 by Pasadena. Δ = 112°3

(continued on next page)

Bulletin for May, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 25 No. 55 (continued)	e N e E e N e E e N M E F E	$19^h04^m54^s$ 19 04 56 19 05 14 19 25 49 19 25 51 19 34.2 21 03	
May 26 No. 56	eP E iP' Z ePR_1 E epPR_1 E esPR_1 N e(SKS) N e(SKS) ne e ne iPS E ePS N F E	$01^h32^m17^s$ 01 36 14 dil 01 37 03 01 37 28 01 37 42 01 42 55 01 42 57 01 43 11.9 01 47 01 01 47 05 06 08	Epicenter by U.S.C.G.S. 20° S., 169° E., New Hebrides Islands Region. H = 01^h 17^m 14^s h about 100 km. Magnitude 7 1/2 by Pasadena. Δ = 117°.6
May 27 No. 57	M N F N	$13^h40.5^m$ 15 09	Epicenter by U.S.C.G.S. 20° S., 168° E., New Hebrides Islands Region. H = 12^h 39^m 43^s h = 200 km. Magnitude 6 1/2 by Pasadena. Δ = 118°.0
May 28 No. 58	e n eSKS e eSKS N iSKS E e E eSR_1 E e N eSR_2 E M E F E	$02^h02^m10^s$ 02 02 24 02 02 24 02 02 25 02 11 30 02 12 54 02 13 30 02 17 45 02 36.1 04 06	Epicenter by U.S.C.G.S. 20° S., 169° E., New Hebrides Islands Region. H = 01^h 36^m 44^s Magnitude 6 1/2 by Pasadena. Δ = 117°.6

Bulletin for May, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
May 28 No. 59	iP e iS F	Z n E E	$05^h14^m16.8^s$ dil 05 14 17 05 20 28 05 50	Epicenter by U.S.C.G.S. 0.5° S., 81° W., Off coast of Ecuador. H = $05^h\ 06^m\ 26^s$ Δ = 41°.9
May 30 No. 60	iP eP eS F	Z E E E	$01^h27^m02^s$ dil 01 27 03 01 35 56 02 49	Δ_{S-P} = 66°.0 H = $01^h\ 16^m\ 20^s$
May 30 No. 61	iPR_1 ePR_1 eS ePS esS eSR_1 F	Z e N E N N N	$15^h22^m03.5^s$ dil 15 22 04.0 15 28 49 15 30 41 15 32 49 15 36 33 16 03	Epicenter by U.S.C.G.S. 20° S., 178°.5 W., Tonga Islands Region. H = $15^h\ 04^m\ 03^s$ h about 600 km. Magnitude 6 1/2 by Pasadena. Δ = 108°.2

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

May, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	02	02	02	02	04	02	02	03
2	03	03	03	03	06	07	05	04
3	06	06	08	07	04	08	09	09
4	07	08	NR	12	08	10	NR	12
5	11	09	07	02	12	11	05	03
6	03	02	01	03	02	03	01	03
7	01	02	03	07	03	03	04	10
8	07	09	12	10	10	10	12	12
9	12	10	07	07	12	15	11	07
10	10	10	05	05	10	10	09	08
11	06	05	03	03	07	08	04	04
12	03	04	03	06	07	06	04	09
13	08	09	04	06	12	09	10	14
14	02	09	11	07	05	13	12	11
15	05	04	03	03	07	06	04	05
16	02	02	02	03	03	02	04	03
17	03	04	04	05	04	05	04	08
18	03	03	02	02	05	04	03	03
19	02	02	02	02	02	02	02	03
20	02	03	03	02	04	03	03	02
21	02	02	02	NR	02	03	03	NR
22	02	02	02	03	03	02	02	03
23	02	02	02	03	02	03	05	03
24	02	03	03	03	03	03	02	02
25	03	02	02	02	03	03	02	02
26	02	01	02	02	02	02	01	02
27	02	03	04	04	02	03	03	04
28	03	04	03	03	03	03	04	04
29	02	03	04	08	03	03	05	06
30	05	04	03	03	07	04	03	02
31	03	06	04	05	05	08	06	07

NR = No Record

CLEVELAND

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JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.
41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.
Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for June, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
June 1 No. 62	e	n	$21^h10^m06.1^s$	
	e	e	21 10 10.7	
	e	n	21 11 19	
	e	e	21 11 21	
	F	E	21 20	
June 5 No. 63	iP	Z	$11^h25^m06.8^s$ comp	Epicenter by U.S.C.G.S. 87° N., 45° E. North Polar Region.
	eP	N	11 25 08	$H = 11^h\ 16^m\ 12^s$
	i	n	11 25 15.9	Δ = 50°.4
	F	E	12 15	
June 7 No. 64	iP	n	$17^h00^m47.7^s$	Epicenter by U.S.C.G.S. 4° S., 76°.5 W. Northern Peru.
	iP	Z	17 00 48 dil	$H = 16^h\ 52^m\ 34^s$
	iP	N	17 00 48	h about 100 km.
	eP	e	17 00 48.3	Δ = 45°.7
	e	E	17 00 57	
	ipP	N	17 01 16	
	(i)	Z	17 02 24	
	isP	N	17 02 39	
	i	N	17 06 17	
	e	N	17 06 52	
	iS	N	17 07 22	
	esS	N	17 08 11	
	eSR_1	e	17 10 31	
	$esSR_1$	e	17 11 29	
	$esSR_1$	N	17 11 29	
	F	N	17 39	

Bulletin for June, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
June 8 No. 65	eP Z eP' Z ePR_1 E ePR_1 N eSKS E eSKS e iSKS N ePS e iPS N iPS E ePPS N e(SR_1) N eSR_1 E e N eSR_2 E M E F E	$16^h21^m43^s$ dil 16 25 54 comp 16 26 06 16 26 07 16 32 22 16 32 22 16 32 23 16 35 17 16 35 18 16 35 22 16 36 00 16 40 58 16 41 08 16 41 25 16 45 08 17 00.6 19 15	Epicenter by U.S.C.G.S. 45°5 S., 15°W. H = 16^h 07^m 33^s South of Tristan da Cunha. Depth possibly greater than normal. Magnitude 7 - 7 1/4 by Pasadena. Δ = 105°5
June 11 No. 66	iP' Z iP' e e e eSKS E eSKKS E M E F E	$22^h30^m43^s$ comp 22 30 50.7 22 35 02 22 37 44 22 39 53 23 21.9 00 28	Epicenter by U.S.C.G.S. South Pacific Ocean, approximately 1200 miles southwest of New Zealand. H = 22^h 11^m 12^s** Δ in the range of 135° - 145°.
June 14 No. 67	M E F E	$04^h36.7^m$ 06 30	Epicenter by U.S.C.G.S. 18°5 S., 174°5 W., Tonga Islands Region H = 03^h 44^m 10^s* = 104°7
June 19 No. 68	eP' Z iP' Z iP' Z iP' N iP' Z e E e N e E (continued on next page)	$12^h56^m28^s$ 12 56 37 12 56 41 12 56 41 12 56 42 12 56 51 12 58 42 12 59 38	Epicenter by U.S.C.G.S. 8° S., 112° E., Eastern Java Several killed. H = 12^h 36^m 58^s Magnitude 6 1/2 by Pasadena. Δ = 144°8

Bulletin for June, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
June 19 No. 68 (continued)	iPR_1	N	$12^h59^m47^s$	
	iSKP	NZ	12 59 56	
	eSKKS	N	13 05 51	
	e	E	13 06 02	
	i	Z	13 06 42	
	e	N	13 06 53	
	e	N	13 09 05	
	ePSKS	E	13 09 09	
	ePPS	N	13 11 46	
	eSR_1	E	13 18 38	
	M	E	13 53.7	
	F	E	15 30	
June 21 No. 69	ePR_1	E	$07^h15^m39^s$	Epicenter by U.S.C.G.S. 21°S., 169° E., New Hebrides Islands Region. H = 06^h 55^m 39^s Magnitude 6 3/4 by Pasadena. Δ = 118°.0
	eSKS	E	07 21 18	
	iSKS	NE	07 21 32	
	eSKKS	E	07 22 50	
	ePS	N	07 25 24	
	iPS	E	07 25 31	
	e(PPS)	E	07 27 07	
	e	E	07 30 10	
	iSR_1	N	07 32 07	
	iSR_2	E	07 36 40	
	M	E	07 59.6	
	F	E	10 18	
June 23 No. 70	iP	Z	$03^h54^m17.2^s$dil	Epicenter by U.S.C.G.S. 13° N., 93° W., off coast of Guatemala H = 03^h 48^m 12^s Depth possibly greater than normal. Δ = 30°.1
	$e(SR_1)$	E	04 00 19	
	M	E	04 05.1	
	F	E	04 30	

Bulletin for June, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
June 24 No. 71	eP' ePR$_1$ e eSKS iSKS i iPS e(PPS) e(SR$_1$) M F	E E E N E e E E E E E	$22^h44^m21^s$ 22 45 29 22 46 24 22 51 22 22 51 23 22 51 48 22 55 12 22 57 00 23 02 09 23 30.6 01 59	Epicenter by U.S.C.G.S. 19°5 S., 168°5 E., New Hebrides Islands Region. H = $22^h25^m31^s$ Magnitude 7 by Pasadena. Δ = 117°5
June 25 No. 72	iP' iP' ePR$_1$ iPR$_1$ eSKS eSKKS ePS eSR$_1$ M F	Z Z Z Z N N N E E E	$11^h24^m56.5^s$ comp 11 25 59.4 11 27 07.0 11 27 08.8 11 31 55 11 33 40 11 36 53 11 43 44 12 12.2 12 53	Epicenter by U.S.C.G.S. 5° N., 127° E., off southeast coast of Mindanao, Philippine Islands H = 11^h 05^m 51^s Magnitude 6 1/2 by Pasadena. Δ = 127°3
June 27 No. 73	iP iP iP iP iP iP iSKKS iSKKS ePS iPPS L F	Z Z e Z n e E N E N E E	$15^h54^m32.9^s$ comp 15 54 36.3 comp 15 54 37.6 15 54 37.7 dil 15 54 38.3 15 54 38.9 16 05 17 16 05 19 16 06 09 16 06 22 16 24.4 17 24	Epicenter by U.S.C.G.S. 45°5 N., 140° E., off northwest coast of Hokkaido, Japan. H = 15^h 41^m 54^s Magnitude 6 1/2 - 6 3/4 by Pasadena. Δ = 85°6

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

June, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	03	03	04	02	04	07	08	04
2	02	01	01	02	04	02	02	02
3	03	03	03	02	02	02	02	02
4	02	03	02	01	02	04	02	03
5	02	02	02	03	03	03	02	05
6	03	04	03	04	04	05	07	04
7	03	02	01	01	02	02	02	01
8	01	01	01	01	01	01	02	02
9	02	03	02	02	02	02	01	02
10	02	03	02	02	02	02	02	02
11	01	02	02	02	01	02	02	02
12	03	07	06	07	03	12	13	13
13	06	05	02	02	08	04	03	03
14	02	02	02	02	02	02	02	02
15	01	01	01	01	02	01	02	02
16	01	01	01	01	01	02	02	01
17	01	01	01	01	01	02	02	01
18	02	04	05	03	03	07	09	05
19	04	04	02	04	05	05	04	04
20	02	02	02	02	03	03	02	02
21	02	02	02	02	02	03	02	02
22	02	02	02	03	02	03	03	03
23	03	03	02	04	03	03	03	02
24	05	09	09	08	07	12	15	12
25	04	04	05	09	06	07	07	09
26	09	07	06	06	07	09	09	07
27	04	04	02	03	05	03	02	02
28	02	02	02	01	03	02	02	02
29	01	01	02	02	02	02	03	03
30	02	02	02	02	03	02	03	03

CLEVELAND

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41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for July, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 1		$06^h\ 56^m$ to 07 18	Surface waves
July 2 No. 74	iP N iP Z e(PR_1) N e(PR_1) Z eS E e(SR_1) E e E M E F E	$22^h 56^m 47^s$ 22 56 48 comp 22 58 16 22 58 17 23 02 36 23 05 28 23 06 27 23 12.2 23 42	Epicenter by U.S.C.G.S. 4° N., 73°5 W. Central Colombia, felt in Bogota. $H = 22^h\ 49^m\ 24^s$ Δ = 38°0
July 3 No. 75	ePR_1 N ePR_1 Z eSKKS N e E e E ePS E ePPS E eSR_2 E M E F E	$10^h 23^m 43^s$ 10 23 46 dil 10 30 42 10 30 59 10 33 03 10 33 31 10 34 26 10 45 12 11 05.8 12 39	Epicenter by U.S.C.G.S. 8° N., 141°5 E. Caroline Islands Region. $H = 10^h\ 03^m\ 36^s$ Δ = 116°7 Agreement poor.
July 3 No. 76		$13^h\ 25^m$ to 14 04	Surface waves. Epicenter by U.S.C.G.S. Tonga Islands Region. $H = 12^h\ 29^m\ 33^s$** h about 200 km.

Bulletin for July, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 5 No. 77		04^h 34^m to 05 28	Surface waves. Epicenter by U.S.C.G.S. 19° S., 168° E. New Hebrides H = 03^h 34^m 59^s*
July 5 No. 78	iP Z iP Z M E eM e M N F E	$18^h 38^m 40.6^s$ 18 38 44.0 18 53.9 18 54 18.5 18 54.5 19 14	Epicenter by U.S.C.G.S. 62° N., 155° W., Southern Alaska. H = 18^h 30^m 08^s* Δ = 46°9
July 7 No. 79	eSKS E eSKKS E ePS E e(SR_1) E e E M E F E	$17^h 12^m 30^s$ 17 13 46 17 16 25 17 23 22 17 34 11 17 45.3 19 45	Epicenter by U.S.C.G.S. 11° S., 163°5 E., Solomon Islands Region. H = 16^h 46^m 55^s Δ = 115°8 Record weak.
July 9 No. 80	eP Z eP E iP Ne iP n iP Z ipP Z ipP e ipP n esP E isP N eS N eS NE e N i E esS N iPS E esPS E M E F N	$01^h 51^m 36^s$ comp 01 51 36 01 51 37 01 51 37.4 01 51 37.6 dil 01 51 48.7 comp 01 51 49.3 01 51 50.3 01 51 56 01 51 57 02 01 33 02 01 35 02 01 37 02 01 39 02 01 54 02 02 12 02 02 36 02 19.5 03 46	Epicenter by U.S.C.G.S. 33° S., 112° W., about 500 miles southeast of Easter Islands. H = 01^h 39^m 29^s Δ = 79°7 Record indicates 50-60 km. of depth.

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 9 No. 81	iP i i i iPR_2 eSR_1 e F	Z n e Z Z e e N	$02^h 42^m 21^s$ comp 02 42 21.5 02 42 21.5 02 42 27 02 43 40 02 50 06 02 52 46 04 46	Epicenter by U.S.C.G.S. 8° N., 73°W., Northern Colombia, felt in Cucuta Province, Colombia, and north-west Venezuela. Several hundred killed. Heavy property damage. H = $02^h 35^m 31^s$ Δ = 34°4. Aftershock: H = $12^h 34^m 15^s$
July 9 No. 82	iP iP i i ipP isP i i i iS iS iS iS iS ipS $i(SR_1)$ isS isS i i F	ne NEZ N Z Z N N Z N n e E N E Ee E e n E E E	$04^h 48^m 07.8^s$ 04 48 08 dil 04 48 12 04 49 14 04 50 04 04 51 16 04 52 39 04 52 45 04 53 12 04 54 29.7 04 54 32.7 04 54 33 04 54 34 04 54 37 04 56 51 04 57 56 04 58 10 04 58 11 05 04 32 05 06 49 07 18	Epicenter by U.S.C.G.S. 8°5 S., 71° W., Western Brazil. H = $04^h 39^m 57^s$ h about 600 km. Magnitude 7 by Pasadena. Δ = 51°4 Aftershocks: H = $04^h 49^m 58^s$ Magnitude 6 3/4 - 7 by Pasadena. H = $09^h 44^m 55^s$ Magnitude 6 1/4 - 6 1/2 by Pasadena.
July 9 No. 83	iP iP iP iP iP i ipP iS i i i i F	eZ Z n e N Z Z ne EN E e E N	$09^h 53^m 04.8^s$ comp 09 53 06.0 comp 09 53 06.1 09 53 06.5 09 53 07 09 54 14 09 55 01 09 59 29 10 00 31 10 00 33 10 01 47 10 01 48 10 32	Aftershock of preceding quake. H = $09^h 44^m 55^s$ Magnitude 6 1/4 to 6 1/2 by Pasadena. Δ 51°4

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 9 No. 84	eP iP ePR_1 iPR_1 e eS e e e(PS) e e eSR_1 F	Z Z N Z N N N E E NE E N E	$16^h 23^m 34.8^s$ comp 16 23 35.8 dil 16 27 36 16 27 37 dil 16 28 51 16 35 07 16 35 29 16 35 30 16 36 46 16 37 42 16 39 31 16 41 30 17 38	Epicenter by U.S.C.G.S. 36° N., 72° E., Northern North-West Frontier Province, Pakistan. Felt. H = 16^h 09^m 53^s Δ = 98°.7
July 9 No. 85	iP	Z	$19^h 29^m 20.6^s$ dil	Epicenter by U.S.C.G.S. 36°.5 S., 103° W., Pacific Ocean, about 600 miles south of Easter Islands. H = 19^h 17^m 12^s* Δ = 80°.6
July 10 No. 86	eP e e L M F	Z E E E E E	$05^h 52^m 51^s$ 05 57 25 06 00 48 06 42.5 06 50.2 07 39	
July 11 No. 87	iP iP eS F	Z e NE E	$22^h 37^m 49.8^s$ dil 22 37 52.9 22 45 39 22 59	Δ = 76°.5. Weak H = 22^h 26^m 03^s
July 12 No. 88	iP iP iP eP eS eS eSR_1 M F	Z n Z e N NE E N N	$01^h 44^m 44.4^s$ dil 01 44 45.0 01 44 45.4 comp 01 44 45.7 01 51 15 01 51 19 01 54 48 02 02.9 02 19	Epicenter by U.S.C.G.S. 2° N., 101° W., 700 miles northwest of Galapagos Islands. H = 01^h 36^m 42^s* Δ = 43°.8

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 12 No. 89	iP eS eS F	Z N E N	$11^h 19^m 08.0^s$ comp 11 26 38 11 26 38 13 50	Epicenter by U.S.C.G.S. 53° N., 166° W., Aleutian Islands Region. $H = 11^h\ 09^m\ 15^s$ Magnitude 6 1/4 by Pasadena. Δ = 55°.4
July 12 No. 90	iP eP eP iP ipP ipP ipP F	Z n n Z Z e n N	$15^h 57^m 43.7^s$ comp 15 57 44.0 15 57 48.0 15 57 48.3 comp 15 57 55.3 dil 15 57 55.4 15 57 55.8 16 43	Epicenter by U.S.C.G.S. off east coast of Kamchatka. $H = 15^h\ 46^m\ 51^s$** h about 100 km. Δ about 67°
July 12 No. 91	eP iP F	e Z N	18 08 44.4 18 08 44.5 dil 18 32	
July 13 No. 92	ePR_1 ePR_1 ePR_1 ePR_1 iPR_1 ePR_1 iSKS iSKS eSKS iSKS eSKKS eSKKS eS esSKS e_sSKS esS esS F	E E N n Z e NE e n n N E E N E E N E	$04^h 21^m 08^s$ 04 21 12 04 21 12 04 21 12 04 21 12.7 dil 04 21 13 04 26 40 04 26 40.3 04 26 40.5 04 26 41.4 04 27 18 04 27 19 04 27 44 04 29 21 04 29 24 04 30 16 04 30 19 05 28	Epicenter by U.S.C.G.S. 27°.5 N., 139°.5 E., Bonin Islands Region. $H = 04^h\ 03^m\ 50^s$ h about 500 km. Magnitude 6 3/4 - 7 by Pasadena. Δ = 102°.0
July 14 No. 93	M F	N N	$12^h 35.4^m$ 13 27	Epicenter by U.S.C.G.S. 54° N., 171° W., Aleutian Is. $H = 12^h\ 06^m\ 45^s$* Δ = 57°.6

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 17			23^h 39^m to 23 58	Seismic activity
July 19			11^h 22^m to 12 05	Surface waves
July 20 No. 94	iPR_1 eS ePS e eSR_1 (L) (M) F	E E E E E N N E	09 50 14 09 58 00 09 59 43 10 01 13 10 06 05 10 18.1 10 23.5 11 44	Epicenter by U.S.C.G.S. 17° S., 174° E., Fiji Islands Region. H = 09^h 30^m 48^s Δ = 111°9
July 21			08^h 21^m to 08 38	Surface waves.
July 21 No. 95	iPR_1 eSKKS iS iPS M F	eEZ E N NE E E	$20^h51^m48^s$comp 20 58 53 20 59 45 21 01 31 21 39.3 23 32	Epicenter by U.S.C.G.S. 15°5 S., 168°5 E., New Hebrides Islands Region. H = 20^h 32^m 01^s Δ = 115°3
July 22 No. 96	ePR_1 eSKS e ePS ePPS M F	E E E E E E E	$23^h27^m41^s$ 23 33 30 23 33 51 23 37 44 23 39 01 00 10.5 00 41	Epicenter by U.S.C.G.S. New Hebrides Islands Region. H = 23^h 07^m 45^s** Δ about 115°
July 25 No. 97	iP iP eP ePR_1 eS eS eSR_1 M F	Z E Z E N E E E E	$18^h21^m42.1^s$comp 18 21 45 18 21 49.5 comp 18 22 50 18 27 08 18 27 09 18 29 17 18 32.0 19 13	Epicenter by U.S.C.G.S. 31° N., 42° W., Atlantic Ocean. H = 18^h 15^m 00^s Δ = 33°4

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Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 26 No. 98	iP Z eP N eS N M N F N	$08^h36^m57.6^s$comp 08 36 59 08 41 38 08 48.5 09 08	Epicenter by U.S.C.G.S. off east coast of Dominican Republic. H = 08^h 31^m 28^s** Δ about 25°5
July 27 No. 99	iP Z e N eM N F N	$11^h35^m47.9^s$dil 11 44 09 11 44 43 12 05	Foreshock of quake No. 107. H = 11^h 29^m 24^s Magnitude 4.7 by Pasadena.
July 27 No. 100	e N eM N F N	$23^h05^m35^s$ 23 06 06 23 11	Probable foreshock of quake No. 107.
July 28 No. 101	e N eM N F N	$03^h40^m14^s$ 03 40 47 03 58	Probable foreshock of quake No. 107.
July 28 No. 102	ePR_1 E eSKKS E eS E ePS E ePPS E L E F E	$05^h14^m55^s$ 05 22 06 05 22 51 05 24 29 05 25 30 05 50.2 07 21	Epicenter by U.S.C.G.S. 13° S., 167° E., Santa Cruz Islands. H = 04^h 55^m 13^s* Δ = 115°0
July 28		12^h 58^m to 13 20	Surface waves
July 28 No. 103	i N eM N F N	$17^h41^m32^s$ 17 42 06 17 53	Probable foreshock of quake No. 107.

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 28 No. 104	iP e eS e i iM F	Z E E N N N N	$17^h56^m51^s$ dil 18 01 34 18 01 47 18 02 01 18 05 32 18 06 04 18 45	Foreshock of quake No. 107. H = 17^h 50^m 46^s Magnitude 5.3 by Pasadena. Δ = 28°6
July 28 No. 105	i eM F	N N N	21 27 45 21 28 07 21 34	Probable foreshock of quake No. 107.
July 29 No. 106	i eM F	N N N	$00^h31^m51^s$ 00 32 25 00 37	Probable foreshock of quake No. 107.
July 29 No. 107	iP e eS eSR_1 i iM F	Z E E E N N N	$14^h42^m37^s$ dil 14 47 18 14 47 31 14 48 39 14 51 16 14 51 48 15 54	Epicenter by U.S.C.G.S. 33° N., 115°5 W., Southern California. Slight damage at Calipatica. H = 14^h 36^m 33^s Magnitude 5.4 by Pasadena. Δ = 28°1
July 29 No. 108	eP' iP' iPR_1 ePR_1 eSKP eSKP eSKP e ePS eSR_1 F	ne Z Z NE E n N N E E E	$17^h05^m04^s$ 17 05 04.4 comp 17 07 11.6 17 07 13 17 08 25 17 08 25.5 17 08 27 17 17 09 17 17 22 17 24 23 18 38	Epicenter by U.S.C.G.S. 2°5 N., 127°5 E., Molucca Passage. H = 16^h 45^m 56^s Δ = 129°6
July 29 No. 109	e eM F	N N N	18 57 26 18 57 55 19 19	

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
July 30 No. 110	iP'	Z	$00^h07^m47.8^s$ dil	Epicenter by
	eP'	n	00 07 48.7	U.S.C.G.S. 6° S.,
	eP'	e	00 07 49.2	155° E., Solomon
	iP'	Z	00 07 49.4 dil	Islands Region.
	iPR_1	NE	00 09 08	H = 23^h 48^m 58^s
	eSKS	E	00 14 40	Magnitude about 7
	eSKS	N	00 14 42	by Pasadena.
	i	Z	00 17 53.8	Δ = 119°.0
	ePS	E	00 18 56	Note: Phase time
	e	N	00 18 58	occurred at 0^h GMCT
	eSR_1	N	00 25 25	on July 30.
	M	E	00 48.2	H occurred at 23^h
	F	N	02 51	GMCT on July 29.

MICROSEISMIC REPORT

Amplitudes are read to the nearest tenth millimeter
at 0, 6, 12, 18 hrs., G.M.C.T.
Decimal point is dropped in recording the amplitude

July, 1950

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	01	03	02	02	03	03	01	02
2	03	02	02	01	03	02	02	02
3	01	02	01	02	02	02	01	02
4	03	02	02	02	02	02	02	02
5	01	02	02	02	02	02	02	02
6	02	02	02	03	02	02	02	02
7	02	02	02	NR	02	02	02	NR
8	02	02	02	02	02	02	02	03
9	02	02	03	03	03	02	04	04
10	02	03	02	02	04	03	03	02
11	02	02	02	02	02	02	02	02
12	02	02	NR	02	02	02	NR	02
13	02	03	03	02	02	02	02	03
14	04	03	02	03	02	02	04	02
15	04	03	03	04	02	02	03	06
16	05	07	05	05	12	09	10	07
17	04	03	03	02	03	03	03	02
18	02	02	01	02	02	02	01	02
19	01	01	01	02	02	02	01	03
20	04	07	07	05	04	06	07	05
21	06	03	03	02	06	04	06	03
22	03	02	02	02	03	03	02	02
23	02	02	02	02	03	02	03	02
24	02	02	01	01	02	01	02	02
25	02	01	01	02	01	02	01	01
26	01	02	02	02	02	02	01	02
27	02	02	01	02	02	03	02	03
28	02	NR	02	01	02	NR	02	02
29	02	03	02	02	02	03	02	02
30	02	03	04	04	03	03	04	04
31	03	02	02	02	04	02	02	02

NR = No Record

CLEVELAND

SEISMOLOGICAL OBSERVATORY
JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.

41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
August 1 No. 111	(iP)	Z	$08^h43^m33.6^s$ comp	Aftershock of quake No. 108 in July Bulletin. Epicenter by U.S.C.G.S. 33° N., 115°5 W. H = 08^h 37^m 18^s Magnitude 4.7 by Pasadena. △ = 28°4
	eS	NE	08 48 11	
	e	E	08 50 53	
	e	N	08 52 08	
	eM	N	08 52 28	
	F	N	09 14	
August 1 No. 112	iP	Z	$09^h24^m26.0^s$ dil	Epicenter by U.S.C.G.S. 42°5 N., 145° E. Off south-eastern coast of Hokkaido, Japan. H = 09^h 11^m 39^s △ = 86°3
	eP	eN	09 24 26	
	iSKKS	eE	09 34 59	
	iSKKS	N	09 35 00	
	e	e	09 35 26	
	ePS	e	09 35 51	
	F	N	10 42	
August 2 No. 113	eP	N	$11^h08^m21^s$	Weak
	i	N	11 15 31	
	e	N	11 19 08	
	e	E	11 19 11	
	F	N	13 21	
August 3 No. 114	iP	Z	06 20 37.5 dil	Epicenter by U.S.C.G.S. 18° N., 100° W., Southern Mexico; felt. H = 06^h 14^m54^s* h about150 km. Magnitude 6 - 6 1/4 by Pasadena. △ = 28°3
	iP	e	06 20 37.5	
	eP	E	06 20 38.0	
	eP	N	06 20 38	
	iP	n	06 20 38.2	
	i	e	06 21 30.7	
	i	Z	06 21 31.9	
	i	N	06 21 32	
	e	n	06 25 15.9	
	eS	e	06 25 17.0	
	esS	E	06 26 11	
	F	E	06 55	

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
August 3	iP	Z	$22^h24^m58.9^s$dil	Epicenter by
No. 115	iP	n	22 24 59.5	U.S.C.G.S. 10° N.,
	iP	NE	22 25 00	69°5 W. Northwestern
	iP	Z	22 25 00.7 dil	Venezuela
	iP	n	22 25 00.9	H= 22^h 18^m 18^s
	iP	e	22 25 01.0	Magnitude 6 3/4 by
	iPR_1	Z	22 25 56	Pasadena.
	iPR_1	N	22 26 00	Δ = 33°3
	ePR_2	E	22 26 13	
	iS	E	22 30 20	
	eSR_1	E	22 32 03	
	M	E	22 38.2	
	F	E	00 14	
August 5	iP'	e	$09^h36^m11.9^s$	Epicenter by
No. 116	iP'	Z	09 36 12 comp	U.S.C.G.S. 50° S.,
	i	N	09 36 26	164° E. Auckland
	iPR_1	NEZ	09 38 46	Island Region.
	i	Ne	09 38 56	H = 09^h 16^m 48^s
	eSKP	n	09 39 42	Δ = 135°2
	iSKP	eNE	09 39 43	
	i	NE	09 39 50	
	e	N	09 52 19	
	e	N	09 52 49	
	e	N	09 53 09	
	e	N	09 53 16	
	e (SR_1)	N	09 55 40	
	e (SR_1)	E	09 55 42	
	M	E	10 25.9	
	F	E	12 04	
August 7	iP'	Z	$03^h03^m49^s$dil	Epicenter by
No. 117	iP'	Z	03 03 51	U.S.C.G.S. 6° N.,
	eP'	e	03 03 50.9	126° E., off south-
	eP'	e	03 03 51.1	eastern coast of
	i	Z	03 04 24	Mindanao, Philippine
	e	e	03 04 44	Islands.
	iPR_1	Z	03 05 44.5	H = 02^h 44^m 44^s
	ePR_1	NE	03 05 45	Magnitude 6 3/4 by
	iSKP	Z	03 06 53.3	Pasadena.
	iSKKS	e	03 12 27.8	Δ = 126°0
	eSKKS	N	03 12 28	
	e	N	03 16 30	

(continued on next page)

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
August 7 No. 117 (continued)	ePPS	N	$03^h17^m01^s$	
	e	E	03 18 13	
	e	N	03 22 18	
	e	E	03 22 38	
	eSR_1	N	03 22 48	
	e	E	03 23 46	
	e	N	03 25 22	
	F	N	05 24	
August 7 No. 118	iP'	Z	$16^h06^m38.6^s$dil	Epicenter by
	iP'	ne	16 06 39.1	U.S.C.G.S. 1° N.,
	i	Z	16 06 57.2 dil	126° E., Molucca
	iPR_1	Z	16 08 58 dil	Passage.
	iSKP	Z	16 09 57	H = 15^h 47^m 23^s
	eSKP	E	16 10 00	Δ = 131°0
	eSKP	Nn	16 10 01	Weak
	eSKP	e	16 10 01.1	
	iSKP	n	16 10 02.1	
	e	e	16 10 18	
	e	nN	16 10 20	
	e	E	16 10 23	
August 8 No. 119	eP	e	$05^h20^m22.6^s$	Δ S - P = 29°3
	eS	e	05 25 24	H = $05^h14^m17^s$
	e	E	05 31 21	California
	eM	NE	05 31 55	High frequency.
	F	N	06 03	
August 13 No. 120	iP	n	$16^h48^m37.2^s$	Epicenter by
	eP	e	16 48 37.3	U.S.C.G.S. 19°5 N.,
	iP	Z	16 48 37.5 comp	70°5 W. near coast of
	iP	Z	16 48 40.7 dil	Santo Domingo.
	eP	e	16 48 41.0	H = 16^h 43^m 20^s
	iP	n	16 48 41.7	Δ = 24°0
	i	N	16 48 42	Preliminaries large
	i	E	16 48 44	with much high fre-
	ePR_1	NE	16 49 01	quency.
	iS	E	16 53 00	
	iS	N	16 53 02	
	i	e	16 53 05.9	
	i	e	16 53 34	
	F	N	17 57	

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
August 14 No. 121	iP iP iP iP iP ipP ipP ipP iS iS iS i i isS F	Z n e E N Z N E n e NE N E E N	$23^h01^m42.3^s$ 23 01 42.6 23 01 42.6 23 01 43 23 01 43.0 23 03 46 23 03 48 23 03 52 23 10 08.2 23 10 08.4 23 10 09 23 10 46 23 10 47 23 13 48 01 35	Epicenter by U.S.C.G.S. 27° N., 62°5 W. Northern Argentina. H = 22^h 51^m 28^s h about 700 km. Magnitude 7 1/4 - 7 1/2 by Pasadena. Δ = 70°7
August 15 No. 122	eP iP eP iP' iPR_1 i e ePS M F	Z N E N Z N E Z Z N	$14^h24^m03^s$ 14 24 03 14 24 16 14 27 47 14 28 25 14 28 50 14 29 03 14 38 18 15 14.3 20 27	Epicenter by U.S.C.G.S. 28°5 N., 97° E. Region of China-Burma-India Border. Damage reported in Bramaputra River Valley. Magnitude 8 1/2 by Pasadena; 8 1/4 by Berkeley. Δ = 110°7 H = 14^h 09^m 30^s
August 16 No. 123	$e(PR_1)$ M F	Z N N	$05^h52^m21^s$ 06 38.3 07 03	Aftershock of preceding quake. H = $05^h33^m06^s$ Δ = 110°7
August 16 No. 124	iP' ePS iPPS iPPS L F	Z N Z N N N	$07^h00^m34.2^s$ 07 10 31 07 11 46 07 11 48 07 36.9 08 38	Aftershock of quake No. 122. H = 06^h 42^m 02^s Δ = 110°7

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Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 17 No. 125	iP' Z	$16^h32^m49^s$	Epicenter by
	ePR_1 Z	16 33 33	U.S.C.G.S. 21° S.,
	iSKS NE	16 38 33	180° Longitude. Tonga
	iSKS ne	16 38 33.1	Islands Region.
	iSKKS ne	16 39 34.1	H = 16^h 15^m 22^s
	iSKKS E	16 39 35	h about 600 km.
	eS N	16 40 23	Magnitude 6 3/4 - 7
	e E	16 40 35	by Pasadena.
	iSP E	16 42 07	Δ = 110°.4
	esSKS N	16 42 30	
	esSKKS N	16 43 31	
	esS N	16 44 28	
	esSP N	16 45 47	
	esSP E	16 45 54	
	eSR_1 N	16 48 22	
	eSR_1 E	16 48 23	
	F N	17 14	
August 18 No. 126	ePR_1 N	$01^h26^m53^s$	Aftershock of earth-
	iPR_1 Z	01 26 55.2	quake No. 122,
	ePR_2 N	01 29 08	August 15.
	iSKS N	01 32 57	H = 01^h 07^m 49^s
	eSKS en	01 32 59	Magnitude 7± by Pasa-
	e N	01 33 11	dena
	iSKKS N	01 33 53	Δ = 110°.7
	eSKKS n	01 33 54	
	i N	01 34 07	
	M E	02 07.5	
	F E	03 34	
August 18 No. 127	M E	$17^h37.9^m$	Probable aftershock
	F N	18 28	of quake No. 122,
			August 15.
August 20 No. 128	iM Z	$01^h57^m06^s$	Epicenter by
	iM n	01 57 07	U.S.C.G.S. 47 1/4° N.
	F n	02 02	113°.5 W. Western
			Montana.
			H = 01^h 44^m 55^s
			Δ = 23°.5

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Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 22 No. 129	e E e E e N M N F - lost in following quake.	$07^h23^m58^s$ 07 30 33 07 31 43 07 49.0	Epicenter by U.S.C.G.S. 31° N., 93° E., Southeastern Tibet. H = 06^h 43^m 18^s * Δ = 108°2
August 22 No. 130	iP n iP Z ipP n ipP Z M E F E	$07^h51^m36.9^s$ 07 51 37 dil 07 51 54.8 07 51 57 08 17.3 08 39	Epicenter by U.S.C.G.S. 53° N., 160° E., off east coast of Kamchatka. H = 07^h 40^m 09^s Possibly deeper than normal. Δ = 72°2
August 22 No. 131	M N F N	$14^h27.0^m$ 14 45	
August 23 No. 132	L E M E F E	$04^h10.7^m$ 04 15.0 04 36	Epicenter by U.S.C.G.S. 29°5 N., 95° E., Southeastern Tibet. H = 03^h 09^m 19^s* Δ = 109°9
August 24 No. 133	iP Z eS E M E F E	$17^h52^m12^s$dil 17 57 39 18 03.0 18 17	Epicenter by U.S.C.G.S. 42°5 N., 126° W. Off coast of southern Oregon. H = 17^h 45^m 34^s Δ = 33°0
August 26 No. 134	eP nZ eP e iP eZ iP n e Z iS N eSR$_1$ N e E e E i N iM N F N	$04^h48^m20^s$comp 04 48 21 04 48 24 dil 04 48 24.0 04 49 07 04 55 29 04 59 03 04 59 21 05 03 02 05 03 03 05 05 49 06 28	Epicenter by U.S.C.G.S. 65° N., 162° W. About 150 miles northwest of Nome, Alaska. Felt in Nome. H = 04^h 39^m 27^s Magnitude 6 1/2 by Pasadena. Δ = 49°5

Bulletin for August, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
August 26 No. 135	M	E	$07^h 29.0^m$	
	F	E	08 23	
August 27 No. 136	(eS)	NE	$00^h\ 55^m 19^s$	
	e	N	01 00 50	
	e	E	01 00 51	
	iM	NE	01 04 12	
	F	E	01 34	
August 30 No. 137	eSKP	N	$07^h 13^m 48^s$	Epicenter by U.S.C.G.S. 3°.5 S., 130°.5 E., off west coast of New Guinea. $H = 06^h\ 51^m\ 03^s$ Magnitude 6 1/2 by Pasadena. Δ = 133°.8
	iSKP	E	07 13 51	
	i	n	07 14 01	
	e	E	07 14 03	
	i	N	07 14 05	
	eS	E	07 20 52	
	M	E	07 53.3	
	F	E	09 06	
August 31 No. 138	iP'	Z	$07^h 24^m 41^s$ comp	Epicenter by U.S.C.G.S. 6° N., 126° E., off southern coast of Mindanao, Philippine Islands. $H = 07^h\ 05^m\ 35^s$ Magnitude 7 by Pasadena. Δ = 126°.6
	iP'	e	07 24 46	
	iPR_1	N	07 26 40	
	ePR_1	E	07 26 40	
	iPR_1	Z	07 26 43	
	iPR_1	e	07 26 49	
	e(SKP)	N	07 28 01	
	ePS	E	07 36 35	
	eSR_1	N	07 43 36	
	eSR_1	E	07 43 44	
	e	E	07 46 16	
	F	E	09 14	

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41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for September, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
September 2 No. 139	iP	Z	$02^h57^m02.2^s$dil	Epicenter by U.S.C.G.S. 52°5 N., 169° W., Aleutian Islands.
	iP	e	02 57 03.8	H = $02^h47^m23^s$
	ipP	nZ	02 57 15.4	Magnitude 6 1/4 - 6 1/2 by Pasadena.
	ipP	e	02 57 15.6	h about 100 km.
	iS	E	03 04 57	Δ = 57°3
	e	N	03 05 06	
	i	E	03 05 13.9	
	i	NE	03 06 50	
	eSR_1	E	03 08 42	
	e	E	03 11 42	
	e	N	03 16 02	
	M	E	03 19.7	
	F	E	04 52	
September 9 No. 140	eSKKS	E	10 48 57	Epicentery by U.S.C.G.S. 4° S., 153° E. New Britain region.
	eSR_1	E	10 58 09	H = $10^h\ 21^m\ 40^s$
	eSR_1	N	10 58 10	Magnitude 6 1/4 by Pasadena.
	M	E	11 26.0	Δ = 119°0
	F	N	12 39	
September 10 No. 141	iP	Z	$03^h34^m44.9^s$comp	Epicenter by U.S.C.G.S. 35° N., 140° E., near coast of Honshu, Japan.
	eP	Z	03 34 47 dil	H = $03^h\ 21^m\ 20^s$
	eSKS	NE	03 45 10	Magnitude 6 3/4 by Pasadena.
	eSKKS	N	03 45 46	Δ = 94°7
	ePS	E	03 47 03	
	e	N	03 54 05	
	F	N	04 34	

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
September 10 No. 142	eP'	Z	15^h 34^m 40^s comp	Epicenter by U.S.C.G.S. 14° S., 167° E. New Hebrides Region. H = 15^h 15^m 57^s Magnitude 7 by Pasadena and Berkeley. Δ = 115°8
	eP'	e	15 34 41	
	iP'	EZ	15 34 43 comp	
	eP'	e	15 34 44	
	ePR_1	E	15 35 44	
	iPR_1	Z	15 35 45	
	ePR_1	e	15 35 46	
	eSKP	E	15 36 24	
	e	E	15 38 14	
	i	Z	15 38 52.3	
	iSKKS	EN	15 41 20	
	iSKKS	e	15 41 20.1	
	iSKKS	n	15 41 20.2	
	eS	e	15 42 30	
	i	N	15 43 23	
	ePS	N	15 44 22	
	ePS	N	15 44 29	
	ePPS	E	15 45 24	
	ePPS	n	15 45 29	
	e	E	15 46 01	
	e	N	15 51 34	
	e	E	15 51 39	
	e	N	15 52 27	
	F	E	18 11	
September 16 No. 143	iP	Z	01^h 04^m 33.4^s dil	Epicenter by U.S.C.G.S. 4° S., 104°5 W. About 1000 miles west of the Galapagos Islands. H = 00^h 55^m 36^s Magnitude 6 1/2 by Pasadena. Δ = 50°1
	i	E	01 04 56	
	ePR_1	E	01 06 10	
	i	Z	01 06 41	
	eS	NE	01 11 47	
	e	NE	01 14 00	
	eSR_1	N	01 15 17	
	e	E	01 15 34	
	iSR_2	N	01 16 11	
	e	N	01 16 49	
	e	N	01 17 31	
	e	E	01 17 33	
	F	E	03 04	

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
September 16 No. 144	iP iP ipP epP ipP iS eS isS esS F	Z e Z E e E N E E E	$23^h 08^m 46.9^s$ comp 23 08 46.9 23 09 09 dil 23 09 13 23 09 13.1 23 17 14 23 17 14 23 17 59 23 18 03 23 59	Epicenter by U.S.C.G.S. 52°5 N., 178° E., Aleutian Islands Region. $H = 21^h 58^m 15^s$ h about 100 km. Magnitude 6.6 by Pasadena. Δ = 64°6
September 19 No. 145	eS e eSR_1 e e eSR_2 e L M F	N E N N N E N N NE E	$20^h 59^m 20^s$ 21 07 17 21 07 41 21 10 17 21 11 37 21 12 24 21 17 26 21 22.0 21 26.5 22 55	Epicenter by U.S.C.G.S. 2° S., 138°5 E., near northern coast of New Guinea. $H = 20^h 29^m 48^s$ Magnitude 6.9 by Pasadena, 7 by Berkeley. Δ = 127°6
September 22 No. 146	iP iP iP iP iP eS iS eSR_1 eSR_1 M F	N Z Z ne NE N E N E N N	$08^h 03^m 37^s$ 08 03 37.3 dil 08 03 37.7comp 08 03 38.0 08 03 39 08 13 07 08 13 10 08 17 52 08 18 01 08 30.7 09 09	Epicenter by U.S.C.G.S. 25° S., 114° W., Easter Islands Region. $H = 07^h 52^m 07^s$ Magnitude 6.8 by Pasadena, 6.5 by Berkeley. Δ = 73°3
September 23 No. 147	ePR_1 ePR_1 iPR_1 $epPR_1$ e e eSKS eSKKS eS iS eS iS esSKS	E e Z E E E E E n e E N E	$00^h 11^m 23^s$ 00 11 25 00 11 28 comp 00 12 47 00 13 39 00 14 55 00 17 02 00 17 51 00 18 22 00 18 25.0 00 18 25 00 18 26 00 19 58	Epicenter by U.S.C.G.S. 18° S. 177° W., Fiji Islands Region. $H = 23^h 53^m 29^s$ h about 450 km. Magnitude 7 by Pasadena. Δ = 105°7

(continued on next page)

Gnwch. Date and Number	Phase and	Component	G. M. C. T.	Remarks
September 23 No. 147 (continued)	e esSKKS e esS i F	E N E N N E	$00^h20^m18^s$ 00 20 48 00 20 55 00 21 15 00 25 55 01 40	
September 27 No. 148	iP iP iP iP eS eSR_1 M F	Z Z e n E E E E	$03^h43^m30.4^s$dil 03 43 37.0 comp 03 43 37.4 03 43 37.6 03 48 34 03 50 53 03 53.8 04 23	Epicenter by U.S.C.G.S. 20° N., 109° W., off west coast of Mexico. H = 03^h 36^m 55^s Magnitude 5 1/4 by Pasadena, 5 3/4 by Berkeley. Δ = 31°6 Aftershock H=$03^h43^m32^s$
September 28 No. 149	iP eM F	Z NE E	$21^h54^m17^s$comp 22 06 52 22 30	Epicenter by U.S.C.G.S. 54°5 N., 134°5 W. Queen Charlotte Islands region. Felt on Annette Island. H = 21^h 47^m 01^s* Δ = 37°1
September 29 No. 150	iP iP iP iP iP iP i iS i e M F	e n Z NE neZ NE E N e Z n e	$06^h38^m37.0^s$ 06 38 37.3 06 38 37.3 comp 06 38 38 06 38 41.8 dil 06 38 42 06 43 22 06 43 50 06 43 59 06 48 36 06 48.9 09 46	Epicenter by U.S.C.G.S. 19° N., 107° W., off coast of Colima, Mexico H = 06^h 32^m 14^s Magnitude 7 by Pasadena and Berkeley. Δ = 31°4
September 29 No. 151	iP iP eS eS e e M M F	Z Z N E E E N E E	$08^h00^m53.8^s$dil 08 00 54.6 dil 08 06 12 08 06 13 08 07 28 08 08 39 08 11.2 08 11.5 09 46	Aftershock of preceding quake. H = 07^h 54^m 22^s Δ = 31°4 Magnitude 6.2 by Pasadena.

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41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for October, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 2 No. 152	iP Z M N F N	$11^h49^m51^s$ comp 12 00 20 12 21	Epicenter by U.S.C.G.S. 21° N., 109° W., off west coast of Mexico H = 11^h 43^m 30^s* Δ = 31°0
October 3 No. 153	e E eM E eM N F E	$09^h28^m43^s$ 09 30 43 09 30 45 09 45	Epicenter by U.S.C.G.S. Western Alaska, 150 miles northeast of Nome. Δ about 52°
October 5 No. 154	ePS E e E L E M E F E	$01^h10^m38^s$ 01 13 29 01 35.7 01 40.0 02 24	Epicenter by U.S.C.G.S. 18°5 S., 170°E. H = 00^h 41^m 07^s Δ = 115°8
October 5 No. 155	eP N iP ZN iP ne iP e i NE iS N L n M n	$16^h15^m50^s$ 16 15 51 dil 16 15 51.7 16 15 53.7 16 15 54 16 21 31 16 24.5 16 27.2	Epicenter by U.S.C.G.S. 10°5 N., 85° W. Northwest Costa Rica. Damage reported in Puntarenas. H = 16^h 09^m 34^s h about 100 km. Magnitude 7 1/2 by Pasadena, 7 3/4 by Berkeley. Δ = 31°1

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Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 5 No. 156	eP n iP Z iP n eP e	$16^h54^m40.9^s$ 16 54 41.1comp 16 54 42.1 16 54 42.5	Aftershock of preceding quake No. 155. H = $16^h\ 48^m\ 25^s$ h about 100 km. Δ = 31°.1
October 5 No. 157	iP Z iP n eP e eS N L N M N F N	$20^h15^m36.1^s$comp 20 15 37.0 20 15 37.2 20 20 59 20 25.9 20 27.8 20 57	Aftershock of earthquake No. 155. H = $20^h\ 09^m\ 22^s$ h about 100 km. Δ = 31°.1
October 5 No. 158	iP Z	$20^h58^m50^s$dil	Aftershock of earthquake No. 155. H = $20^h\ 52^m\ 31^s$ h about 100 km. Δ = 31°.1
October 5 No. 159	iP Z	$23^h16^m04.3^s$comp	Aftershock of earthquake No. 155.
October 6 No. 160	iPR_1 Z iS N F N	$08^h22^m01^s$dil 08 26 18 08 50	Epicenter by U.S.C.G.S. 20° N., 66° W., off coast of northern Puerto Rico. H = $08^h\ 16^m\ 02^s$* Δ = 25°.3
October 6 No. 161	(i)P e eP Z iSR_1 Z iSR_1 ne	$11^h25^m39^s$ 11 25 51 comp 11 31 38 11 31 39	Epicenter by U.S.C.G.S. 17° N., 68° W., off southwest coast of Puerto Rico. H = $11^h\ 20^m\ 05^s$ Δ = 27°.4

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
October 8	eP'	Z	$03^h42^m29.0^s$dil	Epicenter by
No. 162	eP'	e	03 42 31	U.S.C.G.S. 4° S.,
	eP'	n	03 42 31	128° E., Molucca Is-
	iP'	Z	03 42 31.5 comp	lands. Seismic sea
	iPR_1	Z	03 44 55	wave reported.
	iPR_1	N	03 44 57	H = $03^h23^m09^s$
	ePR_1	e	03 44 58.0	Magnitude 7.6 by Pasa-
	iSKP	E	03 46 01	dena.
	iSKP	N	03 46 02	Δ = 134°7
	iPSKS	N	03 54 54	
	i	N	03 55 10	
	F	N	06 57	
October 19	eP	n	$03^h54^m07^s$	Epicenter by
No. 163	iP	Z	03 54 07.3 comp	U.S.C.G.S. 19° N.,
	i	Z	03 54 35.9 comp	64° W., off northeast
	i	e	03 54 36.0	coast of Puerto Rico.
	i	n	03 54 36.1	H = 03^h 48^m 25^s
	eS	E	03 58 45	Δ = 27°2
	eS	N	03 58 49	Aftershock H=$07^h44^m30^s$
	i	n	03 59 14.8	
	i	N	03 59 15	
	e	E	03 59 18	
	M	E	04 02.7	
	F	E	04 47	
October 20	iP	Z	$07^h50^m46^s$	ΔS - P = 22°1
No. 164	iP	e	07 50 46.0	H = 07^h 45^m 50^s
	iP	n	07 50 46.5	Possibly 50 km. deep.
	i	Z	07 50 57	
	e	N	07 50 57	
	eS	E	07 54 48	
	eS	N	07 54 52	
	e	N	07 55 02	
	i	E	07 55 05	
	e	E	07 55 19	
	M	E	07 59 00	
	F	E	08 48	
October 21	iP	Z	$09^h49^m24^s$dil	Epicenter by
No. 165	eP	Ne	09 49 24	U.S.C.G.S. 17°5 N.,
	iS	N	09 54 31	106° W., off coast of
	eS	E	09 54 31	Colima, Mexico.
	(continued on next page)			

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
October 21 No. 165 (continued)	i e F	E N N	$09^h55^m26^s$ 10 00.2 11 12	H = 09^h 42^m 58^s Magnitude 6 3/4 + by Pasadena. Δ = 32°0 Foreshocks: H = $08^h27^m13^s$* H = $08^h57^m10^s$* Magnitude 5 3/4 by Pasadena, 5 by Berkeley.
October 23 No. 166	eP iP eP iP iP i iS iS	E Z N N NE N E N	$16^h19^m16^s$ 16 19 17 comp 16 19 17 16 19 18 16 19 23 16 20 14 16 24 02 16 24 05	Epicenter by U.S.C.G.S. 14°5 N., 92° W., near coast of Guatemala. H = 16^h 13^m 24^s h about 100 km. Magnitude 7.2 by Pasadena, 7.0 by Berkeley. Δ = 28°7
October 23 No. 167	iP	Z	$17^h11^m19^s$comp	Aftershock of No. 166. H = 17^h 05^m 31^s
October 23 No. 168	iP iP	Z Z	$17^h53^m48^s$comp 17 53 49 dil	Aftershock of No. 166. H = 17^h 47^m 57^s Magnitude 6.5 by Pasadena.
October 23 No. 169	iP eS	Z E	$23^h44^m43.1^s$comp 23 49 57	Aftershock of No. 166. H = 23^h 38^m 50^s Magnitude 6.1 by Pasadena and Berkeley.
October 24 No. 170	iP e e	Z E E	$00^h58^m02^s$ 01 03 17 01 04 06	Aftershock of No. 166. H = 00^h 52^m 07^s Magnitude 6.2 by Pasadena and Berkeley.
October 24 No. 171	iP	Z	$05^h56^m17^s$dil	Aftershock of No. 166. H = 05^h 50^m 24^s Magnitude 6.0 by Berkeley.

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
October 26 No. 172	iSKS ePS eSR_1 e e M F	E E N E N E E	$04^h15^m21^s$ 04 19 19 04 25 26 04 34 34 04 41 54 04 50.6 05 55	Foreshock of following quake, No. 173. H = 03^h 49^m 55^s Magnitude 6 1/4 by Pasadena. Δ = 115°6
October 26 No. 173	iSKS iPS iSR_1 M F	E E N E E	$16^h04^m18^s$ 16 08 10 16 14 25 16 37.9 18 11	Epicenter by U.S.C.G.S. 32° S., 178° W., Kermadec Islands Region. H = 15^h 38^m 48^s Magnitude 6 1/2 - 6 3/4 by Pasadena. Δ = 115°6
October 28 No. 174	iP iP iPR_1 iPR_1 eSR_1 $esSR_1$ M F	Z n n Z E E N E	$22^h21^m37.8^s$dil 22 21 38.2 22 22 28.6 22 22 29.0comp 22 27 08 22 28 37 22 33.9 23 01	Epicenter by U.S.C.G.S. 15° N., 91°5 W., western Guatemala. H = 22^h 15^m 48^s h about 100 km. Magnitude about 6 1/2 by Pasadena. Δ = 28°0.
October 31 No. 175	eL eM F	E E E	$05^h20^m37^s$ 05 24 01 05 32	Epicenter by U.S.C.G.S. 52° N., 174° W., Aleutian Islands Region. H = 04^h 49^m 15^s Δ = 60°5
October 31 No. 176	eP eP eS eL F	Z e NE NE E	$20^h28^m39^s$ 20 28 40 20 33 20 20 37.0 21 23	Epicenter by U.S.C.G.S. 23°5 N., 108° W., Gulf of California. H = 20^h 22^m 30^s Δ = 28°5

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41° 29′ 27.90″ North, 81° 31′ 52.22″ West, h = 326 m.

Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

Bulletin for November, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
November 1 No. 177	iP M F	Z N N	$12^h51^m56^s$ 13 03.8 13 18	Epicenter by U.S.C.G.S. 10° N., 85° W., near west coast of Costa Rica. H = 12^h 45^m 32^s h about 100 km. Δ = 31°7
November 2 No. 178	iP' eP' iP' iP' i iSKP i i i i F	Z E N n N Z n E N E E	$15^h47^m12^s$dil 15 47 13 15 47 13 15 47 13.4 15 50 05 15 50 25 15 50 42.3 15 50 44 15 50 58 16 00 44 20 18	Epicenter by U.S.C.G.S. 6° N., 129°5 E., Banda Sea Region. Felt in Darwin, Australia. H = 15^h 27^m 49^s Magnitude 7 1/2 by Pasadena; 7 1/4 by Berkeley. Δ = 135°8 Aftershock-H = $18^h14^m03^s$
November 5 No. 179	iP i iPR_1 eS e M M F	nZ Z Z N N E N E	$16^h41^m18.0^s$comp 16 41 52 16 41 57.8 16 46 19 16 47 16 16 52.0 16 52.9 17 30	Epicenter by U.S.C.G.S. 14°5 N., 92° W., near west coast of Guatemala. H = 16^h 35^m 20^s Magnitude 6 1/4 by Pasadena and Berkeley. Δ = 28°6
November 5 No. 180	e i e e e e M F	N E N N NE E E E	$18^h01^m52^s$ 18 02 32 18 02 38 18 08 57 18 09 19 18 20 36 18 29.2 20 27	Epicenter by U.S.C.G.S. 33° N., 134°5 E., off coast of Shikoku, Japan. Felt. H = 17^h 37^m 25^s Magnitude 6 1/2 by Pasadena; 6.8 by Berkeley. Δ = 97°5

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Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
November 6 No. 181	M E F E	$23^h28.1^m$ 00 41	Epicenter by U.S.C.G.S. 7°5 S., 155°5 E. Solomon Islands Region. H = 22^h 22^m 05^s Magnitude 7 by Pasadena. Δ = 120°3
November 8 No. 182	ePR_1 Z ePR_1 EZ eSKS E iSKS EN eSKKS E iSKKS E iPS E e E e N M N F E	$02^h38^m14^s$dil 02 38 23 02 43 54 02 44 07 02 45 17 02 45 24 02 48 06 02 53 16 03 11.5 03 18.1 05 50	Epicenter by U.S.C.G.S. 9°5 S., 159°5 E., Solomon Islands Region. H = 02^h 18^m 09^s Magnitude 7 1/4 - 7 1/2 by Pasadena and Berkeley Δ = 118°8 Aftershocks: H = 02^h 35^m 59^s H = 02 48 01 H = 06 41 06 H = 11 49 22 H = 11 53 30 H = 14 08 50
November 10 No. 183	e E e N M N F E	$02^h25^m29^s$ 02 27 13 02 31.2 03 00	Epicenter by U.S.C.G.S. 19°5 N., 110° W. Pacific Ocean, off west coast of Mexico. H = 02^h 14^m 12^s Δ = 33°1
November 11 No. 184	e N eS E M N F E	$09^h40^m07^s$ 09 41 41 09 45.3 10 30	Epicenter by U.S.C.G.S. 19°5 N., 110° W. Pacific Ocean, off west coast of Mexico. H = 09^h 28^m 23^s Δ = 33°1
November 11 No. 185	iP Z iP n e N M N F N	$13^h57^m38.5^s$comp 13 57 39.5 14 05 30 14 08.4 14 27	Epicenter by U.S.C.G.S. 10° N., 85° W., near west coast of Costa Rica Magnitude 5 3/4 by Berkeley. H = $13^h51^m04^s$ Δ = 31°7

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
November 14 No. 186	e(SR_1)	E	$04^h59^m01^s$	Epicenter by U.S.C.G.S. 11° S., 161° E., Solomon Islands. H = 04^h 23^m 46^s Magnitude 6 1/4 by Berkeley. Δ = 118°.4
	e	E	04 59 50	
	M	E	05 23.1	
	F	E	06 57	
November 17 No. 187	iP	n	$19^h34^m19.8^s$	Epicenter by U.S.C.G.S. 17° N., 100°.5 W., near west coast of Mexico. H = $19^h23^m18^s$ Magnitude 6 3/4 - 7 by Pasadena. Δ = 29°.4
	iP	NEZ	19 34 20 dil	
	eP	e	19 34 20.8	
	i	E	19 35 00	
	ePR_2	E	19 35 32	
	eS	NE	19 39 14	
	iSR_1	E	19 40 49	
	e	N	19 41 24	
	L	E	19 42.0	
	F	N	21 35	
November 22 No. 188	iP	Z	$10^h26^m45.5^s$	Epicenter by U.S.C.G.S. 51° N., 176° W. Aleutian Islands Region. Felt at Adak. Depth possibly greater than normal. H = $10^h16^m26^s$ Magnitude 6 3/4 by Pasadena. Δ = 61°.7
	iP	e	10 26 46.0	
	iP	n	10 26 46.0	
	eS	E	10 35 06	
	eSR_1	E	10 39 02	
	M	E	10 49.7	
	F	E	12 00	
November 24 No. 189	M	E	$13^h54.9^m$	Epicenter by U.S.C.G.S. 15° S., 173° W. Samoa Islands. H = $13^h03^m43^s$ Magnitude 6 1/4 - 6 1/2 by Pasadena; 6.2 by Berkeley. Δ = 101°.3
	F	E	14 26	
November 24 No. 190	M	E	$21^h09.9^m$	Epicenter by U.S.C.G.S. 15° S., 173° W., Samoa Islands. H = $20^h18^m48^s$ Magnitude 6 1/4 - 6 1/2 by Pasadena; 6 1/4 by Berkeley. Δ = 101°.3
	F	E	21 41	
November 25 No. 191	M	E	$06^h13.3^m$	Epicenter by U.S.C.G.S. Samoa Islands Region. H = 05^h 21^m 30^s**
	F	E	06 55	

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JOHN CARROLL UNIVERSITY, CLEVELAND 18, OHIO, U. S. A.
41° 29' 27.90" North, 81° 31' 52.22" West, h = 326 m.
Seismographs: Two Sprengnether long-period horizontal, one Sprengnether vertical.
Two Sprengnether short-period horizontal.

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Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
December 1 No. 192	eP	e	$14^h58^m32.8^s$	Epicenter by U.S.C.G.S. 14° N., 47° W. Mid-Atlantic Ocean, about 800 miles off northeast coast of Brazil. H = 14^h 51^m 00^s h about 100 km. Magnitude 7 1/4 by Pasadena, 7.4 by Berkeley. Δ = 40°7
	iP	n	14 58 33.0	
	iP	Z	14 58 33 dil	
	eP	E	14 58 35	
	iP	N	14 58 37	
	i	Z	14 58 37.9 dil	
	i	e	14 58 38.1	
	i	n	14 58 38.5	
	i	E	14 58 39	
	iPR_1	N	15 00 12	
	iPR_1	EZ	15 00 13	
	iS	E	15 04 43	
	eS	N	15 04 48	
	iSR_1	NE	15 07 45	
	F	E	18 19	
December 2 No. 193	iP	Z	$15^h27^m21.0^s$dil	Epicenter by U.S.C.G.S. 8° S., 71°5 W., Western Brazil. H = 15^h 19^m 20^s h about 650 km. Magnitude 6 3/4 by Pasadena, 6 - 6 1/4 by Berkeley. Δ = 50°8
	iP	n	15 27 21.5	
	eP	e	15 27 21.8	
	eP	E	15 27 22	
	iP	E	15 27 24	
	ipP	n	15 29 16.1	
	ipP	Z	15 29 19	
	iS	n	15 33 46	
	i	e	15 33 47	
	i	E	15 33 48	
	e	N	15 33 49	
	i	N	15 36 04	
	i	ne	15 36 05	
	esS	N	15 37 39	
	F	E	16 05	
December 2 No. 194	iP'	Z	$20^h10^m33^s$	Very strong. Epicenter by U.S.C.G.S. 18° S., 167° E., New Hebrides Islands Region. (continued on next page)
	iP'	Z	20 10 44	
	iSKS	E	20 17 27	
	F	E	00 30	

Bulletin for December, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 2 No. 194 (continued)			H = 19^h 51^m 45^s Magnitude 7 1/2 - 7 3/4 by Pasadena, 7 3/4 - 8 by Berkeley. Δ = 118°0 Aftershocks: Dec. 4 - H = 07^h 38^m 02^s H = 10 18 01 H = 11 07 43 H = 20 12 10
December 4 No. 195	eSKS E eSKKS E ePS E eSR_1 E F E	$08^h03^m46^s$ 08 04 30 08 07 43 08 14 48 09 27	Aftershock of No. 194. H = 07^h 38^m 02^s Δ = 118°
December 4 No. 196	iP' Z e N i Z iPR_1 E $ipPR_1$ Z i E e N ePR_2 E eSKS E esSKS E esSKKS E iPS E iPS N iSR_1 N i N M E F E	$16^h47^m01^s$dil 16 48 00 16 48 03 comp 16 48 04 16 48 19.6 16 48 44 16 48 45 16 50 35 16 53 06 16 54 09 16 55 25 16 57 49 19 57 50 17 04 17 17 04 56 17 27.2 18 17	Epicenter by U.S.C.G.S. 5° S., 153°5 E., New Britain region. H = 16^h 28^m 01^s h about 100 km. Magnitude 7 by Pasadena. Δ = 120°2
December 9 No. 197	iP NEZe eS e iS E F E	$21^h49^m28^s$dil 21 58 06 21 58 06 02 13	Epicenter by U.S.C.G.S. 24° S., 67°5 W., Northern Argentina - Chile border region. H = 21^h 38^m 56^s h about 200 km. Magnitude 7 3/4 - 8 by Pasadena, 7.7 by Berke- ley. Δ = 67°0

Bulletin for December, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 9 No. 198	iP Z epP Z	$22^h18^m01^s$dil 22 18 36 comp	Aftershock of preceding quake, No. 198.
December 10 No. 199	iP NZ eP ne epP N ipP Z eS e eS NE esS E e N e eE e E F E	$03^h00^m14^s$dil 03 00 14 03 00 33 03 00 36 03 07 53.1 03 07 54 03 08 17 03 08 55 03 09 58 03 10 21 04 52	Epicenter by U.S.C.G.S. 14°5 S., 76°5 W., near southern coast of Peru. Several killed, severe property damage reported. H = 02^h 50^m 40^s h about 60 km. Magnitude 7 by Pasadena and Berkeley. Δ = 56°5
December 10 No. 200	iP' Z epP' e ipP' Z iSKS E iSKKS E isSKS N isSKS E i E i Z i E iSR$_1$ N e(SR$_2$) e e(SR$_2$) n i ne e e F E	$13^h41^m16.0^s$ 13 42 13 13 42 14 13 47 35 13 48 42 13 49 33 13 49 34 13 51 41 13 53 03 13 53 46 13 57 37 14 02 14 14 02 15 14 02 16.2 14 03 39 16 34	Epicenter by U.S.C.G.S. 28°5 S., 179° W. Kermadec Islands Region. H = 13^h 23^m 10^s h about 300 km. Magnitude77 3/4 by Pasadena, 7 1/4 by Berkeley. = 113°5
December 11 No. 201	eP n iP Z iP n eP e iS E isS E	$03^h43^m23.5^s$ 03 43 24.6 dil 03 43 25.0 03 43 25.0 03 52 00 03 52 53	Epicenter by U.S.C.G.S. 24° S., 68° W., Northern Argentina - Chile border region. H = 03^h 32^m 56^s h about 200 km. Δ = 67°2

Bulletin for December, 1950

Gnwch. Date and Number	Phase and	Component	G. M. C. T.	Remarks
December 11 No. 202	iP iP iP iP ipP iS iS iS i i esS F	n Z e e Z e n EZ e E E E	$14^h54^m43.8^s$ 14 54 44 dil 14 54 44.3 14 54 46.3 14 56 50 15 01 07.5 15 01 07.7 15 01 08 15 03 23.5 15 03 24 15 05 03 15 23	Epicenter by U.S.C.G.S. 8° S., 71° W., Western Brazil. H = 14^h 46^m 41^s h about 650 km. Magnitude 7 by Pasadena. Δ = 50°8
December 14 No. 203	iP epP ipP ePR_1 iPR_1 i iSKS ISKS isSKS esSKS F	EZ N E N E N E N NE ne E	$02^h06^m42^s$dil 02 07 35 02 07 35 02 11 02 02 11 06 02 15 18 02 16 57 02 16 59 02 18 25 02 18 26 06 55	Epicenter by U.S.C.G.S. 19°5 S., 176° W., Tonga Islands Region. H = 01^h 52^m 47^s h about 200 km. Magnitude 7 1/2 - 7 3/4 by Pasadena, 8 - 8 1/4 by Berkeley. Δ = 106°2
December 14 No. 204	iS e i F - lost in following quake.	E E E	$13^h35^m19^s$ 13 39 10 13 39 49	Epicenter by U.S.C.G.S. 40°1 N., 120°2 W. Northern California; slight property damage reported at Herlong. H = 13^h 24^m 21^s Δ = 29°3 Foreshocks: H = $08^h59^m34^s$-magnitude about 5 by Pasadena H = $09^h29^m54^s$-magnitude about 4 3/4 by Pasadena
December 14 No. 205	iP iP iPR_2 iPR_2 iS iS iS F	NEZ ne N E EN E N E	$14^h21^m25^s$comp 14 21 25 14 22 57 14 22 59 14 26 35 14 26 52 14 26 55 18 31	Epicenter by U.S.C.G.S. 17° N., 98° W., Southern Mexico. Felt. H = 14^h 15^m 50^s. Magnitude 7 3/4 by Pasadena, 7 1/2 by Berkeley. Δ = 28°5

Bulletin for December, 1950

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
December 18 No. 206	iP iP ipP e eS i e esS eSR_1 $isSR_1$ F	ne NEZ N NE N E N N N N E	$08^h10^m23.7^s$ 08 10 24 08 11 01 08 11 26 08 14 47 08 14 55 08 15 28 08 15 55 08 16 15 08 17 13 08 40	Epicenter by U.S.C.G.S. 15° N., 90° W., Guate- mala. H = 08^h 04^m46^s h about 200 km. Δ = 27°7
December 18 No. 207	eSR_1 M F	E E E	16 24 17 16 53.7 17 56	Epicenter by U.S.C.G.S. Flores Sea. H = 15^h 44^m 15^s** Δ about 140° (Region 7°S., 121° E.)
December 22 No. 208	iPR_1 iSKP i M F	Z Z Z E E	$09^h32^m14^s$ 09 32 59 09 33 29 10 22.6 12 01	Epicenter by U.S.C.G.S. Nicobar Islands Region. H = $09^h10^m36^s$** Δ about 130° (Region 9° N., 93° E.)
December 26 No. 209	iP iP iP eS eS iSR_1 iSR_1 iSR_1 F	Z n e N E N N E E	$13^h57^m38^s$dil 13 57 38.4 13 57 38.6 14 02 40 14 02 41 14 03 45 14 03 51 14 03 53 14 39	Epicenter by U.S.C.G.S. 17° N., 98° W., Southern Mexico aftershock. Felt. H = 13^h 51^m 43^s Magnitude 6 1/2 by Pasa- dena. Δ = 28°4
December 27 No. 210	i e e e e e e e F	Z n e e n E N E E	$23^h22^m06.6^s$comp 23 22 06.8 23 22 07.7 23 22 35.3 23 22 36.0 23 25 35 23 25 51 23 26 20 23 50	Epicenter by U.S.C.G.S. Leeward Islands Fore- shocks. 17° N., 63° W. H = 23^h 10^m 02^s** H = 23 19 24 ** h about 100 km. Δ = 29°5

Bulletin for December, 1950

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 29 No. 211	(e)P n i n eS e iS n e E F E	$20^h 22^m 28^s$ 20 23 13.8 20 28 19 20 28 19 20 28 28 21 32	Epicenter by U.S.C.G.S. 17° N., 63° W. Leeward Islands. H = 20^h 16^m 29^s h about 100 km. Δ = 29°5

The Seismological Observatory of John Carroll University acknowledges with thanks the receipt of the following bulletins from January 1, 1950 to December 31, 1950:

Buenos Aires, Argentina	"El Puelchense de Buenos Aires Y Su Fauna (Plioceno Medio)" Carlos Rusconi
San Miguel, Argentina	January - December, 1948 January - December, 1949
Brisbane, Australia	August - December, 1949 January - September, 1950
Perth, Western Australia	July - December, 1949 January - June, 1950
Riverview, Australia	January - December, 1948 January - December, 1949
Melbourne, Victoria, Australia	Bulletin for 1949
La Paz, Bolivia	April - June, 1949
Rio de Janeiro, Brazil	<u>Anuario</u> Para O Ano de 1950
Sofia, Bulgaria	January - December, 1946
Ottawa, Canada	July - December, 1949 Bibliography of Seismology, No. 6, January - June, 1950
Chile, South America	<u>Un Hecho Sismologico en Extremo llamatino; Una Erupcion Volcanica extraordinaria</u>.
Nanking, China	January - December, 1949
Bogota, Colombia	April - December, 1949 Series "A" Sismologia Publicacion 1A
Quito, Ecuador	<u>Sismologia del Terremota de Peliles</u>
Cairo, Egypt	November - December, 1949 January - June, 1950
Liverpool, England	Annual Report - 1949
Helsinki, Finland	April - September, 1949 April - September, 1950

Strasbourg, France	Bulletin du Bureau Central Seismologique Francais: November - December, 1949; January - July,1950 Institut de Physique du Globe: Annales - 1939-1941; December, 1949 January - October, 1950 Union Geodesique et Geophysique Internationale: August - December, 1949; January - June, 1950. Exchange Bulletin No. 2
Athens, Greece	October - December, 1949 January - August, 1950
Port-au-Prince, Haiti	Bulletin - 1935-1947
DeBilt, Holland	Preliminary bulletins - November - December, 1949; January - September 1950; Seismic Record No. 33 - 1945.
Budapest, Hungary	Rapport Microseismi Que 1943-1945 C Sorozat, Serie: 5; Rapport sur l'Activite for 1947, 1948 Sorozat Serie A, B, C: 8
Dublin, Ireland	April - September, 1950
Firenze, Italy	October - December, 1949 January - September, 1950
Rome, Italy	October - December, 1949 January - August, 1950
Trieste, Italy	October - December, 1949
Rep. Libanaise	October - December, 1949 January - September, 1950 Annees 1946, 1947
Tananarive, Madagascar	January - December, 1949 Annee 1950
Royal Observatory, Malta	Meteorological Records: October, 1948 - December, 1949
Tacubaya, Mexico	December, 1949; January - July,1950
Mexico, D.F., Mexico	August - November, 1950 Bulletin for 1949
Amsterdam, The Netherlands	October, 1950

Wellington, New Zealand	Report for 1944, 1945, 1947 Provisional Bulletins No. P-212, P-214, P-215. Seismological Reports January - March, 1948; Bulletin for February-June, 1950; December, 1948. Bulletins E112-E113.
Lima, Peru	Bulletin for 1948
Lisbon, Portugal	December, 1949 January - September, 1950
Bucarest, Roumania	October - December, 1949 January - February, 1950
Apia, Western Samoa	October - December, 1949 January - September, 1950
Aberdeen, Scotland	January- November, 1950
Edinburgh, Scotland	January - December, 1941 April - July, 1949
Johannesburg, South Afria	November, December, 1949 January - November, 1950
Barcelona, Spain	Bulletin #36
Malaga, Spain	July - December, 1949 January - February, 1950
Toledo, Spain	September - December, 1949 January - October, 1950
Istanbul, Turkey	Bulletin for 1944 July, 1949 - April, 1950
Gric, Yougoslavia	January - June, 1949 Srednjn Rozina Jodranskog Mora I Geodetska Normalna Nula Trst Zogret 1950; Brog 3
Beograd, Yougoslavia	October, December, 1949 January - November, 1950

Harvard, Massachusetts	Bulletins 29, 30, 31, 33, 34
Jesuit Seismological Association	Preliminary Bulletin No. 51 Bulletins 1-9, 11-16, 62, 63, 69-79 80, 81, 83, 87, 89, 92, 93, 95-98, 100, 101-115, 120, 121, 123, 133

Pasadena, California	January - December, 1949 Preliminary Bulletin #67, 68, 69, 71
Pittsburgh, Pennsylvania	January - December, 1949
Santa Clara, California	December, 1949; January - November, 1950
State College, Pennsylvania	Seismograph Report No. VIII, IX, X, XI