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.

Beginning with the January, 1949 Bulletin, the designation of the instrument component recording a wave will be as follows:

N) Phase recorded on the long-period horizontal
E) instruments (free period about 18.5 seconds)

n) Phase recorded on the short-period horizontal
e) instruments (free period about 1.5 seconds)

Z No change; phase recorded on vertical instrument (free period about 1.5 seconds)

Bulletin for January, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
January 2		$13^h\ 44^m$ to 14 27	Seismic activity and surface waves
January 9		$08^h\ 02^m$ to 08 19	Surface waves
January 9 No. 1	eP N iP n iP Z i(pP) n i Z i Z iS E iS N iS n i(sS) E F E	$10^h45^m06.0^s$ 10 45 08.0 10 45 08.0 10 45 13.3 10 45 57.2 10 46 02.5 10 53 35 10 53 36 10 53 36.8 10 54 41 11 10	Probably deep. No surface waves. Determination made using normal tables. $\triangle$ S - P = 61°6 H = $10^h\ 34^m\ 53^s$

Bulletin for January, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
January 10		$10^h\ 39^m$ to 11 02	Surface waves
January 12		$10^h\ 45^m$ to 11 02	Surface waves
January 14 No. 2	i e	$03^h49^m28.3^s$	Local shock felt at Sikeston, Missouri
	i n	03 49 28.7	
	i e	03 49 29.9	
	i n	03 49 30.7	
	i n	03 49 32.0	
	i e	03 49 34.1	
	i n	03 49 34.9	
	i nZ	03 49 38.6	
January 19		$15^h\ 50^m$ to 16 48	Surface waves
January 20		$14^h\ 24^m$ to 15 01	Seismic activity
January 23 No. 3	eP' e	$06^h50^m56.6^s$	Δ about 150°
	i e	06 50 59.0	
	i n	06 50 59.8	
	e n	06 51 15.4	
	i n	06 51 27.9	
	e e	06 54 28.1	
	eSKP n	06 54 31.3	
	e nN	06 54 53.6	
	eS N	07 13 26	
	iS N	07 13 53	
	F E	09 23	

Bulletin for January, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
January 24 No. 4	ePR_1 e	$09^h34^m22.8^s$	Epicenter by U.S.C.&G.S.
	iP' e	09 34 36.1	22° S. 176° W.
	$ipPR_1$ e	09 34 46.2	Tonga Islands Region
	eSKKS E	09 41 17	$H = 09^h 15.7^m$
	eS N	09 41 56	Depth about 100 km.
	esSKKS E	09 42 00	Magnitude about 6 3/4 by
	esS N	09 42 40	Pasadena.
	e N	09 42 49	$\triangle$ meas = 107?9
	e E	09 42 50	
	e E	09 43 44	
	eSR_1 N	09 49 29	
	$esSR_1$ N	09 50 12	
	e N	09 52 59	
	$e(SR_2)$ N	09 53 32	
	e N	09 53 58	
	F N	11 08	
January 25		$08^h 04^m$ to 08 29	Surface waves
January 27 No. 5	e N	$07^h45^m53^s$	Epicenter by U.S.C.&G.S.
	e N	07 47 05	3° S. 152° E.
	e E	07 49 42	New Britain region
	e NE	07 54 51	$H = 07^h 18.2^m$
	L N	08 08.6	Magnitude by Pasadena
	M N	08 13.4	about 6 1/2.
	F N	09 43	
January 27 No. 6	M E	$11^h34.7^m$	Epicenter by U.S.C.&G.S.
	F E	12 12	55° No. 164° E.
			$H = 11^h 00.0^m$

Bulletin for January, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
January 28 No. 7	i N e N e N i n i N i e i e i n e E e E e E F - lost in following quake.	$07^h55^m33^s$ 07 57 43 07 58 27 08 06 35.2 08 06 38 08 06 39.3 08 07 08.0 08 07 09.2 08 07 18 08 13 57 08 15 09	
January 28 No. 8	iP ne iP E i E M E F E	$08^h22^m26.0^s$ 08 22 27 08 30 32 08 34.5 09 25	Epicenter by U.S.C.&G.S. 27°3 N. 47°4 W. H = 08^h 18.4^m Δ meas = 30°7
January 28		11^h 06^m to 12 28	Seismic activity probably from the same epicenter as No. 5

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, 1949

	Component EW					Component NS			
Date \ Hour	0	6	12	18		0	6	12	18
1	26	31	51	52		26	40	44	66
2	34	32	35	22		47	39	32	39
3	22	22	20	16		44	31	27	21
4	16	21	19	22		28	22	20	20
5	20	13	11	10		29	22	13	12
6	12	16	12	07		15	22	12	20
7	12	12	14	17		15	16	18	20
8	20	15	12	13		20	23	17	14
9	09	10	12	07		07	10	12	11
10	11	08	08	08		13	13	09	10
11	07	08	12	11		08	09	10	14
12	12	11	10	08		12	14	12	10
13	11	10	10	06		12	12	12	12
14	07	07	09	12		12	09	09	12
15	15	20	22	30		22	23	33	29
16	23	10	24	14		32	19	25	26
17	13	13	10	11		13	12	12	10
18	33	22	19	10		30	24	17	15
19	12	11	08	04		12	06	09	04
20	04	03	04	06		03	04	08	10
21	13	20	20	14		15	29	22	18
22	15	09	09	10		14	10	06	09
23	08	09	12	13		12	12	14	13
24	11	12	06	04		12	12	08	09
25	05	10	11	10		12	12	12	08
26	13	12	12	18		11	15	19	22
27	11	10	04	09		20	11	07	06
28	04	04	06	05		06	03	03	07
29	05	06	06	07		08	06	06	10
30	07	08	10	12		08	12	11	16
31	21	23	21	21		26	29	24	22

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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 February, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
February 1 No. 9	ePS E iPPS E eSR$_1$ N M E F N	$18^h47^m22^s$ 18 48 58 18 55 04 19 23.2 20 54	Epicenter by U.S.C.&G.S. 2 1/2° S. 138° E. Northern New Guinea. H = 18^h 15.9^m Δ meas = 129°6
February 2 No. 10	iP en iP NE ipP en e NE i E i N iS E iS n iS N iS e iPS E ePS N isS ne isS NE eSR$_1$ NE F E	$17^h51^m11.0^s$ 17 51 11 17 51 58.5 17 54 51 17 55 03 17 55 04 17 58 59 17 58 59.7 17 59 00 17 59 00.5 17 59 49 17 59 51 18 00 39.5 18 00 40 18 03 07 18 53	Epicenter by U.S.C.&G.S. 53° N. 172°5 W. Aleutian Islands. H = 17^h 41.5^m h = 200 km. Δ meas = 59°4
February 5 No. 11	(i)P$_4$ n iP$_2$ n iP$_1$ ne iS$_4$ e iS$_4$ n iS$_1$ n iS$_1$ e iS$_0$ n iS$_0$ e F e	$15^h05^m31.8^s$ 15 05 40.7 15 05 48.2 15 06 24.9 15 06 27.2 15 06 42.6 15 06 42.7 15 06 45.9 15 06 46.4 15 09.7	Local quake Δ S$_4$ - P$_4$ = 510 km.

Bulletin for February, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
February 10 No. 12	L E M E F E	$22^h44.0^m$ 22 48.4 22 34	Epicenter by U.S.C.&G.S. 16° S. 173° W. Samoan Islands H = 21^h 56.6^m Magnitude about 6 by Pasadena. △ meas = 101°7
February 13 No. 13	iP' e ePR$_1$ eE iPS E iPS N e E e E eSR$_1$ N e E L E F E	$18^h43^m27.3^s$ 18 44 02 18 53 44 18 53 46 18 58 46 18 59 08 19 00 09 19 08.1 19 19.9 21 16	Epicenter by U.S.C.&G.S. 33 1/2° S. 177 1/2° W. Kermadec Islands region. H = 18^h 24.3^m Magnitude about 7 by Pasadena and Strasbourg. △ meas = 115°2
February 14 No. 14	iP e iPR$_2$ E ePR$_2$ N i E iS EN iS E i E i N M N F N	$18^h13^m53.1^s$ 18 14 46 18 14 46 18 15 57.7 18 19 01 18 19 05 18 21 10 18 21 57 18 24.8 18 40	Epicenter by U.S.C.&G.S. 18 1/2° N. 105° W. Off coast of Mexico. H = 18^h 07.5^m △ meas = 30°2 Aftershocks H = 19^h 24.6^m Feb. 15-H = $03^h52.3^m$
February 17		21^h19^m to 21 44	Surface waves
February 18		05^h25^m to 05 36	Seismic activity

Bulletin for February, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
February 18 No. 15	iP Z i(PR_1) n eS E eS N esS E F E	$09^h06^m53.1^s$ 09 07 05.7 09 11 25 09 11 29 09 11 52 09 35	Epicenter by U.S.C.&G.S. 19° N. 69 1/2° W. Near Northern coast of Dominican Republic. H = 09^h 01.6^m Δ meas = 24°3
February 19 No. 16	L E M E F E	$01^h49.2^m$ 01 51.7 02 18	
February 21 No. 17	iP Z iP e ipP Z ipP e (e) S E eS N M E F E	$11^h48^m26.9^s$ 11 48 27.0 11 48 35.5 11 48 36.5 11 55 32 11 55 36 12 03.0 12 19	Δ S - P = 46°8 H = 11^h 40^m 07^s Possibly some depth. h about 40 km.
February 22		17^h16^m to 17 36	Seismic activity
February 23 No. 18	(e)P N iS E iS N L E M E F E	$09^h23^m17^s$ 09 30 27 09 30 31 09 38.4 09 41.1 10 14	Δ S - P = 49°1 H = 09^h 14^m 31^s

Bulletin for February, 1949

Gnwch. Date and Number	Phase and Component		G.M.C.T.	Remarks
February 23 No. 19	iP	Z	$16^h21^m37.3^s$	Epicenter by U.S.C.&G.S. 39 1/2° N. 85° E. Eastern Turkiston $H = 16^h\ 07.9^m$ $\triangle$ meas = 98?1
	iP	n	16 21 37.7	
	e	N	16 24 49	
	iPR_1	n	16 25 29.0	
	iPR_1	Z	16 25 29.3	
	iPR_1	N	16 25 35	
	eSKS	N	16 32 05	
	iSKS	N	16 32 19	
	iPS	N	16 34 11	
	eSR_1	N	16 39 35	
	eSR_2	N	16 43 18	
	M	E	16 58.4	
	F	E	18 58	
February 26 No. 20	(e)S	E	$18^h27^m23^s$	
	iM	E	18 30 56	
	F	E	18 37	
February 27 No. 21	e	N	$23^h23^m29^s$	
	e	N	23 31 55	
	e	N	23 37 18	
	i	N	23 42 22	
	i	E	23 42 23	
	i	E	23 46 47	
	i	N	23 46 55	
	L	E	23 59.7	
	F	E	01 53	

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, 1949

	Component EW					Component NS			
Date \ Hour	0	6	12	18		0	6	12	18
1	14	16	12	9		18	16	14	14
2	06	10	10	10		11	12	13	10
3	10	12	16	19		11	12	20	20
4	12	13	12	11		14	18	19	12
5	09	12	12	13		12	10	22	20
6	10	10	09	10		14	13	11	13
7	09	10	09	11		12	13	12	12
8	07	12	23	30		10	14	32	42
9	22	16	13	14		32	24	14	14
10	12	12	10	11		14	13	12	16
11	15	18	36	43		21	22	33	46
12	40	43	34	24		50	52	47	46
13	26	26	15	13		35	20	31	19
14	12	07	06	09		12	13	10	06
15	03	02	04	02		06	05	05	04
16	04	03	03	05		03	08	07	05
17	09	16	12	08		08	11	09	10
18	12	14	20	23		14	18	27	36
19	36	30	33	21		24	30	26	23
20	13	11	11	12		22	20	14	12
21	07	07	10	12		11	10	14	22
22	12	12	12	09		14	16	19	11
23	09	10	10	NR		10	11	12	08
24	09	10	05	08		09	20	12	10
25	06	06	05	16		05	10	12	19
26	13	13	11	12		14	15	13	11
27	13	10	10	09		16	17	13	14
28	04	19	19	17		10	19	32	25

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 March, 1949

Gnwch. Date and Number	Phase and Component		G.M.C.T.	Remarks
March 2	eP	Z	$07^h03^m13^s$	Epicenter by U.S.C.&G.S. 72° N. 3° W. Arctic Ocean, east of Greenland. H = $06^h\ 54.6^m$ Magnitude 4 1/2 by Strasbourg. △ meas = 47.2° Record weak
No. 22	iP	Z	07 03 15.7	
	eS	N	07 10 18	
	e(SR_1)	E	07 14 07	
	L	E	07 16.9	
	M	E	07 20.9	
	F	E	07 41	
March 4	eP'	Z	$01^h36^m28.3^s$	△ = 132° H = $01^h\ 20^m\ 10^s$
No. 23	iP'	Z	01 36 29.4	
	iP'	n	01 36 30.5	
	i	Z	01 39 33.2	
	i	Z	01 40 32.3	
	eS	N	01 50 16	
	epPS	E	01 53 28	
	epPS	N	01 53 30	
	e	N	01 58 18	
	eSR_1	N	01 59 16	
	e	N	02 00 00	
	L	E	02 21.1	
	M	E	02 36.2	
	M	N	02 37.5	
	F	E	03 38	
March 4	iP	Z	$10^h32^m43.2^s$	Epicenter by U.S.C.&G.S. 37° N. 70° E. Hindu Kush Range of Himalaya Mountains, Afghanistan. H = $10^h\ 19.4^m$ h about 200 km. Magnitude by Pasadena about 7 1/2 ∠ meas = 97°2
No. 24	iP	n	10 32 44.0	
	iP	Z	10 32 44.2	
	iP	e	10 32 44.3	
	ipP	Z	10 33 38.4	
	i	Z	10 34 01.0	
	iPR_1	E	10 36 45	
	iPR_1	Z	10 36 48.8	
	i(pPR_1)	E	10 37 55	
	iPR_2	n	10 38 58.4	
	eSKS	e	10 42 56	
	iSKS	E	10 42 57	
	i(pPS)	n	10 46 21.9	
	F	N	13 01	

Bulletin for March, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
March 6 No. 25	i(P) Z e E (M) E F E	$11^h25^m42.9^s$ 11 42 34 11 47.0 12 01	
March 7 No. 26	(i)P Z (i) Z (i) Z M E F E	$11^h30^m00.8^s$ 11 38 54.0 11 38 56.0 12 04.5 12 20	
March 9 No. 27	i e i e iM N F N	$12^h38^m27.5^s$ 12 38 32.5 12 45 38 13 02	Epicenter by U.S.C.&G.S. 37°1 N. 121°3 W. Felt in central California H = 12^h 28^m 39^s Magnitude about 5 1/2 by Pasadena. $\angle$ meas = 31°0
March 12 No. 28	iP n iP Z M E F E	$19^h36^m02.5^s$ 19 36 11.0 19 51.7 20 01	Record weak
March 13 No. 29	iP Z iP nZ eP e eP NE ipP Z ipP ne ipP NE iS E iS N iS n iS e esS E isS e isS n isS N e E e E F N	$18^h53^m26.8^s$ 18 53 28.0 18 53 28 18 53 29 18 53 56.7 18 53 57.7 18 53 58 19 01 50 19 01 51 19 01 51.2 19 01 51.4 19 02 41 19 02 41.8 19 02 42.4 19 02 43 19 03 09 19 04 03 19 27	Epicenter by U.S.C.&G.S. 21°5 S. 68° W. Northern Chile H = 18^h 43.0^m h about 100 km. $\angle$ meas = 63°9

Bulletin for March, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
March 14		01^h04^m to 02 28	Surface waves
March 14		03^h33^m to 04 35	Surface waves
March 16 No. 30	iP' Z iP' Z eSKS E eSKKS N eSKKS E ePS E iSR_1 N M N F N	$22^h34^m02.4^s$ 22 34 16.6 22 41 16 22 42 22 22 42 25 22 45 00 22 51 52 23 17.3 01 29	Epicenter by U.S.C.&G.S. 6° S. 151°5 E. New Britain region H = 22^h 15.1^m △ meas = 121°5
March 17 No. 31	iP' Z iP' e iSKP NE iPS E iSR_1 N L E M E F E	$21^h23^m59.5^s$ 21 24 01.5 21 31 17 21 35 17 21 41 48 21 55.1 22 04.4 00 16	Aftershock of quake No. 29 by U.S.C.&G.S. H = 21^h 05.1^m △ meas = 121°5
March 20		01^h08^m to 01 20	Seismic activity
March 20		12^h56^m to 12 09	Seismic activity
March 24 No. 32	eP Z iP e iP Z iP Z eP NE eP n ePR_1 E eS E eS N e N M E F E	$21^h03^m29.4^s$ 21 03 29.5 21 03 30.0 21 03 31 21 03 31 21 03 31.2 21 04 34 21 08 46 21 08 47 21 11 26 21 14 09 23 05	Epicenter by U.S.C.&G.S. 42° N. 126°5 W. Pacific Ocean off coast of Cape Mendocino, Calif. H = 20^h 56.8^m Magnitude about 6 1/2 by Tucson. △ meas = 33°7

Bulletin for March, 1949

Gnwch. Date and Number	Phase and Component	G.M.C.T.	Remarks
March 25 No. 33	iM n iM e iM N iM E F N	$02^h43^m10^s$ 02 43 11 02 43 12 02 43 14 03 00	
March 27 No. 34	iP' n iPR_1 n e n F n	$06^h53^m17.6^s$ 06 55 23.1 06 55 55.3 07 12	Epicenter by U.S.C.&G.S. 4° N. 127°5 E. Celebes Sea off southern coast of Cape Mindanao $H = 06^h 34.1^m$ Magnitude about 6 3/4 by Tucson. $\triangle$ meas = 127°8

Corrections to February Bulletin

February 27 - Earthquake No. 21: Add one hour to all readings.

Microseismic Report: Replace readings of the February bulletin with the following data:

Date	EW 0^h	EW 6^h	EW 12^h	EW 18^h	NS 0^h	NS 6^h	NS 12^h	NS 18^h
February 27	--	--	--	09	--	--	--	10
February 28	10	18	24	--	12	19	22	--

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

March, 1949

	Component EW					Component NS			
Date \ Hour	0	6	12	18		0	6	12	18
1	22	40	32	26		30	40	30	32
2	25	24	22	22		35	24	30	24
3	21	20	21	22		27	27	20	20
4	22	29	NR	22		24	26	NR	21
5	20	14	10	07		21	13	06	08
6	08	12	04	08		14	13	07	09
7	12	12	14	20		05	09	13	26
8	23	25	26	14		31	21	30	25
9	13	13	12	16		17	14	14	16
10	14	16	14	05		25	18	12	12
11	11	11	16	26		22	19	20	26
12	15	21	22	15		22	26	24	22
13	20	14	15	13		21	19	19	19
14	12	14	12	11		20	16	18	15
15	11	11	14	12		12	12	15	NR
16	10	15	15	12		NR	NR	NR	19
17	12	12	12	10		18	16	15	16
18	11	15	12	10		NR	NR	NR	15
19	12	18	19	12		12	22	21	16
20	09	09	09	06		15	10	10	07
21	08	06	08	08		12	10	09	11
22	08	07	10	05		12	12	12	10
23	03	03	04	12		05	06	07	12
24	13	10	11	13		16	13	15	14
25	10	12	13	11		12	15	23	13
26	12	08	06	NR		11	10	08	NR

Note: From March 26, 16^h to April 1, 21^h the recording unit for the horizontal long period seismographs and the vertical seismograph was not in operation.

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 April, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 3		$07^h\ 13^m$ to 08 32	Seismic activity, mainly surface waves
April 4 No. 35	(iP) n	$02^h36^m25.7^s$	Weak
	e E	02 46 33	
	e N	02 46 46	
	M N	02 49 27	
	F N	02 56	
April 5 No. 36	iP E	$09^h39^m18.7^s$	Epicenter by U.S.C.&G.S. 43° N. 131° E. Near Vladivostok, U.S.S.R. $H = 09^h\ 27.1^m$ h about 550 km. Magnitude about 7 1/4 by Pasadena $\triangle$ meas = 90.9
	iP n	09 39 19.0	
	epP n	09 41 21	
	iSKS e	09 48 53.6	
	iSKS n	09 48 54.6	
	eS e	09 49 27	
	iS E	09 49 27	
	iS N	09 49 33	
	isSKS E	09 52 48	
	isS E	09 53 09	
	esS E	09 53 12	
	iSR_1 E	09 55 58	
	i E	09 58 37	
	eSR_2 E	09 59 08	
	e E	10 02 17	
	F E	10 38	
April 6 No. 37	M N	$03^h51.5^m$	
	M E	03 51.6	
	F N	03 59	
April 9 No. 38	e E	$04^h35^m10^s$	
	M E	04 38.0	
	F E	04 58	

Bulletin for April, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 9 No. 39	M E F E	$22^h42.2^m$ 23 01	
April 11 No. 40	e E e N F E	$00^h20^m42^s$ 00 42 17 01 43	
April 12 No. 41	(i)P n eS E F E	$18^h28^m32.0^s$ 18 33 50 18 48	ΔS - P = 31°8 H = 18^h 22^m 03^s
April 13 No. 42	i(P) Z eS E e E eSR_1 E M E F E	$15^h21^m35^s$ 15 28 17 15 28 34 15 31 47 15 36.0 16 05	Epicenter by U.S.C.&G.S. 11° N. 41° W. Atlantic Ocean, off northeast coast of South America H = 15^h 12.9^m Δ meas = 46°4
April 13 No. 43	iP EZ eP n iP e eP N iP E ePR_1 n iPR_1 E iPR_2 E iS E i N eL N eM n eM N F E	$20^h01^m42.7^s$ 20 01 42.9 20 01 42.9 20 01 43 20 01 43.1 20 02 25 20 02 25 20 02 38 20 06 32 20 06 58 20 09.2 20 11.4 20 11.5 23 35	Epicenter by U.S.C.&G.S. 47°1 N. 122°7 W. Between Olympia and Tacoma, Washington. H = 19^h 55^m 41^s Deeper than normal Magnitude 6 3/4 - 7 by Pasadena Δ meas = 29°7
April 14		16^h 34^m to 17 16	Surface waves
April 14		17^h 50^m to 18 39	Surface waves

Bulletin for April, 1949

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
April 19 No. 44	eP	N	$15^h31^m12^s$	Epicenter by U.S.C.&G.S.
	iP	Zn	15 31 12.9	48° N. 154° E.
	ipP	Z	15 31 24.9	Kurile Islands region
	epP	N	15 31 25	$H = 15^h\ 19.2^m$
	ipP	n	15 31 25.1	Slightly deeper than normal
	eS	N	15 41 00	∠ meas = 78°3
	is	E	15 41 01	
	esS	N	15 41 21	
	isS	E	15 41 22	
	isS	n	15 41 23.2	
	M	N	16 01.8	
	F	E	17 37	
April 20 No. 45	eP	Z	$03^h41^m05.9^s$	Epicenter by U.S.C.&G.S.
	iP	Z	03 41 06.7	38° S. 72.5° W.
	eP	n	03 41 06.8	Chile, province of Bio-Bio. Heavy casualties and property damage at Angol and Traiguen.
	eP	N	03 41 07	
	iP	n	03 41 07.7	
	iP	Z	03 41 07.9	$H = 03^h\ 29.0^m$
	ipP	N	03 41 21	h about 70 km.
	ipP	Z	03 41 23.6	Magnitude:
	isP	Z	03 41 30.6	7 1/2 - Pasadena
	iPR_1	N	03 44 06	7 1/4 - Tucson
	$ipPR_1$	N	03 44 23	7.0 - Strasbourg
	eS	N	03 50 57	∠ meas = 80°1
	iS	e	03 50 58.1	
	iS	E	03 50 58.8	
	iS	n	03 51 01.8	
	e	n	03 51 14.3	
	e	e	03 51 20.2	
	isS	n	03 51 26.9	
	L	N	03 07.5	
	M	N	03 14.5	
	F	N	06 46	
April 22 No. 46	eP	Z	$17^h29^m29.3^s$	∠S - P = 80°4
	eS	E	17 39 37	
	eS	N	17 39 39	$H = 17^h\ 17^m\ 20^s$
	ePS	E	17 51 09	
	L	E	17 52.7	
	M	NE	17 59.2	
	F	E	18 36	

Bulletin for April, 1949

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
April 23 No. 47	iP'	Z	$11^h34^m56.6$	Epicenter by U.S.C.&G.S. 8° S. 120° E. Flores Sea $H = 11^h\ 15.5^m$ Magnitude by Pasadena about 7 Δ meas = 143±1
	ePR_1	N	11 38 00	
	ePR_1	E	11 38 01	
	iPR_1	Z	11 38 01.9	
	eSKP	E	11 38 36	
	eSKP	N	11 38 38	
	ePPS	N	11 51 04	
	F	N	13 37	
April 24 No. 48	ePR_1	NE	$04^h39^m11^s$	Epicenter by U.S.C.&G.S. 27° N. 56° E. Persian Gulf $H = 04^h\ 22.1^m$ Δ meas = 101±7
	e	e	04 45 38	
	e	n	04 45 41	
	i	E	04 45 44	
	e	N	04 45 45	
	ePS	E	04 49 04	
	e	N	04 49 15	
	M	E	05 15.8	
	F	E	06 13	
April 25 No. 49	iP	Z	$14^h05^m13.9^s$	Epicenter by U.S.C.&G.S. 20° S. 69±5 W. Coast of nothern Chile $H = 13^h\ 55.0^m$ h about 100 km. Magnitude: 7 1/2 - Pasadena 7 1/4 - Tucson Δ meas = 62±1
	iP	NEZ	14 05 14	
	iP	n	14 05 14.9	
	iP	e	14 05 15.0	
	i	EN	14 05 18	
	ipP	Z	14 05 41.1	
	ipP	n	14 05 42.3	
	ipP	NZ	14 05 43	
	isP	N	14 06 01	
	eS	N	14 13 21	
	iS	E	14 13 27	
	iS	Nn	14 13 29	
	iS	e	14 13 30	
	isS	E	14 14 12	
	isS	N	14 14 14	
	isS	n	14 14 17	
	i	E	14 15 45	
	F	E	17 36	
April 25 No. 50	M	E	$20^h26.4^m$	
	F	E	21 06	

Bulletin for April, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
April 26 No. 51	M E F E	$11^h35.2^m$ 11 43	
April 28		23^h47^m to 00 11	Surface waves
April 30 No. 52	eP' Z iP' n iP' e iP' Z iP' n iP' NE ePR_1 NE i N i E i E i N iSKS E iSKKS E iSKKS N iPS N i N ePPS E e N iSR_1 N iSR_1 E i N F E	$01^h42^m23^s$ 01 42 25.5 01 42 27.4 01 42 27.6 01 42 28.0 01 42 29 01 44 22 01 44 51 01 44 56 01 46 12 01 49 18 01 49 24 01 51 05 01 51 06 01 54 45 01 55 37 01 55 49 01 57 00 02 01 00 02 01 07 02 04 04 05 04	Epicenter by U.S.C&G.S. 6° N. 126° E. Near southern coast of Mindanao $H = 01^h 23.4^m$ h about 100 km. $\angle\Delta$ meas = 126°9

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, 1949

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

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.

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 2 No. 53	e(P) e	$11^h31^m42.5^s$	Δ S - P = 30°6
	e(P) Z	11 31 43.4	H = 11^h 25^m 24^s
	e(S) e	11 36 52	
	e E	11 37 41	
	M n	11 40 25	
	M N	11 40 52	
	F N	12 19	
May 3 No. 54	iP Z	$06^h08^m30.7^s$	Epicenter by
	iP n	06 08 31.5	U.S.C.&G.S. 49° N.
	iP e	06 08 31.7	153°5 E. Kurile Islands
	epP E	06 09 04	H = 05^h 56.7^m
	ipP Z	06 09 04.7	h about 100 km.
	ipP N	06 09 05	Magnitude about 7 by
	ipP n	06 09 05.3	Pasadena
	ipP e	06 09 05.4	Δ meas = 77°4
	esP E	06 09 17	
	esP N	06 09 18	
	e N	06 12 01	
	e N	06 12 15	
	iS e	06 18 10.1	
	iS NE	06 18 11	
	iS n	06 18 11.1	
	i e	06 18 25.2	
	iPS N	06 18 31	
	isS E	06 19 05	
	isS NE	06 19 11	
	iSPS NE	06 19 30	
	eSR_1 N	06 22 55	
	e E	06 23 21	
	F E	07 23	

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
May 4 No. 55	(e)P	Z	$06^h07^m50^s$	Δ about 48° Record weak; preliminary phases doubtful.
	(e)P	e	06 07 50.7	
	eP	e	06 08 04.9	
	eS	E	06 14 56	
	eM	E	06 22 17	
	eM	N	06 22 42	
	F	E	06 38	
May 6			00^h59^m to 01 13	Sinusoidal surface waves
May 6 No. 56	iP	Z	$14^h42^m49.4$	Δ about 122° Doubtful
	eP	e	14 42 50.1	
	iP	n	14 42 50.2	
	i	n	14 42 54.4	
	e	e	14 42 54.4	
	eSR_1	E	15 14 26	
	F	E	15 36	
May 7 No. 57	i	n	$13^h12^m21.9^s$	Weak
	e	e	13 12 22.3	
	e	e	13 20 50.2	
	i	n	13 20 50.5	
	F	N	13 43	
May 8 No. 58	iP	Z	$21^h34^m44.8^s$	Epicenter by U.S.C.&G.S. 20° S. 71° W. Off coast of northern Chile H = 21^h 24.6^m h about 120 km. Magnitude about 6-3/4 by Pasadena. Δ meas = 62°.5
	iP	n	21 34 45.0	
	epP	N	21 35 15	
	ipP	n	21 35 15.4	
	ipP	Z	21 35 15.6	
	iSP	Z	21 35 29.0	
	iSP	N	21 35 29	
	iS	E	21 43 01.6	
	iS	N	21 43 01.8	
	iS	e	21 43 02.4	
	iS	n	21 43 02.6	
	isS	E	21 43 51	
	isS	NE	21 43 53	
	isS	e	21 43 53.3	
	isS	n	21 43 53.9	
	i	E	21 45 22	
	F	E	22 08	

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 9 No. 59	iP' Z eSKP NE eSKP Z iSKP n e(SKKS) N e(SR_1) N e(SR_1) E L E M N F E	$13^h55^m39.3^s$ 13 59 04 13 59 06.5 13 59 07.1 14 05 25 14 16 41 14 16 45 14 35.3 14 46.0 16 42	Epicenter by U.S.C.&G.S. 5° N. 95° E. Near coast of N.W. Sumatra H = 13^h 36.3^m Magnitude 6-3/4 by Pasadena. Δ meas = 134°1
May 10 No. 60	iP Z eP e iP n i Z i e ePR$_1$ NE eS N eS E e N e E eM E eM N F N	$00^h30^m56.5^s$ 00 31 00.2 00 31 01.7 00 31 07.5 00 31 07.9 00 31 48 00 36 01 00 36 02 00 38 24 00 39 04 00 41 40 00 41 49 01 33	Epicenter by U.S.C.&G.S. 19° N. 106°5 W. Off western coast of Mexico H = 00^h 24.7^m Magnitude about 6-1/4 by Pasadena Δ meas = 30°6
May 10 No. 61	eS N eS E (eSR$_1$) E eM E eM N F E	$03^h23^m58^s$ 03 24 01 03 27 07 03 29 36 03 29 44 03 51	Epicenter by U.S.C.&G.S. 17° N. 109° W. Off western coast of Mexico H = 03^h 12.2^m Magnitude 5-1/4 by Pasadena. Δ meas = 34°2
May 14		23^h56^m to 00 04	Seismic activity
May 15 No. 62	M N F N	$05^h44.6^m$ 05 57	

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 16 No. 63	$e(PR_1)$ N $e(PR_2)$ N $e(SR_1)$ N e E M E F E	$04^h55^m22^s$ 04 58 02 05 14 28 05 28 38 05 47.0 06 57	Δ about 128° H = 04^h 34^m 18^s Doubtful
May 17 No. 64	eP N iP n,Z eP e epP e ipP Z iS E eS N isS E esS N M E F E	$02^h41^m47^s$ 02 41 47.0 02 41 48.4 02 41 59.9 02 42 00.3 02 51 35 02 51 36 02 51 59 02 52 00 03 15.0 03 41	Epicenter by U.S.C&G.S. 48° N. 155° E. Kurile Islands H = 02^h 29.8^m Δ meas = 78?3 Record indicates a depth of about 50 km.
May 19		07^h23^m to 07 53	Seismic activity
May 19 No. 65	L E F E	$20^h29.1^m$ 21 22	
May 21		08^h44^m 09 17	Seismic activity
May 21 No. 66	eP Z iP n e Z iSKKS E iSKKS e iSKKS E iSKKS n eS N iS E eS e eSR_1 E eSR_1 N M E F E	$21^h53^m17^s$ 21 53 18.4 21 53 27 22 04 13 22 04 14.9 22 04 15 22 04 16.9 22 04 33 22 04 38 22 04 39 22 10 33 22 10 51 22 35.0 23 28	Epicenter by U.S.C.&G.S. 37° N. 142° E. Off east coast of Honshu, Japan H = 21^h 40.0^m Magnitude: 6-1/2 by Pasadena 6-1/4 by Tucson Δ meas = 92?7

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
May 23		05^h05^m to 05 55	Surface waves
May 24		03^h26^m to 04 20	Sinusoidal surface waves
May 24		11^h18^m to 11 36	Seismic activity
May 24 No. 67	iP e iP e iP Z iPR_1 n iPR_1 e iPR_1 n e N eS N M N M n M E F N	$16^h26^m32.0^s$ 16 26 32.9 16 26 33.0 16 27 16.9 16 27 18.6 16 27 20.0 16 27 28 16 31 44 16 37.3 16 37.4 16 37.4 17 17	Epicenter by U.S.C.&.G.S. 17° N. 106° W. Off western coast of Mexico H = 16^h 20.0^m Magnitude 6-1/2 by Pasadena $\angle$ meas = 32.4° Foreshock at H = 13^h 49.4^m
May 25 No. 68	ePR_1 N e N eSKS N iSKS E eS N eSR_1 N M N F N	$08^h41^m06^s$ 08 45 46 08 47 48 08 47 55 08 48 34 08 58 41 09 22.5 09 51	Epicenter by U.S.C&G.S. 42° N. 83° E. Eastern Turkistan H = 08^h 23.8^m $\angle$ meas = 95°4

Bulletin for May, 1949

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
May 30 No. 69	iP	Z	$01^h43^m08.0^s$	Epicenter by U.S.C.&G.S. 20° S. 69°5 W. Coast of northern Chile. H = 01^h 32.9^m h = 100 km. Magnitude 7 by Pasadena △ meas = 62°1
	eP	N	01 43 08	
	iP	N	01 43 09.0	
	eP	e	01 43 09.5	
	epP	NE	01 43 33	
	ipP	Z	01 43 34.4	
	ipP	n	01 43 34.6	
	ipP	e	01 43 36.6	
	i	Z	01 43 40.8	
	iSP	Z	01 43 45.8	
	iS	e	01 51 28.6	
	iS	E	01 51 29.3	
	iS	n	01 51 29.5	
	iS	N	01 51 29.9	
	esS	E	01 52 10	
	i	E	01 52 50	
	i	E	01 53 39	
	e	E	02 00 05	
	F	E	02 40	

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, 1949

	Component EW					Component NS			
Date \ Hour	0	6	12	18		0	6	12	18
1	15	16	11	12		18	15	13	12
2	12	04	03	02		10	03	04	04
3	02	02	02	02		02	02	02	02
4	03	02	02	02		03	03	03	02
5	02	02	01	02		02	03	03	03
6	02	03	09	10		03	05	12	13
7	09	06	07	05		12	12	07	07
8	03	05	03	03		09	06	03	03
9	02	02	02	01		03	02	02	02
10	02	01	01	01		02	03	01	01
11	01	01	01	02		01	02	01	02
12	02	02	03	03		02	03	04	04
13	03	03	02	03		04	05	04	02
14	02	02	02	NR		03	02	02	NR
15	02	02	01	02		02	02	02	02
16	04	04	03	04		06	04	05	05
17	02	03	02	02		03	03	02	02
18	03	03	03	08		03	03	05	06
19	06	06	06	05		07	05	08	03
20	05	10	07	NR		05	12	15	NR
21	12	13	20	24		21	22	24	32
22	15	16	08	NR		22	15	12	NR
23	08	06	03	04		12	08	06	04
24	05	03	03	03		06	04	04	03
25	03	04	03	03		03	05	04	03
26	05	04	02	02		03	03	03	03
27	02	02	01	03		02	03	02	03
28	03	03	02	04		04	04	04	04
29	02	03	03	03		04	03	02	04
30	02	03	02	02		03	03	03	02
31	02	02	01	01		02	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.

Bulletin for June, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
June 4 No. 70	iP Z i n i Z i n e(S) E e E F E	$23^h32^m12.3^s$ 23 32 23.0 23 32 24.5 23 32 34.3 23 36 59 23 38 58 23 56	Δ S - P = 27°4 H = 23^h 26^m 23^s Weak
June 6 No. 71	M F F E	$07^h53.9^m$ 07 55	
June 8 No. 72	iP Z iP n iP e i Z i n i e e(S) E eSR_1 E eSR_2 N F N	$05^h09^m15.0^s$comp 05 09 15.2 05 09 15.2 05 09 19.7 05 09 20.2 05 09 20.5 05 19 20 05 24 49 05 27 45 05 37	Δ S - P = 79°7 H = 04^h 57^m 10^s Compression from S.W.
June 11 No. 73	iP n iP e iP Z iPR_2 n eS N M N F N	$07^h40^m48.8^s$ 07 40 52.1 07 40 52.6 07 42 02.6 07 46 11 07 51.9 08 28	Epicenter by U.S.C.&G.S. 12°5 N. 87°5 W. Near west coast of Nicaragua H = 07^h 34.8^m Possibly deeper than normal. Δ meas = 29°3

Bulletin for June, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
June 12 No. 74	iP n iP e eS E F E	$04^h36^m59.8^s$ 04 37 06.7 04 41 29 05 08	Epicenter by U.S.C.&G.S. 19° N. 69° W. H = 04^h 31^m 36^s Dominican Republic Δ meas = 24°8
June 12 No. 75	iP N iP n iP e iP Z i Z ipP Z ipP Z ipP n ipP N iS e iS NE iS n iS e i n i e iPS E iPS N isS N isPS N	$18^h02^m44^s$ 18 02 44.1 18 02 44.2 18 02 44.2 comp 18 02 47.2 18 04 44.9 18 04 46.9 18 04 47.3 18 04 47.6 18 11 10.6 18 11 11 18 11 11.2 18 11 11.8 18 11 19.7 18 11 23.1 18 11 50 18 11 52 18 14 43 18 15 17	Compression from S.W. Epicenter by U.S.C.&G.S. 27° S. 64° W. Northern Argentina H = 17^h 52.4m h = 600 km. Magnitude about 7 by Pasadena. Δ meas = 71°1
June 12 No. 76	iP N iP Z iP e iP n i Z eS N iS e e e e E e N F E	$18^h06^m11^s$ 18 06 11.4 18 06 11.6 18 06 11.8 18 06 17 18 14 34 18 14 38.8 18 14 49 18 15 49 18 18 46 18 56	Epicenter same as preceding quake H = 17^h 55.8m

Bulletin for June, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
June 14		01^h16^m to 02 04	Surface waves
June 15 No. 77	(i)P n e e eM E F E	$01^h57^m44.8^s$ 01 58 08 02 21 00 02 47	Epicenter by U.S.C.&G.S. 52° N. 178° W. Aleutian Islands $H = 01^h\ 47.3^m$ $\Delta = 63°.0$
June 17 No. 78	iP_3 Z iP_0 Z iS_3 n iS_4 n M n	$19^h50^m27.3^s$ 19 50 28.3 19 50 43.9 19 50 49.3 19 51 01.3	$\Delta S_3 - P_3 = 142$ km.
June 19 No. 79	M E F E	$00^h03.4^m$ 00 12	
June 19		01^h18^m to 01 39	Surface waves
June 19		22^h24^m to 22 39	Surface waves
June 23 No. 80	i(SKP) e e(SKKS) N e N e(SR_1) N F N	$22^h47^m29.8^s$ 22 54 11 22 55 39 23 03 44 23 58	Epicenter by U.S.C.&G.S. 16° S. 168° E. New Hebrides Islands $H = 22^h\ 27.2^m$ h = 180 km. Magnitude 6 1/2 to 6 3/4 by Pasadena Δ meas = 116°.1

Bulletin for June, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
June 24 No. 81	eP' N	$22^h58^m18^s$	Epicenter by U.S.C.&G.S. 7° S. 105° E. Off S.W. coast of Java
	eP' E	22 58 18	
	iP' n	22 58 18.4	
	eP' e	22 58 18.4	
	iP' Z	22 58 18.5 dil	
	i e	22 58 18.9	
	e e	22 58 34	
	i n	22 58 35.9	
	ePR_1 N	23 01 33	
	eSKP N	23 02 00	
	ePPS E	23 13 40	
	e E	23 15 36	
	F E	01 15	
June 25 No. 82	iP' e	$06^h20^m56.4^s$	Interpretation doubtful; possible aftershock of preceding quake.
	iP' N	06 20 57	
	eP' E	06 20 57	
	iP' n	06 20 59.6	
	iP' Z	06 21 02.7 comp	
	iP' e	06 21 04.9	
	e N	06 23 25	
	e N	06 42 01	
	F N	07 02	
June 25		20^h09^m to 20 40	Surface waves
June 26 No. 83	ePR_1 E	$09^h03^m56^s$	
	ePR_1 Z	09 03 57.6	
	ePR_1 Z	09 03 59	
	iPR_1 N	09 04 02	
	ePR_1 E	09 04 02	
	e NE	09 12 54	
	(e) E	09 14 31	
	e(SR_1) E	09 20 40	
	F E	11 08	

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, 1949

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

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 1 No. 84	iP Z iP e iP n ipP Z ipP n eS e eS n esS e esS n	$03^h37^m21.4^s$ 03 37 22 03 37 22.3 03 38 00.2 03 38 01.2 03 45 43 03 45 44 03 46 53 03 46 57	Δ = 64°.4 Epicenter by U.S.C.&G.S. near coast of northern Chile. h = 100 km. H = 03^h 27^m 00^s
July 2		12^h34^m to 13 31	Surface waves
July 2 No. 85	iP' Z ePR$_1$ Z iPR$_1$ e ePR$_1$ N iSKS E iSKS e iSKS N iSKKS E e N iPS N ePS E i NE ePPS NE eSR$_1$ N eSR$_1$ E M E M N F E	$20^h14^m55.0^s$ 20 15 43 20 15 45.9 20 15 46 20 22 06 20 22 06.7 20 22 07 20 23 05 20 24 43 20 25 10 20 25 16 20 25 38 20 26 03 20 31 22 20 31 23 20 55.8 20 57.8 23 12	Epicenter by U.S.C.&G.S. 16° N. 148° E. Marianas Islands Region. H = 19^h 57^m 10^s Magnitude 7-1/4 by Tucson; about 7 by Pasadena. Δ = 107°.1

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 7 No. 86	e(PR_1) E ePR_2 E eS N e N F N	$04^h39^m43^s$ 04 40 35 04 45 01 04 47 45 05 18	Epicenter by U.S.C.&G.S. 36°5 N. 36° W. North Atlantic Ocean. H = $04^h\ 32^m\ 17^s$ Δ = 35°2
July 8 No. 87	eP N e N ePR_1 N M N F N	$08^h26^m31^s$ 08 27 06 08 28 47 08 53.5 09 23	Weak and doubtful. Δ about 59°.
July 8 No. 88	eP Z eP N ePR_2 N ePR_2 E eS N eS E eSR_1 E eSR_1 N L N M N F N	$12^h46^m39.1^s$ 12 46 42 12 47 35 12 47 38 12 51 36 12 51 45 12 52 40 12 52 41 12 55.9 13 00 47 14 03	Epicenter by U.S.C.&G.S. 13° N. 91° W. Off W. coast of Guatemala H = $12^h\ 40^m\ 30^s$ Magnitude 6 by Pasadena Δ = 29°7
July 8 No. 89	eP Z eS N eSR_1 N M N F N	$18^h26^m54^s$ 18 34 03 18 37 35 18 44.8 19 03	Epicenter by U.S.C.&G.S. 72° N. 0°; Arctic Ocean 200 miles east of Jan Mayen Island H = $18^h\ 18^m\ 06^s$ Δ = 48°7

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 9 No. 90	eP N eP E iP Z iP n iP e iS e L N F N	$18^h47^m45^s$ 18 47 45 18 47 45.9 18 47 46.4 18 48 00 18 49 57 18 50 59 19 54	Epicenter by U.S.C.&G.S. 33° N. 71° W. North Atlantic coast, 350 miles west of Bermuda $H = 18^h\ 44^m\ 50^s$ $\Delta = 11°.7$
July 10 No. 91	eP Z eP N eP E iP Z eP e,n ePR_1 NE ePR_1 Z ePR_1 n eSKS E eSKS e eSKS n iSKS N iPS E i N F E	$04^h07^m06^s$ 04 07 07 04 07 08 04 07 12 04 07 13 04 11 03 04 11 04 04 11 05 04 17 43 04 17 45 04 17 45.4 04 17 46 04 19 45 04 19 55 08 45	Epicenter by U.S.C.&G.S. 39° N. 71° E. Eastern Turkistan $H = 03^h\ 53^m\ 36^s$ Magnitude nearly 8 by Pasadena and Tucson. $\Delta = 96°.3$
July 10 No. 92	eP Z iSKS NE eSKS n eSKS e iSKKS N iPS N F	$16^h02^m48^s$ 16 13 19 16 13 19.3 16 13 20 16 14 01 16 15 21 Lost in the following quake.	Aftershock of preceding quake. $H = 15^h\ 49^m\ 14^s$

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 10 No. 93	eP Z	$16^h37^m25^s$	Aftershock of quake No. 91
	e N	16 37 31	
	i n	16 37 31.6	
	ePR_1 Z	16 41 26	
	ePR_1 e	16 41 27	
	e n	16 41 30.2	
	e e	16 41 56.1	
	ePR_2 N	16 43 21	
	eSKS N	16 48 04	
	eSKS n	16 48 05	
	e e	16 48 13.3	
	eSKKS N	16 48 29	
	e n	16 48 57.1	
	ePS N	16 50 11	
	F E	18 59	$H = 16^h\ 24^m\ 00^s$
July 12 No. 94	eP e	$04^h54^m53.1^s$	Δ S - P = 11?2
	eS e	04 57 18.6	
	M N	04 59 43	
	F e	05 03	$H = 04^h\ 52^m\ 11^s$
July 12		15^h47^m to 16 01	Surface waves
July 14 No. 95	e e	$19^h19^m36.9^s$	Weak and doubtful; only surface waves; distant.
	e n	19 21 19	
	e e	19 25 41.2	
	M E	19 55.0	
	F E	20 06	
July 16 No. 96	eP N	$10^h03^m35^s$	Weak; Epicenter by U.S.C.&G.S. off coast of Guatemala
	eP E	10 03 39	
	e N	10 08 42	
	eS N	10 09 28	
	eS E	10 09 32	
	L N	10 15.1	
	M N	10 18 14	
	F N	10 45	$H = 09^h\ 57^m\ 20^s$

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 18		00^h55^m to 02 34	Seismic activity
July 19		18^h04^m to 19 16	Seismic activity and surface waves
July 20 No. 97	iP Z iP ne i n F N	$22^h39^m52.7^s$ 22 39 54.6 22 43 24.5 00 25	No secondaries
July 21 No. 98	iP N iP Z iP ne ipP N eS E eS N e(PS) E esS E isPS E F E	$08^h11^m14^s$ 08 11 14.0 08 11 14.5 08 11 55 08 18 58 08 18 59 08 19 46 08 20 53 08 21 44 08 52	Epicenter by U.S.C.&G.S. 16° S. 74° W. Near southern coast of Peru. H = $08^h01^m34^s$ h about 100 km. Magnitude 6-1/2 by Pasadena. Δ = 58°1
July 23 No. 99	iS E eS E M N F N	$09^h11^m27.4^s$ 09 11 46 09 13 44 09 37	
July 23 No. 100	eP' Z e E ePR_1 Z iPR_1 e iPR_1 E iSKS NE eSKKS E (e)S E ePS e ePS E ePPS E eSR_1 E F E	$10^h45^m12^s$ 10 45 30 10 46 20 10 46 22.0 10 46 22 10 51 44 10 53 00 10 54 28 10 56 05 10 56 11 10 57 04 10 03 04 13 18	Epicenter by U.S.C.&G.S. 18°5 S. 169° E. New Hebrides Islands. H = $10^h\ 26^m\ 49^s$ h about 200 km. Magnitude 7.3 by Pasadena Δ = 116°5

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 23 No. 101	iP Z iP E iP N iS N iS E i N iPS E e E L N eM E F E	$15^h15^m27^s$ 15 15 27 15 15 29 15 25 17 15 25 18 15 25 39 15 25 49 15 27 31 15 38.2 15 40 01 18 05	Epicenter by U.S.C.&G.S. 38°5 N. 26°5 E. Near west coast of Turkey; several reported killed and injured. Destructive in Izmir and Karaburun H = 15^h 03^m 30^s Magnitude 7 by Tucson. Δ = 77°2
July 25 No. 102	eS NE ePS E eSR_1 E L E M E F E	$11^h45^m49^s$ 11 47 41 11 52 02 12 00.7 12 07.0 12 35	Weak Δ about 78° No preliminaries
July 27 No. 103	ePR_1 e e NE eS N e E ePS e ePS N ePS E ePPS NE eSR_1 N e E eSR_2 N e E i e e N e N F N	$15^h30^m51^s$ 15 31 56 15 38 41 15 40 12 15 40 22 15 40 27 15 40 29 15 41 28 15 46 42 15 46 51 15 50 53 15 51 15 15 51 55 15 54 44 16 01 58 17 59	Epicenter by U.S.C.&G.S. 29° S. 177° W. Kermadec Islands region. H = 15^h 11^m 35^s Magnitude 7 by Pasadena and Tucson. Δ = 112°5
July 28		20^h31^m to 21 01	Surface waves

Bulletin for July, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
July 30 No. 104	M N F	$22^h03.6^m$ Runs into following quake	
July 30 No. 105	M N F N	$22^h14.8^m$ 22 30	Probably from same epicenter as preceding quake.
July 31		00^h22^m to 00 36	Surface waves

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, 1949

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

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 1 No. 106	eP NE e N eS E e E eSR$_1$ N M E F E	08^{h}09^m 17^s 08 12 11 08 13 46 08 14 12 08 14 48 08 18.9 08 53	Weak; no preliminaries. Epicenter by U.S.C.&G.S. 19° N. 96° W. Near east coast of Mexico. H = 08^h 03^m 47^s Δ = 25°7
August 4		08^{h}15^m to 09 26	Surface waves
August 5 No. 107	eP Z iP e iP N eP n i N e E ePR$_2$ E eS E eSR$_2$ E F E	19^{h}16^{m}44^s 19 16 44.7 19 16 45 19 16 45.7 19 16 49 19 16 52 19 18 31 19 22 57 19 26 12 19 35	Epicenter by U.S.C.&G.S. 1° S. 78° W. Central Ecuador Several thousand killed and heavy damage. Severest at Ambato and vicinity. H = 19^h 08^m 47^s Foreshock: H = 19^h 02^m 56^s Magnitude 7 by Pasadena and Tucson. Δ = 42°3
August 6 No. 108	eP E iP e e E i e ePR$_1$ e ePR$_1$ E iSKS E eSKS E i E e E	00^{h}49^{m}36^s 00 49 37.4 00 49 39 00 49 41.5 00 53 51 00 53 54 01 00 11 01 00 14 01 00 43 01 00 47	Epicenter by U.S.C.&G.S. 19° S. 174°5 W. Tonga Islands region. H = 00^h 35^m 27^s Magnitude 7 1/2 by Pasadena and Tucson. Δ = 105°3

(continued on following page)

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 6 No. 108 (continued)	e e e Z ePS E ePS e e E eSR$_1$ E F E	01^{h}01^{m}27^s 01 01 28 01 03 04 01 03 08 01 06 52 01 09 11 04 19	
August 8 No. 109	eSKP e ePSKS E e(SR$_2$) E F E	07^{h}32^{m}35.0^s 07 42 24 07 57 27 09 05	Epicenter by U.S.C.&G.S. Indian Ocean, 1100 miles east of Madagascar. H = 07^h 09^m 05^s
August 8 No. 110	i n e N ePR$_1$ e i n e e e E e E e E F - runs into following quake	14^{h}16^{m}52.2^s 14 16 54 14 17 04.5 14 17 04.7 14 20 15 14 23 54 14 27 03 14 28 15	Epicenter by U.S.C.&G.S. 15° N. 93° W. Near southwest coast of Mexico H = 14^h 10^m 29^s Aftershock August 11, 1949: H = 13^h 49^m 53^s Δ = 28°4
August 8 No. 111	e ne i E i e i n F E	14^{h}40^{m}59.1^s 14 41 14 14 44 17.1 14 44 19.4 14 55	Weak
August 8		15^{h}42^m to 16 00	Surface waves
August 11		14^{h}02^m to 14 18	Surface waves
August 11		14^{h}58^m to 15 11	Surface waves

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 13 No. 112	ePR_1 E eSKS E F E	$18^h45^m07^s$ 18 50 48 21 17	Epicenter by U.S.C.&G.S. 0° 146° E. Admiralty Islands region. H = 18^h 24^m 49^s Magnitude 6 1/2 by Pasadena Δ = 119°7
August 17 No. 113	eP Z eP e eP E ePR_1 E ePR_1 N iSKS N i N F - lost in following quake	$18^h46^m42.3^s$ 18 46 42.9 18 46 44 18 50 03 18 50 04 18 56 59 18 57 07	Epicenter by U.S.C.&G.S. 43° N. 146° E. Near east coast of Hokkaido, Japan. Felt in north Japan. H = 18^h 34^m 07^s h = 100 km. Magnitude 6 1/2 by Pasadena. Δ = 87°3
August 17 No. 114	iP Z eP e iP n iP NE ePR1 n iPR_1 N iS N iS E iSKKS E e E eSR_1 N L N M E F N	$18^h56^m46.7^s$ 18 56 47.6 18 56 47.7 18 56 50 19 00 01.2 19 00 04 19 07 09 19 07 10 19 07 40 19 09 33 19 13 13 19 26.5 19 32.8 21 20	Epicenter by U.S.C.&G.S. 39° N. 40° E. Eastern Turkey Several killed and moderate damage. H = 18^h 44^m 15^s Magnitude 6 3/4 by Pasadena and Tucson. Δ = 84°6
August 18 No. 115	iP N iP n eP Z ePR_2 N iS E eS N L E M E F E	$13^h40^m01^s$ 13 40 01.6 13 40 01.6 13 41 16 13 45 20 13 45 22 13 48.5 13 50.5 13 54	Epicenter by U.S.C.&G.S. 8°5 N. 82°5 W. Near southwest coast of Panama. Slight damage at David. H = 13^h 33^m 25^s Magnitude 6 1/2 by Pasadena Δ = 32°9

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 22 No. 116	eP e iP Z iP N iP n iP E e E e N F N	$04^h08^m19^s$ 04 08 19.5 04 08 20 04 08 20.1 04 08 21 04 17.3 04 17.5 10 10	Very strong; only P phase could be read. Epicenter by U.S.C.&G.S. 54° N. 133° W. Queen Charlotte Islands; off coast of British Col. Widely felt with minor damage reported. Two-foot tidal wave at Ketchikan, Alaska $H = 04^h\ 01^m\ 12^s$ Magnitude 7.5 by Ottawa, 8 by Pasadena, and 8.2 by Tucson. Δ = 36°0
August 22 No. 117		06.3^h	Aftershock of No. 116 $H = 06^h\ 16^m\ 45^s$ by U.S.C.&G.S.
August 22 No. 118	L E M NE F N	$12^h39^m35^s$ 12 42 15 13 01	Aftershock of No. 116 $H = 12^h\ 21^m\ 43^s$ by U.S.C.&G.S.
August 22 No. 119	M N F N	$14^h00^m10^s$ 14 13	Aftershock of No. 116 $H = 13^h\ 40^m\ 20^s$ by U.S.C.&G.S.
August 22 No. 120	M N F N	$20^h05^m13^s$ 20 10	Aftershock of No. 116
August 23 No. 121	M NE F N	$03^h18^m45^s$ 03 38	Aftershock of No. 116 $H = 02^h\ 52^m\ 29^s$ by U.S.C.&G.S.
August 23		15^h33^m to 16 14	Seismic activity and surface waves.

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 23 No. 122	eP e eS E eS N e N e N M NE F - runs into following quake	$19^h50^m43^s$ 19 56 20 19 56 23 19 56 43 19 57 36 20 02.7	Foreshock of following quake, No. 123 H = $19^h\ 43^m\ 35^s$ Δ = 35°5
August 23 No. 123	eP NE ePR_1 E ePR_1 N eS E eS N e E eSR_1 N M N F N	$20^h32^m34^s$ 20 32 41 20 32 42 20 37 13 20 37 14 20 37 23 20 39 07 20 42 59 23 31	Epicenter by U.S.C.&G.S. 53° N. 132° W. Queen Charlotte Islands. Off coast of British Columbia; felt widely. H = $20^h\ 24^m\ 32^s$ Magnitude: 6 1/4 by Pasadena 6 3/4 by Tucson Δ = 35°5
August 24 No. 124	eS N M N F N	$06^h19^m26^s$ 06 26 02 06 52	Epicenter by U.S.C.&S.G. 43°5 N. 127° W. Off coast of Oregon. H = $06^h\ 07^m\ 14^s$
August 24		09^h39^m to 10 08	Seismic activity and surface waves.
August 24		22^h55^m to 23 10	Surface waves
August 25		04^h32^m to 05 13	Surface waves

Bulletin for August, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
August 25 No. 125	e Z e ne i Z i Z i ne i NE i e i n F N	$23^h45^m03^s$ 23 45 04.6 23 48 22 23 48 23 23 48 23.4 23 54 21 23 54 21.0 23 54 21.6 00 54	Weak
August 26 No. 126	M NE F N	$05^h46.3^m$ 06 13	Epicenter by U.S.C.&G.S. Off British Columbia H= 05^h 26^m 00^s
August 26 No. 127	M NE F N	$22^h59.4^m$ 23 11	Epicenter by U.S.C.&G.S. Off British Columbia H = 22^h 39^m 40^s
August 27 No. 128	eSR_1 E e E M E F E	$15^h08^m05^s$ 15 10 21 15 11 00 15 21	Probably off coast of British Columbia.
August 27 No. 129	eSR_1 E e E eM E F E	$21^h49^m28^s$ 21 49 39 21 52 20 21 59	Epicenter by U.S.C.&G.S. Off coast of British Columbia H = 21^h 30^m 40^s

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 September, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
September 5		07^h13^m to 07 22	Surface waves
September 7		07^h42^m to 08 09	Seismic activity
September 12 No. 130	M E F E	$10^h15.6^m$ 11 56	Epicenter by U.S.C.&G.S. 22° S. 170° E. Loyalty Islands Region H = $09^h\ 17^m\ 04^s$ Δ = 118°.4
September 14 No. 131	eP' ne ePR$_1$ E iSKP NE iSKP ne eSR$_1$ N L N M N F E	$20^h09^m36.4^s$ 20 11 38 20 12 54 20 12 54 20 28 52 21 51.5 21 00.5 23 03	Epicenter by U.S.C.&G.S. 1° N. 126° E. Celebes Region H = $19^h\ 50^m\ 15^s$ Magnitude 7 1/4 by Pasadena and Tucson Δ = 131°.4
September 16 No. 132	M N F N	$16^h00.6^m$ 16 06	
September 16 No. 133	eSKP ne iSKP NE	$19^h33^m47.5^s$ 19 33 48	Epicenter by U.S.C.&G.S. 1° N. 126° E. Celebes Region H = $19^h\ 11^m\ 07^s$ Δ = 131°.4

Bulletin for September, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
September 16 No. 134	$e(SR_1)$ N eM N F N	$20^h58^m48^s$ 21 00 53 21 31	
September 17		02^h46^m to 03 00	Seismic activity and surface waves
September 20 No. 135	eSKS E e E ePS NE e E eSR_1 N e N e N L E M E F E	$12^h20^m41^s$ 12 20 57 12 24 33 12 24 44 12 30 41 12 38 03 12 38 37 12 48.2 12 57.1 13 43	Epicenter by U.S.C.&G.S. 30° S. 178° W. Kermadec Islands $H = 11^h\ 55^m\ 20^s$ Magnitude 6 3/4 - 7 by Pasadena $\Delta = 114°3$
September 21 No. 136	eP NEZ iP e iP n e e e N i N i(S) E i(S) E F E	$13^h00^m48^s$ 13 00 49.0 13 00 49.5 13 00 55 13 01 15 13 01 17.7 13 05 15 13 06 03 14 19	Epicenter by U.S.C.&G.S. 17° N. 94°5 W. Southern Mexico $H = 12^h\ 55^m\ 05^s$ $\Delta = 27°0$ The records show an unusual amount of high frequency motion.
	The vertical record shows the following distinct phases that may be successive shocks:		
	iP Z iS E i E	$13^h06^m15.2^s$ 13 11 20 13 12 11	
	iP Z	13 06 33.1	
	iP Z	13 06 39.5	
	iP Z	13 07 19.8	
	iP Z	13 07 28.1	

Bulletin for September, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
September 24 No. 137	ePR_1 E iSKS E ePS E ePS N M E F E	$04^h37^m53^s$ 04 43 27 04 47 35 04 47 41 05 17.1 07 08	Epicenter by U.S.C.&G.S. 6° S. 154° E. Solomon Islands Region H = 04^h 17^m 38^s Magnitude: 7 by Pasadena 7 1/4 by Tucson Δ = 119°7 Aftershocks: September 25: H = $15^h15^m00^s$ September 25: H = $15^h57^m32^s$ Magnitude by Pasadena - 6 1/2 September 26: H = $03^h05^m11^s$ September 26: H = $08^h04^m13^s$ September 26: H = $22^h32^m00^s$
September 25	V	16^h09^m to 17 09	Surface waves
September 26	V	04^h04^m to 04 40	Surface waves (See No. 137)
September 26	V	08^h03^m to 08 42	Surface waves
September 27 No. 138	eP Z eP e iP N eP Z eP ne i NEZ ePR_2 NE iS E iS N eSR_1 N	$15^h38^m54^s$ 15 38 55 15 38 56 15 38 58 15 38 58.5 15 39 07 15 40 57 15 45 29 15 45 34 15 48 25	Epicenter by U.S.C.&G.S. 60° N. 149° W. Southern Alaska; felt at Anchorage H = 15^h 30^m 43^s Magnitude: 7 by Pasadena 7 1/4 by Tucson Δ = 44°5

(Continued on following page)

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

October, 1949

	Component EW				Component NS			
Hour / Date	0	6	12	18	0	6	12	18
1	07	06	07	08	07	05	06	09
2	09	10	10	09	10	12	12	11
3	09	06	07	06	07	08	06	05
4	05	07	07	05	06	07	05	09
5	08	09	09	12	10	08	12	13
6	14	16	21	13	22	30	26	25
7	12	12	13	09	17	15	14	14
8	11	12	10	12	12	13	14	14
9	11	09	07	07	11	10	08	06
10	03	04	03	06	06	03	04	04
11	07	04	14	33	06	07	22	61
12	22	23	14	10	32	27	17	13
13	11	12	12	08	19	13	12	15
14	10	10	09	07	15	17	10	10
15	09	09	12	07	10	10	12	09
16	11	10	16	13	12	12	17	17
17	09	11	12	10	14	13	13	21
18	10	06	10	11	20	13	17	14
19	10	12	10	12	15	11	12	12
20	05	08	05	07	12	10	12	09
21	03	03	04	05	09	07	NR	06
22	04	03	03	05	05	04	05	07
23	03	06	09	12	07	08	12	14
24	14	13	14	16	22	22	26	32
25	23	21	17	12	40	29	23	16
26	09	07	03	03	10	07	NR	05
27	03	03	10	13	05	08	12	17
28	14	21	18	14	20	20	23	17
29	21	17	13	11	16	19	15	12
30	12	12	12	17	08	11	10	12
31	24	21	25	10	16	15	13	14

NR No Record

Bulletin for September, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
September 27 No. 138 (continued)	e E i ne i N M N M E F N	$15^h48^m36^s$ 15 48 46.5 15 48 58 15 53.0 15 53.2 19 30	
September 30 No. 139	M E	$04^h54.7^m$	Epicenter same as following quake H = 03^h 58^m 52^s Magnitude 6 1/2 by Pasadena Δ = 108°
September 30 No. 140	eP E e N e E ePR$_1$ E M E F E	$04^h23^m55^s$ 04 25 32 04 27 05 04 28 36 04 54.7 06 44	Epicenter by U.S.C.&G.S. 23° S. 176° W. Tonga Islands Region H = 04^h 09^m 44^s Δ = 108° Aftershocks: September 30: H = $18^h19^m35^s$ H = $22^h16^m55^s$
September 30		15^h05^m to 16 58	Surface waves
September 30		18^h47^m to 20 23	Seismic activity, mainly surface waves waves. Aftershock of No. 139 and 140.
September 30 No. 141	ePR$_1$ E eSKS E L E F E	$22^h35^m19^s$ 22 41 21 23 04 52 23 56	Aftershock of No. 139 and 140 H = 22^h 16^m 55^s Δ = 108°

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

September, 1949

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	02	01	02	01	03	02	02	02
2	01	02	03	05	03	03	02	06
3	05	05	06	06	08	07	10	10
4	06	04	03	05	12	07	05	05
5	03	04	02	02	04	03	03	05
6	03	04	03	03	04	04	03	04
7	03	04	04	03	04	04	03	03
8	02	02	02	02	04	03	02	04
9	03	03	04	07	05	04	06	06
10	06	10	01	12	10	13	12	14
11	10	22	51	30	15	28	42	33
12	14	15	12	07	16	13	09	08
13	06	09	06	NR	08	10	07	NR
14	07	06	07	07	10	09	09	08
15	09	07	04	04	09	06	04	04
16	04	07	03	03	05	07	07	06
17	03	03	03	02	04	04	03	03
18	03	09	05	06	08	10	07	07
19	07	09	05	05	08	10	08	09
20	03	05	05	05	06	05	06	09
21	05	07	06	04	10	09	10	04
22	03	04	05	05	05	05	03	06
23	08	10	05	05	05	10	08	06
24	02	05	04	07	04	03	08	09
25	08	19	19	28	10	22	29	30
26	15	13	15	09	21	19	12	10
27	10	03	09	04	08	06	07	08
28	07	06	04	04	07	09	08	09
29	06	08	09	09	10	06	09	10
30	06	10	11	10	11	13	10	07

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.

Bulletin for October, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 4 No. 142	eP n eP Z	$10^h09^m43.1^s$ 10 09 46	Epicenter by U.S.C.&G.S. 30° N. 70° W. Northern Chile. H = $09^h58^m24^s$ Δ = 72°0
October 4 No. 143	eP Z iP N iP E eP e i e iS N iS E ePS N eSR$_1$ E eL E F E	$10^h31^m31.0^s$ comp 10 31 31 10 31 31 10 31 31.3 10 31 45.7 10 40 34 10 40 35 10 40 56 10 44 59 10 52 32 12 22	Comp. from S.W. Epicenter by U.S.C.&G.S. 1° S. 21°W. Mid-Atlantic Ocean. H = $10^h20^m23^s$ Magnitude 6 1/4 by Pasadena. Δ = 68°8
October 7 No. 144	eP' Z eP' N eP' Z eP' e eP' n e Z e e i N e N eSKP NE e E iSR$_1$ N M E F N	$12^h22^m02.3^s$ 12 22 04 12 22 04.2 12 22 04.4 12 22 04.5 12 22 06.3 12 22 06.9 12 22 15 12 22 32 12 25 31 12 26 08 12 44 32 13 26.0 14 41	Epicenter by U.S.C.&G.S. 33° S. 56°5 E. Indian Ocean, 1000 miles southeast of Madagascar. H = $12^h02^m19^s$ Magnitude 7 by Pasadena Δ = 146°7

Bulletin for October, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 20 No. 148 (continued)	eS N e N e E ePS N e E ePPS N e N eSR_1 E L E M E F E	$13^h12^m50^s$ 13 13 52 13 14 31 13 14 45 13 15 15 13 16 24 13 21 13 13 21 22 13 40.1 13 46.9 15 27	
October 21 No. 149	ePKS N eSKS E ePS E e(PPS) E eSR_1 E M E F E	$22^h00^m03^s$ 22 00 04 22 04 24 22 05 56 22 10 54 22 36 44 00 25	Epicenter by U.S.C.&G.S. 5°5 S. 154° E. Solomon Islands region. H = $21^h34^m16^s$
October 26 No. 150	e E M E F E	$09^h44^m53^s$ 10 20.7 11 13	
October 27 No. 151	eS E M NE F E	$08^h34^m57^s$ 08 39 22 09 16	Epicenter by U.S.C.&.G.S Gulf of California. H = $08^h24^m15^s$
October 31 No. 152	eP NZ iP Z eP neE i n i e i N i Z iPR_2 E e N e N (continued on next page)	$01^h46^m46^s$ 01 46 47 01 46 47 01 46 53.8 01 46 54.0 01 46 55 01 46 55.1 01 48 22 01 52 24 01 52 29	Epicenter by U.S.C.&G.S. 56° N. 135° W. 70 miles S. of Sitka, Alaska. Felt at Sitka. H = $01^h39^m32^s$ Magnitude 6 3/4 by Pasadena. Δ = 39°9 Records indicate a multiple shock.

Bulletin for October, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 13 No. 145	eM E F E	$04^h29^m21^s$ 05 28	Epicenter by U.S.C.&G.S. Samoa Islands region H = $03^h35^m25^s$
October 16 No. 146	i n i e iS e iS n F e	$23^h36^m25.9^s$ 23 36 26.0 23 36 53.5 23 36 53.7 23 41	Reported felt in Ottawa, Canada
October 19 No. 147	(e)P E iP' Z eP e eP' n ePR_1 E iPR_1 NE e E eSKS E iSKKS E iPS E i N i E eSR_1 N iSR_2 E F E	$21^h16^m13^s$ 21 19 44.1 21 19 44 21 19 45 21 20 40 21 21 08 21 25 48 21 26 21 21 27 44 21 30 35 21 36 32 21 36 51 21 37 03 21 41 23 01 49	Epicenter by U.S.C.&G.S. 5°5 S. 154° E. Solomon Islands region. H = $21^h00^m11^s$ Magnitude 6 3/4 by Pasadena; 7 1/4 by Strasbourg. Phases check poorly Δ = 119°7 Aftershock Oct. 20: H = $12^h44^m54^s$
October 20 No. 148	ePR_1 E ePR_1 Z e e e E e Z e N e E eSKS N eSKS E e E eSKKS E eSKKS N	$13^h04^m58^s$ 13 05 02 13 05 08 13 05 22 13 05 26 13 05 59 13 06 02 13 10 27 13 10 29 13 11 37 13 11 55 13 11 57	Aftershock of No. 147 by U.S.C.&G.S. H = $12^h44^m54^s$ Magnitude 6 1/2 by Pasadena. Δ = 119°7

(continued on next page)

Bulletin for October, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
October 31 No. 152 (continued)	eS NE	$01^h52^m37^s$	
	e E	01 52 47	
	eSR_2 N	01 55 18	
	i E	01 55 31	
	e E	01 57 23	
	i n	01 59 06	
	eM E	01 59 07	
	iM N	01 59 24	
	F E	03 25	
October 31 No. 153	$e(PR_1)$ E	$18^h16^m03^s$	Epicenter by U.S.C.&G.S. 5° S. 152°5 E. New Britain region. $H = 17^h55^m35^s$ $h = 100$ km. $\Delta = 119°7$ Record weak
	(e)(SKKS) E	18 21 47	
	ePPS N	18 26 19	
	epPPS N	18 27 05	
	$e(SR_1)$ N	18 30 39	
	e N	18 30 57	
	F N	19 36	

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 November, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
November 3 No. 154	eP e eP n eP n i e i e i e iSKS n iS e i e i e F N	$01^h24^m16.1^s$ 01 24 17.2 01 24 18.8 01 24 28.0 01 25 15.8 01 25 23.4 01 33 57.9 01 33 58.1 01 34 12.3 01 34 20.1 02 27	Epicenter by U.S.C.G.S. 48°5 N. 154° E. Kurile Islands H = $01^h\ 12^m\ 37^s$ h about 200 km. Magnitude 6.5 - 7 by Pasadena. Δ = 78.3
November 4 No. 155	e N e N e E e E i E F E	$20^h54^m23^s$ 20 57 20 20 58 08 21 00 40 21 00 50 21 11	Epicenter by U.S.C.G.S. 32° N. 116°5 W. Lower California; felt at San Diego. H = $20^h\ 42^m\ 38^s$ Magnitude 5.5 by Pasadena. Δ = 29°3 Aftershock: Nov. 5, $04^h\ 35^m\ 24^s$ Magnitude 5 by Pasadena.
November 7 No. 156	eSKS E eS N ePS N e(SR_1) N eSR_2 N M N F N	$06^h25^m14^s$ 06 27 18 06 29 20 06 35 48 06 38 54 06 57.9 09 09	Epicenter by U.S.C.G.S. 14° N. 166°5 E. New Hebrides Region. H = $05^h\ 59^m\ 35^s$ Magnitude 6 3/4 by Pasadena. Δ = 115°5

Bulletin for November, 1949

Gnwch. Date and Number	Phase and Component		G. M. C. T.	Remarks
November 11 No. 157	e(P)	n	$17^h05^m45^s$	Epicenter by U.S.C.G.S. 15°5 N. 93° W. Off coast of N. Guatemala. H = $16^h\ 59^m\ 28^s$ Δ about 28°
	ePR_1	e	17 06 20.9	
	(e)S	e	17 10 19.6	
	eSR_1	e	17 12 19	
	e	N	17 12 24	
	e(M)	N	17 18 56	
	F	N	17 29	
November 13 No. 158	eP	Z	$04^h48^m53^s$ comp	Epicenter by U.S.C.G.S. 11° N. 86° W. Near S.W. coast of Nicaragua. H = $04^h\ 42^m\ 35^s$ Δ = 30°6
	iP	Z	04 48 53.1 dil	
	iP	n	04 48 53.1	
	iP	n	04 48 53.6	
	eP	N	04 48 54	
	eP	E	04 48 54	
	eP	e	04 48 54.2	
	ePR_1	N	04 49 45	
	ePR_2	N	04 50 06	
	iS	N	04 54 09	
	e	N	04 54 38	
	eL	N	04 58 24	
	eM	N	05 00 51	
	F	N	05 44	
November 20 No. 159	eP	e	$07^h15^m40.3^s$	Epicenter by U.S.C.G.S. 28°5 N. 112° W. Gulf of California. Felt in Sonora, Mexico. H = $07^h\ 09^m\ 45^s$ Magnitude 6 3/4 by Pasadena. Δ = 28°3
	eP	e	07 15 45.4	
	eP	Z	07 15 45.6 comp	
	iS	N	07 20 34	
	i	N	07 21 22	
	iSR_1	N	07 21 56	
	L	N	07 23.1	
	iM	n	07 24 50	
	F	N	09 38	
November 22 No. 160	ePR_1	e	$01^h11^m00.5^s$	Epicenter by U.S.C.G.S. 29° S. 178° W. Kermadec Islands Region. H = $00^h\ 51^m\ 32^s$ Magnitude 7 1/4 to 7 1/2 by Pasadena. Δ = 113°2
	ePR_1	Z	01 11 02	
	ePR_1	E	01 11 06	
	ePR_1	e	01 11 07	
	ePR_1	E	01 11 08	
	eSKS	E	01 16 38	
	eSKS	e	01 16 39.5	
	eSKKS	E	01 17 45	
	eS	NE	01 18 40	
	iPS	E	01 20 54	
	e	N	01 26 15	

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Bulletin for November, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
November 22 No. 160 (continued)	eSR_1 N M N F N	$01^h26^m35^s$ 01 42.4 03 48	
November 22 No. 161	eM N F N	$09^h44^m42^s$ 09 49	Epicenter by U.S.C.G.S. Gulf of California. Δ about 28°
November 23 No. 162	eP Z eP n eP e eP Z eP n eS E eL E eM E F E	$06^h19^m44^s$ dil 06 19 45.1 06 19 48.7 06 19 50 dil 06 19 50.1 06 23 47 06 25 10 06 26 36 06 52	Epicenter by U.S.C.G.S. 19° N. 78°5 W. Off N.W. coast of Jamaica. H = $06^h14^m39^s$ Δ = 22°7 M waves large and well defined on EW component.
November 27 No. 163	ePR_1 Z ePR_1 Z iPR_1 e eSKS E eSKS e iS e iS N ePS E e E eSR_1 E M E F - runs into following quake.	$09^h00^m26.3^s$ 09 00 26.7 09 00 26.7 09 06 55 09 06 56 09 08 03.6 09 08 04 09 09 35 09 11 35 09 15 25 09 33.4	Epicenter by U.S.C.G.S. 18° S. 173° W. Tonga Islands Region. H = $08^h42^m16^s$ Δ = 103°2
November 27 No. 164	e E e E M E F E	$10^h51^m06^s$ 10 52 51 10 59.4 11 40	Probable aftershock of preceding quake.

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

November, 1949

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	NR	NR	NR	NR	12	12	11	22
2	NR	NR	NR	NR	32	46	47	NR
3	NR	NR	NR	NR	NR	22	22	15
4	NR	NR	NR	NR	15	12	10	NR
5	NR	NR	NR	NR	NR	NR	NR	13
6	NR	NR	NR	NR	10	09	08	05
7	NR	NR	NR	NR	08	10	08	11
8	10	11	11	13	11	12	11	09
9	10	11	NR	44	10	10	23	52
10	52	41	32	30	46	35	36	34
11	22	27	22	22	30	32	30	23
12	19	23	13	12	21	22	21	13
13	11	12	12	12	10	11	10	12
14	18	18	20	19	17	19	20	26
15	19	41	33	34	25	27	25	35
16	37	41	37	32	33	32	27	22
17	31	22	NR	16	22	22	20	12
18	14	15	14	NR	14	11	12	12
19	NR	NR	NR	19	12	13	NR	14
20	20	14	10	13	10	10	14	17
21	13	14	13	10	14	12	12	12
22	11	13	15	13	11	17	20	21
23	14	15	20	21	17	24	24	32
24	40	44	43	40	37	48	48	43
25	30	30	26	20	34	32	32	30
26	15	16	17	27	21	20	20	29
27	30	20	30	32	34	32	37	33
28	32	23	23	17	31	24	30	26
29	24	19	12	11	24	23	16	13
30	11	09	08	07	13	13	10	07

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. 63.
Two Sprengnether short-period horizontal.

Bulletin for December, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 5 No. 165	eP N M N F N	$11^h28^m18.4^s$ 11 41.6 11 51	Epicenter by U.S.C.G.S. 6° N., 84°5 W. Pacific Ocean, south of Panama. H = $11^h21^m34^s$ Δ = 35°4 Record weak.
December 5 No. 166	iP n eP n eP e e E e E M E F E	$12^h49^m12.6^s$ 12 49 17.3 12 49 18.5 12 51 57 12 54 00 13 01.8 13 37	Epicenter by U.S.C.G.S. 6° N., 84°5 W. Pacific Ocean south of Panama. H = $12^h42^m13^s$ Δ = 35°4 Record weak.
December 7 No. 167	i en e E e e e e F E	$09^h19^m52.9^s$ 09 19 56 09 27 13 09 27 23 09 38	Record weak. Motion ragged. Possibly all surface waves.
December 10 No. 168	eP Z eP n eP e iP e iP n iP E eS e eS n iS E M E F E	$19^h25^m28^s$ comp 19 25 28.5 19 25 28.5 19 25 28.9 19 25 28.9 19 25 31 19 33 18 19 33 19 19 33 22 19 46.5 20 47	Δ S - P = 55°5 H = $19^h15^m56^s$ Compression from N.W.

Bulletin for December, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 17 No. 169	eP Z eP e eP Z eP e eP n ePR$_1$ N eSKS N eS E e N iSR$_1$ E i E M N F N	$07^h06^m58^s$ dil 07 06 58.8 07 07 03 07 07 03.9 07 07 04.1 07 10 37 07 17 29 07 18 26 07 18 33 07 25 17 07 25 48 07 41.1 11 18	Epicenter by U.S.C.G.S. 54° S., 71° W. Southern Magallanes Province, Punta Arenas. H = 06^h 53^m 29^s Magnitude 7 1/4 by Pasadena. Δ = 96°.2 Foreshock of following quake.
December 18 No. 170	eP Z eP N eP n e N iPR$_1$ N i N i N eSKS E ePS N e E i E iSR$_1$ E M n F N	$15^h21^m21^s$ dil 15 21 21 15 21 21.5 15 22 56 15 25 16 15 25 59 15 31 54 15 32 32 15 34 00 15 34 05 15 36 06 15 39 22 15 56.1 19 30	Epicenter by U.S.C.G.S. 54° S., 71° W. Southern Magallanes Province, 50 miles south of Punta Arenas. H = 15^h 07^m 53^s Magnitude 7 1/2 by Pasadena. Δ = 96°.2 Preceding quake, No. 169, is foreshock of this quake.
December 21 No. 171	i n eS E eSR$_1$ N e N F N	$12^h38^m11.3^s$ 12 41 21 12 41 37 12 42 55 13 13	Epicenter by U.S.C.G.S. 18°.5 N. 67° W. Near Puerto Rico. H = 12^h 31^m 19^s h = 100 km. Δ = 26°.0 Record weak.
December 21 No. 172	iP N iP neZ iP NE ePR$_1$ N e N	$19^h42^m37^s$ 19 42 37.3 dil 19 42 39 19 45 10 19 45 39	Epicenter by U.S.C.G.S. 20° S., 64° W. Southern Bolivia. H = 19^h 33^m 00^s h = 600 km.

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Bulletin for December, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 21 No. 172 (continued)	iS NE iS e iS n i e i E e N F E	$19^h50^m18^s$ 19 50 20.9 19 50 22.5 19 50 35 19 51 31 19 51 32 20 15	Magnitude 6 1/2 by Pasadena. Δ = 64°8 Preliminaries very sharp but no deep phases.
December 22 No. 173	eP Z iP N iP Z eP E ipP n epP e ipP N i N iS N esS N iSR_1 NE i N i E F E	$09^h36^m28.0^s$comp 09 36 29 09 36 29.2 dil 09 36 32 09 36 46.2 09 36 49 09 36 50 09 40 36 09 41 10 09 41 51 09 42 03 09 42 38 09 44 27 10 43	Epicenter by U.S.C.G.S. 16° N., 93° W. Chiapas, Mexico. H = 09^h 30^m 47^s h = 100 km. Magnitude 6 1/2 by Pasadena. Δ = 27°0
December 25 No. 174	eM N F N	$22^h58^m37^s$ 23 12	Epicenter by U.S.C.G.S. 19°5 N. 104° W. Colima, Mexico. H = 22^h 40^m 45^s Δ = 29°4 Record weak.
December 26 No. 175	e N M E F E	$23^h49^m25^s$ 00 15.2 00 32	Epicenter by U.S.C.G.S. 37° N. 139° E. Honshu, Japan. Felt; several killed; very extensive property damage reported. H = 23^h 24^m 53^s Magnitude 6.75 by Pasadena. Δ = 93°6 Foreshock: H = 23^h 17^m 31^s

Bulletin for December, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 26 No. 176	ePS N ePPS N eSR$_1$ N L E M E F E	06^{h}50^{m}17^s 06 52 03 06 57 38 07 16.2 07 22 32 09 01	Epicenter by U.S.C.G.S. 14°S. 180° Fiji Islands Region. H = 06^h 23^m 54^s Magnitude 7 by Pasadena. Δ = 106°5
December 27		16^{h}43^m to 17 51	Seismic activity.
December 28 No. 177	ePR$_1$ Z iPR$_1$ N iPR$_1$ E e NE ePR$_2$ E i N eSKS N i N eS E i N iSR$_1$ E L N M N F N	00^{h}16^{m}33^s dil 00 16 33 00 16 35 00 17 05 00 19 03 00 21 58 00 22 36 00 24 12 00 24 18 00 32 16 00 32 28 00 50.5 00 55.4 02 52	Epicenter by U.S.C.G.S. 60° S. 22° W. Sandwich Islands. H = 23^h 57^m 13^s Magnitude 7.2 by Pasadena. Δ = 113°0
December 29 No. 178	e Z ePR$_1$ Z e Z e Z eS E ePS E ePS N ePPS N M N F N	03^{h}23^{m}11^s 03 23 55 03 24 08.7 03 24 26.7 03 32 07 03 33 44 03 33 46 03 34 49 04 16.1 06 14	Epicenter by U.S.C.G.S. 18°5 N. 121° E. Northern tip of Luzon, Philippine Islands. Felt. Extensive property damage reported. H = 03^h 03^m 55^s Magnitude 7.4 by Pasadena. Δ = 116°5 Agreement poor.

Bulletin for December, 1949

Gnwch. Date and Number	Phase and Component	G. M. C. T.	Remarks
December 29 No. 179	eS N e N e N e(SR_1) N M N F N	$17^h09^m32^s$ 17 10 20 17 16 40 17 17 47 17 34.2 18 35	Epicenter by U.S.C.G.S. 27° S., 176°5 W. Kermadec Islands Region. H = $16^h\ 42^m\ 56^s$ h = 200 km. Magnitude 6.5 by Pasadena. Δ = 111° 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

December, 1949

	Component EW				Component NS			
Date \ Hour	0	6	12	18	0	6	12	18
1	05	07	07	13	05	07	09	22
2	21	23	25	15	22	28	24	30
3	16	15	12	20	13	19	13	20
4	29	30	24	12	25	32	33	23
5	13	14	19	15	19	20	16	22
6	18	21	13	15	24	24	22	19
7	19	13	19	18	21	24	28	30
8	20	20	14	22	22	22	27	30
9	23	37	105	54	26	51	86	70
10	25	13	14	11	41	22	16	10
11	10	07	07	06	12	12	09	08
12	05	05	06	07	07	05	05	09
13	04	04	05	08	07	08	08	05
14	09	11	11	10	09	11	12	12
15	22	15	18	17	12	13	12	12
16	13	20	20	12	13	13	11	11
17	12	11	13	11	11	10	11	NR
18	10	11	18	10	07	10	11	10
19	07	09	09	10	09	07	14	13
20	11	12	20	23	11	12	18	20
21	22	12	09	08	22	12	19	03
22	06	10	07	11	10	04	08	10
23	10	09	07	07	10	09	05	04
24	14	12	13	13	11	11	12	13
25	12	12	12	16	07	11	09	14
26	14	20	23	17	19	23	19	12
27	14	11	12	11	12	11	10	12
28	12	08	08	12	07	08	05	11
29	10	17	17	38	12	11	13	21
30	66	79	62	80	64	67	65	51
31	56	42	37	50	41	33	42	43

NR = No Record