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THE MINERAL INDUSTRIES EXPERIMENT STATION

College of Mineral Industries

THE PENNSYLVANIA STATE UNIVERSITY

DEPARTMENT OF GEOPHYSICS AND GEOCHEMISTRY

SEISMOGRAPH REPORT XXIX

January - December

1959

University Park, Pennsylvania

PENNSYLVANIA'S
COLLEGE OF MINERAL INDUSTRIES

Division of Earth Sciences

Geology - Mineralogy - Geophysics - Geochemistry - Meteorology - Geography

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Ceramic Technology
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THE PENNSYLVANIA STATE UNIVERSITY
MINERAL INDUSTRIES EXPERIMENT STATION
GEOPHYSICAL LABORATORY
Project C-19

Seismograph Report XXIX
January-December 1959
College of Mineral Industries
Department of Geophysics and Geochemistry
University Park, Penna., U.S.A.

Locality: The station is located in a vault under the central wing of the College of Mineral Industries Building. The instruments are mounted on a concrete pillar separated from the foundations and anchored to bedrock (dolomite). The geographic coordinates are:

$\phi = 40^{\circ}\ 48'$ N $\lambda = 77^{\circ}\ 52'$ W H = 354 m

The geocentric coordinates are (courtesy of Gutenberg and Richter):

A = $40^{\circ}\ 36'$ N $\lambda = 77^{\circ}\ 52'$ W H = + 3 km.

Please address all communications to:
Geophysical Laboratory
220 Mineral Sciences Bldg.
University Park, Pennsylvania, U.S.A.

During 1959 three seismographs were in continuous operation except for brief intervals during repairs, adjustments and record changing. All components were recorded photographically at a rate of 1.56 cm/min. The east-west component was recorded also by a pen galvanometer at a rate of 1.70 cm/min. The free periods of the instruments when last measured (Seis. 3 June; Galv. 26 Aug.; Damp. 31 Aug. 1958) were:

Component	Seismometer Period	Galvanometer Period	overall damping A_1/A_2 cycle
North-South	11 sec	2.3 sec	1.9
East-West	12 sec	3.65 sec	3.7
Vertical	2.6 sec	4.0 sec	3.1

Adjustments were made on the vertical component instrument on 20 April and on the north-south instrument on 19 October which may have resulted in changes in their period and damping.

The time is controlled by a Stromberg clock, which is compared daily with signals from radio station WWV. The time accuracy of the records is estimated to be about ± 2 seconds.

Epicenter locations, origin times and focal depths reported below are thru the courtesy of the United States Coast and Geodetic Survey.

Date	Phase	and component	G.M.C.T.	Remarks
Jan., 1959		E		Seismic activity observed between the hours of 02:32 and 02:40
Jan., 1959		E		Seismic activity observed between the hours of 08:24 and 09:01
Jan., 1959	iP	N, Z	01 : 39 : 51	Epicenter 15-1/2° N, 61° W
	isP	N, Z	01 : 40 : 15	Windward Islands
	iPP	N, Z	01 : 40 : 41	0 = 01 : 33 : 48
	eS	E	01 : 44 : 32	h = about 100 km.
	iScP	Z	01 : 46 : 14	Δ = 3250 km.
Jan., 1959	iP	N, Z	07 : 28 : 20	Epicenter 15° N, 90° W
	iPP	N, Z	07 : 29 : 19	Guatemala
	iS	N,E,Z	07 : 32 : 51	0 = 07 : 22 : 40
				h = about 200 km.
				Δ = 3100 km.

Date	Phase and component		G.M.C.T	Remarks
13 Jan., 1959		E		Seismic activity observed between the hours of 02:14 and 02:40
13 Jan., 1959	iP	N,Z	08 : 40 : 34	Epicenter 9°N, 83-1/2° W
				Costa Rica region
				0 = 08 : 34 : 08
				h = about 100 km
				Δ = 3550 km
16 Jan., 1959	iP	N,Z	01 : 41 : 37	Epicenter 52° N, 171° W
				Fox Islands, Aleutian Islands
	eS	N,E	01 : 49 : 51	0 = 01 : 31 : 25
				h = about 60 km.
				Δ = 6800 km.
16 Jan., 1959				Seismic activity observed starting 17 : 06 : 46
18 Jan., 1959		E		Seismic activity observed between the hours of 15:47 and 15:57
22 Jan., 1959	iP	Z	05 : 23 : 47	
	i	N,Z	05 : 24 : 13	
	e		05 : 34 : 40	
	iS	E	05 : 34 : 49	
	iSS	E	05 : 41 : 16	Δ = 10500 km.
24 Jan., 1959	iP	N,Z	19 : 48 : 23	Epicenter 15° N, 92-1/2° W
	i	N,Z	19 : 48 : 45	Mexico-Guatemala border
				0 = 19 : 42 : 20
				Δ = 3200 km.
24 Jan., 1959	- P	N,Z	20 : 02 : 59	Epicenter 37-1/2° N, 24-1/2° W
	iS	E	20 : 09 : 21	Azores Islands
				0 = 19 : 55 : 14
				Δ = 4550 km.
27 Jan., 1959	eP	N,Z	00 : 25 : 35	Epicenter 18° N, 68-1/2° W
	epP	N	00 : 25 : 52	Eastern Dominican Republic
	isP	N,Z	00 : 26 : 07	0 = 00 : 20 : 22
	esS	E	00 : 30 : 22	h = about 100 km.
				Δ = 2700 km.

Date	Phase and component		G.M.C.T.	Remarks
28 Jan., 1959	iP	N,Z	10 : 15 : 31	Epicenter 30-1/2° S, 79° W
	eS	N,E	10 : 24 : 48	Juan Fernandez Islands region
				O = 10 : 04 : 10
				Δ = 7900 km.
29 Jan., 1959		E		Seismic activity observed between the hours of 07:06 and 07:20
29 Jan., 1959	iP	N,Z	20 : 31 : 54	Epicenter 52° N, 174° W
	eS	N,E	20 : 40 : 19	Andreanof Islands, Aleutian Islands
				O = 20 : 21 : 27
				Δ = 6950 km.
29 Jan., 1959	iP	N,Z	21 : 08 : 45	Epicenter 52° N, 174° W
				Andreanof Islands, Aleutian Islands
				O = 20 : 58 : 18
				Δ = 6950 km.
29 Jan., 1959	iP	N,Z	23 : 33 : 33	Epicenter 71° N, 8° E
	eS	N	23 : 40 : 50	Off coast of Norway
				O = 23 : 24 : 30
				Δ = 5650 km.
30 Jan., 1959		E		Seismic activity observed between the hours of 01:21 and 01:52
30 Jan., 1959		N,E,Z		Seismic activity observed between the hours of 05:26 and 05:32
30 Jan., 1959	iP	N,Z	16 : 26 : 50	Epicenter 26-1/2° S, 71° W
	i	N,Z	16 : 27 : 04	Near coast of Chile
	eS	N,E	16 : 35 : 47	O = 16 : 15 : 58
				h = about 100 km.
				Δ = 7450 km.
30 Jan., 1959	iP	N,Z	20 : 51 : 53	Epicenter 44° N, 144° E
				Hokkaido, Japan
				O = 20 : 38 : 58
				Δ = 9750 km.

Date	Phase and component		G.M.C.T.	Remarks
30 Jan., 1959	iP	N,Z	22 : 29 : 42	Epicenter 44° N, 144° E
	eS	E	22 : 40 : 20	Hokkaido, Japan
				0 = 22 : 16 : 47
				Δ = 9750 km.
6 Feb., 1959	iP	N,Z	14 : 43 : 35	Epicenter 51° N, 175-1/2° W.
	ipP	N,Z	14 : 43 : 51	Andreanof Islands, Aleutian Islands
	eS	E	14 : 52 : 06	0 = 14 : 33 : 02
				h = about 60 km.
				Δ = 7100 km.
7 Feb., 1959	iP	N,E,Z	09 : 45 : 04	Epicenter 4° S, 81-1/2° W
	i	N,Z	09 : 50 : 41	Near coast of northern Peru
	i	N	09 : 51 : 24	0 = 09 : 36 : 51
	iS	N,E,Z	09 : 51 : 37	Δ = 4950
8 Feb., 1959	iP	N,E,Z	01 : 09 : 25	Epicenter 49° N, 28-1/2° W.
	eS	N,E	01 : 14 : 59	North Atlantic Ocean
				0 = 01 : 02 : 26
				Δ = 3950 km.
9 Feb., 1959		E		Seismic activity observed between the hours of 05:14 and 06:00
11 Feb., 1959	eP	N,Z	13 : 58 : 28	Epicenter 16° N, 97° W
				Near coast of Oaxaca, Mexico
				0 = 13 : 52 : 13
				Δ = 3300 km.
15 Feb., 1959		E		Seismic activity commencing 04 : 24 : 31
16 Feb., 1959	eP	N	00 : 47 : 27	Epicenter 1° S, 81-1/2° W
	eS	E	00 : 53 : 43	Near coast of Ecuador
				0 = 00 : 39 : 32
				Δ = 4650 km.
16 Feb., 1959		E		Seismic activity observed between the hours of 18:10 and 18:17

Date	Phase and component		G.M.C.T.	Remarks
17 Feb., 1959	i	Z	12 : 13 : 23	Epicenter 51-1/2° N, 171° W
	iP	N,E,Z	12 : 13 : 27	Fox Islands, Aleutian Islands
	i	N,Z	12 : 13 : 48	0 = 12 : 03 : 05
	ePP	N,Z	12 : 15 : 42	Δ = 6800 km.
	iS	N	12 : 21 : 45	
17 Feb., 1959		N,E,Z		Seismic activity observed between the hours of 20:30 and 20:37
20 Feb., 1959	iP	N,Z	18 : 22 : 01	Epicenter 15-1/2° N, 91° W
	eS	E	18 : 27 : 09	Guatemala
				0 = 18 : 16 : 22
				h = about 150 km.
				Δ = 3100 km
1 Mar., 1959	iP	N,Z	00 : 40 : 19	Epicenter 74-1/2° N, 9° E
	eS	N,E	00 : 47 : 33	Arctic Ocean
				0 = 00 : 31 : 20
				Δ - 5600 km
1 Mar., 1959	iP'	N,Z	17 : 08 : 28	Epicenter 1/2° S, 134-1/2° E
	iPP	N,E,Z	17 : 10 : 39	Near north coast of New Guinea
	ePKS	N,E,Z	17 : 11 : 49	0 = 16 : 49 : 13
				h = about 100 km.
				Δ = 14500 km.
Mar., 1959	iP	N,Z	22 : 08 : 42	Epicenter 15-1/2° N, 91° W
	eS	N,E,Z	22 : 13 : 15	Guatemala
				0 = 22 : 02 : 58
				h = about 150 km.
				Δ = 3100 km.
0 Mar., 1959		N,E		Seismic activity observed between the hours of 22:57 and 23:30
1 Mar., 1959	iP	N,Z	14 : 37 : 36	Epicenter 14-1/2° N, 92° W
				Near coast of Guatemala
				0 = 11 : 31 : 33
				Δ = 3200 km.

Date	Phase and component		G.M.C.T.	Remarks
12 Mar., 1959		E		Seismic activity observed between the hours of 02:24 and 02:53
17 Mar., 1959	eS	E	08 : 51 : 45	Epicenter 27-1/2° N, 130° E Ryukyu Islands
				O = 08 : 25 : 22
				Δ = 12000 km.
19 Mar., 1959	iP	N,E,Z	08: 32 : 16	Epicenter 35° N, 36° W
	iPP	Z	08 : 33 : 22	North Atlantic Ocean
	iPPP	Z	08 : 33 : 35	O = 08 : 25 : 32
	i	N	08 : 34 : 07	Δ = 3700 km
	eS	N,E	08 : 37 : 42	
23 Mar., 1959	iS	N,E	07 : 21 : 46	Epicenter 40° N, 118° W Western Nevada
				O = 07 : 10 : 22
				Δ = 3400 km.
27 Mar., 1959		E		Seismic activity observed between the hours of 23:14 and 23:30
31 Mar., 1959				Seismic activity starting 07:45:31
1 Apr., 1959	iP	N,E,Z	00 : 43 : 05	Epicenter 27-1/2° N, 21° W
	ePP	E,Z	00 : 44 : 59	Canary Islands
	eS	N,E,Z	00 : 50 : 04	O = 00 : 34 : 18
				Δ = 5350 km.
4 Apr., 1959		N,E,Z		Seismic activity observed between the hours of 18:35 and 18:40
5 Apr., 1959		N,E		Seismic activity observed between the hours of 00:44 and 00:52
6 Apr., 1959	iP'	N,E,Z	14 : 32 : 18	Epicenter 10°S, 120-1/2° E
	iPP	N,Z	14 : 35 : 41	Sumba Island
	iPPP	n	14 : 38 : 46	O = 14 : 12 : 36
				Δ = 16200 km.

Date	Phase and component		G.M.C.T.	Remarks
Apr., 1959	eP	Z	11 : 57 : 34	Epicenter 50-1/2°S, 73°W
	iP	N,Z	11 : 57 : 36	Southern Chile-Argentina border
	iPP	N,Z	12 : 01 : 12	0 = 11 : 44 : 25
	eS	E	12 : 08 : 38	Δ = 10100 km.
Apr., 1959	ePP	N,Z	06 : 43 : 03	Epicenter 36° S, 77°E
				Indian Ocean, Kerguelen Islands region
				0 = 06 : 18 : 34
				Δ = 17800 km.
Apr., 1959	eP	N	17 : 42 : 59	Epicenter 7° N, 82° W
	eS	E	17 : 48 : 23	South of Panama
				0 = 17 : 36 : 10
				Δ = 3750 km.
10 Apr., 1959	ePP	N,E,Z	06 : 06 : 37	Epicenter 25°S, 178-1/2° E
				South of Fiji Islands
				0 = 05 : 47 : 34
				h = about 600 km
				Δ = 12900 km.
11 Apr., 1959		E		Seismic activity observed between the hours of 09:38 and 10:00
11 Apr., 1959		E		Seismic activity observed between the hours of 18:49 and 19:16
12 Apr., 1959	iP	N,E,Z	10 : 00 : 33	Epicenter 17-1/2° N, 95° W
	ipP	N,Z,	10 : 00 : 59	Mexico
	isP	N,Z	10 : 01 : 07	0 = 09 : 54 : 51
	i	N,E,Z	10 : 01 : 15	h = about 100 km
	iPP	E,Z	10 : 01 : 31	Δ = 3050 km.
	eS	E,	10 : 05 : 15	
12 Apr., 1959		E		Seismic activity observed between the hours of 16:30 and 17:21
12 Apr., 1959				Seismic activity starting 21:18:48

Date	Phase and component		G.M.C.T.	
Apr., 1959		N,E,Z		Seismic activity observed between the hours of 03:10 and 03:50
Apr., 1959		E		Seismic activity observed between the hours of 07:01 and 07:10
Apr., 1959	iP	N,Z	15 : 12 : 11	Epicenter 58°N, 158 1/2°W
	iS	N	15 : 19 : 13	Near Kodiak Island, Alaska
				O = 15 : 03 : 26
				Δ = 5450 km
Apr., 1959		N,E		Seismic activity observed between the hours of 04:27 and 05:15
Apr., 1959		E		Seismic activity observed between the hours of 11:13 and 11:40
Apr., 1959	iP	N,Z	19 : 07 : 55	Epicenter 11 1/2°N, 86 1/2°W
				Near coast of Nicaragua
				O = 19 : 01 : 41
				Δ = 3450 km
Apr., 1959	eS	E	20 : 48 : 52	Epicenter 36 1/2°S, 97 1/2°W
				Pacific Ocean
				O = 20 : 26 : 46
				Δ = 8800 km
Apr., 1959	iPn?	N,Z	20 : 59 : 49	Epicenter 37 1/2°N, 80 1/2°W
	iP*?	N,Z	20 : 59 : 54	Virginia-West Virginia border
	iSn?	N,Z	21 : 00 : 35	O = 20 : 58 : 41
	iS*?	N,Z	21 : 00 : 39	Δ = 450 km
	i	N,Z	21 : 00 : 44	
	i	N,E,Z	21 : 01 : 18	
Apr., 1959	iP	N,Z	09 : 37 : 48	Epicenter 11 1/2°N, 86 1/2°W
				Near Coast of Nicaragua
				O = 09 : 31 : 33
				Δ = 4350 km

Date	Phase and component		G.M.C.T.	Remarks
24 Apr., 1959		N,E,Z		Seismic activity observed between the hours of 18:24 and 21:31
26 Apr., 1959	eP	E,Z	20 : 55 : 08	Epicenter 25°N, 122 1/2°E
	i	N,Z	20 : 58 : 33	Near northeast coast of Formosa
	e	E	20 : 59 : 34	0 = 20 : 40 : 38
	iPP	N,Z	20 : 59 : 50	h = about 150 km
	i	N,Z	21 : 00 : 10	Δ = 12500 km
	i	N	21 : 01 : 16	
	i	N,Z	21 : 02 : 06	
	-	N	21 : 03 : 58	
	eSkS	N	21 : 05 : 30	
	iSP	N,Z	21 : 09 : 00	
	iPS	E,Z	21 : 09 : 17	
	eSS	E,Z	21 : 15 : 15	
	esSS	E	21 : 16 : 20	
	eSSS	E	21 : 19 : 14	
28 Apr., 1959	eP	N,E,Z	11 : 15 : 33	Epicenter 15°N, 93°W
	iS	N,E,Z	11 : 20 : 29	Mexico-Guatemala border
				0 = 11 : 09 : 30
				Δ = 3200 km
3 May, 1959	iP	N,Z	04 : 47 : 24	Epicenter 12 1/2°N. 87 1/2°W
				Near coast of Nicaragua
				0 = 04 : 41 : 24
				Δ = 3300 km
4 May, 1959	iP	N,E,Z	07 : 27 : 17	Epicenter 52 1/2°N, 159 1/2°E
	iPP	N,E,Z	07 : 30 : 08	Near east coast of Kamahatka
	iPPP	E	07 : 32 : 03	0 = 07 : 15 : 42
	i	N,Z	07 : 36 : 31	Δ = 8300 km
	iS	N,E	07 : 36 : 43	
	eSS	E	07 : 41 : 35	
	eSSS	E	07 : 44 : 51	

Date	Phase and component		G.M.C.T.	Remarks
5 May, 1959	iP	N,Z	19 : 15 : 56	Epicenter 53°N, 159°E
	eS	N,E	19 : 25 : 28	Kamchatka aftershock
				0 = 19 : 04 : 16
				Δ = 8300 km
7 May, 1959		E		Seismic activity observed between the hours of 00:33 and 02: 26
0 May, 1959	iP	Z	00 : 09 : 40	Epicenter 45°N, 149°E
				Kurile Islands
				0 = 23 : 57 : 03
				9 May 1959
				Δ = 9450 km
1 May, 1959	iP	N,Z	16 : 40 : 24	Epicenter 53 1/2°N, 160°E
	ipP?	N,Z	16 : 40 : 41	Kamchatka
				0 = 16 : 28 : 49
				Slightly deeper than normal
				Δ = 8200 km
2 May, 1959	iP	N,E,Z	05 : 08 : 47	Epicenter 54 1/2°N, 168°E
	i	N,Z	05 : 09 : 55	Komandorskie Islands
	eS	N,E	05 : 17 : 51	0 = 04 : 57 : 35
				Δ = 7750 km
2 May, 1959	iP	N,E,Z	09: 57 : 35	Epicenter 23 1/2°S, 64 1/2°W
	eS	N,E	10 : 06 : 14	Salta Province, Argentina
	eScS	E	10 : 07 : 25	0 = 09 : 46 : 51
	eSS	E	10 : 10 : 30	Δ = 7250 km
	iP'P'	N,Z	10 : 26 : 24	
2 May, 1959	iP	N,Z	10 : 24 : 29	Epicenter 20 1/2°S, 63 1/2°W
				Bolivia
				0 = 10 : 14 : 00
				Δ = 6950 km

Date	Phase and component		G.M.C.T.	Remarks
2 May, 1959	iP	N,E,Z	21 : 51 : 02	Epicenter 51 1/2°N, 177°W
	iS	N,E	21 : 59 : 44	Andreanof Islands, Alentian Islands
				O = 21 : 40 : 22
				Courtesy U.S.C.G.S.
				Δ = 7150 km
2 May, 1959	iP	N,E,Z	22: 10 : 40	Epicenter 51 1/2°N, 177°W
	eS	N,E	22 : 19 : 16	Andreanof Islands, Aleutian Islands
				O = 21 : 59 : 56
				Courtesy U.S.C.G.S.
				Δ = 7150 km
4 May, 1959	iP	N,E,Z	06 : 48 : 46	Epicenter 35 1/2°N, 24 1/2°E
	eS	N,E	06 : 58 : 30	Crete
				O = 06 : 36 : 57
				Courtesy U.S.C.G.S.
				Δ = 8550 km
5 May, 1959		E		Seismic activity observed between the hours of 08:00 and 08:34
5 May, 1959		N,E,Z		Seismic activity observed between the hours of 05:23 and 05:45
5 May, 1959	ePP	N,E,Z	06 : 36 : 50	Epicenter 4 1/2°S, 153 1/2°E
	isPP	Z	06 : 37 : 23	New Britain
				O = 06 : 16 : 23
				Courtesy U.S.C.G.S.
				Δ = 13500 km
5 May, 1959		E		Seismic activity observed between the hours of 01:29 and 01: 40
5 May, 1959	ip	N,Z	19 : 47 : 41	Epicenter 44 1/2°N, 149°E
	eS	E	19 : 58 : 35	Kurile Islands
				O = 19 : 35 : 03
				Δ = 9500 km

Date	Phase and component		G.M.C.T.	Remarks
May, 1959	iP	N,Z	11 : 45 : 31	Epicenter 28°S, 69°W
	ipP	N,Z	11 : 45 : 46	Northern Chile-Argentina border
	ePP	N,Z	11 : 48 : 22	0 = 11 : 34 : 23
	eS	N,E	11 : 54 : 31	h = about 60 km
				Δ = 7600 km
May, 1959	iP	N,E,Z	19 : 23 : 30	Epicenter 17 1/2°N, 97°W
	ipP	N,E,Z	19 : 23 : 56	Oaxaca, Mexico
	iPP	E	19 : 24 : 38	0 = 19 : 17 : 40
	iS	E	19 : 28 : 21	h = about 100 km
				Δ = 3200 km
May, 1959	ePP	N,E,Z	04 : 31 : 48	Epicenter 27 1/2°N, 126 1/2°E
	eS	E	04 : 39 : 13	Ryukyu Islands region
				0 = 04 : 13 : 01
				h = about 100 km
				Δ = 12050 km
May, 1959				Seismic activity starting 11:12:41
May, 1959	eP?	N,Z	05 : 41 : 18	Epicenter 20°N, 80°W
				Cayman Islands
				0 = 05 : 36 : 25
				Δ = 2300 km
May, 1959	eP'	Z	09 : 47 : 06	Epicenter 6 1/2°S, 155°E
	ePP	N,Z	09 : 48 : 28	Solomon Islands
				0 = 09 : 28 : 09
				Δ = 13600 km
May, 1959		N,E,Z		Seismic activity observed between the hours of 15:20 and 15:50
May, 1959		N,E		Seismic activity observed between the hours of 16:55 and 17:05
June, 1959		E		Seismic activity observed between the hours of 18:05 and 18:34

Date	Phase and component		G.M.C.T.	Remarks
June, 1959		E		Seismic activity observed between the hours of 03:40 and 07:25
June, 1959	iP	N,Z	05 : 54 : 44	Epicenter 43°S, 72°W Chile-Argentina border 0 = 05 : 42 : 26 h = about 150 km Δ = 9300 km
June, 1959	eP	Z	03 : 50 : 59	Epicenter 4°N, 77°W
	iPP	N,Z	03 : 52 : 23	Near west coast of Colombia
	eS	N,E	03 : 56 : 40	0 = 03 : 43 : 42 Δ = 4050 km
June, 1959	eP	Z	05 : 53 : 35	Epicenter 52 1/2°N, 170°W Fox Islands, Aleutian Islands 0 = 05: 43 : 28 Δ = 6700 km
June, 1959		E		Seismic activity observed between the hours of 12:47 and 13:10
June, 1959	eP	N,E,Z	20 : 43 : 21	Epicenter 12°N, 86 1/2°W Near coast of Nicaragua 0 = 20 : 37 : 15 h = about 100 km Δ = 3250 km
June, 1959		E		Seismic activity observed between the hours of 11:41 and 12:05
June, 1959	eP	Z	13 : 50 : 41	Epicenter 1/2°N, 18°W
	eS	E	13 : 59 : 40	Atlantic Ocean 0 = 13 : 39 : 38 Δ = 7500 km
June, 1959	iP	Z	04 : 27 : 50	Epicenter 36°N, 23°E Crete 0 = 04 : 16 : 03 Δ = 8300 km

Date	Phase and component		G.M.C.T.	Remarks
June, 1959	iP	N,Z	00 : 22 : 10	Epicenter 20 1/2°S, 68°W
	ipP	N,E,Z	00 : 22 : 38	Southwestern Bolivia
	iS	E	00 : 30 : 21	0 = 00 : 11 : 57
	i	N,Z	00 : 30 : 25	h = about 100 km
	iP'P'	Z	00 : 51 : 34	Δ = 6850 km
	ipP'P'	Z	00 : 52 : 03	
June, 1959		E		Seismic activity observed between the hours of 08:13 and 08:27
June, 1959		N,E,Z		Seismic activity observed between the hours of 10:36 and 10:40
June, 1959	-P	N,Z	15 : 42 : 58	Epicenter 54°N, 160°E
	i	N,E,Z	15 : 43 : 06	Near east coast of Kamchatka
	i	N	15 : 43 : 32	0 = 15 : 31 : 25
	i	N,Z	15 : 44 : 21	Δ = 8150 km
	ePP	N,Z	15 : 45 : 41	
	e?	N,Z	15 : 46 : 39	
	eS	E	15 : 52 : 22	
	e	E	15 : 53 : 34	
June, 1959	eP	N,Z	16 : 10 : 11	Epicenter 54°N, 161°E
	e	N,Z	16 : 10 : 33	Near east coast of Kamachatka
				0 = 15 : 58 : 38
				Δ = 8150 km
June, 1959		E		Seismic activity observed between the hours of 01:50 and 02:17
June, 1959		N,E,Z		Seismic activity observed between the hours of 20:45 and 21:25
June, 1959	eP	E,Z	14 : 41 : 28	Epicenter 39°N, 119°W
				Western Nevada
				0 = 14 : 35 : 02
				Δ = 3450 km

Date	Phase and component		G.M.C.T.	Remarks
June, 1959	iP	N,E,Z	06 : 54 : 03	Epicenter 62°N, 27 1/2°W
	iPP	N,E,Z	06 : 55 : 34	South of Iceland
				0 = 06 : 46 : 55
				Δ = 4050 km
June, 1959		E		Seismic activity observed between the hours of 04:27 and 05:20
June, 1959	iP?	Z	19 : 23 : 12	Epicenter 33°S, 179°W
	ePP	E,Z	19 : 24 : 34	South of Kermadec Islands
	esPP	E,Z	19 : 25 : 11	0 = 19 : 04 : 27
	iSKS	N,E,Z	19 : 29 : 52	h = about 100 km
	i	N,E,Z	19 : 31 : 15	Δ = 13300 km
	ePS	E	19 : 34 : 18	
June, 1959		N,E		Seismic activity observed between the hours of 08:18 and 08:35
June, 1959		N,E,Z		Seismic activity observed between the hours of 18:42 and 19:05
June, 1959	-P?	N,E,Z	20 : 02 : 59	Epicenter 9 1/2°S, 122 1/2°E
	i	N,Z	20 : 03 : 21	Sawoe Sea
	e?	N,Z	20 : 03 : 46	0 = 19 : 43 : 22
	ePP	N,Z	20 : 06 : 32	Δ = 16,000 km
June, 1959				Seismic activity starting at 07 : 42 : 07
July, 1959	eSkS	N,E,Z	02 : 50 : 38	Epicenter 28°N, 139 1/2°E
				Bonin Islands region
				0 = 02 : 27 : 46
				h = about 550 km
				courtesy U.S.C.G.S.
				Δ = 11,400 km
July, 1959	iP	N,Z	05 : 29 : 56	Epicenter 58 1/2°N, 152°W
				Kodiak Island region
				0 = 05 : 21 : 13
				Δ = 5400 km

Date	Phase and component		G.M.C.T.	Remarks
July 1959	ePP	E,Z	18 : 14 : 50	Epicenter, 16° S, 172-1/2° E
	epPP	E,Z	18 : 15 : 34	New Hebrides Is. region
	e	Z	18 : 19 : 35	0 = 17 : 55 : 29
	eSPP	E	18 : 25 : 29	h = about 200 km
	esSS	E	18 : 31 : 59	Δ = 12800 km
July 1959	iP	N,E,Z	09 : 20 : 28	Epicenter 26-1/2°S, 61-1/2° W
	ipP	N,Z	09 : 22 : 34	Chaco Province, Argentina
	iPP	N,E,Z	09 : 23 : 11	0 = 09 : 10 : 17
	iS	N,E,Z	09 : 28 : 45	h = about 600 km
	esS	E	09 : 32 : 30	Δ = 7650 km
	i?	N,Z	09 : 48 : 39	
July 1959	iP	N,E,Z	09 : 33 : 37	Epicenter 26-1/2° S, 61-1/2° W
	ipP	N, Z	09 : 35 : 41	Chaco Province, Argentina
	iPP	N, Z	09 : 36 : 20	0 = 09 : 23 : 27
	isP	Z	09 : 36 : 41	h = about 600 km
	ipPP	N, Z	09 : 37 : 56	Δ = 7650 km
	iS?	N, Z	09 : 41 : 49	
	iS?	N,E,Z	09 : 41 : 54	
	e?	N,E,Z	09 : 45 : 35	
	e?	Z	10 : 01 : 35	
	i?	N, Z	10 : 01 : 49	
July 1959		E		Seismic activity observed between the hours of 13:01 and 13:10
July 1959	iP	N,Z	16 : 15 : 30	Epicenter 20-1/2° S, 68° W
	ipP	N,Z	16 : 15 : 59	Chile-Boliva border
	isP	N,Z	16 : 16 : 12	0 = 16 : 05 : 18
	iS	N,E	16 : 23 : 39	h = about 100 km.
	isS	N,E,Z	16 : 24 : 32	Δ = 6850 km
	eP'P'	Z	16 : 44 : 42	
July 1959	eP	Z	04 : 21 : 50	Epicenter 19°S, 69°W
	eS	E	04 : 29 : 59	Chile-Boliva border
				0 = 04 : 11 : 40
				Δ = 6700 km

te	Phase and component		G.M.C.T.	Remarks
July 1959		E		Seismic activity observed between the hours of 12:32 and 14:30
July 1959	iP	N,E,Z	12 : 39 : 06	Epicenter 52° N, 172-1/2° W
	eS	N,E,Z	12 : 47 : 26	Andreanof Islands, Aleutian Islands
				0 = 12 : 28 : 45
				Δ = 6850 km.
July 1959	eP	N,Z	08 : 51 : 09	Epicenter 51-1/2° N, 172°W
	eS	E	08 : 59 : 24	Fox Islands, Aleutian Islands
				0 = 08 : 40 : 48
				Δ = 6850 km
July 1959		N,Z		Seismic activity observed between the hours of 11:43 and 12:15
July 1959	eP	N,Z	15 : 28 : 09	Epicenter 50-1/2°N, 177° W
	eS	N,E	15 : 36 : 56	Andreanof Islands region
				0 = 15 : 17 : 27
				Δ = 7150 km.
July 1959		N,E,Z		Seismic activity observed between the hours of 12:38 and 13:12
July 1959	eP'	N,Z	20 : 13 : 40	Epicenter 15-1/2° N, 120-1/2° E
	iPP	N,Z	20 : 15 : 10	Luzon
	eSKS	N,E	20 : 20 : 28	0 = 19 : 54 : 45
	iSKKS	N,E	20 : 21 : 54	Δ = 13500 km
	i	N,E,Z	20 : 24 : 28	
July 1959	iP	N,Z	15 : 15 : 32	Epicenter 15°S, 70-1/2° W
	ipP	N,Z	15 : 16 : 19	Peru
	isP	N,Z	15 : 16 : 37	0 = 15 : 06 : 10
	iPP	N	15 : 17 : 49	h = about 200 km
	isPP	Z	15 : 18 : 54	Δ = 6250 km
	i	N,Z	15 : 20 : 11	
	i	N,Z	15 : 22 : 56	
	iS	E	15 : 23 : 04	
	i	N	15 : 24 : 47	
	isS	E	15 : 24 : 56	
	eSS	E	15 : 27 : 02	

Date	Phase and component		G.M.C.T.	Remarks
uly 1959	iP	Z	15 : 45 : 29	Epicenter 15-1/2° S, 71° W
				Southern Peru
				O = 15 : 36 : 17
				h = about 200 km
				Δ = 6300 km
uly 1959	iP'	N,E,Z	02 : 59 : 44	Epicenter 6° S, 110°E
	i	N,E,Z	03 : 01 : 43	Java Sea
	i	N,E,Z	03 : 02 : 40	O = 02 : 40 : 13
	e	N,Z	03 : 04 : 47	Δ = 16100 km
	i	N,E	03 : 05 : 25	
	i	N,E	03 : 09 : 05	
	e	N,Z	03 : 14 : 26	
uly 1959		E		Seismic activity observed between
				the hours of 08:03 and 09:23
uly 1959	eP	N,E,Z	09 : 23 : 02	Epicenter 19° n, 68-1/2° W
	eS	N,E,Z	09 : 27 : 14	Near north coast of Dominican Republic
				O = 09 : 17 : 51
				Δ = 2550 km
uly 1959	iP	N,E,Z	12 : 35 : 21	Epicenter 16° N, 98° W
	iS	N,E,Z	12 : 40 : 35	Near coast of Oaxaca, Mexico
				O = 12 : 29 : 09
				Δ = 3350 km
uly 1959		N,E,Z		Seismic activity observed between
				the hours of 17:53:30 and 18:10
uly 1959	eP	N,Z	04 : 57 : 47	Epicenter 15-1/2° N, 97-1/2° W
	eS	N,E,Z	05 : 02 : 59	O = 04 : 51 : 30
				Δ = 3400 km
uly 1959	eP	N,Z	16 : 00 : 14	Epicenter 15-1/2° N, 97-1/2° W
	eS	N,E	16 : 05 : 22	Near coast of Oaxaca, Mexico
				O = 15 : 53 : 53
				Δ = 3400 km.
uly 1959	iP	N,Z	19 : 35 : 06	Epicenter 53° N, 153° E
	ipP	N,E,Z	19 : 37 : 16	Sea of Okhotsk
	esP or PP	N,Z	19 : 38 : 22	O = 19 : 24 : 17
	eS	N,E,Z	19 : 43 : 59	h = about 650 km.
	iSP	N,Z	19 : 44 : 42	Δ = 13600 km.

Date	Phase and component		G.M.C.T.	Remarks
July 1959	iP'	N,Z	23 : 21 : 23	Epicenter 5°S, 152-1/2° E
	eSKS	N,E	23 : 28 : 22	New Britain
				O = 23 : 02 : 27
				h = about 60 km
				Δ = 13600 km
July 1959	iP	N,Z	03 : 55 : 29	Epicenter 3°N, 71° W
	ePP	N,Z	03 : 56 : 59	Colombia
	eS	N,E	04 : 01 : 22	O = 03 : 48 : 12
				h = about 60 km.
				Δ = 4250
July 1959	iP	N,E,Z,	01 : 30 : 08	Epicenter 41°N, 125-1/2° W
	eS	N,E,Z	01 : 35 : 50	Off coast of northern California
				O = 01 : 23 : 09
				Δ = 3950 km.
July 1959		E		Seismic activity observed between the hours of 20:32 and 20:52
July 1959	iSKS?	N,E	23 : 27 : 45	Epicenter 56-1/2° S, 28-1/2° W
				Sandwich Islands
				O = 23 : 03 : 08
				Δ = 11700 km
g. 1959		N,E		Seismic activity observed between the hours of 00:05 and 00:13
g. 1959		N,E,Z		Seismic activity observed between the hours of 06:12 and 06:15
g. 1959		N,E		Seismic activity observed between the hours of 07:53 and 08:00
g. 1959		N,E,Z		Seismic activity observed between the hours of 03:59 and 04:08
g. 1959	eP	Z	10 : 52 : 26	Epicenter 56° N, 154° W
	eS	N,E	10 : 59 : 35	Kodiak Island region
				O = 10 : 43 : 32
				Δ = 5550 km.

Date	Phase and component		G.M.C.T.	Remarks
ug. 1959	eP	Z	21 : 54 : 25	Epicenter 56-1/2° N, 154° W.
	eS	N,E,Z	22 : 01 : 27	Kodiak Island
				0 = 21 : 45 : 26
				Δ = 5550 km
ug. 1959	iP	Z	00 : 58 : 58	Epicenter 55°N, 162-1/2°E
	i	N,Z	00 : 59 : 17	Near east coast of Kamchatka
	eS	N,E	01 : 08 : 15	0 = 00 : 47 : 38
	e	N,E		Δ = 7950 km
ug. 1959		E		Seismic activity observed between the hours of 21:31 and 22:06
Aug. 1959		E		Seismic activity observed between the hours of 22:48 and 23:19
Aug. 1959	i	N,Z	00 : 41 : 41	Epicenter 11-1/2° N, 86° W
				Near coast of Nicaragua
				0 = 00 : 33 : 35
				h = about 60 km
				Δ = 3350 km.
Aug. 1959	ePP	E,Z	10 : 17 : 32	Epicenter 16-1/2° S, 177-1/2° W
				Fiji Islands region
				0 = 09 : 58 : 22
				Δ = 12000 km
ug. 1959		N,E,Z		Seismic activity observed between the hours of 19:24 and 19:50
ug. 1959	iPP	N,E,Z	09 : 16 : 42	Epicenter 23°N, 121° E
				Formosa
				0 = 08 : 57 : 04
				Δ = 12700 km
ug. 1959		N,E		Seismic activity observed between the hours of 14:05 and 15:07
ug. 1959				Seismic activity starting about 01:17:36

Date	Phase and component		G.M.C.T	Remarks
Aug. 1959	eP	Z	01 : 44 : 27	Epicenter 41-1/2° N, 20-1/2°E
	eS	N,E,Z	01 : 53 : 36	Albania - Yugoslavia border
				0 = 01 : 33 : 15
				Δ = 7750 km.
Aug. 1959	iP'	Z	21 : 23 : 42	Epicenter 7-1/2°S, 156°E
	iPP	N,E,Z	21 : 25 : 17	Solomon Islands
	eSKS	E	21 : 30 : 40	0 = 21 : 04 : 40
	e	E	21 : 32 : 15	Δ = 13600 km.
	ePS	N,E	21 : 35 : 12	
Aug. 1959	iP	N,E,Z	06 : 42 : 37	Epicenter 44-1/2° N, 111° W
				Yellowstone Park, Wyoming
				0 = 06 : 37 : 13
				Δ = 2750 km
Aug. 1959	iP	Z	07 : 59 : 52	Epicenter 45° N, 111° W
				Yellowstone aftershock
				0 = 07 : 54 : 32
				Δ = 2750 km.
Aug. 1959	iP	E,Z	08 : 01 : 39	Epicenter 45° N, 110-1/2° W
	iS	E	08 : 05 : 44	Yellowstone aftershock
				0 = 07 : 56 : 18
				Δ = 2700 km.
Aug. 1959	iP	E,Z	08 : 47 : 09	Epicenter 45° N, 110-1/2° W
	i	Z	08 : 47 : 31	Yellowstone aftershock
	eS	E	08 : 51 : 50	0 = 08 : 41 : 50
				Δ = 2700 km.
Aug. 1959	iP	E,Z	11 : 09 : 08	Epicenter 45° N, 111° W
	eS	E,Z	11 : 13 : 36	Yellowstone aftershock
				0 = 11 : 03 : 49
				Δ = 2750
Aug. 1959	iS	N,E,Z	15 : 35 : 50	Epicenter 44-1/2° N, 111° W
				Yellowstone aftershock
				0 = 15 : 26 : 06
				Δ = 2750 km.

Date	Phase and component	G.M.C.T.	Remarks
Aug. 1959	N,E		Seismic activity observed between the hours of 20:22 and 20:35
Aug. 1959	N,E		Seismic activity observed between the hours of 21:48 and 21:51
Aug. 1959	N,E,Z		Seismic activity observed between the hours of 22:06 and 22:15
Aug. 1959 9 Aug."	N,E		Seismic activity observed between the hours of 23:59 and 00:04
Aug. 1959	iP N,E,Z iS N,E,Z	04 : 09 : 27 04 : 13 : 58	Epicenter 45° N, 111-1/2° W Yellowstone aftershock O = 04 : 04 : 03 Δ = 2800 km.
Aug. 1959	N,E,Z		Seismic activity observed between the hours of 19:19 and 19:31
Aug. 1959	N,E,Z		Seismic activity observed between the hours of 19:56 and 20:10
Aug. 1959	N,E,Z		Seismic activity observed between the hours of 21:59 and 22:12
Aug. 1959	iP N,Z eS N,E	07 : 27 : 18 07 : 34 : 10	Epicenter 7°S, 85° W Off coast of Peru O = 07 : 18 : 34 Δ = 5350 km.
Aug. 1959	N,E		Seismic activity observed between the hours of 11:12 and 11:16

Date	Phase	Phase and component	G.M.C.T	Remarks
Aug. 1959		N,E,Z		Seismic activity observed between the hours of 19:24 and 19:33
Aug. 1959		N,E		Seismic activity observed between the hours of 22:52 and 23:00
Aug. 1959		N,E		Seismic activity observed between the hours of 06:12 and 06:18.
Aug. 1959		N,E		Seismic activity observed between the hours of 16:40 and 17:10
Aug. 1959	iPP	N,E,Z	21 : 51 : 06	Epicenter 10-1/2°S, 161°E
	eSKS	N,E	21 : 56 : 52	Soloman Islands
	ePS	N,E	22 : 00 : 54	0 = 21 : 30 : 41
	iSS	N,	22 : 07 : 48	Δ = 13400 km.
Aug. 1959		E		Seismic activity observed between the hours of 04:40 and 05:10
Aug. 1959		N,E		Seismic activity observed between the hours of 05:49 and 06:30
Aug. 1959	iP	N,E,Z	08 : 31 : 12	Epicenter 18° N, 94-1/2° W
	iS	N	08 : 35 : 45	Vera Cruz, Mexico
				0 = 08 : 25 : 30
				Δ = 3000 km.
Aug. 1959	iP	N,Z	10 : 34 : 53	Epicenter 51° N, 132° W
	iS	N,E,Z	10 : 40 : 41	South of Queen Charlotte Islands
				0 = 10 : 27 : 41
				Δ = 4250
Aug. 1959		N,E		Seismic activity observed between the hours of 13:52 and 14:10

Date	Phase and component		G.M.C.T.	Remarks
Aug., 1959		N		Seismic activity observed between the hours of 00:56 and 01:17
Aug., 1959		N,E		Seismic activity observed between the hours of 08:10 and 08:19
Aug., 1959	iP	N,Z	12 : 16 : 11	Epicenter 63 1/2°N, 149°W Central Alaska 0 = 12 : 07 : 44 Courtesy U.S.C.G.S. Δ = 5150 km
Aug., 1959		N,E		Seismic activity observed between the hours of 16:53 and 17:26
Aug., 1959		N,E		Seismic activity observed between the hours of 04:28 and 04:48
Aug., 1959		N,E		Seismic activity observed between the hours of 06:28 and 07:05
Aug., 1959	-P	N,Z	17 : 15 : 59	Epicenter 52°N, 106 1/2°E Lake Baikal, U.S.S.R. 0 = 17 : 03 : 10 Δ = 9750 km
	i	N,Z	17 : 16 : 06	
	iPP	N,Z	17 : 19 : 31	
	ePPP	N	17 : 21 : 24	
	iSKS	N	17 : 26 : 25	
	iS	N,E	17 : 26 : 38	
	iPS?	N	17 : 27 : 42	
Aug., 1959		N,E		Seismic activity observed between the hours of 03:26 and 03:36
Aug., 1959		N,E		Seismic activity observed between the hours of 14:07 and 14:17
Aug., 1959		N,E		Seismic activity observed between the hours of 16:37 and 16:52
Aug., 1959		N,E		Seismic activity observed between the hours of 22:13 and 00:25
Aug., 1959				

Date	Phase and component		G.M.C.T.	Remarks
Sept.,1959		N,E		Seismic activity observed between the hours of 05:52 and 06:02
Sept.,1959		N,E		Seismic activity observed between the hours of 07:40 and 08:06
Sept.,1959	iP	N,E,Z	10 : 54 : 59	Epicenter 20°N, 64 1/2°W
	i	N,E,Z	10 : 55 : 19	North of Puerto Rico
	i	N,Z	10 : 56 : 21	0 = 10 : 49 : 43
	iS	N,E	10 : 59 : 18	Δ = 2650 km
Sept.,1959	eP	Z	11 : 48 : 53	Epicenter 41 1/2°N, 20°E
				Albania
				0 = 11 : 37 : 42
				Δ = 7700 km
Sept.,1959		N,E		Seismic activity observed between the hours of 08:26 and 08:38
Sept.,1959	iP	N,Z	09 : 36 : 52	Epicenter 20°N, 65°W
				Puerto Rico atershock
				0 = 09 : 31 : 36
				Δ = 2600 km
Sept.,1959		N,E		Seismic activity observed between the hours of 12:27 and 12:46
Sept.,1959	iP'	N,E,Z	06 : 47 : 04	Epicenter 4 1/2°S, 123°E
	i	N,E,Z	06 : 50 : 40	Celebes Island
	e	N,E	07 : 02 : 16	0 = 06 : 27 : 30
				Δ = 15,000 km
Sept.,1959	iP	N,Z	18 : 37 : 21	Epicenter 1°S, 24°W
	eS	N,E	18 : 45 : 59	Atlantic Ocean
				0 = 18 : 26 : 41
				Δ = 7150 km
Sept.,1959	iP	N,Z	23 : 35 : 50	Epicenter 47°S, 75°W
				Near coast of southern Chile
				0 = 23 : 22 : 56
				Δ = 9700 km

Date	Phase and component		G.M.C.T.	Remarks
Sept.,1959		N,E		Seismic activity observed between the hours of 06:29 and 08:20
Sept.,1959		N,E		Seismic activity observed between the hours of 22:05 and 22:40
Sept.,1959		N,E		Seismic activity observed between the hours of 07:23 and 07:30
Sept.,1959		N,E		Seismic activity observed between the hours of 10:01 and 10:35
Sept.,1959		N,E		Seismic activity observed between the hours of 06:35 and 07:05
Sept.,1959		N,E,Z		Seismic activity observed between the hours of 16:13 and 16:21
Sept.,1959		N,E		Seismic activity observed between the hours of 20:01 and 22:42
Sept.,1959		N,E		Seismic activity observed between the hours of 02:22 and 04:15
Sept.,1959		N,E		Seismic activity observed between the hours of 12:26 and 13:00
Sept.,1959	eS	N,E	19 : 59 : 28	Epicenter 45°N, 111°W Yellowstone aftershock 0 = 19 : 49 : 36 Δ = 2750 km
Sept.,1959		N,E		Seismic activity observed between the hours of 20:50 and 21:00
Sept.,1959	eS	N,E	21 : 33 : 16	Epicenter 45°N, 111°W Yellowstone aftershock 0 = 21 : 23 : 31 Δ = 2750 km
Sept.,1959		N,E		Seismic activity observed between the hours of 06:35 and 06:44

Date	Phase and component		G.M.C.T.	Remarks
Sept.,1959	iP	N,E,Z	09 : 40 : 16	Epicenter 45°N, 111°W
	iS	N,E	09 : 44 : 41	Yellowstone aftershock
				0 = 09 : 34 : 52
				Δ = 2750 km
Sept.,1959		N,E		Seismic activity observed between the hours of 14:00 and 14:30
Sept.,1959	eP'	N,Z	14 : 28 : 27	Epicenter 28 1/2°S, 177°W
	ePP	N,E	14 : 29 : 47	Kermadec Islands
	e	N,E,Z	14 : 30 : 28	0 = 14 : 09 : 39
	eSKS?	N	14 : 35 : 20	Δ = 12800 km
	e	N,E	14 : 36 : 31	
	e	N	14 : 37 : 20	
	ePS?	N,E	14 : 39 : 24	
	eSS	N,E	14 : 45 : 30	
Sept.,1959	ePP	E,Z	17 : 26 : 04	Epicenter 29°S, 176 1/2°W
	ePS	N	17 : 35 : 49	Kermadec aftershock
	eSS	N	17 : 41 : 50	0 = 17 : 06 : 15
				Δ = 12800 km
Sept.,1959	eSS	N	22 : 59 : 30	Epicenter 29°S, 117°W
				Kermadec aftershock
				0 = 22 : 23 : 53
				Δ = 12800 km
Sept.,1959	iS	N,E	06 : 27 : 20	Epicenter 28 1/2°S, 177°W
	iPS	N	06 : 29 : 22	Kermadec after shock
	iPPS	N	06 : 30 : 20	0 = 05 : 59 : 42
	iSS	N,E	06 : 35 : 17	Δ = 12800 km
Sept.,1959		N,E		Seismic activity observed between the hours of 16:38 and 17:35
Sept.,1959		N,E		Seismic activity observed between the hours of 15:29 and 16:40

Date	Phase and component		G.M.C.T	Remarks
Sept., 1959		N,E,Z		Seismic activity observed between the hours of 22:29 and 23:19
Sept., 1959		N,E		Seismic activity observed between the hours of 17:20 and 17:28
Sept., 1959	eS	N,E,Z	06 : 26 : 57	Epicenter 13-1/2°S, 111-1/2°W Pacific Ocean, north of Easter Is. 0 = 06 : 07 : 59 Δ = 6950 km.
Sept., 1959		N,E		Seismic activity observed between the hours of 03:13 and 03:27
Sept., 1959		N,E		Seismic activity observed between the hours of 16:40 and 17:10
Sept., 1959		N,E		Seismic activity observed between the hours of 08:15 and 08:20
Sept., 1959		N,E		Seismic activity observed between the hours of 20:33 and 21:00
Sept., 1959		N,E		Seismic activity observed between the hours of 11:01 and 11:30
Sept., 1959	eP	N,Z	05 : 53 : 15	Epicenter 83-1/2°N, 112-1/2°E Arctic Ocean 0 = 05 : 43 : 38 Δ = 6200 km
Sept 1959	iP	N,Z	00 : 34 : 18	Epicenter 9°S, 113-1/2°E
	i	N,Z	00 : 34 : 39	Off east coast of Java 0 = 00 : 14 : 30 Δ = 16400 km
Sept., 1959	ePP	N,Z	02 : 56 : 33	Epicenter 22°N, 122°E
	iPS	N,E,Z	03 : 06 : 13	Near east coast of Formosa 0 = 02 : 36 : 48 Δ = 12800 km
Sept., 1959		N,E		Seismic activity observed between the hours of 22:33 and 23:59

ate	Phase and component		G.M.C.T.	Remarks
Sept., 1959	eP	N,Z	08 : 27 : 59	Epicenter 43-1/2°N, 128-1/2°W
	i	N,E,Z	08 : 28 : 10	Off coast of Oregon
	iPP	N,E,Z	08 : 29 : 34	0 = 08 : 20 : 51
	iS	N,E	08 : 33 : 49	Δ = 4100 km
Sept., 1959		N,E,Z		Seismic activity observed between the hours of 08:18 and 08:25
Sept., 1959		N,E,Z		Seismic activity observed between the hours of 15:57 and 17:45
Sept., 1959		N,E		Seismic activity observed between the hours of 21:20 and 23:03
ct., 1959		N,E		Seismic activity observed between the hours of 18:22 and 18:37
ct., 1959	iP	N,Z	18 : 37 : 27	Epicenter 83-1/2°N, 112-1/2°E
	eS	N,E,Z	18 : 45 : 21	Arctic Ocean
				0 = 18 : 27 : 47
				Δ = 6200 km.
ct., 1959	eS	N,E	11 : 47 : 22	Epicenter 45° N, 111-1/2° W
				Yellowstone aftershock
				0 = 11 : 37 : 21
				Δ = 2800 km.
t., 1959		N,E		Seismic activity observed between the hours of 13:27 and 13:48
t., 1959	iP	N,E,Z	08 : 41 : 53	Epicenter 41°N, 20°E
	eS	N,E	08 : 51 : 06	Albania
				0 = 08 : 30 : 41
				Δ = 7750 km.
t., 1959		N,E		Seismic activity observed between the hours of 03:05 and 03:55
t., 1959	iP	N,Z	11 : 00 : 11	Epicenter 19-1/2° N, 73-1/2°W
	eS	E	11 : 04 : 27	Haiti
				0 = 10 : 55 : 12
				Δ = 2400 km.
ct., 1959		N,E		Seismic activity observed between the hours of 03:44 and 05:05

Date	Phase and component		G.M.C.T	Remarks
Oct., 1959	eP'	N,Z	06 : 35 : 01	Epicenter 1/2°N, 120-1/2°E
	ePP	N,E,Z	06 : 37 : 40	Celebes
	e	N,E,Z	06 : 38 : 35	0 = 06 : 15 : 32
	e	N,	06 : 39 : 16	Δ = 15100
	e	N	06 : 41 : 04	
Oct., 1959		N,E,Z		Seismic activity observed between the hours of 20:49 and 21:00
Oct., 1959		N,E		Seismic activity observed between the hours of 09:03 and 10:06
Oct., 1959		N,E		Seismic activity observed between the hours of 00:31 and 00:57
Oct., 1959		N,E		Seismic activity observed between between the hours of 07:12 and 07:25
Oct., 1959	iP	N,Z	07 : 48 : 28	Epicenter 37-1/2° N, 142-1/2° E
	eS	E	07 : 59 : 34	Near east coast of Honshu, Japan
	i	N	07 : 59 : 37	0 = 07 : 35 : 12
				h = about 60 km.
				Δ = 10400 km .
Oct., 1959	eP	N,Z	06 : 19 : 22	Epicenter 42-1/2° N, 127° W
	iS	N,E	06 : 25 : 07	Off coast of Oregon
				0 = 06 : 12 : 17
				Δ = 4050 km.
Oct., 1959	iP	N,Z	07 : 05 : 11	Epicenter 45-1/2° N, 151°E
	i	N,Z	07 : 05 : 31	Kurile Islands
	e	N,Z	07 : 06 : 27	0 = 06 : 52 : 50
	iS	N,E	07 : 15 : 38	h = about 100 km.
				Δ = 9300 km.
Oct., 1959	iP	Z	14 : 42 : 41	Epicenter 43° N, 131° E
	ePP	Z	14 : 46 : 24	China-Korea border
				0 = 14 : 30 : 24
				h = about 550 km.
				Δ = 10300 km.
Oct., 1959		N,E		Seismic activity observed between the hours of 14:50 and 15:07

Date	Phase and component		G.M.C.T	Remarks
Oct., 1959		N,E		Seismic activity observed between the hours of 04:54 and 05:20
Nov., 1959		N,E		Seismic activity observed between the hours of 23:11 and 23:21
Nov., 1959		N,E		Seismic activity observed between the hours of 21:08 and 21:37
Nov., 1959		E		Seismic activity observed between the hours of 22:52 and 23:09
Nov., 1959	iP'	N,Z	09 : 59 : 54	Epicenter 10-1/2° S, 111°E
	ePP	N,Z	10 : 03 : 28	South of Java
				0 = 09 : 40 : 05
				Δ = 16600 km.
Nov., 1959		E		Seismic activity observed between the hours of 12:47 and 13:11
Nov., 1959		E		Seismic activity observed between the hours of 18:39 and 19:00
Nov., 1959		E		Seismic activity observed between the hours of 02:08 and 02:39
Nov., 1959		E		Seismic activity observed between the hours of 14:00 and 14:20
Nov., 1959		E		Seismic activity observed between the hours of 23:10 and 24:00
Nov., 1959	iP	N,Z	14 : 07 : 54	Epicenter 44° N, 140-1/2° E
	eS	E	14 : 18 : 39	Near west coast of Hokkaido, Japan
				0 = 13 : 54 : 55
				Δ = 9900 km.
Nov., 1959		E		Seismic activity observed between the hours of 11:10 and 11:44
Nov., 1959	iP	N,E,Z	17 : 20 : 19	Epicenter 37-1/2° N, 20-1/2° E
	iS	N,E	17 : 29 : 30	Near west coast of Greece
				0 = 17 : 08 : 41
				Δ = 8050 km.

Date	Phase and component		G.M.C.T.	Remarks
Nov., 1959	ePP	N,Z	11 : 29 : 37	Epicenter 5-1/2° S, 146° E
	i	N,E	11 : 36 : 24	Near north coast of New Guinea
	eSS	E	11 : 47 : 20	O = 11 : 08 : 32
				Δ = 14200 km
Nov., 1959		N,E		Seismic activity observed between the hours of 00:06 and 00:45
Nov., 1959		E		Seismic activity observed between the hours of 08:18 and 09:15
Nov., 1959		E		Seismic activity observed between the hours of 00:10 and 01:15
Nov., 1959		E		Seismic activity observed between the hours of 03:45 and 03:55
Nov., 1959	iP	N,Z	12 : 46 : 05	Epicenter 28-1/2° S, 71° W
	i	N,Z	12 : 46 : 15	Chile
	eS	E	12 : 55 : 09	O = 12 : 34 : 53
				Δ = 7700 km.
Nov., 1959	iP	N,Z	15 : 27 : 18	Epicenter 59-1/2° N, 152° W
				Kenai Peninsula, Alaska
				O = 15 : 18 : 37
				Δ = 5350 km.
ec., 1959	eP'	Z	09 : 53 : 30	Epicenter 1° S, 123° E
	ePP	N,Z	09 : 56 : 10	Celebes
		E,Z	09 : 56 : 59	O = 09 : 34 : 00
				Δ = 15000 km.
ec., 1959		E		Seismic activity observed between the hours of 08:33 and 08:42
ec. 1959		N,E,Z		Seismic activity observed between the hours of 04:27 and 04:47
Dec., 1959		E		Seismic activity observed between the hours of 02:35 and 03:00

Date	Phase and component		G.M.C.T.	Remarks
Dec., 1959	iPP	N,Z	18 : 20 : 35	Epicenter 5° N, 126° E Near south coast of Mindanao, P.I. 0 = 17 : 58 : 31 h = about 150 km. or Epicenter 5° N, 125-1/2° E Off south coast of Mindanao, P.I. 0 = 17 : 58 : 33 h = about 200 km. Δ = 14400 km.
Dec., 1959	-P	N,Z	22 : 10 : 59	Epicenter 52-1/2° N, 168° W Fox Islands, Aleutian Islands 0 = 22 : 00 : 50 Δ = 6550 km.
	iS	E	22 : 19 : 05	
Dec., 1959	iPP	N,Z	23 : 40 : 56	Epicenter 59-1/2° S, 31° W Sandwich Islands 0 = 23 : 21 : 56 Δ = 11900 km.
	iSKS?	N	23 : 47 : 05	
Dec. 1959	iP	Z	16 : 34 : 53	Epicenter 53° N, 168-1/2° W Fox Islands, Aleutian Islands 0 = 16 : 24 : 50 Δ = 6600 km.
Dec., 1959		N,E		Seismic activity observed between the hours of 15:23 and 15:50
Dec., 1959		N,E,Z		Seismic activity observed between the hours of 11:25 and 14:00
Dec., 1959		E		Seismic activity observed between the hours of 04:52 and 05:14
Dec., 1959	iP	N,Z	10 : 29 : 31	Epicenter 25-1/2° S, 67° W Chile-Argentina border region 0 = 10 : 18 : 35 Δ = 7400 km.
	-PcP	N,Z	10 : 29 : 59	
	eS	E	10 : 38 : 14	
	e	E	10 : 39 : 03	
	iScS	N	10 : 39 : 16	

Date	Phase and component		G.M.C.T.	Remarks
Dec., 1959	iP	N,Z	18 : 27 : 48	Epicenter 59-1/2° N, 151-1/2° W
	iS	N	18 : 34 : 47	Kenai Peninsula, Alaska
				O = 18 : 19 : 10
				Δ = 5350 km.
Dec., 1959		N,E		Seismic activity observed between the hours of 22:40 and 23:05
Dec., 1959		E		Seismic activity observed between the hours of 05:33 and 05:50.
Dec., 1959	iP	N,Z	12 : 49 : 26	Epicenter 28° S, 63° W
	ipP	N,Z	12 : 51 : 27	Santiago del Estero Province, Argentina
	iS	N,E	12 : 57 : 51	O = 12 : 39 : 09
				h = about 650 km.
				Δ = 7750 km.
Dec., 1959	iP	N,Z	16 : 04 : 12	Epicenter 56° N, 162-1/2° E
	i	N,Z	16 : 04 : 22	Kamchatka
	ePP	N,Z	16 : 06 : 50	O = 15 : 52 : 55
	iS	N,E,Z	16 : 13 : 23	Δ = 7850 km.
Dec., 1959	eP	N,Z	07 : 32 : 12	Epicenter 52-1/2° N, 160°E
	eS	N,E	07 : 41 : 43	Near east coast of Kamchatka
				O = 07 : 20 : 32
				Δ = 8250 km.
Dec., 1959	eP	N,Z	10 : 13 : 35	Epicenter 22-1/2° S, 67-1/2° W
	ipP	N,Z	10 : 14 : 01	Chile-Bolivia border
	esP?	N	10 : 14 : 16	O = 10 : 03 : 08
	esS	E	10 : 22 : 45	h = about 100 km.
				Δ = 7100 km.
Dec., 1959	eP	Z	13 : 16 : 20	Epicenter 52-1/2° N, 160° E
				Near southeast coast of Kamchatka
				O = 13 : 04 : 30
				Δ = 8250 km.
Dec., 1959		N,E		Seismic activity observed between the hours of 21:07 and 21:28

We acknowledge with thanks receipt of the following bulletins and other publications between 11 April 1959 and 29 June 1960:

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