

PALISADES.
Jan. - June '64

LAMONT GEOLOGICAL OBSERVATORY
COLUMBIA UNIVERSITY
PALISADES, NEW YORK



SEISMOLOGICAL BULLETIN

By

RUTH B. SIMON

1 January 1964-30 June 1964

L.G.O. Contribution No. 975

STATION CONSTANTS

Latitude: 41° 00' 25" North
 Longitude: 73° 54' 31" West
 Elevation: 102.59 meters
 Bedrock: Palisades disbase Triassic Age

Abbreviations

i = sudden beginning of the motion (impetus)
 e = gradual beginning of the motion (emersio)
 Comp. = compression
 Dil. = dilatation

All times are G. C. T.

Time - I. B. M. Invar pendulum clock corrected by Naval
 Observatory time signals every six hours.

INSTRUMENTS

Three component Columbia University seismographs,
 To = 12 sec., Tg = 15 sec.

Three component Benioff seismographs. Short-period, To = 1 sec.,
 Tg = 0.2 sec. Long-period, To = 1 sec., Tg = 75 sec.

One Columbia University vertical seismograph, To = .33 sec.,
 Tg = 0.2 sec.

Three component Columbia University visual recording
 seismographs, To = 12 sec.

One Columbia University vertical seismograph for visual
 recording, To = 1 sec.

Three component Columbia University long-period seismographs,
 To = 15 sec., Tg = 75 sec.

Three component Columbia University long-period seismographs,
 To = 30 sec., Tg = 100 sec.

Three component Columbia University long-period seismographs,
 To = 30 sec., Tg = 100 sec. P₂. Filter galvanometers of 6.7 sec.
 are in operation from October through May.

Two Columbia University microbarographs, To = 10 sec.,
 Tg = 75 sec.

Palisades, New York				1964						
Date	Phase	h	m	s	Date	Phase	h	m	s	
Jan. 1	eS	14	35	49	Jan. 8	ePKP	22	50	16	
	eLQ	14	41	37		eLQ	23	35	16	
	eLR (SW)	14	44	17		eLR	23	39	16	
	Galapagos Isls.					Celebes				
	USCGS 14 18 53.9					USCGS 22 30 49.7				
	4.3°S 105.9°W					3.7°S 119.4°E				
	Depth 33km Dist. 53.5°					Depth 112km Dist. 141.4°				
1	eP	17	39	15	9	eP	18	44	25	
	epP	17	39	27		eSKS	18	54	49	
	eS	17	49	37		eS	18	55	07	
	eLQ	18	05	27		eLQ	19	09	05	
	eLR (N)	18	11	57		eLR (NW)	19	12	35	
	Kurile Isls.					Kurile Isls.				
	USCGS 17 26 43.5					USCGS 18 31 52.4				
	45.4°N 151.9°E					45.5°N 150.9°E				
	Depth 45km Dist. 85.0°					Depth 40km Dist. 84.5°				
	Mag. 6					Mag. 5 3/4 - 6				
5	eP	18	42	25	10	eP	05	03	57	
	epP	18	42	59		eSKS	05	14	47	
	eS	18	49	16		eS	05	15	15	
	eScS	18	52	00		eLQ	05	31	35	
	eLR	18	57	00		eLR (NW)	05	34	35	
	Central Peru					Hokkaido, Japan				
	USCGS 18 33 54.7					USCGS 04 50 53.4				
	8.0°S 74.5°W					42.0°N 142.6°E				
	Depth 150km Dist. 48.8°					Depth 33km Dist. 91.2°				
	Mag. 5 3/4					Mag. 5 3/4				
6	ePKP	00	05	28	10	eSKS	17	20	25	
	epPKP	00	05	37.5		eLQ	17	35	45	
	eLR (SE)	00	38	46		eLR (NW)	17	42	15	
	Prince Edw. Isl. Region					Kurile Isls.				
	USCGS 23 46 10.7 (5 Jan)					USCGS 16 57 26.5				
	52.3°S 28.6°E					45.4°N 150.0°E				
	Depth 33km Dist. 128.2°					Depth 50km Dist. 85.8°				
6	eP (Comp.)	23	57	19.8	11	eSKS	07	14	04	
7	eS	00	07	08		eLQ	07	30	54	
	eSKS	00	07	36		eLR	07	33	44	
	eLQ	00	19	46		Samoa Isls.				
	eLR (NW)	00	22	56		USCGS 06 39 55				
	S. Kamchatka					15.1°S 172.9°W				
	USCGS 23 45 23.4					Depth 33km Dist. 106.5°				
	50.9°N 157.3°E									
	Depth 33km Dist. 78.2°									
	Mag. 5 1/2									
7	eSKS	12	57	46	12	eS	06	18	26	
	eLQ	13	16	16		eLQ	06	26	30	
	eLR (SE)	13	20	16		eLR	06	28	40	
	Sandwich Isls.					Aleutians				
	USCGS 12 32 54.5					USCGS 06 00 13.2				
	56.8°S 26.1°W					53.2°N 166.3°W				
	Depth 33km Dist. 105.6°					Depth 33km Dist. 59.7°				
8	ePn	10	05	56.0	13	eS	17	38	44	
	ePg	10	06	17.5		eLR	17	45	14	
	eSn	10	07	01.5		W. of Galapagos Isls.				
	eSg	10	07	32		USCGS 17 23 30.1				
	eLR	10	08	00		2.3°N 102.0°W				
	Ontario-Quebec Border					Depth 33km Dist. 47.3°				
	USCGS 10 04 31.6									
	46.1°N 77.7°W									
	Depth 33km Dist. 5.8°									
						15	eP	21	33	08
							ePcP	21	35	34.0
							eLQ	21	39	34
							eLR	21	40	36

Palisades, New York				1964						
Date	Phase	h	m	s	Date	Phase	h	m	s	
Feb. 13	Depth 15km	Dist. 3.2°			Mar. 2	Continued				
						13.9°N 91.1°W				
14	ePKP	16	48	41.2		Depth 130km	Dist. 30.7°			
	eLQ	17	22	47						
	eLR (NW)	17	28	23	2	eSKS	19	57	40	
	New Britain					esSKS	19	59	16	
	USCGS 16 29 45.0					eLQ	20	18	16	
	5.1°S 151.7°E					eLR (W)	20	25	16	
	Depth 55km	Dist. 125.8°				Tonga Isls.				
	Mag. 6 1/2					USCGS 19 32 41.7				
18	ePn	09	34	24.0		18.9°S 174.8°W	Dist. 110.4°			
	ePg	09	35	02.5		Depth 105km				
	eSn	09	35	49.5	3	ePKP	22	01	42	
	eSg	09	36	33.5		Celebes Sea				
	N. Georgia-Alabama Border					6	eP	19	12	25
	USCGS 09 31 11.6					eLQ	19	48	15	
	34.7°N 85.4°W					eLR (NW)	19	55	55	
	Depth 33km	Dist. 11.7°				New Britain Region				
20	eP	10	06	49		USCGS 18 57 16.1				
	eSKS	10	17	03		6.1°S 154.4°E				
	eLQ	10	29	49		Depth 74km	Dist. 124.5°			
	eLR (NW)	10	33	19		Mag. 6				
	Kurile Isls.					6	eP	21	15	56
	USCGS 09 53 51.1					eS	21	24	25	
	44.6°N 150.0°E					eLQ	21	32	35	
	Depth 50km	Dist. 86.1°				eLR (SE)	21	35	15	
23	eS	23	01	40		N. Chile				
	eLQ	23	11	44		USCGS 21 05 50.2				
	eLR (NE)	23	14	50		19.7°S 70.5°W				
	Aegean Sea					Depth 50km	Dist. 60.8°			
	USCGS 22 41 06.3					Mag. 4 3/4 - 5				
	39.2°N 23.7°E					7	eS	10	54	55
	Depth 33km	Dist. 70.5°				eLQ	11	10	15	
	Mag. 4 3/4 - 5					eLR (SE)	11	13	15	
27	eS	11	48	05		8	ePP	01	57	45
	eLR (WSW)	11	52	45		eSS	02	15	55	
	Colima, Mexico					eLQ	02	30	45	
	USCGS 11 35 32.4					eLR (WSW)	02	40	35	
	18.9°N 104.0°W					S. Island, New Zealand				
	Depth 33km	Dist. 33.8°				USCGS 01 35 48.1				
Mar. 1	iPKP	00	09	17.5		44.0°S 168.4°E				
	ipPKP	00	09	28.5		Depth 33km	Dist. 134.9°			
	iPKP ₂	00	09	51.5		Mag. 5 3/4				
	eLQ	00	52	46		8	ePKP	10	55	47
	eLR (NNE)	01	00	46		eLQ	11	42	45	
	Near S. Coast Java					eLR	11	53	25	
	USCGS 23 49 40.8					Banda Sea				
	8.5°S 112.7°E					USCGS 10 37 20				
	Depth 73km	Dist. 147.0°				6.7°S 125.9°E				
2	eP	11	00	55.8		Depth 540km	Dist. 141.2°			
	eS	11	04	52.8		13	e(Sn)	01	24	38
	South of Puerto Rico					e(Sg)	01	24	47	
	USCGS 10 55 44.2					Lg	01	25	52	
	17.8°N 67.1°W					Central Georgia				
	Depth 33km	Dist. 23.7°				USCGS 01 20 18				
2	eP	12	45	24		33.2°N 83.4°W				
	Near Coast Guatemala					Depth 40km	Dist. 11.0°			
	USCGS 12 39 17.6									

Palisades, New York				1964						
Date	Phase	h	m	s	Date	Phase	h	m	s	
Mar. 13	eS	04	43	22	Mar. 16	Continued				
	eLR (SW)	04	52	32		Depth 140km	Dist. 86.8°			
	W. Galapagos					16	i(P)	20	45	58
	USCGS 04 26 23.5					e(S)	20	49	41	
	4.1°S 105.1°W					N.E. of Puerto Rico				
	Depth 33km	Dist. 53.0°				USCGS 20 40 47.9				
13	e(P)	12	00	32		19.5°N 65.3°W				
	e(S)	12	05	42		Depth 33km	Dist. 22.7°			
	e(Ss)	12	06	02						
	eLR (SW)	12	08	42		17	eS	05	20	42
	Near Coast Guatemala					eLQ	05	27	12	
	USCGS 11 54 06.1					eLR	05	31	12	
	12.9°N 90.4°W					1200km SW Galapagos Isls.				
	Depth 128km	Dist. 31.4°				USCGS 05 01 57				
13	eS	19	02	42		8.9°S 108.8°W				
	eLR (SW)	19	07	42		Depth 33km	Dist. 59.3°			
	Near Coast Guatemala					18	iP	04	48	40
	USCGS 18 51 15.0					epP	04	49	07	
	13.7°N 90.7°W					eS	04	57	56	
	Depth 64km	Dist. 30.6°				eScS	04	58	20	
14	e(S)	02	54	22		esS	04	59	56	
	eLQ	03	02	32		eLR (NW)	05	10	12	
	eLR (E)	03	06	42		Sea of Okhotsk				
	Switzerland					USCGS 04 37 26.9				
	USCGS 02 37 24.6					52.5°N 153.6°E				
	47.1°N 8.3°E					Depth 440	Dist. 78.2°			
	Depth 33km	Dist. 56.8°				19	eSKS	22	09	22
14	eP	15	18	12		eLQ	22	28	12	
	eS	15	23	08		eLR (W)	22	33	52	
	eLR (SE)	15	24	52		Samoa Isls. Region				
	Leeward Isls. Region					USCGS 21 44 03.8				
	USCGS 15 12 22.4					15.1°S 172.6°W				
	15.9°N 60.5°W					Depth 33km	Dist. 106.1°			
	Depth 31km	Dist. 27.5°				21	iPKP (dil)	04	01	02
	eS	16	57	22		eSKS	04	10	25	
	eLR (SE)	17	08	52		eLR (NW)	04	39	13	
	Mid-Atlantic Ocean					eLR ₂ (SE)	05	14	13	
	USCGS 16 36 52.1					Banda Sea				
	1.9°S 12.9°W					USCGS 03 42 19.6				
	Depth 33km	Dist. 69.8°				6.4°S 127.9°E				
15	iP(Comp. from ENE)	22	39	27.5		Depth 367km	Dist. 140.5°			
	epP	22	39	40		21	eP	15	14	46
	ePcP	22	40	32		eS	15	20	31	
	iS	22	46	44		eLR (WSW)	15	25	13	
	eLQ	22	52	12		Rg	15	30	13	
	eLR (ENE)	22	54	12		Near Coast Michoacán, Mexico				
	W. of Strait of Gibraltar					USCGS 15 08 14.3				
	USCGS 22 30 26.0					18.7°N 103.1°W				
	36.2°N 7.6°W					Depth 83km	Dist. 33.1°			
	Depth 27km	Dist. 51.0°				Mag. 5 1/2				
	Mag. 6 1/4 - 6 1/2					22	eP	08	47	03
16	eP	08	57	05		eS	08	56	37	
	eSKS	09	07	24		eScS	08	57	23	
	eS	09	08	28		eLQ	09	07	53	
	eLQ	09	23	42		eLR (SSE)	09	11	33	
	eLR (N)	09	27	12		Near Coast Central Chile				
	Kurile Isls.					USCGS 08 35 06.4				
	USCGS 08 44 32.8					35.7°S 72.9°W				
	44.8°N 146.8°E					Depth 33km	Dist. 76.6°			

Palisades, New York				6	1964				
Date	Phase	h	m	s	Date	Phase	h	m	s
Mar. 24	eP	08	33	09	Mar. 28	Continued			
	epP	08	33	14		59.9°N 147.8°W			
	eS	08	37	16		Depth 15km Dist. 47.9°			
	eLQ	08	38	13					
	eLR (SE)	08	39	33	28	iP	06	53	01
	N. of Puerto Rico					iPcP	06	54	10
	USCGS 08 28 10.4					Alaska			
	19.2°N 65.9°W					USCGS 06 43 57.4			
	Depth 58km Dist. 22.9°					58.3°N 151.3°W			
26	eP	13	39	15		Depth 25km Dist. 49.9°			
	eS	13	46	53	28	eP	06	59	49
	eLR (SW)	13	56	03		epP	07	00	19
	1500km SW Galapagos Isls.					ePcP	07	02	22
	USCGS 13 29 56.2					Alaska			
	4.4°S 104.7°W					USCGS 06 50 48.9			
	Depth 33km Dist. 53.5°					57.1°N 152.3°W			
	Mag. 5 1/2					Depth 33km Dist. 50.7°			
27	eS	17	25	13	28	iP	07	03	45
	eLR	17	32	13		Alaska			
	Costa Rica					USCGS 06 53 35.6			
	USCGS 17 12 36.3					58.8°N 149.5°W			
	9.2°N 84.0°W					Depth 20km Dist. 48.9°			
	Depth 33km Dist. 33.1°				28	iP (dil)	07	17	48
28	eP	03	44	50.5		iPcP	07	19	08
	iP	03	44	52		Alaska			
	(14 sec 21 μ dil from NW)					USCGS 07 09 12			
	ipP	03	45	15		Alaska			
	iS	03	51	47		USCGS 07 09 12			
	eLQ	03	57	00		60.0°N 147.5°W			
	Prince Wm. Sound, Alaska					Depth 33km Dist. 47.8°			
	USCGS 03 36 12.7				28	iP (dil)	07	19	15
	61.1°N 147.6°W					iPcP	07	20	38
	Depth 20km Dist. 47.5°					Alaska			
	Mag. 8.6					USCGS 07 10 2.3			
28	iP	05	17	52		58.8°N 149.5°W			
						Depth 20km Dist. 49.0°			
28	iP	05	42	24	28	iP	07	39	28
	iPcP	05	44	41		Alaska			
	Alaska					USCGS 07 30 29.6			
	USCGS 05 33 52.6					57.4°N 151.7°W			
	60.2°N 146.2°W					Depth 15km Dist. 50.6°			
	Depth 20km Dist. 46.9°				28	eP	07	52	37
28	iP	06	17	25		Alaska			
	iPcP	06	18	51		USCGS 07 47 47.1			
	Alaska					58.3°N 150.2°W			
	USCGS 06 08 44.2					Depth 33km Dist. 49.4°			
	60.1°N 148.6°W				28	eP	08	14	09
	Depth 20km Dist. 48.2°					Alaska			
28	iP	06	41	14		USCGS 10 35 31.2			
	iPcP	06	42	42		60.9°N 143.7°W			
	Alaska					Depth 25km Dist. 45.8°			
	USCGS 06 32 38.6				28	iP	10	44	46
	60.1°N 147.6°W					Alaska			
	Depth 33km Dist. 47.7°					USCGS 10 35 38.9			
26	iP	06	50	07		57.2°N 152.4°W			
	iPcP	06	51	34		Depth 35km Dist. 51.0°			
	Alaska								
	USCGS 06 41 28.0								

Palisades, New York				7	1964					
Date	Phase	h	m	s	Date	Phase	h	m	s	
Mar. 28	eP	09	04	08	Mar. 28	iP	11	17	06	
	Alaska					ipP	11	17	15	
	USCGS 08 55 22.8					ePcP	11	18	33	
	56.7°N 151.9°W					Alaska				
	Depth 25km Dist. 50.7°					USCGS 11 08 26.0				
28	eP (dil)	09	08	23		60.1°N 148.4°W				
	iPcP	09	10	01		Depth 15km Dist. 48.2°				
	Alaska				28	ePKP	11	49	05	
	USCGS 09 01 00.5					iPKS	11	52	36	
	56.5°N 152.0°W					N. Celebes				
	Depth 20km Dist. 50.9°					USCGS 11 30 09.8				
28	eP	09	10	08		0.5°N 122.3°E				
						Depth 140km Dist. 136.2°				
28	eP	09	14	57	28	iP	12	11	50	
	Alaska					epP	12	12	09	
	USCGS 09 05 56.4					iPcP	12	13	21	
	56.6°N 153.2°W					Alaska				
	Depth 25km Dist. 51.3°					USCGS 12 03 16.5				
28	iP	09	22	47		60.3°N 146.6°W				
	iPcP	09	24	07		Depth 15km Dist. 47.2°				
	Alaska				28	iP (dil)	12	29	58	
	USCGS 09 13 56.6					iPcP	12	31	12	
	59.4°N 151.2°W					Alaska				
	Depth 35km Dist. 49.6°					USCGS 12 20 49.8				
28	iP	10	01	28		56.5°N 154.0°W				
	ePcP	10	02	59		Depth 25km Dist. 52.0°				
	Alaska				28	eP	13	09	49	
	USCGS 09 52 55.7					Alaska				
	59.7°N 146.6°W					USCGS 13 01 14.2				
	Depth 30km Dist. 47.2°					60.1°N 147.0°W				
28	eP	10	13	20		Depth 20km Dist. 47.4°				
	eS	10	17	07						
	Lg	10	19	43		28	eP	13	36	14
	Nebraska-S. Dakota Border					Alaska				
	USCGS 10 08 42.7					USCGS 13 27 38.5				
	43.0°N 101.6°W					60.3°N 147.1°W				
	Depth 16km Dist. 20.5°					Depth 15km Dist. 47.4°				
28	iP	10	41	57	28	iP (dil)	14	56	13	
	epP	10	42	34		iPcP	14	57	50	
	iPcP	10	43	14		iS	15	02	01	
	Alaska					eLR (NW)	15	11	13	
	USCGS 10 33 00.2					Alaska				
	57.7°N 152.2°W					USCGS 14 47 37.1				
	Depth 35km Dist. 50.4°					60.4°N 146.5°W				
28	iP	10	44	38		Depth 10km Dist. 47.2°				
	Alaska					Mag. 6 1/2 - 6 3/4				
	USCGS 10 35 31.2				28	iP	16	53	14	
	60.9°N 143.7°W					epP	16	53	21	
	Depth 25km Dist. 45.8°					ePcP	16	54	41	
28	iP	10	44	46		Alaska				
	Alaska					USCGS 16 44 35.9				
	USCGS 10 35 38.9					59.3°N 147.8°W				
	57.2°N 152.4°W					Depth 25km Dist. 48.1°				
	Depth 35km Dist. 51.0°				28	eP	20	37	47	
						iP	20	37	51	
						iS	20	44	49	
						iScS	20	47	37	
						eLQ	20	50	13	

Palisades, New York				12				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Apr 5	Continued				Apr 8	Continued					
	41.9°S 83.7°W					USCGS 10 58 09.1					
	Depth 33 km Dist. 83.1°					45.8°N 150.8°E					
						Depth 40 km Dist. 84.5°					
5	eS	17	57	35		Mag. 5 1/4 - 5 1/2					
	eLQ	18	04	45	8	eP	19	41	53.5		
	eLR (NW)	18	07	15		ePcP	19	43	25		
	Alaska					eS	19	49	45		
	USCGS 17 40 43.1					eScS	19	52	35		
	56.3°N 152.9°W					eLQ	19	55	45		
	Depth 10 km Dist. 51.6°					eLR (NW)	19	58	55		
5	iP	19	36	52		Rg	20	01	55		
	ePcP	19	38	27		Alaska					
	eS	19	43	51		USCGS 19 33 19.0					
	eLQ	19	48	15		59.6°N 147.0°W					
	eLR (NW)	19	51	35		Depth 15 km Dist. 47.6°					
	Alaska					Mag. 5 1/2					
	USCGS 19 28 18.1				8	eP	19	58	45		
	60.2°N 146.7°W					eLQ	20	13	15		
	Depth 15 km Dist. 47.4°					eLR (NW)	20	16	55		
	Mag. 5 1/2					Mag. 5 1/4 - 5 1/2					
6	eP	10	51	06	9	eP	13	14	48		
	ePcP	10	51	57		eS	13	21	39		
	eS	10	58	05		eScS	13	24	35		
	eScS	11	01	15		eLQ	13	26	15		
	eLQ	11	04	15		eLR (NW)	13	28	45		
	eLR (NW)	11	06	35		Alaska					
	Alaska					USCGS 13 06 15.2					
	USCGS 10 42 36.3					59.6°N 146.1°W					
	59.9°N 145.6°W					Depth 15 km Dist. 47.1°					
	Depth 15 km Dist. 47.4°					Mag. 5 1/2 - 5 3/4					
	Mag. 5 1/4				9	eP	22	04	51		
6	eP	13	56	59		eS	22	12	25		
	epP	13	56	59		eLQ	22	21	15		
	Aleutians					eLR (SE)	22	26	35		
	USCGS 13 45 10.5					S. Peru					
	52.5°N 173.9°W					USCGS 21 54 42.1					
	Depth 115 km Dist. 64.1°					18.5°S 71.5°W					
						Depth 34 km Dist. 59.2°					
7	eP	19	37	28	10	eP	01	16	52		
	ePcP	19	38	38		epP	01	17	17		
	eS	19	45	05		iPcP	01	18	14		
	eLR (NW)	19	52	16		eS	01	24	01		
	Alaska					esS	01	24	41		
	USCGS 19 28 24.7					eLR (NW)	01	31	35		
	55.7°N 151.9°W					Alaska					
	Depth 20 km Dist. 51.0°					USCGS 01 08 00.2					
8	eP (comp from N)	11	10	41		58.4°N 150.6°W					
	epP	11	11	31		Depth 15 km Dist. 49.6°					
	eS	11	20	59		Mag. 5 - 5 1/4					
	esS	11	21	25							
	eLQ	11	35	15							
	eLR (NW)	11	39	35							
	Kurile Isls.										

Palisades, New York				13				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Apr 10	eP	19	14	33	Apr 12	eP	01	33	33		
	epP	19	14	39		epP	01	33	39		
	ePcP	19	16	04		ePcP	01	34	49		
	eS	19	21	31		iS	01	40	51		
	eLR (NW)	19	28	45		eScS	01	43	19		
	Alaska					eLQ	01	47	25		
	USCGS 19 05 52.6					eLR (NW)	01	49	15		
	59.7°N 148.2°W					Alaska					
	Depth 15 km Dist. 48.0°					USCGS 01 24 31.2					
	Mag. 5 - 5 1/4					56.6°N 152.2°W					
10	eP	21	53	07.5		Depth 22 km Dist. 50.9°					
	ipP	21	53	12.5		Mag. 6 1/4 - 6 1/2					
	ePcP	21	54	24	12	eP	05	49	38		
	eS	22	00	27							
	eLQ	22	05	25	12	ePKP	06	19	37		
	eLR (NW)	22	07	35		New Hebrides Isls.					
	Rg	22	14	15		USCGS 06 00 46.4					
	Alaska					13.6°S 166.0°E					
	USCGS 21 44 06.7					Depth 33 km Dist. 121.4°					
	60.1°N 153.7°W										
	Depth 10 km Dist. 50.9°				12	eS	09	51	05		
	Mag. 5 1/2 - 5 3/4					eLR (NW)	10	01	45		
11	ePKP	01	22	44		Alaska					
	Kermadec Isls.					USCGS 09 34 44.1					
	USCGS 01 04 30.2					56.6°N 152.1°W					
	29.0°S 178.9°W					Depth 20 km Dist. 50.9°					
	Depth 302 km Dist. 119.2°				12	ePKP	11	29	39		
11	eP	11	44	37		iPKP	11	29	43		
	eS	11	51	35		eSKS	11	36	31		
	eLR	11	58	15		eLQ	12	02	45		
	Alaska					eLR (W)	12	08	15		
	USCGS 11 36 00.5					Kermadec Isls.					
	60.4°N 146.4°W					USCGS 11 10 54.8					
	Depth 15 km Dist. 47.1°					33.9°S 179.8°W					
	Mag. 5					Depth 89 km Dist. 122.6°					
11	eS	12	32	55	12	eP	12	45	21		
	eLQ	12	39	55		ePcP	12	46	41		
	eLR (NW)	12	43	15		eS	12	52	55		
	Alaska					eLQ	12	57	45		
	USCGS 12 16 41.1					eLR (NW)	13	00	45		
	56.6°N 151.0°W					Alaska					
	Depth 20 km Dist. 50.4°					USCGS 12 36 23					
11	eP	16	11	57		56.4°N 151.4°W					
	epP	16	12	33		Depth 30 km Dist. 50.6°					
	eS	16	21	25		Mag. 5 1/2					
	eLQ	16	30	55	12	eP	12	57	00		
	eLR (ESE)	16	33	15		ePcP	12	57	56		
	Aegean Sea					eS	13	04	25		
	USCGS 16 00 42.8					eLQ	13	12	25		
	40.5°N 25.0°E					eLR (NW)	13	15	55		
	Depth 33 km Dist. 70.5°					Alaska					
	Mag. 5 1/4					USCGS 12 48 02.2					
						56.6°N 151.3°W					
						Depth 33 km Dist. 50.4°					
						Mag. 5 1/2 - 5 3/4					

Palisades, New York				14				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Apr 12	eP	17	30	30	Apr 13	Continued					
	ePcP	17	31	26		USCGS 16 14 06.3					
	eS	17	37	25		56.6°N 152.1°W					
	eLQ	17	41	55		Depth 33 km Dist. 50.9°					
	eLR (NW)	17	44	45		Mag. 5 - 5 1/4					
	Alaska				13	eP	16	53	02		
	USCGS 17 22 02.2										
	60.2°N 145.6°W				13	eP	20	39	37		
	Depth 20 km Dist. 46.8°					ePcP	20	40	23		
	Mag. 5 1/4 - 5 1/2										
13	ePKP	01	16	53	13	eP	21	34	37		
	eLR	02	00	15		ePcP	21	35	50		
	N. Celebes					eS	21	42	15		
	USCGS 00 57 43.5					eLQ	21	47	35		
	0.1°N 123.0°E					eLR (NW)	21	49	15		
	Depth 97 km Dist. 136.4°					Alaska					
						USCGS 21 25 33.0					
13	eP	08	40	33		57.5°N 153.9°W					
	ePcP	08	41	20		Depth 30 km Dist. 52.5°					
	eS	08	49	05		Mag. 4 3/4					
	eScS	08	50	35	13	eP	22	01	28		
	eLQ	08	55	15		ePcP	22	02	13		
	eLR (ENE)	09	00	45							
	N. Yugoslavia				14	ePP	09	19	35		
	USCGS 08 30 03.6					eLR (NW)	09	56	15		
	45.3°N 18.1°E					New Hebrides					
	Depth 33 km Dist. 63.7°					USCGS 08 58 41.9					
	Mag. 5 1/4					17.5°S 167.9°E					
13	eP	12	34	02		Depth 33 km Dist. 122.4°					
	ePcP	12	34	55		Mag. 5 1/4 - 5 1/2					
	eS	12	40	55	14	eP	14	40	08		
	esS	12	41	03							
	eLQ	12	45	45	14	eP	14	47	44		
	eLR (NW)	12	47	45							
	Alaska aftershock				14	eP	16	04	08		
	USCGS 12 25 36					eS	16	10	54		
	59.4°N 143.9°W					eScS	16	13	46		
	Depth 40 km Dist. 46.1°					eLQ	16	16	14		
	Mag. 5 3/4 - 6					eLR (NW)	16	18	14		
13	eP	14	13	54		Alaska					
	epP	14	14	02		USCGS 15 55 10.9					
	ePcP	14	15	20		61.3°N 147.3°W					
	eS	14	21	23		Depth 30 km Dist. 47.3°					
	eScS	14	24	45	14	ePKP	16	38	29		
	eLR (NW)	14	29	35		Sumbawa					
	Alaska					USCGS 16 18 54					
	USCGS 14 05 00.0					8.6°S 117.3°E					
	57.6°N 151.2°W					Depth 58 km Dist. 146.2°					
	Depth 25 km Dist. 50.1°				14	eP	20	59	19		
	Mag. 5 - 5 1/4										
13	eS	16	30	27	14	iP	23	04	30		
	eLR (NW)	16	41	35		ePcP	23	05	21		
	Alaska										

Palisades, New York				15				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Apr 14	Continued										
	eLQ	23	17	14							
	eLR (NW)	23	19	26							
	Alaska										
	USCGS 22 55 31.3										
	58.0°N 152.6°W										
	Depth 30 km Dist. 50.7°										
	Mag. 5 3/4 - 6				15	eS	08	38	44		
						eLQ	08	46	14		
						eLR (NW)	08	48	54		
						Alaska					
						USCGS 08 23 27.4					
						57.4°N 149.5°W					
						Depth 15 km Dist. 49.3°					
15	eP	15	40	04							
	ePcP	15	40	27							
	eS	15	47	18							
	esS	15	47	30							
	eScS	15	49	38							
	eLQ	15	54	24							
	eLR (NW)	15	57	14							
	Alaska										
	USCGS 15 30 47.1										
	56.5°N 154.4°W										
	Depth 35 km Dist. 52.1°										
	Mag. 5 3/4 - 6				15	eP	19	55	59		
15	eP	22	38	40							
	ePcP	22	39	29							
16	eP	13	53	31							
	eS	14	01	50							
	eLQ	14	10	44							
	eLR (NW)	14	14	14							
	Fox Isls., Aleutians										
	USCGS 13 43 08.9										
	52.1°N 169.4°W										
	Depth 33 km Dist. 62.1°				16	iP	19	36	01		
						ePcP	19	36	57		
						iS	19	43	21		
						eScS	19	45	45		
						eLQ	19	48	13		
						eLR (NW)	19	51	13		
						Alaska					
						USCGS 19 26 57.4					
						56.4°N 152.9°W					
						Depth 30 km Dist. 51.5°					
						Mag. 6 1/2					

Palisades, New York				20			1964					
Date	Phase	h	m	s	Date	Phase	h	m	s			
May 8	eP	23	51	48.5	May 12	eP	18	25	49.5			
	ePcP	23	52	17		epP	18	25	53.5			
	eS	23	59	29		ePcP	18	27	04			
9	eScS	00	00	47		eS	18	33	05			
	eLQ	00	08	47		esS	18	33	21			
	eLR (NW)	00	12	37		eScS	18	34	37			
	Aleutians					eLQ	18	39	47			
	USCGS 23 40 44.1					eLR (NW)	18	41	27			
	52.2°N 169.5°W					Alaska Aftershock						
	Depth 20 km Dist. 62.1°					USCGS 18 16 41.9						
	Mag. 5 1/2					56.6°N 152.4°W						
						Depth 10 km Dist. 51.2°						
9	eP	02	12	49		Mag. 6 - 6 1/4						
	eS	02	21	13	13	eS	03	35	37			
	esS	02	21	31		eLR (NE)	03	42	17			
	eLQ	02	30	17		Svalbard Region						
	eLR (NW)	02	34	17		USCGS 03 19 43.2						
	Aleutians					76.0°N 8.2°E						
	USCGS 02 02 28.8					Depth 33 km Dist. 48.7°						
	52.2°N 169.6°W											
	Depth 25 km Dist. 62.1°					13	eP	05	41	17		
	Mag. 5 1/4						ePKP	05	44	37		
11	eP	21	40	33			eSKS	05	51	17		
11	eP	21	54	00			eLQ	06	15	57		
							eLR (WSW)	06	21	37		
12	i(Pn)	06	45	47.8			Kermadec Isls. Region					
	ePg	06	45	53.5			USCGS 05 25 26.1					
	eSn	06	46	11.8			32.8°S 178.3°W					
	eSg	06	46	14.8			Depth 33 km Dist. 120.6°					
	Lg	06	46	44			Mag. 6 1/4 - 6 1/2					
	S. E. Pennsylvania											
	USCGS 06 45 14.1						14	ePKP	02	49	30	
	40.2°N 76.5°W							eSKS	03	08	27	
	Depth 33 km Dist. 2.1°							eLQ	03	23	27	
12	ePKP	07	28	20.3				eLR (NW)	03	30	47	
	Timor							New Ireland Region				
	USCGS 07 08 44.6							USCGS 02 30 32.2				
	11.0°S 126.0°E							4.5°S 152.9°				
	Depth 33 km Dist. 145.3°							Depth 32 km Dist. 124.5°				
12	eS	12	03	05				14	iP	13	36	34
	eScS	12	05	57								
	eLQ	12	10	37								
	eLR (NW)	12	12	37								
	Alaska											
	USCGS 11 47 32.2											
	60.1°N 147.0°W											
	Depth 15 km Dist. 47.5°											
12	eS	17	11	05								
	eLR (NW)	17	15	47								
	Alaska aftershock											
	USCGS 16 55 46.9											
	59.5°N 144.8°W											
	Depth 33 km Dist. 46.6°											

Palisades, New York				21			1964		
Date	Phase	h	m	s	Date	Phase	h	m	s
May 16	ePP	16	28	01	May 19	Continued			
	eSS	16	44	37		77.7°N 18.3°E			
	eLQ	16	58	27		Depth 33 km Dist. 50.7°			
	eLR (SW)	17	05	37					
	Kermadec Isl. Region				19	e(P)	10	52	17
	USCGS 16 07 46.2					eS	11	02	37
	32.8°S 178.3°W					eLQ	11	17	37
	Depth 33 km Dist. 120.6°					eLR (NW)	11	20	37
	Mag. 5 3/4 - 6					Kurile Isls.			
						USCGS 10 39 24.8			
17	eP	00	58	35		45.5°N 150.3°E			
	eS	01	05	23		Depth 33 km Dist. 85.4°			
	eLQ	01	10	45					
	eLR	01	12	57	19	eS	15	53	57
	Lg	01	14	57		eLQ	16	01	37
	Rg	01	18	57		eLR	16	04	17
	Alaska aftershock					Alaska aftershock			
	USCGS 00 50 17.9					USCGS 15 37 35.9			
	59.4°N 142.7°W					57.0°N 152.8°W			
	Depth 35 km Dist. 45.6°					Depth 25 km Dist. 51.3°			
	Mag. 6 1/4 - 6 1/2								
17	eP	04	51	22	19	eP (comp from SW)	23	11	30.5
	ePcP	04	52	19		epP	23	11	46.5
	eS	04	59	07		ePcP	23	13	09
	esS	04	59	26		eS	23	17	48.5
	eLQ	05	06	16		eS	23	18	17
	eLR (NW)	05	10	46		eScS	23	21	17
	S. of Alaska					eLR (S)	23	25	17
	USCGS 04 41 44					Ecuador-near coast			
	53.9°N 159.7°W					USCGS 23 03 41.8			
	Depth 33 km Dist. 56.1°					0.7°S 80.2°W			
	Mag. 4 3/4					Depth 54 km Dist. 42.2°			
						Mag. 5 1/2			
17	eP	19	32	30	20	ePKP	06	22	38.5
	eS	19	37	30		eLQ	06	57	17
	esS	19	37	50		eLR (NW)	07	02	37
	eLQ	19	38	56		Near N. Coast New Guinea			
	eLR (NNE)	19	39	56		USCGS 06 01 14.8			
	N. Atlantic Ocean					2.7°S 139.3°E			
	USCGS 19 26 20.6					Depth 61 km Dist. 132.0°			
	35.2°N 35.9°W					Mag. 5 3/4			
	Depth 33 km Dist. 30.3°								
	Mag. 6 - 6 1/4								
18	eS	14	02	56	21	eS	01	26	46
	eLQ	14	10	26		eLR (NW)	01	32	46
	eLR (NW)	14	12	16		Alaska			
	Alaska aftershock					USCGS 01 11 23.4			
	USCGS 13 47 22.7					60.4°N 145.9°W			
	59.6°N 145.0°W					Depth 15 km Dist. 46.9°			
	Depth 20 km Dist. 46.6°								
19	eS	06	25	27	21	eP	15	45	04
	eLQ	06	31	17		epP	15	45	09
	eLR (NE)	06	33	37		eS	15	52	24
	Svalbard Region					esS	15	52	56
	USCGS 06 09 04.1					eScS	15	54	42
						eLQ	15	57	36
						eLR (NW)	16	00	06
						Alaska			

PALISADES.
July - Dec '64

LAMONT GEOLOGICAL OBSERVATORY
COLUMBIA UNIVERSITY
PALISADES, NEW YORK



SEISMOLOGICAL BULLETIN

By

RUTH B. SIMON

30 June 1964 - 31 December 1964

L.G.O. Contribution No. 992

STATION CONSTANTS

Latitude: $41^{\circ} 00' 25''$ North
 Longitude: $73^{\circ} 54' 31''$ West
 Elevation: 102.59 meters
 Bedrock: Palisades disbase Triassic Age

Abbreviations

i = sudden beginning of the motion (impetus)
 e = gradual beginning of the motion (emersio)
 Comp. = compression
 Dil. = dilatation

All times are G. C. T.

Time - I. B. M. Invar pendulum clock corrected by Naval
 Observatory time signals every six hours.

INSTRUMENTS

Three component Columbia University seismographs,
 To = 12 sec., Tg = 15 sec.

Three component Benioff seismographs. Short-period, To = 1 sec.,
 Tg = 0.2 sec. Long-period, To = 1 sec., Tg = 75 sec.

One Columbia University vertical seismograph, To = .33 sec.,
 Tg = 0.2 sec.

Three component Columbia University visual recording
 seismographs, To = 12 sec.

One Columbia University vertical seismograph for visual
 recording, To = 1 sec.

Three component Columbia University long-period seismographs,
 To = 15 sec., Tg = 75 sec.

Three component Columbia University long-period seismographs,
 To = 30 sec., Tg = 100 sec.

Three component Columbia University long-period seismographs,
 To = 30 sec., Tg = 100 sec. P₂. Filter galvanometers of 6.7 sec.
 are in operation from October through May.

Two Columbia University microbarographs, To = 10 sec.,
 Tg = 75 sec.

Palisades, New York					1					1964				
Date	Phase	h	m	s	Date	Phase	h	m	s					
Jul 1	eP	03	00	11	Jul 2	Continued								
	epP	03	00	23		eLQ	07	00	32					
	eSKS	03	10	43		eLR (NW)	07	03	32					
	eLQ	03	25	33		Aleutians								
	eLR (NW)	03	29	23		USCGS 06 35 18								
	Kurile Isls.					53.4°N 167.8°W								
	USCGS 02 47 33.9					Depth 45 km Dist. 60.6°								
	46.3°N 146.9°E					Mag. 4 3/4 - 5								
	Depth 33 km Dist. 86.0°													
	Mag. 5				2	eS	15	22	44					
1	eP	09	59	21		eLR (NW)	15	27	12					
	epP	09	59	35		Off Coast Washington								
	eS	10	09	49		USCGS 15 09 13.5								
	eLQ	10	25	13		47.6°N 128.7°W								
	eLR (NW)	10	30	33		Depth 33 km Dist. 39.3°								
	Kurile Isls.					Mag. 4 3/4 - 5								
	USCGS 09 46 49.6				2	eP	17	11	05					
	45.2°N 150.3°E					ePcP	17	12	37					
	Depth 75 km Dist. 85.8°					eS	17	17	12					
	Mag. 5 - 5 1/4					esS	17	17	32					
1	eP	20	15	12		eLQ	17	20	42					
	eLR (SE)	20	19	52		eLR (NNW)	17	22	22					
	N. Atlantic Ocean					Rg	17	27	12					
	USCGS 20 09 31.2					Off Coast Washington								
	30.9°N 41.5°W					USCGS 17 03 42.4								
	Depth 33 km Dist. 28.0°					47.7°N 128.3°W								
						Depth 33 km Dist. 38.5								
						Mag. 5 1/2 - 5 3/4								
1	eP (dil from S)	22	58	42	2	eP	17	25	03					
	ePcP	22	59	02		epP	17	25	22					
	epP	22	59	14		ePcP	17	26	35					
	epPcP	22	59	44		eLR (NNW)	17	36	12					
	eS	23	06	18		Rg	17	41	12					
	esS	23	06	56		Off Coast Washington								
	eScS	23	07	16		USCGS 17 17 34.4								
	eLQ	23	13	52		47.7°N 128.8°W								
	eLR (S)	23	15	42		Depth 14 km Dist. 39.2°								
	S. Peru					Mag. 5 1/2								
	USCGS 22 49 23.4				3	eP	05	12	12					
	14.3°S 73.1°W					eS	05	17	32					
	Depth 139 km Dist. 54.7°					eLR (WSW)	05	22	32					
	Mag. 5 1/4					Jalisco, Mexico								
2	eP	01	27	35		USCGS 05 05 33.8								
	epP	01	27	40		19.4°N 104.3°W								
	eS	01	34	36		Depth 102 km Dist. 33.5°								
	eScS	01	37	32		Mag. 4 1/4 - 4 1/2								
	eLQ	01	40	32										
	eLR (NW)	01	43	22										
	Alaska aftershock				4	eP	12	23	25					
	USCGS 01 19 02.7					epP	12	23	44					
	60.1°N 146.0°W					eLQ	12	36	32					
	Depth 14 km Dist. 47.0°					eLR	12	42	02					
	Mag. 5 1/4					S. Peru								
2	eP	06	45	20		USCGS 12 13 56.9								
	eS	06	53	40		15.5°S 72.5°W								
						Depth 148 km Dist. 56.2°								

Palisades, New York					4	1964				
Date	Phase	h	m	s	Date	Phase	h	m	s	
Jul 14	Continued				Jul 17	iP	04	53	03.9	
	eS	10	04	23.5		eS	05	03	00	
	iS	10	04	35		Kurile Isls.				
	eLR (SSE)	10	06	05		USCGS 04 41 05.1				
	T (max)	10	22	21		49.3°N 158.6°E				
	Puerto Rico					Depth 50 km Dist. 79.2°				
	USCGS 09 55 24.4									
	19.0°N 66.5°W				17	eP	23	07	22	
	Depth 46 km Dist. 22.7°					epP	23	07	32	
	Mag. 4 1/4 - 4 1/2					eS	23	17	52	
14	eS	13	00	45		eLR (NW)	23	34	30	
	esS	13	01	33		Kurile Isls.				
	eLR (WNW)	13	05	43		USCGS 22 54 42.2				
	Near Coast N. California					44.6°N 149.2°E				
	USCGS 12 47 25.6					Depth 33 km Dist. 86.1°				
	41.8°N 125.7°W					Mag. 5				
	Depth 33 km Dist. 38.5°				18	eS	04	01	12	
	Mag. 4 1/2					Dodecanese Isls.				
14	eP	23	07	33		USCGS 03 40 21.5				
	eS	23	14	23		36.3°N 26.1°E				
	eLR (WNW)	23	21	43		Depth 115 km Dist. 73.9°				
	Alaska				18	eS	20	49	54	
	USCGS 22 59 09.2					eLQ	20	53	43	
	59.5°N 144.8°W					eLR	20	55	45	
	Depth 20 km Dist. 46.6°					Off W. Coast Nicaragua				
	Mag. 4 1/2 - 4 3/4					USCGS 20 37 36				
15	eP	07	36	24		11.0°N 87.0°W				
	eS	07	44	49		Depth 33 km Dist. 32.0°				
	eLQ	07	56	33	18	eP	23	44	41	
	eLR (NW)	07	59	43		eS	23	51	38	
	Aleutians					eScS	23	54	54	
	USCGS 07 26 01.4					eLQ	23	57	24	
	52.1°N 170.6°W					eLR (NNW)	23	59	24	
	Depth 30 km Dist. 62.9°				19	Rg	00	03	39	
	Mag. 4 3/4 - 5					Alaska				
16	eS	11	00	43		USCGS 23 36 21.0				
	eLR	11	17	43		60.0°N 143.4°W				
	Kurile Isls.					Depth 33 km Dist. 45.5°				
	USCGS 10 37 23.1					Mag. 4 1/2 - 4 3/4				
	44.0°N 148.3°E				20	iP	18	56	50	
	Depth 33 km Dist. 87.4°					eS	19	02	32	
17	eP	02	45	30		eLQ	19	05	32	
	iP	02	45	31		eLR (SW)	19	07	26	
	epP	02	46	01		Revilla Gigedo				
	ipP	02	46	11		USCGS 18 49 43.5				
	iS	02	54	24		19.8°N 109.0°W				
	isS	02	55	18		Depth 33 km Dist. 36.4°				
	e(LR) (E)	03	07	53		Mag. 5				
	S. Greece				21	iP	01	16	26	
	USCGS 02 34 26.9					eS	01	22	14	
	38.2°N 23.7°E					eLQ	01	25	14	
	Depth 150 km Dist. 71.4°					eLR (SW)	01	27	06	
						Lg	01	28	46	

Palisades, New York					5	1964				
Date	Phase	h	m	s	Date	Phase	h	m	s	
Jul 21	Continued				Jul 24	Continued				
	Rg	01	31	00		14.2°N 91.6°W				
	Off Coast Mexico					Depth 65 km Dist. 31.2°				
	USCGS 01 09 25.8				24	eP (comp.)	07	03	15	
	19.8°N 108.8°W					iS	07	13	33	
	Depth 31 km Dist. 36.4°					eLQ	07	24	50	
	Mag. 5 1/4					eLR (NW)	07	33	06	
21	ePP	04	08	27		Kurile Isls.				
	eSS	04	24	25		USCGS 06 50 52.8				
	eLQ	04	36	15		46.9°N 153.9°E				
	eLR (WSW)	04	46	41		Depth 33 km Dist. 82.6°				
	Fiji Isls. Region					Mag. 6 - 6 1/4				
	USCGS 03 48 59.1				24	eP (comp.)	08	25	01	
	26.0°S 178.0°W					iS	08	35	16	
	Depth 222 km Dist. 116.8°					eLQ	08	46	44	
	Mag. 5 1/2					eLR (NW)	08	51	16	
21	eP	07	08	08		Kurile Isls.				
	epP	07	08	32		08 12 40.0				
	eS	07	13	05		47.2°N 153.8°E				
	eLQ	07	15	23		Depth 33 km Dist. 82.6°				
	eLR (SW)	07	16	27		Mag. 6 3/4				
	Near El Salvador				24	eS	13	47	56	
	USCGS 07 01 59.3					eLR (NW)	14	09	16	
	13.1°N 88.4°W					Kurile Isls.				
	Depth 68 km Dist. 30.5°					USCGS 13 25 18.3				
21	eS	10	15	51		46.9°N 154.0°E				
	eLQ	10	23	29		Depth 33 km Dist. 82.6°				
	eLR (NNW)	10	27	00	24	iP (comp.)	17	15	10	
	Laptev Sea					iS	17	25	24	
	USCGS 09 56 16.6					eLR (NW)	17	45	16	
	72.1°N 130.2°E					Kurile Isls.				
	Depth 33 km Dist. 66.0°					USCGS 17 02 49.2				
	Mag. 5					47.1°N 153.6°E				
21	ePP	21	22	25		Depth 33 km Dist. 82.6°				
	eSS	21	39	33		Mag. 5 3/4				
	eLR (NW)	21	01	05	25	iP (comp.)	19	42	12	
	New Britain Region					iS	19	51	11	
	USCGS 21 01 49.5					eLR (SE)	20	04	49	
	4.6°S 153.3°E					N. Chile				
	Depth 60 km Dist. 124.9					USCGS 19 31 07.0				
	Mag. 5 1/4					27.9°S 70.9°W				
22	eS	10	46	09		Depth 26 km Dist. 68.7°				
	eLQ	10	49	05		Mag. 6				
	eLR (W)	10	55	00	27	eP	23	13	18	
	Gulf of California					eS	23	23	13	
	USCGS 10 34 11.9					eLQ	23	39	40	
	31.7°N 114.1°W					eLR (NW)	23	44	10	
	Depth 33 km Dist. 33.2°					Kurile Isls.				
24	eS	01	50	45		USCGS 23 00 36.3				
	eLR (SW)	01	56	00		46.8°N 153.8°E				
	W. Coast Guatemala					Depth 33 km Dist. 82.6°				
	USCGS 01 39 39.0					Mag. 5				

Palisades, New York				8				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Aug 18	Continued				Aug 23	Continued					
	eS	05	04	47		Depth 63 km Dist. 127.9°					
	eScS	05	05	25		Mag. 6 - 6 1/4					
	eLR (SSE)	05	15	57							
	N. Chile				24	eP	22	05	44		
	USCGS 04 44 58.0					ePcP	22	07	10.5		
	26.4°S 71.5°W					eS	22	12	53		
	Depth 8 km Dist. 67.2°					eLR (NW)	22	21	13		
	Mag. 5 - 5 1/4					Gulf of Alaska					
						USCGS 21 56 54.2					
20	eS	02	23	46		58.4°N 150.3°W					
	eLR (NE)	02	30	46		Depth 22 km Dist. 49.4°					
	Norwegian Sea					Mag. 5					
	USCGS 02 08 15.8										
	72.1°N 1.4°E				25	eSS	08	11	03		
	Depth 33 km Dist. 47.2°					eLR (SE)	08	22	13		
						Near Coast Central Chile					
20	eS	04	09	46		USCGS 07 45 47.1					
	eLR (NE)	04	14	26		37.6°S 73.7°W					
	Iceland					Depth 24 km Dist. 78.6°					
	USCGS 03 56 27.2					Mag. 5					
	63.9°N 20.5°W										
	Depth 33 km Dist. 38.2°				25	eS	11	33	19		
20	eP	08	43	40		eLQ	11	45	33		
	eLR (SE)	08	50	16		eLR (NE)	11	50	01		
	Windward Isls.					Dodecanese Isls.					
	USCGS 08 37 47.1					USCGS 11 11 53.6					
	14.9°N 60.4°W					36.1°N 28.7°E					
	Depth 65 km Dist. 28.6°					Depth 50 km Dist. 75.8°					
						Mag. 5					
22	ePKP	00	18	49	25	eP (dil from NNW)	13	57	27.5		
	eSKS	00	26	15		epP	13	57	45		
	eLQ	01	00	45		ePcP	13	58	13		
	eLR (W)	01	08	15		eS	14	05	47		
	N. W. of Australia					eScS	14	07	23		
	USCGS 23 58 56.6					eLQ	14	12	33		
	12.2°S 110.5°E					eLR (NNW)	14	15	37		
	Depth 35 km Dist. 150.8°					East of Severnaya Zemlya					
						USCGS 13 47 20.6					
22	eS	03	15	55		78.2°N 126.6°E					
	eLQ	03	18	35		Depth 50 km Dist. 60.6°					
	eLR (W)	03	19	45		Mag. 6 1/2 - 6 3/4					
	Rg	03	23	55							
	Gulf of California				25	eP	14	26	44.5		
	USCGS 03 03 20.7										
	31.5°N 114.3°W				27	e(SKs)	19	53	28		
	Depth 15 km Dist. 33.5°					eLQ	20	05	14		
	Mag. 5 1/4 - 5 1/2					eLR (NE)	20	10	14		
						E. Mediterranean Sea					
23	eP	15	39	44		USCGS 19 31 56.9					
	ePKP	15	43	04		35.5°N 28.7°E					
	eSKS	15	50	14		Depth 33 km Dist. 76.1°					
	eLQ	16	18	14							
	eLR (NW)	16	23	34	29	e(S)	06	24	44		
	New Britain Region					eLQ	06	28	24		
	USCGS 15 24 05.3					eLR	06	30	24		
	6.1°S 149.4°E					S. Bolivia					

Palisades, New York				9				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Aug 29	Continued				Sep 4	Continued					
	USCGS 06 05 24.2					24.2°N 108.6°W					
	19.3°S 66.3°W					Depth 33 km Dist. 33.5°					
	Depth 232 km Dist. 60.2°					Mag. 4 3/4					
31	eP	02	26	35	4	ePKP	10	53	34		
	eS	02	36	45		eLQ	11	32	17		
	eLQ	02	49	55		eLR (NW)	11	38	17		
	eLR (SW)	02	53	45		W. New Guinea Region					
	Easter Isl. Cordillera					USCGS 10 34 13.1					
	USCGS 02 14 20.3					4.0°S 131.4°E					
	35.2°S 106.0°W					Depth 33 km Dist. 136.7°					
	Depth 33 km Dist. 81.2°					Mag. 5 3/4 - 6					
Sep 1	eP	17	27	07	5	eP	03	09	17		
	epP	17	27	11		ePKP	03	12	53		
	eS	17	35	39		eLQ	03	45	57		
	eLQ	17	42	15		eLR ₁ (NW)	03	51	27		
	eLR (NW)	17	45	35		eLR ₂ (SE)	04	48	27		
	Aleutians					Solomon Isls.					
	USCGS 17 16 40.4					USCGS 02 53 50.6					
	51.2°N 170.6°W					5.8°S 154.0°E					
	Depth 25 km Dist. 62.6°					Depth 69 km Dist. 124.9°					
	Mag. 4 3/4 - 5					Mag. 6 1/2 - 6 3/4					
3	eP	21	21	16	6	e(P)	19	08	58		
	eS	21	26	47		e(SKs)	19	17	58		
	eLR (WSW)	21	31	47		eLQ	19	32	18		
	Gulf of California					eLR (NW)	19	37	48		
	USCGS 21 14 43					Nicobar Isls. Region					
	24.6°N 108.6°W					USCGS 18 57 20.4					
	Depth 33 km Dist. 32.9°					7.1°N 93.7°E					
	Mag. 5					Depth 46 km Dist. 131.0°					
3	eS	23	54	27		Mag. 5					
	eLQ	23	58	17	6	eS	21	23	08		
	eLR (WSW)	23	59	17		eLQ	21	30	18		
	Gulf of California					eLR (SW)	21	32	58		
	USCGS 23 41 56.2					Easter Isl.					
	24.2°N 108.8°W					USCGS 21 05 48					
	Depth 15 km Dist. 33.9°					6.0°S 107.1°W					
	Mag. 4 1/4 - 4 1/2					Depth 33 km Dist. 55.8°					
4	eP	03	37	02.5		Mag. 4 3/4					
	ePcP	03	38	29	12	ePKP	13	02	06.5		
	eS	03	43	49		epPKP	13	02	44.5		
	eLQ	03	48	17		eLR (NW)	13	43	44		
	eLR (SE)	03	49	47		Near N. Coast New Guinea					
	Central Mid-Atlantic Ridge					USCGS 12 43 19.0					
	USCGS 03 28 33.1					4.4°S 144.0°E					
	7.6°N 36.9°W					Depth 120 km Dist. 130.2°					
	Depth 22 km Dist. 46.8°										
	Mag. 4 1/2				12	eSKS	15	42	46		
4	eS	10	01	57		eLR	16	05	20		
	eLR (WSW)	10	06	17		Fiji Isls. Region					
	Gulf of California					USCGS 15 19 22.3					
	USCGS 09 50 06.6					17.4°S 179.9°W					
						Depth 561 km Dist. 139.2°					

Palisades, New York			10			1964		
Date	Phase	h m s	Date	Phase	h m s			
Sep 12	eP	22 23 45	Sep 18	e(S)	13 20 33			
	ePKP	22 26 10.5		eLQ	13 26 23			
	eLQ	23 05 31		eLR (ESE)	13 28 03			
	eLR (WSW)	23 12 21		Azores				
	Auckland Isls. Region			USCGS 13 12 42.3				
	USCGS 22 07 03.2			39.8°N 29.7°W				
	49.1°S 164.2°E			Depth 20 km Dist. 33.1°				
	Depth 33 km Dist. 139.2°			Mag. 5 1/4 - 5 1/2				
	Mag. 6 1/2 - 6 3/4							
14	e(P)	10 27 23	19	eP	05 14 31			
	eLQ	10 44 21		ePcP	05 17 33			
	eLR	10 47 21		eS	05 19 47			
	Alaska			eLR (SSW)	05 22 53			
	USCGS 10 17 46.6			Mexico				
	56.7°N 157.4°W			USCGS 05 08 15.1				
	Depth 61 km Dist. 54°			15.3°N 94.0°W				
15	ePKP	15 48 37		Depth 42 km Dist. 31.3°				
	eLQ	16 22 22		Mag. 5 1/2 - 5 3/4				
	eLR (NNE)	16 28 22	20	eSKS	04 57 08			
	Nicobar Isls. Region			eS	04 58 30			
	USCGS 15 29 32.2			eLQ	05 14 52			
	8.9°N 93.1°E			eLR (SSW)	05 20 22			
	Depth 37 km Dist. 128.8°			Easter Isl. Cordillera				
	Mag. 5 1/2			USCGS 04 20 17.6 or 04 33 29.4				
16	eP	01 59 09		49.5°S 116.2°W				
	epP	01 59 28		Depth 33 km Dist. 97.5°				
	eS	02 06 02		5 1/4 - 5 1/2				
	eScS	02 08 58	23	eP	05 09 41			
	eLQ	02 13 02		ePcP	05 10 26			
	eLR (NW)	02 14 22		eS	05 17 42			
	Rg	02 19 22		eScS	05 19 26			
	Alaska			eLQ	05 26 42			
	USCGS 01 50 33.9			eLR (NNW)	05 29 52			
	60.0°N 147.1°W			Unimak Isl. Region				
	Depth 29 km Dist. 47.5°			USCGS 04 59 47.4				
	Mag. 5 3/4 - 6			53.6°N 163.9°W				
16	eP	22 29 47		Depth 29 km Dist. 58.5°				
	eS	22 34 55		Mag. 5 1/2				
	eLQ	22 36 03	23	iP	18 16 04.5			
	eLR (SE)	22 37 23		California-Nevada Border Reg.				
	N. Atlantic Ridge			USCGS 18 09 38				
	USCGS 22 23 36.3			35.9°N 114.8°W				
	22.9°N 45.1°W			Depth 15 km Dist. 32.3°				
	Depth 33 km Dist. 30.2°							
	Mag. 5							
17	eP	15 08 19.0	24	eS	14 13 14			
	eS	15 13 27		eLR (NW)	14 19 30			
	eLQ	15 14 53		Off Coast Oregon				
	eLR (E)	15 16 39		USCGS 13 59 36.8				
	N. Atlantic Ridge			43.5°N 127.5°W				
	USCGS 15 02 00.9			Depth 14 km Dist. 39.2°				
	44.5°N 31.3°W							
	Depth 24 km Dist. 31.4°							
	Mag. 5		26	e(SS)	23 33 20			
				eLR ₁	23 55 00			
				eLR ₂	00 50 30			

Palisades, New York			11			1964		
Date	Phase	h m s	Date	Phase	h m s			
Sep 26-27	Continued		Oct 2	eP	01 10 57			
	New Ireland Region			eS	01 21 09			
	USCGS 22 55 14.8			eLQ	01 34 19			
	4.9°S 153.5°E			eLR (NW)	01 37 39			
	Depth 34 km Dist. 124.5°			Sakhalin Isl.				
	Mag. 5 1/2 - 6			USCGS 00 58 39.2				
				51.9°N 142.9°E				
27	eP	16 00 00		Depth 33 km Dist. 82.0°				
	iS	16 07 14		Mag. 5 1/2 - 5 3/4				
	eLQ	16 13 46						
	eLR (NW)	16 18 00	2	eSKS	13 26 49			
	Kodiak Isls. Region			eLQ	13 50 19			
	USCGS 15 50 54.7			eLR (NW)	13 57 49			
	56.6°N 152.0°W			Solomon Isls.				
	Depth 27 km Dist. 51.0°			USCGS 13 00 39.7				
28	eP	05 15 14		10.5°S 162.4°E				
	eS	05 23 40		Depth 68 km Dist. 122.0°				
	eLQ	05 30 30		Mag. 6 - 6 1/4				
	eLR (SE)	05 32 50	2	eS	22 38 59			
	Central Mid-Atlantic Ridge			eLQ	22 45 59			
	USCGS 05 04 55.5			eLR (NW)	22 48 39			
	1.2°S 24.1°W			Gulf of Alaska				
	Depth 37 km Dist. 61.6°			USCGS 22 23 32.4				
	Mag. 5 1/4 - 5 1/2			59.7°N 144.5°W				
28	eS	15 56 49.5		Depth 22 km Dist. 46.3°				
	eLQ	15 59 35.5	4	eP	14 03 00			
	eLR (NW)	16 02 09.5		Lake Superior Shot				
	Off Coast Oregon							
	USCGS 15 43 13.6		6	eP	07 30 10.5			
	43.5°N 127.1°W			eS	07 40 08			
	Depth 33 km Dist. 38.9°			eLQ	07 51 48			
29	SKS	14 25 26.5		eLR (SW)	07 54 58			
	eLR (SW)	14 52 41.5		S. Pacific Ocean				
	Tonga Isls.			USCGS 07 17 57.1				
	USCGS 14 00 14.9			36.2°S 100.9°W				
	20.4°S 174.4°W			Depth 33 km Dist. 80.6°				
	Depth 29 km Dist. 111.0°			Mag. 5 1/2 - 5 3/4				
29	eP	19 26 49.5	6	eP	14 41 25.3			
	Lg	19 26 51.5		Turkey				
	Mt. Kisco, New York			USCGS 14 29 55.6				
Oct 1	eS	11 13 53.3		40.2°N 28.1°E				
	eLR (NW)	11 20 19.3		Depth 10 km Dist. 72.6°				
	Off Coast Oregon		6	iP (dil from E)	14 42 47.8			
	USCGS 11 00 48.3			iPcP	14 42 58			
	43.5°N 126.9°W			epP	14 43 40			
	Depth 33 km Dist. 38.9°			iS	14 52 25			
				eLQ	15 03 37			
1	eS	18 43 29		eLR (ENE)	15 05 47			
	eLR (NNW)	18 48 39		Turkey				
	Vancouver Isl. Region			USCGS 14 31 19.2				
	USCGS 18 30 01.9			40.2°N 28.1°E				
	49.3°N 128.8°W			Depth 10 km Dist. 72.6°				
	Depth 9 km Dist. 39.0°			Mag. 6 - 6 1/4				

Palisades, New York				12				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Oct 9	iP	19	33	11.0	Oct 15	ePKP	02	26	00		
	eLR	19	40	58		Solomons					
	N. Colombia										
	USCGS 19 26 39.7				15	eP	20	39	20		
	6.8°N 73.0°W					ePcP	20	39	52		
	Depth 157 km Dist. 33.9°					eS	20	49	58		
10	eP	08	33	04		eLQ	21	04	58		
						eLR (NNW)	21	08	48		
10	eP	11	33	06.5		Kurile Isls.					
						USCGS 20 26 53.5					
						44.7°N 149.8°E					
						Depth 49 km Dist. 85.8°					
10	eS	19	54	18		Mag. 6 - 6 1/4					
	eLQ	20	01	38							
	eLR (NW)	20	03	28	16	eSKS	06	39	45		
	S. Alaska					eLR (N)	07	09	38		
	USCGS 19 38 47.7					S. of Fiji Isls.					
	60.4°N 146.1°W					USCGS 06 15 31.5					
	Depth 44 km Dist. 46.9°					23.6°S 177.6°W					
10	eS	20	22	00		Depth 178 km Dist. 115.7°					
	eLQ	20	28	54	16	eP	07	12	19.5		
	eLR (NW)	20	30	48		eS	07	22	50		
	S. Alaska					eLQ	07	37	38		
	USCGS 20 06 39.8					eLR (NNW)	07	41	58		
	60.5°N 145.4°W					Kurile Isls.					
	Depth 31 km Dist. 46.7°					USCGS 06 59 38.6					
11	ePKP	00	32	18		44.3°N 149.5°E					
	New Hebrides					Depth 33 km Dist. 86.8°					
						Mag. 6 1/2 - 6 3/4					
11	ePKP	21	34	26	16	eP	07	34	25.5		
	eLQ	22	13	38		Kurile Isls.					
	eLR (NNW)	22	20	38		USCGS 07 21 42.7					
	N. Celebes				16	eP	08	31	08.5		
	USCGS 21 15 03.9					eLR (NW)	09	03	18		
	0.6°S 121.7°E					Kurile Isls.					
	Depth 33 km Dist. 137.2°					USCGS 08 18 28.3					
	Mag. 6 1/4 - 6 1/2					44.6°N 149.4°E					
12	ePKP	16	01	58		Depth 33 km Dist. 86.4°					
	eLQ	16	39	18		Mag. 6 1/4					
	eLR (NNW)	16	46	48	16	eP	09	30	57		
	Talaud Isls.					eLR (NNW)	10	04	58		
	USCGS 15 42 54.7					Kuriles					
	3.0°N 126.7°E					USCGS 09 18 16.6					
	Depth 59 km Dist. 132.2°					Mag. 6 1/4 - 6 1/2					
	Mag. 5 3/4 - 6				18	eSKS	06	40	06		
12	eP	22	07	40		eLR	07	00	36		
	eS	22	17	42		Kurile Isls. Region					
	eScS	22	17	47		USCGS 06 16 35.2					
	eLQ	22	29	08		44.4°N 149.7°E					
	eLR (SSW)	22	34	18		Depth 33 km Dist. 86.6°					
	Easter Isl. Region				18	ipPKP (dil from NNE)	12	50	51		
	USCGS 21 55 33.2					ipPKP	12	53	11		
	31.3°S 110.8°W					eSKS	12	57	06		
	Depth 25 km Dist. 79.4°										

Palisades, New York				13				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Oct 18	Continued				Oct 24	Continued					
	Banda Sea					eLR (NW)	07	03	57		
	USCGS 12 32 24.1					Rg	07	08	57		
	7.0°S 124.0°E					Off Coast Oregon					
	Depth 574 km Dist. 142.6°					USCGS 06 44 38					
19	ePKP	00	12	04		44.5°N 129.5°W					
	eLR	01	08	16		Depth 33 km Dist. 40.5°					
	Sunda Strait					Mag. 5 - 5 1/4					
	USCGS 23 52 34.3 (18 Oct)				25	eS	03	56	19		
	5.9°S 105.0°E					eLR (SW)	03	59	29		
	Depth 79 km Dist. 145°					S. of Panama					
21	eP	07	44	20		USCGS 03 43 20.0					
	eS	07	49	04		5.0°N 82.5°W					
	eLR (WNW)	07	51	54		Depth 33 km Dist. 36.8°					
	SW Montana, Hebggen Lake				25	eP	06	33	35		
	USCGS 07 38 31.0					epP	06	34	09		
	44.8°N 111.6°W					eS	06	39	43		
	Depth 33 km Dist. 27.9°					esS	06	39	55		
	Mag. 5 1/2					eLR (SE)	06	43	29		
21	eP	23	23	52		Ecuador					
	eSKS	23	34	26		USCGS 06 25 48.6					
	eLR (NNE)	23	58	16		2.0°S 77.2°W					
	India-China Border Region					Depth 160 km Dist. 42.9°					
	USCGS 23 09 18.8					Mag. 4 1/4 - 4 1/2					
	28.1°N 93.8°E				25	eP	23	04	29		
	Depth 37 km Dist. 110.4°					epP	23	04	33		
	Mag. 6 1/4 - 6 1/2					eS	23	10	55		
22	iP	16	03	48.3		esS	23	11	29		
	Lg	16	08	18		eLR (SE)	23	17	19		
						Ecuador					
23	eP	02	01	35		USCGS 22 56 32.8					
	iP (comp from SE)	02	01	36.3		2.0°S 79.0°W					
	ePcP	02	04	32		Depth 57 km Dist. 43.0°					
	eS	02	05	58	26	ePKP	14	42	12		
	eLR (SSE)	02	07	56		eSKS	14	49	19		
	T (max)	02	27	21		Molucca Pas.					
	N. Atlantic Ocean					USCGS 14 22 57.8					
	USCGS 01 56 03.2					2.2°N 126.8°E					
	19.8°N 56.0°W					Depth 48 km Dist. 133.1°					
	Depth 31 km Dist. 25.9°				27	eSS	22	10	55		
	Mag. 6					eLQ	22	35	11		
23	eP	21	19	09		eLR (NNW)	22	43	51		
	eSKS	21	29	41		S. E. Indian Rise					
	eLQ	21	45	17		USCGS 21 24 31.2					
	eLR (NW)	21	50	47		45.6°S 96.1°E					
	Kurile Isls.					Depth 33 km Dist. 171.1°					
	USCGS 21 06 24.2					Mag. 6 - 6 1/4					
	44.0°N 147.5°E				28	eP	01	40	42		
	Depth 45 km Dist. 87.4°					Chiapas, Mexico					
	Mag. 5 1/4 - 5 1/2					USCGS 01 34 54.5					
24	ePcP	06	54	07		17.7°N 94.2°W					
	eS	06	58	37		Depth 159 km Dist. 28.7°					

Palisades, New York				16				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Nov 25	Continued				Nov 29	Continued					
	eLR (NW)	10	31	21		4.6°N 77.6°W					
	Celebes					Depth 44 km Dist. 36.0°					
	USCGS 09 24 08.9										
	4.3°S 122.2°E				30	eS	00	38	03		
	Depth 610 km Dist. 141.1°					eLR	00	54	43		
	Mag. 5 1/4 - 5 1/2					Central Chile					
26	ePP	10	40	36		USCGS 00 15 57					
	eSS	10	56	22		38.9°S 72.4°W					
	eLQ	11	09	02		Depth 87 km Dist. 79.7°					
	eLR (N)	11	14	22	30	eS	04	27	03		
	Taiwan Region					esS	04	29	33		
	USCGS 10 21 07.2					eLQ	04	32	23		
	24.9°N 122.0°E					eLR (NE)	04	35	23		
	Depth 33 km Dist. 112.7°					Jan Mayer Isl.					
	Mag. 6 - 6 1/4					USCGS 04 11 42.9					
27	eP	07	55	43		71.8°N 2.7°W					
	ePcP	07	57	06		Depth 33 km Dist. 45.7°					
	eS	08	02	41	30	iP	10	47	36.3		
	eLQ	08	06	31		eS	10	47	39.2		
	eLR	08	10	21							
	Central Alaska				30	ePKP	12	46	50.5		
	USCGS 07 47 07.6					eLQ	13	24	23		
	62.6°N 151.5°W					eLR (N)	13	31	23		
	Depth 113 km Dist. 49.2°					Nicobar Isls. Region					
28	eP	16	49	23.5		USCGS 12 27 38.6					
	epP	16	50	36		6.8°N 94.8°E					
	eS	16	55	38		Depth 33 km Dist. 131.2°					
	eLR (S)	17	00	52		Mag. 6 1/2 - 6 3/4					
	W. Brazil				Dec 1	eSKS	05	17	53		
	USCGS 16 41 33.4					eLQ	05	41	35		
	7.7°S 71.2°W					eLR (W)	05	49	23		
	Depth 626 km Dist. 48.8°					Tonga Isls.					
28	eP	16	57	18.5		USCGS 04 53 23.9					
	epP	16	58	32		18.9°S 175.8°W					
	eS	17	02	42		Depth 232 km Dist. 111.2					
	eLR (S)	17	09	42	1	eS	07	55	23		
	Western Brazil					eLR (NE)	08	02	23		
	USCGS 16 49 30.3					Greenland Sea					
	8.0°S 71.4°W					USCGS 07 39 50.2					
	Depth 655 km Dist. 48.8°					79.5°N 3.9°E					
29	iP	09	17	36		Depth 33 km Dist. 47.8°					
	eLR	09	25	32	2	eP	08	26	33		
	N. Colombia					ePcP	08	30	13		
	USCGS 09 11 05.8					eLQ	08	31	23		
	6.8°N 73.2°W					eLR (SE)	08	33	23		
	Depth 171 km Dist. 33.9°					N. Atlantic Ridge					
29	eS	12	39	34		USCGS 08 20 45.6					
	eLQ	12	41	52		30.6°N 42.0°W					
	eLR (S)	12	46	22		Depth 33 km Dist. 27.6°					
	Near W. Coast Colombia				2	eP	13	28	27		
	USCGS 12 26 29.6					eS	13	36	23		

Palisades, New York				17				1964			
Date	Phase	h	m	s	Date	Phase	h	m	s		
Dec 2	Continued				Dec 8	eP	04	18	15		
	eLR (NW)	13	47	03		epP	04	18	34		
	Aleutians					eS	04	23	34		
	USCGS 13 18 29.0					eLR (SW)	04	27	48		
	53.8°N 165.4°W					Near Coast Nicaragua					
	Depth 35 km Dist. 58.7°					USCGS 04 11 53.7					
4	eP	02	02	41		11.5°N 87.0°W					
	eS	02	09	03		Depth 48 km Dist. 31.1°					
	eLR (SW)	02	14	43		Mag. 4 3/4 - 5					
	Off Coast Mexico				8	eSKS	18	14	12		
	USCGS 01 54 49.3					eLR (NW)	18	36	52		
	7.8°N 102.7°W					Near S. Coast Honshu, Japan					
	Depth 33 km Dist. 41.8°					USCGS 17 49 46.3					
	Mag. 5					34.7°N 139.2°E					
5	eS	20	05	22		Depth 31 km Dist. 98.5°					
	eLQ	20	11	52							
	eLR (NW)	20	17	22	8	eP	21	01	01.3		
	Gulf of Alaska					eS	21	05	14		
	USCGS 19 50 01.6					eLR (SE)	21	06	52		
	59.4°N 144.8°W					Leeward Isls.					
	Depth 33 km Dist. 46.7°					USCGS 20 55 55.3					
5	eSKS	22	53	02		19.0°N 64.0°W					
	eLQ	23	06	22		Depth 55 km Dist. 23.5°					
	eLR	23	13	52		Mag. 4 - 4 1/4					
	Kamchatka				9	eSKS	11	45	10		
	USCGS 22 31 44.3					eLQ	11	57	22		
	54.0°N 161.5°E					eLR (SW)	11	59	12		
	Depth 38 km Dist. 73.9°					Easter Isl. Cordillera					
6	eSKS	00	13	02		USCGS 11 22 22					
	eLR (NW)	00	26	02		35.1°S 109.7°W					
	E. Coast Kamchatka					Depth 33 km Dist. 82.6°					
	USCGS 23 51 38.8				9	iP (dil from S)	13	45	50.8		
	53.9°N 161.5°E					ePcP	13	46	10		
	Depth 38 km Dist. 73.9°					epP	13	47	50		
7	ePKP	09	17	40.8		iS	13	54	10		
	eLQ	09	51	52		eScS	13	54	54		
	eLR (NW)	09	57	22		esS	13	57	38		
	New Britain					Santiago de Estero Prov.,					
	USCGS 08 58 43.8					Argentina					
	5.4°S 151.3°E					USCGS 13 35 42.4					
	Depth 54 km Dist. 126.2°					27.5°S 63.2°W					
	Mag. 6					Depth 586 km Dist. 69.4°					
7	eP	18	59	33		Mag. 6					
	epP	18	59	46							
	eS	19	05	16		10	eP	15	24	20	
	eLR (SSW)	19	09	34			epP	15	24	23	
	S. of Panama						ePcP	15	24	35	
	USCGS 18 52 47.6						eSKS	15	34	56	
	6.7°N 82.2°W						eLR (N)	15	56	22	
	Depth 30 km Dist. 34.6°						Eastern Sea of Japan				
	Mag. 5 1/4 - 5 1/2						USCGS 15 11 05.5				
12	ePKP	07	38	02			40.4°N 138.9°E				
	eLQ	08	13	22			Depth 33 km Dist. 93.9°				

Palisades, New York		20			1964
Date	Phase	h	m	s	
Dec 30	Continued				
	USCGS 09 58 01				
	8.7°S 109.3°W				
	Depth 33 km Dist. 59.3°				
30	eSKS	15	51	55	
	S. of Honshu, Japan				
	USCGS 15 27 25.8				
	31.3°N 138.8°E				
	Depth 261 km Dist. 102.2°				