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 Benioff vertical.
Two Sprengnether short-period horizontal.

JANUARY, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
6	iP	e	$23^h\ 55^m\ 08.5^s$		USCGS: 34.4°N, 116.5°W H = $23^h\ 47^m\ 11.4^s$ h = 14 km
8	iP	ne	10 05 56.3		USCGS: 46.1°N, 77.7°W
	iP	z	10 05 56.7	d	Δ = 560 km
	iS	e	10 06 58.7		H = $10^h\ 04^m\ 31.6^s$
9	iP	nez	18 44 07.5	c	USCGS: 14.9°N, 87.9°W H = $18^h\ 38^m\ 11^s$ * h = 33 km
12	iP	ez	06 09 44.3		USCGS: 53.2°N, 166.3°W H = $06^h\ 00^m\ 13.2^s$ h = 33 km
18	eP'	E	12 49 45.5		USCGS: 23.5°N, 122.9°E
	ePP	E	12 50 34.5		H = $12^h\ 32^m\ 36.3^s$
	eSKS	E	12 56 19.5		h = 33 km
18	iP	z	22 41 33.1		USCGS: 18.8°N, 69.4°W H = $22^h\ 36^m\ 17.6^s$ h = 95 km
26	iP	nez	09 19 17.5	c	USCGS: 16.3°S, 71.7°W
	eS	e	09 27 08.5		H = $09^h\ 09^m\ 33.9^s$ h = 116 km
28	iP	z	14 22 26.8	c	USCGS: 36.5°N, 70.9°E
	ipP	z	14 23 25.2		H = $14^h\ 09^m\ 17.1^s$
	iPR_1	z	14 26 33.7	d	h = 207 km
31	iP	nez	16 30 42.0		

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JANUARY, 1964, BULLETIN

Date	Phase	Component	GMCT				Remarks
6	iP	e	23^h	55^m	08.5^s		USCGS: 34.4°N, 116.5°W H = 23^h 47^m 11.4^s h = 14 km
8	iP	ne	10	05	56.3		USCGS: 46.1°N, 77.7°W
	iP	z	10	05	56.7	d	Δ = 560 km
	iS	e	10	06	58.7		H = 10^h 04^m 31.6^s
9	iP	nez	18	44	07.5	c	USCGS: 14.9°N, 87.9°W H = 18^h 38^m 11^s * h = 33 km
12	iP	ez	06	09	44.3		USCGS: 53.2°N, 166.3°W H = 06^h 00^m 13.2^s h = 33 km
18	eP'	E	12	49	45.5		USCGS: 23.5°N, 122.9°E
	ePP	E	12	50	34.5		H = 12^h 32^m 36.3^s
	eSKS	E	12	56	19.5		h = 33 km
18	iP	z	22	41	33.1		USCGS: 18.8°N, 69.4°W H = 22^h 36^m 17.6^s h = 95 km
26	iP	nez	09	19	17.5	c	USCGS: 16.3°S, 71.7°W
	eS	e	09	27	08.5		H = 09^h 09^m 33.9^s h = 116 km
28	iP	z	14	22	26.8	c	USCGS: 36.5°N, 70.9°E
	ipP	z	14	23	25.2		H = 14^h 09^m 17.1^s
	iPR_1	z	14	26	33.7	d	h = 207 km
31	iP	nez	16	30	42.0		

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FEBRUARY, 1964, BULLETIN

Date	Phase	Component	GMCT	Remarks
6	eP	NE	$13^h\ 16^m\ 08.0^s$	USCGS: 55.7°N, 155.8°W
	ePR_1	NE	13 17 58.0	H = $13^h\ 07^m\ 25.2^s$
	eS_1	NE	13 23 06.0	h = 33 km
12	ePP	N	21 27 16.3	USCGS: 20.3°S, 175.7°W
				H = $21^h\ 08^m\ 00^s$ *
				h = 33 km
15	e P	nez	20 14 09.5	
18	eP_4	n	09 33 21.0	USCGS: 34.7°N, 85.4°W
	iS_4	e	09 34 48.5	Δ = 820 km
	iS_3	e	09 34 59.5	H = $09^h\ 31^m\ 11.6^s$
				h = 33 km
29	iP'	nez	00 09 09.2 d	USCGS: 8.5°S, 112.7°E
				H = $23^h\ 49^m\ 40.8^s$
				h = 73 km

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Date	Phase	Component	GMCT		Remarks
13	eP_4	e	$01^h\ 22^m\ 18.0^s$		USCGS: 33.2°N, 83.4°W
	eS_1	e	01 24 21.5		Δ = 890 km
					H = $01^h\ 20^m\ 18^s$ *
					h = 40 km
15	eP	enZ	22 40 07.2	d	USCGS: 36.2°N, 7.6°W
	eS	EN	22 47 57.5		H = $22^h\ 30^m\ 26.0^s$
					h = 27 km
18	iP	Z	04 48 20.4	d	
21	ePR_1	Z	04 03 56.8	c	USCGS: 6.4°S, 127.9° E
					H = $03^h\ 42^m\ 19.6^s$
					h = 367 km
21	eP	e	15 14 08.3		USCGS: 18.7°N, 103.1°W
					H = $15^h\ 08^m\ 14.7^s$
					h = 83 km
28	iP	Z	03 44 19.4	d	USCGS: 61.1°N, 147.6°W
	iP	e n	03 44 19.6		(Anchorage, Alaska)
					H = $03^h\ 36^m\ 12.7^s$
					h = 20 km

After Shocks:

Date	Phase	Direction	GMCT	H
28	iP	north-west	$05^h\ 02^m\ 19.8^s$	$04^h\ 54^m\ 07.9^s$
28	iP	north-west	06 16 53.0	06 08 44.2
28	iP	South-east	06 40 42.0	06 32 38.6
28	iP	South-east	06 52 18.8	06 43 56.4
28	iP	South-east	07 03 36.0	----
28	iP	South-east	08 42 08.0	08 33 46.1
28	iP	north-west	09 09 28.9	09 01 00.5
28	iP	north-west	10 44 04.3	10 35 31.2
28	iP	north-west	10 44 11.8	10 35 38.9
28	iP	north-west	11 16 35.0	11 08 26.5

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Date	Phase	Direction	GMCT	H
28	iP	north-west	$12^h\ 11^m\ 18.9^s$	$12^h\ 03^m\ 16.5^s$
28	iP	north-west	12 29 25.2	12 20 49.8
28	iP	south-east	13 09 17.2	13 01 14.2
28	iP	north-west	14 55 41.1	14 47 38.7
28	iP	north-west	14 57 17.8	14 49 13.7
28	iP	south-east	20 37 19.3	20 29 08.6
29	iP	dilatation	01 17 47.5	01 09 36.4
29	iP	dilatation	04 20 11.2	04 12 15.7
30	eP	dilatation	02 26 37.8	02 18 06.3
30	iP	compression	07 17 32.6	07 09 34.0
30	iP	compression	16 17 57.8	16 09 28.4

Date	Phase	Component	GMCT		Remarks
31	iP	Z	$09^h\ 08^m\ 18.7^s$	d	USCGS: 50.8°N, 130.2°W
	iS	E	09 13 34.8		H = $09^h\ 01^m\ 30.2^s$
					h = 15 km

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APRIL, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
2	eP	Z	$01^h\ 31^m\ 00.1^s$	c	
2	eP	Z	$22^h\ 42^m\ 22.3^s$	d	USCGS: 59.8°N, 144.3°W
	eS	N	$22^h\ 48^m\ 41.7^s$		H = $22^h\ 34^m\ 31.7^s$
					h = 20 km
3	iP	en z	$08^h\ 46^m\ 38.1^s$	c	USCGS: 59.6°N, 144.7°W
	iS	E	$08^h\ 53^m\ 02.4^s$		H = $08^h\ 38^m\ 42.8^s$
					h = 10 km
3	iP	z	$22^h\ 41^m\ 44.4^s$	d	USCGS: 61.6°N, 147.6°W
	eS	NE	$22^h\ 48^m\ 11.5^s$		h = 40 km
					H = $22^h\ 33^m\ 42.2^s$
4	iP	z	$05^h\ 02^m\ 00.9^s$	d	USCGS: 60.1°N, 146.7°W
	iP	en	$05^h\ 02^m\ 01.0^s$		H = $04^h\ 54^m\ 01.7^s$
	eS	N	$05^h\ 08^m\ 28.4^s$		h = 40 km
4	eS	N	$08^h\ 55^m\ 57^s$		USCGS: 56.5°N, 152.6°W
	eSR_1	N	$08^h\ 59^m\ 26^s$		H = $08^h\ 40^m\ 29.8^s$
					h = 15 km
4	iP	z	$09^h\ 19^m\ 24.8^s$	c	USCGS: 56.9°N, 152.7°W
	iP	en	$09^h\ 19^m\ 25.1^s$		H = $09^h\ 10^m\ 55.1^s$
					h = 15 km
4	iP	z	$17^h\ 54^m\ 51.0^s$	d	USCGS: 56.3°N, 154.4°W
	eS	E	$18^h\ 01^m\ 39^s$		H = $17^h\ 46^m\ 08.6^s$
					h = 25 km
4	eP	z	$22^h\ 24^m\ 52.3^s$	c	USCGS: 59.4°N, 145.2°W
	iS	NE	$22^h\ 31^m\ 16.8^s$		H = $22^h\ 16^m\ 54.5^s$
					h = 10 km
5	iP	z	$01^h\ 30^m\ 48.3^s$	d	USCGS: 56.2°N, 153.5°W
	eS	E	$01^h\ 37^m\ 37^s$		H = $01^h\ 22^m\ 13.3^s$
					h = 25 km
5	eP	N	$01^h\ 49^m\ 13^s$		USCGS: 56.2°N, 153.3°W
	eS	N	$01^h\ 56^m\ 20^s$		H = $01^h\ 41^m\ 45.0^s$
					h = 35 km
5	iP	enz	$19^h\ 36^m\ 20.3^s$	c	USCGS: 60.2°N, 146.7°W
	eS	E	$19^h\ 42^m\ 49^s$		H = $19^h\ 28^m\ 18.1^s$
					h = 15 km
7	iP	n z	$19^h\ 36^m\ 53.0^s$	d	USCGS: 55.7°N, 151.9°W
	iS	N	$19^h\ 43^m\ 42.5^s$		H = $19^h\ 28^m\ 24.7^s$
					h = 20 km

Date	Phase	Component	GMCT		Remarks
8	iP	en z	11h 10m 23.0s	c	USCGS: 48.5°N, 150.8°E
	iS	EN	11 20 27.5	d	H = 10h 58m 09.1s
	iScS	EN	11 20 48.5		h = 40 km
8	iP	ez	19 41 22.0	c	USCGS: 59.6°N, 147.0°W
	eS	EN	19 47 35.7		H = 19h 33m 19.0s
					h = 15 km
9	iP	z	13 14 15.2	c	USCGS: 59.6°N, 146.1°W
	eScS	NE	13 23 47.5		H = 13h 06m 15.2s
					h = 15 km
10	iP	enz	01 16 19.3	c	USCGS: 58.4°N, 150.6°W
					H = 01h 08m 00.2s
					h = 15 km
10	iP	enz	19 13 59.8	d	USCGS: 59.7°N, 148.2°W
					H = 19h 05m 52.6s
					h = 15 km
10	iP	enz	21 52 04.8	d	USCGS: 60.1°N, 153.7°W
	eS	EN	21 59 30		H = 21h 44m 06.7s
					h = 10 km
12	iP	enz	01 32 59.8	d	USCGS: 56.6°N, 152.2°W
	iS	EN	01 39 46.6		H = 01h 24m 31.2s
					h = 22 km
12	eP	enz	12 56 25.6	d	USCGS: 56.6°N, 151.3°W
	eS	E	13 03 14.6		H = 12h 48m 02.2s
					h = 33 km
13	eP	enz	21 51 01.4	c	USCGS: 59.4°N, 143.1°W
					H = 21h 43m 16.5s
					h = 33 km
14	eP	z	16 03 01.5	d	USCGS: 61.3°N, 147.3°W
	eS	NE	16 09 06.5		H = 15h 55m 10.9s
					h = 30 km
14	eP	enz	23 03 56.5	c	USCGS: 58.0°N, 152.6°W
	eS	N	23 10 44.5		H = 22h 55m 31.3s
					h = 30 km
16	eP	z	19 35 26		USCGS: 56.4°N, 152.9°W
	iS	EN	19 42 17.5		H = 19h 26m 57.5s
					h = 30 km
17	iP	enz	04 58 02.4	d	USCGS: 56.4°N, 152.9°W
	eS	EN	05 04 52.5		H = 04h 49m 30s
					h = 25 km

Date	Phase	Component	GMCT		Remarks
20	eP	enz	$12^h\ 04^m\ 43.5^s$	c	USCGS: 61.4°N, 147.3°W
		E	12 11 09.5		H = $11^h\ 56^m\ 4.6^s$
					h = 30 km

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Date	Phase	Component	GMCT		Remarks
8	iP	en z	11h 10m 23.0s	c	USCGS: 48.5°N, 150.8°E
	iS	EN	11 20 27.5	d	H = 10h 58m 09.1s
	iScS	EN	11 20 48.5		h = 40 km
8	iP	ez	19 41 22.0	c	USCGS: 59.6°N, 147.0°W
	eS	EN	19 47 35.7		H = 19h 33m 19.0s
					h = 15 km
9	iP	z	13 14 15.2	c	USCGS: 59.6°N, 146.1°W
	eScS	NE	13 23 47.5		H = 13h 06m 15.2s
					h = 15 km
10	iP	enz	01 16 19.3	c	USCGS: 58.4°N, 150.6°W
					H = 01h 08m 00.2s
					h = 15 km
10	iP	enz	19 13 59.8	d	USCGS: 59.7°N, 148.2°W
					H = 19h 05m 52.6s
					h = 15 km
10	iP	enz	21 52 04.8	d	USCGS: 60.1°N, 153.7°W
	eS	EN	21 59 30		H = 21h 44m 06.7s
					h = 10 km
12	iP	enz	01 32 59.8	d	USCGS: 56.6°N, 152.2°W
	iS	EN	01 39 46.6		H = 01h 24m 31.2s
					h = 22 km
12	eP	enz	12 56 25.6	d	USCGS: 56.6°N, 151.3°W
	eS	E	13 03 14.6		H = 12h 48m 02.2s
					h = 33 km
13	eP	enz	21 51 01.4	c	USCGS: 59.4°N, 143.1°W
					H = 21h 43m 16.5s
					h = 33 km
14	eP	z	16 03 01.5	d	USCGS: 61.3°N, 147.3°W
	eS	NE	16 09 06.5		H = 15h 55m 10.9s
					h = 30 km
14	eP	enz	23 03 56.5	c	USCGS: 58.0°N, 152.6°W
	eS	N	23 10 44.5		H = 22h 55m 31.3s
					h = 30 km
16	eP	z	19 35 26		USCGS: 56.4°N, 152.9°W
	iS	EN	19 42 17.5		H = 19h 26m 57.5s
					h = 30 km
17	iP	enz	04 58 02.4	d	USCGS: 56.4°N, 152.9°W
	eS	EN	05 04 52.5		H = 04h 49m 30s
					h = 25 km

CLEVELAND

May 1964

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 Benioff vertical.
Two Sprengnether short-period horizontal.

MAY, 1964, BULLETIN

Date	Phase	Component	GMCT	Remarks
8	eP	z	$16^h\ 30^m\ 24.0^s$ c	USCGS: 56.7°N, 154°W
	eS	N	16 37 16.5	H = $16^h\ 21^m\ 49.8^s$
				h - 25 km
8	eP	z	21 42 26.5	USCGS: 60.8°N, 143.6°W
	eSR_1	N	21 51 45.5	H = $21^h\ 34^m\ 40.6^s$
				h = 35 km
26	eP	N	11 13 23	USCGS: 56.2°S, 27.8°W
	ePR_1	E	11 17 53.0	H = $10^h\ 59^m\ 12.3^s$
				h = 120 km
31	iP	ezn EN	00 53 07.5	USCGS: 43.5°N, 146.8°E
	eS	E	01 03 24.5	H = $00^h\ 40^m\ 36.4^s$
				h = 48 km

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JUNE, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
16	iP	z	$04^h\ 14^m\ 51.9^s$	d	USCGS: 38.3°N, 139.1°E
	eP	EN	04 14 56.8		H = $04^h\ 01^m\ 44.3^s$
	eS	N	04 25 58.9		h = 57 km
23	iP	enz	01 39 06.9	c	USCGS: 43.3°N, 146.1°E
	iS	EN	01 49 23		H = $01^h\ 26^m\ 37.0^s$
					h = 77 km
29	iP	zen	07 29 50.9	c	USCGS: 62.7°N, 152°W
					H = $07^h\ 21^m\ 32.8^s$
					h = 33 km

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JULY, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
5	iP	z	$19^h\ 13^m\ 41.2^s$	c	USCGS: 26.2°N, 110.2°W
	iS	N	19 18 31		H = $19^h\ 07^m\ 57.8^s$
					h = 29 km
5	iP	z	23 48 12.1	d	USCGS: 44.8°N, 149.6°E
	eS	N	23 58 30		H = $23^h\ 36^m\ 01.5^s$
					h = 54 km
6	iP	e	02 20 15.4		USCGS: 26.2°N, 110.4°W
	iP	nze	02 20 18.6		H = $02^h\ 14^m\ 36.0^s$
	eS	E	02 25 07		h = 33 km
6	iP	nez	07 27 46.6	c	USCGS: 18.3°N, 100.4°W
	eS	E	07 32 09		H = $07^h\ 22^m\ 11.7^s$
					h = 100 km
8	iP_1	enz	12 14 39.1	d	USCGS: 5.5°S, 129.8°E
	ePR_1	N	12 17 07.9		H = $11^h\ 55^m\ 39^s$
					h - 165 km
9	eS	N	11 48 31.1		USCGS: 23.3°S, 175.7°W
	ePS	EN	11 50 14.4		H = $11^h\ 22^m\ 05.4^s$
					h = 43 km
11	iP	zen	20 33 37.1		USCGS: 59.7°N, 146.2°W
					H = $20^h\ 25^m\ 40.3^s$
					h = 40 km
24	iP	z	07 02 56.1	c	USCGS: 46.9°N, 153.9°E
	iS	E	07 12 51.7		H = $06^h\ 50^m\ 52.8^s$
					h = 33 km
24	iP	z	08 24 42.9	d	USCGS: 47.2°N, 153.8°E
	iP	EN	08 24 45.4		H = $08^h\ 12^m\ 40.0^s$
	iS	EN	08 34 36.4		h = 33 km

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AUGUST, 1964, BULLETIN

Date	Phase	Component	GMCT				Remarks
8	iP	ż	15^h	51^m	08.7^s	c	USCGS: 12.5°N, 87.8°W
	iPP	z	15	51	51.7		H = 15^h 45^m 10.9^s
							h = 63 km ca
8	i (P)	ż	20	12	16.1	d	
10	iP	ż	01	15	38.8	d	USCGS: 19.1°N. 67.3°W
	iS	ne	01	20	05.5		H = 01^h 10^m 12.4^s
							h = 33 km ca
10	i (P)	e	23	29	49.5		
13	iS	ż	00	49	19.9		
13	iPKP	e	00	49	55.5		USCGS: 5.4°S, 154.3°E
	i (pPKP)	ż	00	51	59.0		H = 00^h 31^m 14.1^s
	i sPKP	NE	00	52	02.9		h = 383 km ca
	iPP	ż	00	52	15.3	c	
	iSKS	E	00	55	41.0		
15	iP	e	03	53	50.8		Δ = 310 km
	iS	e	03	54	24.4		
15	iS	n	18	02	40.8		
16	iP	e	01	35	28.8		
	i	e	01	36	08.1		
18	iP	zn	04	56	00.7	c	USCGS: 26.4°S, 71.5°W
	iPP	n	04	58	33.8		H = 04^h 44^m 58^s
	iS	N	05	04	55.6		h = 8 km ca
20	iP	ne	02	09	01.7		
22	e (P)	E	02	14	06.3		
	e (S)	E	02	18	07.3		
24	iP	z	22	05	12.7	c	USCGS: 58.4°N, 150.3°W
	iS	N	22	11	54.8		H = 21^h 56^m 54.2^s
							h = 22 km ca
25	iP	ż	43	57	20.5	c	USCGS: 78.2°N, 126.6°E
	iS	e	14	05	30.7		H = 13^h 47^m 20.6^s
							h = 50 km ca
26	iP	ż	03	25	44.8	d	
26	iP	ze	23	21	51.7	d	

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SEPTEMBER, 1964, BULLETIN

Date	Phase	Component	GMCT				Remarks
3	iP	z	21^h	20^m	40.1^s	d	USCGS: 24.6°N, 108.6°W
	eS	E	21	25	(59.9)		$H = 21^h\ 14^m\ 43^s$
							h = 33 km ca
4	iP	zn	03	37	42.1	d	
4	iPKP	z	10	56	52.2	c	
12	iPKP	z	22	26	18.5	d	USCGS: 49.1°S, 164.2°E
	iPP	z	22	28	56.5	d	$H = 22^h\ 07^m\ 03.2^s$
	iSKP	e	22	29	47.6		h = 33 km ca
15	iPKP	z	15	48	40.2	d	USCGS: 8.9°N, 93.1°E
	iPP	z	15	50	47.3	d	$H = 15^h\ 29^m\ 32.2^s$
	iSKP	e	15	52	01.3		h = 37 km ca
16	iP	zne	01	58	35.3	c	USCGS: 60.0°N, 147.1°W
	iS	E	02	05	03.6		$H = 01^h\ 50^m\ 33.9^s$
							h = 29 km ca
17	iP	z	15	09	05.3	d	
	eS	e	15	14	51.8		
17	iP	z	22	09	35.5		
	iS	n	22	11	46.3		
18	iP	e	23	59	44.3		
19	iP	z	05	14	07.2	c	USCGS: 15.3°N, 94.0°W
	eS	NE	05	19	02.7		$H = 05^h\ 08^m\ 15.1^s$
							h = 42 km ca
21	iP	z	18	55	59.9	d	
23	iP	ze	05	09	09.0	d	USCGS: 53.6°N, 163.9°W
	eSS	E	05	29	(44.2)		$H = 04^h\ 59^m\ 47.4^s$
							h = 29 km ca
24	iP	n	20	23	05.0		
25	iP	n	19	06	24.0		
27	iP	z	15	59	24.3	d	USCGS: 56.6°N, 152.0°W
	iS	E	16	06	08.4		$H = 15^h\ 50^m\ 54.7^s$
							h = 27 km ca
28	iP	n	19	20	28.6		
30	iP	e	22	05	54.2		

OCTOBER, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
2	iP	z	$01^h\ 10^m\ 43.0^s$	c	USCGS: 51.9°N, 149.9° E
	eS	NE	01 20 37		H = $00^h\ 58^m\ 39.2^s$
					h = 33 km ca
6	iP	z	07 30 02.5	d	USCGS: 36.2°S, 100.9°W
	iS	N	07 40 06.8		H = $07^h\ 17^m\ 57.1^s$
					h = 33 km ca
6	iP	z	14 43 11.4	c	USCGS: 40.3°N, 28.2°E
	ePP	E	14 46 10		H = $14^h\ 31^m\ 19.2^s$
	eS	NE	14 53 03		h = 10 km ca
9	iP	z	07 33 23.2	c	
11	i (PKP)	e	21 34 24.1		USCGS: 0.6°S, 121.7°E
	ePKS	N	21 37 50.6		H = $21^h\ 15^m\ 03.9^s$
					h = 33 km ca
12	iP	z	22 07 34.7	c	USCGS: 31.3°S, 110.8°W
	iS	E	22 17 24.0		H = $21^h\ 55^m\ 33.2^s$
					h = 35 km ca
14	iP	n	20 28 51.1		
	iP	ze	20 28 51.9	d	
16	iP	z	07 12 02.3	c	USCGS: 43.3°N, 149.5°E
	ePP	N	07 14 58.8		H = $06^h\ 59^m\ 38.6^s$
	eS	E	07 22 16.8		h = 33 km ca
16	iP	z	09 30 40.8	d	USCGS: 44.5°N, 149.1°E
					H = $09^h\ 18^m\ 16.6^s$
					h = 33 km ca
18	iPKP	ze	12 50 41.5	c	USCGS: 7.0°S, 124°E
	ipPKP	n	12 53 01.7		H = $12^h\ 32^m\ 24.1^s$
	iPP	zn	12 53 30.0		h = 574 km ca
21	iP	e	07 43 26.0		USCGS: 44.8°N, 111.6°W
	iP	z	07 43 27.8	d	H = $07^h\ 38^m\ 31.0^s$
	eS	N	07 47 38.5		h = 33 km ca
29	iP	z	20 02 49.1	c	Δ = 350 km
	iS	e	20 03 26.1		

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Date	Phase	Component	G. M. C. T.		Remarks
2	iP	z	$06^h\ 59^m\ 09.6^s$	d	USCGS: 4.1°S, 76.9°W
	ipP	zn	06 59 45.3	d	H = $06^h\ 50^m\ 58.2^s$
	iPP	z	07 00 42.7	c	h = 91 km ca
6	iP	z	10 05 44.5	c	USCGS: 44.4°N, 149.0°E
					H = $09^h\ 53^m\ 22.4^s$
					h = 60 km ca
9	iP	e	21 02 58.3		
11	iP	z	08 09 20.7	d	USCGS: 59.4°N, 144.6°W
	eS	N	08 15 45.1		H = $08^h\ 01^m\ 26.1^s$
					h = 10 km ca
11	iP	zn	22 43 47.5	d	Δ = 365 km
	iS	e	22 44 27.5		
17	iPKP	z	08 34 30.0	d	USCGS: 5.7°S, 150.7°E
	iiPKP	zn	08 34 31.5	d	H = $08^h\ 15^m\ 37.3^s$
	ePP	N	08 35 55.5		h = 45 km ca
19	iPKP	ze	23 54 10.6	d	USCGS: 6.0°S, 150.8°E
	iSKS	n	24 01 07.1		H = $23^h\ 35^m\ 06.0^s$
					h = 3 km ca
24	iPKP	z	11 00 56.0	c	USCGS: 6.8°S, 107.4°E
	ipPKP	n	11 01 26.7		H = $10^h\ 41^m\ 33.5^s$
	iPKS	z	11 04 19.4	c	h = 125 km ca
25	iP	zn	02 51 20.9	d	Δ = 475 km
	iS	ze	02 52 12.8	c	
30	iPKP	z	12 46 57.3	d	USCGS: 6.8°N, 94.8°E
	eS	E	12 57 14.3		H = $12^h\ 27^m\ 38.6^s$
					h = 33 km ca

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DECEMBER, 1964, BULLETIN

Date	Phase	Component	GMCT		Remarks
10	iP	z	$15^h\ 24^m\ 06.3^s$	d	USCGS: 40.4°N, 138.9°E
	iPP	n	15 27 41.5		H = $15^h\ 11^m\ 05.5^s$
	iPPP	n	15 29 39.3		h = 33 km ca
13	iP	z	00 02 29.4	d	USCGS: 64.9°N, 165.7°W
					H = $00^h\ 33^m\ 24.7^s$
					h = 15 km ca
14	iP	z	21 16 49.6	d	
15	iP	e	12 19 07.4		USCGS: 14.7°N, 91.7°W
	iP	z	12 19 08.6	c	H = $12^h\ 13^m\ 25.8^s$
	ipP	z	12 19 28.3	c	h = 118 km
	iPP	z	12 19 50.0	c	
	eS	E	12 23 46.4		
22	iP	z	08 06 37.4	c	
22	iP	ne	08 11 19.8		USCGS: 18.4°N, 68.8°W
	iP	z	08 11 25.8	c	H = $08^h\ 01^m\ 12.6^s$
					h = 115 km ca
22	iP	z	21 00 47.2	d	USCGS: 31.9°N, 117.1°W
	iPP	e	21 01 37.2		H = $20^h\ 54^m\ 35.3^s$
	eS	E	21 05 50.8		h = 14 km ca
24	iP	e	23 08 58.6		
26	iP	z	08 22 29.3	d	USCGS: 16.7°N, 99.6°W
	iPP	e	08 23 11.6		H = $08^h\ 16^m\ 28.9^s$
	eS	E	08 27 27.8		h = 33 km ca
26	iP	ze	14 41 51.5	c	USCGS: 51.8°N, 156.8°E
	ipP	z	14 42 24.5	d	H = $14^h\ 30^m\ 29.1^s$
	eS	NE	14 51 10.8		h = 136 km ca

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