M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR JANUARY, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	1 November 1960	20.7	20.7	-0.01	59.3
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	ZV	iP	17	38	55			9000	Confused by strong microseisms.
	NE	eS		49	01	14	4.8 (H)		45.4°N., 151.9°E. h = 45 km.
	E	M	18	13½	-	20	6½		Kurile Islands.
	N	M		13½	-	20	5½		USCGS.
		F	19	15	-				Mag.: M = 6
3	ZV	iPKP	21	43	44				20.4°S., 178.2°W. h=520 km.
									Fiji Islands USCGS.
5	ZV,Z	ePKP	10	32	08				26.6°S., 175.7°W. Kermadec Islands
	ZV,Z	e		32	20				region. USCGS.
5	NE	eSS	17	11	-				
	NE	eL		34	-				61.4°S., 154.9°E.
	E	M	18	01	-	20	2		Macquarie Island region. USCGS.
	N	M		01	-	20	3½		
		F		30	-				Mag.: M = 6
5	ZV,Z	iP	18	46	22				Dilatation. 8.0°S., 74.5°W.
									Central Peru. USCGS.
5	ZV,Z	e(PKP)	24	04	45			12000	
	ZV,Z	e(PP)		04	59				
	N	eSKS		11	01				52.3°S., 28.6°E. Prince Edward
	N	e		19	39				Islands region. USCGS.
	E	eL		30	-				
	N	M		49½	-	20	12½		
	E	M		50½	-	20	9½		
		F	26	30	-				Mag.: M = 6½

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SEISMOLOGICAL BULLETIN

JANUARY, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
6	ZV,Z	iP	06	07	28				27.2°N., 127.3°E. h = 110 km.
		F	07	05	-				Ryukyu Islands. USCGS.
6	ZV,Z	iP	23	57	10	4	0.7	8400	Compression.
	ZV,Z	e		57	35				50.9°N., 157.3°E. Southern
	NE	eS	24	06	47	12	1.1		Kamchatka. USCGS.
	E	M		34	-	20	4½		
	N	M		34½	-	20	3		
		F	25	20	-				Mag.: M = 5.6
7	NE	e	06	35	-				58.8°S., 149.4°E.
		F	07	10	-				Macquarie Islands region. USCGS.
7	NE	e	13	25	-				Small. 56.8°S., 26.1°W.
		F	14	00	-				Sandwich Islands. USCGS.
8	NE	e	23	25	-				Small. 3.7°S., 119.4°E.
		F		50	-				Celebes. USCGS.
9	ZV,Z	iP	18	44	01	6	2.0	8900	Compression.
	NE	eS		54	01	17	5.0(H)		
	N	ePPS		55	00				45.5°N., 150.9°E. h = 40km.
	N	eSS		59	44				Kurile Islands. USCGS.
	E	M	19	21	-	21	7½		
	N	M		21	-	21	13		
	Z	M		21	-	21	5½		
		F	21	15	-				Mag.: M = 6.2
10	ZV,Z	iP	05	03	09	5	1.0	9100	Compression.
	NE	eS		13	18				42.0°N., 142.6°E. Near south coast
	E	eL		24	-				of Hokkaido, Japan. USCGS.
	E	M		43	-	20	4½		
	N	M		43	-	20	5		
		F	06	25	-				Mag.: M = 5.9
10	ZV,Z	iP	17	09	33				45.4°N., 150.0°E. h = 50 km.
	ZV,Z	i		10	00				Kurile Islands. USCGS.
	E	M		46½	-	20	2		
	N	M		47	-	20	1½		
		F	18	15	-				Mag.: M = 5½
11	ZV,Z	eP	06	11	52			8240	53.2°N.,166.3°W. Fox Islands,
	E	eS		21	22				Aleutian Islands. USCGS.
	E	M		50½	-	20	3		
	N	M		50½	-	20	3½		
		F	07	25	-				Mag.: M = 5¾
12	ZV	eP	12	53	31				31.5°N., 49.4°E. h = 67 km.
	NE	M	13	12	-				Western Iran. USCGS.
		F		20	-				
15	ZV	iP	02	35	56				45.3°N., 150.6°E. Kurile Islands. USCGS.
15	ZV,Z	iP	21	49	11	4	2.1	10060	Confused by strong microseisms.
	ZV	ePP		52	53				
	NE	eS		59	57	16	3.8(H)		29.1°N., 140.8°E. h = 70 km.
	ZN	ePPS	22	01	21				South of Honshu, Japan. USCGS.
	NE	eL		18	-				
	E	M		33½	-	20	9½		
	N	M		34	-	20	12½		

contd.

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JANUARY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
15	Z	M	22	34	-	20	5		
		F	23	25	-				Mag.: M = 6.3
17	ZV	iP	03	06	31				45.4°N., 151.3°E. h = 55
	ZV	i		06	35				Kurile Islands. USCGS.
17	ZV	e(PKP)	03	14	13				
	N	M	04	23	-	20	1½		21.6°S., 169.9°E. Loyalty Islands
	E	M		24	-	20	1		region. USCGS.
		F	05	10	-				
18	ZV,Z	eP	12	17	35	6	1.7	9800	
	ZV,Z	ePP		21	10				23.1°N., 120.5°E. Taiwan,
	NE	eSKS		27	56				110 dead, 479 injured. USCGS.
	NE	eS		28	20	16	9.6(H)		
	NE	eSS		34	18				
	NE	eL		42	-				
	E	M		55	-	19	70		
	N	M		55	-	19	86		
	Z	M		55	-	19	8		
		F	14	10	-				Mag.: M = 6.7
18	ZV	iP	22	46	33				Depth = 100 km.
	ZV	ipP		46	58				18.8°N., 69.4°W. Dominican
									Republic USCGS.
19	ZV,Z	iP	09	22	27				Compression. 26.9°N., 54.0°E.
	N	M		42	-	20	1½		Near coast of southern Iran.
		F	10	00	-				USCGS.
20	ZV,Z	ePKP	17	28	03				Depth = 156 km.
	ZV,Z	epPKP		28	44				20.7°S., 169.9°E. h = 141 km.
	E	M	18	33	-	22	3½		Loyalty Islands. USCGS.
	N	M		33	-	22	3		
		F	19	30	-				Mag.: M = 6
21	NE	e	23	10	-				Very small. 10.6°N., 125.3°E.
		F		30	-				Philippine Islands. USCGS.
22	ZV,Z	iP	16	10	22	4	1.1		Dilatation. Depth = 80 km.
	ZV,Z	ipP		10	43				22.4°N., 93.6°E. h = 88 km.
	E	M		46	-	24	2½		Burma. USCGS.
	N	M		46	-	24	2		
		F	17	20	-				Mag.: M = 5½
22	N	ePKS	24	22	45				
	NE	eSS		40	41				13.7°S., 165.9°E. New Hebrides
	E	M	25	22	-	20	1½		Islands. USCGS.
	N	M		22	-	20	2		
		F	26	30	-				
24	ZV	iP	17	28	59			8860	38.7°N., 129.4°E. h = 542 km.
	NE	eS		38	17				Near east coast of Korea. USCGS.
		F	18	15	-				
26	ZV,Z	eP	09	22	28	4	0.7	10200	Compression.
	NE	eSKS		32	50	12	7.5(H)		16.3°S., 71.7°W. h = 116 km.
	NE	eS		33	11	14	3.5(H)		Southern Peru. 6 injured, slight
	E	eSS		39	35				damage at Areguipa. USCGS.
	E	M	10	00	-	19	4½		
	N	M		00	-	19	4		

contd.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
26	Z	M	10	00	19	2½			
		F		30	-				Mag.: M = 6
27	ZV,Z	e(P)	01	21	53				00.0°., 17.9°W. Mid Atlantic Ocean
	E	M		41	-	22	2		USCGS.
	N	M		41½	-	22	2		
		F	02	20	-				Mag.: M = 5-5¼
28	ZV,Z	iP	14	18	01	5	7.2	5690	Compression. Depth = 194 km.
	ZV,Z	ipP		18	44	5	4.9		PH 12 sec. 5.5 μ
	ZV,Z	iPcP		19	06	5	12		
	NE	eS		25	03	18	8.9(H)		36.5°N., 70.9°E. h = 207 km.
	E	esS		26	16				Hindu Kush.
	NE	eSS		28	54				USCGS.
	E	M		40	-	22	13		
	N	M		40	-	22	17		
		F	15	40	-				Mag.: M = 6.2
30	ZV	iP	17	51	23			3000	Confused by strong microseisms.
	ZV	i		51	27				37.3°N., 29.9°E. h = 41 km.
	NE	eS		56	01	16	11.8(H)		Near southwest coast of Turkey.
	E	M	18	02	-	16	3½		
	N	M		02	-	16	3½		
		F		20	-				Mag.: M = 5¼

D 6741/1(4)/R.72 140 6/64 XL

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AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR FEBRUARY, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

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E.	1 November 1960	20.7	20.7	-0.01	59.3
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK. TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
2	NE	eL	09	37	-				
	E	M		52	-	20	$6\frac{1}{2}$		24.2°N, 122.6°E. Near coast of
	Z	M		52	-	20	7		Taiwan. USCGS.
	Z	M		52	-	20	4		
		F	10	25	-				Mag.: M = 6
5	ZV,Z	eP	11	42	53	5	1.7	9600	
	NE	eS		53	30	16	2.8 (H)		36.5°N., 141.0°E. h = 46km.
	NE	eL	12	06	-				Central Honshu, Japan.
	E	M		25	-	20	7		USCGS.
	N	M		25	-	20	9		
	Z	M		25	-	20	$7\frac{1}{2}$		
		F	13	15	-				Mag.: M = 6.0
5	ZV,Z	iPKP	11	54	17				19.7°S., 179.8°W. h = 414
									Fiji Islands. USCGS.
6	ZV,Z	iP	13	18	43	6	6	7800	Compression.
	ZV,Z	i		18	46				PH 16 sec. 12.1 μ
	ZN	ePP		21	23	16	8.7 (H)		
	E	eS		27	45	19	60 (H)		55.7°N., 155.8°W.
	NE	i		28	04				Kodiak Island region. USCGS.
	N	eSS		32	23				
	E	eL		$36\frac{1}{2}$	-				
	E	M		51	-	19	92		
	N	M		$51\frac{1}{2}$	-	19	153		
	Z	M		$51\frac{1}{2}$	-	19	45		
		F	17	30	-				Mag.: M = 7.3
6	NE	e	19	55	-				
	E	M	20	01	-	20	$1\frac{1}{2}$		24.0°N., 126.4°E.
	N	M		01	-	20	$1\frac{1}{2}$		Ryukyu Islands. USCGS.
		F		20	-				

Form 3717

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

FEBRUARY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
7	ZV	iP	13	11	18				
	E	M		52	-	20	2		39.8°N., 142.8°E. h = 45 km.
	N	M		52	-	20	1½		Off coast of Honshu, Japan.
		F	14	15	-				USCGS.
8	ZV	iP	11	29	31				52.3°N., 175.6°E. h = 60 km.
		F	12	25	-				Rat Islands. USCGS.
9	ZV,Z	iPKK	02	18	49				Dilatation. 16.5°S., 179.2°W.
									Fiji Islands. USCGS.
12	NE	eL	21	22	-				Confused by microseisms.
	E	M		44	-	22	10½		3.5°S., 146.6°E. Admiralty
	N	M		44	-	22	8½		Islands region. USCGS.
		F	22	30	-				Mag.: M = 6¼-6½
12	NE	eL	23	40	-				Confused by microseisms.
	E	M		54½	-	20	1½		15.3°S., 174.4°W.
	N	M		55	-	20	3		Samoa Islands region. USCGS.
		F	24	40	-				Mag.: M = 5¾-6.
13	NE	e	10	40	-				Small. 26.1°N., 100.9°E.
		F	11	00	-				China. USCGS.
13	ZV	iP	14	02	17				Confused by strong microseisms.
	E	M		23	-	16	2		39.4°N., 72.7°E. h = 144 km.
	N	M		23	-	16	3		Tadzhik S.S.R. USCGS.
		F		40	-				
14	ZV	iPKP	16	48	48				Confused by microseisms.
	NE	eSS	17	08	41				5.1°S., 151.7°E. h = 55 km.
	NE	eL		22	-				New Britain. USCGS.
	E	M		46½	-	22	8		
	N	M		48½	-	22	7½		Mag.: M = 6¼
		F	18	40	-				
									30.1°N., 51.2°E. Iran. USCGS.
16	ZV	iP	00	25	18				
17	ZV	eP	12	20	49				47.2°N., 8.5°E.
	E	e		22	43				Switzerland.
	E	M		23¾	-	12	3½		USCGS.
	N	M		23¾	-	12	3		
	Z	M		23¾	-	12	2		
		F		28	-				
20	E	eS	10	15	53				44.6°N., 150.0°E. h = 50 km.
	E	M		42	-	18	1		Kurile Islands. USCGS.
	N	M		43	-	18	1½		
		F	11	15	-				
21	ZV,Z	eP	17	19	57				38.3°N., 28.7°W.
	NE	eL		26	-				Azores. USCGS.
	E	M		28	-	12	2		
	N	M		28	-	12	2½		
		F		35	-				
23	ZV,Z	eP	22	45	47	4	1.1	2400	39.2°N., 23.7°E.
	NE	eS		49	38	12	4.2(H)		Aegean Sea. USCGS.
	NE	eL		51	-				
	E	M		53	-	20	8		
	N	M		53	-	20	25		
		F	23	20	-				Mag.: M = 5.1

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SEISMOLOGICAL BULLETIN

FEBRUARY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
24	ZV	iP	23	35	10				39.2°N., 23.8°E.
	E	M		42	-	18	2		Aegean Sea.
	N	M		42½	-	18	4		USCGS.
		F	24	00	-				Mag.: M = 4½
27	ZV,Z	iP	15	22	29			8250	Compression. Confused by strong
	ZV,Z	ipP		22	54				microseisms.
	NE	eS		31	53				Depth = 96 km.
	N	eL		41	-				21.7°N., 94.4°E. h = 102 km.
	E	M	16	02	-	20	3		Central Burma. USCGS.
	N	M		02	-	20	3		
		F		30	-				
28	NE	e	18	30	-				Small. 18.2°N., 94.3°E.
		F		50	-				Near coast of Burma. USCGS.
29	NE	eL	15	56	-				
	E	M	16	10	-	20	2		34.8°N., 141.7°E. h = 34 km.
	N	M		10	-	20	2		Off coast of Honshu, Japan.
		F		45	-				USCGS.
29	ZV,Z	e(PKP)	20	33	21				18.2°S., 172.8°W.
									Tonga Islands. USCGS.

D 8888/1/R.72 140 7/64 XL

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AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

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Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

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CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

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TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	ZV	1P	11	34	34				45.3°N., 150.6°E. Kurile Islands. USCGS.
2	ZV	ePKP	19	52	12				18.9°S., 174.8°W. Tonga Islands. USCGS.
4	ZV	e(P)	03	03	11				43.6°N., 28.9°W.
	N	M		09	-	16	1		Azores region.
		F		18	-				USCGS.
4	ZV	e(P)	16	21	14				43.6°N., 29.3°W. Azores region. USCGS.
5	NE	e	07	05	-				45.2°S., 96.4°E.
	E	M		17	-	20	1½		Indian Ocean. USCGS.
	N	M		18	-	20	1		
		F		40	-				Mag.: M = 5½
6	NE	e	20	00	-				Small. 6.1°S., 154.4°E.
		F		25	-				New Britain. USCGS.
8	NE	e	02	50	-				44.0°S., 168.4°E. South Island,
	E	M	03	19	-	20	1½		New Zealand. USCGS.
	N	M		19	-	20	2		
		F		40	-				Mag.: M = 5¾
11	NE	e	02	00	-				Small. 1.8°N., 127.1°E.
		F		30	-				Molucca Passage, U.S.C.G.S.

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MARCH, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
11	ZV	e	19	22	-				Very small. 46.9°N., 8.5°E.
		F		26	-				Switzerland. USCGS.
12	NE	eL	23	15	-				13.5°N., 122.9°E. Near coast of
	N	M		34	-	20	2½		Luzon. Philippine Islands.
	E	M		34½	-	20	2		USCGS.
		F		55	-				Mag.: M = 5¾
13	NE	e	06	35	-				Very small. 52.1°N., 170.0°W.
		F		55	-				Fox Islands. USCGS.
14	Z	eP	02	39	19			900	Confused by microseisms.
	Z	e		39	43				
	E	iS		40	49				47.1°N., 8.3°E.
	E	i		41	23				Switzerland. Slight damage.
	NZ	eSg		41	48				USCGS.
	E	M		42¼	-	11	20		
	N	M		42½	-	12	18		
	Z	M		42¼	-	11	13		
		F	03	00	-				Mag.: M = 5.2
14	NE	e	15	35	-				Small. 15.9°N., 60.5°W.
		F	16	00	-				Leeward Islands. USCGS.
14	NE	e	17	00	-				Small. 1.9°S., 12.9°W.
		F		20	-				Mid-Atlantic Ocean. USCGS.
14	NE	e	19	05	-				Small. 1.8°S., 13.2°W.
		F		25	-				Mid-Atlantic Ocean. USCGS.
15	ZV,Z	iP	22	34	11	4	5.3	1940	Dilatation. PH 14 sec. 18 μ
	Z	iPP		34	33	8	5.5		36.2°N., 7.6°W. West of Strait
	NEZ	iS		37	22	12	41(H)		of Gibraltar. USCGS.
	E	M		39½	-	18	430		
	N	M		40	-	18	260		Confused by very strong
	Z	M		41	-	16	100		microseisms.
		F	24	30	-				Mag.: M = 6¾
16	ZV,Z	iP	01	15	59				Dilatation. Confused by strong
	NE	eL		33	-				microseisms.
	E	M		46½	-	16	4		36.9°N., 95.5°E. Tsinghai Province,
	N	M		46½	-	16	3½		China. USCGS.
		F	02	15	-				
16	ZV	iP	03	37	06				38.0°N., 72.9°E. Tadzhik S.S.R.
									USCGS.
16	Z	iP	08	56	30				44.8°N., 146.8°E. h = 140 km.
									Kurile Islands. USCGS.
18	ZV,Z	iP	04	48	18	6	1.8	8200	52.5°N., 153.6°E. h = 440 km.
	NE	eS		57	12	16	3.3(H)		Sea of Okhotsk. USCGS.
		F	05	35	-				Mag.: M = 5.1
19	NE	e	22	40	-				15.1°S., 172.6°W. Samoa Island
	E	M	23	07½	-	20	2½		region. USCGS.
	N	M		09½	-	20	1½		
		F	24	00	-				Mag.: M = 5¾-6

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MARCH, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
21	ZV	iPKP	04	00	27				Confused by microseisms.
	ZV	i		03	27				
	NE	eS		08	59	16	3.5 (H)		6.4°S., 127.9°E. h = 367 km.
	NE	eSS		17	31				Banda Sea. USCGS.
	NE	eL		30	-				
	E	M		49	-	20	5½		
	N	M		49	-	20	4½		
		F	05	25	-				Mag.: M = 6½
21	ZV	e P	15	20	35				18.7°N., 103.1°W. h = 83 km.
	E	e(S)		31	07	16	1.8		Near coast of Mexico. USCGS.
	E	M		58½	-	16	3½		
	N	M		58½	-	16	1½		
	N	M		58½	-	16	2		
		F	16	25	-				Mag.: M = 5½
21	ZV	e(PKP)	16	47	31				27.6°S., 177.2°W. Kermadec Islands. USCGS.
22	ZV	iP	07	18	06				5.5°S., 77.1°W. h = 147 km. Northern Peru. USCGS.
22	NE	eL	09	25	-				
	E	M		37	-	20	1½		35.7°S., 72.9°W. Near coast of
	N	M		37	-	20	1½		Chile. USCGS
		F	10	05	-				
23	ZV	iP	13	49	23				Depth = 150 km.
	ZV	epP		49	57				38.3°N., 73.7°E. Hindu Kush. USCGS.
26	NE	eL	02	55	-				11.3°N., 142.0°E.
	E	M	03	14	-	20	3		Mariana Islands. USCGS.
	N	M		14	-	20	2		
		F		35	-				Mag.: M = 5¾
27	ZV,Z	iPKP$_1$	20	41	08				23.7°S., 179.9°E. h = 520 km.
	ZV	ePKP$_2$		41	20				Fiji Islands. USCGS.
27	NE	e	23	38	-				Very small. 27.2°N., 89.3°E.
		F		50	-				Bhutan. USCGS.
28	ZV,Z	eiP	03	46	52	6	42		Compression. PH 20 sec. 68 μ
	ZV	eL	04	07	-				61.1°N., 147.6°W. Prince William
	ZV	M		17	-	20	2000		Sound, Alaska. 114 dead or missing, major property damage. USCGS.
	Due to severity of shock the record is mostly illegible.								Mag.: M = 8.7 (Kew).
28	ZV	iP	05	04	46				Dilatation. 59.8°N., 149.4°W. P.W. Sound, Alaska. USCGS.
28	ZV	iP	05	44	36				60.2°N., 146.2°W. P.W.S. Alaska. USCGS.
28	ZV	eP	05	46	43				57.2°N., 153.0°W. P.W.S. Alaska. USCGS.
28	ZV	eP	06	19	28				60.1°N., 148.6°W. P.W.S. Alaska. USCGS.
28	ZV	iP	06	43	20				60.1°N., 147.6°W. P.W.S. Alaska. USCGS.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MARCH, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
28	ZV	eP.	06	52	14				59.9°N., 147.8°W. P.W.S., Alaska. USCGS.
28	ZV	iP	06	54	57				Dilatation. 58.3°N., 151.3°W. P.W.S.,Alaska. USCGS.
28	ZV	eP	07	02	09				57.1°N., 152.3°W. P.W.S., Alaska. USCGS.
28	ZV	iP	07	04	31				58.8°N., 149.5°W. P.W.S., Alaska. USCGS.
28	ZV,Z	eP	07	21	15	6	2.0		Dilatation. 58.8°N., 149.5°W. P.W.S.,Alaska. Mag.: M = 6¼(Kew).
28	ZV	iP	07	41	36				57.4°N., 151.7°W. P.W.S., Alaska. USCGS.
28	ZV	iP	07	49	42				
28	ZV	eP	08	44	47				58.1°N., 151.1°W. P.W.S., Alaska. USCGS.
28	ZV	iP	09	12	12	7	2.1		56.5°N., 152.0°W. P.W.S.,Alaska. USCGS. Mag.: M = 6¼ (Kew)
28	ZV,Z	iP	10	03	40	6	1.7		
	E	M		34	-	20	8		59.7°N., 146.6°W. P.W.S.,
	N	M		34	-	20	15		Alaska. USCGS.
	Z	M		34	-	20	8		
		F	-	-	-				Mag.: M = 6.2
28	ZV,Z	iP	10	46	45	5	2.0	7640	
	NE	eS		55	45	16	5.4(H)		57.2°N., 152.4°W.
	E	M		19½	-	16	10		P.W.S.,Alaska. USCGS.
	N	M		19½	-	16	13		
	Z	M		19½	-	16	4		
		F	-	-	-				Mag.: M = 6.3
28	ZV	eP	11	19	11				60.1°N., 148.4°W. P.W.S.,
	ZV	i		19	13				Alaska. USCGS.
28	ZV	e(PKP)	11	48	18				0.5°N., 122.3°E. h = 140 km.
	ZV	ePP		48	46				Celebes. USCGS.
28	ZV,Z	eP	11	59	43				
28	ZV,Z	iP	12	32	01	8	3.1	7900	PH 16 sec. 4.8 μ
	NE	iS		41	15	15	11.7(H)		
	NE	e		41	51				56.5°N., 154.0°W.
	NE	eL		49	-				P.W.S., Alaska. USCGS.
	E	M	13	05	-	17	32		
	N	M		05	-	19	33		
	Z	M		05	-	19	15		Mag.: M = 6.7
		F	-	-	-				overlapped by next shock.
28	ZV,Z	eP	12	59	58				

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MARCH, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
28	ZV	eP	13	12	03				60.1°N., 147.0°W. P.W.S., Alaska. USCGS.
28	ZV,Z	iP	14	58	21	6	1.5	7450	60.4°N., 146.5°W.
	NE	iS	15	07	12	15	9.5(H)		P.W.S., Alaska. USCGS.
	E	eL		16	-				
		F	-	-	-				Mag.: M = 6.4
28	ZV,Z	iP	14	59	55	6	1.7	7450	Compression. 60.4°N., 147.1°W.
	EN	eS	15	08	46				P.W.S., Alaska. USCGS.
		F	16	50	-				Mag.: M = 6.3
28	NE	e	17	20	-				59.3°N., 147.8°W. P.W.S., Alaska.
	N	M		39	-	19	1½		USCGS.
		F		55	-				
28	ZV,Z	iP	20	39	54	6	2.9	7400	Compression. PH 16 sec. 5.1 μ
	Z	ePP		42	19	6	2.3		PPH 16 " 4.2 μ
	NE	eS		48	41	16	8.3(H)		
	NE	e		49	47				59.8°N., 148.7°W. Prince William
	N	eSS		52	59				Sound, Alaska. USCGS.
	ZV	iP'P'	21	08	27				
	E	M		09½	-	20	16		
	N	M		10½	-	20	19		
	Z	M		10½	-	20	10		
		F	23	45	-				Mag.: M = 6.7
28	ZV	iP	22	39	47				58.2°N., 150.4°W. P.W.S., Alaska.
		i		39	53				USCGS.
29	ZV,Z	iP	01	20	25				Dilatation. 59.8°N., 149.2°W.
									P.W.S., Alaska. USCGS.
29	NE	e	02	10	-				Small. 57.5°N., 151.3°W.
		F		30	-				P.W.S., Alaska. USCGS.
29	ZV	iP	04	23	01				
	E	M		53½	-	18	1½		60.2°N., 145.5°W.
	N	M		53½	-	18	1½		P.W.S., Alaska. USCGS.
		F	05	05	-				
29	ZV	eP	06	15	58			7870	Compression. 56.1°N., 154.3°W.
	E	eS		25	09	18	5.0(H)		Prince William Sound, Alaska.
	E	eSS		29	13				USCGS.
	E	M		47½	-	20	6		
	N	M		48	-	20	8		
	Z	M		48	-	20	3		
		F	07	50	-				Mag.: M = 6.0
29	ZV	iP	08	04	05				56.1°N., 154.2°W. P.W.S., Alaska.
									USCGS.
29	ZV,Z	eP	10	18	50				60.0°N., 148.6°W. P.W.S., Alaska.
									USCGS.
29	ZV,Z	eP	16	51	45	5	1.2	7500	Dilatation.
	NE	eS	17	00	37	16	2.5(H)		
	NE	eSS		04	31				59.7°N., 147.0°W.
	E	eL		09	-				Prince William Sound, Alaska.
	E	M		20	-	20	10		USCGS.
	N	M		20	-	20	6		
	Z	M		20	-	20	4		
		F	18	20	-				Mag.: M = 6.0

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MARCH, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
29	NE	e	19	05	-				
	E	M		19	-	20	5		P.W.S., Alaska.
	N	M		19½	-	20	3		
		F		40	-				
29	NE	e	22	40	-				Small. 6.7°S., 155.1°E.
		F	23	20	-				Solomon Islands. USCGS.
30	ZV,Z	iP	02	29	18	6	1.7	7800	Compression.
	NE	eS		38	27	20	22.5(H)		PH 16 sec. 2.5 μ
	NE	i		38	39				
	NE	eSS		42	31				56.6°N., 152.9°W. Prince William
	E	eL		46	-				Sound, Alaska.
	E	M		55	-	26	75		USCGS.
	N	M		56½	-	26	45		
	N	M	03	02½	-	19	50		
	N	M		03½	-	19	49		
	Z	M		03½	-	19	17		
		F	05	50	-				Mag.: M = 6.5
30	ZV,Z	eP	03	32	23				35.3°N., 23.9°E. h = 100 km.
									Near Crete. USCGS.
30	ZV,Z	eP	07	20	19	6	2.2	7400	Dilatation.
	ZV,Z	ePP		22	42	6	1.8		
	NE	eS		29	06	16	6.0(H)		59.9°N., 145.7°W. Prince William
	N	eSS		33	07				Sound, Alaska. USCGS.
	E	M		50	-	20	11		
	N	M		50	-	20	18		
	Z	M		50	-	20	8		
		F	09	00	-				Mag.: M = 6.4
30	NE	e	09	38	-				
	E	M		52	-	20	1½		P.W.S., Alaska.
	N	M		52	-	20	1½		
		F	10	15	-				
30	NE	e	12	20	-				56.4°N., 152.5°W.
	N	M		34	-	19	2		P.W.S., Alaska.
		F		45	-				USCGS.
30	ZV,Z	eP	13	14	47			7870	
	E	eS		23	58	16	2.1(H)		56.5°N., 152.7°W. P.W.S.,
	E	M		46	-	20	3½		Alaska. USCGS.
	N	M		46	-	20	3		
		F	14	50	-				Mag.: M = 5.6
30	ZV,Z	iP	15	18	45				58.7°N., 149.6°W. P.W.S., Alaska.
									USCGS.
30	ZV,Z	iP	16	20	39	6	0.7	7870	Compression.
	NE	eS		29	50	16	2.5(H)		56.6°N., 152.1°W. Prince William
	E	M		53½	-	19	5		Sound, Alaska. USCGS.
	N	M		53½	-	19	6½		
	Z	M		53½	-	19	3½		
		F	17	50	-				Mag.: M = 5.8
31	ZV,Z	iP	00	26	19	4	1.1	9100	Compression.
	E	eS		36	30	16	2.0(H)		45.3°N., 151.0°E. h = 60 km.
	E	M	01	03½	-	20	4		Kurile Islands. USCGS.
	N	M		03½	-	20	4		
		F		40	-				Mag.: M = 5.8

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
31	NE	e	07	45	-				Very small.
		F		55	-				
31	?V	eP	09	12	43			7820	
	N	eS		21	52	16	1.4		50.8°N., 130.2°W.
	N	eSS		26	14				Vancouver Island region. USCGS.
	N	eL		34½	-				
	E	M		42	-	20	12		
	N	M		42½	-	20	12		
	Z	M		42½	-	20	4		
		F	10	40	-				Mag.: M = 5.9
31	NE	e	11	30	-				Very small. 58.9°N., 149.9°W.
		F		55	-				P.W.S., Alaska. USCGS.
31	NE	eS	12	13	40				
	NE	eL		22	-				P.W.S., Alaska.
	E	M		35½	-	20	1½		
	N	M		35½	-	20	1½		
		F	13	15	-				

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M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR APRIL, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{nI}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	1 November 1960	20.7	20.7	-0.01	59.3
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	ZV	eP	03	34	31				57.2°N., 151.3°W.
	E	M	04	06½	-	18	2		P.W.S., Alaska.
	N	M		06½	-	18	2		
		F		35	-				Mag.: M = 5½
2	ZV,Z	eP	01	24	41	5	2.0	9800	
	ZV,Z	epP		25	20				5.9°N., 95.7°E. h = 132 km.
	ZV,Z	ePP		28	18	5	1.2		Near coast of northern
	E	eSKS		35	07				Sumatra. USCGS.
	N	eS		35	18	20	10.5 (H)		
	N	eL		47½	-				
	E	M	02	03	-	24	25		
	N	M		03	-	24	45		Depth = 150 (Kew)
	Z	M		10	-	20	15		
	E	M		10	-	20	49		Magnitude.
	N	M		11	-	18	36		M = 6.0 (Body waves)
		F	04	30	-				M = 6¾ (Surface waves)
2	N	e	05	20	-				25.8°S., 13.8°W. South Atlantic
	N	M		28½	-	20	1½		Ocean. USCGS.
		F		30	-				
2	ZV	eP	11	52	05				58.8°N., 149.6°W.
	ZV	e		52	10				P.W.S., Alaska. USCGS.
2	NE	e	23	00	-				59.8°N., 144.3°W. P.W.S.,
	E	M		15	-	18	1½		Alaska. USCGS.
	N	M		15	-	18	1½		
		F		25	-				Mag.: M = 5½

Form 3717

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

APRIL, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
3	ZV	iP	04	25	43			9800	Compression. Depth = 57 km.
	ZV	ipP		25	59				4.0°N., 96.6°E. h = 70 km.
	N	eS		36	33	12	1.4		Near coast of Sumatra.
									USCGS.
3	ZV,Z	eP	08	49	30	4	0.7		59.6°N., 144.7°W. P.W.S.,
	N	M	09	19	-	18	1½		Alaska. USCGS.
		F	-	-	-				
3	ZV	e(P)	08	57	30				57.9°N., 150.5°W. P.W.S.,
	N	M	09	27	-	20	2½		Alaska. USCGS.
		F		45	-				
3	ZV,Z	eP	22	44	18	5	1.1	7200	
	NE	eS		52	56	12	5.0(H)		61.6°N., 147.6°W.
	E	M	23	13	-	20	4		P.W.S., Alaska. USCGS.
	N	M		13½	-	19	5½		
	Z	M		13½	-	19	3½		Mag.: M = 6.1
		F		50	-				
4	ZV,Z	iP	05	04	43	6	1.0	7500	
	NE	eS		13	35	16	2.7(H)		60.1°N., 147.6°W.
	Z	M		33	-	20	3		P.W.S., Alaska. USCGS.
	E	M		33	-	20	6½		
	N	M		33½	-	20	11		
		F	06	30	-				Mag.: M = 5.9
4	E	eS	09	00	53	16	4.1		56.5°N., 152.6°W.
	E	M		23	-	20	8		P.W.S., Alaska. USCGS.
	N	M		23	-	20	5½		
		F	-	-	-				Mag.: M = 6.1
4	ZV,Z	iP	09	22	06				
	ZV,Z	i		22	12				56.9°N., 152.7°W.
	N	M		52½	-	19	4½		P.W.S., Alaska. USCGS.
	E	M		53	-	19	4½		
		F	10	45	-				Mag.: M = 5¾
4	ZV,Z	iP	17	57	22	6	2.5	7970	Compression.
	ZV,Z	i		57	30				PH 16 sec. 2.8 μ
	Z	ePP	18	00	07	20	4.7(H)		
	NE	eS		06	38	19	20.5(H)		56.3°N., 154.4°W.
	N	eSS		10	57				P.W.S., Alaska. USCGS.
	E	eL		16	-				
	E	M		29	-	20	31		
	N	M		29	-	20	45		
	Z	M		29	-	20	15		
		F	-	-	-				Mag.: M = 6.7
4	ZV,Z	iP	18	10	57	6	1.0		
	ZV,Z	i		11	25				56.4°N., 154.5°W.
	E	M		45½	-	18	12		P.W.S., Alaska. USCGS.
	N	M		45½	-	19	22		
		F	21	10	-				Mag.: M = 6.1

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
4	NE	e	22	40	-				59.4°N., 145.2°W. P.W.S.,Alaska.
	E	M		57	-	16	2½		USCGS.
	N	M		57½	-	18	4		
		F	23	35	-				Mag.: M = 5½
5	ZV,Z	eP	01	33	27			7900	
	NE	eS		42	41	20	7.1 (H)		56.2°N., 153.3°W.
	N	eSS		46	59				P.W.S.,Alaska. USCGS.
	E	M	02	04	-	20	7½		
	N	M		04	-	20	9½		
	Z	M		04	-	20	3		
		F	-	-	-				Mag.: M = 6.2
5	ZV,Z	eP	01	52	57				56.2°N., 153.3°W.
	ZV	i		53	07				P.W.S.,Alaska. USCGS.
	N	M	02	23½	-	20	4		
		F	03	30	-				Mag.: M = 5¾
5	NE	e	04	00	-				Small.
		F		30	-				
5	ZV,Z	eP	19	39	01				Compression. 60.2°N., 146.7°W.
	E	M	20	10½	-	16	1½		P.W.S.,Alaska. USCGS.
	N	M		10½	-	18	1½		
		F		25	-				Mag.: M = 5¼
7	NE	e	02	15	-				Small. 58.5°N., 154.5°W.
		F		40	-				P.W.S.,Alaska. USCGS.
7	ZV	eP	10	32	58				
7	NE	e	14	10	-				Very small. 0.1°N., 123.2°E.
		F		35	-				Northern Celebes. USCGS.
7	NE	e	18	35	-				Small. 57.3°N., 151.1°W.
		F		55	-				P.W.S.,Alaska. USCGS.
7	ZV,Z	eP	19	39	40				55.7°N., 151.9°W. Alaska. USCGS.
8	ZV	eP	02	16	15				Small.
	N	M		57	-				46.1°N., 152.8°E. Kurile Islands.
		F	03	10	-				USCGS.
8	NE	e	08	45	-				Small. 6.8°S., 68.9°E.
		F	09	25	-				Chagos Archipalago region. USCGS.
8	ZV,Z	iP	11	10	17	6	1.4	8800	Compression.
	N	eS		20	14	14	2.3		
	E	e		20	34				45.8°N., 150.8°E. h = 40 km.
	E	eSS		25	44				Kurile Islands. USCGS.
	E	M		49	-	20	8		
	N	M		50½	-	20	8½		
	Z	M		50½	-	20	3		
		F	12	40	-				Mag.: M = 6.0
8	ZV,Z	iP	14	17	40				Compression.
	NE	e(S)		22	16				35.1°N., 24.3°E. h = 71 km.
	E	M		27	-	18	1		Near Crete. USCGS.
	N	M		27½	-	20	2		
		F		35	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
8	N	e	19	58	-				59.6°N., 147.0°W.
	E	M	20	14	-	19	1½		P.W.S., Alaska. USCGS.
	N	M		14	-	19	1½		
		F	-	-	-				Mag.: M = 5¼
8	ZV	e	20	00	59				60.4°N., 145.9°W.
	E	M		31	-	18	1		P.W.S., Alaska. USCGS.
	N	M		30	-	20	1½		
		F		55	-				Mag.: M = 5-5¼
9	NE	e	13	30	-				59.6°N., 146.1°W.
	N	M		47	-	19	1½		P.W.S., Alaska. USCGS.
		F	14	00					
10	ZV,Z	iP	01	19	00				58.4°N., 150.6°W.
	N	M		52½	-	18	1		P.W.S., Alaska. USCGS.
		F	02	10	-				
10	ZV	eP	19	16	42				59.7°N., 148.2°W.
	N	M		47	-	18	1		P.W.S., Alaska. USCGS.
		F	20	05	-				
10	ZV,Z	eP	21	54	59			7600	60.1°N., 153.7°W.
	NE	eS	22	03	56				P.W.S., Alaska. USCGS.
	E	M		25	-	20	1		
	N	M		25	-	20	1½		
		F	23	05	-				Mag.: M = 5-5¼
11	ZV	ePKP$_1$	01	23	51				29.0°S., 178.9°W. h = 302 km.
	ZV	ePKP$_2$		24	23				Kermadec Islands. USCGS.
11	NE	e	12	55	-				Very small. 56.6°N., 151.0°W.
		F	13	10	-				P.W.S., Alaska. USCGS.
11	ZV,Z	eP	16	05	21	4	2.1	2400	
	ZV,Z	i		05	25				
	NE	eS		09	14	11	4.3(H)		40.5°N., 25.0°E.
	N	eL		10½	-				Aegean Sea. USCGS.
	N	M		12½	-	18	16½		
	E	M		13	-	18	10		
	Z	M		14	-	10	5		
		F		55	-				Mag.: M = 5.2
12	ZV,Z	iP	01	35	44	7	1.3	7850	PN 14 sec. 1.1 μ
	NE	eS		44	54	16	5.7(H)		
	N	eSS		49	32				56.6°N., 152.2°W.
	E	M	02	01½	-	26	26		P.W.S., Alaska. USCGS.
	N	M		01½	-	26	15		
	E	M		09	-	18	10		
	N	M		09	-	18	14		
	Z	M		09	-	18	6		
		F	04	15	-				Mag.: M = 6.1
12	NE	e	13	10	-				56.6°N., 151.3°W.
	E	M		31½	-	18	1½		P.W.S., Alaska. USCGS.
	N	M		31½	-	18	1½		
		F	14	05	-				Mag.: M = 5¼
12	NE	e	17	45	-				Very small. 60.2°N., 145.6°W.
		F	18	10	-				P.W.S., Alaska. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
13	ZV,Z	iP	08	33	19			1750	45.3°N., 18.1°E. Northern
	E	eS		36	12	10	2.9(H)		Yugoslavia. Two killed,
	N	eL		36½	-				100 injured and extensive
	E	M		38	-	18	6		property damage. USCGS.
	N	M		38	-	18	30		
	Z	M		39½	-	8	15		
		F	09	25	-				Mag.: M = 5¼
13	NE	e	12	50	-				Confused by microseisms.
	E	M	13	06	-	19	3		59.4°N., 143.9°W. Alaska. USCGS.
	N	M		06	-	20	4½		
		F		45	-				Mag.: M = 5½
13	NE	e	14	40	-				Small. 57.6°N., 151.2°W.
		F	15	00	-				P.W.S., Alaska. USCGS.
13	NE	e	16	40	-				Small. 56.6°N., 152.1°W.
		F	17	15	-				P.W.S., Alaska. USCGS.
13	NE	e	22	15	-				Confused by microseisms.
	E	M		23½	-	18	1½		59.4°N., 143.1°W. P.W.S., Alaska.
	N	M		23½	-	18	2½		USCGS.
		F		35	-				Mag.: M = 5¼
14	NE	e	23	20	-				Confused by microseisms.
	E	M		36	-	18	2		58.0°N., 152.6°W. P.W.S., Alaska.
	N	M		36	-	18	4		USCGS.
		F	24	15	-				Mag.: M = 5½
15	ZV,Z	eP	15	41	57	6	1.7	8250	Confused by microseisms.
	NE	eS		51	27	16	2.9(H)		56.5°N., 154.4°W.
	N	eSS		55	29				P.W.S., Alaska. USCGS.
	E	M	16	13½	-	22	5		
	N	M		13½	-	22	8		
	Z	M		13½	-	22	5		
		F	17	10	-				Mag.: M = 6.1
15	ZV	iP	16	47	30				Confused by microseisms.
	E	M		23	-	16	1½		21.7°N., 88.0°E. India.
	N	M		23	-	16	2		Pakistan border. USCGS.
		F		35	-				Mag.: M = 5½
15	ZV	iP	20	59	10				40.0°N., 24.7°E. h = 121 km.
	N	M	21	06	-	18	2		Aegean Sea. USCGS.
		F		15	-				
16	ZV,Z	eP	01	17	13				37.0°N., 142.7°E.
	NE	eL		46	-				Off coast of Honshu, Japan. USCGS.
	E	M		55½	-	18	3½		
	N	M		56	-	18	2½		
		F	02	20	-				Mag.: M = 5¾
16	ZV	iPKP	02	55	26				21.5°S., 170.5°E. h = 110 km.
									Loyalty Islands. USCGS.
16	ZV	eP	10	06	22				
16	NE	e	14	25	-				52.1°N., 169.4°W.
	E	M		35	-	20	1		Fox Islands. USCGS.
	N	M		35	-	20	2		
		F		55	-				Mag.: M = 5¼

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16	ZV,Z	eP	19	38	08	6	1.2	7900	
	ZV,Z	i		38	16				
	NE	eS		47	21	16	10.6(H)		56.4°N., 152.9°W.
	NE	eSS		51	37				P.W.S., Alaska. USCGS.
	E	eL		56	-				
	E	M	20	04	-	27	29		
	N	M		04	-	26	18		
	E	M		09	-	19	13		
	N	M		09	-	20	14		
	Z	M		09	-	20	8		
		F	22	25	-				Mag.: M = 6.3
17	ZV,Z	eP	05	00	43	6	1.2	7900	
	E	eS		09	55	16	3.0(H)		56.4°N., 152.9°W.
	N	eSS		14	21				P.W.S., Alaska. USCGS.
	E	M		31½	-	19	4		
	N	M		31½	-	20	4½		
	Z	M		31½	-	20	2½		
		F	06	25	-				Mag.: M = 5.9
17	NE	e	07	05	-				Small. 6.6°S., 154.9°E.
		F		30	-				Solomon Islands. USCGS.
17	NE	e	09	40	-				Small. 57.7°N., 151.4°W.
		F	10	15	-				P.W.S., Alaska. USCGS.
18	ZV,Z	iP	05	39	57				45.5°N., 151.1°E.
	N	M	06	16	-	20	1		Kurile Islands. USCGS.
		F		55	-				
18	NE	e	09	45	-				
	E	M		55½	-	20	1		
	N	M		55½	-	20	1½		
		F	10	05	-				
18	E	eS	20	36	43				56.1°N., 153.7°W.
	E	M		58	-	20	1½		P.W.S., Alaska. USCGS.
	N	M		58	-	20	2½		
		F	21	45	-				Mag.: M = 5½
19	NE	e	04	55	-				Very small. 55.1°S., 128.5°W.
		F	05	30	-				Pacific Ocean. USCGS.
19	NE	e	06	00	-				41.7°S., 83.9°W. Off coast of
	E	M		17½	-	22	1½		Chile. USCGS.
	N	M		17½	-	22	2		
		F		55	-				Mag.: M = 5¾
19	NE	e	14	40	-				60.5°S., 58.3°W. Near South
	E	M	15	16	-	20	2		Shetland Islands. USCGS.
	N	M		16	-	20	2½		
		F	16	25	-				Mag.: M = 5¾-6.
20	NE	e	04	05	-				Very small. 59.7°N., 144.6°W.
		F		20	-				P.W.S., Alaska. USCGS.
20	ZV,Z	iP	12	07	16	5	1.3	7580	Dilatation.
	ZV,Z	i		07	36				61.4°N., 147.3°W.
	E	eS		16	12				P.W.S., Alaska. USCGS.
	E	M		35½	-	20	3		
	N	M		37	-	20	6		

contd.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ. km.	REMARKS
contd.									
20	Z	M	12	37	-	20	3		
		F	13	25	-				Mag.: M = 6.0
20	NE	e	16	50	-				60.7°N., 145.3°W. P.W.S., Alaska.
	N	M		58½	-	20	1½		USCGS.
		F	17	15	-				
21	ZV	iP	05	12	10				61.5°N., 147.4°W.
	E	M		42	-	20	1		P.W.S., Alaska. USCGS.
	N	M		42	-	20	1½		
		F		55	-				Mag.: M = 5¼
22	ZV	iP	09	51	34			2300	
	ZV	e		52	04				56.1°N., 34.9°W.
	N	eS		55	19	16	2.7		North Atlantic Ocean. USCGS.
	E	M		58	-	16	4		
	N	M		58	-	16	6½		
		F	10	20	-				Mag.: M = 5.0
23	NE	e	02	35	-				Very small. 6.7°S., 155.0°E.
		F	03	00	-				Solomon Islands. USCGS.
23	ZV,Z	ePKP	03	51	41			13200	
	ZV,Z	ePP		53	18	6	2.9		PPH 12 sec. 2.7 μ
	NE	eSS	04	09	21				
	E	M		37	-	26	16		5.3°S., 134.0°E.
	N	M		37	-	26	13		Aru Islands region. USCGS.
	E	M		51½	-	20	9		
	N	M		51½	-	22	10		
	E	M	05	43	-	20	9½		} via 180°
	N	M		43	-	20	8½		}
	Z	M		43	-	20	4		} Magnitude:
		F	06	40	-				M = 7¼ (Body waves)
									M = 6½ (Surface waves)
23	NE	e	14	35	-				Small. 36.9°N., 37.9°E.
		F		55	-				Turkey. USCGS.
23	ZV	eP	15	07	36				57.3°N., 151.9°W. Alaska. USCGS.
23	NE	e	21	45	-				Very small. 52.7°N., 160.9°E.
		F	22	05	-				Near Kamchatka. USCGS.
24	NE	e	01	25	-				Very small. 52.7°N., 160.9°E.
		F		40	-				Near Kamchatka. USCGS.
24	NE	eS	04	10	37				59.5°N., 144.5°W.
	N	M		31½	-	18	1		P.W.S., Alaska. USCGS.
	E	M		32	-	16	1½		
		F	05	00	-				Mag.: M = 5-5¼
24	ZV,Z	ePKP	06	15	02				Depth = 90 km.
	ZV,Z	epPKP		15	27				
	NE	e		22	38				5.1°S., 144.2°E. h = 106 km.
	NE	e(S)		24	39	14	4.5(H)		North-East New Guinea. USCGS.
	NE	eSS		33	41				
	NE	eLQ		47½	-				
	E	M	07	02½	-	22	28		
	N	M		02½	-	22	18		
	Z	M		02½	-	22	3½		
		F	08	40	-				Mag.: M = 6¾-7

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24	ZV	eP	14	52	14				13.3°N., 88.8°W. h = 158 km.
	E	M	15	22½	-	20	1		Near coast of El Salvador.
		F		35	-				USCGS.
25	N	e	01	25	-				Very small. 37.8°N., 30.0°E.
		F		30	-				Turkey. USCGS.
25	ZV	iP	12	49	40				35.2°N., 27.6°E.
	N	M		59	-	20	1½		Dodecanese Island. USCGS.
		F	13	10	-				
25	NE	e	19	20	-				
	E	M		37	-	20	1		24.4°N., 125.3°E.
	N	M		37	-	20	1½		Ryukyu Islands. USCGS.
		F		50	-				
27	NE	e	02	30	-				Very small. 0.3°N., 98.1°E.
		F		55	-				Off coast of Sumatra. USCGS.
27	NE	e	07	29	-				60.1°S., 151.0°E.
	E	M		30	-	20	4		Balleny Islands region. USCGS.
	N	M		31	-	20	4½		
	Z	M		31	-	20	2½		
		F	09	30	-				Mag.: M = 6-6¼
29	NE	e	02	55	-				Small. 32.4°N., 129.0°E.
		F	03	20	-				Near Kyushu, Japan. USCGS.
29	ZV,Z	iP	04	25	49	4	2.1	2350	Compression.
	ZV,Z	i		25	53				39.3°N., 23.7°E.
	NE	eS		29	37	16	5.1 (H)		Aegean Sea. Extensive property
	N	eL		31	-				damage. USCGS.
	E	M		33	-	20	13		
	N	M		33	-	19	33		
		F	05	10	-				Mag.: M = 5¼
29	ZV,Z	eP	17	04	46			2360	
	N	eS		08	35	16	1.4 (H)		39.2°N., 23.7°E.
	N	eL		10½	-				Aegean Sea. USCGS.
	E	M		11	-	20	3½		
	N	M		11	-	19	10½		
		F		30	-				Mag.: M = 4½
30	NE	e	04	15	-				Very small.
		F		40	-				
30	NE	eL	16	56	-				
	N	M	17	14	-	28	4		4.6°S., 153.2°E. h = 78 km.
	E	M		21	-	20	1½		New Ireland region. USCGS.
	N	M		21	-	20	1½		
		F		30	-				
30	NE	e	17	50	-				60.1°N., 142.2°W.
	E	M	18	05	-	20	1½		P.W.S., Alaska. USCGS.
	N	M		05½	-	20	1½		
		F		25	-				Mag.: M = 5-5¼

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M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR MAY, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	1 November 1960	20.7	20.7	-0.01	59.3
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK. TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	ZV	eP	06	12	35				60.5°N., 145.6°W.
	E	M		41	-	20	1½		Alaska aftershock. USCGS.
	N	M		41	-	20	1		
		F		55					
2	ZV,Z	eP	16	23	10	8	3.1	8900	Compression.
	NE	eS		33	12	16	4.7(H)		PH 16 sec. 2.6 μ
	NE	eScS		33	31				
	NE	eSS		38	31				45.5°N., 150.3°E.
	E	eL		46½	-				Kurile Islands. USCGS.
	E	M	17	02	-	20	17		
	N	M		02½	-	20	18		
	Z	M		02½	-	20	6		
		F	19	05	-				Mag.: M = 6.2
4	NE	e	17	50	-				Small. 55.8°S., 4.4°W.
		F	18	15	-				Bouvet Island region. USCGS
5	ZV,Z	eP	08	13	56				45.5°N., 150.1°E. Kurile Islands. USCGS.
6	NE	e	05	20	-				Small. 60.7°S., 25.2°W.
		F		40	-				Sandwich Islands. USCGS.
6	NE	e	09	20	-				Small. 11.1°S., 162.2°E.
		F		50	-				Solomon Islands. USCGS.
6	ZV,Z	eP	15	37	52			7770	
	NE	eS		46	58	16	2.0(H)		56.7°N., 152.1°W.
	E	M	16	11	-	18	3½		Alaska aftershock. USCGS.
	N	M		11	-	18	4½		
	Z	M		11	-	18	2		

Form 3717 contd.

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MAY, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
6		F	17	00	-				Mag.: M = 5½
7	ZV	ePKP	00	54	03				18.2°S., 176.6°W. Fiji Islands. USCGS.
7	ZV,Z	iP	05	55	55	3	2.4	7100	Dilatation.
	ZV,Z	ePcP		56	10				
	ZV,Z	ePP		58	12				4.0°S., 34.9°E.
	E	iS	06	04	26	15	10(H)		Tangamyika, 1 killed, 19 injured
	ENZ	e		04	52				and extensive property damage.
	N	eSS		08	32				USCGS.
	N	eLR	06	15½	-				
	Z	M		24	-	21	13		
	N	M		24	-	21	40		
	E	M		24½	-	20	28		
		F	07	55	-				Mag.: M = 6.7
7	ZV,Z	iP	08	10	32	6	6.4	9200	Compression.
	ZV,Z	ePP		13	40	8	4.2		PH 10 sec. 5.3 μ
	NE	iS		20	46	18	21(H)		PPH 11 sec. 4.2 μ
	Z	ePPS		21	38				
	E	eSS		25	52				40.4°N., 139.0°E.
	E	eLQ		32	-				Off coast of northern Honshu,Japan.
	NE	eLR		36	-				USCGS.
	N	M		44	-	23	57		
	E	M		44½	-	22	85		
	Z	M		47	-	22	24		
		F	11	10	-				Mag.: M = 7.0
7	ZV,Z	iP	11	23	16				Depth = 500 km.
	ZV	ipP		25	09				30.6°N., 137.7°E. h = 469 km.
	ZV	ePP		26	58				Off coast of Honshu, Japan. USCGS.
7	ZV,Z	iP	20	25	07	6	2.0	9200	Compression.
	ZV,Z	ePP		28	16				
	NE	eS		35	22	16	6.0(H)		40.5°N., 139.0°E. Off coast of
	NE	eLR		50	-				Honshu, Japan. USCGS.
	E	M		59	-	22	21		
	N	M		59	-	20	11		
		F	22	15	-				Mag.: M = 6.3
8	NE	eL	16	50	-				56.7°N., 154.0°W.
	N	M	17	07	-	20	5		Alaska aftershock. USCGS.
	E	M		08	-	19	2½		
		F		35	-				Mag.: M = 5¾
8	ZV	iP	21	45	18				60.8°N., 143.6°W.
	NE	eL	22	03	-				Alaska aftershock.
	E	M		14	-	16	1½		USCGS.
	N	M		14	-	16	1½		
		F		30	-				Mag.: M = 5¼
8	ZV	iP	23	52	36				52.2°N., 169.5°W.
	E	M	24	32½	-	20	1½		Andreanof Islands. USCGS.
	N	M		32½	-	20	3		
		F	25	20	-				Mag.: M = 5½
9	NE	eL	02	36	-				52.2°N., 169.6°W.
	E	M		54	-	20	1		Andreanof Islands. USCGS.
	N	M		54	-	20	1½		
		F	03	20	-				Mag.: M = 5¼

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MAY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
11	NE	e	02	45	-				Very small. 60.8°N., 142.2°W.
		F	03	05	-				Alaska. USCGS.
12	ZV	iP	18	27	58			7850	
	NE	eS		37	08	16	3.9(H)		56.6°N., 152.4°W.
	N	eSS		41	31				Alaska aftershock.
	E	eL		49½	-				USCGS.
	E	M		54	—	26	15		
	N	M		54	-	26	10		
	N	M		59	-	22	7½		
	E	M		59½	-	20	6½		
	Z	M		59½	-	20	5		
		F	20	20	-				Mag.: M = 6.0
13	ZV,Z	e(PKP)	05	45	27				
	N	eSS	06	10	27				32.8°S., 178.3°W.
	E	eL		33	-				Kermadec Islands region. USCGS.
	E	M	07	00	-	20	8		
	N	M		00	-	20	11		
	Z	M		00	-	20	8		
		F	08	15	-				Mag.: M = 6½
13	NE	e	13	53½	-				35.4°N., 1.9°W. Near coast of
	E	M		55½	-	16	2½		Algeria. BCIS.
		F	14	03	-				
15	NE	eL	11	45	-				3.5°S., 149.1°E. h = 44 km.
	E	M	12	06	-	20	1½		Bismarck Sea.
	N	M		06	-	21	1½		USCGS.
		F		25	-				
16	ZV	iP	06	09	36				Compression. 49.9°N., 78.3°E.
									h = 0 km. Kazakh S.S.R. USCGS.
16	ZV,Z	iP	08	47	51				Compression. Depth = 200 km.
	ZV	epP		48	35				36.3°N., 71.5°E. Hinshu Kush.
									USCGS.
16	ZV,Z	e(PKP)	16	27	53				32.8°S., 178.3°W.
	E	M	17	42	-	20	2		Kermadec Islands. USCGS.
	N	M		42	-	20	2½		
	Z	M		42	-	20	2		
		F	18	40	-				Mag.: M = 6
17	ZV,Z	eP	01	00	57			7500	
	NE	eS		09	49	12	1.3(H)		59.4°N., 142.7°W.
	NE	eL		21½	-				Alaska aftershock.
	E	M		30	-	18	7		USCGS.
	N	M		30½	-	18	12		
	Z	M		30½	-	18	6		
		F	02	30	-				Mag.: M = 5¾
17	ZV,Z	iP	04	53	18				53.9°N., 159.7°W.
	N	M	05	30	-	20	½		South of Alaska. USCGS.
		F		40	-				
17	ZV,Z	iP	19	32	33	4	0.7	3380	Compression.
	NE	eS		37	30	20	13.5(H)		PH 16 sec. 1.2 μ
	NE	eLQ		390	-				
	N	M		40½	-	20	49		35.2°N., 35.9°W.
	E	M		41½	-	20	24		North Atlantic
	E	M		42½	-	14	33		Ocean. USCGS.
	Z	M		42½	-	14	14		
		F	21	10	-				Mag.: M = 5.6

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MAY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
18	ZV,Z	ePKP	14	31	57				21.2°S., 174.5°W. Tonga Islands. USCGS.
19	NE	e	06	20	-				Small. 77.7°N., 18.3°E.
		F		35	-				Svalbard region. USCGS.
19	ZV,Z	iP	10	51	34				Compression. 45.5°N., 150.3°E. Kurile Islands. USCGS.
19	ZV,Z	e(P)	15	48	44				57.0°N., 152.8°W.
	N	M	16	22	-	18	1		Alaska aftershock.
		F		30	-				USCGS.
19	ZV,Z	iP	23	16	09	7	1.1	9470	Compression.
	N	eS		26	33	20	6.7(H)		PE 16 sec. 1.3 μ
	N	e		26	53				
	N	eSS		31	57				0.7°S., 80.2°W. h = 54 km.
	N	eL		39	-				Near coast of Ecuador.
	N	M		48½	-	22	4½		USCGS.
	E	M		49	-	22	7½		
	Z	M		49	-	22	4½		
		F	25	45	-				Mag.: M = 5.9
19	ZV	iP	23	34	01				48.3°N., 154.4°E. Kurile Islands. USCGS.
20	NE	e	06	50	-				
	E	M	07	14½	-	21	1½		2.7°S., 139.3°E. h = 61 km.
	N	M		14½	-	21	1½		Near coast of New Guinea.
		F	08	15	-				USCGS.
21	NE	e	16	00	-				
	E	M		15½	-	20	1½		59.0°N., 153.5°W.
	N	M		16½	-	20	1½		Alaska aftershock. USCGS.
		F		55	-				
21	ZV,Z	iP	22	44	00				17.5°N., 83.9°W.
	N	M	23	14	-				Caribbean Sea. USCGS.
		F		25	-				
21	ZV	eP	23	23	01				44.5°N., 149.6°E. Kurile Islands. USCGS.
22	NE	e	13	20	-				Small.
		F		45	-				
23	ZV	iP	11	35	01				28.6°N., 139.4°E. h = 409 km.
									Bonin Islands. USCGS.
24	ZV,Z	ePKP1	04	32	49				
	ZV,Z	iPKP2		32	55				22.6°S., 174.1°W.
	NE	eL	05	33	-				Tonga Islands. USCGS.
		F	06	30	-				
24	ZV,Z	eP	10	44	13	4	0.6	9800	
	ZV,Z	i		44	24				34.3°N., 141.1°E. Near east coast
	NE	eS		54	52	10	1.3(H)		of Honshu, Japan. USCGS.
	E	M	11	21	-	20	2		
	N	M		21½	-	20	1½		
		F	12	15	-				Mag.: M = 5.6
25	E	eSKS	20	08	10				
	E	eSS		15	16				9.1°S., 88.9°E. Indian Ocean.
contd.	N	eL		29	-				USCGS.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MAY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
25	E	M	20	47½	-	19	2		
	N	M		47½	-	19	2		
		F	21	20	-				Mag.: M = 5½
26	Z	eP	11	13	35	8	1.3	12300	Depth = 100 km.
	Z	epP		14	02	8	3.5		IPH 20 sec. 9.0 μ
	Z	ePP		18	26	10	4.8		
	NE	eSKS		23	54	15	30(H)		56.2°S., 27.8°W. h = 120 km.
	N	eSKKS		24	55				Sandwich Islands.
	ZNE	eSP		27	31				USCGS.
	ZNE	eSPP		28	29				
	NE	eSS		33	42				
	E	eL		46	-				
	ZN	eLR		50	-				
	E	M		46½	-	28	160		
	N	M		51	-	40	220		
	E	M	12	00½	-	19	32		
	N	M		00½	-	19	106		
	Z	M		00½	-	19	50		
		F	15	35	-				Mag.: M = 7.3
26	NE	e	00	35	-				Very small. 56.1°S., 26.6°W.
		F	01	10	-				Sandwich Islands. USCGS.
27	NE	e	01	23	-				56.1°S., 27.6°W. h = 105 km.
	E	M		58	-	19	½		Sandwich Islands. USCGS.
	N	M		58	-	19	1½		
		F	02	40	-				
27	NE	e	07	20	-				Very small. 56.2°S., 27.4°W.
		F		50	-				Sandwich Islands. USCGS.
28	E	eS	02	20	17				
	E	M		47	-	18	½		24.5°N., 122.0°E. h = 41 km.
	N	M		47	-	18	1		Near coast of Taiwan. USCGS.
		F	03	20	-				
28	N	eS	12	50	51				0.8°S., 24.7°W.
	NE	eL		56	-				Mid-Atlantic Ocean. USCGS.
		F	13	30	-				
28	NE	e	16	50	-				Very small. 58.3°N., 150.6°W.
		F	17	15	-				Alaska aftershock.
29	ZV	iP	05	20	13				Compression.
	NE	M		58	-				44.7°N., 149.4°E. h = 50 km.
		F	06	20	-				KurileIslands. USCGS.
29	ZV,Z	eP	10	28	19	4	0.7	7400	
	NE	eS		37	09				60.2°N., 146.3°W.
	N	eSS		41	13				Alaska aftershock. USCGS.
	E	M		57	-	18	1		
	N	M		58	-	18	2		
	Z	M		58	-	18	1		
		F	11	30	-				Mag.: M = 5½
30	ZV,Z	iP	14	43	24	4	1.2	9600	
	ZV,Z	i		43	38				36.2°N., 141.1°E. h = 49 km.
	EN	eS		53	57	11	4.2(H)		Near east coast of Honshu, Japan.
	EN	e		54	19				USCGS.
	EN	eL	15	10	-				

contd.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

MAY, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
30	E	M	15	15	-	34	11		
	N	M		15	-	34	8		
	E	M		26	-	19	11		
	N	M		26½	-	18	14		
	Z	M		26½	-	18	4		
		F	16	40					Mag.: M = 6.2
31	ZV,Z	iP	00	52	50	4	16	9100	Compression.
	Z	ipP		53	07				Depth = 60 km.
	Z	ePP		55	52				PH 14 sec. 8 μ
	ZNE	iS	01	02	57	10	24 (H)		
	NE	e		03	14				43.5°N., 146.8°E. h = 48 km.
	ZN	ePS		03	37				Kurile Islands. USCGS.
	N	eSS		07	59				
	N	e		09	16				
	E	eLQ		14	-				
	N	eLR		19	-				
	Z	M		27½	-	26	32		
	N	M		27½	-	26	86		
	E	M		28	-	24	37		
	N	M		31	-	20	39		
	E	M		32½	-	20	35		
		F	03	45	-				Mag.: M = 7.2
31	NE	eL	18	22	-				
	N	M		34½	-	22	1		13.6°S., 172.1°E. h = 73 km.
	E	M		36	-	22	1		New Hebrides Islands.
		F	19	30	-				USCGS.

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M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR JUNE, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	1 November 1960	20.7	20.7	-0.01	59.3
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	△ km.	REMARKS
1	ZV	ePKP	13	37	11				21.0°S., 175.7°W. Tonga Islands. USCGS.
1	ZV	iP	18	43	29				43.6°N., 147.0°E. Japan. USCGS.
2	NE	eS	16	28	55				59.7°N., 144.4°W.
	NE	eLR		41	-				Alaska aftershock. USCGS.
	N	M		49½	-	18	1		
	E	M		50½	-	16	1		
		F	-	-	-				overlapped by next shock.
2	NE	e	17	00	-				Very small. 59.7°N., 144.2°W.
		F		30	-				Alaska aftershock. USCGS.
3	ZV	eP	03	00	40				Depth = 123 km.
	ZV	ipP		01	11				
	N	M		33½	-	16	½		25.9°N., 95.8°E. Northern Burma. USCGS.
		F		45	-				
4	NE	eL	03	25	-				
	E	M		27	-	20	½		36.4°N., 69.3°E. Hindu-Kush.
	N	M		27	-	20	1		USCGS.
		F	03	40	-				
4	ZV	eP	04	41	20				Small. 17.5°N., 100.8°W.
	NE	eL	05	10	-				Near coast of Mexico. USCGS.
		F		40	-				
4	NE	eL	12	22½	-				
	E	M		35	-	20	½		9.6°S., 76.1°W. h = 124 km.
	N	M		35	-	20	1		Central Peru. USCGS.
		F	12	50	-				

Form 3717

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JUNE, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
5	NE	e	00	25	-				Very small. 39.3°N., 43.1°E.
	E	F		40	-				Eastern Turkey. USCGS.
5	ZV	eP	04	48	57				47.8°N., 27.3°W.
	E	eL		53½	-				North Atlantic Ocean. USCGS.
		F	05	05	-				
5	NE	eS	10	09	58				60.4°N., 146.0°W.
	E	eL		20	-				Alaska aftershock. USCGS.
		F		55	-				
5	ZV	e(P)	22	17	55				
	N	eL		42	-				58.1°N., 152.1°W.
	N	M		49½	-	18	1		Alaska aftershock. USCGS.
		F	23	15	-				
6	NE	e	20	00	-				26.6°S., 114.4°W. Eastern Islands
	E	M		11	-	22	2½		region. USCGS.
		F		40	-				
7	N	eL	20	51½	-				
	E	M	21	08	-	20	1½		30.4°S., 67.6°W.
	N	M		08	-	20	1		Argentina. USCGS.
		F		40	-				
9	NE	eL	02	41.0	-				
	E	M		42	-	12	1½		38.2°N., 2.5°W.
	N	M		43	-	12	2		Southeastern Spain. USCGS.
	Z	M		43	-	12	1		
		F		53	-				
10	NE	eSKS	22	41	22				
	ZNE	eSP		44	32				5.0°N., 127.4°E. h = 146 km.
	ZNE	epSP		45	32				Talaud Islands region. USCGS.
	N	eL	23	07½	-				
	E	M		20½	-	26	3		
	N	M		20½	-	26	3½		
	N	M		25½	-	20	2		
	E	M		26	-	20	2		
		F	-	-	-				overlapped by next shock.
10	E	eL	23	56	-				59.1°N., 153.8°W.
	N	M	24	09½	-	20	1		Alaska aftershock. USCGS.
		F		25	-				
11	NE	e	17	50	-				
	N	M	18	10	-	26	4		2.0°S., 140.8°E. Near coast of
	E	M		15	-	20	1½		New Guinea. USCGS.
	N	M		15	-	20	3		
		F		30	-				Mag.: M = 6
12	EN	eS	07	56	30				
	N	M	08	02	-				37.5°N., 30.4°E. Western Turkey.
		F		10	-				USCGS.
12	N	eL	11	49	-				
	E	M		55½	-	24	2½		2.1°S., 141.1°E. Near coast of
	N	M		56	-	26	2		New Guinea. USCGS.
	E	M	12	03½	-	20	1½		
	N	M		03½	-	20	2		
		F		20	-				Mag. M = 5¾

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JUNE, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
12	ZV	$iPKP_2$	18	31	30				26.5°S., 178.3°E. h = 648 km. South of Fiji Islands. USCGS.
13	EN	e	04	55	-				Small. 53.6°N., 172.1°E.
		F	05	30	-				Aleutian Islands. USCGS.
13	EN	e	05	55	-				Very small. 1.9°S., 141.2°E.
		F	06	30	-				Near coast of New Guinea. USCGS.
13	EN	e	09	00	-				Small. 10.0°N., 93.0°E.
		F		35	-				Andaman Islands. USCGS.
13	ZV	ePKP	14	19	50				Depth = 460 km.
	ZV	esPKP		22	29				3.9°S., 154.3°E. Solomon Islands. USCGS.
13	EN	e	18	07	-				Very small. 23.0°N., 94.0°E.
		F		30	-				Burma. USCGS.
13	EN	eL	23	45	-				27.6°S., 178.3°W. h = 94 km.
	E	M	24	00½	-	20	1		Kermadec Islands. USCGS.
	N	M		00½	-	20	1		
		F		40	-				
14	ZV	eP	01	08	55				48.2°N., 154.3°E. Kurile Islands. USCGS.
14	ZV,Z	eP	12	21	44	4	1.3	3400	Dilatation.
	ZV,Z	e		22	31				
	ZV,Z	ePP		22	42				38.0°N., 38.5°E. h = 8 km.
	ZV	iPPP		22	56				Southeastern Turkey. 1 killed,
	N	eS		26	44	12	2.4		15 injured, extensive property
	N	eLQ		30	-				damage. USCGS.
	N	M		34	-	20	8½		
	E	M		34½	-	20	6		
	E	M		36½	-	17	10		
	N	M		36½	-	17	7½		Mag.: M = 5.3
		F	13	30	-				
15	Z	eP	00	18	31	7	0.5	10100	5.4°N., 97.0°E.
	NE	eS		29	23	14	1.7(H)		Northern Sumatra. USCGS.
	NE	ePPs		30	17				
	N	eLQ		41½	-				
	E	M		59½	-	22	5½		
	N	M	01	00	-	22	7½		
	E	M		10	-	18	11½		
	Z	M		10	-	18	3½		
		F	02	00	-				Mag.: M = 5¾
16	ZV,Z	eP	04	14	10	6	7.0	9400	Compression. Depth = 60 km.
	ZV,Z	i		14	17				PH 10 sec. 3.3 μ
	ZV,Z	ipP		14	28				PPH 14 sec. 4.5 μ
	ZV,Z	iPP		17	30	7	3.8		
	ZV,Z	ipPP		17	45				
	ZV,Z	ePPP		19	27				38.3°N., 139.1°E. h = 57 km.
	NE	eP_a		20	55				Near west coast of Honshu, Japan.
	EN	eSKS		24	37				25 killed, many injured and
	EN	eS		24	43	18	73(H)		extensive property damage. USCGS.
	N	eSS		30	01				
	E	eLQ		36	-				
	EN	eLR		41	-				
	N	M		44½	-	36	510		
contd.	E	M		45½	-	32	540		

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
16	E	M	04	55½	-	20	350		
	N	M		55½	-	20	340		
	Z	M		55½	-	18	150		
		F	08	55	-				Mag.: M = 7.2
16	ZV	iP	04	30	07				Compression. 38.9°N., 139.1°E. Near coast of Japan. USCGS.
16	ZV	eP	07	05	35				Compression. 38.7°N., 139.0°E. Near coast of Japan. USCGS.
16	ZV	eP	07	27	28				Compression. 38.5°N., 139.2°E. Near coast of Japan. USCGS.
16	NE	e	12	10	-				
	E	M		30	-	20	1		2.0°S., 141.1°E. Near coast of
	N	M		30	-	20	1		New Guinea.
		F		40	-				USCGS.
18	ZV	eP	18	13	52			8850	Compression.
	EN	eS		23	50				
	EN	eL		35	-				47.5°N., 154.9°E.
	E	M		48	-	20	1½		Kurile Islands. USCGS.
	N	M		48	-	20	1		
		F	19	25	-				
18	EN	eL	21	24	-				Small.. 39.3°S., 74.7°W.
		F	22	05	-				Near coast of Chile. USCGS.
19	EN	eL	01	00	-				Small. 40.7°N., 32.9°E.
		F		30	-				Turkey. USCGS.
19	EN	e	10	47	-				Small. 38.8°N., 139.3°E.
		F	11	15	-				Near coast of Japan. USCGS.
19	EN	e	11	15	-				Small. 22.6°N., 121.0°E.
		F	12	00	-				Taiwan. USCGS.
21	ZV	iP	01	44	57				Small. 51.0°N., 157.0°E.
		F	02	35	-				Kamchatka. USCGS.
22	EN	eL	01	20	-				
	N	M		38	-	20	1		15.7°S., 172.8°W.
	E	M		38½	-	20	1		Samoa Islands. USCGS.
		F	02	45	-				
22	EN	eL	04	07	-				
	E	M		19½	-	26	1		10.4°S., 161.1°E. h = 70 km.
	N	M		19½	-	26	2		Solomon Islands. USCGS.
		F		40	-				
22	NE	eL	18	01	-				Very small. 54.9°N., 40.2°W.
		F		10	-				Atlantic Ocean. USCGS.
22	NE	e	22	15	-				Very small. 13.6°N., 120.3°E.
		F		35	-				Philippine Islands. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
23	ZV,Z	iP	01	38	47	5	12.3	9050	Compression. Depth = 75 km.
	ZV,Z	ePP		39	07				PH 12 sec. 6.7 μ
	ZNE	ePP		41	53				PPH 16 sec. 4.1 μ
	ZV,Z	epPP		42	15				
	N	ePa		44	59				
	EN	iS		48	51	13	19.5(H)		
	N	e		49	16				
	N	e		49	57				
	N	eSS		54	19				43.3°N., 146.1°E. h = 77 km.
	E	eLQ	02	01	-				Kurile Islands. USCGS.
	NE	eLR		04	-				
	Z	M		13½	-	26	30		
	N	M		13½	-	26	77		
	E	M		14	-	24	45		
	E	M		18	-	20	27		
	N	M		18	-	20	35		
	Z	M		18	-	20	12		
		F		40	-				Mag.: M = 7.0
23	ZV	eP	02	17	17				2.7°S., 80.0°W. Ecuador. USCGS.
23	NE	e	06	00	-				Very small. 53.9°N., 163.2°W.
		F		25	-				Unimak Islands. USCGS.
23	NE	e	20	00	-				Very small. 3.0°N., 126.6°E.
		F		10	-				Talaud Islands. USCGS.
24	NE	e	13	40	-				Small. 32.2°N., 129.4°E.
		F	14	05	-				Near coast of Japan. USCGS.
27	ZV	eP	02	38	10				40.4°N., 77.5°E.
	NE	eL		54	-				Sinkiang Province, China. USCGS.
	E	M	03	03½	-	20	1½		
	N	M		03½	-	20	1½		
		F		20	-				Mag.: M = 5
27	NE	eL	17	13½	-				11.5°S., 13.8°W.
	E	M		17	-	20	1½		Ascension Islands. USCGS.
	N	M		18	-	20	1½		
		F		30	-				Mag.: M = 5-5¼
28	ZV,Z	ePKP	13	10	36				
	N	eSS		29	23				1.7°S., 149.6°E.
	NE	eL		43	-				New Ireland region. USCGS.
	E	M		51	-	38	10		
	N	M		51	-	38	8		
	E	M		56½	-	22	5		
	N	M		56½	-	22	5½		
		F	15	25	-				Mag.: M = 6¼
28	ZV	ePKP	15	11	13				13.2°S., 167.1°E. h = 215 km.
									New Hebrides Islands. USCGS.
28	ZV	iP	15	26	44				
	E	M		31½	-	18	1		37.4°N., 14.3°W. About 400 km.
	N	M		32	-	16	1		southwest of Portugal. USCGS.
		F		45	-				
28	ZV	eP	17	16	35				3.5°N., 32.4°W. Atlantic Ocean. USCGS.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JUNE, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
28	ZV	eP	17	37	25			6250	
	NE	eS		45	11				4.0°N., 32.4°W.
	N	eL		53	-				North Atlantic Ocean. USCGS.
	E	M		57	-	20	1½		
	N	M		57	-	20	1½		
		F	18	30	-				Mag.: M = 5¼
28	NE	eL	19	35	-				58.3°N., 150.2°W. Alaska
		F	20	10	-				aftershock. USCGS.
29	NE	e	07	55	-				Small. 62.7°N., 152.0°W.
		F	08	15	-				Alaska. USCGS.
30	ZV	eP	12	32	42				47.8°N., 16.0°E. Austria. USCGS.
30	ZV	ePP	14	05	33				0.8°S., 122.5°E. Northern Celebes. USCGS.
30	ZV	iP	15	59	55				Compression. 44.7°N., 150.4°E.
									Kurile Islands. USCGS.
30	ZV	iP	16	00	51			8930	Compression.
	E	eS		10	49				45.9°N., 150.4°E.
	E	M		40	-	20	1½		Kurile Islands. USCGS.
	N	M		40⅝	-	20	2		
		F	-	-	-				Mag.: M = 5½
30	ZV,Z	iP	20	19	46			8700	Compression. Depth = 383 km.
	ZV,Z	i		19	49				
	ZV,Z	epP		21	13				46.6°N., 144.6°E. h = 383 km.
	NE	eS		29	09				Sea of Okhotsk. USCGS.

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AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR JULY, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK. TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland

Lat. 55° 19′ 00″N., Long. 3° 12′ 18″W. Height above M.S.L. 243 m.

Foundation: Llandovery shales (late Silurian)

Instruments: World-Wide Standardised Seismographs (USCGS)

Constants:

Instrument	Comp	FREE PERIODS Pendulum sec.	FREE PERIODS Galvanometer sec.	Magnification
SPRENGNETHER WWSS	N	30.0	100	1500 at 30 sec.
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N′	1.0	0.75	25000 at 1 sec.
	E′	1.0	0.75	
	Z′	1.0	0.75	

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JULY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	Z'	iP	02	59	17.5				02 47 33.9; 46.3°N., 146.9°E.
	EN	eL	03	23	-				h = 33 km. Kurile Islands.
ESK	Z	M		31½	-	20	½		USCGS
	E	M		31½	-	21	½		
	N	M		32	-	21	½		
		F	04	05	-				Mag.: M = 5 (ESK)
KEW	ZV	eP	02	59	34				
	E	eL	03	27	-				
		F	04	00	-				
1	Z'Z	eP	09	58	39.3	6	1.1	8200	
	E	eS	10	08	30	16	0.9(H)		09 46 49.6; 45.2°N., 150.3°E.
	N	eSS		13	50				h = 75 km. Kurile Islands.
ESK	EN	eL		20	-				USCGS.
	E	M		32½	-	20	1		
	N	M		33	-	20	1		
	Z	M		33	-	20	1		
		F	11	20	-				Mag.: M = 5.2(ESK)
	NE	eS	10	08	55				
KEW	N	M		34	-	20	½		
	E	M		34½	-	20	½		
		F	11	10	-				
1 ESK	Z'Z	eP	10	04	29.0				09 52 31.8; 44.6°N., 149.9°E. h = 33 km. Kurile Islands.USCGS.
1 ESK	Z'	eP	13	42	26.9				13 31 06.2; 52.7°N., 168.2°W. h = 33 km. Fox Islands. USCGS.
1	Z'	eP	20	16	35.0				
	ZEN	eLQ		25	-				20 09 31.2; 30.9°N., 41.5°W.
ESK	ZEN	eLR		26½	-				h = 33 km. North Atlantic Ocean.
	E	M		28	-	19	½		USCGS.
	N	M		28	-	19	½		
	Z	M		28	-	18	1		
		F		41	-				
KEW	EN	eL	20	25	-				
		F		35	-				
1 ESK	EN	eL	20	59	-				20 20 56.6; 17.1°S., 69.1°W. h = 147 km. Peru-Bolivia border. USCGS.
		F	21	15	-				
KEW	EN	eL	21	05	-				
		F	22	05	-				
1 ESK	Z'	eP	22	58	54.5				22 46 18.7; 31.1°N., 139.6°E. h = 147 km. South of Honshu, Japan. USCGS.
	ZEN	eL	23	24	-				
		F	-	-	-				
KEW	ZV	eP	22	59	06				
1 ESK	Z'	eP	23	02	12.2				22 49 23.4; 14.3°S., 73.1°W. h = 139 km. Southern Peru. USCGS.
	e	e		12	36				
	N	eL		28	-				
		F		55	-				
KEW	ZV	eP	23	02	13				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
2	Z'	iP	01	29	19.0	1	0.1	7000	01 19 02.7; 60.1°N., 146.0°W.
	Z'	epP		29	24.0				h = 14 km. Alaska aftershock.
	EN	eS		37	48				USCGS.
	N	eSS		41	55				
ESK	E	eLQ		46½	-				
	E	M		54	-	25	½		
	N	M		54	-	24	½		
	Z	M		55½	-	25	½		
		F	02	20	-				Mag.: M = 5 (ESK)
KEW	ZV	iP	01	29	47				Depth = 20 km.
	ZV	ipP		29	53				
	EN	eL		50	-				
		F	02	30	-				
2	EN	eL	06	05	-				05 03 35; 1.2°N., 118.9°E.
ESK		F		20	-				h = 133 km. Macasser Strait.USCGS.
2	E	eLQ	07	06	-				06 35 18; 53.4°N., 167.8°W.
ESK	N	eLR		09½	-				h = 45 km. Fox Islands. USCGS.
		F		25	-				
2	EN	eL	15	39	-				15 09 13.5; 47.6°N., 128.7°W.
ESK		F		55	-				h = 33 km. Off coast of Washington.
									USCGS.
2	EN	eS	17	23	26	26	1.1(H)		17 03 42.4; 47.7°., 128.3°W.
ESK	EN	eLQ		32	-				h = 33 km. Off coast of Washington.
	E	M		41	-	20	3½		USCGS.
	N	M		41½	-	20	2½		
	Z	M		42	-	20	4½		
		F	-	-	-				Mag.: M = 5½ (ESK)
KEW	EN	eS	17	24	30				
	EN	eLQ		33½	-				
	E	M		43	-	20	3		
	N	M		43½	-	20	2		
		F	-	-	-				Mag.: M = 5½ (KEW)
2	N	M	17	54½	-	20	2		17 17 34.0; 47.7°N., 128.8°W.
	E	M		55	-	20	2½		h = 14km. Off coast of Washington.
ESK	Z	M		56	-	20	3½		USCGS.
		F	18	45	-				Mag.: M = 5½ (ESK)
KEW	E	M	17	57	-	20	2		
	N	M		57½	-	20	1½		
		F	18	30	-				Mag.: M = 5½ (KEW)
3	Z'	eP	11	53	55.5				
ESK									
3	Z'N'E'	iPn	16	40	19.7			135	
	Z'N'	ePg		40	21.8				
	E'	eSx		40	35.5				Local
ESK	Z'N'E'	iSn		40	36.4				
	Z'N'E'	iSg		40	37.7				
	E	i		40	39.7				
		F		41	10				
3	Z'	eP	19	28	03.2				19 18 34.0; 11.0°N., 39.3°E.
ESK									Central Ethiopia. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
4	Z	ePP	11	08	18	15	0.5		
	EN	eLQ		35	-				10 49 28.8; 11.7°N., 1445°E.
ESK	Z	eLR		40½	-				h = 33 km. Mariana Islands.
	Z	M		43	-	50	2½		USCGS.
	N	M		43½	-	50	1½		
	E	M		55½	-	20	½		
	N	M		55½	-	20	½		
	Z	M		56	-	20	1		
		F	12	30	-				Mag.: M = 5¼ (ESK)
KEW	NE	e	11	40	-				Small.
		F	12	25	-				
4	Z'	iP	11	16	14.9			2500	11 11 20.0; 42.2°N., 23.6°E.
	EN	eS		20	14	18	0.8(H)		h = 10 km. Bulgaria. USCGS.
	EN	eLQ		21	-				
ESK	E	M		23½	-	20	2		
	N	M		23½	-	20	3½		
		F		40	-				Mag.: M = 4-4¼ (ESK)
KEW	ZV,Z	eP	11	15	41			2200	
	EN	eS		19	18				
	EN	eL		20½	-				
	E	M		22	-	12	1½		
	N	M		22	-	14	4½		
		F		40	-				
4	EN	e	12	30	-				12 13 56.9; 15.5°S., 72.5°W.
ESK		F	13	00	-				h = 148 km. Peru. USCGS.
5	Z'	eP	03	24	41.0	1	0.04	6900	
	Z'	epP		24	48.0				03 14 33.3; 60.8°N., 144.9°W.
	EN	eS		32	56				h = 30 km. Alaska aftershock.
	E	eLQ		40½	-				USCGS.
ESK	E	M		43	-	40	1		
	E	M		48	-	26	½		
	N	M		48	-	26	½		
	Z	M		48	-	26	½		
		F	04	40	-				Mag.: M = 4¾ (ESK)
KEW	E	eS	03	33	51				
	N	eL		48	-				
		F	04	10	-				
5	EN	eS	05	02	50				04 53 10; 37°N., 20°E.
ESK	EN	eL		06	-				Ionian Sea, Greece. BCIS
		F		20	-				
KEW	EN	eL	05	05	-				
		F		15	-				
5	NE	e	13	15	-				12 36 27.5; 51.2°N., 179.1°E.
ESK		F		25	-				Rat Islands. USCGS.
5	NE	e	17	30	-				
ESK		F		50	-				
5	Z'	eP	18	09	13.0				17 58 59.7; 60.2°N., 146.2°W.
ESK									Alaska aftershock. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
5	Z'	eP	19	19	55.5			8700	
	Z'	e		19	58.6				19 07 57.8; 26.2°N., 110.2°W.
	EN	iS		29	48	19	5.8(H)		h = 29 km. Gulf of California.
	N	eSS		34	34				USCGS.
	EN	eLQ		39½	-				
	ZE	eLR		44½	-				
ESK	E	M		47½	-	26	15		
	N	M		48	-	23	43		
	N	M		51	-	18	28		
	E	M		52	-	18	24		
	Z	M		52	-	18	34		
		F	22	30	-				Mag.: M = 6.3 (ESK)
KEW	ZV,Z	eP	19	20	14	5	1.2	9300	
	NE	eS		30	26	18	5.0(H)		
	EN	eSS		35	30				
	EN	eLQ		41½	-				
	E	M		50½	-	21	25		
	N	M		51	-	21	39		
	Z	M		52	-	20	8		
		F	22	20	-				Mag.: M = 6.2 (KEW)
5	ZNE	e	23	00	-				22 14 55.8; 10.0°S., 75.0°W.
ESK		F		20	-				Peru. USCGS.
5	Z,Z'	iP	23	47	54.6	1.3	0.17	8800	Compression. Depth = 58 km.
	Z'	epP		48	10.2				PZ 16 sec. 4.3 μ
	Z	ePP		50	44	20	1.4		PH 20 " 1.8 μ
ESK	EN	eS		57	44	19	5.1(H)		
	EN	eScS		58	15				23 36 01.5; 44.8°N., 149.6°E.
	ZN	eSS	24	03	15				h = 54 km. Kurile Islands. USCGS.
	E	eLQ		09½	-				
	ZN	eLR		13½	-				
	Z	M		26½	-	21	18		
	N	M		26½	-	20	14		
	E	M		27	-	20	7		
		F	-	-	-				Mag.: M = 5.8 (ESK)
KEW	ZV,Z	iP	23	48	11	6	2.1	9100	Compression. Depth = 58 km.
	ZV	epP		48	27				PH 10 sec. 1.3 μ
	EN	eS		58	14	17	5.6(H)		
	N	eSS	24	03	48				
	E	eL		11	-				
	E	M		26	-	18	15		
	N	M		26	-	19	15		
	Z	M		26	-	20	7		
		F	-	-	-				Mag.: M = 6.1 (KEW)
5	Z'	iP	23	51	03.2				23 39 10.3; 44.7°N., 149.6°E.
ESK									h = 48 km. Kurile Islands. USGGS
KEW	ZV,Z	eP	23	51	19				
6	Z'	eP	02	26	33			8700	
	EN	eS		36	25	23	12.3(H)		02 14 36.0; 26.2°N., 110.4°W.
	EN	e		36	46				h = 33 km. Gulf of California.
	N	eSS		41	17				USCGS.
ESK	N	eSSS		44	45				
	N	eLQ		46½	-				
	ZE	eLR		50	-				
	E	M		54	-	26	29		

contd.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
6 ESK	N	M	02	54½	-	24	75		
	E	M		57	-	20	28		
	N	M		57	-	19	44		
	E	M		59	-	17	53		
	Z	M		59	-	18	77		Mag.: M = 6.7 (ESK)
		F	-	-	-				
KEW	ZV,Z	eP	02	26	50	5	1.3	9150	
	EN	eS		37	04	16	7.1(H)		
	EN	e		37	19				
	EN	eSS		42	18				
	EN	eLQ		48	-				
	EN	eLR		51	-				
	E	M		56½	-	21	36		
	N	M		57½	-	21	75		
	Z	M		57½	-	21	16		
	N	M	03	01½	-	15	49		
	E	M		02½	-	16	85		
	Z	M		02½	-	15	29		Mag.: M = 6.4 (KEW)
		F	-	-	-				
6 ESK	Z'	eP	03	31	41.7				03 20 59.4; 56.7°N. 152.3°W. Alaska aftershock. USCGS.
6	Z'	iP	07	34	08.9	1.9	3.7	9000	Dilatation. Depth = 89 km.
	Z'	ipP		34	32.3				PH' 1.8 sec. 1.1 μ
	Z	iPP		37	10	30	11.2		PZ 30 sec. 30 μ
	Z	ePPP		39	14				PH 30 " 14.8 μ
	EN	iS		44	08	30	71(H)		PPH 33 " 10.8 μ
	N	eSKS		44	20				
ESK	EN	eSS		49	30				07 22 11.7; 18.3°N., 100.4°W.
	EN	eLQ		54½	-				h = 100 km. Guerrero, Mexico.
	E	M	08	02	-	36	166		More than 30 killed, many injured
	N	M		02½	-	32	122		and considerable property damage.
	E	M		09	-	24	76		USCGS.
	N	M		09	-	24	40		
	Z	M		09	-	24	120		
		F	12	00	-				Mag.: M = 6.9 (ESK).
KEW	ZV,Z	iP	07	34	24	6	15	9300	Dilatation. Depth = 96 km.
	ZV,ZE	epP		34	49				PH 14 sec. 8.2 μ
	Z	ePP		37	27	6	2·2		
	EN	eS		44	38	10	33(H)		
	E	eSKS		44	50				
	EN	eSS		49	32				
	EN	eLQ		57	-				
	ZEN	eLR	08	01	-				
	N	M		04½	-	30	173		
	E	M		05	-	28	89		
	E	M		12	-	20	72		
	N	M		12	-	20	30		
	Z	M		12½	-	19	23		Mag.: M = 7.1 (KEW)
		F	10	50	-				
6 ESK	Z'	eP	10	22	46.3				10 13 45.2; 37.1°N., 71.4°E.
	Z'	epP		23	09.3				Hindu Kush. USCGS.
KEW	ZV	iP	10	22	42				Depth = 91 km.
	ZV	ipP		23	04				
6 ESK	Z'	eP	10	36	26				10 24 33.8; 18.3°N, 100.3°W. Mexico. USCGS.

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6 ESK	Z'	iP	15	07	03.5				
6	NE	eL	20	51	-				19 50 42.1; 21.2°S., 173.8°E.
	E	M	21	14	-	20	½		h = 22 km. New Hebrides Islands.
ESK	N	M		14	-	20	½		USCGS.
	Z	M		14	-	20	½		
		F	22	05	-				
KEW	NE	e	21	05	-				
		F		30	-				
7 KEW	ZV	eP	04	10	25				04 05 27; 73.7°N., 8.6°E. Svalbard region. USCGS.
7 ESK	Z'	iPKP	07	57	56				07 39 04.2; 23.6°S., 179.9°W. h = 462 km. Fiji Islands. USCGS.
KEW	ZV	iPKP	07	58	05				
7	Z'N'E'	iPn	17	30	31.8			130	Confused by strong microseisms.
ESK	N'	eSn		30	47.8				
	N'	iSg		30	49.0				Local.
	N'E'	e		30	53.0				
		F		31½	-				
8	Z'	iPKP	12	14	7.0			13150	Confused by strong microseisms.
	Z;Z	iPP		15	23	20	4.1		
	Z	isPP		16	28				PPH 22 sec. 3.1 μ
	NE	eSKS		20	40				
	ZNE	eSPP		26	06				11 55 39; 5.5°S., 129.8°E.
ESK	EN	eLQ		43	-				h = 165 km. Banda Sea. USCGS.
	E	M		56	-	32	24		
	N	M		56	-	32	25		
	E	M	13	07	-	24	7		
	N	M		07	-	24	9		
	Z	M		07	-	24	15		Mag.: M = 6.3 (ESK)
		F	14	40	-				
KEW	ZV	ePKP	12	14	10			13150	Confused by strong microseisms.
	ZV	epPKP		15	05				
	ZV,Z	ePP		15	28	6	4.1		Depth = 215 km.
	E	eSKS		20	42				PPH 12 sec. 2.3 μ
	NE	esSS		32	32				
	N	M	13	01½	-	21	7		
	E	M		02½	-	21	13		Mag.: M = 6.5 (KEW)
		F	-	-	-				
9 ESK	Z'	iP	01	31	41.2				00 21 18; 59.8°N., 150.7°W. Alaska aftershock. USCGS.
9	Z'	eP	06	00	26.2				Confused by strong microseisms.
ESK	E	M		49	-	20	1½		
	N	M		49	-	20	1½		05 47 09.2; 15.4°N., 119.8°E.
	Z	M		49	-	20	2		h = 53 km. Philippine Islands.
		F	07	15	-				USCGS. Mag.: M = 5½ (ESK).
KEW	NE	e	06	40	-				
		F	07	00	-				

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9	Z	ePKP	11	41	43			16250	PPN 20 sec. 1.3 μ
ESK	Z'	iPKP	11	41	46.3	1	0.14		
	Z	ePP		45	10	20	2.4		11 22 05.4, 23.3°S., 175.7°W.
	NE	eSS	12	04	14				h = 43 km. Tonga Islands. USCGS.
	E	eL		23	-				
	E	M		41½	-	23	4½		
	N	M		41½	-	23	5		
	Z	M		41½	-	23	7½		
		F	13	45	-				Mag.: M = 5.9(ESK)
KEW	E	eSS	12	04	58				
	E	M		53	-	20	5½		
	N	M		53	-	20	4		
	Z	M		53	-	20	2		
		F	-	-	-				Mag.: M = 6¼(KEW)
9	Z'	eP	12	14	47				12 02 11.9; 34.2°N., 140.9°E.
ESK									Near Honshu, Japan. USCGS.
9	Z	ePKP	16	58	50	8	24	15750	Confused by microseisms.
	Z	ePP	17	02	00	16	17		PPH 24 sec. 7.4 μ
E SK	Z	ipPP		02	28	14	27		Depth = 113 km.
	Z	isPP		14	12				
	NE	eSS		20	14				16 39 49.3; 15.5°S., 167.6°E.
	E	eLQ		37	-				h = 121 km. New Hebrides
	ZN	eLR		44½	-				Islands. USCGS.
	Z	M	18	03½	-	21	22		
	N	M		03½	-	21	20		
	E	M		04½	-	21	16		
		F	20	00	-				Mag.: M = 7.1 (ESK)
KEW	ZV,Z	ePKP	16	59	06	5	13	15600	Depth = 114 km.
	ZV	i		59	15				PPN 12 sec. 6.0 μ
	ZV	epPKP		59	42				
	ZV,Z	ePP	17	02	10	8	7.4		
	ZV,Z	ipPP		02	39	6	6.9		
	NE	eSS		20	50				
	NE	esSS		21	46				
	E	eLQ		40½	-				
	E	M	18	06½	-	20	16		
	N	M		06½	-	20	12		
	Z	M		06½	-	20	4		
		F	19	40	-				Mag.: M = 7.2 (KEW)
9	Z'	iP	18	56	54.4				18 45 32.9; 49.4°N., 153.5°E.
ESK									Sea of Okhotsk. USCGS.
9	EN	eL	22	40	-				21 43 46.3; 1.8°S., 141.6°E.
ESK	E	M		55½	-	22	½		h = 33 km. Off coast of
	N	M		55½	-	22	1½		New Guinea.
	Z	M		55½	-	22	1		USCGS.
		F	23	10	-				
KEW	EN	e	22	45	-				Very small.
		F	23	05	-				
10	Z'	e(P)	01	27	39				01 17 53.3; 0.6°S., 19,8°W.
ESK	E	eLQ		42	-				h = 33 km. Mid-Atlantic Ocean.
		F	02	10	-				USCGS.
KEW	NE	e	01	45	-				
		F	02	05	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
10	Z'E'	ePn	04	08	52.3			170	
	Z'N'	iPx		08	53.3				
E SK	Z'E'	iPg		08	56.7				Local.
	Z'N'E'	iSn		09	12.8				
	N'	i		09	13.4				
	E'N'	iSg		09	16.8				
		F		10	30				
10	Z'N'E'	iPg	13	08	41.9			56	
	N'E'	i		08	43.0				
E SK	N'E'	eSg		08	48.0				Local.
	Z'N'E'	i		08	48.8				
		F		09	30				
11	ZNE	e	02	35	-				01 36 16.3; 7.3°S., 148.0°E.
ESK		F	03	05	-				Near New Guinea. USCGS.
11	Z'	iP	09	54	34.5				09 44 18.7; 59.7°N., 146.1°W.
ESK	NE	eL	10	14	-				h = 33 km. Alaska aftershock.
		F		40	-				USCGS.
11	N	eS	12	10	30				
	NE	eL		16½	-				11 52 25.0; 1.0°N., 29.3°W.
ESK	E	M		23	-	20	½		h = 33 km. Mid-Atlantic Ocean.
	N	M		23	-	20	½		USCGS.
	Z	M		23	-	20	1		
		F	12	40	-				
KEW	NE	e	12	15	-				Very small.
		F		35	-				
11	Z'	eP	17	47	44.8				
ESK	ZNE	eL		50½	-				17 44 29.8; 66.4°N., 19.7°W.
	Z	M		52	-	20	2½		h = 19 km. Northern Iceland.
	N	M		52	-	20	2½		USCGS.
	E	M		52½	-	16	2½		
		F	18	20	-				Mag.: M = 4½ (ESK)
KEW	ZV	iP	17	48	38				
	NE	eL		52½	-				
	E	M		54	-	20	2		
	N	M		54½	-	20	1½		
		F	18	10	-				Mag.: M = 4½ (KEW)
11	Z'	iP	20	35	55.0			6900	20 25 40.3; 59.7°N., 146.2°W.
	EN	eS		44	16				h = 40 km. Alaska aftershock.
ESK	N	eSS		48	18				USCGS.
	NE	eL		53	-				
	Z	M	21	04½	-	20	7		
	N	M		04½	-	20	5		
	E	M		04½	-	17	2		Mag.: M = 5½(ESK)
		F	22	15	-				
KEW	NE	eL	20	53	-				
	E	M	21	07	-	18	3		
	N	M		07	-	18	4		
	Z	M		07	-	18	2½		
		F	22	00	-				Mag.: M = 5½ (KEW)
11	ZNE	e	22	40	-				Very small.
ESK		F	23	40	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
12	Z,Z'	eP	01	57	42.0			9000	01 45 25.6; 38.6°N., 139.2°E.
ESK	Z'	i		57	48.7				h = 13 km. Near coast of Honshu,
	NE	eS	02	07	50	18	1.9(H)		Japan. USCGS.
	E	eL		18	-				
	Z	M		31	-	24	2½		
	E	M		31½	-	20	3½		
	N	M		31½	-	20	3		
		F	03	30	-				Mag.: M = 5.5(ESK)
KEW	ZV	iP	01	57	56			9200	Compression.
	NE	eS	02	08	14	15	1.8(H)		
	N	eL		23	-				
	E	M		32	-	20	3½		
	N	M		32½	-	20	2		
		F	03	25	-				Mag.: M = 5.5 (KEW)
12	Z'	eP	20	09	24.3				20 00 59.6; 53.8°N., 81.3°E.
ESK									Central Russia. USCGS.
12	Z'	eP	20	27	22.8	1	0.05	8300	20 15 59.0; 24.9°N., 95.3°E.
ESK	E	eS		36	46				h = 155 km. Northwestern Burma.
	E	M		58	-	22	½		USCGS.
	N	M		58½	-	20	½		
		F	21	20	-				Mag.: M = 4½ (ESK)
KEW	ZV	iP	20	27	22			8250	
	E	eS		36	41				
		F	21	10	-				
12	ZNE	e	21	50	-				21 08 52.6; 55.9°S., 27.6°W.
ESK		F	22	20	-				Sandwich Islands. USCGS.
13	Z'	iPKP	01	33	07.0				01 14 33.5; 20.7°S., 178.7°W.
ESK									Fiji Islands. USCGS.
13	ZNE	e	07	15	-				06 47 54; 44.7°N., 129.9°W.
ESK		F		45	-				Off coast of Oregon. USCGS.
13	Z'	iP	11	10	20.0	1	0.06	8340	Depth = 111 km.
ESK	Z'	ipP		10	48.3				
	Z'	isP		10	56				10 58 47.7; 23.7°N., 94.7°E.
	E	eS		19	48				h = 117 km.
	ZNE	eL		33	-				Northwestern Burma. USCGS.
	Z	M		42½	-	24	½		
	N	M		42½	-	22	½		
	E	M		42½	-	22	½		
		F	12	20	-				Mag.: M = 4¾(ESK)
KEW	ZV	iP	11	10	19				Depth = 105 km.
	ZV	epP		10	46				
	ZV	esP		10	55				
13	Z'	iPKP	15	12	53.5				14 53 27.0; 20.9°S., 169.9°E.
ESK									New Hebrides. USCGS.

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13	Z¦Z	eP	16	26	41	13	0.5	2150	PE 13 sec. 0.5 μ
ESK	N	eS		30	10	20	0.7		16 22 26; 53.7°N., 35.2°W.
	ZE	eL		31	-				h = 33 km. North Atlantic Ocean.
	Z	M		32	-	20	1½		USCGS.
	E	M		32	-	20	1		
		F		50	-				Mag.: M = 3½ (ESK)
KEW	EN	eL	16	33½	-				
	E	M		34	-	20	1½		
		F		40	-				
13	Z'	eP	21	11	53.6			6050	21 02 33.3; 7.7°N., 34.7°W.
ESK	ZNE	eS		19	30	20	1.0(H)		h = 33 km. North Atlantic Ocean.
	E	eL		24½	-				USCGS.
	Z	M		29	-	22	2		
	N	M		29	-	22	1½		
	E	M		29½	-	20	1		
		F	22	15	-				Mag.: M = 4¾ (ESK)
KEW	ZV	eP	21	11	41			5900	
	NE	eS		19	06				
	NE	eL		25	-				
	E	M		25½	-	20	1		
	N	M		26	-	20	½		Mag.: M = 4¾(KEW)
		F		55	-				
14	NE	eL	00	32	-				23 43 48; 48.3°S., 32,0°E.
ESK	N	M		45	-	24	½		h = 33 km. Prince Edward Islands
	Z	M		46	-	22	½		region. USCGS.
		F	01	05	-				
KEW	NE	e	00	35	-				
		F	01	00	-				
14	Z'	eP	05	32	31.0				05 22 20.0; 60.4°N., 142.9°W.
ESK									Alaska aftershock. USCGS.
KEW	Z	eP	05	32	58				
14	Z'	iPn	05	35	20.9	0.5	0.09	590	Compression.
ESK	Z'	i		35	27.5	0.5	0.16(H)		05 33 55.1; 57.0°N., 7.3°E.
	NE	iSn		36	21.2	0.6	0.13(H)		Near south coast of Norway. USCGS.
		F		40	-				
KEW	Z	e	05	36	-				
		F		38½	-				
14	ZNE	eL	10	33	-				09 55 24.4; 19.0°N., 66.5°W.
ESK		F	-	-	-				Puerto Rico.
14	ZNE	e	13	20	-				12 47 25.6; 41.8°N., 125.7°W.
ESK		F		35	-				Near coast of California. USCGS
14	Z'	iP	14	09	43.1	1	0.06		Compression. 13 58 28.5;
ESK									53.3°N., 159.7°E. h = 40 km.
									Near Kamchatka. USCGS.
14	Z'	iP	17	31	15.8				17 19 23.3; 45.3°N., 150.2°E.
ESK	ZNE	F	18	15	-				Kurile Islands. USCGS.
14	N	eS	23	17	50				22 59 09.2; 59.5°N., 144.8°W.
ESK	N	M		33½	-	22	½		h = 20km. Alaska aftershock.
	E	M		33½	-	20	½		USCGS.
		F	24	10	-				

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SEISMOLOGICAL BULLETIN

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
KEW	NE	e	23	51	-				Very small.
		F		55	-				
15	Z'	eP	07	37	26.7				07 26 01.4; 52.1°N., 170.6°W.
ESK	N	M	08	14	-	20	½		h = 30 km. Fox Islands. USCGS.
	Z	M		14	-	20	½		
		F		30	-				
15	Z'	eP	09	53	46.8			2500	09 49 05.8; 35.2°N., 4.5°E.
	Z	ePcP		57	36				h = 39 km. Algeria. USCGS.
	N	eL		58	-				
ESK	Z	M	10	01½	-	20	½		
	N	M		01½	-	20	1		
	E	M		01½	-	20	½		
		F		15	-				Mag.: M = 4 (ESK)
KEW	Z	eP	09	52	58				
	E	M		58	-	16	1½		
	N	M		59½	-	13	1		
		F	10	15	-				
15	Z'	iP	19	08	23.0				18 56 26.0; 44.0°N., 148.1°E.
ESK									Kurile Islands. USCGS.
16	Z'	eP	10	49	20.0				10 37 23.1; 44.0°N., 148.3°E.
ESK									Kurile Islands. USCGS.
16	Z'	eP	12	32	39.0				12 20 56; 17.2°N., 94.4°W.
ESK									Mexico. USCGS.
16	ZNE	e	16	45	-				16 07 18.3; 0.3°N., 67.0°E.
ESK		F	17	15	-				Indian Ocean. USCGS.
16	ZNE	e	17	53	-				17 39 59.6; 36.1°N., 30.8°E.
	E	M	18	00	-	18	½		h = 61 km. Near coast of Turkey.
ESK	N	M		00	-	18	½		USCGS.
	Z	M		00	-	18	½		
		F		15	-				
KEW	NE	e	17	53	-				Small.
		F	18	05	-				
17	Z'	eP	02	39	37.5	0.8	0.26	2700	PH' 0.8 sec. 0.17 μ
	Z;Z	i		39	39.7				SH' 3 sec. 1.4 μ
ESK	Z'	i		39	42.1				Depth = 113 km.
	Z;Z	ipP		40	02.0				
	Z;Z	isP		40	06.7				02 34 26.9; 38.2°N., 23.7°E.
17	Z'	iPcP		43	08.0				h = 150 km. Southern Greece.
	N'E;NE	eS		43	47.0	12.	7.0(H)		USCGS.
	N'E',E	e		43	56.5				
	N'E'	esS		44	49.0				
	Z'	iScP		46	31.7				
	N;E;E	eScS		50	18.7				
	ZNE	eL		45½	-				
	Z	M		47	-	46	19		
	N	M		47	-	46	11		
	E	M		47	-	46	15		Mag.: M = 5.4 (ESK)
		F	04	15	-				
KEW	ZV	eP	02	39	04	4	0.7	2400	
	ZV, ZNE	epP		39	26	5	2.2		

contd.

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contd.									
KEW	ZV	iPP		39	33				
	ZNE	e		40	09				
	NE	eS		42	50	9	18.3(H)		
	NE	esS		43	39				
	ZV	iScP		46	23				
	E	M		47	-	20	9		
	N	M		47	-	20	17		
		F	03	45	-				Mag.: M = 5.5 (KEW)
17	Z'	iP	04	52	39.9	1·1	0.05		Dilatation.
	Z'	i		52	44.0				04 41 05.1; 49.3°N., 158.6°E.
ESK	E	eL	05	12½	-				h = 50 km. Kurile Islands.USCGS.
	E	M		31	-	20	½		
	N	M		31	-	20	½		
	Z	M		31	-	20	½		
		F	06	10	-				
KEW	ZV	eP	04	52	58				Depth = 67 km.
	ZV	epP		53	16				
		F	05	55	-				
17	Z'	eP	05	13	50.5				04 55 00; 24.3°S., 179.6°E.
ESK									h = 495 km. Fiji Islands. USCGS.
17	Z'	eP	22	01	54.7				21 49 58.3; 44.5°N., 149.9°E.
ESK									h = 39 km. Kurile Islands. USCGS.
17	Z'	iP	23	06	37.9	1	0.06	8560	Compression.
ESK	NE	eS		16	24				PH' 1 sec. 0.02 u
	E	eLQ		27	-				22 54 42.2; 44.6°N., 149.2°E.
	E	M		45	-	20	½		h = 33 km. Kurile Islands.
	N	M		45½	-	20	½		USCGS.
	Z	M		45½	-	20	½		
		F	24	15	-				Mag.: M = 5.0 (ESK)
KEW	ZV	iP	23	06	54				
	EN	M		45	-				
		F	24	10	-				
18	Z'	eP	03	22	21.2				03 12 20.1; 60.5°N., 139.6°W.
ESK									Alaska. USCGS.
18	Z'	eP	03	45	58.7	0.6	0.04	3100	
	Z'	e		46	22.0	0.6	0.2(H)		SH 7 sec. 1.4 μ
ESK	Z'	e		46	41.8				
	E'N',EN	eS		50	32.0	1.5	0.11(H)		03 40 21.5; 36.3°N., 26.1°E.
	E'N',N	e		50	46.6				h = 115 km. Dodecanese Islands.
	ZE	e		51	20				USCGS.
	Z'	ePcS		52	46.3				
	N'E'	eScS		56	37.5				
	NE	eL		52½	-				
	N	M		55	-	32	2½		
	N	M		56	-	20	1½		
	E	M		56½	-	20	1½		
	Z	M		56½	-	20	1		
		F	04	20	-				Mag.: M = 4.5 (ESK)
KEW	ZV,Z	eP	03	45	28			2700	
	ZV	ePP		46	05				
	NE	eS		49	39				
	E	e		50	15				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
KEW	NE	eL	03	52½	-				
	N	M		54	-	24	2½		
		F	04	15	-				
18	ZNE	e	11	50	-				11 13 14.2; 18.4°S., 70.9°W.
ESK		F	12	15	-				Near Chile. USCGS.
18	NE	eL	13	31	-				12 45 47.7; 0.2°N., 123.5°E.
ESK		F	14	15	-				Celebes. USCGS.
18	Z'	iP	23	46	31.9				23 36 21.0; 60.0°N., 143.4°W.
ESK	Z	M	24	12½	-	20	½		h = 33 km. Alaska aftershock.
	N	M		12½	-	20	½		USCGS.
	E	M		12½	-	20	½		
		F		30	-				
19	Z'	iP	06	08	33.2	0.9	0.05	5300	Compression. PH' 0.9 sec. 0.02 μ
	Z'	iPcP		10	05.2				
ESK	Z'	ePP		10	23.8				05 59 58.9; 49.9°N., 78.1°E.
	N'	ePcS		13	54.1				h = 0 km. Kazakh S.S.R. USCGS.
	N	M		28	-				
		F		40	-				Mag.: M = 4.9; m = 5.6 (ESK)
19	ZV	iP	06	08	37				Compression.
KEW									
19	ZNE	eL	14	45	-				13 40 06.6; 15.1°S., 173.4°W.
	Z	M		56	-	20	½		h = 33 km. Tonga Islands.
ESK	N	M		56	-	20	½		USCGS.
	E	M		56	-	20	½		
		F	15	10	-				
19	ZNE	e	19	00	-				18 10 48.2; 7.5°N., 121.8°E.
ESK		F		25	-				Philippine Islands. USCGS.
20	ZNE	e	10	55	-				09 34 22; 64.5°S., 176.7°E.
ESK		F	11	35	-				South Pacific Ocean. USCGS.
KEW	NE	e	11	00	-				
		F		25	-				
20	ZNE	e	11	40	-				10 22 53; 35.2°S; 179.8°W.
ESK		F	12	30	-				Near New Zealand. USCGS.
20	Z'	eP	19	02	06.0			9300	18 49 43.5; 19.8°N., 109.0°W.
	EN	eS		12	24	20	0.6(H)		h = 33 km. Revilla Gigedo
ESK	EN	eLQ		23½	-				Islands. USCGS.
	Z	M		35	-	20	½		
	N	M		36	-	20	½		
	E	M		36½	-	20	½		
		F	20	10	-				Mag.: M = 4.8 (ESK)
KEW	N	eS	19	12	56				
	N	eL		25	-				
		F	20	00	-				
20	EN	e	23	10	-				22 37 23.6; 51.2°N., 179.6°W.
ESK		F		25	-				Andreanof Islands. USCGS.
20	Z'	ePKP2	23	03	26.9				22 43 15; 35.5°S., 179.7°E.
	E	eL	24	00	-				h = 223 km. Near New Zealand.
contd.									USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
ESK	Z	M		27	-	20	½		
		F	25	05	-				
21	EN	eS	01	32	5	20	1.2(H)	9100	01 09 25.8; 19.8°N., 108.8°W.
	N	eSS		37	25				h = 31 km. Off coast of Mexico.
ESK	EN	eLQ		43	-				USCGS.
	E	eLR		48	-				
	Z	M		56	-	20	2		
	E	M		56	-	20	1½		
	N	M		56	-	20	1½		
		F	02	40	-				Mag.: M = 5¼ (ESK)
KEW	EN	eS	01	32	36				
	EN	eLQ		45	-				
	E	M		52½	-	24	2		
	N	M		52½	-	24	2		
		F	02	30	-				
21	Z'	ePKP$_1$	04	08	18.7			16670	Depth = 225 km.
	Z'	i		08	24.7				
ESK	Z'	ePKP2		08	33.0				03 48 59.1; 26.0°S., 178.0°W.
	Z'	epPKP2		09	32.0				h = 222 km. Fiji Islands region.
	Z'	ePP		12	01.0	16	0.5		USCGS.
	N	eSKKS		18	31				
	E	eSS		29	56				
	EN	eSSS		36	45				
	E	e		49	20				
	ZN	eL		50½	-				
		F	05	50	-				
KEW	ZV	e	04	08	34			17200	
	ZV	e		08	50				
	ZV	ePP		12	22				
	E	eSS		31	45				
21	Z'	eP	07	13	41.0				07 01 59.3; 13.1°N., 88.4°W.
ESK	Z	eL		37	-				h = 68 km. Near coast of
		F		45	-				El Salvador. USCGS.
21	Z'	eP	10	05	00.2	1	0.04	5600	09 56 16.6; 72.1°N., 130.2°E.
	Z	ePP		06	51				h = 33 km. Laptev Sea. USCGS.
ESK	N	eS		12	10	16	0.4(H)		
	E	eL		16	-				
	E	M		26	-	20	½		
	N	M		26½	-	16	½		
	Z	M		26½	-	16	½		
		F	11	15	-				Mag.: M = 4.5 (ESK)
KEW	ZV	eP	10	05	25				
	E	M		33	-	16	1		
	N	M		34	-	18	1		
		F		55	-				
21	NE	eSKS	13	37	16				13 13 00.2; 11.5°N., 121.9°E.
	Z	eSP		39	31				h = 34 km. Paney, Philippine
	N	eSS		44	42				Islands. USCGS.
	EN	eLQ		54	-				
ESK	N	eLR		58	-				
	E	M	14	05½	-	30	2		
	N	M		05½	-	30	2½		
	Z	M		09½	-	22	1		
contd.	N	M		09½	-	22	3½		

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
21	E	M		09½	-	22	3		
		F		55	-				Mag.: M = 5¾ (ESK)
KEW	EN	eL	13	59	-				
	E	M	14	10½	-	20	2		
	N	M		10½	-	20	1½		
		F		40	-				Mag.: M = 5½ - 5¾(KEW)
21	Z'	ePKP	21	20	46.5			13900	21 01 49.5; 4.6°S., 153.3°E.
	Z	ePP		21	42				h = 60 km. New Britain region.
ESK	EN	eSS		40	13				USCGS.
	ZN	eL		53½	-				
	ZNE	eLR	22	02	-				
	Z	M		18	-	20	½		
	E	M		18	-	20	½		
	N	M		19	-	20	½		
		F	23	15	-				
KEW	ZV	ePKP	21	20	52				
	EN	eL	22	06	-				
		F		30	-				
22	Z'	eP	04	50	44.9				04 41 55.1; 27.6°N., 55.0°E.
ESK	N	eL	05	07	-				h = 64 km. Southern Iran.
		F		20	-				USCGS.
KEW	ZV	eP	04	50	26				
22	Z'	ePKP	07	24	24.3				07 04 34; 54.2°S., 132.4°W.
ESK									Pacific Ocean. USCGS.
22	ZNE	e	08	45	-				07 37 52.4; 16.3°S., 167.7°E.
ESK		F	09	10	-				New Hebrides. USCGS.
22	ZNE	e	21	25	-				20 15 04.6; 13.2°N., 144.3°E.
ESK		F		45	-				Mariana Islands. USCGS.
23	Z'	eP	05	09	32.0				04 57 54.3; 10.5°N., 83.9°W.
ESK									Costa Rica. USCGS.
23	Z'	eP	09	32	06.0				Ascension Island foreshock?
	Z'	e		32	13.0				
ESK	N	e		39	54				
	NE	eL		46	-				
		F	-	-	-				
23	Z'	eP	09	50	11.8			6200	09 40 29.2; 0.7°S., 16.3°W.
	Z'	e		50	20.5				h = 33 km. About 800 km.
	EN	eS		57	56				north of Ascension Island.
ESK	EN	eLQ	10	04	-				USCGS.
	ZEN	eLR		07	-				
	Z	M		11	-	22	½		
	E	M		11	-	22	½		
	N	M		11	-	22	½		
		F		50	-				
KEW	EN	eL	10	05	-				Very small.
		F		35	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
23	Z'	iP	19	18	22.7				Dilatation.
	Z'	e		18	29.5				19 08 06.6; 59.9°N., 149.2°W.
ESK	E	eLQ		34	-				h = 55 km. Alaska aftershock.
	Z	M		46½	-	19	½		USCGS.
	E	M		46½	-	18	½		
	N	M		46½	-	18	½		
		F		55	-				
KEW	ZV	eP	19	18	49				
24	Z'	eP	01	51	27.5				01 39.0; 14.2°N., 91.6°W.
ESK	EN	eL	02	16	-				h = 65 km. Near coast of Guatemala.
		F		40	-				USCGS.
24	Z'	eP	07	02	39.1	1.3	0.15	8500	Compression.
	Z'	epP		02	46.9				PH 1.3 sec. 0.06 μ
	ZN	ePP		05	30	12	5.3		PZ 12 sec. 5.3 μ
ESK	EN	eS		12	22	16	5.5(H)		PH 12 " 2.1 μ
	EN	e		12	54				PPH 16 " 1.1 μ
	N	eSS		17	30				
	EN	eLQ		22½	-				06 50 52.8; 46.9°N., 153.9°E.
	ZN	eLR		27½	-				h = 33 km. Kurile Islands. USCGS.
	E	M		34½	-	20	7		
	N	M		34½	-	21	6		
	E	M		41	-	18	7		
	N	M		42	-	18	8		
	Z	M		42	-	18	11		Mag.: M = 5.9(ESK)
		F	-	-	-				
KEW	Z'	eP	07	02	57	7	2.2	8900	Compression.
	EN	eS		12	58	13	5.7(H)		PH 15 sec. 1.5 μ
	EN	eSS		18	33				
	E	eLQ		24	-				
	Z	M		44½	-	18	3		
	N	M		44½	-	18	9		
	E	M		45	-	17	11		Mag.: M = 6.1(KEW)
		F	-	-	-				
24	Z'	eP	07	46	39.3				07 35 48.4; 56.3°N., 157.8°W.
ESK									Near coast of Alaska. USCGS.
24	Z;Z	iP	08	24	25.9	14	22	8500	Compression.
	Z'N'	epP		24	33.0				PH 15 sec. 8.4 μ
	ZN	ePP		27	18	16	6.1		PPH 16 " 4.1 μ
ESK	EN	iS		34	08	15	25(H)		
	N	eSS		39	14				08 12 40.0; 47.2°N., 153.8°E.
	EN	eLQ		44	-				h = 33 km. Kurile Islands.
	ZN	eLR		48	-				USCGS.
	Z	M		51	-	42	67		
	N	M		51	-	44	56		
	Z	M	09	00	-	18	37		
	N	M		00	-	19	30		
	E	M		01	-	19	36		
		F	12	50	-				Mag.: M= 6.8 (ESK)

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KEW	ZV,Z	iP	08	24	44	8	7.9	8750	Compression.
	ZN	ePP		27	39	9	2.5		PH 10 sec. 6.2 μ
	EN	eS		34	39	16	28.3(H)		PPH 12 sec. 4.5 μ
	ZN	ePS		36	27				
	ZN	ePPS		35	43				
	N	eSS		39	41				
	E	eLQ		45½	-				
	E	M	09	03½	-	17	36		
	N	M		04	-	19	63		
	Z	M		04½	-	18	21		
		F	11	55	-				Mag.: M = 6.8(KEW)
24 ESK	Z'	eP	08	41	37.2				08 29 47.6; 46.9°N., 153.9°E. Kurile Islands. USCGS.
24 ESK	Z'	eP	09	28	48.3				09 17 00.5; 46.8°N., 154.1°E. Kurile Islands. USCGS.
24 ESK	Z'	eP	10	14	04.3				10 02 16.4; 46.8°N., 153.8°E. Kurile Islands. USCGS.
24 ESK	Z'	eP	12	21	14.9				12 09 27.0; 46.8°N., 154.1°E. Kurile Islands. USCGS.
24 ESK	Z'	eP	12	47	47.4				12 35 59.5; 46.9°N., 154.0°E. h = 33 km. Kurile Islands. USCGS.
	ZN	eL	13	11	-				
	Z	M		23	-	18	½		
	N	M		23	-	18	½		
		F	-	-	-				
KEW	NE	e	13	20	-				Small.
		F		40	-				
24	Z	iP	13	37	04.9	11	2.2	8500	Compression.
	N	eS		46	48	12	1.2		PZ' 2.5 sec. 0.45 u
	N	e		47	17				PN 12 sec. 0.8 u
ESK	N	eSS		52	00				
	N	eLQ		57½	-				13 25 18.3; 47.0°N., 153.7°E. h = 33 km. Kurile Islands. USCGS.
	ZN	eLR	14	01	-				
	Z	M		18	-	17	3½		
	N	M		18	-	16	2½		
		F	-	-	-				Mag.: M = 5.8(ESK)
KEW	ZV,Z	eP	13	37	23	5	1.0	8900	Compression.
	EN	eS		47	23	12	1.7(H)		
	EN	eL	14	02	-				
	E	M		16	-	18	2½		
	N	M		16½	-	18	3½		
		F	-	-	-				Mag.: M = 5.7 (KEW)
24	ZN	eL	14	43	-				13 47 48.6; 6.6°S., 154.8°E. h = 62 km. Solomon Islands. USCGS.
	Z	M	15	13½	-	20	1		
ESK	N	M		13½	-	20	½		
		F	-	-	-				
24 ESK	Z'	eP	14	37	47.9				14 25 58.5; 46.8°N., 153.6°E. Kurile Islands. USCGS.
24 ESK	Z'	eP	16	46	17.0				16 34 29.2; 47.2°N., 153.9°E. Kurile Islands. USCGS.

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JULY, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
24	Z'	eP	17	14	35.5	3.4	1.6	8400	Compression.
	Z'	e		14	47.0				PZ 16 sec. 5.0 μ
	Z	ePP		17	27				PH 16 " 2.0 μ
ESK	Z	ePPP		19	16				
	N	iS		24	14	16	3.0		17 02 49.2; 47.1°N., 153.6°E.
	Z	ePS		24	36				h = 33 km. Kurile Islands. USCGS.
	N	ePPS		24	50				
	N	eSS		29	29				
	N	eLQ		35	-				
	Z	eLR		38	-				
	Z	M		53	-	20	11		
	N	M		53	-	19	10		Mag.: M = 6.2 (ESK)
		F	20	30	-				
KEW	ZV,Z	eP	17	14	54	5	1.5	8850	Compression.
	EN	eS		24	52	16	6.2(H)		PH 16 sec. 1.8 μ
	E	eLQ		38	-				
	E	M		48½	-	22	15		
	N	M		48½	-	22	9		
		F	20	30	-				Mag.: M = 6.1 (KEW)
24	Z'	eP	19	01	50.3				18 50 04.1; 47.0°N., 153.8°E.
ESK	N	eLQ		21	-				h = 33 km. Kurile Islands.
		F	-	-	-				USCGS.
24	Z'	eP	19	03	51.0				18 52 02.1; 46.7°N., 153.9°E.
ESK									Kurile Islands. USCGS.
24	ZN	e	22	25	-				21 54 54.0; 57.7°N., 152.2°W.
ESK		F		40	-				Alaska aftershock. USCGS.
25	Z'	eP	01	44	34.3				01 33 20.6; 52.8°N., 159.3°E.
ESK									Near Kamchatka. USCGS.
25	ZN	eL	03	22	-				02 24 38.9; 1.8°S., 141.0°E.
ESK		F		55	-				New Guinea. USCGS.
25	Z'	ePKP	12	39	32.4				12 20 22.2; 19.9°S., 176.2°W.
ESK									Tonga Islands. USCGS.
25	ZEN	eP	19	44	56	20	1.8	11200	Compression.
	ZEN	ePP		49	04	24	1.8		PH 20 sec. 0.5 μ
	EN	eSKS		55	35				PPH 24 " 1.3 μ
	NE	eS		56	30	32	2.2(H)		
ESK	ZEN	ePS		58	00				
	ZEN	eSS	20	03	36				19 31 07.0; 27.9°S., 70.9°W.
	EN	eLQ		13	-				h = 26 km. Northern Chile.
	EN	eLR		15½	-				USCGS.
	N	M		17½	-	41	19		
	E	M		17½	-	40	12		
	Z	M		17½	-	40	5		
	N	M		32	-	20	6		
	E	M		32½	-	19	12		
	Z	M		32½	-	18	16		Mag.: M = 5.9(ESK)
		F	-	-	-				
KEW	ZV,Z	eP	19	44	53			11200	
	E	eSKS		55	31				
	EN	eS		56	35				
	EN	ePS		57	57				
	EN	eLR	20	17	-				

contd.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JULY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
KEW	E	M	20	25½	-	24	14		
	N	M		27	-	20	8		
	Z	M		27	-	20	4		Mag.: M = 6¼ (KEW)
		F	-	-	-				
25	EN	eLQ	22	18	-				21 29 33.2; 2.9°N., 128.2°E.
ESK	N	M		32½	-	25	1½		h = 22 km. North of Halmahera.
	E	M		32½	-	27	2½		USCGS.
	Z	M		32½	-	28	2½		
		F	23	15	-				Mag.: M = 5¾ (ESK)
KEW	EN	e	22	20	-				Small.
		F	23	00	-				
26	Z'	ePKP	06	47	15.7				06 28 32.7; 23.4°S., 180.0
ESK									Fiji Islands. USCGS.
26	EN	e	09	21	-				
ESK	N	M	10	10	-	22	½		
	E	M		11	-	20	½		
		F		30	-				
26	Z'	eP	14	07	41.2	1	0.03		Compression. 13 55 37.4;
ESK	E	eL		34	-				2.6°N, 78.5°W. h = 38 km.
		F		45	-				Ecuador. USCGS.
KEW	ZV	eP	14	07	47				
26	Z'	eP	18	46	22.6				18 34 34.6; 46.8°N., 153.8°E.
ESK	ZN	eL	19	12	-				h = 33 km. Kurile Islands.
		F		45	-				USCGS.
KEW	ZV	eP	18	46	40				
26	EN	e	21	16	-				20 24 13.9; 4.1°N., 126.4°E.
ESK		F		35	-				Talaud Islands. USCGS.
27	Z'	eP	04	15	39.3				04 03 33.2; 1.7°S., 77.9°W.
ESK									Peru-Colombia border. USCGS.
27	ZV, ZNE	e	11	12½	-				11 09 15; 46° 45'N., 5°54'E.
KEW		F		14	-				Champagnole mine disaster. BCIS
27	Z'	eP	23	12	24.3			8500	23 00 36.3; 46.8°N., 153.8°E.
ESK	EN	eS		22	06				h = 33 km. Kurile Islands. USCGS.
	E	eLQ		33	-				
	E	M		52½	-	17	1		
	N	M		52½	-	18	1		
	Z	M		53½	-	17	2		
		F	24	30	-				Mag.: M = 5¼ (ESK)
KEW	E	eL	23	43	-				
	E	M		54½	-	18	1½		
	N	M		54½	-	18	1		
		F	24	20	-				Mag.: M = 5¼ (KEW)
28	Z'	ePKP1	19	00	03.0			17500	Confused by strong microseisms.
	Z'	ePKP2		00	37.8				
	Z	ePP		04	14				
	E	ePPS		17	12				
ESK	EN	eSS		24	10				
contd.									

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JULY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
28	ZEN	e S KSSKS	19	24	52				
	EN	eSSS		30	16				via 180°
	EN	eLQ		44½	-				
	ZEN	eLR		52½	-				18 40 04.3; 51.2°S., 139.0°E.
	E	M		56½	-	44	9		h = 33 km. About 100 km.
	N	M		56½	-	44	6		southwest of Tasmania. USCGS.
	N	M	20	17	-	22	5		
	Z	M		17½	-	22	7		
	E	M		18½	-	22	6		
		F	21	00	-				Mag.: M = 6¼ (ESK)
KEW	EN	eSS	19	23	39				
	EN	eLQ		45	-				
	E	M	20	19	-	22	4		
	N	M		19	-	22	2½		
		F		50	-				Mag.: M = 6-6¼ (KEW)
28	ZE,Z'	eP	21	51	11.2	14	3.5	9400	Dilatation.
	Z'	i		51	15.2				PE 14 sec. 1.3 μ
ESK	ZE	ePP		54	17	12	2.4		PPE 12 " 1.2 μ
	ZNE	eS	22	01	35	22	4.3(H)		
	ZE	ePS		02	16				21 38 43.5; 14.3°N., 96.2°E.
	ZE	ePPS		02	56				h = 33 km. Andaman Islands
	EN	eSS		07	06				region. USCGS.
	ZEN	eLR		18	-				
	N	M		28	-	23	26		
	Z	M		32½	-	21	14		
	E	M		32½	-	21	19		
	N	M		32½	-	20	19		
		F	24	25	-				Mag.: M = 6.2 (ESK)
KEW	ZV,Z	eP	21	51	8	5	2.3	9300	Dilatation.
	N	eS	22	01	27	14	1.9(H)		
	E	ePS		02	05				
	N	eLR		17	-				
	E	M		28½	-	21	13		
	N	M		28½	-	21	23		
		F	23	50	-				Mag.: M = 6.2 (KEW)
28	Z'	eP	22	59	4.8				22 46 34.0; 14.1°N., 96.1°E.
ESK									Andaman Islands. USCGS.
KEW	ZV	eP	22	59	01				
30	Z'	eP	05	27	52.8				05 16 03.3; 11.1°N., 86.2°W.
ESK	NE	e		37	20				h = 42 km. Near coast of Costa
	E	ePS		38	14				Rica. USCGS.
	ZEN	eSS		42	28				
	N	eLQ		49	-				
	ZE	eLR		52	-				
	N	M		57½	-	20	2½		
	E	M		58½	-	20	3½		
	Z	M		58½	-	20	4½		
		F	07	20	-				Mag.M = 5½-5¾ (ESK)
KEW	E	ePPS	05	38	50				
	EN	eLR		52½	-				
	Z	M		59	-	20	1		
	E	M		59	-	20	4		
	N	M		59	-	20	2		
		F	06	50	-				Mag.: M = 5½-5¾ (KEW)

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JULY, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
30	Z'E'	ePx	15	35	16.1			95	
ESK	ZEN'	e		35	16.8				
	EN'	eSx		35	28.0				Local.
	Z'N'	e		35	29.0				
	EN'	eSn		35	29.9				
		F		36	-				
30	EN	eL	23	35	-				22 52 19.4; 14.3°N., 96.2°E.
ESK		F	24	00	-				Andaman Islands. USCGS.
31	Z'	eP	04	17	03.0				04 05 06.2; 44.6°N., 151.6°E.
ESK	E	eLQ		38	-				h = 53 km. Kurile Islands. USCGS.
		F	05	15	-				
KEW	ZV	eP	04	17	20				
31	ZN	eP	06	08	00			13900	Confused by microseisms.
	Z,Z'	ePKP		11	16				
	Z	ePP		13	10	28	4.7		PPH 28 sec. 2.8 μ
ESK	EN	ePKS		14	28				
	ZEN	ePS		23	17				
	ZEN	eSS		30	28				05 52 18.8; 6.1°S., 149.4°E.
	ZN	eSSS		35	14				h = 63 km. New Britain. USCGS.
	ZE	eLQ		44	-				
	E	M	07	00	-	30	17		
	N	M		01½	-	30	28		
	Z	M		02½	-	27	31		
	Z	M		09½	-	23	14		
	E	M		11½	-	24	5		
	N	M		11½	-	24	11		Mag.: M = 6¼(ESK)
		F	09	20	-				
KEW	ZN	ePP	06	13	34				
	EN	ePKS		14	34				
	EN	eLR		52	-				
	E	M	07	02½	-	28	25		
	N	M		03½	-	27	20		
	Z	M		03½	-	28	8		
	N	M		11	-	22	14		
	E	M		11½	-	20	7		
		F	09	25	-				Mag.: M = 6½ (KEW)
31	Z'	ePKP	06	45	37.0				06 26 36.7; 25.7°S., 179.6°W.
ESK									h = 429 km. South of Fiji. USCGS.
31	Z'N'E	iPn	11	28	17.7			170	
ESK	N'	iPx			19.0				
	Z'N'E'	iSn			38.5				Local.
	Z'N'E'	iSx			40.0				
	Z'N'E'	i(Sg)			42.5				
		F		30½	-				
31	ZNE	e	17	15	-				Very small.
ESK		F		35	-				
31	ZNE	e	18	26	-				Small.
ESK		F		45	-				
31	Z'	eP	20	54	17.9				20 43 19.2; 47.8°N., 147.4°E.
ESK									h = 378 km. Sea of Okhotsk. USCGS.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

JULY, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
31	E	eLQ	21	36	-				21 22 24.3; 86.4°N., 38.5°E.
ESK		F		50	-				Arctic Ocean. USCGS.
31	Z'	eP	23	52	28.4	1.1	0.03	3560	23 45 55.2; 86.3°N., 40.5°E.
ESK	N	eS		57	40	16	1.4		h = 10 km. Arctic Ocean. USCGS.
	E	eLQ		59	-				
	ZN	eLR	24	01	-				
	E	M		02½	-	22	1		
	N	M		03	-	20	1		
	Z	M		03	-	20	1½		
		F		40	-				Mag.: M = 4½ (ESK)
KEW	ZV,Z	eP	23	53	00			4100	
	N	eS		58	44				
	EN	eL	24	01	-				
		F		25	-				

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M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR AUGUST, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland

Lat. 55° 19' 00"N., Long. 3° 12' 18"W. Height above M.S.L. 243 m.

Foundation: Llandovery shales (late Silurian)

Instruments: World-Wide Standardised Seismographs (USCGS)

Constants:

Instrument	Comp.	FREE PERIODS Pendulum sec.	FREE PERIODS Galvanometer sec.	Magnification
SPRENGNETHER WWSS	N	30.0	100	1500 at 30 sec.
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N'	1.0	0.75	25000 at 1 sec.
	E'	1.0	0.75	
	Z'	1.0	0.75	

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

AUGUST, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
2	Z'	eP	03	15	7.3				03 04 16.9; 56.1°N., 156.1°W.
ESK	Z'	ipP		15	16.0				h = 33 km. Alaska. USCGS.
2	Z'	iP	08	46	59.0	1	0.05	7280	Depth = 34 km.
ESK	Z'	epP		47	09.3				
	EN	eS		55	40	22	1.3(H)		08 36 16.9; 56.2°N., 149.9°W.
	ZEN	eSS		59	50				h = 31 km. Alaska aftershock.
	E	eLQ	09	03	-				USCGS.
	Z	eLR		07	-				
	E	M		06½	-	44	4½		
	N	M		14	-	20	1½		
	E	M		14½	-	20	2		
	Z	M		15½	-	18	2½		
		F	10	20	-				Mag.: M = 5.1 (ESK)
KEW	ZV	eP	08	47	26				
	E	eL	09	06	-				
	E	M		19½	-	18	2		
	N	M		19½	-	18	2½		
		F		50	-				Mag.: M = 5¼(KEW)
3	Z,Z'	eP	01	58	40	16	0.6	6800	01 48 23.3; 19.8°N., 70.7°W.
	EN	eS	02	06	55	19	0.8(H)		h = 7 km. Dominican Republic
ESK	ZEN	eLR		16½	-				region. USCGS.
	N	M		20	-	20	1		
	E	M		20½	-	20	2½		
	Z	M		20½	-	20	3		
		F	03	30	-				Mag.: M = 4.8(ESK)
KEW	ZV	eP	01	58	49			7000	
	ZV	e		58	54				
	E	eS	02	07	15				
	E	eScS		08	37				
	EN	eL		18	-				
	E	M		21	-	21	1½		
	N	M		21½	-	20	2		Mag.: M = 5¼(KEW)
		F	03	10	-				
3	Z	eP	07	57	36	5	1.1	10100	
	EN	eS	08	08	28				07 44 44.3; 22.6°N., 121.3°E.
	ZN	eSS		14	33				h = 33 km. Near south coast of
ESK	EN	eLQ		23	-				Taiwan. USCGS.
	ZEN	eLR		27½	-				
	E	M		33½	-	24	8		
	N	M		33½	-	24	8		
	Z	M		42	-	17	12		
	E	M		42	-	19	4½		
	N	M		42	-	17	6		
		F	09	40	-				Mag.: M = 6.1(ESK)
	ZV,Z	eP	07	57	43				
	EN	eL	08	24	-				
KEW	E	M		42	-	19	5		
	N	M		42	-	17	5½		
	Z	M		42	-	18	3		
		F	09	15	-				Mag.: M = 6 (KEW)

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

AUGUST, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
4	Z',Z	iP	17	36	8.7	8	1.2	8400	Dilatation.
	ZN	ePcP		36	28				17 24 29.2; 46.5°N., 151.1°E.
	EN	eS		45	40	16	1.6(H)		h = 101 km. Kurile Islands.
	EN	e		46	07				USCGS.
ESK	N	eSS		50	32				
	ZN	eLR	18	01	-				
	Z	M		02½	-	44	4½		
	N	M		02½	-	42	3½		
		F		50	-				Mag.: M = 5¼(ESK)
	Z	iP	17	36	27	4	1.0	8800	Dilatation.
	EN	eS		46	17	10	1.9(H)		
KEW	N	e		46	32				
	E	eL	18	01	-				
		F		45	-				Mag.: M = 5¾
4	Z'E'	eP	23	26	23.5				23 18 51.1; 34.3°N., 46.0°E.
ESK	ZEN	eL		38	-				h = 29 km. Iran-Iraq border.
		F	24	00	-				USCGS.
5	Z'	eP	04	37	26.5				04 24 51.3; 27.1°N., 128.1°E.
ESK									h = 144 km. Ryukyu Islands.
									USCGS.
5	Z'	ePn	10	57	24.0			180	PgH' 0.6 sec. 0.10 μ
	Z'E'N'	iP*			25.0				
	Z'E'N'	iPg			28.0	0.5	0.08		
ESK	E'	eSn			43.8				Local.
	Z'N'	iS*			45.0				
	Z'N'	iSg			48.3	0.6	0.12(H)		
		F		59¼	-				
5	Z',Z	ePKP1	11	25	29.1			17400	Depth = 215 km.
	Z'	ePKP2		26	01.1				
	Z	ipPKP1		26	24				11 06 02.6; 32.1°S., 179.8°E.
	Z',Z	epPKP2		26	58				h = 235 km. South of Kermadec
ESK	ZN	epPP		30	24	14	2.4		Islands. USCGS.
	ZN	e		35	56				
	Z;Z	ePPP		38	31.7				via 180°
	E	eSS		49	04				
	E	esSS		50	50				
		F	13	30	-				
	Z	ePKP	11	25	35				
	Z	epPP		30	59	7	1		
KEW	Z	eSKKS		35	45				
	N	e		36	23				
		F	13	25	-				
5	Z	ePP	22	42	36				22 23 13.0; 41.1°S., 74.9°W.
	ZEN	ePS		52	16				h = 33 km. Off coast of Chile.
	EN	eSS		58	17				USCGS.
	EN	eLQ	23	09½	-				
ESK	ZEN	eLR		17	-				
	Z	M		24½	-	22	11		
	E	M		24½	-	22	6		
	N	M		24½	-	22	6		
		F	25	25	-				Mag.: M = 6¼(ESK)
	Z	ePP	22	42	36	6	0.8		
	N	eLQ	23	11	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
ontd.									
KEW	E	M	23	25½	-	22	8		
	N	M		26	-	20	5		
		F	25	00	-				Mag.: M = 6.2 (KEW)
6	Z'	iP	02	45	52.7	0.9	0.07		02 33 39.5; 31.5°N., 129.9°E.
ESK									h = 197 km. Off coast of Kyushu, Japan. USCGS.
6	Z'	eP	07	16	29.0				07 05 49; 56.3°N., 149.8°W.
ESK									Alaska aftershock. USCGS.
6	Z'	ePKP	17	22	13.6				17 03 28.9; 22.5°S., 179.5°W.
ESK	Z'	e		22	17.2				h = 504 km. South of Fiji Islands. USCGS.
6	Z',Z	eP	18	35	31.5	16	0.8	7300	18 24 50.5; 56.9°N., 152.1°W.
	EN	eS		44	16	16	1.4(H)		h = 39km. Alaska aftershock.
	EN	eSS		48	30				USCGS.
	EN	eLQ		52	-				
ESK	EN	eLR		55½	-				
	E	M	19	06½	-	17	4		
	N	M		07½	-	18	6		
	Z	M		07½	-	17	7½		
		F	20	20	-				Mag.: M = 5.4 (ESK)
KEW	EN	eS	18	45	08	12	1.6(H)		
	N	M	19	06½	-	20	2		
	E	M		07½	-	19	4		
		F	20	10					Mag.: M = 5.6(KEW)
7	Z'	eP	05	48	7.5			7300	05 37 25.1; 56.8°N., 152.3°W.
	Z'	e		48	145				h = 33 km. Alaska, aftershock.
ESK	E	eS		56	53				USCGS.
	E	eLQ	06	04½	-				
		F		30	-				
7	Z'	eP	15	43	7.4				15 31 18.0; 14.0°N., 91.9°W.
	ZE	eLR	16	7½	-				h = 89 km. Near coast of
	N	M		15½	-	20	½		Guatemala. USCGS.
ESK	E	M		16½	-	20	½		
	Z	M		16½	-	20	1		
		F		50	-				
8	Z'	eP	09	59	17.2				09 48 35.6; 56.7°N., 152.4°W.
ESK									Alaska aftershock. USCGS.
8	Z'E'	eP	15	00	03.3				14 50 32.2; 42.1°N., 83.7°E.
ESK									Sinkiang Province, China. USCGS.
8	Z;Z	eP	15	12	19.3	1.2	0.11		14 59 41.2; 31.7°N., 140.2°E.
ESK	Z	ePP		15	45	8	0.58		h = 110 km. South of Honshu,
	ZEN	eLR		41½	-				Japan. USCGS.
		F	-	-	-				Mag.: M = 5½(ESK)
KEW	ZV,Z	eP	15	12	31				

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8	Z'Z	eP	15	56	54.2				15 45 10.9; 12.5°N., 87.8°W.
	N	eLQ		17	-				h = 63 km. Off coast of
	ZEN	eLR		21	-				Nicaragua. USCGS.
ESK	Z	M		24½	-	22	1½		
	E	M		24½	-	22	1		
	N	M		25	-	22	½		
		F	17	05	-				Mag.: M = 5(ESK)
8 ESK	Z'	eP	20	17	32.2				20 06 51; 18.0°N., 74.0°W. Near coast of Haiti. USCGS.
9 ESK	Z'	eP	05	30	53.2				05 20 32.7; 53.4°N., 153.4°E. h = 511 km. Sea of Okhotsk. USCGS.
10	Z'	eP	01	20	15.3	1.1	0.04	6700	Depth = 37 km.
	Z'	epP		20	26.2	1.1	0.04		
	EN	eS		28	24	16	1.0(H)		01 10 12.4; 19.1°N., 67.3°W.
	ZE	eLR		37½	-				Mona Passage. USCGS.
ESK	Z	M		46½	-	18	1½		
	E	M		46½	-	18	1		
	N	M		48	-	18	½		
		F	02	40	-				Mag.: M = 4.7(ESK)
	ZV	eP	01	20	24				
	N	eL		36½	-				
KEW	E	M		48	-	18	2		
	N	M		48	-	17	1½		
		F	02	25	-				
10 ESK	Z'	eP	17	09	20.8				16 58 44.0; 09.2°N., 62.0°W. h = 51 km. Near Venezuela. USCGS.
10 ESK	Z'N'	eP	18	03	55.1	0.9	0.04		17 52 02.5; 45.1°N., 149.9°E. h = 40 km. Kurile Islands. USCGS.
KEW	ZV	iP	18	04	12				17 52 02.5; 45.1°N., 149.9°E. h = 40 km. Kurile Islands. USCGS.
10 ESK	Z'	eP	20	28	50.9				20 16 55.8; 44.6°N., 148.8°E. Kurile Islands. USCGS.
11 ESK	Z'	ePKP	02	13	33.7				01 55 25.0; 5.8°S., 154.1°E. h = 425 km. Solomon Islands. USCGS.
11 ESK	Z'	eP	12	46	12.6				12 34 35.6; 48.7°N., 154.8°E. h=43km. Kurile Islands. USCGS.
12 ESK	Z;Z	iP	03	03	15.1	0.8	0.17		Compression. PH' 0.8 sec. 0.06 μ
	Z'	i		03	16.0				06 51 49.9; 48.9°N., 153.7°E.
	Z'N'	ePcP		03	29.5				h = 127 km. Kurile Islands.USCGS.
	E	eS		12	35				Mag.: M = 5.2(ESK)
KEW	ZV,Z	eP	03	03	34				
12	Z;Z	eP	19	34	34.3	8	0.46	5000	19 26 26.1; 31.0°N., 49.8°E.
	Z	ePP		36	18	8	0.58		h = 33 km. Western Iran. USCGS.
ESK	EN	eS		41	08				
	E	M		52½	-	24	1		
	N	M		52½	-	24	½		

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contd.									
12		F	20	35	-				Mag.: M = 4.7 (ESK)
KEW	ZV,Z	eP	19	34	16				
13	Z	eP	00	46	16				Depth = 370 km.
	Z	epP		47	44				PPH 13 sec. 3.8 μ
	Z¦Z	ePKP		49	34	12	2.6		pPPH 16 sec. 5.9 μ
	Z	epPKP		51	04				
ESK	ZE	ePP		51	36	12	8.4		00 31 14.1; 5.4°S., 154.3°E.
	ZEN	epPP		52	50	16	4.7		h = 383 km. Solomon Islands.
	N	eSS	01	08	08				USCGS.
	N	esSS		10	26				
		F	03	45	-				Mag.: M = 6.8(ESK)
	ZV,Z	iPKP	00	49	40				Dilatation.
	Z	epPKP		51	17				PPH 16 sec. 2.1 μ
KEW	ZEN	ePP		51	53	8	2.4		
	EN	iPKS		53	04				
		F	03	30	-				Mag.: M = 6.5(KEW)
14	Z'	eP	19	37	49.8				19 25 38.2; 0.4°N., 79.9°W.
ESK									h = 102 km. Near Ecuador. USCGS.
14	Z¦Z	eP	21	37	11.0			5900	21 27 41.6; 7.4°N., 36.8°W.
	EN	eS		44	40	20	1.6(H)		h = 33 km. Mid-Atlantic Ridge.
	EN	eLQ		50	-				USCGS.
ESK	ZN	eLR		52½	-				
	E	M		58½	-	18	1		
	N	M		58½	-	19	1½		
	Z	M		58½	-	19	2		
		F	23	10	-				Mag.: M = 4.9(ESK)
	EN	eS	21	44	29	16	1.7(H)		
KEW	E	M		59	-	18	2		
	N	M		59	-	18	1½		
		F	22	40	-				Mag.: M = 5.1(KEW)
16	Z'	iP	21	36	19.0				Compression. 21 28 49.1;
ESK	Z'	e		36	31.7				39.7°N., 52.6°E. Caspian Sea.
									USCGS.
17	Z'	eP	00	23	36.7				00 17 40.9; 35.0°N.,.26.0°E.
	E	M		34	-	20	½		h = 18 km. Crete. USCGS.
ESK	N	M		34	-	20	1		
	Z	M		36	-	20	1		
		F		50	-				Mag.: M = 4½(ESK)
	ZV	eP	00	23	05				
KEW	N	M		32½	-	18	1½		
	E	M		32½	-	18	1		
		F		45	-				Mag.: M = 4½(KEW)
17	Z'	iP	09	10	53.3	1	0.06		09 07 03.8; 52.0°N., 30.0°W.
	EN	eL		14½	-				h = 42 km. North Atlantic Ocean.
ESK	E	M		15½	-	20	½		USCGS.
	N	M		15½	-	20	½		
	Z	M		16	-	18	1½		
		F		45	-				

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17 ESK	Z'	eP	15	05	59.6				14 54 01.4; 42.6°N., 142.8°E. h = 33km. Hokkaido, Japan. USCGS.
17 ESK	Z,'N'	eP	15	19	16.0	14	1.3		PH 14 sec. 1.3 μ
	EN	eL		22	-				15 15 18.9; 72.2°N., 1.7°E.
	Z	M		24	-	22	4		h = 33 km. Norwegian Sea. USCGS.
	N	M		24	-	22	3½		
	E	M		24½	-	16	5½		
		F	16	00	-				Mag.: M = 4¼(ESK)
	ZV	eP	15	20	02			2300	
KEW	E	eS		23	47	16	3.1		
	E	M		27½	-	13	2		
	N	M		27½	-	16	2½		Mag.: M = 4½(KEW)
17	Z'	eP	22	51	21.6	1.2	0.13		PH' 1.2 sec. 0.09 μ
	Z	M		56	-	20	1½		22 47 32.4; 52.1°N., 30.1°W.
ESK	E	M		56	-	20	1		h = 36 km. North Atlantic. USCGS.
	N	M		56	-	20	½		
		F	23	15	-				Mag.: M = 3.8(ESK)
KEW	ZV	eP	22	51	48				
18 ESK	Z'	eP	00	39	12.7				00 26 51.8; 7.2°S., 74.4°W. h = 156 km. Peru-Brazil border. USCGS.
18	ZEN	eSKS	05	09	18				
	ZEN	ePS		11	48				04 44 58.0; 26.4°S., 71.5°W.
	EN	eSS		17	18				h = 8 km. Off coast of Chile. USCGS.
	EN	eLQ		26½	-				
ESK	E	M		39½	-	22	3½		
	N	M		39½	-	22	4		
	Z	M		39½	-	22	7		
		F	07	30	-				Mag.: M=6(ESK)
	E	eSKS	05	09	17				
	N	M		40½	-	21	4½		
KEW	E	M		40½	-	21	7½		
		F	06	35	-				Mag.: M = 6-6¼(KEW)
18 ESK	Z'	eP	15	37	14.4				15 26 11.4; 5.7°N., 58.0°E. Carlsberg Ridge. USCGS.
19	Z,'Z	eP	09	41	45.2			5300	09 33 10.0; 28.2°N., 52.6°E.
	EN	eS		48	36				h = 50 km. Southern Iran. USCGS.
	EN	eSS		52	16				
ESK	E	M	10	04½	-	20	2½		
	N	M		04½	-	22	5		
	Z	M		06	-	20	4		
		F		50	-				Mag.: M = 5½(ESK)
	ZV,Z	iP	09	41	26	5	1.0	5100	
	EN	eS		48	05	8	1.7(H)		
KEW	E	M	10	03½	-	16	2½		
	N	M		03½	-	16	2½		
		F		40	-				Mag.: M = 5.2(KEW)

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19	Z',Z	eP	15	28	49.2	8	0.8	5300	15 20 13.9; 28.2°N., 52.7°E.
	ZE	ePP		30	43	10	0.7		h = 52 km. Southern Iran.
	E	eS		35	42	18	1.1(H)		USCGS.
	EN	eSS		39	16				
ESK	N	eLQ		41	-				
	Z	M		53½	-	19	2		
	E	M		53½	-	20	1½		
	N	M		53½	-	22	3		
		F	16	40	-				Mag.: M = 4.9(ESK)
	ZV	iP	15	28	30				
	N	M		51	-	16	1		
KEW	E	M		51½	-	16	1½		
		F	16	35	-				Mag.: M = 5(KEW)
19 ESK	Z'	eP	22	48	51.7				22 40 17.9; 28.4°N., 52.7°E. h = 58 km. Southern Iran. USCGS.
KEW	ZV	eP	22	48	33				
20	Z,'Z	eP	02	12	11.5	12	0.7		02 08 15.8; 72.1°N., 1.4°E.
	N	eLQ		15	-				h = 33 km. Norwegian Sea. USCGS.
	Z	M		17	-	21	2		
ESK	N	M		17	-	20	1½		
	E	M		17½	-	15	3		
		F		45	-				Mag.: M = 4(ESK)
20	Z'E'N'	iP	03	59	20.1	0.9	0.19	1350	Dilatation. PH' 0.9 sec. 0.15 μ
	Z'E'N'	i		59	22.7				03 56 29.2; 63.9°N., 20.5°W.
	E'N'	eS	04	01	34.0	0.9	0.13(H)		h = 33 km. Iceland. USCGS.
	EN	eL		01¾	-				
ESK	Z	M		03	-	23	7		
	N	M		03	-	20	5½		
	E	M		03½	-	17	7		
		F	05	00	-				Mag.: M = 4½(ESK)
	Z'Z	eP	04	00	17	4	1.1	2000	
	EN	eS		03	34				
KEW	EN	eL		04	-				
	E	M		05½	-	20	4		
	N	M		06	-	18	3½		Mag.: M = 4.6(KEW)
		F		40	-				
20	Z'	eP	05	17	25.9				05 08 50.3; 28.1°N., 52.6°E.
	N	eL		34	-				h = 47 km. Southern Iran. USCGS.
ESK	Z	M		41½	-	20	½		
	E	M		41½	-	20	½		
	N	M		42½	-	22	½		
		F		55	-				
KEW	ZV	iP	05	17	8				Compression.
20	Z'	eP	05	48	22.2	1	0.04	5200	05 39 47.7; 28.2°N., 52.6°E.
	ZE	eS		55	10				h = 52 km. Southern Iran. USCGS.
ESK	Z	M	06	12½	-	20	1		
	E	M		12½	-	19	1		
	N	M		13	-	21	1		
		F		40	-				Mag.: M = 4¾(ESK)
KEW	ZV,Z	iP	05	48	04				

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20	Z'	eP	16	33	58.0				16 29 58.5; 72.3°N., 1.7°E.
	E	eL		37	-				h = 33 km. Norwegian Sea. USCGS.
	Z	M		39	-	20	1		
ESK	N	M		39	-	20	½		
	E	M		39½	-	16	1½		
		F		50	-				Mag.: M = 4(ESK)
KEW	ZV	eP	16	34	42				
21	Z,'Z	eP	08	07	51.1			5200	07 59 17.0; 28.3°N., 52.5°E.
	E	eS		14	40				h = 54 km. Southern Iran. USCGS.
	N	M		32	-	21	1½		
ESK	E	M		33	-	20	½		
	Z	M		33	-	20	1		
		F	09	10	-				Mag.: M = 4¾(ESK)
KEW	ZV	eP	08	07	33				
21	Z'	eP	16	55	43.8				16 49 12.9; 40.1°N., 40.9°E.
ESK									h = 44 km. Turkey. USCGS.
22	Z'	eP	17	08	20.8	1	0.08		17 04 31.2; 51.9°N., 30.0°W.
	Z	M		13½	-	18	1		h = 33 km. North Atlantic. USCGS.
ESK	E	M		13½	-	18	½		
	N	M		14	-	16	½		
		F	-	-	-				
KEW	ZV	eP	17	08	46				
22	E	eL	17	31	-				
	E	M		32½	-	20	1½		North Atlantic ?
ESK	N	M		32½	-	20	1		
	Z	M		32½	-	20	2½		
		F		50	-				
	NE	eL	17	33½	-				
KEW	N	M		34½	-	20	1½		North Atlantic.?
	E	M		35	-	20	1½		
		F		50	-				
22	ZNE	eL	19	18½	-				
	E	M		20½	-	20	½		North Atlantic ?
ESK	N	M		20½	-	20	½		
	Z	M		20½	-	20	1		
		F		30	-				
23	ZNE	eL	03	03	-				
	Z	M		04½	-	20	1½		02 56 13.3; 59.4°N., 30.3°W.
ESK	E	M		04½	-	19	1		h = 33 km. North Atlantic.
	N	M		04½	-	19	1		USCGS.
		F		15	-				Mag.: M = 4(ESK)
23	Z	eP	04	51	15				04 47 46.4; 59.4°N., 30.2°W.
	EN	eLQ		54	-				h = 33 km. North Atlantic.
	N	M		55½	-	20	2		USCGS.
ESK	E	M		56	-	17	1½		
	Z	M		56	-	19	2½		
		F	05	15	-				Mag.: M = 4¼(ESK)

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	ZNE	eP	04	52	04				
	N	M		58	-	19	1½		
KEW	E	M		58½	-	16	1½		
		F	05	10	-				Mag.: M = 4¼(KEW)
23	ZN	ePP	15	44	54				
	EN	ePKS		46	16				
	ZEN	ePS		54	54				15 24 05.3; 6.1°S., 149.4°E.
	EN	eSS	16	02	16				h = 63 km. New Britain region.
	EN	eLQ		18	-				USCGS.
ESK	N	M		33	-	30	7½		
	Z	M		34	-	27	8½		
	E	M		34½	-	24	4½		
	E	M		39½	-	23	3		
	N	M		40	-	24	4½		
	Z	M		40½	-	20	5½		
		F	18	00	-				Mag.: M=6(ESK)
	EN	eL	16	23	-				
	E	M		42½	-	20	3½		
KEW	N	M		42½	-	20	6½		
	Z	M		42½	-	20	2		
		F	17	35	-				Mag.: M = 6¼(KEW)
24 ESK	Z'	iP	10	49	27.8	0.9	0.04		Dilatation. 10 37 23.4; 1.5°S., 78.1°W. h = 173 km. Ecuador. USCGS.
24	Z'	iP	22	07	25.1	1.5	0.10	7000	Compression.
	N	eS		15	56	16	0.86(H)		21 56 54.2; 58.4°N., 150.3°W.
	ZEN	eLR		27	-				h = 22 km. Gulf ofAlaska. USCGS.
ESK	Z	M		38	-	15	3½		
	E	M		38	-	16	1½		
	N	M		38	-	16	2		
		F	23	15	-				Mag.: M = 5.1(ESK)
	ZV	eP	22	07	52				
	E	M		41½	-	16	1½		
KEW	N	M		41½	-	16	1		
		F	23	10	-				Mag.: M = 5-5¼(KEW)
25	E	eLQ	11	24	-				11 11 53.6; 36.1°N., 28.7°E.
	E	M		28½	-	23	2		h = 50 km. Dodecanese Islands.
ESK	N	M		28½	-	24	5½		USCGS.
	Z	M		29	-	26	2½		
		F	12	15	-				Mag.: M = 5(ESK)
	NE	eS	11	22	07				
	EN	eL		25	-				
KEW	E	M		26½	-	22	4		
	N	M		27	-	20	8½		
		F	12	00	-				Mag.: M = 5-5½(KEW)
25	Z,'N'	iP	13	55	19.1	0.9	0.29	4900	Compression.
	Z	e		55	48				PH' 0.9 sec. 0.24 μ
	ZEN	ePP		57	06	20	7.6		PZ 16 sec. 9.2 μ
	EN	eS	14	01	49	24	40 (H)		PH 16 sec. 5.5 μ
ESK	E	iSS		05	08				PPH 20 sec. 8.2 μ
	E	iScS		05	46				13 47 20.2; 78.2°N., 126.6°E.
	ZN	eL		07	-				h = 50 km. East of Severnaya
	Z	M		13	-	17	22		Zemlya. USCGS.
	E	M		14	-	20	15		

contd.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

AUGUST, 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
ESK	N	M	14	14	-	22	21		Mag.: M = 6.1(ESK)
		F	17	30	-				
25	ZV,Z	eP	13	55	46	5	2.9	5000	PH 16 sec. 3.9 μ
	Z	ePP		57	42	5	2.7		
	EN	eS	14	02	37	20	21.4(H)		
KEW	E	eLQ		08	-				
	E	M		18½	-	20	32		
	N	M		18½	-	19	23		
		F	16	10	-				Mag.: M = 6.3(KEW)
26	Z'E'	iP	03	22	30.4	1	0.18		Compression.
	Z'	i		22	34.2				PH' 1 sec. 0.12 μ
	ZEN	eL		25½	-				03 18 44.1; 52.1°N., 30.1°W.
ESK	Z	M		27½	-	20	2½		h = 33 km. North Atlantic.
	E	M		27½	-	20	1½		USCGS.
	N	M		28	-	14	1½		
		F	04	05	-				Mag.: M = 4.2(ESK)
	ZV Z	eP	03	22	58				
	E	M		39	-	20	2		
KEW	N	M		39	-	18	1½		
		F		55	-				Mag.: M = 4¼(KEW)
26	Z'	eP	05	51	37.3				05 40 27.1; 47.2°N., 148.4°E.
ESK									h = 308 km. Kurile Islands.USCGS.
27	Z'	eP	10	03	12.6				09 53 51.0; 65.3°N., 133.8°W.
ESK									h = 33km. Yukon, Canada. USCGS.
27	Z'	eP	12	07	27.3				11 58 41.3; 28.2°N., 55.7°E.
ESK									h = 69 km. Southern Iran. USCGS.
KEW	ZV	eP	12	07	11				
27	Z'	eP	13	05	42.2			5500	12 56 46.1; 27.5°N., 55.9°E.
	N	eS		12	49				h = 33 km. Southern Iran. USCGS.
	N	eL		19½	-				
ESK	Z	M		26	-	26	1		
	N	M		26	-	24	2		
	E	M		26½	-	26	1		
		F	14	05	-				Mag.: M = 5(ESK)
	ZV,Z	eP	13	05	25			5300	
	N	eS		12	19				
KEW	N	eL		20	-				
	E	M		26½	-	20	1½		
	N	M		27	-	19	1½		
		F		45	-				Mag.: M = 5(KEW)
27	N	eL	19	44½	-				19 31 56.9; 35.5°N., 28.7°E.
	E	M		48½	-	24	2		h = 33 km. Eastern Mediterranean
ESK	N	M		48½	-	23	4½		Sea. USCGS.
	Z	M		49	-	26	2		
		F	20	45	-				Mag.: M = 5(ESK)
	EN	eS	19	42	15				
	N	eL		45	-				
KEW	E	M		47	-	22	24		
	N	M		47	-	20	7		
		F	20	20	-				Mag.: M = 5½(KEW)

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
28 ESK	Z'	iPKP1	04	54	00.2	1.2	0.12		Compression. 04 35 29.3; 19.8°S., 178.2°W. h = 580 km. Fiji Islands region. USCGS.
KEW	ZV,Z	iPKP1	04	54	11				
28	Z'	eP	12	11	23.0				12 06 18.3; 37.9°N., 19.8°E.
ESK	Z'	e		11	30.3				h = 61 km. Ionian Sea. USCGS.
28 ESK	Z'	eP	13	34	05.7				13 21 13.5; 7.1°N., 95.1°E. h = 33 km. Nicobar Islands. USCGS.
28 ESK	Z'	eP	13	34	56.5				13 22 05; 7.6°N., 95.6°E. h = 33 km. Nicobar Islands. USCGS.
28	N	eS	18	40	43				18 17 03.2; 23.5°N., 120.6°E.
ESK	E	M	19	05	-	24	1		h = 10km. Taiwan. USCGS.
	N	M		05	-	24	1½		
		F		30	-				Mag.: M = 5¼
29	Z'	eP	02	48	24.6				02 45 29; 43.3°N., 0.1°E.
	E	M		52½	-	14	½		h = 33 km. France.
ESK	N	M		53½	-	10	1½		
	Z	M		53½	-	16	1		
		F		55	-				
29 ESK	Z'N'	eP	05	24	08.3				05 20 19.8; 71.6°N., 3.7°W. Jan Mayen Island region. USCGS.
29 ESK	Z'	ePKP	13	44	48.7				13 25 25.9; 13.7°S., 172.6°E. New Hebrides Islands region. USCGS.
30 KEW	ZV	eP	02	46	08				02 35 08; 27.6°N., 88.3°E. h = 21 km. Sikkim. USCGS.
30	Z'N	iP	04	57	11.0	0.9	0.03		04 53 21.6; 71.8°N., 3.6°W.
ESK	Z	ipP		57	15.3	1.0	0.04		h = 33 km. Jan Mayen Island region. USCGS.
30 ESK	Z'N'	iPKP	22	04	02.3	0.8	0.04		21 44 56.9; 19.9°S., 176.0°W. h = 253 km. Fiji Islands. USCGS.
31 ESK	Z'	ePKP	02	33	17.8				02 14 20.3; 35.2°S., 106.0°W. Easter Island. USCGS.
31 ESK	Z'	eP	19	46	55.0				19 36 38; 59.5°N., 145.9°W. Gulf of Alaska. USCGS.
31 ESK	Z'	eP	23	31	42.1				23 20 19.4; 52.4°N., 170.7°W. Fox Islands. USCGS.

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AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN FOR SEPTEMBER, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION: RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS: (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS: FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON 1913).

COMPONENT	DATE FROM WHICH CONSTANTS APPLY	GALVANOMETER FREE PERIOD T_1 sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{nI}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE: MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK. TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY. SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland

Lat. 55° 19′ 00°N., Long. 3° 12′ 18′W. Height above M.S.L. 243 m.

Foundation: Llandovery shales (late Silurian)

Instruments: World-Wide Standardised Seismographs (USCGS)

Constants:

Instrument	Comp	FREE PERIODS Pendulum sec.	FREE PERIODS Galvanometer sec.	Magnification
SPRENGNETHER WWSS	N	30.0	100	1500 at 30 sec.
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N′	1.0	0.75	25000 at 1 sec.
	E′	1.0	0.75	
	Z′	1.0	0.75	

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

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SEPTEMBER, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1	Z'	eP	13	33	54.1	1.0	0.1	8000	13 22 36.6; 27.2°N., 92.3°E.
	EN	eS		43	10	14	1.4(H)		h = 33 km. India-China border.
	E	eScS		44	00				USCGS.
	Z	eLR		56	-				
ESK	E	M	14	04½	-	24	1½		
	N	M		04½	-	24	2½		
	Z	M		08½	-	16	4		
	E	M		08½	-	16	2		
	N	M		09	-	16	3		
		F		40	-				Mag.: M = 5.5 (ESK)
	ZV	eP	13	33	53			7900	
	N	eS		43	07	10	1.6(H)		
KEW	E	M	14	04	-	16	2		
	N	M		04	-	16	2½		
		F		35	-				Mag.: M = 5.7(KEW)
1	Z'N'	eP	17	28	12.0	1	0.08	8200	17 16 40.4; 51.2°N., 170.6°W.
	Z'E'N'	i		28	19.4				h = 25 km. Fox Islands,
ESK	Z'	iPcP		28	27.0				Aleutian Islands. USCGS.
	N	eS		37	40				Mag.: M = 5¼(ESK)
KEW	ZV	eP	17	28	36				
	ZV	ePcP		28	50				
2	Z'	eP	18	23	38.7				18 12 22.9; 7.8°N., 73.3°W.
ESK									h = 112km. N. Colombia. USCGS.
3	Z'	eP	21	26	42				
	N	eLQ		47	-				21 14 43; 24.6°N., 108.6°W.
ESK	E	M		55½	-	20	½		h = 33km. Gulf of California.
	N	M		56½	-	20	1		USCGS.
	Z	M		56½	-	22	1		
		F	22	50	-				Mag.: M = 5 (ESK)
KEW	ZV	eP	21	27	01				
4	Z'Z	eP	03	38	02.1	1.0	0.05	6000	Dilatation. Depth = 20 km.
	Z'	epP		38	07.8	1.0	0.05		PZ 9 sec. 1.1 μ
	E	eS		45	36	24	2.2(H)		
ESK	EN	eLQ		51	-				03 28 33.1; 7.6°N., 36.9°W.
	Z	eLR		53½	-				h = 22km. Mid-Atlantic Ridge.
	Z	M	04	00½	-	17	2		USCGS.
	E	M		00½	-	20	1		
	N	M		00½	-	20	2		
		F	05	20	-				Mag.: M = 5.0(ESK)
	ZV,Z	iP	03	37	52	6	0.7	5900	Dilatation.
	EN	eS		45	22	14	1.9(H)		
KEW	E	M		59	-	20	2½		
	N	M		59	-	19	1½		
		F	05	00	-				Mag.: M = 5.2(KEW)
4	Z'	eP	03	46	05.7				03 39 36.7; 39.8°N., 40.3°E.
ESK									h = 33km. Turkey. USCGS.
4	Z'	eP	08	24	00.3				08 12 45; 52.4°N., 158.6°E.
ESK									h = 70 km. East coast of Kamchatka. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
4	ZEN	ePP	10	54	09	14	1.1	13000	10 34 13.1; 4.0°S., 131.4°E.
	EN	ePS	11	03	48				h = 33 km. West New Guinea.
	EN	eSS		10	14				USCGS.
	EN	eL		26	-				
ESK	E	M		37	-	26	6		
	N	M		37½	-	26	5½		
	N	M		48½	-	22	6½		
	Z	M		48½	-	21	7½		
		F	14	10	-				Mag.: M = 6.2 (ESK)
	Z	ePP	10	54	13	5	0.6		
	EN	eL	11	27	-				
KEW	E	M		43½	-	21	5½		
	N	M		43½	-	22	3		
		F	12	35	-				Mag.: M = 6.3(KEW)
5	Z	eP	03	09	30			14200	02 53 50.6; 5.8°S., 154.0°E.
	Z	ePKP		12	48				h = 69 km. Solomon Islands.
	ZEN	ePP		14	48				USCGS.
	EN	ePKS		16	05				
ESK	N	ePS		24	56				
	ZN	ePPS		26	25				
	EN	eSS		32	06				
	E	eLQ		46	-				
	E	M	04	11	-	22	6½		
	N	M		11½	-	22	8		
	Z	M		11½	-	22	9½		
		F	07	50	-				Mag.: M = 6¼(ESK)
5	ZV,Z	ePKP	03	12	53				
	EN	ePKS		16	13				
	EN	eLQ		47	-				
KEW	E	M	04	13½	-	22	6		
	N	M		15	-	20	7		
	Z	M		15	-	20	2½		
		F	06	30	-				Mag.: M = 6¼(KEW)
5	Z	eP	12	37	06			6450	12 27 22.2; 0.6°N., 25.9°W.
	EN	eS		45	04	21	5.1(H)		h = 33km. Mid-Atlantic Ridge.
	EN	eLQ		51	-				USCGS.
	Z	eLR		53½	-				
ESK	E	M		57	-	20	2		
	N	M		57	-	20	6		
	Z	M		57	-	20	7		
		F	14	25	-				Mag.: M = 5.6(ESK)
	EN	eS	12	44	33	16	2.5(H)		
	EN	eLQ		50	-				
KEW	N	M		58½	-	18	2½		
	E	M		59	-	16	2½		
		F	14	10	-				Mag.: M = 5.3(KEW)
6	Z'	iP	17	46	37.0				17 36 44.3; 63.1°N., 147.7°W.
ESK	Z'	i		46	41.2				h = 33 km. Central Alaska. USCGS.
6	Z'	eP	19	00	51.7	1.3	0.06	2700	18 55 47.4; 38.3°N., 26.6°W.
ESK	EN	eS		05	05	9	0.7(H)		h = 33 km. Azores. USCGS.
									Mag.: M = 4.0(ESK).
KEW	ZV	eP	19	00	47				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
6	EN	eSS	19	15	00				18 41 01.8; 10.0°N., 140.2°E.
	EN	eLQ		27	-				h = 33 km. West Caroline Islands.
	E	M		33	-	38	3½		USCGS.
ESK	N	M		33	-	38	4		
	E	M		38	-	26	2		
	N	M		39	-	26	1½		
	Z	M		41½	-	22	2		
		F	20	35	-				Mag.: M = 5¾(ESK)
6	NE	eL	19	33	-				
	E	M		39½	-	26	4		
	N	M		40	-	24	3½		
		F	20	20					Mag.: M = 6(KEW)
6 ESK	Z'	eP	19	10	08.2				18 57 20.4; 7.1°N., 93.7°E. h = 46km. Nicobar Islands.USCGS.
7 ESK	Z'	eP	04	05	33.9				03 54 05.1; 48.6°N., 153.9°E. h = 100 km. Kurile Islands.USCGS.
7 ESK	Z'	iP	07	52	33.9				07 42 02.3; 58.3°N., 152.0°W. h = 33km. Kodiak Islands.USCGS.
7	Z',Z	eP	11	37	07			6700	11 27 15; 15.7°N., 53.3°E.
	EN	eS		45	18	24	1.4(H)		h = 33km. Arabian Sea. USCGS.
	N	eLQ		52	-				
	ZEN	eLR		56	-				
ESK	N	M		59½	-	30	2		
	E	M	12	00	-	30	2		
	Z	M		00	-	30	3½		
		F		40	-				Mag.: M = 5(ESK)
8 ESK	Z'	iPKP	17	24	00.3				17 05 23.4; 20.4°S., 178.3°W. h = 539 km. Fiji Islands.USCGS.
9 ESK	Z'	iP	22	27	04.2				Dilatation. 22 19 40.5; 34.5°N., 45.8°E. h = 68km. Iran-Iraq border.USCGS.
12	Z'	ePKP	13	02	02.3			13500	
	ZN	ePP		03	40				
	ZN	ePS		13	40				12 43 19.0; 4.4°S., 144.0°E.
	EN	eSS		20	16				h = 120 km. North coast of
ESK	EN	eLQ		34	-				New Guinea. USCGS.
	ZEN	eLR		42½	-				
	Z	M	14	00	-	20	1½		
	E	M		00	-	20	½		
	N	M		00½	-	20	1		
		F	15	10	-				
	N	M	14	00½	-	20	1		
KEW	E	M		01	-	20	1½		
		F	14	50	-				
12 ESK	Z'	iPKP	15	37	47.8				15 19 22.3; 17.4°S., 179.9°W. h = 561km. Fiji Islands. USCGS.
12 ESK	Z'	eP	20	37	43.0				20 25 53.5; 45.4°N., 149.7°E. h = 53km. Kurile Islands.USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
12	Z	iPKP$_1$	22	27	05	16	23	19000	Compression.
	Z'Z	iPKP$_2$		28	24.9	16	18		22 07 03.2, 49.1°S., 164.2°E.
	Z	iPP		32	18	14	53		h = 33km. Aukland Islands.
	Z	iPPP		36	22				USCGS.
	ZEN	eSKSP		42	44				PPH 14 sec. 16 μ
ESK	EN	eLQ	23	17½	-				
	Z	eLR		27½	-				
	Z	M		51½	-	19	50		
	N	M		51½	-	19	31		
	E	M		52½	-	19	20		
		F	29	30	-				Mag.: M = 7.5(ESK)
	ZV	ePKP1	22	27	06			19000	
KEW	ZV	ePKP$_2$		28	26				
	ZV,Z	ePP		32	19				
14	Z'	eP	13	45	24.9				13 33 33.7; 15.0°N., 93.2°W.
	Z	M	14	20½	-	20	2		h = 64km. Coast of Chiapas,
ESK	E	M		20½	-	20	1½		Mexico. USCGS.
	N	M		20	-	20	½		
		F	-	-	-				
14	ZNE	eL	14	28	-				
	E	M		30½	-	24	2½		Mid-Atlantic Ridge?
ESK	N	M		30½	-	24	3½		
	Z	M		30½	-	24	6½		
		F		50	-				
	NE	eL	14	31	-				
KEW	E	M		33	-	20	5		
	N	M		33	-	20	4		
		F		50	-				
14	Z'	eP	15	57	11.3				15 45 22.2; 15.5°N., 90.8°W.
ESK									h = 38km. Guatemala.
									Major damage to property. USCGS.
14	Z'	iP	20	52	19.3				Compression.
ESK									20 40 26.5; 45.2°N., 150.3°E.
									h = 33km. Kurile Islands. USCGS.
KEW	ZV	iP	20	52	36				Compression.
15	ZNE	eL	06	30	-				05 37 45.4; 0.1°S., 124.6°E.
	Z	M		44½	-	26	2		h = 33km. Molucca Sea.
ESK	E	M		44½	-	26	½		
	N	M		45	-	26	1½		
		F	07	10	-				Mag.: M = 5½(ESK)
15	Z'Z	iP	15	42	12.2	16	7.3	10,000	Compression.
	Z'	e		42	35				15 29 32.2; 8.9°N., 93.1°E.
	ZE	ePP		45	30	16	3.8		h = 37km. Nicobar Islands.
	ZNE	eSKS		52	38				USCGS.
	EN	eS		53	06	24	23(H)		
ESK	N	eLQ	16	04½	-				PH 16 sec. 1.9 μ
	ZE	eLR		11	-				
	N	M		24	-	24	19		
	E	M		25½	-	24	11		
	Z	M		25½	-	24	18		
		F	18	00	-				Mag.: M = 6.4(ESK)

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
15	ZV,Z	iP	15	42	07.5	5	3.3	9,400	Compression.
	ZV,Z	i		42	30				
	EN	eSKS		52	25	10	11.2(H)		
	EN	eS		52	48	11	16.8(H)		
KEW	N	eSS		58	24				
	N	eLQ	16	04½	-				
	E	M		26½	-	22	8		
	N	M		27	-	21	8		
		F	17	15	-				Mag.: M = 6.7 (KEW)
16	Z'	iP	01	38	58.1	1	0.06	9400	01 26 26.9; 10.9°N., 93.1°E.
	NE	eS		49	20	23	1.8(H)		h = 47 km. Andaman Islands.
	N	eL	02	01	-				USCGS.
ESK	Z	M		16½	-	24	3		
	E	M		16½	-	26	2		
	N	M		17½	-	24	4½		
		F	-	-	-				Mag.: M = 5.2(ESK)
KEW	ZV	iP	01	38	53				
16	Z'	iP	02	00	49.9	1	0.16	6800	Compression.
	Z'	i		00	54.3				01 50 33.9; 60.0°N., 147.1°W.
	EN	eS		09	09	18	3.7(H)		h = 29km. Gulf of Alaska. USCGS.
ESK	E	eLQ		18	-				
	Z	M		30	-	16	8½		
	E	M		30	-	16	6		
	N	M		30	-	16	5½		
		F	03	40	-				Mag.: M = 5.7(ESK)
	ZV	eP	02	01	18			7400	
	ZV	i		01	23				
KEW	NE	eS		10	05	14	4.0(H)		
	E	M		31½	-	18	4½		
	N	M		31½	-	18	5		
		F	03	15	-				Mag.: M = 5.9(KEW)
16	Z'	iP	22	31	50.0	1.8	0.34	5100	22 23 36.3; 22.9°N., 45.1°W.
	NE	eS		38	32				h = 33km. North Atlantic Ridge.
	NE	eL		42½	-				USCGS.
ESK	E	M		43½	-	24	1		
	N	M		43½	-	24	2½		
	Z	M		46½	-	20	1½		
		F	23	05	-				Mag.: M = 5.2(ESK)
	ZV	iP	22	31	50				
KEW	E	M		46½	-	20	2½		
	N	M		46½	-	20	2		
		F		55	-				Mag.: M = 5-5¼(KEW)
17	E'	iP	15	06	43.8	1	0.12	2400	15 02 00.9; 44.5°N., 31.3°W.
	NE	eS		10	36	24	12(H)		h = 24km. North Atlantic Ridge.
	NE	eL		11	-				USCGS.
ESK	E	M		13	-	20	6		
	N	M		13	-	16	4½		
	Z	M		13	-	20	9		
		F		50	-				Mag.: M = 5.0(ESK)
	ZV	iP	15	06	53.5			2450	
	NE	eS		10	50	18	6.7(H)		
KEW	NE	eL		12	-				
	N	M		14½	-	12	8		

contd.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
KEW	E	M	15	14½	-	12	5½		
		F		50	-				Mag.: M = 5.1(KEW)
18	N	eL	00	21	-				00 08 42.6; 35.4°N., 28.8°E.
	E	M		25	-	26	2½		h = 18km. East Mediterranean.
ESK	N	M		25½	-	24	6		USCGS.
	Z	M		27	-	18	3½		
		F		55	-				Mag.: M = 5-5¼(ESK)
	N	eL	00	22	-				
KEW	E	M		23½	-	24	4½		
	N	M		24	-	18	7½		
		F		50	-				Mag.: M = 5-5¼(KEW)
18	Z'Z	iP	13	17	52.2	1.7	0.34	2700	Compression.
	EN	eS		22	6	14	3.6(H)		13 12 42.3; 39.8°N., 29.7°W.
	EN	eLQ		23	-				h = 20km. Azores. USCGS.
ESK	Z	M		24½	-	20	10		
	E	M		24½	-	17	8		PH' 1.4 sec. 0.13 μ
	N	M		24½	-	18	6		PZ 9 sec. 1.7 μ
		F	14	30	-				Mag.: M = 4.9(ESK)
	ZV,Z	eP	13	17	53	6	1.8	2700	Compression.
	ZV	ePP		18	19				
	EN	eS		22	8	12	3.1(H)		
KEW	EN	eLQ		23½	-				
	E	M		25	-	20	5½		
	N	M		25	-	18	6½		
		F	14	10	-				Mag.: M = 5.1(KEW)
19	Z',Z	iP	05	20	11.8	1.3	0.1	8900	Depth = 30 km.
	Z'	ipP		20	20.7				
	EN	eS		30	12	13	1.7(H)		05 08 15.1; 15.3°N., 94.0°W.
	ZE	ePPS		30	54				h = 42km. Coast of Oaxaca Mexico.
ESK	NE	eLR		45	-				USCGS.
	E	M		51½	-	22	3		
	N	M		51½	-	22	2		PZ 8sec. 2.4 μ
	Z	M		51½	-	22	5		
		F	06	40	-				Mag.: M = 5.7(ESK)
	ZV,Z	eP	05	20	25	5	0.9	9000	
	EN	eS		30	28				
KEW	E	M		53	-	20	5		
	N	M		53	-	20	1½		
		F	06	30	-				Mag.: M = 5.7(KEW)
21	ZV	iPKP$_2$	04	42	04				04 23 19.7; 21.8°S., 179.6°W.
KEW	ZV	i		42	13				h = 609km. Fiji Islands. USCGS.
23	ZV	eP	05	11	24			9500	04 59 47.4; 53.6°N., 163.9°W.
	ZV	iPcP		11	37				h = 29km. Unimak Islands. USCGS.
	EN	eS		21	03				
KEW	E	e L		32	-				
	E	M		46½	-	20	2½		
	N	M		47	-	20	3		
		F	06	25	-				Mag.: M = 5½(KEW)
24	Z'E'N'	ePn	00	36	13.0			190	Local.
	Z'E'N'	iPg		36	14.7	0.6	0.06		PgH' 0.6 sec. 0.07 u
contd.	Z'N'	ePg		36	18.0				SgH' 0.7 sec. 0.09 u

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
ESK	Z'E'	eSn	00	36	34.2				
	Z'N'E'	eSm		36	36.0	0.7	0.09		
	E'N'	eSg		36	39.7				
		F		38½	-				
24	Z'E'N'	iPm	22	02	28.5	0.6	0.05	200	PmH' 0.6 sec. 0.06 u
	E'	eSn		02	48.7				
ESK	Z'E'	iSm		02	51.0				Local.
		F		04	-				
25	Z'	eP	15	53	55.8	1	0.04	8500	15 42 17.9; 50.3°N., 176.6°E.
	ZE	eS	16	03	34	20	1.7		h = 30km. Rat Islands, Aleutian
	EN	eSS		08	30				USCGS. Islands.
ESK	ZN	eL		16½	-				
		F		45	-				Mag.: M = 4¾-5(ESK)
25	Z'	eP	17	35	57.0				17 24 44.9; 53.6°N., 163.9°W.
ESK									h = 33km. Unimak Islands.
26	Z'E'	iP	00	56	22.9	0.9	0.08	6900	Depth = 62km.
	Z'E'	ipP		56	39.0				PE' 0.9 sec. 0.03 u
	EN	eS	01	04	42	16	3.6(H)		
	N	eLQ		13½	-				00 46 02.8; 30.1°N., 80.7°E.
ESK	E	eLR		15½	-				h = 50km. Tibet-India border.
	E	M		21½	-	20	4		USCGS.
	N	M		21½	-	20	10		
	E	M		26	-	16	9		
	N	M		26	-	16	5		
	Z	M		26	-	16	16		Mag.: M = 5.6(ESK)
		F	02	15	-				
	ZV	iP	00	56	18			6900	
	N	eS	01	04	34				
	E	M		21½	-	20	2		
KEW	N	M		21½	-	20	3½		
	E	M		26	-	15	3½		
	N	M		26	-	14	3		
	Z	M		26	-	15	1½		
		F	02	00	-				Mag.: M = 5½(KEW)
27	Z,Z'	iP	16	01	38.0	14	1.4	7400	Compression.
	ZN	ePcP		05	58				15 50 54.7; 56.6°N., 152.0°W.
	NE	eS		10	25	16	2.3(H)		h = 27km. Kodiak Islands.USCGS.
	NE	eScS		11	32				
ESK	NE	e		15	36				
	E	eLQ		18	-				
	E	M		31½	-	18	5½		
	N	M		32½	-	18	11		
	Z	M		32½	-	19	7½		
		F	17	45	-				Mag.: M = 5.8(ESK)
	ZV,Z	iP	16	02	05			7800	
	EN	eS		11	15				
KEW	E	M		35	-	18	2½		
	N	M		35	-	18	2½		
		F	17	25	-				Mag.: M = 5½-5¾(KEW)
27	Z'	eP	23	11	37.0				22 58 29.3; 21.4°S., 68.7°W.
ESK									h = 132km. Chile-Bolivia border.
									USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
28	Z	eP	05	14	54			6500	
	EN	eS		22	51	30	7.2(H)		05 04 55.5; 1.2°S., 24.1°W.
	E	eL		29	-				h = 37 km. Mid Atlantic Ridge.
ESK	E	M		33½	-	21	1½		USCGS.
	N	M		33½	-	21	4½		
	Z	M		34½	-	21	6		
		F	07	00	-				Mag.: M = 5.5(ESK)
	ZV	eP	05	14	36			6150	
KEW	N	eS		22	15				
	N	eL		31	-				
		F	06	15	-				
KEW	ZV	eP	07	00	04				06 51 05.3; 36.3°N., 71.6°E.
									h = 118km. Afghanistan-USSR
									border. USCGS.
29	Z'Z	iPKP	14	19	47.9	1.7	0.18	16000	Compression.
	Z	ePP		23	06	17	2.1		PKPZ 17 sec. 5.6 μ
	EN	eSS		41	49				
	EN	eSKSSKS		43	22				
ESK	E	eLQ	15	00½	-				14 00 14.9; 20.4°S., 174.4°W.
	ZN	eLR		12	-				h = 29km. Tonga Islands.
	E	M		20	-	21	3		USCGS.
	N	M		20	-	21	4½		
	Z	M		20	-	21	6		
		F	16	50	-				Mag.: M = 6.1(ESK)
	ZV,Z	ePKP	14	19	58				
	E	M	15	25	-	20	2		
KEW	N	M		25	-	20	1½		
		F	16	25	-				Mag.: M = 6(KEW)
29	N	eL	22	44	-				
	E	M		47	-	22	1		22 30 48.4; 34.3°N., 23.0°E.
ESK	N	M		47	-	22	2		h = 33km. Mediterranean.
	Z	M		50	-	20	½		USCGS.
		F		55	-				Mag.: M = 4½(ESK)
KEW	ZV	e(P)	22	35	56				
	N	M		46	-	18	1		
		F		55	-				
30	Z'	iP	04	45	29.2			3000	04 39 44.0; 34.5°N., 23.4°E.
	NE	eS		50	02				h = 43km. Crete. USCGS.
	EN	eLQ		51½	-				
ESK	E	M		56	-	23	3½		
	N	M		56	-	22	6½		
	Z	M		59	-	18	4		
		F	05	30	-				Mag.: M = 5(ESK)
	N	eS	04	49	15				
KEW	E	M		54	-	22	2½		
	N	M		54	-	20	4½		
		F	05	15	-				Mag.: M = 4½-5
30 ESK	Z'	iP	20	37	55.1				20 27 24.1; 58.4°N., 151.3°W. h = 17km. Kodiak Islands. USCGS.

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AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR OCTOBER, 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN "VORLESUNGEN ÜBER SEISMOMETRIE" (LEIPZIG, 1914) OR G. W. WALKER "MODERN SEISMOLOGY" (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T_1. sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ.	$\frac{Ak}{wl}$ $sec.^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland

Lat. 55° 19′ 00°N., Long. 3° 12′ 18′W. Height above M.S.L. 243 m.

Foundation: Llandovery shales (late Silurian)

Instruments: World-Wide Standardised Seismographs (USCGS)

Constants:

Instrument	Comp	FREE PERIODS		Magnification
		Pendulum sec.	Galvanometer sec.	
SPRENGNETHER WWSS	N	30.0	100	3000 at 30 sec.
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N′	1.0	0.75	50000 at 1 sec.
	E′	1.0	0.75	
	Z′	1.0	0.75	

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
2	Z'	eP	01	09	46.7				
	EN	eL		29	-				00 58 39.2; 51.9°N., 142.9°E.
ESK	E	M		39½	-	22	2		h = 33km. Sakhalin Is. USCGS.
	N	M		40	-	20	1½		
		F	02	30	-				Mag.: M = 5¼(ESK)
	ZV,Z	eP	01	10	03				
KEW	E	M		40	-	22	2		
	N	M		40½	-	22	1½		
		F	02	10	-				Mag.: M = 5¼(KEW)
2	Z'	ePKP	13	19	51.6			14,700	
	Z'	ePP		22	19.3				13 00 39.7; 10.5°S, 162.4°E.
	Z'	e		22	25.3				h = 68km. Solomon Is. USCGS.
	Z'	ePKS		23	36.2				
	EN	eSS		40	21				
ESK	EN	eSSS		45	01				Confused by very large microseisms.
	E	eLQ		54	-				
	ZE	eLR	14	03	-				
	E	M		17	-	22	4		
	N	M		17	-	22	2½		
	Z	M		23	-	22	5½		
		F	15	25	-				Mag.: M = 6(ESK)
	ZV,Z	ePKP	13	19	56			15,100	
	ZV,Z	ePP		22	40	5	1.1		
	ZV,Z	e		22	47				
KEW	EN	eLR	14	06	-				
	E	M		18½	-	20	2		
	N	M		18½	-	20	2½		
		F	15	20	-				Mag.: M = 6-6¼(KEW)
2	Z'E'N'	iPg	14	06	17.7	0.3	0.026	55	Local.
ESK	Z'E'N'	iSg		06	23.9	0.4	0.072		PgH 0.3 sec. 0.03 μ
	Z'E'N'	iSn		06	27.7				SgH 0.5 sec. 0.042 μ
		F		07	45				
2	Z'	eP	22	33	47.5	1	0.023		
ESK	N	M		57½	-	20	1		22 23 32.4; 59.7°N., 144.5°W.
	E	M		58½	-	20	1		h = 22 km. Gulf of Alaska. USCGS.
		F	23	15	-				Mag.: M = 4¾
3	Z'	eP	13	49	46.2				13 39 39.9; 61.4°N., 147.1°W.
ESK	Z'	e		50	05.1				h = 48 km. S. Alaska. USCGS.
3	Z'	iPKP	23	00	18.8	1	0.04		22 41 09.0; 20.2°S., 176.3°W.
ESK									h = 219 km. Fiji Islands.USCGS.
4	Z'	iP	01	51	08.8	0.7	0.035		01 46 54; 39.4°N., 15.4°E.
ESK	Z'	i		51	44.2				h = 261km. S. Italy. USCGS.
4	Z'	eP	07	10	47.6				07 00 57.1; 27.9°N., 69.2°E.
ESK									h = 14 km. Border India-W.Pakistan. USCGS.
4	Z'	eP	09	40	20.5				
ESK									
4	Z'	eP	23	02	07.3				22 57 03.4; 37.8°N., 20.9°E.
ESK									h = 90 km. Ionian Sea. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
5	Z'	iP	03	47	07.3	0.6	0.021		Dilatation.
ESK									03 35 08.4; 42.6°N., 142.6°E.
									h = 38 km. Hokkaido, Japan. USCGS.
5	Z'	iPKP	13	31	40.9				13 12 15.5; 22.3°S., 171.6°E.
ESK									h = 145 km. Loyalty Islands.USCGS.
5	Z'	ePKP	14	18	38.9				13 58 56.9; 22.2°S., 175.8°W.
ESK	Z'	e		18	48.6				h = 33km. Tonga Islands. USCGS.
6	EN	eSKS	06	35	10				
	ZEN	eL		55	-				06 11 32.6; 18.6°N., 119.6°E.
ESK	Z	M	07	05	-	26	1½		h = 33km. Philippine Islands.
	E	M		06	-	22	½		USCGS.
	N	M		06	-	22	1		
		F		30	-				Mag.: M = 5¼ (ESK)
KEW	E	M	07	10½	-	18	2		
	N	M		10½	-	18	1½		
		F		30	-				Mag.: M = 5½(KEW)
6	Z	ePP	07	38	29	20	0.5	13,450	07 17 57.1; 36.2°S., 100.9°W.
	ZE	ePS		48	17				h = 33km. South Pacific Ocean.
ESK	Z	ePPS		49	47				USCGS.
	EN	eLQ	08	09	-				
	ZEN	eLR		15	-				
	Z	M		18½	-	32	4½		
	E	M		18½	-	32	3½		
	N	M		22½	-	22	1		
	E	M		22½	-	22	1		
		F	09	35	-				Mag.: M = 5¼(ESK).
	NE	eL	08	10	-				
KEW	E	M		21½	-	24	5		
	N	M		22½	-	22	2		
		F	09	00	-				Mag.: M = 6(KEW)
6	Z',Z	iP	14	35	27.2	2	0.34		Compression. PZ 5 sec. 1.2 μ
ESK	Z'	i		35	31.3				14 29 55.6; 40.2°N., 28.1°E.
									h = 10 km. Turkey. USCGS.
									Mag.: M = 5.1(ESK)
KEW	ZV	eP	14	34	58				
6	Z',Z	iP	14	36	49.2	14	18.4	2,900	Dilatation.
	Z'	i		36	55.0				PH 14 sec. 12.5 μ
ESK	EN	iS		41	16	26	120(H)		
	EN	eL		42	-				14 31 19.2; 40.3°N., 28.2°E.
		F	18	45	-				h = 10 km. Turkey. 19 killed, many injured and extensive property damage. USCGS.
									Mag.: M = 6.7(ESK)
	ZV,Z	iP	14	36	21	5	12.9	2,600	Dilatation. PH 15 sec. 14.3 μ
	ZV	i		36	28				
KEW	EN	iS		40	32	15	140(H)		
	EN	eL		42	-				
		F	18	45	-				Mag.: M = 6.7(KEW)

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6	Z'	eP	18	28	36.3			1,650	Depth = 15 km.
	Z'	ipP		28	40.0	1.3	0.10		18 24 57.0; 70.9°N., 5.7°W.
	E	eS		31	20				h = 33 km. Jan Mayen Islands.
ESK	E	M		33	-	16	1		USCGS.
	N	M		33	-	20	1		
	Z	M		33	-	22	1½		
		F		45	-				Mag.: M = 3.8(ESK)
6	Z'	iP	20	30	00.9				20 19 34.1; 29.3°N., 80.9°E.
ESK									h = 27 km. Border India-Nepal. USCGS.
9	Z'	eP	19	37	53.5				19 26 39.7; 6.8°N., 73.0°W.
ESK									h = 157 km. N.Colombia. USCGS.
9	Z'	iP	20	06	17.1				19 55 34.7; 57.0°N., 151.9°W.
ESK	Z'	i		06	24.7				h = 17 km. Kodiak Islands.USCGS.
10	Z'	iP	19	48	58.5				19 38 47.7; 60.4°N., 146.1°W.
									h = 44 km. S. Alaska. USCGS.
10	Z'	eP	20	16	50.8				20 06 39.8; 60.5°N., 145.4°W.
	Z'	i		16	57.0				h = 31 km. S. Alaska. USCGS
	EN	eL		34	-				
ESK	E	M		41½	-	22	1½		
	N	M		43	-	22	2		
		F	21	00	-				Mag.: M = 5¼ (ESK)
11	Z'	iPKP	10	39	48.5				10 21 01.1; 6.3°S., 145.7°E.
ESK									h = 138 km. New Guinea. USCGS.
11	N	eS	21	41	41				
	E	ePS		43	17				21 15 03.9; 0.6°S., 121.7°E.
	EN	eSS		49	21				h = 33 km. N. Celebes. USCGS.
	EN	eLQ	22	00	-				
ESK	N	eLR		06	-				
	N	M		15	-	26	19		
	E	M		15	-	26	14		
	E	M		25½	-	21	9½		
	N	M		26	-	22	13½		
		F	23	50	-				Mag.: M = 6½(ESK)
	ZV,Z	ePP	21	34	10	8	2.4		
	NE	eS		41	44	11	4.6(H)		
	NE	eSS		49	40				
KEW	EN	eLQ		00½	-				
	E	M		26	-	22	10		
	N	M		26½	-	20	11		
		F	23	15	-				Mag.: M = 6.7(KEW)
12	EN	eS	16	09	31				15 42 54.7; 3.0°N., 126.7°E.
	EN	ePPS		12	15				h = 59 km. Talaud Is. USCGS.
	EN	eSS		17	11				
	N	eLQ		28	-				
ESK	N	M		42	-	32	6½		
	E	M		42	-	32	4		
	N	M		50½	-	24	5½		
	E	M		50½	-	24	2		
		F	17	35	-				Mag.: M = 6(ESK)

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	N	eL	16	36	-				
KEW	E	M		51½	-	22	3		
	N	M		51½	-	22	3		
		F	17	20	-				Mag.: M = 6(KEW)
12	EN	eSS	22	33	25				
	N	eLQ		47½	-				21 55 33.2; 31.3°S., 110.8°W.
	E	eLR		55	-				h = 25 km. Easter Islands.
ESK	E	M	23	17½	17½	18	1½		USCGS.
	N	M		17½	-	19	1½		
		F	24	25	-				Mag.: M = 5¾(ESK)
	N	eSS	22	33	35				
	N	eL		48	-				
KEW	E	M	23	10½	-	20	2		
	N	M		11	-	20	2½		
		F	25	15	-				Mag.: M = 5¾-6(KEW)
13	Z'	iP	02	32	49.3				02 20 49.3; 44.4°N., 151.6°E.
ESK									h = 33km. Kurile Islands.USCGS.
13	Z'	eP	07	05	10.0				06 57 48.7; 34;0°N., 45.1°E.
ESK									h = 96 km. Border Iran-Iraq.USCGS.
13	N	eSS	11	16	51				10 38 59.3; 3.3°S., 149.9°E.
ESK	N	eL		37	-				h = 59km. Bismark Sea. USCGS.
	N	M		46	-	32	1½		
		F	12	55	-				
13	Z'	eP	14	10	42.5				14 00 12.3; 58.5°N., 151.4°W.
ESK									h = 33km. Kodiak Islands.USCGS.
13	Z'	iPKP	18	31	52.8	0.9	0.018		18 12 14.5; 22.1°S., 170.5°E.
ESK									h = 41 km. Loyalty Islands.USCGS.
14	Z'	eP	03	17	43.5			9,600	
	E	eS		28	17				
	EN	eSS		34	07				03 04 59.6; 33.4°N., 141.8°E.
ESK	ZEN	eLR		46½	-				h = 33km. Off coast of Honshu,
	Z	M	04	01½	-	20	2½		Japan. USCGS.
	N	M		01½	-	19	2		
	E	M		03	-	20	1		Mag.: M = 5½(ESK)
		F		45	-				
	E	eS	03	28	40				
	N	eL		49	-				
KEW	E	M		57½	-	20	2		
	N	M		58½	-	20	1½		
		F	04	30	-				Mag.: M = 5½ (KEW)
14	Z'	ePKP	04	04	42.0				03 45 58.0; 21.4°S., 178.5°W.,
ESK									h = 481 km. Fiji Islands.USCGS.
14	ZE'N'	iPg	15	22	39.7	0.3	0.065	25	Local.
	Z'E'N'	i(P*)		22	41.9				Pg H 0.3 sec. 0.10 μ
ESK	E'N'	iSg		22	43	0.5	0.41		Sg H 0.5 sec. 0.49 μ
		F		23	15				
14	EN	eS	17	44	13				
	N	eLQ		51	-				
ESK	Z	eLR		55	-				
		F	18	30	-				

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KEW	EN	eS	17	43	35				
15	Z;Z	iP	20	38	48.6	12	2.7	8,700	Compression. Depth = 54 km.
	Z'	ipP		39	03.5				
	EN	iS		48	39	16	4.4(H)		
	N	iPS		49	11				20 26 53.5; 44.7°N., 149.8°E.
	E	eSS		53	41				h = 49 km. Kurile Islands.
ESK	E	eLQ		59½	-				USCGS.
	Z	eLR	21	04	-				
	N	M		13	-	20	6½		
	E	M		14½	-	20	7½		
	Z	M		19½	-	19	10		Mag.: M = 6.0(ESK)
		F	-	-	-				
	ZV,Z	iP	20	39	04	5	1.5	9,080	Compression.
	EN	eS		49	11	15	4.9(H)		
KEW	EN	eL	21	07	-				
	E	M		15½	-	20	9½		
	N	M		16	-	20	6		Mag.: M = 6.1(KEW)
		F	-	-	-				
15	Z'	iP	20	47	29.6				20 35 33; 44.8°N., 149.5°E,
ESK	Z'	i		47	43.6				h = 33km. Kurile Islands. USCGS.
15	Z'	eP	22	52	28.3				Depth = 54 km.
ESK	Z'	epP		52	43.2				22 40 32.4; 44.6°N., 149.9°E.
									h = 44 km. Kurile Islands.USCGS.
15	Z'	eP	23	20	05.8				23 09 25.1; 56.9°N., 151.7°W.
ESK									h = 33 km. Kodiak Islands.USCGS.
16	Z'	iPKP$_1$	06	34	55.9			16,350	06 15 31.5; 23.6°S., 177.6°W.
ESK	Z'	iPKP2		35	00.2				h = 178km. Southern Fiji Islands. USCGS.
16	Z;Z	iP	07	11	36.4	14	6.8	8,700	Compression.
	EN	eS		21	28	16	14.4(H)		
	N	PS		21	56				PM 14 sec. 3.0 μ
	EN	eSS		26	34				
ESK	EN	eLQ		32½	-				06 59 38.6; 44;3°N.,149.5°E.
	ZN	eLR		37	-				h = 33 km. Kurile Islands. USCGS.
	E	M		47½	-	18	21		
	N	M		47½	-	18	23		
	Z	M		51	-	20	25		Mag.: M = 6.7(ESK)
		F	-	-	-				
	ZV	eP	07	11	52	7	3	9000	Compression.
	EN	eS		21	59	14	17.7(H)		
	N	eSS		57	47				
KEW	E	M		48½	-	19	33		
	N	M		49½	-	18	18		
	Z	M		49½	-	18	5½		Mag.: M=6.7(KEW)
		F	-	-	-				
16	Z'	eP	07	33	40.7	1	0.06		07 21 42.7; 44.2°N., 149.4°E.
ESK									h = 33 km. Kurile Islands. USCGS.
16	Z'	iP	07	40	24.6	1	0.03		07 28 28.3; 44.3°N., 149.5°E.
ESK									h = 52 km. Kurile Islands. USCGS.

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16	Z'	eP	07	49	17.1				07 37 19.6; 44.5°N., 149.6°E.
ESK									h = 33 km. Kurile Islands.USCGS.
16	Z'Z	iP	08	30	24.2	12	3.3		Compression.
ESK									08 18 28.3; 44.6°N., 149.4°E.
									h = 33km. Kurile Islands.USCGS.
									Mag.: M = 6-6¼(ESK)
	ZV,Z	eP	08	30	42	6	2.0	9100	
	EN	eS		40	53	17	8.6(H)		
KEW	E	M	09	07½	-	20	14½		
	N	M		08	-	19	9½		Mag.: M = 6.2(KEW)
		F	-	-	-				
16	Z'	eP	08	34	56.3				08 23 00.6; 44.6°N., 149.6°E.
ESK									h = 33 km. Kurile Islands.USCGS.
16	Z'	eP	08	45	27.4				08 33 29.8; 44.2°N., 149.4°E.
ESK									h = 33 km. Kurile Islands. USCGS.
16	Z'	iP	09	30	15.6	1	0.055		09 18 16.6; 44.5°N., 149.1°E.
ESK	Z'	i		30	37.1				h = 33 km. Kurile Islands.USCGS.
	ZV	iP	09	30	31			9,300	
	EN	eS		40	49	14	7.1(H)		
KEW	E	M	10	07½	-	20	17		
	N	M		08	-	18	10		Mag.: M = 6¼(KEW)
		F	-	-	-				
16	Z'	eP	11	10	30.8				10 58 30.6; 44.1°N., 149.5°E.
ESK	E	M		47	-	19	½		h = 25 km. Kurile Islands.
	N	M		47	-	19	1		USCGS.
16	Z	i	12	16	04.0				12 04 05.3; 44.6°N., 149.5°E.
ESK									h = 33 km. Kurile Islands.USCGS.
16	Z'	iP	12	49	24.8				
	Z'	i		49	36.8				12 37 26.8; 44.3°N., 149.4°E.
ESK	E	M	13	23	-	22	1		h = 33 km. Kurile Islands.USCGS.
	N	M		23½	-	21	½		
		F	14	05	-				
16	Z'	iP	13	41	29.1	0.9	0.02		13 29 30.6; 44.4°N.,149.5°E.
ESK									h = 33 km. Kurile Islands.USCGS.
17	Z'	iP	02	10	20.1	1	0.047		02 00 03.3; 59.5°N., 145.5°W.
ESK									h = 33 km. Gulf of Alaska.USCGS .
17	Z'	iPKP	06	15	23.8	0.9	0.022		05 55 54.4; 22.3°S., 171.5°E.
ESK									h = 116 km. Loyalty Islands.USCGS.
17	Z'	eP	09	56	22.8			3,200	09 50 29.5; 35.0°N., 25.4°E.
	EN	eS	10	01	06.8				h = 33 km. Crete. USCGS.
	EN	eL		03	-				
ESK	N	M		07	-	18	3		
	E	M		07½	-	18	2		
	Z	M		10	-	17	2½		
		F	10	30	-				Mag.: M = 4¾(ESK)
	EN	eS	10	00	16	15	3.7(H)		
	EN	eL		03½	-				
KEW	E	M		05	-	18	2		
	N	M		05	-	18	5½		
		F		22	-				Mag.: M = 4.9(KEW)

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17	E	eS	15	02	16				
	EN	eLQ		05½	-				14 48 10.9; 26.7°N., 44.6°W.
	Z	eLR		07½	-				h = 33 km. North Atlantic Ridge.
ESK	N	M		08½	-	20	1		USCGS.
	E	M		09	-	20	1		
	Z	M		09	-	20	1½		
		F		25	-				Mag.: M = 4½-4¾(ESK)
18 ESK	E'	iP	06	28	31.9	1	0.022		06 16 35.2; 44.4°N., 149.7°E. h = 33km. Kurile Islands.USCGS.
18	Z'	eP	09	18	09.6				
	N	eLQ		38	-				09 06 26.0; 2.9°N., 65.7°E.
	N	eLR		42	-				h = 33 km. Carlsberg Ridge.USCGS.
ESK	Z	M		52	-	23	1		
	E	M		52½	-	24	1		
	N	M		54	-	22	1½		
		F	10	35	-				Mag.: M = 5¼(ESK)
	ZV,Z	eP	09	17	54				
	N	M		56	-	20	1		
KEW	E	M		56½	-	20	1		
		F	10	15	-				Mag.: M = 5¼(KEW)
18	ZEN	eP	12	46	22	20	1.0	13,000	Depth = 581 km.
	ZEN	ipP		48	29	20	1.2		
	Z,Z'	iPKP		50	05.4				12 32 24.1; 7.0°S., 124.0°E.
	Z,Z'	iPP		51	20				h = 574 km. Banda Sea. USCGS.
	ZEN	epPP		53	15				
	ZEN	esPP		54	14				
ESK	ZN	eSKKS		56	42				
	NE	eS		58	10	26	4.8(H)		
	ZEN	eSP		59	56				
	ZEN	eSPP	13	01	10				
	ZEN	esSP		03	52				
	ES	eSS		06	44				
		F	17	00	-				Mag.: M = 6½(ESK)
	ZV,Z	eP	12	46	26			13,000	
	ZV,Z	iPKP		50	05				
	ZV,Z	ePP		51	20	8	1.9		
KEW	EN	eS		58	15	11	6.7(H)		
	ZEN	iSP	13	00	06				
	EN	isPS		03	54				
	EN	eSS		07	44				
		F	14	55	-				Mag.: M = 7(KEW)
18	Z'E'N'	iPg	13	09	52.9				Local.
	Z'N'	iSg		09	58.1				
ESK	Z'E'N'	i		10	01.1				
		F		10	45				
18 ESK	Z'	iP	13	28	41.2	0.9	0.02		13 20 20.3; 29.7°N., 50.8°E. h = 33 km. Southern Iran.USCGS.
KEW	ZV	iP	13	28	23				
18 ESK	Z'	eP	21	34	15.1				21 25 29.9; 28.0°N., 54.7°E. h = 61 km. Southern Iran.USCGS.
18 ESK	Z'	iP	22	44	06.3				22 35 45.5; 29.7°N., 51.0°E. h = 36 km. Southern Iran.USCGS.
KEW	ZV	eP	22	43	48				

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18 ESK	Z'	iPKP	22	49	58.1				22 31 37.7; 19.4°S., 179.1°W. h = 666 km. Fiji Islands. USCGS.
21	EN	eL	08	04½	-				
	E	M		13	-	20	1½		07 38 31.0; 44.8°N., 111.6°W. h = 33 km. Hebgen Lake, USCGS.
	N	M		13	-	20	1		
	Z	M		13	-	20	2½		
		F		55	-				Mag.: M = 5¼(ESK)
	EN	eL	08	06½	-				
KEW	E	M		15	-	18	1½		
	N	M		15½	-	18	1½		
		F		35	-				Mag.: M = 5¼(KEW)
21 ESK	Z'	eP	19	22	21.9				19 17 50.0; 36.4°N., 4.3°E. h = 33 km. Algeria. USCGS.
21	Z¦Z	iP	23	20	37.2	18	4.5	8000	Compression.
	Z¦Z	iPP		23	17	20	2.0		23 09 18.8; 28.1°N., 93.8°E. h = 37 km. India-China border. USCGS.
	ZEN	iPPP		25	01				
	EN	eS		29	53	20	12.5(H)		
	ZE	eScS		30	35				PZ' 1.5 sec. 0.29 μ
ESK	EN	eSS		34	31				PPZ' 1.7 " 0.17 μ
	ZEN	eLR		43	-				PH 18 sec. 1.7 μ
	E	M		54	-	22	50		PPH 20 " 1.3 μ
	N	M		54½	-	20	60		
	Z	M		54½	-	22	120		
		F	26	20	-				Mag.: M = 5.9 (P waves) M = 6.8 (SH & MH) (ESK)
	ZV,Z	eP	23	20	35	6	1.4	7950	Compression.
	Z	ePP		23	20				
	Z	ePPP		25	00				
	EN	eS		29	49	13	9.1(H)		
	EN	eScS		30	36				
KEW	EN	eL		42½	-				
	N	M		55	-	14	34		
	E	M		55½	-	15	70		
	Z	M		55½	-	14	23		
		F	01	35	-				Mag.: M = 6 (PZ) M = 6.8 (SH & MH) } KEW
23 ESK	Z'Z	iP	02	05	19.5	10	7.7	5900	01 56 03.2; 19.8°N., 56.0°W. h = 31km. North Atlantic Ocean. USCGS.
	EN	eS		12	47	17	30(H)		
									Mag.: M = 6¾(ESK)
	ZV,Z	eP	02	05	23	6	3.6	6000	
	EN	eS		12	54	11	15.9(H)		
	EN	eLQ		18½	-				
KEW	Z	eLR		21½	-				
	E	M		22½	-	22	51		
	N	M		22½	-	19	24		
	Z	M		23	-	20	19		
		F	03	30	-				Mag.: M = 6.5 (KEW)
23 ESK	Z'	iP	21	18	20.6	1	0.11		21 06 24.2; 44.0°N., 147.5°E. h = 45 km. Kurile Islands. USCGS.
KEW	ZV	iP	21	18	36				
25 ESK	Z'	iP	03	55	29.2				03 43 20.0; 5.0°N., 82.5°W. h = 33 km. South of Panama. USCGS.

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
25 ESK	Z'	iP	06	37	55.1	0.9	0.08		06 25 48.6; 2.0°S., 77.2°W. h = 160 km. Ecuador. USCGS.
KEW	ZV	iP	06	37	59				
25 ESK	Z'	iP	08	06	03.2	0.5	0.02		07 59 58.8; 73.5°N., 53.7°E. h = 0 km. Novaya Zemlya. USCGS.
25 ESK	Z'	iPKP	12	27	26.8	0.9	0.11		Dilatation. 12 08 46.9; 21.7°S., 179.2°W. h = 534 km. Fiji Islands. USCGS.
KEW	ZV	iPKP	12	27	35				
25 ESK	Z'	eP	23	05	06.0				22 56 08; 38.7°N., 70.8°E. h = 33 km. Afghanistan-USSR border.
26 ESK	Z'	eP	14	43	31.9				14 32 49.3; 56.8°N., 152.3°W. h = 33 km. Kodiak Islands. USCGS.
26	NE	eL	15	08½	-				14 22 57.8; 2.2°N., 126.8°E. h = 48 km. Molucca Passage. USCGS.
	E	M		26	-	30	1½		
ESK	N	M		26½	-	30	1½		
	Z	M		26½	-	30	2½		
		F	16	05	-				Mag.: M = 5½(ESK).
27	Z'E'	iP	19	49	28.0				
	Z'E'	i		49	36.0				19 46 12.0; 47.8°N., 16.1°E. h = 39 km. Austria. USCGS.
	Z'E'	i		49	48.0				
ESK	EN	eL		52	-				
	E	M		54½	-	16	3½		
	N	M		54½	-	18	7		
	Z	M		55½	-	14	2		
		F	20	30	-				Mag.: M = 4¾-5(ESK)
	ZV	eP	19	48	52				
	N	eL		52	-				
KEW	N	M		52½	-	14	7		
		F	20	10	-				
27	N	eSKS	21	50	57				
	EN	eSS	22	03	12				21 24 31.2; 45.6°S., 96.1°E. h = 33 km. S.E. Indian Rise. USCGS.
	N	eLQ		18	-				
ESK	E	M		46½	-	18	3½		
	N	M		46½	-	20	4½		
	Z	M		46½	-	20	4		Mag.: M = 6-6¼(ESK)
		F	-	-	-				
	EN	eSS	22	02	26				
KEW	N	M		44½	-	20	4		
	E	M		45	-	20	3		
		F	-	-	-				Mag.: M = 6-6¼(KEW)
28 ESK	Z'	iP	01	46	26.7	0.8	0.02		01 34 54.5; 17.7°N., 94.2°W. h = 159 km. Chiapas, Mexico. USCGS.
28 ESK	Z'	eP	19	44	18.7				19 35 15.8; 36.1°N., 71.3°E. h = 130; Afganistan-USSR border. USCGS.
KEW	ZV	eP	19	44	13				
29 ESK	Z'	iP	13	42	04.2				13 30 44; 26.3°N., 96.7°E. h = 170 km. Burma. USCGS.

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

OCTOBER, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
30	ZE	ePS	02	41	29				02 10 37.6; 35.0°S., 107.3°W.
	ZE	eSS		48	31				h = 33 km. Easter Islands.
	N	eLQ	03	03	-				USCGS.
ESK	ZE	eLR		09½	-				
	Z	M		14½	-	26	1½		
	E	M		14½	-	25	1		
	N	M		15	-	26	1		
		F	04	20	-				Mag.: M = 5½(ESK)
30	Z'	eP	17	23	58.3				17 13 13.8; 56.6°N., 152.2°W.
ESK									h = 33 km. Kodiak Islands.USCGS.

D 41166/1/R.72 140 7/65 XL

(*1228—50) Wt. 42282—B J556 125 9/54 T.S. 841

M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR NOVEMBER 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (i) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN " VORLESUNGEN ÜBER SEISMOMETRIE " (LEIPZIG, 1914) OR G. W. WALKER " MODERN SEISMOLOGY " (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T_1. sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(ii) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland
Lat. 55° 19' 00"N., Long 3° 12' 18"W. Height above M.S.L. 243 m.
Foundation: Llandovery shales (late Silurian)
Instruments: World-Wide Standardised Seismographs (USCGS)
Constants:

Instrument	Comp	FREE PERIODS		Magnification
		Pendulum sec.	Galvanometer sec.	
SPRENGNETHER WWSS	N	30.0	100	3000 (1st - 10th) 750 (11th - 30th)
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N'	1.0	0.75	50000 (1st - 10th) 12500 (11th - 30th
	E'	1.0	0.75	
	Z'	1.0	0.75	

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

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NOVEMBER, 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
1. ESK	Z'	iPKP	12	44	32.7			12000	
	Z	ePP		45	20	14	0.8		
	N	eS		52	31				
	Z	eSP		54	13				12 26 06.2; 3.1°N., 128.1°E.
	EN	eSS	13	00	27				h = 65km. North of Halmahera.
	EN	eLQ		11½	-				USCGS.
	ZN	eLR		18	-				
	Z	M		24	-	38	3		
	E	M		24	-	36	3½		
	N	M		24½	-	30	3½		
	E	M		27	-	25	2½		
	N	M		27	-	25	2½		
		F	14	55	-				Mag.: M = 5.9(ESK)
	KEW	ZV	ePP	12	45	06			
		N	eSS	13	00	31			
		EN	eL		15	-			- " -
		E	M		30	-	20	1	
		N	M		30	-	20	1½	
		F	14	05	-				Mag.: M = 5¾(KEW)
2. ESK	Z'Z	iP	07	03	19.8	1.5	0.17	9200	Dilatation.
	Z'	ipP		03	50.2				Depth = 120 km.
	Z'	i		03	56.8				06 50 58.2; 4.1°S., 76.9°W.
	EN	eS		13	30	18	1.3(H)		h = 91km. Northern Peru.USCGS.
	ZE	esS		14	22				
	E	eSS		18	48				
	N	eLQ		26	-				
		F	08	05	-				Mag.: M = 5¼ (ESK)
	KEW	ZV,Z	iP	07	03	23			9230	Depth = 120 km.
		ZV	epP		03	54			
		E	eS		13	33	10	1.7(H)	
		E	esS		14	31			Mag.: M = 5¾-6(KEW)
3. ESK	Z'	iP	00	40	43.7				00 29 41.8; 47.1°N., 144.6°E.
									h = 353km. Sea of Okhotsk. USCGS.
3. ESK	Z'	eP	15	07	38.0	1	0.03		14 55 40.1; 44.6°N., 149.0°E.
									h = 20km. Kurile Islands. USCGS.
3. ESK	Z'Z	iP	17	43	49.3	1.1	0.07		17 36 09.5; 36.0°N., 50.6°E.
									h = 33km. Iran. USCGS.
4. ESK	Z'	iP	03	48	41.4				03 37 35.9; 54.9°N., 162.6°E.
									h = 49 km. Near Kamchatka.USCGS.
4. ESK	N	eL	21	46½	-				21 02 38.7; 6.8°N., 125.4°E.
	Z	M	22	04	-	26	1		h = 70km. Philippine Islands.
	N	M		04	-	26	1		USCGS.
	E	M		04	-	26	1		
		F		25	-				Mag.: M = 5½ (ESK).
5. ESK	Z'	iP	21	01	31.8				20 55 42.9; 35.1°N., 24.2°E.
	Z'	i		01	34.5				h = 10km. Crete. USCGS.
6. ESK	Z;Z	iP	10	05	14.8	7	1.5		
	NE	eS		15	25	36	2.8(H)		09 53 22.4; 44.4°N., 149.0°E.
	N	eSS		20	20				h = 60km. Kurile Islands. USCGS.
	E	eLQ		27	-				
	E	M		43½	-	20	2		
	N	M		44½	-	22	5½		
	Z	M		44½	-	22	6		
		F	11	35	-				Mag.: M = 5¾(ESK)

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
	KEW	ZV,Z	LP	10	05 32			9000	
		EN	eS		15 32				- " -
		E	eL		33 -				
		E	M		43 -	20	2½		
		N	M		43½ -	20	4		
			F	11	15 -				Mag.: M = 5¾(KEW).
7.	ESK	Z'	iP	15	01 04.2				14 49 13.4; 45.5°N., 150.3°E. h = 33km. Kurile Islands.
	KEW	ZV	iP	15	01 22				- " -
7.	ESK	N	eLQ	19	17½ -				18 37 43.7; 0.4°N., 100.1°E. h = 107km. Sumatra. USCGS.
		Z	M		40 -	21	3		
		N	M		42½ -	20	2½		
		E	M		42½ -	20	2½		
			F	20	25 -				Mag.: M = 5¾(ESK)
	KEW	N	eL	19	21 -				
		E	M		36½ -	22	3		- " -
		N	M		36½ -	22	2½		
			F	20	15 -				Mag.: M = 5¾(KEW)
8.	ESK	Z	iPKP1	03	04 00			18840	
		Z	ePKP2		05 18				PPM 16 sec. 2.0 μ
		ZE	ePP		09 06	16	4.3		
		Z	ePPP		13 14				
		ZEN	eSKSP		19 36				02 43 57; 49.0°S., 163.7°E. h = 33km. Auckland Islands region. USCGS.
		EN	eSS		30 08				
		EN	eLQ		54 -				
		Z	eLR	04	04 -				
		Z	M		16½ -	26	11		
		E	M		16½ -	25	4		
		N	M		16½ -	24	7		
		Z	M		24 -	21	11		
		N	M		25 -	20	6		
		E	M		26 -	19	2		
			F	05	40 -				Mag.: M = 6.2 (ESK)
8.	ESK	Z'	iP	10	41 48.6	1	0.08		Compression. 10 33 27.5; 29.7°N., 51.0°E. h = 40km. Iran. USCGS.
	KEW	ZV	eP	10	41 29				Compression.
9.	ESK	Z'	eP	08	12 55.2				08 05 48.8; 39.8°N., 48.4°E. h = 65km. Iran-USSR.border.USCGS.
		Z'	i		13 07.5				
9.	ESK	NE	eL	19	23 -				18 43 38.6; 19.3°N., 121.0°E. h = 33km. Philippine Islands. USCGS.
		E	M		41½ -	20	1		
		N	M		41½ -	20	1½		
		Z	M		41½ -	20	2		
			F	20	05 -				Mag.: M = 5½(ESK)
	KEW	NE	eL	19	32 -				
		N	M		42½ -	18	1½		
		E	M		43 -	17	1½		
			F	20	00 -				Mag.: M = 5½(KEW)
10.	ESK	Z'	eP	15	55 45.7	1.1	0.05		15 47 49.3; 32.6°N., 49.1°E. h = 28km. Iran. USCGS.
	KEW	ZV	eP	15	55 26				- " -

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
10. ESK	Z'	eP	19	30	12.7				19 26 40.8; 47.5°N., 23.6°W. h = 31km. Atlantic Ocean. USCGS.
KEW	ZV	eP	19	30	20				- " -
11. ESK	Z'	eP	08	11	44.8	1	0.03		08 01 26.1; 59.4°N., 144.6°W. h = 10km. Gulf of Alaska. USCGS.
	E	eLQ		28	-				
	E	M		36	-	20	2		
		F	09	15	-				Mag.: M = 5¼(ESK).
KEW	N	eS	08	21	03				
	EN	eL		33	-				- " -
	N	M		42	-	18	1½		
	E	M		42½	-	16	2½		
		F	09	10	-				Mag.: M = 5½(KEW)
11. ESK	Z'	eP	13	28	34.0				13 17 37.5; 56.6°N., 161.4°E. h = 33 km. Near Kamchatka. USCGS.
11. ESK	Z'	eP	15	51	14.4				15 40 18.0; 56.6°N., 161.4°E. h = 33km. Near Kamchatka. USCGS.
14. ESK	Z'	eP	04	08	28.3				03 56 06.0; 33.6°N., 131.6°E. h = 60 km. Kyushu, Japan. USCGS.
15. ESK	Z'	eP	06	40	45.5				06 33 23.5; 35.6°N., 45.7°E. h = 33km. Iran-Iraq border.USCGS.
15. ESK	Z'	eP	09	42	11.6				09 33 46.7; 29.9°N., 51.0°E. h = 33km. Iran. USCGS.
15. ESK	NE	eL	16	32	-				15 52 21.5; 24.0°N., 122.2°E. h = 42 km. Taiwan region. USCGS.
	Z	M		49½	-	20	2		
	N	M		49½	-	20	3½		
	E	M		49½	-	20	5		
		F	17	05	-				Mag.: M = 5¾-6 (ESK)
KEW	NE	eL	16	40	-				
	E	M		49	-	20	2½		- " -
	N	M		49½	-	20	3		
		F	17	05	-				Mag.: M = 5¾-6(KEW)
15. ESK	Z'	eP	20	08	31.2				20 03 49.6; 34.9°N., 05.2°W. h = 3 km. Morocco. USCGS.
16. ESK	Z'	eP	05	34	00.9				05 27 33.8; 39.8°N., 39.9°E. h = 39km. Turkey. USCGS.
16. ESK	Z'	iP	06	08	32.5	0.9	0.07		Compression. 05 59 57.4; 49.7°N., 78.0°E. h = 0km. Kazakh SSR. USCGS.
KEW	ZV	iP	06	08	36				- " -
16. ESK	Z'	eP	12	50	14.9				12 38 29.7; 47.4°N., 154.2°E. h = 33km. Kurile Islands. USCGS.
17. ESK	Z', Z	ePKP	08	34	35			14100	
	ZN	ePP		36	37	32	8.9		PPH 32 sec. 6.9 μ
	N	ePKS		37	53				
	N	ePS		46	35				
	Z	ePPS		47	52				08 15 39.3; 5.7°S., 150.7°E. h = 45km. New Britain. USCGS.
	EN	eSS		53	50				
	EN	eSSS		58	00				
	EN	eLQ	09	09	-				
	N	M		25	-	26	76		
	E	M		26	-	26	32		
	Z	M		26	-	26	82		

contd.

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
contd.									
17 ESK	N	M	09	31	-	22	45		
	E	M		31	-	22	29		
	Z	M		31	-	24	51		Mag.:M = 6.8(ESK)
		F	11	40	-				
KEW	ZV	ePKP	08	34	43				
	EN	ePKS		37	59				
	EN	ePPS		48	31				
	N	eSS		54	27				
	E	M	09	33	-	22	34		
	N	M		35	-	21	30		
	Z	M		35	-	21	9		
		F	11	15	-				Mag.: M = 7(KEW)
17 ESK	Z'	ePKP2	11	21	50.4				11 03 06.8; 23.4°S., 179.9°W. h = 549 km. South of Fiji Islands. USCGS.
18 ESK	Z	ePP	14	55	44				
	N	ePS	15	05	35				
	EN	eSS		13	07				
	EN	eLQ		28½	-				14 34 54.5; 6.0°S., 148.2°E. h = 49 km. New Britain region. USCGS.
	Z	eLR		34½	-				
	Z	M		42½	-	30	7		
	E	M		42½	-	29	4		
	N	M		42½	-	30	8		
	Z	M		51½	-	21	5		
	E	M		52	-	20	3		
	N	M		52	-	22	4		
		F	17	00	-				Mag.: M = 6¼(ESK)
KEW	NE	eSS	15	13	19				
	N	M		48½	-	24	4		
	E	M		49	-	24	8		
		F	16	55	-				Mag.: M = 6¼(KEW)
18 ESK	Z'	ePKP	22	40	36.4				22 21 01.9; 20.2°S., 174.1°W. h = 33km. Tonga Islands.USCGS.
19 ESK	Z	eP	23	51	08			14000	
	Z'	ePKP		54	13				
	ZNE	ePP		56	10	28	10.7		PPH 28 sec. 8.0 μ
	ZNE	ePKS		57	30				
	N	eSKS	24	01	32				23 35 06.0; 6.0°S., 150.8°E. h = 3km. New Britain region. USCGS.
	EN	eSKKS		03	06				
	ZNE	ePS		06	15				
	ZNE	ePPS		07	48				
	EN	eSS		13	50				
	E	eLQ		28	-				
	Z	M		49½	-	25	60		
	N	M		49½	-	25	37		
	E	M		49½	-	25	52		
		F	03	30	-				Mag.: M = 6.9(ESK)
KEW	ZV,Z	ePKP	23	54	17				
	ZV,ZNE	ePKS		57	35				- " -
	N	eSKKS	24	03	33				
	EN	ePPS		08	05				
	EN	eSS		14	20				
	EN	eLQ		29½	-				
	Z	M		53	-	21	20		
	E	M		53	-	20	49		
	N	M		53	-	21	58		Mag.: M = 7(KEW)
		F	03	15	-				

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SEISMOLOGICAL BULLETIN

NOVEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
20 ESK	Z'	eP	09	59	54.7				09 50 13.5; 0.2°S., 18.2°W. h = 33km. Mid-Atlantic Ridge.USCGS.
20 ESK	Z'	eP	23	45	05.5				23 33 08.9; 44.6°N., 149.7°E. h = 33km. Kurile Islands. USCGS.
	N	eSS	24	00	22				
	Z	M		25	-	20	5		
	N	M		25	-	20	5		
	E	M		25	-	20	1½		
		F	25	00	-				Mag.: M = 5¾(ESK)
KEW	ZV	eP	23	45	22				
	EN	eL	24	13	-				- " -
	E	M		23½	-	20	3½		
	N	M		23½	-	20	3½		
		F		55	-				Mag.: M = 5¾(ESK)
21 ESK	Z'	eP	00	03	32.2				23 51 35.4; 44.6°N., 149.5°E. h = 33 km. Kurile Islands. USCGS.
KEW	ZV	eP	00	03	49				- " -
22.ESK	Z'	eP	00	10	40.5				00 02 33.3; 24.0°N., 45.4°W. h = 33km. North Atlantic Ridge. USCGS.
	E	M		22½	-	20	1		
	N	M		22½	-	20	2½		
	Z	M		24	-	20	2		
		F		40	-				Mag.: M = 5(ESK)
24 ESK	N	ePP	12	58	40	20	1.7	11000	12 40 51.4; 13.1°N., 124.7°E. h = 5 km. Luzon, Philippine Islands. USCGS.
	N	eSKS	13	05	13				
	N	eS		06	00	26	6.8		
	N	ePS		07	33				
	N	eSS		13	00				E & Z comp. U/S.
	N	eLQ		22	-				
	N	M		39	-	19	22		
		F	14	50	-				Mag.: M = 6¾ (ESK)
KEW	E	eSKS	13	05	17				
	NE	eS		06	13	22	3.8(H)		
	NE	ePS		07	43				
	E	M		44½	-	18	19		
	N	M		44½	-	17	17		
	Z	M		44½	-	17	8		
		F	14	55	-				Mag.:,M = 6.6(KEW)
25 ESK	Z'	eP	08	44	26.8				08 32 59.0; 26.6°N., 96.3°E. h = 80km. Burma. USCGS.
26 KEW	ZV	ePP	10	37	32			9900	10 21 07.2; 24.9°N., 122.0°E. h = 33km. Taiwan. USCGS.
	N	eS		44	44				
	EN	eL		58	-				
	E	M	11	14½	-	20	17		
	N	M		16½	-	21	17		
		F	12	00	-				Mag.: M = 6½(KEW)
27 ESK	Z'	eP	05	47	54				05 36 01.5; 45.2°N., 150.9°E. h = 33km. Kurile Islands. USCGS.
KEW	ZV	iP	05	48	12				- " -
27 ESK	Z'	eP	07	57	02.6				07 47 07.6; 62.6°N., 151.5°W. h = 113km. Alaska. USCGS.
28 ESK	Z'	eP	16	53	01.3				16 41 33.4; 7.7°S., 71.2°W. h = 626km. Brazil. USCGS.
28 ESK	Z'	eP	17	00	57.9				16 49 30.3; 8.0°S., 71.4°W. h = 655km. Brazil. USCGS.

107 Wt.29264 BM4113 200 7/63 KPLtd G892

M.O. 750

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

NOVEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
KEW	ZV	eP	17	00	58				- " -
30 ESK	Z'	eP	04	15	35.4				04 11 42.9; 71.8°N., 2.7°W. h = 33km. Jan Mayen Island. USCGS.
30 ESK	Z'	eP	12	40	34.0			9900	
	Z'	e		40	44.9				
	N	eS		51	18	30	7.5		12 27 38.6; 6.8°N., 94.8°E. h = 33 km. Nicobar Islands region. USCGS.
	N	eSS		57	12				
	N	eLQ	13	04	-				
	Z	eLR		10	-				
	E	M		24½	-	23	8½		
	N	M		25½	-	24	9		
	Z	M		25½	-	22	13		
		F	15	25	-				Mag.: M = 6.1(ESK)
KEW	ZV	eP	12	40	26			9760	
	EN	eS		51	04	18	3.6		- " -
	N	eL	13	05	-				
	N	M		26½	-	20	6½		
	E	M		27½	-	20	10½		
		F	15	10	-				Mag.: M = 6.0(KEW)

M.O. 750

AIR MINISTRY, METEOROLOGICAL OFFICE, LONDON.

KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND.

SEISMOLOGICAL BULLETIN FOR DECEMBER 1964

Lat. 51° 28′ 6″ N, Long. 0° 18′ 47″ W, Height above M.S.L. 5m.

LITHOLOGIC FOUNDATION : RIVER GRAVEL RESTING ON LONDON CLAY.

INSTRUMENTS : (I) GALITZIN APERIODIC SEISMOGRAPHS, PHOTO-GALVANOMETRIC REGISTRATION, THREE COMPONENTS.

CONSTANTS : FOR NOTATION SEE FÜRST B. GALITZIN " VORLESUNGEN ÜBER SEISMOMETRIE " (LEIPZIG, 1914) OR G. W. WALKER " MODERN SEISMOLOGY " (LONDON, 1913).

COMPONENT.	DATE FROM WHICH CONSTANTS APPLY.	GALVANOMETER FREE PERIOD T_1. sec.	PENDULUM FREE PERIOD T. sec.	DAMPING CONSTANT μ^2.	$\frac{Ak}{\pi l}$ sec.$^{-1}$
N.	1 October 1960	21.3	21.4	+0.01	64.0
E.	14 July 1964	20.7	20.7	0.00	53.0
Z.	1 September 1960	11.1	9.1	+0.01	156.0

(II) VERTICAL SEISMOGRAPH, PERIOD 1·5 SECS., DIRECT OPTICAL REGISTRATION (ZV.).

TIME SERVICE : MINUTE TIME-MARKS ARE MADE ELECTROMAGNETICALLY BY CONTACT CLOCK.
TIME COMPARISONS ARE MADE DAILY WITH SIGNALS FROM GREENWICH OBSERVATORY.
SEISMOMETRIC READINGS CAN BE DETERMINED TO THE NEAREST SECOND.

The Kew Observatory Seismological Bulletin now also contains the readings from the records obtained at:

ESKDALEMUIR Observatory, Langholm, Dumfriesshire, Scotland

Lat. 55° 19′ 00°N., Long. 3° 12′ 18′W. Height above M.S.L. 243 m.

Foundation: Llandovery shales (late Silurian)

Instruments: World-Wide Standardised Seismographs (USCGS)

Constants:

Instrument	Comp	FREE PERIODS Pendulum sec.	FREE PERIODS Galvanometer sec.	Magnification
SPRENGNETHER WWSS	N	30.0	100	750 at 30 sec.
	E	30.0	100	
	Z	30.0	100	
BENIOFF WWSS	N′	1.0	0.75	12500 at 1 sec.
	E′	1.0	0.75	
	Z′	1.0	0.75	

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

DECEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
2. ESK	N	eS	08	33	38				
	EN	eLQ		36½	-				08 20 45.6; 30.6°N., 42.0°W.
	Z	eLR		38	-				h = 33 km. North Atlantic Ridge.
	Z	M		39½	-	18	3		USCGS.
	N	M		39½	-	18	1		
	E	M		39½	-	18	1½		
		F	09	00	-				Mag.: M = 4¾(ESK)
KEW	NE	eLQ	08	36½	-				
	N	M		39	-	20	3		
	E	M		39½	-	20	2½		
		F	09	00	-				Mag.: M = 5(KEW)
2. ESK	Z'	eP	08	32	12.1				08 21 43.3; 29.5°N., 81.3°E.
									h = 23 km. Nepal. USCGS.
2. ESK	Z'	iP	13	29	42.0	1	0.09		13 18 29.0; 53.8°N., 165.4°W.
									h = 35 km. Fox Islands. USCGS.
3. ESK	N	eLQ	04	29	-				03 50 01.2; 15.0°S., 66.8°E.
	Z	M		46½	-	22	1½		h = 46 km. Mid-Indian Ridge.
	E	M		46½	-	22	1		USCGS.
	N	M		47½	-	22	2		
		F	05	20	-				Mag.: M = 5½(ESK)
5. ESK	Z'	ePKP	05	33	18				05 14 39.6; 20.9°S., 178.5°W.
									h = 529 km. Fiji Islands. USCGS.
5. ESK	Z'	eP	22	42	56.6				22 31 44.3; 54.0°N., 161.5°E.
									h = 38 km. Near Kamchatka.USCGS.
5. ESK	Z'	eP	24	02	52.6				23 51 38.8; 53.9°N., 161.5°E.
									h = 38 km. Near Kamchatka.USCGS.
5. ESK	Z'	eP	24	07	12.1				23 55 59.2; 54.0°N., 161.5°E.
									h = 39 km. Near Kamchatka. USCGS.
6. ESK	NE	eL	05	23	-				04 27 16; 2.3°S., 138.3°E.
	Z	M		40	-	20	3½		h = 33 km. New Guinea. USCGS.
	N	M		40	-	20	1½		
	E	M		40	-	20	1½		
		F		50	-				Mag.: M = 5½-5¾(ESK)
7. ESK	Z'	ePKP	09	17	40.3				08 58 43.8., 5.4°S., 151.3°E.
	EN	eSS		37	10				h = 54 km.
	E	eLQ		51	-				New Britain Region. USCGS.
	Z	M	10	13½	-	24	2		
	N	M		13½	-	24	1		
	E	M		13½	-	24	1½		Mag.: M = 5½-5¾(ESK)
		F	11	10	-				
KEW	e	e	09	35	20				
	N	M	10	16	-	20	2½		
	E	M		17	-	20	2		
		F		50	-				Mag.: M = 5¾-6(KEW)

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

DECEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
7. ESK	Z	iP	18	41	38.1				18 30 17; 51.7°N., 158.0°E. h = 50 km. Near Kamchatka. USCGS.
8. ESK	NE	eL	18	25	-				17 49 46.3; 34.7°N., 139.2°E. h = 31 km. Near Honshu, Japan. USCGS. Mag.: M = 5½(ESK)
	N	M		43½	-	18	2½		
	E	M		43½	-	18	1½		
	Z	M		43½	-	18	4½		
		F	19	15	-				
KEW	NE	eL	18	30	-				
	E	M		46	-	18	2		
	N	M		46½	-	18	4		Mag.: M = 5¾(KEW)
		F	19	10	-				
9. ESK	Z'	eP	06	54	30.2				06 42 32; 43.1°N., 145.2°E. h = 39 km. Hokkaido, Japan. USCGS.
9. ESK	Z'	iP	13	48	12.1				13 35 42.4; 27.5°S., 63.2°W. h = 586 km. Santiago, Argentina. USCGS.
	Z'	ePP		52	16.6				
KEW	ZV	iP	13	48	9				
9. ESK	Z'	eP	18	33	23.9				18 28 38.2; 41.1°N., 21.0°E. h = 30 km. Albania-Yugoslavia border. USCGS.
KEW	ZV	eP	18	32	47				
9. ESK	Z'	eP	19	11	03.2				19 06 16.9. 40.9°N., 20.6°E. h = 23 km. Greece-Albania border. USCGS.
10. ESK	Z;Z	iP	15	23	09.4	11	3.5	8800	15 11 05.5; 40.4°N., 138.9°E. h = 33 km. E. Sea of Japan. USCGS.
	Z'	i		23	23.9				
	Z	ePP		26	16	11	2.9		
	ZEN	eS		33	06	19	3.4(H)		
	N	eSS		38	20				
	EN	eLQ		44	-				
	Z	eLR		49	-				
	Z	M		56	-	22	7½		Mag.: M = 6.0(ESK)
	N	M		56	-	22	5½		
	E	M		56½	-	20	8		
	Z	M	16	01½	-	18	12½		
	N	M		01½	-	16	9½		
	E	M		01½	-	17	7		
		F	17	20	-				
KEW	ZV	eP	15	23	22			9150	
	ZV	i		23	38				
	EN	eS		33	35	10	4.0(H)		
	EN	eL		47	-				
	E	M		59½	-	18	8		Mag.: M = 6.2(KEW)
	N	M		59½	-	18	6½		
		F	17	05	-				
11. ESK	Z'	eP	16	16	00.8				16 04 58.2; 38.9°N., 130.0°E. h = 550 km. Sea of Japan. USCGS.
KEW	ZV	iP	16	16	12				
13. ESK	Z'	eP	00	42	07.8				00 32 09.4; 65.2°N., 164.9°W. h = 33 km. Alaska. USCGS.

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DECEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
13. ESK	Z'	eP	00	43	27.5				00 33 24.7; 64.9°N., 165.7°W. h = 15 km. Alaska. USCGS.
13. ESK	NE	eL	13	55	-				13 15 49.8; 20.1°N., 122.0°E. h = 33 km. Philippine Islands. USCGS. Mag.: M = 6-6¼(ESK)
	N	M	14	08½	-	20	6½		
	E	M		08½	-	20	7½		
		F		30	-				
KEW	NE	eL	13	55	-				
	N	M	14	08	-	20	5½		
	E	M		08	-	20	5½		Mag.: M = 6-6¼(KEW)
		F		35	-				
14. ESK	N	ePS	02	27	20				01 59 05.6; 54.3°S., 2.4°W. h = 33 km. S. Atlantic Ridge. USCGS.
	NE	eSS		33	20				
	E	eLQ		44	-				
	ZN	eLR		50	-				
	Z	M	03	03½	-	19	7½		
	N	M		03½	-	19	4		Mag.: M = 6-6¼(ESK)
	E	M		03½	-	19	5½		
		F		45	-				
KEW	N	eSS	02	32	28				
	EN	eLQ		43	-				
	N	M		55	-	22	14		
	E	M		58½	-	18	6		
	N	M		59	-	18	5½		Mag.: M = 6¼(KEW)
		F	03	50	-				
15. ESK	Z'	eP	03	52	26.3				03 40 16.5; 20.8°N., 106.6°W. h = 33 km. Off coast of Jalisco, Mexico. USCGS.
15. ESK	Z'	eP	12	25	07.9			8580	12 13 25.8; 14.7°N., 91.7°W. h = 118 km. Guatemala. USCGS.
	E	eS		34	48				
	N	eLQ		45½	-				
	ZNE	eLR		49½	-				
	Z	M		57½	-	22	2½		
	E	M		57½	-	22	2		Mag.: M = 5½(ESK)
	N	M		57½	-	22	1		
		F	13	25	-				
KEW	N	eL	12	46	-				
	E	M		58½	-	20	2½		
	N	M		58½	-	20	1		Mag.: M = 5½(KEW)
		F	13	20	-				
15. ESK	Z'	eP	21	08	49.2				21 03 15.9; 40.0°N., 28.9°E. h = 33km. Turkey. USCGS.
15. ESK	Z'	eP	22	45	39.1				22 34 07.7; 51.0°N., 169.6°W. h = 33 km. Fox Islands, Aleutian Islands. USCGS.
17. ESK	Z'	eP	05	30	28.8				05 18 34.8; 45.4°N., 150.1°E. h = 17 km. Kurile Islands. USCGS.
17. ESK	Z;Z	eP	23	56	15			8200	23 44 46.2; 51.4°N., 177.9°W. h = 57km. Andreanof Islands. USCGS.
	NE	eS	24	05	40				
	ZN	eLR		20	-				
	E	M		36	-	20	1		
	N	M		36	-	20	½		Mag.: M = 5(ESK)
	Z	M		36	-	20	1		
		F	25	15	-				

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SEISMOLOGICAL BULLETIN

DECEMBER 1964

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
17. KEW	NE	eL	24	20	-				
	N	M		36	-	20	1		
	E	M		36	-	20	1		Mag.: M = 5-5¼(KEW)
		F	25	10	-				
21. ESK	Z'	eP	17	46	39.8				17 36 29.0; 60.5°N., 146.8°W. h = 43 km. S. Alaska. USCGS.
22. ESK	Z'	eP	00	36	24.9				00 24 48.7; 9.5°S., 71.3°W. h = 614 km. Peru-Brazil border. USCGS.
22. ESK	Z'	iP	01	05	00.9				00 46 33; 21.3°S., 179.3°W. h = 663 km. Fiji Islands. USCGS.
22. ESK	Z;Z	eP	04	45	30.0	16	1.4	5640	04 36 34.7; 28.2°N., 57.0°E. h = 42 km. S. Iran. USCGS.
	Z'	epP		45	39.4				
	N	eS		52	42	21	2.3(H)		
	N	eScS		55	14				
	N	eLQ		58½	-				
	N	M	05	08½	-	24	6		Mag.: M = 5.3(ESK)
	E	M		10½	-	21	5		
	Z	M		10½	-	21	9		
		F	06	00	-				
KEW	Z,ZV	iP	04	45	13	4	1.2	5450	
	N	eS		52	14	16	2.4		
	N	eL	05	00	-				
	E	M		08	-	20	4½		Mag.: M = 5.6(KEW)
	N	M		10½	-	18	4½		
		F		50	-				
22. ESK	Z'	eP	08	11	16.8			6780	08 01 12.6; 18.4°N., 68.8°W. h = 115 km. Mona Passage. USCGS.
	E	eS		19	24				
	E	eSS		23	20				
	N	eL		27	-				
	Z	M		34	-	20	2		
	E	M		34	-	20	1		
		F		45	-				
22. ESK	Z'	ePKP	12	16	45.7				11 58 10.1; 22.2°S., 179.7°W. h = 600 km. S. of Fiji Islands. USCGS.
22. ESK	N	eS	21	16	08				20 54 35.3; 31.9°N., 117.1°W. h = 14 km. Off W. coast of Baja, California. USCGS.
	N	eLQ		26½	-				
	N	M		35½	-	20	3½		
	Z	M		38½	-	18	7		Mag.: M = 5¾(ESK)
		F	22	20	-				
KEW	N	eL	21	31	-				
	E	M		40½	-	20	3		
	N	M		41	-	18	4		
		F	22	15	-				Mag.: M = 5¾(KEW)
23. ESK	Z'	eP	20	00	38.8				19 47 59.3; 30.3°N., 131.1°E. h = 33km. Kyushu, Japan. USCGS.
	NE	eL		29	-				
	N	M		40	-	22	1½		
	E	M		40½	-	20	1½		
	Z	M		40½	-	22	2½		Mag.: M = 5½(ESK)
		F	21	05	-				

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KEW OBSERVATORY, RICHMOND, SURREY, ENGLAND

SEISMOLOGICAL BULLETIN

DECEMBER 19 64

DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
23. KEW	NE	eL	20	33	-				
	E	M		45	-	20	2		
	N	M		45	-	20	1½		Mag.: M = 5½(KEW)
		F	21	05	-				
24. ESK	Z'	eP	01	17	36.0				Depth = 210 km.
	Z'	epP		18	21.7				01 08 37.7; 36.2°N., 70.9°E.
									h = 158 km. Hindu Kush Region.
									USCGS.
KEW	ZV	eP	01	17	28				Depth = 210 km.
	ZV	epP		18	15				
24. ESK	Z'	ePKP	19	04	37.1				18 45 45.5; 4.4°S., 153.1°E.
									h = 93 km. New Ireland region.
									USCGS.
KEW	ZV	iPKP	19	04	42				
26. ESK	Z'	eP	14	41	37.9			8000	Depth = 140 km.
	Z'	ipP		42	13.1	1.8	0.37		14 30 29.1; 51.8°N., 156.8°E.
	EN	eS		50	46	22	2.1		h = 136 km. Kamchatka. USCGS.
	EN	ePS		51	28				
	E	eLQ		59	-				Mag.: M = 5.1(ESK)
	Z	eLR	15	05	-				
		F		45	-				
26. KEW	ZV	eP	14	41	55			8370	Depth = 146 km.
	ZV	ipP		42	31				
	E	eS		51	21	14	2		
	E	e		52	25				Mag.: M = 5¼(KEW)
27. ESK	EN	eL	18	30	-				17 43 21.4; 12.9°N., 125.4°E.
	E	M		38½	-	22	3		h = 33 km. Philippine Islands.
	N	M		38½	-	22	1½		USCGS.
		F	19	20	-				Mag.: M = 5¾(ESK)
KEW	NE	eL	18	31	-				
	N	M		47	-	20	3		
	E	M		47½	-	18	3½		
		F	19	20	-				Mag.: M = 5¾-6(KEW)
28. ESK	Z;Z	$ePKP_1$	16	34	43.3				Depth = 599 km.
	Z;Z	$iPKP_2$		34	46.5	0.9	0.56		
	Z'	i		34	50.5				16 16 11.0; 22.1°S., 179.6°W.
	ZN	ipPKP1		37	02				h = 611 km. S. of Fiji Islands.
	Z	isPKP1		58	04				USCGS.
	Z	epPP		40	20	20	2.7		pPPN 20 sec. 1.4 μ
	Z	e		41	18				
	E	eSS		56	23				
	E	esSS	17	00	14				Mag.: M = 5¾(ESK)
	E	eSSS		02	11				
		F	18	20	-				
KEW	ZV,Z	ePKP1	16	34	48				Depth = 610 km.
	ZV,Z	iPKP2		34	54				
	ZV	i		35	04				
	ZV,Z	epPKP1		37	16				
	E	eSS		57	08				
		F	18	15	-				

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DATE	COMPT.	PHASE	G.M.T. h.	m.	s.	PERIOD sec.	AMPLITUDE μ	Δ km.	REMARKS
29. ESK	Z'	eP	06	50	38.1				06 39 08.0; 51.5°N., 174.8°W. h = 33 km. Andreanof Islands. USCGS.
30. ESK	Z'	eP	15	39	47.5				15 27 25.8; 31.3°N., 138.8°E. h = 261 km. S. of Honshu. USCGS.
KEW	ZV	iP	15	39	57				
30. ESK	Z'	ePKP	21	49	41.2				21 30 58.8; 23.3°S., 179.9°W. h = 547 km. S. of Fiji Islands. USCGS.
31. ESK	Z'	eP	16	23	43.8	0.9	0.14		Depth = 96 km.
	Z'	i		23	47.1				16 18 01.7; 35.8°N., 25.6°E.
	Z'	i		23	59.1				h = 86 km. Crete. USCGS.
	Z'	i(pP)		24	04.8				
	Z'	e		24	09.1				Mag.: M = 5(ESK)
KEW	ZV	eP	16	23	11				