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SEISMIC RECORDS AT DE BILT

37

1949

TE VERKRIJGEN BIJ HET
STAATSDRUKKERIJ- EN UITGEVERIJBEDRIJF
'S-GRAVENHAGE

PREFACE

This seismic Yearbook was composed under the supervision of Dr. J. Veldkamp, director of the Geophysical Section. The records have been reduced by Mr. J. Oldeman, scientific assistant.

The Director in Chief of the Royal Netherlands Meteorological Institute,
Ir. C. J. Warners.

DE BILT, October 1953.

INTRODUCTION

SEISMOGRAPHIC STATION DE BILT

The geographic coordinates of the seismographic station are: 52° 6'.1 N and 5° 10'.6 E. The instruments are placed at a height of 3 m above mean sea-level on a subsoil consisting of sand (diluvial deposits).

The instruments are:

a set of seismographs (two horizontal and one vertical) with galvanometric recording according to GALITZIN,

one astatic horizontal seismograph according to WIECHERT, M = 200 kg,

two horizontal pendulums according to BOSCH, M = 25 kg.

THE GALITZIN SEISMOGRAPHS AT DE BILT. Below are given: the period of the galvanometer T1, the reduced pendulum length l, the distance Al between the mirror of the galvanometer and the recording paper, and the rough values for the natural period T of the undamped pendulum, of the damping constant μ and of the multiplying factor k for the year 1949.

	NS comp.	EW comp.	Z comp.
Period of galvanometer T1	24.43 sec	24.96 sec	12.0 sec
Reduced length of pendulum l	123 mm	123 mm	406 mm
Distance Al	1380 mm	1380 mm	1380 mm
Period of pendulum T	25 sec	25 sec	12 sec
Damping constant μ	0.0	0.0	0.0
Multiplying factor k	11.0	11.0	175

THE WIECHERT AND BOSCH SEISMOGRAPHS AT DE BILT. The mean values of the natural period of the undamped pendulum T, of the damping ratio ε and of the static magnification V are for the year 1949:

	T	ε	V
WIECHERT (NS comp.)	5.0 sec	4	170
,, (EW comp.)	5.0 sec	4	170
BOSCH (NS comp.)	18.0 sec	4	20
,, (EW comp.)	18.0 sec	4	20

SEISMOGRAPHIC STATION HEERLEN

The geopgraphic coordinates of the seismagraphic station are: 50° 53'.0 N and 5° 59'.0 E.

The instrument, a horizontal seismograph, M = 450 kg, is placed at a height of 100 m above mean sea-level on a subsoil consisting of loess.

The mean values of the constants are for the year 1949:

T	ε	V	V max.	T max.
2	3	400	600	2

EXPLANATION OF THE TABLES

The data given in this Yearbook have generally been obtained from the GALITZIN records. The velocity of the recording paper is 30 mm per minute, allowing a good time-accuracy. Only when the earthquake was extraordinarily strong, so that the GALITZIN records could not be analyzed, the records of the WIECHERT and BOSCH seismographs were used. The velocity of the paper of these seismographs is 10 mm and 15 mm per minute respectively. Whenever the WIECHERT and BOSCH records were used, this has been mentioned in the column "remarks".

The data from the seismograph at Heerlen are mentioned in a few cases.

The time is Greenwich mean time.

In the column "direction" + means an upward movement of the soil (compression), — means a downward movement (dilatation). Uncertain data have been given in parentheses. The following symbols were used for the phases.

P = normal first phase, or first longitudinal tremor.
pP = P-wave once reflected at the earth's surface near the epicenter.
PP = P-wave reflected halfway between epicenter and station.
PPP = P-wave two times reflected at the earth's surface.
PPPP = P-wave three times reflected.
S = second phase, arrival of the transversal tremor.
sS = S-wave reflected at the earth's surface near the epicenter.
PS = wave changed from longitudinal to transversal oscillation through reflection at the earth's surface.
PPS = wave twice reflected, having been transversal on one branch of the path.
SS = S-wave reflected halfway between epicenter and station.
SSS = S-wave two times reflected at the earth's surface.

SSSS = S-wave three times reflected at the earth's surface.
PcP = P-wave reflected at the core boundary.
ScS = S-wave reflected at the core boundary.
P′ = PKP = wave having penetrated the core.
S′ = SKS = transversal wave, having been longitudinal within the core.
PKS = alternating wave having penetrated the core.
pP′ = P′-wave reflected near the epicenter.
sS′ = S′-wave reflected near the epicenter.
SKKS = alternating wave which has been reflected within the core.
L = long waves or surface waves.
M = maximum of the surface waves.
L′ = surface waves travelling around the major arc.
M′ = maximum of these waves.
i = sudden beginning of the phase.
e = gradual beginning of the phase.
F = end of discernable movement.
H = time of the shock at point of origin.
h = depth of the origin.
△ = distance of epicenter.

The indices H, N, E, and Z refer to the horizontal, north-south, east-west and vertical components of the movement.

The distance of epicenter and the depth of origin have been calculated by means of curves constructed with the aid of the time tables of Jeffreys and Bullen (1940).

The data given in the column "amplitude" are the maximal amplitudes measured from the medium line. The amplitudes have been calculated by means of the formula:

$$V = \frac{A1\ k\ T_b}{\pi\ 1} \cdot \frac{1}{\left\{1 + \left(\frac{T_b}{T}\right)^2\right\}^2}$$

Here A1 is the distance between galvanometer mirror and recording paper, k is the multiplying factor, T_b the period of the wave, 1 the reduced length of the pendulum, T the free period of the undamped seismograph, and V the magnification. The period of the galvanometer is assumed to be equal to the free period of the undamped seismograph.

For the horizontal components of the Galitzin records the following mean values were used: k = 11,0 and T = 24.5 sec, and for the vertical component k = 175 and T = 12.0 sec.

Whenever it was possible the amplitudes and periods of the first P- and S-waves have been given. As the movement of these waves is irregular in general, the accuracy of these data is small. The amplitudes of the maxima of L-waves have been calculated in case of very strong earthquakes.

The amplitudes have been omitted when the oscillations were very irregular.

The seismological bulletins of the following stations were available: Alicante, Almeria, Athens, Batavia, BCIS (Bureau Central International Seismologique), Beograd, Berkeley, Bogota, Bucarest, Budapest, Firenze, Granada, Graz, Helsinki, Helwan, Istanbul, John Carroll University (Cleveland), JSA (Jesuit Seismological Association), Kew, Ksara, La Paz, La Plata, Harvard University, Ottawa, Paris, Pasadena, Perth, Pittsburgh, Poona, Praha, Prato, Riverview N.S.W., Roma, Santiago (Chile), Stuttgart, Tamanrasset, Toledo, Trieste, Uppsala, USCGS (United States Coast and Geodetic Survey), Wellington (New Zealand), Western Samoa, Zagreb, Zurich.

THE MICROSEISMIC ACTIVITY

The table on page VII shows the character of the microseismic activity (see also 1915 p. 101 and 1916 p. 101). The used numbers 0, 1, 2 and 3 mean:

0 very weak and weak
1 moderate
2 strong
3 very strong

For measuring the microseismic activity the records of the GALITZIN seismograph were used. In the table below the amplitudes of the oscillations (measured from the medium line) and the corresponding amplitudes of the movement of the surface are given.

Character	Ampl. record	Ampl. surface
0	0—½ mm	0—1¼ μ
1	½—2 „	1¼—5 „
2	2—4 „	5—10 „
3	> 4 „	> 10 „

CHARACTER OF THE MICROSEISMIC MOVEMENT

Date 1949	Jan.	Febr.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	3	1	3, 2	0	0	0	1, 0	1	0	1, 2, 1	1, 0	1, 2
2	3	1	2, 1	0, 1	0, 1	0	0	1, 2	0	1, 2	0, 2	2, 1
3	3, 2	1, 2	1	1, 2	1, 0	0	0	2	0	2, 3, 2	2, 3	1, 2
4	2	2	1, 0	2, 3	0	0	0	2, 1	0, 1	2	3, 2	2, 3, 2
5	2	2	0, 1	3, 2	0, 1	0, 1	0, 1	1, 2	1, 0	2, 1	2	2, 1
6	2	2	1	2	1	1, 2	1	2	0	1, 2, 1	2	1
7	2, 3	2, 3	1	2	1	2, 1	1, 0	2, 1	0	1, 2, 1	2, 1	1,2
8	3, 2	3	1, 2, 1	2	1	1, 0	0	1	0, 1	1, 0	1	2
9	2, 1	3	1	2, 1	1, 0	0	0	1, 0	1, 0	0, 1	1, 2	2
10	1, 2	3, 2	1, 0	1	0	0	0	0	0	1, 2, 1	2, 1	2, 1
11	2, 3	2	0, 1	1	0	0	0	0	0	1, 2	1	1, 0
12	3,2	2, 3	1, 2	1	0	0	0	0	0	2, 1	1, 2	0, 1
13	2	3, 2	2, 3, 2	1	0	0, 1	0	0	0	1, 2, 1	2, 1	1
14	2, 3	2	2	1	0	1, 0	0	0, 1, 0	0, 2, 1	1, 2, 1	1	1, 2
15	3	2	2	1, 0	0	0	0	0	1, 0	1, 2, 1	1	2, 1
16	3	2	2, 1	0	0	0	0	0	0	1, 2	1, 2	1
17	3	2	1	0, 1	0	0, 1	0	0	0	2, 3, 2	2, 1	1, 2
18	3, 2	2	1, 2, 1	1, 2, 1	0	1	0	0	0	2, 3	1	2, 3
19	2, 3	2, 3	1, 0	1, 2	0, 1	1, 0	0	0	0	3	1	3
20	3	3	0, 1	2, 1	1	0	0	0	0	3	1	3, 2
21	3, 2	3	1	1	1	0	0	0	0	3, 2	1, 2	2, 1
22	2	3	1, 2	1	1, 0	0	0	0	0	2, 3, 2	2	1
23	2	3, 2	2, 1	1, 2, 1	0	0	0	0	0	2, 3	2	1, 2
24	2, 3	2	1, 0	1	0	0	0	0	0	3, 2	2, 1	2, 1
25	3	2, 1, 2	0	1, 2, 1	0	0	0	0	0, 1	2, 3	1	1, 2
26	3,2	2, 3	0	1	1, 0, 1	0	0	0	1, 0	3	1, 0	2, 1
27	2, 3, 2	3, 2	0	1, 2	1	0	0	0	0, 1	3	0, 1	1
28	2	2, 3	0	2, 1	1	0	0	0	1, 0	3, 2	1, 0	1
29	2		0	1	1, 0	0	0, 1	0, 1	0, 1	2, 3, 1	0, 1	1, 2
30	2, 1		0	1, 0	0	0, 1	1, 0	1, 0	1	1, 2, 1	1	2, 1
31	1		0		0		0, 1	0		1, 2, 1		1

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Jan. 2 (1)	eL	13 20				(1) Disturbed by microseisms. BCIS: 15° N 64° E, H. $12^h50.4^m$. USCGS: 26° N 64½° E, H. $12^h50^m22^s$, near coast of Baluchistan.
	F	14 00				
Jan. 3 (2)	eL	18 37				(2) Disturbed by microseisms. USCGS: H. $18^h11^m13^s$, Eastern Turkistan.
	F	18 45				
Jan. 4 (3)	eL	3 06				(3) Disturbed by microseisms. USCGS: 26° N 125° E, H. $2^h21^m16^s$, East China Sea.
	F	3 30				
Jan. 7 (4)	eL	18 23				(4) Disturbed by microseisms. F in next shock. BCIS: South Pacific Ocean.
Jan. 7 (5)	eL	18 55				(5) Disturbed by microseisms. Riverview: aftershock of (4).
	F	19 20				
Jan. 9 (6)	eL	17 21				(6) Disturbed by microseisms. USCGS: H. $16^h35^m30^s$, Ryukyu Islands region.
	F	17 50				
Jan. 13 (7)	ePKP	9 06.4				(7) Disturbed by microseisms. BCIS: 25° S 179° E, H. $8^h47.5^m$, h = about 600 km. USCGS: 25½° S 178° E, H. $8^h47^m34^s$, h = about 680 km. JSA: 24°.7 S 176°.3 E, H. $8^h47^m28^s$, h = about 650 km. Fiji Islands region.
	epPKP	9 08.9				
	eE	9 23.0				
	eSS	9 30				
	F	10 00				
Jan. 14 (8)	eL	3 00				(8) Disturbed by microseisms. USCGS: 33° N 121° E, H. $2^h17^m45^s$. Yellow Sea. Felt at Nanking and in Lower Yantze Valley.
	F	3 20				
Jan. 14 (9)	iP	15 58 26	—			(9) Disturbed by microseisms. BCIS: 39°.3 N 26°.2 E, H. $15^h53.8^m$. USCGS: 39° N 26° E, H. $15^h53^m50^s$, Aegean Sea region.
	eS	16 02 02				
	eL	16 03 20				
	F	16 25				
Jan. 19 (10)	eL	15 40				(10) Disturbed by microseisms. BCIS: H. $15^h00.3^m$. USCGS: 24° N 122½° E, H. $14^h59^m59^s$, off east coast of Formosa.
	F	16 30				
Jan. 23 (11)	eP	1 13 22				(11) Disturbed by microseisms. USCGS: 72° N 14° W, H. $1^h08^m31^s$, off east coast of Greenland.
	eS	1 17 30				
	eL	1 19				
	F	1 35				
Jan. 23 (12)	ez	6 54 24				(12) Disturbed by microseisms. BCIS: 8° S 95° E, H. $6^h31^m15^s$, h = about 100 km. USCGS: 9½° S 94½° E, H. $6^h31^m13^s$, h = about 100 km. JSA: 7° S 96° E, H. $6^h31^m34^s$, h = about 200 km. Indian Ocean.
	iS	6 55 24				
	ezH	6 57 32				
	eL	7 12				
	F	9 10				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Jan. 24 (13)	iPKP	9 35 24				(13) Disturbed by microseisms. BCIS: 23°.5 S 176° W, H. $9^h15^m39^s$, h = about 100 km. USCGS: 23° S 176° W, H. $9^h15^m42^s$, h = about 100 km. JSA: 22°.9 S 176°.2 W, H. $9^h15^m51^s$, h = about 150 km. Tonga Islands region.
	eL	10 26				
	F	11 05				
Jan. 27 (14)	eSS	7 58				(14) Disturbed by microseisms. BCIS: 3° S 152° E, H. $7^h18.2^m$. USCGS: 4° S 151° E, H. $7^h18^m06^s$. JSA: 4°.0 S 151°.7 E, H. $7^h18^m10^s$. New Britain Islands region.
	eL	8 15				
	F	8 55				
Jan. 27 (15)	eL	11 44				(15) Disturbed by microseisms. BCIS: 55° N 164° E, H. $11^h00^m00^s$. USCGS: 55° N 163½° E, H $11^h00^m00^s$. JSA: 53°.1 N 162°.3 E, H. $11^h00^m13^s$, h = about 150 km. Off east coast of Kamchatka.
	F	12 10				
Jan. 27 (16)	eL	16 00				(16) Disturbed by microseisms. USCGS: Aftershoek of (14).
	F	16 30				
Jan. 28 (17)	e(S)	8 31.7				(17) Disturbed by microseisms. BCIS: 28° N 43¾° W, H. $8^h18^m04^s$. USCGS: 28½° N 43½° W, H. $8^h18^m03^s$. JSA: 28½° N 44½° W, H. $8^h18.2^m$, probably deeper than normal. Mid-Atlantic Ocean.
	eL	8 34				
	F	9 00				
Febr. 1 (18)	eL	14 32				(18) Disturbed by microseisms. USCGS: H. $14^h15^m56^s$, Atlantic Ocean, 600 miles southwest of Azores.
	F	14 40				
Febr. 1 (19)	iPP	18 35 58				(19) Disturbed by microseisms. BCIS: 4° S 135° E, H. $18^h15.9^m$. USCGS: 4° S 135½° E, H. $18^h15^m53^s$. JSA: 4°.0 S 136°.0 E, H. $18^h15^m56^s$. Northern New Guinea.
	ePPP	18 38 16				
	ePS	18 45.5				
	eSS	18 52				
	eL	19 13				
	F	21 00				
Febr. 2 (20)	e	10 00				(20) Disturbed by microseisms.
	F	10 10				
Febr. 2 (21)	iP	17 52 56	+			(21) USCGS: 53½° N 172½° W, H. $17^h41^m31^s$, h = about 200 km. JSA: 52°.7 N 172°.2 W, H. $17^h41^m34^s$, h = about 200 km. Aleutian Islands region.
	ipP	17 53 44	—			
	iS	18 02 20				
	eSSS	18 12				
	F	19 00				
Febr. 3 (22)	eP	16 49				(22) Disturbed by microseisms. BCIS: 15° S 180° W. USCGS: 19° S 173° W, H. $16^h29^m21^s$, h = about 100 km. Tonga Islands region.
	F	16 51				
Febr. 3 (23)	i(S)	22 33 38				(23) Disturbed by microseisms. Roma: 46°.5 N, 13°.1 E, H. $22^h29^m17^s$. Trieste: 46° 31′ N, 13° 11′ E, H. $22^h29^m17^s$.
	F	22 38				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Febr. 4 (24)	i(S)	15 52 30				(24) Disturbed by microseisms. BCIS: 38° N 21° E, H. $15^h44.8^m$. Ionian Islands. Foreshock of (27).
	eL	15 54				
	F	16 00				
Febr. 5 (25)	eL	0 37				(25) Disturbed by microseisms. BCIS: 39°.8 N 29°.6 E, H. $0^h28^m15^s$. USCGS: 39° N 29° E, H. $0^h28^m16^s$. Western Turkey.
	F	0 55				
Febr. 5 (26)	eL	9 26				(26) Disturbed by microseisms.
	F	9 40				
Febr. 5 (27)	eL	15 34 30				(27) Disturbed by microseisms. BCIS: 38°.2 N 20°.0 E, H. $15^h24.3^m$. USCGS: 38° N 22° E, H. $15^h24^m13^s$. Greece.
	F	15 45				
Febr. 9 (28)	eL	13 38				(28) Disturbed by microseisms. BCIS: aftershock of (27), H. $13^h29.3^m$.
	F	14 00				
Febr. 10 (29)	(ePKP	22 16 27)				(29) Disturbed by microseisms. BCIS: 15 S 173 W, H. $21^h56.6^m$. USCGS: 16° S 173° W, H. $21^h56^m39^s$. JSA: 13°.0 S 176°.2 W, H. $21^h56^m45^s$. Samoa Islands region.
	eL	23 04				
	F	24 15				
Febr. 11 (30)	e	4 08				(30) Disturbed by microseisms. USCGS: 34° N 39° W, H. $3^h51^m29^s$. North Atlantic Ocean.
	F	4 15				
Febr. 13 (31)	$iPKP_1$	18 44 19	+			(31) Disturbed by microseisms. USCGS: 33½ S 178° W, H. $18^h24^m23^s$. JSA: 33°.2 S 178°.3 W, H. $18^h24^m28^s$, h = about 100 km. Wellington (N.Z.) 34°.0 S 178°.0 W, H. $18^h24.4^m$. Kermadec Islands region.
	$iPKP_2$	18 45 10	+			
	iPP	18 48 44	+			
	ez	18 54 25				
	iPPS	19 02 22				
	eSS	19 09				
	eSSS	19 14.5				
	eL	19 28				
	F	21 00				
Febr. 14 (32)	eL	18 43 30				(32) Disturbed by microseisms. USCGS: 18° N 106° W, H. $18^h07^m31^s$. JSA: 17°.9 N 104°.5 W, H. $18^h07^m35^s$. Tacubaya: 19°06′ N 106°00′ W, H. $18^h07^m27^s$. Off coast of Colima, Mexico.
	F	19 25				
Febr. 14 (33)	eL	19 30				(33) Disturbed by microseisms. BCIS: 16° N 123° E, H. $18^h42.1^m$. USCGS: 14° N 121° E, H. $18^h42^m04^s$, near southern coast of Luzon.
	F	20 10				
Febr. 17 (34)	e	21 09				(34) Disturbed by microseisms. USCGS: 36° N 5½° E, H. $20^h00^m46^s$. Algeria: 36°30′ N 5°15′ E, H $21^h00^m50^s$, h = about 10 km. Northern Algeria, destructive in Constantine.
	F	21 20				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Febr. 19	eL	2 04				(35) Disturbed by microseisms. BCIS: 14° S 169° E,
(35)	F	2 30				H. 0h55.6m. USCGS: 11° S 166° E, H. 0h55m39s.
						Santa Cruz Islands region.
Febr. 23	iP	16 17 22	+			(36) Disturbed by microseisms.
(36)	iPcP	16 18 41				BCIS: 42°.5 N 84.0° E, H. 16h08.2m.
	ePP	16 19 19				USCGS: 41° N 84° E, H. 16h08m07s.
	iS	16 24 47				JSA: 40°.0 N 84°.5 E, H. 16h08m03s.
	eSS	16 28 37				Poona: 42°.5 N 83° E, H. 16h08m10s.
	eL	16 32				Sinkiang Province, China.
	MH	16 36		18	>1000	
	MZ	16 36		18	>1000	
	F	18 30				
Febr. 24	eL	5 55				(37) Disturbed by microseisms.
(37)	F	6 05				BCIS: Probably North Atlantic Ocean.
Febr. 24	eL	23 28				(38) Disturbed by microseisms. BCIS: 30¾° N 69¼° E,
(38)	F	24 00				H. 23h02m20s. USCGS: 30° N 69° E, H. 23h02m18s.
						Northeastern Baluchistan.
Febr. 25	e	5 00				(39) Disturbed by microseisms. USCGS: 4h09m45s.
(39)	F	5 15				Philippine Islands region.
Febr. 26	eL	4 46				(40) Disturbed by microseisms. USCGS: 35° N 142½° E,
(40)	F	5 30				H. 4h01m40s. Off east coast of Honshu, Japan.
Febr. 26	e	16 32				(41) Disturbed by microseisms. USCGS: H. 15h45m45s.
(41)	F	16 45				Ryukyu Islands region.
Febr. 28	e(PS)	0 42.0				(42) Disturbed by microseisms.
(42)	e(SS)	0 48.3				USCGS: 57½° S 30° W, H. 0h12m59s.
	eL	1 03				JSA: 59° S 37° W, H. 0h13.6m, possibly deeper than
	F	2 40				normal. Sandwich Islands region.
March 2	iP	6 59 08	+			(43) Disturbed by microseisms. BCIS: 72° N 3° W,
(43)	eS	7 02 48				H. 6h54.6m. USCGS: 72½° N 2° W, H. 6h54m31s.
	eL	7 04.0				JSA: 71°.1 N 3° W, H. 6h54.6m.
	F	7 40				Jan Mayen Island region.
March 3	e	3 20				(44) Disturbed by microseisms.
(44)	F	3 30				
March 3	eL	5 26				(45) Disturbed by microseisms.
(45)	F	5 31				USCGS: H. 4h38m18s. Off coast of southern Korea.
March 4	eP	1 30 20				(46) Disturbed by microseisms.
(46)	eSKS	1 41.0				BCIS: 3½° S 102¼° E, H. 1h17.1m, h = about 100 km.
	ePS	1 43.5				USCGS: 3½° S 102½° E, H. 1h17m03s, h = 100 km.
	eL	2 02				JSA: 6° S 102° E, H. 1h17.3m, h = about 150 km.
	F	4 00				Poona: 4° S 103° E, H. 1h17m07s, h = about 125 km.
						Near coast of southern Sumatra.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
March 4	iP	10 27 45	+	4	85	(47) BCIS: 36°.5 N 70°.5 E, H. 10h19m26s,
(47)	ipP	10 28 34				h = about 220 km.
	iz	10 30 45				USCGS: 37° N 70° E, H. 10h19m25s, h = about 230 km.
	iS	10 34 26				JSA: 37°.5 N 70°.2 E, H. 10h19m25s, h = about 250 km
	isS	10 35 46				Poona: 37° N 70° E, H. 10h19m21s, h = 200 km.
	eL	10 40				Hindu Kush Range, Afghanistan. Destructive in West
	F	14 00				Punjab. Heerlen: iP 10h27m43s.
March 4	—	— — —				(48) Traces beginning during change of papers, from
(48)	F	16 05				15h53m till 15h57m.
March 5	eL	2 27				(49) Disturbed by microseisms.
(49)	F	2 50				USCGS: 30° N 140° E, H. 1h39m11s. Bonin Islands
						region.
March 6	e	11 56				(50) Disturbed by microseisms. Poona: 40° N 89° E,
(50)	F	12 03				H. 11h29m05s. USCGS: H. 11h27m55s, Western Sin-
						kiang Province, China.
March 9	e	4 50				(51) Disturbed by microseisms.
(51)	F	4 58				
March 9	e	5 53				(52) Disturbed by microseisms.
(52)	F	6 01				
March 10	iS	21 34 55				(53) BCIS: 43¼° N 21½° E, H. 21h28.0m, probably near
(53)	eL	21 37				Nich, Yougoslavia.
	F	21 45				
March 11	ez	20 28.0				(54) Disturbed by microseisms.
(54)	eL	21 01				
	F	21 20				
March 11	eL	23 05				(55) BCIS: 29° N 94° E, H. 22h28.7m.
(55)	F	23 20				Poona: 30° N 94° E, H. 22h28.3m.
March 16	ePP	22 36.0				(56) Disturbed by microseisms.
(56)	ePS	22 46 20				BCIS: 5° S 151° E, H. 22h15.2m.
	ePPS	22 47 38				USCGS: 6° S 151½° E, H. 22h15m08s.
	eSS	22 53				JSA: 5°.3 S 151°.3 E, H. 22h15m12s, h = about 50 km.
	eL	23 11				New Britain region.
	F	1 00				
March 17	e	3 14				
(57)	F	3 22				
March 17	iPP	21 26 08				(58) Disturbed by microseisms. Aftershock of (56).
(58)	eSS	21 43				USCGS: H. 21h05m16s.
	eL	22 03				JSA: H. 21h05m12s.
	F	0 30				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
March 19 (59)	iP	18 31 39	+			(59) BCIS: 31°.4 N 129°.8 E, H. $18^h19^m28^s$, h = about 150 km. USCGS: 30½° N 130° E, H. $18^h19^m22^s$, h = about 150 km. C.M.O: 30°.0 N 131°.2 E, h = about 60 km. Off southwestern coast of Kyushu, Japan.
	iPP	18 34 56				
	iz	18 35 52				
	iS	18 51 48				
	eH	18 42 55				
	eL	19 00				
	F	19 35				
March 20 (60)	e	12 35				
	F	12 45				
March 22 (61)	eL	2 20				
	F	2 29				
March 23 (62)	eL	7 36				(62) BCIS: 3° S 142½° E, H. $6^h36.6^m$. USCGS: 3° S 143½° E, H. $6^h36^m32^s$. Off northeastern coast of New Guinea.
	F	8 00				
March 23 (63)	eL	23 23				
	F	23 32				
March 24 (64)	e	20 11				(64) BCIS: South Atlantic Ocean.
	F	20 18				
March 24 (65)	eP	21 08 54				(65) BCIS: 42° N 126½° W, H. $20^h56.8^m$. USCGS: 41½° N 125½° W, H. $20^h56^m54^s$. JSA: 41°.9 N 124°.8 W, H. $20^h56^m58^s$. Off coast of Cape Mendocino, California.
	iP	21 09 11				
	iS	21 18 51				
	eSS	21 23 36				
	eL	21 30				
	F	23 50				
March 25 (66)	e	2 50				(66) BCIS: Yougoslavia.
	F	2 56				
March 25 (67)	eL	3 10				(67) USCGS: 25° N 109½° W, H. $2^h28^m05^s$. Gulf of California.
	F	3 20				
March 27 (68)	eP	6 48 16				(68) BCIS: 3°.0 N 126°.7 E, H. $6^h34^m01^s$. USCGS: 3° N 128½° E, H. $6^h33^m55^s$. JSA: 3°.7 N 126°.9 E, H. $6^h34^m10^s$. Molucca Passage.
	e(PKP)	6 52 00				
	ePP	6 52 47				
	iSKS	6 58 56				
	ePS	7 02				
	eSS	7 08				
	eL	7 23				
	F	10 00				
March 27 (69)	eL	12 50				(69) BCIS: aftershock of (56), H. $11^h45.4^m$. USCGS: H. $11^h45^m29^s$, h = about 100 km. New Britain region.
	F	14 00				
March 27 (70)	eL	21 25				(70) BCIS: H. $20^h36.5^m$, probably Java Sumatra region.
	F	22 30				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
March 28 (71)	eL	7 10				
	F	7 50				
March 28 (72)	eH	13 22				(72) BCIS: 16° N 120° E, H. $12^h50.6^m$. USCGS: H. $12^h50^m31^s$. Near coast of Mindoro Island, Philippine Islands.
	eL	13 38				
	F	14 20				
March 29 (73)	eL	3 46				
	F	4 25				
March 30 (74)	eL	13 07				
	F	13 16				
March 30 (75)	ePKP	15 07 25				(75) BCIS: 17° S 178½° W, H. $14^h47.8^m$. USCGS: 16° S 178° W, H. $14^h47^m46^s$. JSA: 16°.4 S 178° W, H. $14^h47^m57^s$, h = about 100 km. Fiji Islands region.
	eSS	15 30				
	eL	15 53				
	F	17 10				
March 30 (76)	eL	19 27				
	F	19 40				
March 31 (77)	eL	22 40				(77) USCGS: 5½° S 151° E, H. $21^h40^m05^s$, h = about 60 km. New Britain region.
	F	23 10				
April 1 (78)	e	9 25				(78) USCGS: 29° N 113° W, H. $8^h40^m52^s$. Gulf of California.
	eL	9 40				
	F	10 20				
April 2 (79)	eL	2 10				
	F	2 35				
April 2 (80)	eL	17 03				
	F	17 35				
April 3 (81)	eL	7 05				(81) Disturbed by microseisms. BCIS. Butung Island, Flores Sea.
	F	8 15				
April 3 (82)	eP	12 34 15				(82) Disturbed by microseisms. Uccle: 50°28′ N 4°00′ E, h = about 2.8 km. BCIS: H. $12^h33^m40^s$. Heerlen: iP $12^h34^m06^s$, iS $12^h34^m23^s$.
	eS	12 34 40				
April 5 (83)	iS	9 46 50				(83) Disturbed by microseisms. BCIS: 42° N 131° E, H. $9^h27^m04^s$, h = about 550 km. USCGS: 42° N 131½° E, H. $9^h27^m00^s$, h = about 550 km. JSA: 40°.8 N 130°.8 E, H. $9^h27^m09^s$, h = about 580 km. Near Vladivostok U.S.S.R.
	eL	10 06				
	F	10 20				
April 6 (84)	e	16 24				(84) Disturbed by microseisms. BCIS: Probably Butung Island region.
	F	16 40				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
April 10 (85)	eL	12 38				
	F	12 43				
April 11 (86)	iPKP	0 08 10				(86) Disturbed by microseisms.
	ePP	0 11 56				BCIS: 28° S 174° W, H. $23^h48.2^m$.
	eSS	0 32.5				USCGS: $23^h48^m16^s$, about 300 miles north of Kermadec
	eL	1 10				Islands. JSA: 26°.0 S 175°.0 W, H. $23^h48^m20^s$.
	F	2 00				
April 13 (87)	eS	15 30.4				(87) Disturbed by microseisms.
	iPS	15 30 31				USCGS: 11° N 41½° W, H. $15^h12^m56^s$.
	eL	15 39				JSA: 10°.8 N 41°.5 W, H. $15^h13^m00^s$.
	F	16 10				
April 13 (88)	iP	20 07 01	—			(88) Disturbed by microseisms.
	ipP	20 07 32				USCGS: 47°.1 N 122°.7 W, H. $19^h55^m41^s$, slightly
	iS	20 16 20				deeper than normal. JSA: 47°.2 N 122°.5 W, H. 19^h
	e(sS)	20 17 37				55^m39^s.
	eSS	20 20.5				Western Washington. Property damage in Seattle,
	eSSS	20 24				Tacoma and Olympia areas. Eight killed, many injured.
	eL	20 27				
	F	23 15				
April 14 (89)	e	17 09				(89) USCGS: Samoa Islands region.
	F	17 25				
April 14 (90)	eL	18 22				(90) USCGS: Samoa Islands region.
	F	19 00				
April 14 (91)	eS	23 37.0				(91) USCGS: Jan Mayen Island region.
	eL	23 39				
	F	23 45				
April (92)	ePP	14 37.4				(92) USCGS: 5° S 124° E, H. $14^h07^m21^s$.
	e	14 39 17				Flores Sea. Felt on Butung Island.
	eL	15 10				
	F	15 35				
April 17 (93)	e	1 20				(93) USCGS: H. $0^h41^m50^s$, h = about 100 km.
	F	1 40				JSA: 31° S 67° W, H. $0^h41.1^m$, h = about 100 km.
April 18 (94)	e	1 02				(94) Disturbed by microseisms.
	F	1 40				
April 18 (95)	eL	22 46				(95) Disturbed by microseisms. USCGS: 15½° S 173½°
	F	23 05				W, H. $21^h34^m49^s$, h = about 100 km. JSA: 15°.3 S
						174°.1 W, H. $21^h34^m54^s$, h = about 100 km. Samoa
						Islands region.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
April 20 (96)	eP	3 44 00				(96) USCGS: 38½° S 72½° W, H $3^h29^m01^s$, h = 70 km.
	ez	3 48.0				JSA: 38°.0 S 73°.1 W, H. $3^h29^m10^s$, h = about 100 km.
	iPP	3 48 32				La Paz: 37°50′ S 72°40′ W, H. $3^h28^m55^s$.
	iPPP	3 50 43				Central Chile. Destructive in Angol and Traiguen.
	iSKS	3 54 16				57 killed, extensive property damage.
	ePS	4 57 51				
	eSS	4 03.5				
	eSSS	4 08.0				
	eL	4 21				
	F	6 40				
April 22 (97)	eL	18 20				(97) USCGS: 35° S 113° W, H. $17^h17^m09^s$.
	F	19 20				JSA: 36°.2 S 112°.5 W, H. $17^h17^m20^s$. South Pacific Ocean.
April 23 (98)	iPP	11 34 50				(98) USCGS: 7° S 121° E, H. $11^h15^m30^s$.
	ePS	11 44 16				JSA: 8° S 120°.5 E, H. $11^h15^m35^s$, h = about 50 km.
	eSSS	11 56.0				Flores Sea.
	eL	12 12				
	F	13 10				
April 24 (99)	iP	4 30 30	+			(99) USCGS: 27° N 56° E, H. $4^h22^m14^s$, h = about
	iPP	4 32 22				100 km.
	iS	4 37 13				JSA: 26° N 55½° E, H. $4^h22.3^s$, h = about 100 km.
	iSS	4 40.5				Persian Gulf, near south coast of Iran.
	eL	4 44				
	F	6 20				
April 25 (100)	eP	14 08.2				(100) USCGS: 20½° S 69½° W, H. $13^h54^m56^s$, h =
	ePP	14 12 05				about 100 km.
	iS	14 18 50				JSA: 20°.0 S 68°.7 W, H. $13^h55^m02^s$, h = about 100 km.
	ePPS	14 20.9				Northern Chile. Destructive.
	eL	14 35				
	F	16 35				
April 25 (101)	eL	20 24				(101) Disturbed by microseisms.
	F	20 55				BCIS: South Pacific Ocean.
April 25 (102)	e	23 20.0				(102) Disturbed by microseisms.
	eL	23 21				BCIS: 37°.9 N 40°.2 E, H. $23^h09^m03^s$.
	F	23 45				Istanbul: 38° N 40° E. Roma: 38° N 41° E, H. $23^h09^m02^s$.
April 26 (103)	eL	11 19				(103) Disturbed by microseisms.
	F	11 50				BCIS: South Pacific Ocean.
April 30 (104)	iP	1 37 22	+			(104) USCGS: 6° N 125½° E, H. $0^h23^m32^s$, h = 130 km.
	ePP	1 41 38				JSA: 6°.8 N 125°.0 E, H. $0^h23^m37^s$, h = about 150 km.
	iSKS	1 47 49				Near southern coast of Mindanao, Philippine Islands.
	eS	1 49.0				
	eSS	1 56.4				
	eL	2 10				
	F	4 40				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
May 2 (105)	eL	12 09				(105) USCGS: 34°01′ N 115°41′ W, H. 11h25m47s.
	F	12 25				Pinto Basin, California.
May 3 (106)	iP	6 08 20	—	4	7	(106) Disturbed by microseisms.
	ePP	6 11 06				USCGS: 49° N 153½° E, H. 5h56m44s,
	iS	6 17 52				h = about 150 km.
	esS	6 18 48				JSA: 49°.0 N 154°.2 E, H. 5h56m55s, h = about 150 km.
	eL	6 30				CMO: 49°.5 N 155°.0 E, h = about 160 km.
	F	7 15				
May 3 (107)	e	12 42				(107) Disturbed by microseisms.
	F	12 50				USCGS: H. 10h54m26s. Off east coast of Kamchatka.
May 5 (108)	eN	19 04				(108) Disturbed by microseisms.
	F	19 10				
May 5 (109)	eL	22 21				(109) Disturbed by microseisms.
	F	22 55				
May 6 (110)	eL	14 53				(110) Disturbed by microseisms. BCIS: 56° N 109° E,
	F	15 35				H. 19h13m21s. USCGS: 54° N 109½° E, H. 14h13m12s.
						Lake Baikal region, U.S.S.R.
May 9 (111)	iP	13 49 05	—			(111) Disturbed by microseisms.
	iPP	13 52 40				BCIS: 5° N 95° E, H. 13h36.4m.
	iSKS	13 59 32				USCGS: 4½° N 95½° E, H. 13h36m17s.
	eS	14 00 02				JSA: 4° N 94° E, H. 13h36.5m, h = about 100 km.
	ePS	14 01.0				Poona: 1°.5 N 94°.5 E, H. 13h36m02s, h = about 65 km.
	eSS	14 05.5				Northwest coast of Sumatra.
	eL	14 18				
	F	15 50				
May 10 (112)	eS	0 48 20				(112) USCGS: 19° N 106° W, H. 0h24m38s.
	eL	1 07				JSA: 18°.9 N 106°.4 W, H. 0h24m38s.
	F	1 35				Off coast of Colima, Mexico.
May 12 (113)	eL	11 15				(113) Aftershock of (111). BCIS: H. 10h18.7m.
	F	11 30				USCGS: H. 10h18m40s.
May 13 (114)	iP	20 18 59	—			(114) Disturbed by microseisms.
	eS	20 23.0				BCIS and Istanbul: 40°50′ N 33° E, H. 20h14.0m.
	eL	20 25				Trieste: 40°.5 N 34° E, H. 20h13m51s. Roma: 40°51′ N
	F	21 00				34°10′ E, H. 20h13m51s. Anatolia.
May 16 (115)	ePP	4 51.7				(115) BCIS and Poona: 6° S 122° E, H. 4h32m28s.
	ePS	5 01.5				USCGS: H. 4h32m18s.
	eL	5 20				Timor Sea.
	F	6 50				
May 17 (116)	iP	2 41 41				(116) USCGS: 48° N 155° E, H. 2h29m53s.
	eS	2 51 30				JSA: 49°.4 N 155°.3 E, H. 2h30m04s, h = about 75 km.
	eL	3 09				Kurile Islands region.
	F	3 35				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
May 19 (117)	eL	6 01				
	F	6 30				
May 21 (118)	eL	17 51				(118) BCIS: 39° N 26° E, H. 17h41.2m.
	F	18 05				Near Mytilene Island, Aegean Sea.
May 21 (119)	iP	21 52 33	+			(119) USCGS: 37° N 142° E, H. 20h40m03s.
	ePP	21 55 45				JSA: 37°.3 N 141°.5 E, H. 20h40m11s, h = about 50 km.
	ePPP	21 57 06				CMO: 36°.7 N 141°.2 E.
	iS	22 02 50				
	eSS	22 08.0				
	eL	22 19				
	F	0 20				
May 23 (120)	ePKP	4 37 24				(120) USCGS: 30° S 178° W, H. 4h17m36s, h = 70 km.
	ePP	4 41 32				JSA: 30°.0 S 178°.6 W, H. 4h17m35s, h = about 75 km.
	eH	4 52				Kermadec Islands.
	eL	5 30				
	F	6 25				
May 24 (121)	eL	3 55				(121) BCIS: South Pacific Ocean.
	F	4 40				
						No records May 24 from 13h30m till 14h30m.
May 24 (122)	eL	19 50				(122) Disturbed by microseisms. Aftershock of (119).
	F	20 00				BCIS: H. 18h59.2m. USCGS: H. 18h59m16s.
May 25 (123)	eL	5 42				
	F	6 05				
May 25 (124)	eL	7 28				
	F	8 00				
May 25 (125)	iP	8 32 59	+	4	4	(125) BCIS: aftershock of (36).
	iPP	8 35 00				USCGS: 42° N 83° E, H. 8h23m48s.
	eS	8 40 22				JSA: 42°.0 N 83°.0 E, H. 8h24m00s, h = about 100 km.
	eH	8 42 53				Poona: 42° N 83° E, H. 8h23m52s.
	eSS	8 44 30				Sinkiang Province, China.
	eL	8 48				
	F	10 00				
May 26 (126)	eL	6 37				(126) BCIS: H. about 6h23m.
	F	7 00				North Atlantic Ocean, Azores region.
May 30 (127)	iP	1 46 38	+			(127) BCIS: Aftershock of (100).
	ePP	1 50 10				USCGS: 22° S 69° W, H. 1h32m44s, h = about 100 km.
	iSKS	1 56 42				JSA: 22°.6 S 68°.3 W, H. 1h32m58s, h = about 150 km.
	iS	1 57 25				Tarapaca Province, Chile.
	ePS	1 58 42				
	eSS	2 03				
	eL	2 20				
	F	2 50				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
June 9 (128)	iPKP	21 38 03	—			(128) BCIS: 16° S 175° W. USCGS: 16½° S 174° W, H. 21h18m47s, h = about 200 km. JSA: 16° S 173° W, H. 16h18m40s. Samoa Islands region.
	ePP	21 41 30				
	F	21 46				
June 10 (129)	e	6 48				
	F	6 55				
June 11 (130)	eL	8 15				(130) USCGS: 12½° N 87° W, H. 7h34m55s, h = about 100 km. JSA: 12°.2 N 87°.4 W, H. 7h34m50s, h = about 100 km. Near west coast of Nicaragua.
	F	8 40				
June 11 (131)	e(P)	14 24 48				(131) BCIS: Kurile Islands?
	eL	14 49				
	F	15 40				
June 12 (132)	iP	18 05 05				(132) USCGS: 28° S 63½° W, H. 15h52m26s, h = about 650 km. JSA: 27°.5 S 63°.1 W, H. 15h52m27s, h = about 600 km. Northern Argentina.
	epP	18 07 15				
	iPP	18 09 15				
	ipPP	18 11 11				
	eSKS	18 14 50				
	eS	18 15 47				
	esS	18 19 42				
	F	19 10				
June 13 (133)	eL	20 17				
	F	20 35				
June 14 (134)	eP	0 33.7				(134) USCGS: 12° N 95½° E, H. 0h21m14s. Bay of Bengal.
	ePP	0 36 46				
	eS	0 43 45				
	eL	1 00				
	F	1 55				
June 15 (135)	eL	2 20				(135) USCGS: 51° N 179° W, H. 1h47m25s, h = about 100 km. JSA: 51°.5 N 179°.4 W, H. 1h47m23s. Aleutians Islands.
	F	3 10				
June 15 (136)	eL	10 13				
	F	10 45				
June 16 (137)	eS	18 14.5				(137) BCIS: 12° N 45° E, H. 17h57m55s. USCGS: H. 17h57m58s. JSA: 11°.2 N 42°.7 E, H. 17h58m05s. Gulf of Aden, off south coast of Arabia.
	eN	18 18 30				
	eL	18 23				
	F	19 15				
June 17 (138)	eS	1 52				(138) BCIS: 2°.5 S 13°.2 W, H. 1h34m48s. USCGS: 3° S 12½° W, H. 1h34m50s. JSA: 1° S 13° W, H. 1h35.0m. Atlantic Ocean, about 400 miles north of Ascension Island.
	eL	2 04				
	F	2 20				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
June 17 (139)	eP	4 26 19				(139) BCIS: 34°.4 N 28°.5 E, H. 4h21.0m. USCGS: 34° N 28° E, H. 4h20m55s. Trieste: 34°.3 N 28°.4 E, H. 4h20m57s. Mediterranean Sea, about 100 miles east of Crete.
	eS	4 30.8				
	eL	4 33				
	F	4 50				
June 19 (140)	eSS	9 28				(140) BCIS: 53° S 160° E, H. 8h42.2m.
	eL	9 55				
	F	11 00				
June 19 (141)	eS	12 39 45				(141) BCIS: 24°.0 N 44¾° W, H. 12h24m18s. USCGS: 23½° N 45° W, H. 12h24m18s. JSA: 24°.7 N 45° W, H. 12h24m25s. North Atlantic Ocean.
	eL	12 45				
	F	13 10				
June 22 (142)	eL	2 10				
	F	2 25				
June 23 (143)	ePKP	22 46 30				(143) USCGS: 16½° S 168° E, H. 22h27m15s, h = about 200 km. JSA: 20°.5 S 171°.0 E, H. 22h27m15s, h = about 200 km.
	ePP	22 49 47				
	F	0 00				
June 24 (144)	iP	22 52 34	+			(144) USCGS: 5° S 106½° E, H. 22h38m48s, h = about 60 km. JSA: 7°.6 S 104°.4 E, H. 22h39m02s, h = about 200 km. Poona: 5°.8 S 105°.8 E, H. 22h38m47s, h = about 100 km. Java Sea.
	ez	22 56 05				
	iPP	22 56 43				
	ePPP	22 58 56				
	eSKS	23 03 10				
	eH	23 03 30				
	eS	23 04 31				
	ez	23 05 34				
	ePS	23 06 30				
	eL	23 25				
	F	1 20				
June 25 (145)	iPKP	19 37 00				(145) USCGS: H. 19h17m10s. JSA: 20° S 175°.5 W, H. 19h17m10s. Tonga Islands region.
	eL	20 34				
	F	21 40				
June 26 (146)	eP	5 46 19				(146) BCIS: 39°.6 N 20°.1 E, H. 5h42m23s. JSA: 39°.6 N 20°.2 E, H. 5h42m25s. Roma: 40° N 21° E, H. 5h42m26s. Ionian Sea, near Corfu.
	eS	5 49 40				
	eL	5 51				
	F	6 25				
June 26 (147)	ePP	9 00 13				(147) BCIS: 2½° N 127° E, H. 8h41.3m. USCGS: 0° N 125° E, H. 8h41m16s. JSA: 0° 125°.5 E, H. 8h41m25s. Celebes Island region.
	eSKS	9 06 34				
	ePS	9 09 50				
	eL	9 33				
	F	10 35				
June 27 (148)	eL	1 05				
	F	1 30				
June 28 (149)	eL	0 05				
	F	0 45				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
June 28 (150)	eS	20 24.0				(150) BCIS: aftershock of (141). USCGS: 24° N 45° W, H. $20^h08^m29^s$. JSA: 24°.4 N 45°.6 W, H. $20^h08^m34^s$. North Atlantic Ocean.
	eL	20 30				
	F	21 00				
July 1 (151)	eS	22 28.2				(151) BCIS: H. $22^h18.9^m$. USCGS: 35° N 24° E, H. $22^h19^m10^s$. Mediterranean Sea, near north coast of Crete.
	eL	22 31				
	F	22 40				
July 2 (152)	eL	2 57				
	F	3 10				
July 2 (153)	$ePKP_1$	11 47 48				(153) USCGS: 50½° S 162° E, H. $11^h27^m48^s$. JSA: 50°.7 S 162°.7 E, H. $11^h27^m46^s$. Riverview: H. $11^h27^m37^s$. About 350 miles southwest of New-Zealand.
	$ePKP_2$	11 48 47				
	ePP	11 52 35				
	eSS	12 13				
	eSSS	12 19				
	eL	12 40				
	F	14 30				
July 2 (154)	iP	20 11 18	—			(154) USCGS: 16° N 147½° E. H. $19^h57^m16^s$, h = about 60 km. JSA: 16°.1 N 145°.8 E, H. $19^h57^m21^s$, h = 100 km. Poona: 16°.5 N 147°.0 E, H. $19^h57^m14.0^s$. Mariana Islands region.
	iz	20 11 25				
	iPP	20 15 32				
	i	20 15 41				
	iSKS	20 21 55				
	iS	20 23 04				
	iPS	20 24 41				
	iSS	20 30 17				
	eSSS	20 34.5				
	eL	20 47				
	F	20 35				
July 4 (155)	iP	3 49 00	+			(155) USCGS: 27½° N 56° E, H. $3^h40^m40^s$. JSA: 30°.4 N 56°.9 E, H. $3^h40^m52^s$. Poona: 27°.5 N 55°.5 E, H. $3^h40^m50^s$. Persian Gulf.
	iPP	3 50 56				
	iS	3 55 39				
	eSS	3 58 55				
	eL	4 03				
	F	5 15				
July 5 (156)	eP	2 38 28				(156) BCIS: aftershock of (155), H. $2^h30.1^m$. USCGS: H. $2^h30^m01^s$. JSA: H. $2^h30^m15^s$.
	ePP	2 40.3				
	eS	2 45 05				
	eSS	2 48 30				
	eL	2 53				
	F	3 20				
July 7 (157)	eL	4 46				(157) Disturbed by microseisms. USCGS: 35° N 36° W, H. $4^h32^m13^s$. JSA: 36°.3 N 35°.7 W, H. $4^h32^m18^s$. North Atlantic Ocean.
	F	5 05				
July 7 (158)	iP	12 26 10				(158) BCIS: 35°.5 N 27°.9 E, H. $12^h20^m58^s$. USCGS: 36° N 27½° E, H. $12^h21^m06^s$. Off southwest coast of Turkey.
	eS	12 30 20				
	eL	12 32				
	F	12 50				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
July 7 (159)	e	22 43				
	F	22 50				
July 8 (160)	eP	8 11.0				(160) BCIS: foreshock of (166) H. $8^h02.3^m$. USCGS: H. $8^h02^m10^s$.
	e	8 17 32				
	eL	8 27				
	F	9 05				
July 8 (161)	e(P)	12 53.0				(161) USCGS: 14° N 91½° W, H. $12^h40^m47^s$, h = about 100 km. JSA: 14°.5 N 91°.6 W, H. $12^h40^m41^s$. Tacubaya: 13°48′ N 91°47′ W. Near coast of Guatemala.
	ez	12 53 13				
	e(S)	13 03 33				
	eL	13 18				
	F	14 05				
July 8 (162)	iP	18 22 44	+			(162) BCIS: 73½° N 4° E, H. $18^h18^m00^s$. USCGS: 72° N 0°, H. $18^h18^m06^s$. Artic Ocean, about 200 miles east of Jan Mayen Island.
	eS	18 26 26				
	eL	18 28				
	F	19 05				
July 8 (163)	eL	23 37				
	F	23 55				
July 9 (164)	eL	1 38				(164) USCGS: 58° S 24° W, H. $0^h36^m51^s$. Sandwich Islands.
	F	2 00				
July 9 (165)	eP	18 54.5				(165) USCGS: 32½° N 70½° W, H. $18^h44^m44^s$. JSA: 32°.9 N 70°.9 W, H. $18^h44^m50^s$. Atlantic Ocean.
	eS	19 02 36				
	eL	19 11 30				
	F	19 50				
July 10 (166)	iP	4 02 02	+			(166) USCGS: 39½° N 70½° E, H. $3^h53^m35^s$. JSA: 39°.0 N 70°.0 E, H. $3^h53^m40^s$. Poona: 40° N 72°.5 E, H. $3^h53.4^m$. CMO: 40° N 73° E. Eastern Turkistan.
	iP	4 02 05				
	iPP	4 03 50				
	iS	4 08 54				
	eL	4 16				
	M	4 51		22	> 1500	
	F	9 00				
July 10 (167)	e	11 09				(167) Aftershock of (166). USCGS: H. $10^h57^m32^s$.
	F	11 40				
July 10 (168)	e	12 23				
	F	13 00				
July 10 (169)	iP	14 21 54	—			(169) Aftershock of (166). USCGS: H. $14^h13^m20^s$.
	ePP	14 23 43				
	eS	14 28 38				
	eSS	14 32.0				
	eL	14 37				F in next shock.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
July 10 (170)	iP	15 27 27	+			(170) Aftershock of (166).
	ePP	15 29 16				USCGS: H. $15^h18^m58^s$.
	eS	15 34 16				
	eSS	15 37 30				
	eL	15 42				F in next shock.
July 10 (171)	iP	15 57 46	—			(171) Aftershock of (166).
	eS	16 04 33				USCGS: H. $15^h49^m13^s$.
	eSS	16 07.5				
	eL	16 12				
July 10 (172)	iP	16 32 18				(172) Aftershock of (166).
	eS	16 39 18				
	eL	16 48				
	F	20 20				
July 10 (173)	eL	23 34				(173) Aftershock of (166).
	F	23 45				USCGS: H. $23^h08^m55^s$.
July 11 (174)	iP	1 07 48				(174) Records from Heerlen.
	iS	1 07 53				BCIS: 50°45′ N 6°21′ E, H. $1^h07^m43^s$.
	F	1 09				West of Düren, Rhineland.
July 11 (175)	eS	1 28				(175) Aftershock of (166).
	eL	1 37				USCGS: H. $1^h12^m25^s$.
	F	1 50				
July 11 (176)	eP	4 01.5				(176) Aftershock of (166).
	eL	4 18				USCGS: H. $3^h55^m34^s$.
	F	4 35				
July 11 (177)	ePKP	9 50.4				(177) USCGS: H. $9^h30^m28^s$.
	eSS	10 13				Fiji Islands region.
	F	10 20				
July 11 (178)	iP	16 23 09	—			(178) USCGS: 34° N 132° E, H. $16^h10^m50^s$,
	iP	16 23 23	+			h = about 50 km.
	ePP	16 26 34				JSA: 33°.5 N 132°.1 E, H. $16^h10^m51^s$, h = about 75 km.
	eS	16 33 21				CMO: 34°.0 N 132°.5 E, h = 40 km.
	eL	16 53				Near south coast of Honshu, Japan.
	F	18 30				
July 13 (179)	e	9 19				
	F	9 30				
July 13 (180)	iP	10 22 28				(180) Aftershock of (166).
	eS	10 29.3				USCGS: H. $10^h14^m00^s$.
	eL	10 39				
	F	11 00				
July 13 (181)	eL	18 47				(181) Aftershock of (166).
	F	19 10				USCGS: H. $18^h28^m23^s$.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
July 14 (182)	e	0 48				(182) BCIS: Probably aftershock of (166).
	F	1 00				
July 14 (183)	e	3 54				(183) Aftershock of (166).
	F	4 10				USCGS: H. $3^h35^m33^s$.
July 14 (184)	eS	11 16.5				(184) Beograd: 43°50′ N 21°05′ E.
	eL	11 17.2				BCIS: H. $11^h09^m52^s$.
	F	11 40				Praha: 43°.7 N 20°.9 N, H. $11^h10.0^m$. Yugoslavia.
July 15 (185)	e	0 08				(185) USCGS: 29° N 138° E, H. $23^h20^m38^s$, h = about
	F	0 30				200 km. BCIS: 29°.5 N 138¼° E, H. $23^h20^m06^s$, h =
						400-450 km. CMO: 29°.9 N 134°.0 E, h = 300 km.
July 15 (186)	e	11 40				(186) USCGS: H. $11^h22^m45^s$. Assam region.
	eL	12 01				
	F	12 15				
July 15 (187)	eP	18 21 44				(187) Recorded at Heerlen. Explosion near Prüm,
	F	18 23				Rhineland.
July 17 (188)	eL	14 39				
	F	15 05				
July 17 (189)	eL	23 29				
	F	23 40				
July 18 (190)	iPP	0 51 48				(190) BCIS: 5° N 128° E, H. $0^h32.9^m$.
	epPP	0 52 35				USCGS: H. $0^h33^m19^s$, h = about 200 km.
	eS	0 59 20				JSA: 1°.2 N 125°.2 E, H. $0^h32^m58^s$.
	ePPS	1 01 40				Celebes region.
	eSS	1 07				
	eL	1 24				
	F	2 15				
July 18 (191)	ez	4 55.9				(191) BCIS: 5½° N 126½° E, H. $4^h41^m59^s$, h = about
	ez	5 01.0				100 km.
	iH	5 06 26				USCGS: 5½° N 127° E, H. $4^h42^m04^s$, h = about 150 km.
	eL	5 33				JSA: 6°.8 N 124°.4 E, H. $4^h42^m18^s$, h = about 150 km.
	F	6 05				Off south coast of Mindanao, Philippine Islands.
July 19 (192)	ez	13 23.8				(192) BCIS: H. $13^h28^m55^s$.
	eL	13 54				USCGS: H. $13^h28^m30^s$.
	F	14 05				Northeastern Afghanistan.
July 19 (193)	e	15 28				(193) USCGS: H. $14^h58^m37^s$.
	F	15 31				Banda Sea.
July 19 (194)	iP	17 50 39	+			(194) BCIS and Poona: 39°.5 N 70°.0 E, H. $17^h42.2^m$.
	eS	17 57 28				USCGS: 39½° N 71° E, H. $17^h42^m10^s$.
	eSS	18 00 27				Eastern Turkistan.
	eL	18 06				
	F	19 05				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
July 20 (195)	ePP	22 38				(195) BCIS: 11° S 102° E, H. 22h20m04s.
	eSKS	22 44.6				USCGS: 11° S 102° E, H. 22h20m05s.
	ePS	22 47.5				JSA: 10°.7 S 101°.9 E, H. 22h20m09s.
	eL	23 10				Off south coast of Sumatra.
	F	0 00				
July 21 (196)	eP	8 14 50				(196) BCIS: 15°.0 S 72°.0 W, H. 8h01m37s, h = about 100 km.
	epP	8 15 20				USCGS: 15½° S 73° W, H. 8h01m39s, h = about 100 km.
	eSKS	8 25 20				JSA: 14°.3 S 72°.1 W, H. 8h01m49s, h = about 150 km.
	eS	8 26 00				Near coast of southern Peru.
	eL	8 44				
	F	9 10				
July 21 (197)	eE	21 45				
	eL	21 55				
	F	22 15				
July 23 (198)	eL	6 25				(198) No z-record.
	F	6 50				
July 23 (199)	eL	7 20				(199) No z-record.
	F	7 30				
July 23 (200)	iPP	10 49 27				(200) No record from 10h45m till 10h48m.
	iPPP	10 52 34				USCGS: 19° S 169½ E, H. 10h26m44s, h = about 150 km.
	iPS	11 00 42				JSA: 18°.9 S 169°.4 E, H. 10h26m47s, h = about 150 km.
	eSS	11 08.1				New Hebrides.
	eSSS	11 13.5				
	eL	11 28				
	F	13 05				
July 23 (201)	iP	15 08 04				(201) Athens: 38°.7 N 26°.1 E. Istanbul: 38°.5 N 26°.5 E.
	iS	15 11 55				USCGS: 38½° N 26½° E, H. 15h03m30f.
	eL	15 13				JSA: 38°.5 N 26°.1 E, H. 15h03m33s.
	M	15 15		15	>1100	Near west coast of Turkey. Heavy property demage in
	F	19 00				Marmara and Kardamyea, northern part of Island of Chios.
July 25 (202)	eL	9 58				
	F	10 10				
July 25 (203)	iPKP	11 43 46				(203) BCIS and JSA: 34°9 S 113°.9 W, H. 11h24m26s.
	iPKS	11 47 17				USCGS: 33° S 112° W, H. 11h24m33s.
	eSS	12 04				Pacific Ocean, south of Easter Island.
	eL	12 25				
	F	13 05				
July 27 (204)	ez	11 21 25				(204) USCGS: H. 11h01m29s.
	ez	11 23 49				Band Sea, north of Timor.
	eN	11 29				
	e	11 31				
	eL	11 50				
	F	12 50				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
July 27 (205)	iPKP	15 31 33	+			(205) USCGS: 27½° S 177° W, H. 15h11m40s.
	ePP	15 35.7				JSA: 29°.0 S 176°.2 W, H. 15h11m38s.
	iz	15 44 32				Kermadec Islands region.
	eSKSP	15 46 30				
	eSS	15 55.5				
	eSSS	16 01.5				
	eL	16 25				
	F	18 30				
July 28 (206)	ez	4 31				
	e	5 25				
	F	5 50				
July 29 (207)	eL	11 30				
	F	11 50				
July 30 (208)	eP	17 51.6				(208) Probably aftershock of (201).
	eS	17 55 30				USCGS: H. 17h47m06s.
	eL	17 57 30				
	F	18 15				
Aug. 1 (209)	eL	22 53				(209) Disturbed by microseisms.
	F	23 00				No z-record Aug. 1, from 7h43m till 15h45m.
Aug. 3 (210)	eL	21 19				(210) Disturbed by microseisms.
	F	21 35				BCIS: 55° S 25° E, H. 20h23.6m.
Aug. 4 (211)	eL	8 50				(211) Disturbed by microseisms.
	F	9 20				USCGS: H. 7h51m40s. New Britain Island region.
Aug. 5 (212)	eL	1 01				
	F	1 10				
Aug. 5 (213)	eL	3 00				
	F	3 10				
Aug. 5 (214)	iP	19 21 36	+	6	7	(214) Disturbed by microseisms.
	iPP	19 24 59				USCGS: 1° S 78° W, H. 19h08m48s, h = about 60 km.
	ePPP	19 26 37				JSA: 0°.9 S 78°.3 W, H. 19h08m53s.
	iS	19 32 18				Central Ecuador. Destructive in Ambato, Guano,
	i(PS)	19 33 38				Pelileo, Patate and Pillaro. 4000-6000 killed.
	eL	19 44				$ 7½ million property damage.
	F	23 45				
Aug. 6 (215)	iPKP	0 55 13				(215) Disturbed by microseisms.
	ePKS	0 59.5				USCGS: 18½° S 175° W, H. 0h35m33s, h = about 70 km.
	iSS	1 17 30				JSA: 19°.3 S 174°.8 W, H. 0h35m39s, h = about 100 km.
	eSSS	1 23				Tonga Islands region.
	eL	1 44				
	F	3 30				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Aug. 9	eL	21 75				
(216)	F	22 07				
Aug. 10	e	20 52				(217) BCIS and USCGS: 86½° N 67° E, H. 20h35m47s.
(217)	F	21 10				North Polar region.
Aug. 11	eL	12 42				
(218)	F	12 50				
Aug. 11	eL	14 37				(219) F in next shock.
(219)						Disturbed by visitors.
Aug. 11	eP	14 45 55				(220) BCIS: 43° N 28° W, H. 14h40m30s.
(220)	eS	14 50.1				USCGS: 45° N 29° W, H. 14h40m36s.
	eL	14 52				North Atlantic Ocean, about 400 miles north of Azores.
	F	15 20				
Aug. 11	eL	21 30				
(221)	F	21 50				
Aug. 12	eH	8 05				
(222)	eF	8 15				
Aug. 12	ePP	23 38 30				(223) USCGS: 14½° S 167° E, H. 23h15m49s.
(223)	F	0 00				New Hebrides Islands.
Aug. 13	iPP	18 45 04	+			(224) USCGS: 0° 146½° E, H. 18h24m51s.
(224)	iPPP	18 47 33				JSA: 0,2 N 146°.1 E, H. 18h24m49s.
	iPS	18 54 47				Admiralty Islands region.
	eSS	19 01.0				
	eL	19 20				
	F	21 10				
Aug. 14	eL	19 23				(225) BCIS: Indian Ocean, southeast of South Africa.
(225)	F	19 50				
Aug. 16	iP	11 58 08	+			(226) BCIS: 30½° N 67°.5 E, H. 11h49.2m.
(226)	eS	12 05 20				USCGS: H. 11h48m53s.
	eL	12 15				Southern Baluchistan.
	F	12 45				
Aug. 17	eP	18 46 09				(227) F in next shock. USCGS: 43° N 146° E, H. 18h
(227)	epP	18 46 26				34m09s, h = about 100 km. JSA: 43° N 145°.4 E, H.
						18h34m15s, h = about 100 km. CMO: 42°.7 N 145°.5 E.
						Near east coast of Hokkaido, Japan.
Aug. 17	iP	18 50 02	—	4	6	(228) F in next shock.
(228)	iPP	18 50 56				Heerlen: eP: 18h50m02s.
	iPcP	18 53 18				BCIS: 39°.4 N 40°.9 E, H. 18h44m13s. Istanbul: 39°.5 N
	iS	18 54 49				40°.7 E. USCGS: 39° N 40° E, H. 18h44m15s.
	eL	18 56 30				JSA: 39°.3 N 40°.1 E, H. 18h44m10s.
	M	19 02		20	> 350	Eastern Turkey. 320 killed, Aga Kevy distroyed.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Aug. 17	eP	20 51 32				(229) Aftershock of (228).
(229)	eL	20 57.5				BCIS and USCGS: H. 22h45m22s.
	F	22 55				
Aug. 18	eL	6 09				
(230)	F	6 25				
Aug. 18	eP	13 45 45				(231) Disturbed by visitors.
(231)	eS	13 55 30				USCGS: 8½° N 83° W, H. 13h33m25s.
	eL	14 12				JSA: 9°.3 N 82°.9 W, H. 13h33m32s.
	F	(16 00)				Off south coast of Panama.
Aug. 22	iP	4 12 22	—			(232) F in next shock, iS and eSSS from Wiechert record.
(232)	iS	4 21 37				USCGS: 54° N 133° W, H. 4h01m12s.
	eSSS	4 29.5				JSA: 53°.7 N 133°.3 W, H. 4h01m13s.
	eL	4 33				Queen Charlotte Islands. Two-foot tidal wave at
	M	4 36				Ketchikan, Alaska.
Aug. 22	eP	9 04 26				(233) USCGS: 37° S 18° W, H. 8h51m18s.
(233)	eS	9 15 30				South Atlantic Ocean, near Tristan da Cunha.
	eSS	9 21 30				
	eL	9 35				
	F	10 50				
Aug. 22	eL	15 40				
(234)	F	16 00				
Aug. 22	eP	20 37 14				(235) BCIS: 15° S 15° W.
(235)	eS	20 46.5				USCGS: 14° S 14° W, H. 20h26m08s.
	eL	20 57				South Atlantic Ocean, about 375 miles south of
	F	21 20				Ascension Island.
Aug. 23	iP	15 26 56				(236) Disturbed by visitors.
(236)	eSKS	15 38.2				BCIS: 17½° S 74° W.
	eL	15 55				USCGS: 16° S 73° W, H. 15h13m44s, h = about 150 km.
	F	16 50				Southern Peru.
Aug. 23	eL	20 16				(237) Fin next shock. Aftershock of (232).
(237)						
Aug. 23	eP	20 35 42				(238) F in next shock.
(238)	iP	20 35 47	—	8	8	BCIS and USCGS: 53° N 132° W, H. 20h24m32s.
	ePP	20 38 29				JSA: 52°.6 N 129°.5 W, H. 20h24m42s.
	ePPP	20 40 00				Queen Charlotte Islands aftershock.
	eS	20 45 00				
	e(ScS)	20 45 54				
	eSS	20 49 30				
	eL	20 57				
Aug. 23	e	22 23				
(239)	F	23 40				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Aug. 24 (240)	eL	0 07				
	F	0 15				
Aug. 24 (241)	eL	6 38				(241) BCIS and USCGS: 43½° N 127° W, H. $6^h07^m14^s$. Off coast of Oregon, USA.
	F	7 10				
Aug. 24 (242)	eSS	9 55				(242) USCGS: 9° S 109° W, H. $9^h22^m02^s$. Pacific Ocean, 1200 miles north of Easter Island.
	eL	10 15				
	F	10 55				
Aug. 25 (243)	iP	4 26 12	+			(243) BCIS: 53½° N 178° W, H. $4^h14^m28^s$. USCGS: 51½° N 179° W, H. $4^h14^m28^s$. JSA: 51°.0 N 180°, H. $4^h14^m22^s$. Andreanof Islands, Aleutian Islands.
	eS	4 35 56				
	eL	4 50				
	F	5 25				
Aug. 25 (244)	e(P)	5 55.2				(244) BCIS: 37° N 16° W, H. $5^h50.6^m$. USCGS: H. $5^h50^m22^s$. Atlantic Ocean, about 500 miles east of Azores.
	eL	6 02				
	F	6 15				
Aug. 25 (245)	ePP	23 45.4				(245) BCIS: 7° S 129½° E, H. $23^h25^m39^s$. USCGS: 7° S 129° E, H. $23^h25^m57^s$, h = about 200 km. Banda Sea.
	iSKS	23 51 06				
	iSKKS	23 52 20				
	iPS	23 54 56				
	ePPS	23 57				
	eL	0 20				
	F	2 00				
Aug. 28 (246)	eP	19 34 10				(246) BCIS: 52½° N 35° W, H. $19^h28^m46^s$. USCGS: 54° N 34° W, H. $19^h28^m54^s$. North Atlantic Ocean.
	eS	19 38 30				
	eL	19 40.5				
	F	20 10				
Aug. 29 (247)	e	0 36				(247) Aftershock of (228), Eastern Turkey. USCGS: H. $0^h19^m11^s$.
	F	0 50				
Aug. 29 (248)	eL	14 57				
	F	15 10				
Aug. 30 (249)	e	8 50				
	F	9 10				
Aug. 30 (250)	iP	16 55 06				(250) BCIS: 45½° N 36½° E, H. $16^h50.2^m$. USCGS: 44½° N 34° E, H. $16^h50^m21^s$. Near coast of Crimea, USSR.
	eS	16 58 56				
	eL	17 00.5				
	F	17 20				
Aug. 31 (251)	eL	1 02				(251) USCGS: H. $0^h08^m10^s$, h = about 100 km. Mariana Islands.
	F	1 30				
Sept. 1 (252)	eL	15 00				(252) BCIS: H. $13^h58^m18^s$. USCGS: 36° S 97° W, H. $13^h58^m14^s$. JSA: 36°.3 S 97°.4 W, H. $13^h58^m18^s$. Pacific Ocean, southeast of Easter Island.
	F	15 25				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Sept. 1 (253)	eL	19 10				(253) BCIS: 1¼° N 91°.5 W, H. $18^h26^m45^s$. USCGS: 2½° N 90° W, H. $18^h26^m50^s$. JSA: 2°.2 N 90°.3 W, H. $18^h26^m52^s$. Galapagos Islands region.
	F	19 35				
Sept. 5 (254)	eP	3 07 18				(254) F in next shock. BCIS: 17½° N 121¼° E, H. $2^h54^m02^s$. USCGS: 19° N 122° E, H. $2^h54^m14^s$, h = about 100 km. JSA: 18½° N 122° E, H. $2^h54^m08^s$. Northern Luzon, Philippine Islands.
	eSKS	3 18 00				
	eL	3 40				
Sept. 5 (255)	eP	3 31 22				(255) Aftershock of (254). USCGS: 17° N 121½° E, H. $3^h18^m10^s$.
	F	5 00				
Sept. 8 (256)	eL	16 56				(256) USCGS: 15½° S 75½° W, H. $16^h02^m02^s$, h = about 100 km. Near south coast of Peru.
	F	17 00				
Sept. 9 (257)	ePKP	20 46 30				(257) BCIS: 16½° S 173° W, H. $20^h26^m22^s$. USCGS: 16½° S 172½° W. H. $20^h26^m21^s$. Samoa Islands region.
	eL	21 52				
	F	22 00				
Sept. 12 (258)	iPKP	9 36 49				(258) BCIS and USCGS: 22° S, 170° E, H. $9^h17^m04^s$. JSA: 23°.5 S 171°.6 E, H. $9^h17^m06^s$. Loyalty Islands region.
	ePP	9 40 36				
	ePS	9 51 08				
	eSS	9 59.5				
	eL	10 26				
	F	11 40				
Sept. 13 (259)	e(PKP)	12 14.6				
	ez	13 00				
	F	13 30				
Sept. 14 (260)	eL	2 19				
	F	2 40				
Sept. 14 (261)	eP	20 04 55				(261) Disturbed by microseisms. BCIS and USCGS: 1° N 126° E, H. $19^h50^m15^s$. JSA: 1°.3 N 127°.0 E, H. $19^h50^m29^s$, h = 100 km. Molucca Passage.
	ePP	20 09 21				
	eSKS	20 15 17				
	eS	20 16 46				
	eSS	20 24.5				
	eL	20 39				
	F	23 00				
Sept. 16 (262)	ePP	19 30 00				(262) Aftershock of (261). USCGS: H. $19^h11^m07^s$.
	eSKS	19 36.6				
	eL	20 05				
	F	20 50				
Sept. 16 (263)	eL	21 28				
	F	21 45				
Sept. 17 (264)	iP	11 34 42				(264) BCIS: 36°.7 N 22°.1 E, H. $11^h30^m07^s$. USCGS: 37 N 22½° E, H. $11^h30^m06^s$. Roma: 36°.5 N 22° E, H. $11^h30^m02^s$. Southern Greece.
	eS	11 38 26				
	eL	11 40.5				
	F	11 50				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Sept. 17 (265)	eH	23 38				(265) USCGS: 35 S 154 W, H. $22^h46^m25^s$. South Pacific Ocean.
	eL	0 08				
	F	1 00				
Sept. 19 (266)	eSS	22 16				(266) $53\frac{1}{2}°$ S $2\frac{1}{2}°$ W, H. $21^h42^m21^s$. South Atlantic Ocean.
	eL	22 30				
	F	0 05				
Sept. 20 (267)	eS	2 49.0				(267) USCGS: 39° N 138° E, H. $2^h26^m42^s$. Off north coast of Honshu, Japan.
	eL	3 09				
	F	3 40				
Sept. 20 (268)	$iPKP_1$	12 15 16	+			(268) USCGS: 30° 178° W, H. $11^h55^m29^s$, h = about 80 km. JSA: 30°.5 S 177°.8 W. H. $11^h55^m26^s$, h = about 75 km. Kermadec Islands.
	$iPKP_2$	12 15 40				
	iPP	12 19 29				
	eSS	12 39.3				
	eSSS	12 45.5				
	eL	13 10				
	F	14 20				
Sept. 20 (269)	eL	17 03				
	F	17 25				
Sept. 21 (270)	iP	13 07 30	+			(270) Disturbed by visitors. USCGS: 17° N $94\frac{1}{2}°$ W, H. $12^h55^m11^s$, h = about 100 km. JSA: 16°.8 N 94°.7 W, H. $12^h55^m15^s$, h = about 100 km. Tacubaya: 16°51′ N 95°02′ W, H. $12^h55^m28^s$, h = 150 km. Oaxaca, Mexico.
	epP	13 07 59				
	ePP	13 10 43				
	iS	13 17 44				
	eSS	13 18 27				
	eL	13 34				
	F	14 30				
Sept. 21 (271)	(ePKP	18 39 14)				(271) USCGS: H. $18^h19^m40^s$. JSA: 15°.8 S 173°.4 W, H. $18^h19^m45^s$. Samoa Islands region.
	eSS	19 01 30				
	eL	19 38				
	F	20 30				
Sept. 22 (272)	eP	15 50 21				(272) USCGS: 42° N 142° E, H. $15^h38^m15^s$. JSA: 41°.7 N 142°.0 E, H. $15^h38^m18^s$, probably deeper than normal. Near south coast of Hokkaido, Japan.
	eS	16 00 28				
	eL	16 20				
	F	16 45				
Sept. 24 (273)	ePKP	4 36 52				(273) USCGS: 6° S $153\frac{1}{2}°$ E, H. $4^h17^m38^s$. JSA: 6°.2 S 153°.3 E, H. $4^h17^m40^s$. Solomon Islands region.
	ePP	4 38 57				
	ePKS	4 40.6				
	eSKKS	4 46.0				
	iSS	4 56 18				
	eL	5 15				
	F	7 30				
Sept. 25 (274)	e	3 57				
	eL	4 07				
	F	4 30				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Sept. 25 (275)	ePP	15 36 12				(275) Aftershock of (273). USCGS: H. $15^h15^m00^s$.
	ePKS	15 37 27				
	eL	16 13				
	F	18 00				
Sept. 26 (276)	eL	4 04				(276) Aftershock of (273). USCGS: H. $3^h05^m11^s$.
	F	5 00				
Sept. 26 (277)	eL	9 15				(277) Aftershock of (273). USCGS: H. $8^h04^m13^s$.
	F	9 40				
Sept. 26 (278)	eL	23 30				(278) Aftershock of (273). USCGS: H. $22^h32^m00^s$.
	F	23 55				
Sept. 27 (279)	iP	15 41 31	(+)			(279) BCIS and USCGS: 60° N 149° W, H. $15^h30^m43^s$. JSA: 60°.3 N 147°.9 W, H. $15^h30^m47^s$. Near south coast of Alaska.
	ePP	15 44 05				
	iS	15 50 24				
	eSS	15 54 51				
	eL	16 02				
	F	19 30				
Sept. 28 (280)	eL	0 25				
	F	0 30				
Sept. 29 (281)	ez	5 11.5				
	eL	5 15				
	F	5 30				
Sept. 30 (282)	ePKP	4 18 51				(282) BCIS: 23° S 176° W, H. $3^h58^m52^s$. USCGS: 24° S $175\frac{1}{2}°$ W, H. $3^h58^m48^s$. JSA: 22°.1 S 177°.2 W, H. $3^h58^m54^s$. Tonga Island region.
	iPP	4 22 29				
	eSS	4 41.9				
	eL	5 18				
	F	7 00				
Sept. 30 (283)	ePKP	15 35 47				(283) BCIS: 21° S 170° E, H. $15^h16^m00^s$. USCGS: 22° S 170° E, H. $15^h16^m07^s$, h = about 100 km. JSA: 21°.4 S 169°.7 E, H. $15^h16^m02^s$. Loyalty Islands region.
	ePP	15 39 20				
	eL	16 36				
	F	17 30				
Sept. 30 (284)	ePKP	18 40.3				(284) Aftershock of (282). USCGS: H. $18^h19^m35^s$. JSA: H. $18^h19^m38^s$.
	eL	19 40				
	F	20 30				
Sept. 30 (285)	ePKP	22 26.5				(285) Aftershock of (282). USCGS: H. $22^h06^m55^s$. JSA: H. $22^h07^m00^s$.
	eL	23 29				
	F	0 30				
Oct. 1 (286)	eP	18 11 18				(286) USCGS: 8° S $31\frac{1}{2}°$ E, H. $18^h00^m42^s$. Tanganyika, South Africa.
	eL	18 35				
	F	19 00				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Oct. 4 (287)	iP	10 30 16	+	6	7	(287) BSIS: 1°.0 S 21°.5 W, H. $10^h20^m24^s$.
	iPP	10 32 24				USCGS: 1° S 21° W, H. $10^h20^m23^s$.
	iPPP	10 33 41				JSA: 1°.2 S 21°.6 W, H. $10^h20^m30^s$.
	iS	10 38 18				Atlantic Ocean.
	eSS	10 42.0				
	eSSS	10 44.7				
	eL	10 48				
	F	12 10				
Oct. 4 (288)	(eS	17 40 35)				(288) BCIS: H. $17^h33.5^m$.
	eL	17 42.5				Athens: 38°.5 N 21°.7 E.
	F	18 00				Greece.
Oct. 5 (289)	eL	16 30				(289) Aftershock of (288). USCGS: 39° N 22½° E,
	F	16 40				H. $16^h20^m35^s$. Near east coast of Greece.
Oct. 5 (290)	e	19 28				(290) BCIS and USCGS: H. $19^h17^m00^s$.
	F	19 45				New Britain region.
Oct. 5 (291)	e	21 12				
	F	21 25				
Oct. 5 (292)	e	21 52				
	F	22 10				
Oct. 7 (293)	iP	12 15 56	—			(293) BCIS: 33° S 58° E, H. $12^h02^m23^s$.
	iPP	12 19 56				USCGS: 33° S 56½° E, H. $12^h02^m19^s$, h = about 60 km.
	iPPP	12 21 57				JSA: 33°.7 S 56°.4 E, H. $12^h02^m30^s$, h = about 100 km.
	iSKS	12 26 42				Indian Ocean.
	ePS	12 28 50				
	eSS	12 34				
	eL	12 50				
	F	15 15				
Oct. 8 (294)	iP	3 12 57	+			(294) BCIS: 36°.3 N 15°.5 E, H. $3^h08^m49^s$.
	eS	3 16 24				USCGS: 36° N 16° E, H. $3^h08^m46^s$.
	L	3 18 30				Roma: 36°.3 N 14°.5 E, H. $3^h08^m49^s$.
	F	3 45				Off south coast of Sicily.
Oct. 8 (295)	eL	21 20				(295) BCIS: 22° N 121° E, H. $20^h34^m25^s$.
	F	21 50				USCGS: H. $20^h34^m19^s$. Off east coast of Formosa.
Oct. 12 (296)	e	22 55				
	F	23 10				
Oct. 13 (297)	ePKP	3 55 17				(297) BCIS: 19½° S 173° W, H. $3^h35^m24^s$.
	eL	4 55				USCGS: 16° S 176° W, H. $3^h35^m44^s$, h = about 200 km.
	F	5 50				Fiji Islands region.
Oct. 13 (298)	eL	10 41				(298) BCIS: 36° N 47° E, H. $10^h26^m12^s$.
	F	11 00				Northwestern Iran.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Oct. 18 (299)	eL	9 07				
	F	9 20				
Oct. 19 (300)	ePP	21 21 48				(300) Disturbed by microseisms.
	ePS	21 31				BCIS: 5½° S 154° E, H. $21^h00^m11^s$.
	eSS	21 38				USCGS: 6° S 154½° E, H. $21^h00^m17^s$, h = about 60 km.
	eL	21 55				Poona: 7°.0 S 152°.0 E, H. $21^h00^m25^s$.
	F	0 30				Solomon Islands.
Oct. 20 (301)	eL	2 48				(301) Disturbed by microseisms. BCIS: 47° N 93° E,
	F	3 05				H. 2^h 21.5^m. Altai mountains, Mongolia.
Oct. 20 (302)	ePKP	13 04 00				(302) Disturbed by microseisms. Aftershock of (300).
	ePP	13 05 53				USCGS: 5½° S 154° E, H. $12^h44^m54^s$.
	eL	13 40				Solomon Islands.
	F	15 10				
Oct. 21 (303)	eL	6 55				(303) USCGS: 21½° N 121° E, H. $6^h09^m01^s$.
	F	7 20				Off south coast of Formosa.
Oct. 21 (304)	ez	21 55 20				(304) Aftershock of (300).
	eL	22 30				USCGS: 5½° S 153½° E, H. $21^h34^m33^s$, h = about
	F	24 00				100 km. Solomon Islands.
Oct. 29 (305)	eL	7 27				(305) USCGS: 10° S 160° E, H. $6^h31^m46^s$.
	F	8 15				Solomon Islands.
Oct. 31 (306)	ePKP	0 22 12				(306) F in next shock. USCGS: H. $0^h02^m27^s$.
	eL	1 12				Tonga Islands region.
Oct. 31 (307)	iP	1 50 29	+			(307) USCGS: 56° N 135° W, H. $1^h39^m32^s$.
	iPP	1 53 00				Near coast of southeastern Alaska.
	iS	1 59 33				
	eSS	2 03.5				
	eSSS	2 07.4				
	eL	2 12				
	F	3 20				
Oct. 31 (308)	ePKP	18 14.6				(308) USCGS: 5½° S 154° E, H. $17^h55^m39^s$,
	ePP	18 16 37				h = about 100 km.
	eSS	18 33.5				Solomon Islands region.
	eL	18 50				
	F	20 10				
Nov. 1 (309)	eS	13 21.5				(309) Disturbed by microseisms.
	eL	13 30				BCIS and USCGS: 48° N 93° E, H. $13^h04^m25^s$.
	F	14 00				Mongolia.
Nov. 2 (310)	ePP	2 52.1				(310) Disturbed by microseisms.
	eL	3 25				BCIS: 3° S 134° E, H. $2^h32^m29^s$. USCGS: 3° S 135° E,
	F	5 00				H. $2^h32^m32^s$. JSA: 3°.0 S 135°.5 E, H. $2^h32^m32^s$. North-
						western New Guinea.

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Nov. 3 (311)	iP	1 24 09	+			(311) USCGS: 48½° N 154° E, H. 1h12m37s, h = about 200 km. JSA: 48°.8 N 154°.4 E, H. 1h12m47s, h = about 190 km. CMO: 48°.8 154°.5 E, h = 160 km. Kurile Islands.
	ipP	1 24 50				
	iPP	1 27 00				
	ipPP	1 27 38				
	iS	1 33 41				
	isS	1 34 47				
	eSS	1 39 38				
	eL	1 51				
	F	2 30				
Nov. 4 (312)	eL	21 27				(312) Disturbed by microseisms. USCGS: 32°.2 N 116°.6 W, H. 20h42m40s. JSA: 31°.9 N 117°.1 W, H. 20h42m38s. Lower California.
	F	21 40				
Nov. 7 (313)	iPKP	6 18 30				(313) Disturbed by microseisms. USCGS: 14° S 167° E, H. 5h59m41s, h = about 60 km. JSA: 14°.0 S 166°.7 E, H. 5h59m47s, h = 75 km. New Hebrides Islands.
	iPKS	6 22 10				
	iz	6 22 25				
	eSS	6 40.3				
	eL	7 03				
	F	8 30				
Nov. 11 (314)	eS	16 07.9				(314) Disturbed by microseisms. BCIS: 21½° N 121° E, H. 15h44.3m. USCGS: 23° N 121° E, H. 15h44m18s. Formosa.
	eL	16 32				
	F	17 00				
Nov. 13 (315)	eL	5 21				(315) Disturbed by microseisms. USCGS: 11° N 85½° W, H. 4h42m40s, h = about 60 km. JSA: 11°.0 N 86°.0 W, H. 4h42m35s. Southwestern Nicaragua.
	F	6 00				
Nov. 20 (316)	iP	7 22 22	(+)			(316) BCIS and JSA: 28°.1 N 112°.6 W, H. 7h09m43s. USCGS: 28° N 112° W, H. 7h09m47s. California.
	eS	7 32 40				
	eSS	7 38.0				
	eL	7 44				
	F	10 00				
Nov. 22 (317)	iPKP1	1 11 32	+			(317) Disturbed by microseisms. BCIS and USCGS: 28½° S 178½° W, H. 0h51m48s, h = about 150 km. JSA: 28°.7 S 176°.4 W, H. 0h51m32s, h = about 150 km. Kermadec Islands.
	iPKP2	1 12 01				
	iz	1 12 21				
	iz	1 13 00				
	iPP	1 15 37				
	iz	1 19 16				
	iSKKS	1 26 00				
	F	3 10				
Nov. 23 (318)	eL	17 01				(318) Disturbed by microseisms. USCGS: 39° N 26° E, H. 16h51m00s. Aegean Sea.
	F	17 15				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Nov. 27 (319)	iPKP	9 01 58	+			(319) Disturbed by microseisms. BCIS and USCGS: 18½° S 173° W, H. 8h42m20s, h = 60 km. JSA: 17°.5 S 174°.2 W, H. 8h42m28s, h = about 100 km. Tonga Islands region.
	iz	9 02 22				
	iz	9 02 56				
	ez	9 16 21				
	eSS	9 24.2				
	eSSS	9 29				
	eL	9 51				
	F	11 30				
Dec. 7 (320)	eL	16 26				(320) Disturbed by microseisms. BCIS: H. 16h13m47s. Trieste: 34°.6 N 24°.4 E, H. 16h13m34s. Off south coast of Crete.
	F	16 30				
Dec. 10 (321)	eL	20 10				(321) USCGS: H. 19h37m05s. Eastern India.
	F	20 30				
Dec. 17 (322)	iPKP	7 14 10	—			(322) Disturbed by microseisms. USCGS: 54½° S 70° W, H. 6h53m23s. JSA: 53°.3 S 71°.1 W, H. 6h53m30s. Southern Magellanes Province, Chile. Destructive in Punta Arenas.
	iz	7 14 37				
	iPP	7 15 21				
	eSKKS	7 22 24				
	eSS	7 30.2				
	eL	7 43				
	F	10 30				
Dec. 17 (323)	iPKP	15 28 37				(323) Disturbed by microseisms. USCGS: 54½° S 70° W, H. 15h07m48s. JSA: 53°.5 S 72°.5 W. H. 15h07m56s. Southern Magellanes Province, Chile.
	eSKKS	15 36 30				
	eSS	15 45 22				
	F	18 50				
Dec. 20 (324)	eL	1 00				(324) Disturbed by microseisms. Poona: 27°.5 N 54° E, H. 0h34m28s.
	F	1 15				
Dec. 21 (325)	eS	12 51				(325) Disturbed by microseisms. USCGS: 18½° N 67° W, H. 12h31m19s, h = about 100 km. JSA: 19°.0 N 67°.5 W, H. 12h31m29s, h = about 100 km. Near coast of Puerto Rico.
	eL	13 00				
	F	13 25				
Dec. 21 (326)	iP	19 45 20	—			(326) USCGS: 20° S 64° W, H. 19h33m00s, h = about 600 km. JSA: 18°.7 S 63°.0 W, H. 19h33m10s, h = about 600 km. Southern Bolivia.
	epP	19 47 30				
	eS	19 54 59				
	esS	19 58 19				
	F	20 40				
Dec. 22 (327)	iP	9 43 07	—			(327) USCGS: 16° N 93° W, H. 9h30m47s, h = about 100 km. JSA: 15°.9 N 93°.0 W, H. 9h30m50s, h = about 100 km. Tacubaya: 16°24′ N 93°05′ W, H. 9h30m49s, h = 100 km. Chiapas, Mexico.
	ipP	9 43 30				
	eS	9 53 16				
	ePPS	9 54 34				
	eSS	9 58				
	eL	10 10				
	F	11 40				

Date 1949	Phase	Time	Direction	Period	Amplitude	Remarks
		h m s		s	μ	
Dec. 23 (328)	eL	22 22				(328) Disturbed by microseisms. USCGS: H. $21^h33^m30^s$. About 100 miles south of Formosa.
	F	22 35				
Dec. 26 (329)	eL	0 00				(329) Disturbed by microseisms. USCGS: 36° N 139° E, H. $23^h24^m52^s$. JSA: 36°.7 N 139°.6 E, H. $23^h24^m57^s$. Honshu, Japan. 8 killed and heavy property damage.
	F	0 45				
Dec. 26 (330)	iPKP	6 44 13				(330) Disturbed by microseisms. USCGS: 16° S 180°, H. $6^h24^m00^s$, h = about 100 km. JSA: 15°.6 S 180°, H. $6^h23^m54^s$. Fiji Islands region.
	eSS	7 05				
	eL	7 30				
	F	9 30				
Dec. 28 (331)	ePKP	0 16.0				(331) Disturbed by microseisms. USCGS: 59½° S 21° W, H. $23^h57^m13^s$. JSA: 59°.7 S 20°.3 W, H. $23^h57^m15^s$. Sandwich Islands.
	ePP	0 16.8				
	ePS	0 26 20				
	ePPS	0 27 08				
	eSS	0 32.0				
	eL	0 46				
	F	2 00				
Dec. 28 (332)	eL	4 05				(332) Disturbed by microseisms. BCIS: Foreshock of (333), H. $3^h50^m54^s$. USCGS: H. $3^h50^m59^s$. Azores region.
	F	4 10				
Dec. 28 (333)	eS	6 35 40				(333) Disturbed by microseisms. BCIS: 41° N 29½° W, H. $6^h25^m24^s$. USCGS: 41° N 29° W, H. $6^h25^m25^s$. Azores region.
	eL	6 38				
	F	7 00				
Dec. 29 (334)	iP	3 17 00	+			(334) Disturbed by microseisms. USCGS: 17½° N 121½° E, H. $3^h03^m50^s$. JSA: 17°.8 N 121°.5 E, H. $3^h03^m55^s$. Northern Luzon. Heavy property damage. Seawave near Mercedes.
	eS	3 27 34				
	eL	3 49				
	F	6 30				
Dec. 29 (335)	e	7 10				(336) Disturbed by microseisms. Aftershock of (334). USCGS: H. $6^h22^m54^s$.
	F	7 50				
Dec. 29 (336)	e	11 03				(336) Disturbed by microseisms. Aftershock of (334). USCGS: H. $10^h17^m53^s$.
	F	12 10				
Dec. 29 (337)	$iPKP_1$	17 03 27				(337) Disturbed by microseisms. USCGS: 27° S 176½° W, H. $16^h42^m56^s$, h = about 200 km. JSA: 26°.5 S 177°.2 W, H. $16^h43^m01^s$, h = about 200 km. Kermadec Islands region.
	$ePKP_2$	17 04 17				
	eSS	17 26 20				
	eL	18 08				
	F	19 20				