The International Seismological Summary.

1948 April, May, June.

INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION.
ASSOCIATION OF SEISMOLOGY.
FORMERLY THE BULLETIN OF
THE BRITISH ASSOCIATION SEISMOLOGY COMMITTEE.

The Director of the I.S.S. wishes to express his thanks to U.N.E.S.C.O. and H.M. Treasury for financial support, which has covered the cost and preparation of this volume.

The second quarter for 1948 contains 149 epicentres, 100 of which are repetitions from previously adopted epicentres.

Cases of abnormal focal depth are noted below :—

April	3d. 7h.	4·7°N.	125·3°E.	0·015
	9d. 3h.	49·6°N.	153·0°E.	0·020
	11d. 15h.	32·9°N.	136·9°E.	0·060
	12d. 6h.	14·8°N.	90·1°W.	0·010
	17d. 16h.	33·0°N.	135·6°E.	Suggested Deep.
	20d. 4h.	31·8°S.	179·5°E.	0·060
	24d. 12h.	45·7°N.	26·8°E.	0·025
	28d. 12h.	10·5°N.	62·6°W.	0·010
	29d. 0h.	45·7°N.	26·8°E.	0·025
	29d. 15h.	50·8°N.	154·2°E.	0·015
	30d. 14h.	35·9°N.	31·1°E.	Suggested Deep.

			°	°	
May	1d.	22h.	53·6N.	159·5E.	Suggested Deep.
	2d.	0h.	36·8N.	142·9E.	0·005
	8d.	2h.	44·7N.	150·3E.	0·005
	10d.	9h.	18·3N.	145·2E.	0·015
	11d.	8h.	17·4S.	71·0W.	0·005
	11d.	9h.	17·4S.	71·0W.	0·005
	12d.	0h.	37·8N.	142·6E.	0·005
	12d.	1h.	37·8N.	142·6E.	0·005
	13d.	23h.	2·0N.	124·0E.	0·030
	14d.	13h.	37·8N.	142·6E.	Base of Superficial Layers.
	14d.	22h.	54·3N.	161·5W.	Suggested Deep.
	15d.	2h.	54·3N.	161·5W.	Suggested Deep.
	16d.	21h.	37·8N.	143·3E.	Suggested Deep.
	22d.	19h.	52·8N.	168·2W.	0·010
	23d.	4h.	16·1S.	168·3E.	0·015
	28d.	5h.	13·1S.	76·2W.	Base of Superficial Layers.
	28d.	23h.	37·8N.	142·6E.	0·005
	29d.	4h.	45·7N.	26·8E.	0·015
June	4d.	18h.	36·0N.	140·1E.	0·005
	7d.	7h.	49·0N.	8·3E.	Suggested Deep.
	8d.	17h.	37·1N.	71·2E.	0·015
	14d.	9h.	8·5S.	74·0W.	0·020
	14d.	10h.	37·4N.	137·9E.	0·005
	20d.	0h.	34·7N.	137·9E.	0·040
	25d.	9h.	1·8S.	77·7W.	0·025
	27d.	15h.	36·3N.	71·0E.	0·030
	28d.	7h.	36·1N.	136·2E.	Suggested Deep.
	29d.	10h.	15·3S.	172·5W.	Suggested Deep.

Thanks are also due to the Director of the Meteorological Office and the Superintendent of Kew Observatory for hospitality extended to the staff and assistance with the administration.

KEW OBSERVATORY,
Richmond,
SURREY.

May, 1956.

1948 APRIL, MAY, JUNE.

April 1d. Readings at 1h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, near La Paz, and near Apia), 2h. (Pierce Ferry), 4h. (Bogota), 6h. (Pierce Ferry), 7h. (near Manzanillo), 9h. (Pierce Ferry), 14h. (Hungry Horse), 17h. (Andijan and near Murgab), 19h. (Pierce Ferry, Fresno, and near Batavia), 20h. (Pierce Ferry, La Paz, and near Kulyab), 21h. (Pasadena, Mount Wilson, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Lick (2), near Murgab, Andijan, Frunse, Almata, Obi-garm, Kulyab, Tchimkent, and Stalinabad), 22h. (La Paz), 23h. (Mount Wilson, Riverside, Tucson, Boulder City, Hungry Horse, Shasta Dam, La Plata, and La Paz).

April 2d. Readings at 0h. (Ashkabad, Almata, Tashkent (2), Tchimkent (2), Frunse (2), near Kulyab (4), Andijan (2), Murgab (2), Obi-garm (3), Samarkand (2), and Stalinabad (4)), 1h. (near Kulyab (3)), 2h. (near Kulyab), 3h. (near Berkeley, Branner, Lick, and San Francisco), 5h. (Ksara and near Mineral), 6h. (near Kulyab), 7h. (Ksara, Apia, Pasadena, Mount Wilson, Haiwee, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam), 10h. (near Kulyab), 11h. (Hungry Horse, Pierce Ferry, near Branner, Lick, near Kulyab, near Andijan, Murgab, Stalinabad, near Granada, and near Alicante), 14h. (near Lick), 17h. (Batavia), 20h. (Samarkand, Andijan, near Kulyab, Obi-garm, Stalinabad, Murgab, and near Ottawa), 21h. (near Lick), 23h. (De Bilt).

April 3d. 7h. 42m. 43s. Epicentre 4°·7N. 125°·3E. Depth of focus 0·015.

A = −·5760, B = +·8134, C = +·0820 ; δ = +12 ; h = +7 ;
D = +·816, E = +·578 ; G = −·047, H = +·067, K = −·997.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		21·4	240	i 4 42	+ 3	i 8 30	+ 7	i 5 21	pP	—
Miyazaki		27·6	12	e 5 45	+ 8	i 10 8	0	—	—	—
Nagoya		32·1	19	6 18	+ 1	11 16	− 3	—	—	—
Gihu		32·3	19	6 20	+ 1	—	—	—	—	—
Shizuoka		32·4	21	6 20	0	11 22	− 1	—	—	—
Hunatu		33·0	21	e 6 29	+ 4	11 33	0	e 15 34	?	—
Tokyo		33·6	22	6 23	− 7	11 25	−17	—	—	—
Kakioka		34·2	22	6 33	− 2	11 44	− 7	—	—	—
Hukusima		35·7	21	6 49	+ 1	12 10	− 4	—	—	—
Mizusawa		37·1	20	7 2	+ 2	12 33	− 3	—	—	—
Vladivostok		38·7	7	i 7 12	− 1	i 12 51	− 9	i 7 50	pP	—
Sapporo		40·7	17	7 31	+ 2	13 30	0	—	—	—
Brisbane	N.	41·7	141	i 7 37	− 1	i 13 33	−11	—	—	i 16·9
Colombo	E.	45·2	275	8 8	+ 2	14 43	+ 8	10 5	PP	—
Riverview		45·5	149	i 8 10a	+ 2	i 14 39	0	i 17 59	SS	—
Hyderabad	N.	47·5	289	e 8 24	0	15 6	− 2	17 56	SS	—
Kodaikanal	E.	47·7	280	i 8 17	− 8	i 14 57	−13	—	—	—
Irkutsk		50·5	343	e 8 50	+ 3	i 15 44	− 5	e 9 30	pP	—
Bombay		53·1	290	e 9 5	− 1	e 16 22	− 3	—	—	—
Almata		57·3	320	9 36	− 1	17 17	− 4	—	—	—
Murgab		57·3	313	i 9 36?	− 1	i 17 18?	− 3	—	—	—
Frunse		58·7	318	e 9 46	0	—	—	—	—	—
Andijan		59·4	315	9 51	0	i 17 45	− 3	—	—	—
Kulyab		60·2	311	i 9 57?	0	i 17 54?	− 4	—	—	—
Obi-garm		60·6	312	i 9 59	0	i 18 0	− 3	—	—	—
Stalinabad		61·2	312	i 10 2	− 1	i 18 7	− 4	e 10 45	pP	—
Tashkent		61·7	314	i 10 3?	− 4	i 18 13?	− 5	e 10 45?	pP	—
Tchimkent		61·9	316	i 10 9	+ 1	i 18 17	− 3	—	—	—
Wellington		64·3	140	10 20	− 4	19 55	+65	i 11 1	pP	—
Ashkabad		69·0	308	e 10 54	0	—	—	—	—	—
Sverdlovsk		72·4	328	11 11	− 3	i 20 16	−10	e 21 26	sS	—
Baku		75·8	311	—	—	e 21 0	− 3	—	—	—
Grozny		79·2	313	e 11 55	+ 3	e 21 33?	− 7	—	—	—
Moscow		84·8	325	e 12 22	+ 1	—	—	—	—	—
Ksara		86·9	303	e 12 31	0	e 22 59	+ 2	24 0	sS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Yalta		87·5	314	—	—	e 22 51	[+ 3]	—	—	—
Helwan		91·1	300	i 13 10	+19	—	—	i 13 32	pP	—
Shasta Dam		103·6	46	e 13 47	− 1	e 24 34	SKKS	e 17 59	PP	—
Hungry Horse		106·1	37	i 13 59	0	e 24 19	[− 6]	i 18 26	PP	—
Tinemaha	z.	107·8	49	e 17 39	?	—	—	i 18 19	PKP	—
Haiwee	z.	108·3	50	e 18 41	PP	—	—	—	—	—
Mount Wilson	z.	108·9	52	e 17 38	?	—	—	i 18 15	PKP	—
Pasadena	z.	108·9	52	e 17 36	?	—	—	i 18 4	PKP	—
Riverside	z.	109·5	52	e 17 35	?	—	—	e 18 21	PKP	—
Palomar	z.	110·2	52	i 18 45	PP	—	—	i 20 29	?	—
Pierce Ferry		111·3	49	e 18 33	[+14]	i 28 35	PS	—	—	—
Tucson		115·3	51	e 18 28	[+ 1]	—	—	i 19 35	PP	—
Huancayo		158·3	111	e 19 46	[+ 4]	—	—	e 24 1	PP	—
Bogota		158·5	64	e 20 41	[+59]	e 31 30	?	i 21 19	pPKP	—
La Paz		162·4	133	20 29	PKP_2	i 31 17	SKKS	—	—	—

Additional readings :—
Batavia i = 6m.6s.
Vladivostok isS = 13m.59s.
Riverview iZ = 9m.10s., eSEN = 14m.36s., iS_eSEN = 17m.47s., iEN = 18m.12s., iE = 18m.21s., iSSSE = 19m.8s.
Irkutsk sS = 16m.55s.
Bombay ePN = 9m.9s.
Stalinabad sS = 19m.20s.
Helwan eN = 23m.33s.
Shasta Dam e = 17m.1s.
Mount Wilson eZ = 18m.42s.
Riverside eZ = 18m.49s.
Tucson ePPP? = 21m.54s., ePKKP = 29m.8s.
Huancayo i = 20m.23s.
Bogota iPPEZ = 21m.25s.
Long waves were also recorded at Kew.

April 3d. Readings also at 1h. (Stuttgart), 3h. (Brisbane), 6h. (near Murgab, Andijan, Kulyab, Obi-garm, and Stalinabad), 7h. (Auckland, near Apia, Palomar, Riverside, Tinemaha, Tucson, near Shasta Dam, and near Ferndale), 10h. (near Obi-garm), 12h. (San Francisco), 16h. (near Alicante), 17h. (Pasadena, Mount Wilson, Palomar, Riverside, Tinemaha, and Shasta Dam), 18h. (near Bogota), 20h. (Mizusawa), 23h. (near Manzanillo).

April 4d. Readings at 2h. (near Ottawa), 3h. (Brisbane, Riverview, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Andijan, near Kulyab, Murgab, Obi-garm, and Stalinabad), 4h. (Helwan, Ksara, Istanbul, Triest, Rome, Messina, Strasbourg, Stuttgart, Zürich, and Paris), 5h. (Hungry Horse, Alicante, De Bilt, Upsala, Copenhagen, Warsaw, near Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 8h. (Tucand near Lick), 9h. (Branner, near Lick, Andijan, Samarkand, near Kulyab, Murgab, Obi-garm (2), and Stalinabad), 12h. (Branner, Fresno, near Berkeley, and Lick), 13h. (near Lick), 14h. (Paris and Rome), 15h. (near Lick), 16h. (Mount Wilson, Pasadena, Tucson, and Pierce Ferry), 17h. (Ksara, Batavia, and near Ashkabad), 18h. (near Batavia), 19h. (Mount Wilson, Pasadena, Palomar, Tucson, Stuttgart, Ksara, Auckland, near Apia, and near Mizusawa), 21h. (La Paz), 22h. (Hungry Horse and near Lick), 23h. (Istanbul, Tucson, and near Apia).

April 5d. Readings at 4h. (Rome, Triest, and near Obi-garm), 6h. (Upsala), 7h. (Mount Wilson, Riverside, Tinemaha, Tucson, Pierce Ferry, Hungry Horse, La Paz, Obigarm, and near Alicante), 10h. (near Apia), 13h. (Upsala and near Tananarive), 14h. (near Tacubaya), 15h. (Hungry Horse, San Francisco, near Berkeley, Branner, and Lick), 16h. (La Paz), 17h. (near Lick), 18h. (Bombay and near Mineral), 19h. (Tacubaya, Mount Wilson, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Shasta Dam, and Hungry Horse), 21h. (near Obi-garm).

April 6d. 2h. 27m. 44s. Epicentre 7°·0S. 111°·0E.

Approximate epicentre.

A = − ·3557, B = + ·9267, C = − ·1211 ; δ = −4 ; h = +7 ;
D = + ·934, E = + ·358 ; G = + ·043, H = − ·113, K = − ·993.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		4·2	281	i 1 8	+ 1	i 1 55	− 2	—	—	e 5·3
Vladivostok		53·4	21	i 9 32	+ 8	e 17 9	+14	—	—	—
Irkutsk		59·3	356	e 10 11	+ 5	e 18 24	+10	—	—	—
Andijan		59·3	327	e 10 5	− 1	e 18 12	− 2	—	—	—
Obi-garm		59·5	324	i 10 5	− 2	—	—	—	—	—
Stalinabad		59·9	323	i 10 8	− 2	e 18 13	− 8	—	—	—
Samarkand		61·7	322	i 10 18	− 4	—	—	—	—	—
Ashkabad		66·3	317	e 10 51	− 1	—	—	—	—	—
Sverdlovsk		75·7	334	i 11 50	+ 1	e 21 26	− 4	—	—	—
Grozny		77·3	317	e 11 55	− 3	—	—	—	—	—
Shasta Dam		121·9	46	e 18 55	[− 1]	—	—	—	—	—
Hungry Horse		123·9	34	i 19 11	[+11]	—	—	—	—	—
Tinemaha	z.	126·2	49	i 19 6	[+ 1]	—	—	—	—	—
Mount Wilson	z.	127·4	52	i 19 8	[+ 1]	—	—	—	—	—
Riverside	z.	128·0	52	i 19 7	[− 1]	—	—	—	—	—
Tucson		133·7	50	i 19 21	[+ 2]	—	—	i 22 45	PKS	—
Kirkland Lake		137·9	10	e 19 27	[0]	—	—	e 22 18	PP	—
St. Louis		143·1	27	i 19 34	[− 2]	—	—	—	—	—
Harvard		144·6	2	i 19 39	[+ 1]	—	—	—	—	—
Fordham		146·0	5	i 19 43	[+ 2]	—	—	—	—	—

Additional readings :—
Tinemaha iZ = 19m.31s.
Mount Wilson iZ = 19m.34s.
Riverside iZ = 19m.35s.
Tucson i = 19m.46s.
St. Louis i = 19m.57s.

April 6d. Readings also at 0h. (Tacubaya, St. Louis, Mount Wilson, Riverside, Tucson, Pierce Ferry, Shasta Dam, Hungry Horse (2), and Sitka), 4h. (near Kulyab), 6h. (near Andijan, Frunse, Kulyab, Murgab, Obi-garm, Stalinabad, Samarkand, Tashkent, and Tchimkent), 10h. (near Bogota), 11h. (Mount Wilson, Riverside, Tinemaha, Tucson, Pierce Ferry, and Shasta Dam), 12h. (Kulyab, Murgab, near Andijan, Frunse, and near Alicante), 13h. (Uccle), 14h. (Hungry Horse, Sitka, and Stuttgart), 15h. (La Paz), 21h. (near Kulyab, and near Mizusawa), 22h. (near Bogota).

April 7d. Readings at 1h. (near Batavia and near Kulyab), 3h. (Murgab, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 4h. (near Granada), 5h. (near Balboa Heights), 6h. (Frunse, Samarkand, Tashkent, near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and Tchimkent), 7h. (near Alicante), 9h. (near Kulyab, Murgab, Obi-garm, and Stalinabad), 10h. (near Granada), 12h. and 13h. (near Apia), 15h. (Paris), 17h. (near Taranto), 19h. (Shasta Dam), 20h. (Fresno and Shasta Dam), 21h. (near Branner), 23h. (Murgab, Samarkand, Tchimkent, near Andijan, Obi-garm, and Stalinabad).

April 8d. Readings at 0h. (Hungry Horse, Murgab, Samarkand, near Obi-garm, and Stalinabad), 1h. (Hungry Horse, and near Istanbul), 3h. and 4h. (near Apia), 6h. (Tucson), 8h. (Andijan, Frunse, Samarkand, Tashkent, Tchimkent, near Murgab, Obi-garm, and Stalinabad), 9h. (Hungry Horse (2)), 11h. (Brisbane, Riverview, Shasta Dam, Hungry Horse, Strasbourg, near Basle, Neuchatel, Zürich, and Stuttgart), 12h. (Hungry Horse), 13h. (Hungry Horse, and near Mizusawa), 14h. (Kew), 19h. (near Ottawa), 20h. (near Mizusawa).

April 9d. 3h. 17m. 29s. Epicentre 49°·6N. 153°·0E. Depth of focus 0·020.

A = −·5798, B = +·2954, C = +·7593 ; δ = −3 ; h = −5 ;
D = +·454, E = +·891 ; G = −677, H = +·345, K = −·651.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Mizusawa	E.	13·5	223	3 5	− 1	5 23	− 9	—	—
Vladivostok		15·9	254	i 3 36	0	i 6 40	+13	—	—
Irkutsk		30·4	296	e 6 0	+ 1	e 10 47	0	—	—
Almata		50·7	295	e 8 47	+ 2	—	—	—	—
Sverdlovsk		51·7	317	i 8 53	0	i 16 0	•0	e 9 40	pP
Frunse		52·3	295	e 8 59	+ 2	—	—	—	—
Andijan		55·0	294	e 9 16?	− 1	e 16 46?	+ 1	—	—
Murgab		55·5	290	i 9 23	+ 3	i 16 51	0	—	—
Hungry Horse		57·1	53	i 9 32	0	e 19 1	?	—	—
Shasta Dam		57·3	64	i 9 33	0	—	—	e 11 38	PP
Obi-garm		57·8	294	i 9 37	0	i 17 21	0	—	—
Kulyab		58·3	293	i 9 40	0	i 17 28	0	—	—
Stalinabad		58·5	294	i 9 40	− 2	i 17 29	− 1	i 10 25	pP
Samarkand		58·8	296	e 9 44	0	—	—	—	—
Lick	z.	60·0	67	i 9 51	− 1	—	—	—	—
Tinemaha		62·1	65	i 10 7a	+ 1	—	—	—	—
Haiwee		63·0	65	i 10 12a	0	—	—	—	—
Santa Barbara	z.	63·1	68	i 10 13a	0	—	—	—	—
Pasadena		64·2	67	i 10 19a	− 1	e 18 41	− 2	e 11 4	pP
Riverside	z.	64·8	67	i 10 22a	− 2	—	—	i 10 39	pP
Boulder City		64·9	63	i 10 25	+ 1	—	—	i 11 10	pP
Pierce Ferry		65·3	63	i 10 27	0	e 19 1	+ 5	e 39 1	P′P′
Palomar		65·5	67	i 10 28a	0	e 18 58	0	—	—
La Jolla	z.	65·6	68	i 10 28a	− 1	—	—	—	—
Grozny		67·8	312	e 10 43	0	—	—	—	—
Tucson		69·9	64	i 10 55a	0	—	—	e 11 41	pP
Kirkland Lake		72·4	35	e 11 20	+10	—	—	—	—
Temiskaming		74·0	35	e 11 19	− 1	—	—	—	—
Stuttgart	z.	77·2	337	e 11 37	− 1	—	—	e 11 42	P
Strasbourg		77·7	338	i 11 41	+ 1	—	—	i 12 4	?
Basle		78·7	337	e 11 46	0	—	—	—	—
Paris		78·7	342	i 11 47	+ 1	—	—	—	—
Ksara		80·0	312	e 11 58	+ 5	e 22 28	PS	—	—
Toledo		88·6	343	i 12 36	0	—	—	—	—
La Paz	z.	133·2	60	i 22 12	PP	—	—	—	—

Additional readings :—
Sverdlovsk isP = 10m.4s., esS = 17m.14s.
Shasta Dam e = 14m.5s.
Stalinabad sS = 18m.48s.
Pasadena ePKP,PKPZ = 39m.2s.
Riverside ePKP,PKPZ = 39m.2s.
Boulder City e = 12m.46s., ePKP,PKP = 39m.2s.
Pierce Ferry i = 12m.6s.
Tucson ePKP,PKP = 38m.54s.

April 9d. 14h. 59m. 13s. Epicentre 29°·5N. 68°·5E.

A = +·3195, B = +·8111, C = +·4899 ; δ = −3 ; h = +2 ;
D = +·930, E = −·367 ; G = +·180, H = +·456, K = −·872.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		8·5	7	i 2 5	− 2	3 42	− 3	—	—	—
Stalinabad		9·1	2	i 2 13?	− 1	i 3 58?	− 2	—	—	—
Obi-garm		9·3	6	i 2 16	− 1	i 4 0	− 5	—	—	—
Samarkand		10·2	354	e 2 31	0	—	—	—	—	—
Bombay	N.	11·3	158	e 3 30	+44	e 5 32	SSS	—	—	e 6·3

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		11·8	3	e 2 50	− 3	e 4 58	− 8	—	—	—
Ashkabad		11·9	318	e 2 56	+ 2	—	—	—	—	—
Tchimkent		12·8	4	e 3 3	− 3	—	—	—	—	—
Frunse		14·2	19	e 3 25	+ 1	—	—	—	—	—
Almata		15·3	24	i 3 37	− 2	—	—	—	—	—
Baku		18·7	310	e 4 30	+ 8	e 8 2	+14	—	—	—
Calcutta	E.	19·1	107	e 4 30	+ 3	i 8 10	+13	—	—	9·4
Kodaikanal	E.	20·9	155	8 37	S	(8 37)	+ 2	—	—	—
Grozny		22·8	313	e 5 11	+ 6	—	—	—	—	—
Leninakan		23·0	305	e 5 19	+12	—	—	—	—	—
Sverdlovsk		27·9	350	5 54	0	e 10 31	− 6	—	—	—
Helwan	Z.	32·2	280	—	—	e 12 41	+56	—	—	—
Istanbul		33·9	300	e 6 47?	0	—	—	—	—	—
Irkutsk		34·8	38	e 8 18	PP	e 12 25	0	e 14 23	SS	—
Stuttgart		48·6	311	e 8 47	0	—	—	—	—	e 27·8
Alicante		56·7	299	—	—	e 22 15	?	—	—	—
Toledo		59·1	301	e 10 1	− 3	—	—	—	—	—

Long waves were also recorded at Hyderabad and at other European stations.

April 9d. Readings also at 0h. and 1h. (near Grozny), 4h. (Hungry Horse, Pierce Ferry, Shasta Dam, Samarkand, near Kulyab, Obi-garm, Stalinabad, and Murgab), 11h. (Ksara, Frunse, near Tchimkent, and Andijan), 13h. (Helwan, Istanbul, near Obi-garm, and near Alicante), 16h. (Istanbul), 17h. (Hungry Horse, Almata, Tchimkent, near Kulyab, Obi-garm, Stalinabad, Murgab, Andijan, Samarkand, Tashkent, and near Tananarive), 18h. (Messina, Rome, and near Grozny), 19h. (La Plata), 20h. (near Berkeley, Branner, Fresno, and Lick), 21h. (La Paz), 22h. (Berkeley and near Kulyab), 23h. (Fresno and near Kulyab (2)).

April 10d. 13h. Undetermined shock. Off the coast of Central America.

Oaxaca PE =46m.14s., iN =46m.53s., LE =47m.12s.
Tacubaya PE =47m.2s., SN =48m.35s., SE =48m.40s.
Bogota eZ =49m.28s., iZ =49m.32s.
Tucson eP =49m.58s.k, i =50m.14s., e =51m.37s., 57m.3s., and 58m.7s., eL =59m.54s.
Cleveland ePZ =50m.28s.a, eSE =55m.3s., eN =55m.13s. and 55m.17s., LE =58·6m.
Riverside ePZ =50m.50s.
Pasadena ePZ =50m.57s.
Tinemaha iPZ =51m.11s.
Fresno ePZ =51m.22s.
Hungry Horse eP =51m.56s.
La Paz eP? =56m.48s.
Stuttgart eZ =57m.20s.? and 57m.25s.
Long waves were also recorded at Berkeley and Philadelphia.

April 10d. Readings also at 0h. (Berkeley, Pasadena (2), Riverside, Pierce Ferry (2), Boulder City, Hungry Horse (2), Shasta Dam (2), Tucson (2), Jena, Stalinabad (2), Kulyab (2), Irkutsk, Sverdlovsk, and Tashkent (2), several shocks), 1h. (Rome, Istanbul, Stuttgart, Moscow, Simferopol, near Yalta, and Theodosia), 6h. (Catania), 10h. (near Huancayo), 11h. (Mount Wilson, Tinemaha, Pasadena, Riverside, Hungry Horse, and near Grozny), 12h. (La Paz), 14h. (Hungry Horse, Boulder City, Shasta Dam, Tucson, Riverside, Pasadena, Tinemaha, Tashkent, and near Kulyab), 16h. (Shasta Dam, Tucson, Riverside, Tinemaha, and near Istanbul), 17h. (near Apia), 19h. (near Baku and Grozny), 22h. (Tucson, Riverside, Pasadena, Tinemaha, Fresno, near Palomar, and near Tacubaya).

April 11d. 15h. 56m. 57s. Epicentre 32°·9N. 136°·9E. Depth of focus 0·060.
(as on 1947, February 18d.).

Intensity II-III at Yokohama, Tokyo, Kakioka, and Onahama. Macroseismic radius 300km. Depth 250km. Epicentre given as 31°·7N. 137°·8E.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948. Tokyo, 1950, p. 10, with macroseismic chart.

$A = -\cdot6143$, $B = +\cdot5748$, $C = +\cdot5406$; $\delta = +1$; $h = +1$;
$D = +\cdot683$, $E = +\cdot730$; $G = -\cdot395$, $E = +\cdot369$, $K = -\cdot841$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Owase		1·3	333	0 54	0	1 38	+ 2	—	—
Kameyama		2·0	350	0 59k	+ 1	1 47	+ 4	—	—
Omaesaki		2·0	33	1 1k	+ 3	1 51	+ 8	—	—
Osaka		2·1	327	1 0	+ 2	1 42	− 2	—	—
Sumoto		2·2	211	0 58k	− 1	1 43	− 2	—	—
Kobe		2·3	321	0 58a	− 2	1 45	− 1	—	—
Kyoto		2·3	335	0 59	− 1	1 45	− 1	—	—
Nagoya		2·3	1	1 1	+ 1	1 50	+ 4	—	—
Hikone		2·4	347	1 0	0	1 49	+ 1	—	—
Shizuoka		2·4	31	1 3k	+ 3	1 54	+ 6	—	—
Osima		2·8	48	1 6	+ 3	—	—	—	—
Hunatu		3·0	31	1 7	+ 2	2 2	+ 6	—	—
Toyooka		3·1	327	1 5	− 1	1 56	− 1	—	—
Yokohama		3·4	41	1 12	+ 4	2 8	+ 6	—	—
Tokyo		3·6	40	1 14k	+ 4	2 10	+ 5	—	—
Kumagaya		3·8	32	1 12k	0	2 11	+ 3	—	—
Toyama		3·8	4	1 8a	− 4	2 12	+ 4	—	—
Maebasi		3·9	26	1 16a	+ 4	2 13	+ 3	—	—
Nagano		3·9	15	1 12	0	2 11	+ 1	—	—
Tukubasan		4·2	38	1 16	+ 1	2 16	+ 2	—	—
Kakioka		4·3	38	1 17	+ 1	2 17	+ 1	—	—
Utunomiya		4·4	32	1 16k	− 1	2 17	− 1	—	—
Mito		4·5	39	1 20k	+ 2	2 21	+ 1	—	—
Wazima		4·5	0	1 21	+ 3	2 23	+ 3	—	—
Miyazaki		4·7	259	1 31k	+11	2 36	+13	—	—
Aikawa		5·2	12	1 26a	+ 1	2 32	0	—	—
Kumamoto		5·2	271	1 34k	+ 9	2 29	− 3	—	—
Onahama		5·2	38	1 25	0	2 31	− 1	—	—
Hukuoka		5·5	279	1 24	− 4	2 28	−10	—	—
Hukusima		5·6	30	1 32	+ 2	2 42	+ 2	—	—
Kagosima		5·6	258	1 23k	− 7	2 40	0	—	—
Sendai		6·3	29	1 37	0	2 52	− 1	—	—
Mizusawa		7·1	28	1 49	+ 3	3 10	0	—	—
Akita		7·3	20	2 4	+16	3 14	0	—	—
Morioka		7·6	25	1 51	− 1	3 17	− 3	—	—
Miyako		7·9	30	1 54	− 1	3 21	− 5	—	—
Aomori		8·5	20	2 1	− 1	3 39	+ 1	—	—
Mori		9·6	16	2 16	+ 2	4 5	+ 4	—	—
Sapporo		10·7	18	2 26	− 1	4 24	0	—	—
Vladivostok		10·9	340	i 2 25	− 4	e 4 19	− 9	—	—
Irkutsk		30·5	318	—	—	10 1	− 9	—	—
Andijan		51·2	297	e 8 19	− 6	i 15 3	− 8	—	—
Tashkent		53·4	298	—	—	e 15 29	−11	—	—
Kulyab		53·9	295	i 8 44	− 1	i 15 42	− 5	18 35	S_eS
Stalinabad		54·5	295	i 8 42?	− 7	i 15 45?	− 9	—	—
Samarkand		55·5	297	e 8 53	− 3	e 16 0	− 8	—	—
Shasta Dam		76·6	50	i 11 7	− 1	—	—	i 12 43	pP
Hungry Horse		77·3	40	i 11 11	− 1	i 20 26	0	i 13 2	pP
Mineral	z.	77·3	50	i 10 46	−26	—	—	—	—
Lick	z.	78·9	53	i 11 19	− 1	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tinemaha	z.	81·2	52	i 11 32	0	—	—	—	—
Mount Wilson	z.	83·0	53	i 11 41	0	—	—	—	—
Pasadena	z.	83·0	53	i 11 41	0	—	—	—	—
Riverside	z.	83·6	53	i 11 42	− 2	—	—	—	—
Palomar	z.	84·3	53	i 11 47	− 1	—	—	—	—
Tucson		89·0	51	e 12 11	+ 1	—	—	—	—

Additional readings :—
Mizusawa ePN = 1m.54s.
Palomar eZ = 12m.11s.

April 11d. Readings also at 0h. (Bogota, near Andijan, Kulyab, Obi-garm, Samarkand, and Stalinabad), 3h. (Hungry Horse and Shasta Dam), 4h. (near Apia and near Tacubaya), 6h. (Boulder City, Murgab, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 7h. (near Tacubaya), 9h. (Leninakan and near Erevan), 10h. (Istanbul), 11h. (Mount Wilson, Tucson, Shasta Dam, and near Apia), 12h. (Istanbul), 18h. (Shasta Dam), 20h. (near Alicante (2)), 23h. (near Mizusawa).

April 12d. 6h. 15m. 15s. Epicentre 14°·8N. 90°·1W. Depth of focus 0·010.

A = −·0017, B = −·9672, C = +·2538 ; δ = −11 ; h = +6 ;
D = −1·000, E = +·002 ; G = ·000, H = −·254, K = −·967.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida	z.	6·1	4	i 1 42	+13	i 2 58	+20	—	—	—
Tacubaya		9·8	299	e 2 26	+ 6	i 4 22	+14	—	—	—
Balboa Heights		11·8	118	e 2 50	+ 4	—	—	—	—	—
Mobile		15·9	6	3 52	+13	7 0	+28	—	—	—
Bogota		18·8	120	i 4 11	− 3	e 7 37	0	i 4 30	pP	—
San Juan		23·2	76	e 4 57	− 2	—	—	e 5 30	pP	e 10·0
St. Louis		23·8	0	i 5 4	− 1	i 9 21	+11	i 5 45	pP	—
Tucson		25·7	317	e 5 20	− 3	—	—	i 6 0a	pP	e 15·3
Cleveland		27·6	14	i 5 40a	0	i 10 13	0	i 6 18	PP	—
Philadelphia		28·3	26	i 5 48	+ 2	e 10 24	0	—	—	—
Bermuda		29·0	48	e 6 3	+10	—	—	—	—	e 12·0
Fordham		29·6	25	i 5 57	− 1	—	—	—	—	e 12·6
Pierce Ferry		30·1	320	i 6 1	− 1	—	—	i 6 40	pP	—
Huancayo		30·4	149	e 6 3	− 2	e 10 49	− 8	e 8 58	PcP	e 13·6
Palomar		30·5	312	i 6 3a	− 3	—	—	i 6 42	pP	—
Boulder City		30·6	318	i 6 5	− 2	—	—	e 6 45	pP	—
Riverside	z.	31·2	313	i 6 10a	− 2	—	—	e 6 49	pP	—
Rapid City	E.	31·3	342	e 6 20	+ 7	e 11 46	+34	e 7 32	PP	—
Mount Wilson	z.	31·8	313	i 6 15a	− 2	—	—	i 6 54	pP	—
Pasadena	z.	31·8	313	i 6 15a	− 2	—	—	i 6 54	pP	—
Harvard		31·9	27	i 6 17	− 1	—	—	—	—	—
Ottawa		32·8	18	6 25	− 1	11 33	− 2	12 51	SS	14·8
Temiskaming		33·1	14	6 29	0	11 37	− 3	—	—	—
Tinemaha	z.	33·5	318	i 6 30a	− 2	—	—	i 7 10	pP	—
Fresno	z.	34·3	316	e 6 34	− 5	—	—	—	—	—
Kirkland Lake		34·3	11	6 37	− 2	—	—	—	—	—
Lick	z.	35·9	315	i 6 50	− 2	—	—	—	—	—
Mineral	z.	37·4	319	i 7 4	− 1	—	—	i 7 43	pP	—
La Paz		37·9	143	7 14	+ 5	i 12 45	− 8	15 37	SS	—
Shasta Dam		38·1	319	e 7 6	− 5	e 12 46	−10	e 7 30	pP	—
Hungry Horse		38·8	335	i 7 15	− 2	i 12 51	−16	—	—	i 20·8
Alicante		80·7	53	e 12 16	+12	—	—	—	—	e 38·1
De Bilt		81·7	38	e 13 15	+66	—	—	—	—	e 54·8
Strasbourg		84·2	41	e 13 15	+53	—	—	—	—	—
Copenhagen		84·8	33	—	—	22 36	− 7	—	—	51·8
Stuttgart		85·0	41	e 12 20	− 6	e 29 58	sSS	e 13 8	pP	—
Sverdlovsk		104·6	16	17 7	?	—	—	—	—	—
Ksara		109·4	45	e 16 59	?	—	—	—	—	—
Tashkent		121·0	18	e 16 5?	?	—	—	—	—	—
Stalinabad		123·4	19	i 16 8	?	—	—	—	—	—
Bombay		142·5	27	—	—	e 25 45?	PPP	—	—	—

For Notes see next page.

NOTES TO APRIL 12d. 6h. 15m. 15s.

Additional readings :—
Tacubaya iE = 2m.47s., iN = 4m.3s., iE = 4m.31s.
Bogota ipPZ = 4m.14s.
San Juan ePP = 6m.3s.
St. Louis i = 10m.19s.
Tucson i = 5m.25s., isP = 6m.22s., i = 6m.54s., esS = 10m.46s., iS_cP = 12m.7s.
Cleveland eSEN = 10m.10s., iSSN = 11m.25s., eE = 11m.35s., iN = 11m.39s.
Riverside iP_cPZ = 8m.57s., iS_cPZ = 12m.23s.
Pasadena eZ = 6m.45s., iS_cPZ = 12m.25s.
Tinemaha eP_cPZ = 9m.5s., iS_cPZ = 12m.31s.
Fresno eN = 6m.39s., eE = 6m.54s.
Copenhagen 23m.55s. and 24m.6s.
Stuttgart ePPZ = 15m.40s.
Long waves were also recorded at Uccle and Warsaw.

April 12d. 7h. Undetermined shock. West Indies.

Port au Prince eP = 53m.9s., i = 53m.24s., iS = 53m.44s., iL = 54m.9s.
Bogota iPZ = 55m.0s., ipPZ = 58m.3s., iSZ = 58m.22s.
Huancayo eP = 57m.49s.
Tucson iP = 58m.52s., e = 59m.3s.
Pierce Ferry iP = 59m.20s.
Boulder City eP = 59m.25s.
Riverside iPZ = 59m.39s.
Hungry Horse iP = 59m.48s.
Tinemaha iPZ = 59m.48s., iZ = 59m.56s.
Shasta Dam eP = 60m.13s., e = 60m.22s.
Harvard e = 60m.48s.

April 12d. 8h. 49m. 9s. Epicentre 6°·6S. 152°·1E.

A = −·8780, B = +·4649, C = −·1142 ; δ = +6 ; h = +7 ;
D = +·468, E = +·884 ; G = +·101, H = −·053, K = −·993.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	20·8	179	i 5 1	+16	e 8 41	+ 8	e 9 11	SS	e 14·0
Riverview		27·1	183	i 5 49a	+ 3	i 10 28	+ 4	i 10 40	sS	e 12·8
Apia		36·2	104	e 7 3	− 3	—	—	—	—	e 16·8
Auckland		36·6	149	7 8	− 2	12 52	− 1	8 38	PP	17·6
Arapuni		37·9	149	—	—	e 13 51?	+38	—	—	—
Wellington		40·0	153	7 32	− 6	13 34	−10	7 57	pP	19·4
Christchurch		41·0	158	7 47	+ 1	13 57	− 2	e 8 43	PP	20·4
Perth		42·2	228	—	—	i 14 14	− 3	—	—	i 20·4
Batavia		45·0	268	e 8 17	− 2	i 14 23	−35	i 10 26	P_cP	—
Mizusawa		46·6	348	e 8 32	0	9 23	PP	—	—	—
Vladivostok		52·8	341	i 9 18	− 1	i 16 45	− 2	—	—	—
Irkutsk		71·3	331	i 11 23	0	i 20 44	+ 3	i 11 37	pP	—
Kodaikanal	E.	76·2	282	i 11 51	− 1	e 21 31	− 5	—	—	—
Hyderabad	N.	76·5	290	e 11 52	− 2	21 31	− 8	—	—	—
Bombay		82·1	290	e 12 4	−20	e 22 17	−21	—	—	—
College		83·8	22	—	—	e 22 52	− 3	e 28 3	SS	e 34·4
Almata		83·8	315	i 12 33	+ 1	e 22 58	+ 3	—	—	—
Murgab		84·9	309	i 12 38?	0	i 23 1?	− 5	—	—	—
Frunse		85·4	314	i 12 42	+ 2	—	—	—	—	—
Sitka		86·3	31	e 12 47	+ 2	e 23 11	[+ 2]	e 24 15	PS	e 35·7
Andijan		86·5	311	i 12 46	0	e 23 25	+ 3	—	—	—
Kulyab		88·0	308	i 12 54	+ 1	—	—	—	—	—
Obi-garm		88·2	309	i 12 54	0	—	—	—	—	—
Stalinabad		88·9	309	i 12 56	− 2	i 23 44	0	23 19	SKS	—
Tashkent		88·9	312	i 12 57?	− 1	e 23 39?	− 5	—	—	—
Tchimkent		88·9	313	i 12 58	0	—	—	—	—	—
Samarkand		90·4	310	e 13 3	− 1	e 23 57	− 1	—	—	—
Berkeley		90·6	52	e 13 9	+ 4	e 24 3	+ 3	i 23 36	SKS	e 42·4
Shasta Dam		90·9	49	e 13 5	− 2	e 24 4	+ 1	e 16 10	PP	—
Lick		91·0	52	i 13 7	0	—	—	i 16 4	PP	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Victoria		91·2	42	e 21 10	?	e 23 8	?	—	—	42·8
Mineral	z.	91·4	50	i 13 10	+ 1	—	—	i 16 45	PP	—
Santa Barbara	z.	92·2	56	e 13 20	+ 7	—	—	—	—	—
Fresno	z.	92·4	53	e 13 14	0	—	—	i 16 24	PP	—
Pasadena		93·4	56	i 13 18	0	e 24 19	− 5	e 23 46	SKS	e 42·8
Mount Wilson	z.	93·5	56	i 13 20	+ 1	—	—	—	—	—
Tinemaha	z.	93·6	54	i 13 21	+ 2	—	—	—	—	—
La Jolla	z.	94·1	57	e 13 27	+ 5	—	—	—	—	—
Riverside	z.	94·1	56	i 13 22	0	—	—	—	—	—
Palomar		94·4	57	i 13 24	+ 1	—	—	—	—	—
Boulder City		96·3	55	e 13 33	+ 1	—	—	e 17 23	PP	—
Sverdlovsk		96·3	327	i 13 30	− 2	i 24 47	− 2	—	—	—
Pierce Ferry		97·0	55	e 13 36	+ 1	—	—	e 16 52	PP	—
Hungry Horse		97·5	42	e 13 35	− 2	e 24 8	[− 6]	—	—	—
Bozeman		99·5	45	—	—	e 24 26	[+ 1]	e 24 56	S	e 47·3
Tucson		99·5	59	e 13 59	+13	e 25 26	+10	e 17 47	PP	e 45·7
Saskatoon		102·1	38	—	—	e 25 26	−12	—	—	44·8
Rapid City	E.	105·1	46	e 18 3	PKP	e 23 52	?	—	—	e 49·4
Grozny		106·4	313	e 18 28	PKP	—	—	—	—	—
Erevan		107·7	310	e 19 5	PP	—	—	—	—	—
Sotchi		110·7	315	e 19 7	PP	—	—	—	—	—
Theodosia		113·4	317	e 19 45	PP	—	—	—	—	—
Yalta		114·4	316	e 19 38	PP	—	—	—	—	—
Ksara		115·4	304	e 19 41	PP	30 42	PPS	—	—	—
Scoresby Sund		116·1	358	20 0	PP	29 28	PS	36 3	SS	—
Istanbul		119·0	314	19 58	PP	29 53	PS	—	—	—
Warsaw		119·4	328	20 15	PP	e 37 54	SS	—	—	e 59·8
Helwan	z.	119·9	301	e 20 14	PP	—	—	—	—	—
Temiskaming		120·8	39	e 18 56	[+ 2]	—	—	—	—	—
Cleveland		121·2	45	e 20 22	PP	e 25 54	[0]	e 27 22	SKKS	—
Copenhagen		121·5	335	20 26	PP	—	—	—	—	—
Ottawa		123·4	38	e 18 58	[− 1]	e 25 51	[−10]	e 27 39	SKKS	55·8
Potsdam		123·4	332	20 43	PP	—	—	—	—	—
Collmberg	z.	124·1	331	i 19 3	[+ 2]	—	—	i 20 49	PP	—
Jena		125·0	330	e 20 54	PP	—	—	—	—	—
Philadelphia		126·2	44	—	—	—	—	e 38 11	SS	e 59·1
De Bilt		127·1	335	i 21 2	PP	e 38 11	SS	e 22 21	PKS	e 58·8
Stuttgart		127·6	330	e 19 1	[− 6]	e 38 27	SS	i 21 11k	PP	e 64·8
Strasbourg		128·4	331	e 19 7	[− 2]	e 38 34	SS	e 21 4	PP	e 53·8
Uccle		128·4	336	e 19 9	[0]	—	—	e 21 15	PP	e 58·8
Zürich		128·8	329	e 19 8	[− 2]	—	—	e 21 8	PP	—
Basle		129·2	329	e 19 9	[− 1]	—	—	e 22 20	PKS	—
Huancayo		129·3	112	e 19 14	[+ 3]	e 32 11	PS	e 21 26	PP	e 63·9
Florence		129·5	323	e 19 13	[+ 2]	—	—	i 22 36	PKS	—
Rome		129·9	321	e 19 9k	[− 3]	22 34	PKS	i 21 24	PP	e 63·1
Paris		130·7	334	e 19 13	[0]	e 22 38	PKS	i 21 30	PP	e 68·8
Clermont-Ferrand		132·7	331	i 19 17	[0]	i 23 8	PKS	i 21 45	PP	72·8
Bogota	z.	134·0	90	e 19 18	[− 1]	—	—	—	—	—
La Paz		134·1	121	19 19	[− 1]	—	—	i 22 59	PKS	65·6
Bermuda		137·2	48	e 23 18	PKS	e 29 22	{+18}	e 34 16	PPS	e 57·8
Alicante		139·8	327	19 54	[+24]	e 23 54	PKS	—	—	—
Toledo		140·5	331	e 19 16	[−15]	i 23 32	PKS	i 22 33	PP	—
Fort de France		146·4	74	e 19 34	[− 8]	—	—	—	—	—

Additional readings :—
Riverview iE =9m.17s., iSN =10m.31s., iN =10m.43s. and 11m.8s., iE =11m.15s., 11m.38s. and 12m.7s., iN =12m.42s.
Auckland SS =15m.39s.
Wellington e =13m.31s., i =13m.42s., e =14m.4s., S_cS?Z =17m.0s., PKP,PKP = 39m.22s., PKP,PKS =43m.58s.
Christchurch SS =17m.5s.
Batavia eSSEN =17m.9s.
College e =23m.51s. and 24m.10s., eSSS =31m.39s.
Sitka e =13m.11s. and 32m.13s.
Berkeley eZ =18m.36s., eSZ =25m.6s.
Shasta Dam eSKS =23m.37s.

Continued on next page.

Fresno iZ =13m.26s.
Pasadena iZ =13m.31s., 13m.43s., and 13m.50s., eE =25m.39s.
Mount Wilson iZ =13m.26s. and 13m.33s.
Tinemaha iZ =13m.33s. and 13m.53s.
Riverside iZ =13m.28s. and 13m.33s.
Palomar iZ =13m.34s.
Pierce Ferry i =13m.49s.
Hungry Horse e =16m.27s., i =28m.3s.
Bozeman eSS =31m.11s., eSSS =35m.32s.
Tucson e =14m.12s., 14m.42s., 17m.14s., and 18m.44s., ePS =26m.45s., eSSS =36m.2s.
Scoresby Sund 27m.35s.
Cleveland eSKSE =25m.59s., cPSE =30m.23s., eSSE =36m.43s., eSSN =36m.52s.
Ottawa e =37m.21s.
Colmberg iZ =19m.17s.
Stuttgart ePKPZ =19m.7s.k, ePPP? =24m.41s., ePPSZ =32m.51s.
Strasbourg iPP =21m.15s., ePP =21m.18s., ePPP =24m.34s., ePS =31m.19s. and 31m.31s., eSS =38m.47s., e =40m.57s., eSSS =43m.10s. and 43m.21s.
Huancayo ePKS =22m.31s., e =41m.21s., eSSS? =44m.11s.
Rome eN =29m.40s.
Paris e =21m.13s. and 22m.11s., eSS =39m.1s.
Bermuda eSS =39m.30s.
Long waves were also recorded at Helsinki.

April 12d. Readings also at 0h. (Auckland, Huancayo, Stalinabad, and Tashkent), 2h. (near Lick), 5h. (Nanking), 6h. (Hungry Horse, Shasta Dam (2), Nanking, and near Vladivostok), 9h. (Palomar, Tinemaha, Tucson, Shasta Dam, and Theodosia), 11h. La Paz, La Plata, Shasta Dam, and near Lick), 12h. (Mount Wilson, Tinemaha, Tucson, and Shasta Dam), 13h. (Almata, Andijan, Frunse, Kulyab, Murgab, Samarkand, Stalinabad, Tashkent, and Tchimkent), 14h. (near Obi-garm), 17h. (near Branner), 18h. (near Alicante), 19h. (near Hungry Horse), 23h. (Harvard).

April 13d. Readings at 2h. (Samarkand, near Kulyab, Stalinabad, and near Alicante (2)), 4h. (La Paz, Bogota, near Huancayo, and near Sotchi), 7h. (Pierce Ferry), 9h. (Kew, near Bogota, near Lick, and near Obi-garm), 11h. (near Kulyab, Obi-garm, and Stalinabad), 13h. (Murgab, Samarkand, Andijan, near Kulyab, Obi-garm, and Stalinabad), 14h. (near Theodosia), 16h. (Mizusawa), 17h. (near Granada), 19h. (Pierce Ferry and Shasta Dam), 22h. (near Kulyab), 23h. (near Tacubaya).

April 14d. Readings at 0h. (Pierce Ferry), 3h. (Stuttgart, Triest, Rome, and near Taranto), 4h. (near Kulyab (2)), 7h. (near Kulyab, Obi-garm, and Stalinabad), 9h. (near Alicante), 13h. (Mount Wilson, Palomar, Tinemaha, Tucson, Boulder City, Hungry Horse, Pierce Ferry, and Shasta Dam), 19h. (near Lick, Branner, and Berkeley), 21h. (Pierce Ferry, and near Balboa Heights).

April 15d. 7h. Local Californian shock.

Pasadena iPZ =34m.5s.a
Mount Wilson iPZ =34m.5s.a, epPZ =34m.15s., esPZ =34m.22s.
Palomar iPZ =34m.7s., isPZ =34m.25s.
Riverside iPZ =34m.8s.a, epPZ =34m.19s., esPZ =34m.24s.
Shasta Dam eP =34m.14s.
Tinemaha iPZ =34m.15s., esPZ =34m.27s., isPZ =34m.32s.
Boulder City iP =34m.23s.
Tucson iP =34m.25s.a, epP =34m.33s., esP =34m.43s., e =35m.21s.
Pierce Ferry iP =34m.26s., ipP =34m.36s., isP =34m.46s.
Bogota eEZ =59m.25s.

April 15d. 19h. 34m. 43s. Epicentre 5°·1S. 153°·5E. (as on 1947 November 21d.).

$A = -\cdot 8914$, $B = +\cdot 4445$, $C = -\cdot 0883$; $\delta = -3$; $h = +6$;
$D = +\cdot 446$, $E = +\cdot 895$; $G = +\cdot 079$, $H = -\cdot 039$, $K = -\cdot 996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		22·3	181	i 4 59	− 2	i 9 3	+ 1	i 5 44	PPP	e 12·3
Riverview	E.	28·7	184	—	—	e 10 45	− 5	—	—	e 13·4
Arapuni		38·5	151	—	—	e 14 17?	+55	—	—	—
Wellington		40·7	155	—	—	e 17 17?	SSS	—	—	e 21·3
Christchurch		41·8	159	—	—	14 9	− 2	17 15	SS	21·4

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa	E.	45·5	347	(e 8 25)	+ 2	e 8 25	P	—	—	—
Batavia		46·4	267	i 8 24	− 6	i 15 20	+ 2	—	—	—
Vladivostok		51·8	341	e 9 10	− 2	i 16 34	+ 1	—	—	—
Calcutta	E.	69·3	296	—	—	e 20 19	+ 2	—	—	—
Irkutsk		70·7	330	e 11 19	− 1	e 20 34	0	—	—	—
Kodaikanal	E.	77·2	282	—	—	i 21 47	0	—	—	—
Bombay		82·9	290	—	—	e 21 23	?	—	—	—
Almata		83·7	315	e 12 32	0	—	—	—	—	—
Murgab		85·0	308	i 12 37	− 1	23 5	− 2	—	—	—
Frunse		85·4	314	e 12 43	+ 3	—	—	—	—	—
Andijan		86·6	311	e 12 47	+ 1	e 23 15	[+ 4]	—	—	—
Kulyab		88·2	307	i 12 53?	− 1	i 23 37?	− 1	e 23 24?	SKS	—
Obi-garm		88·3	308	—	—	i 23 25	[+ 3]	—	—	—
Shasta Dam		88·8	49	e 12 58	+ 1	—	—	—	—	—
Stalinabad		89·0	308	i 12 57	− 1	23 40	− 5	—	—	—
Tashkent		89·0	312	e 12 53	− 5	e 23 34	[+ 7]	e 16 21	PP	—
Santa Barbara	z.	90·2	56	i 13 43	+39	—	—	—	—	—
Samarkand		90·5	310	e 13 11	+ 6	—	—	—	—	—
Tinemaha	z.	91·6	53	e 12 58	−12	—	—	—	—	—
Pasadena	z.	92·0	56	e 13 12	0	—	—	i 13 34	?	—
Mount Wilson	z.	92·1	56	e 13 13	+ 1	—	—	i 13 35	?	—
Riverside	z.	92·1	56	e 13 12	0	—	—	i 13 41	?	—
Palomar	z.	92·5	57	e 13 13	− 1	—	—	i 13 43	?	—
Pierce Ferry		95·0	54	e 13 29	+ 3	—	—	e 17 15	PP	—
Hungry Horse		95·4	42	e 13 29	+ 1	—	—	—	—	—
Sverdlovsk		95·8	326	e 13 26	− 3	i 24 55	+10	e 17 21	PP	—
Tucson		97·5	58	—	—	e 28 49	?	—	—	e 45·8
Ksara		115·7	304	e 19 52	PP	e 31 39	?	—	—	—
Istanbul		118·9	315	e 19 17?	[+26]	29 53	PS	—	—	—
Copenhagen		120·8	336	18 54	[0]	—	—	—	—	55·3
De Bilt		126·3	336	e 32 54	PPS	—	—	—	—	e 56·3
Triest		126·6	326	e 22 31	PKS	e 39 15	?	—	—	—
Stuttgart		127·0	331	e 19 5a	[− 1]	—	—	e 21 7	PP	e 62·3
Strasbourg		127·8	332	21 17	PP	—	—	—	—	60·3
Zürich		128·2	330	e 19 6	[− 3]	—	—	—	—	—
Rome		129·6	323	e 17 7	?	38 59	SS	e 33 8	PPS	e 57·8
Paris		129·9	335	e 19 15	[+ 3]	e 22 34	SKP	—	—	e 71·3
Clermont-Ferrand		132·0	333	i 19 18	[+ 2]	i 22 42	SKP	—	—	73·8
La Paz	z.	133·6	119	e 22 47	PKS	—	—	—	—	—
Alicante		139·3	328	e 24 55	?	—	—	—	—	e 50·5

Additional readings :—
Brisbane iPPN =5m.47s., iSSN =9m.33s.
Christchurch QEN =18m.22s.
Tashkent eSKS =23m.7s.?, eSS =29m.59s.
Sverdlovsk ePS =26m.9s., eSS =31m.17s.
Stuttgart eZ =19m.18s.
Rome eSKP? =22m.31s., e =47m.48s.
Long waves were also recorded at Sitka, Bermuda, and at other American and European Stations.

April 15d. Readings also at 0h. (Budapest), 1h. (Rome), 2h. (Kodaikanal), 3h. (Rome), 5h. (Kodaikanal, Apia, and Stalinabad), 8h. (Pierce Ferry (2), Shasta Dam, Tucson, Mount Wilson, Tinemaha, Riverside, La Paz, and Kodaikanal), 9h. (near Lick), 10h. (Andijan, Samarkand, Tchimkent, near Kulyab, Obi-garm, Murgab, Stalinabad, near Lick, and Branner), 11h. (near Taranto), 12h. (Rome), 13h. (near Lick), 15h. (Hungry Horse), 16h. (Rome), 20h. (Hungry Horse, Andijan, Samarkand, near Kulyab, Obi-garm, Murgab, and Stalinabad), 21h. (La Paz), 22h. (near Triest).

April 16d. 22h. 26m. 23s. Epicentre 34°·0N. 119°·0W.

Intensity VI at Oxnard, Somis, V at Huntington Park, Los Angeles, Moorpark, Venice, etc., IV at Long Beach, etc. Felt on the coast to the South-East of Long Beach over an area of 1,400 sq. miles. Epicentre 34°1′N. 118°58′W.

L. M. Murphy, F. P. Ulrich.
United States Earthquakes 1948, serial No. 746, Washington 1951, p.15 with macroseismic chart p.13.

$A = -·4028$, $B = -·7266$, $C = +·5566$; $\delta = 0$; $h = +1$;
$D = -·875$, $E = +·485$; $G = -·270$, $H = -·487$, $K = -·831$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Santa Barbara		0·7	305	i 0 17k	0	i 0 28	0	—	—	—
Pasadena		0·7	78	i 0 15k	− 2	i 0 26	− 2	—	—	—
Mount Wilson		0·8	75	i 0 19k	+ 1	i 0 28	− 3	—	—	—
Riverside		1·3	90	i 0 26a	+ 1	i 0 44	0	—	—	—
La Jolla		1·8	127	e 0 33	+ 1	i 1 3	S_g	—	—	—
Palomar		1·9	110	i 0 34a	0	—	—	—	—	—
Haiwee	E.	2·3	22	e 0 40	0	—	—	—	—	—
Fresno		2·8	347	i 0 47	0	i 1 21	− 1	i 0 51	P*	—
Tinemaha		3·1	11	e 0 53	+ 2	i 1 38	S*	—	—	—
Boulder City		3·9	59	i 1 3	+ 1	—	—	i 1 12	P*	i 2·1
Lick	Z.	4·0	328	i 1 2	− 2	—	—	i 1 12	P*	—
Branner		4·3	323	e 0 7	−61	—	—	i 0 37	P_g	—
Pierce Ferry		4·6	61	i 1 12	0	—	—	—	—	i 2·2
Berkeley		4·7	326	i 1 15	+ 1	i 2 20	S*	i 1 23	P*	—
Mineral	Z.	6·7	343	i 1 43	+ 1	i 3 23	S*	—	—	—
Tucson		7·1	102	i 1 49	+ 1	—	—	e 2 47	?	i 3·8
Shasta Dam		7·2	339	e 1 55	+ 6	—	—	—	—	e 3·5
Hungry Horse		14·8	13	i 3 38	+ 6	—	—	—	—	e 8·2

Additional readings :—
Fresno iN = 1m.2s., iSNZ = 1m.24s., iN = 1m.27s.
Lick eEN = 1m.7s., iSZ = 1m.19s.
Berkeley iN = 1m.19s.
Mineral eE = 1m.46s., iZ = 3m.13s.

April 16d. Readings also at 0h. (Rome), 1h. (Mount Wilson, Palomar, Riverside, Pierce Ferry, Shasta Dam, and Tucson), 2h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, and Riverside), 7h. (near Kulyab), 8h. (near Lick), 9h. (Tucson), 10h. (near Zürich, Basle, Stuttgart, and near Alicante), 11h. (Bogota, La Paz, and near Huancayo), 12h. (Pierce Ferry and Tucson), 13h. (Hungry Horse, Shasta Dam and Tucson), 14h. (near Mineral), 16h. (near Alicante), 17h. (Samarkand, Tashkent, near Kulyab (2), Obi-garm (2), and Stalinabad (2)), 20h. (near Lick), 23h. (near Tacubaya and near Lick).

April 17d. 16h. 11m. 28s. Epicentre 33°·0N. 135°·6E. (as on 1947 July 16d.).

Intensity VI at Siomisaki and Tokusima; V at Owase, Osaka, Kobe, Kyoto, Irako, Tu, Kôti, Nagoya, Hikone, Gihu, and Iida; IV at Shimizu, Hirosima, Shizuoka, Matsue, and Saigo; II-III at Tokyo, Onahama, Nagano, Ito, and Takayama.
Macroseismic radius more than 300km. Small Tsunami.
Epicentre 33°·1N. 135°·6E. Depth of focus 40km.
Repetition of the Nankaido earthquakes of 1946 Dec. 20d.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1948. Tokyo, 1950 pp.11-12; with macroseismic chart p.11.

$A = -·6004$, $B = +·5879$, $C = +·5421$; $\delta = -2$; $h = +1$;
$D = +·700$, $E = +·714$; $G = -·387$, $H = +·379$, $K = +·840$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Siomisaki	0·5	17	0 10k	P_g	—	—	—	—	—
Muroto	1·2	282	0 23	− 1	0 38	− 3	—	—	—
Owase	1·2	25	0 20	− 4	0 33	− 8	—	—	—
Sumoto	1·5	336	0 28	0	0 46	− 3	—	—	—
Osaka	1·6	358	0 30a	0	0 47	− 4	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kobe		1·7	348	0 32a	+ 1	0 54	0	—	—	—
Kôti		1·8	288	0 36a	P_g	0 55	− 1	—	—	—
Kameyama		2·0	21	0 33a	− 2	1 9	S_g	—	—	—
Kyoto		2·0	3	0 32a	− 3	0 52	−10	—	—	—
Hikone		2·3	13	0 41a	+ 1	1 6	− 3	—	—	—
Nagoya		2·4	28	0 40a	− 1	1 15	+ 3	—	—	—
Matuyama		2·5	290	0 44a	+ 1	1 21	S_g	—	—	—
Gihu		2·6	22	0 44a	0	1 21	S*	—	—	—
Toyooka		2·6	346	0 44a	0	1 15	− 2	—	—	—
Omaesaki		2·7	53	0 44k	− 1	1 16	− 3	—	—	—
Hirosima		3·0	297	0 45a	− 5	1 21	− 6	—	—	—
Shizuoka		3·0	49	0 47k	− 3	1 28	+ 1	—	—	—
Hamada		3·5	305	0 52a	− 5	1 27	−13	—	—	—
Hunatu		3·6	46	0 56	− 2	1 43	+ 1	—	—	—
Osima		3·6	60	0 53	− 5	—	—	—	—	—
Miyazaki		3·7	253	0 59a	− 1	—	—	—	—	—
Mera		4·0	61	1 1	− 3	1 49	− 3	—	—	—
Kumamoto		4·1	269	1 8a	+ 3	2 5	S*	—	—	—
Yokohama		4·1	54	1 4k	− 1	1 55	0	—	—	—
Nagano		4·2	30	1 5	− 2	2 7	S*	—	—	—
Hukuoka		4·4	279	1 11a	+ 1	2 21	S_g	—	—	—
Kumagaya		4·4	44	1 15	+ 5	2 4	+ 2	—	—	—
Maebasi		4·4	39	1 10a	0	2 12	S*	—	—	—
Tokyo		4·4	51	1 8k	− 2	—	—	—	—	—
Kagosima		4·5	252	1 15	+ 4	—	—	—	—	—
Unzendake		4·5	268	1 12	+ 1	2 7	+ 2	—	—	—
Wazima		4·5	14	1 11a	0	2 12	+ 7	—	—	—
Tukubasan		4·9	48	1 14	− 3	—	—	—	—	—
Kakioka		5·0	48	1 15k	− 3	2 30	S*	—	—	—
Utunomiya		5·0	44	1 16	− 2	—	—	—	—	—
Mito		5·2	49	1 21k	0	2 45	S_g	—	—	—
Aikawa		5·5	23	1 22a	− 3	2 16	− 14	—	—	—
Tomie		5·8	267	1 29k	0	2 53	S*	—	—	—
Onahama		5·9	47	1 30	− 1	2 43	+ 3	—	—	—
Hukusima		6·2	39	1 35k	0	3 3	S*	—	—	—
Sendai		6·8	38	1 31	−13	—	—	—	—	—
Akita		7·6	27	1 52	− 3	3 22	− 1	—	—	—
Mizusawa		7·6	35	1 53	− 2	3 25	+ 2	—	—	—
Morioka		8·0	32	1 58a	− 2	3 33	0	—	—	—
Miyako		8·4	36	2 0a	− 6	3 35	− 8	—	—	—
Aomori		8·8	26	2 10	− 1	—	—	—	—	—
Mori		9·9	22	2 26	+ 1	4 33	+13	—	—	—
Vladivostok		10·5	345	i 2 31	− 4	i 4 44	+ 9	—	—	—
Sapporo		11·0	23	2 43k	+ 1	4 52	+ 5	—	—	—
Nemuro		12·9	34	3 3	− 4	—	—	—	—	—
Nanking		14·2	271	i 3 23	− 1	6 26	+22	i 3 34	PP	7·2
Guam		21·2	155	i 4 41	− 8	i 8 49	+ 8	—	—	—
Irkutsk		29·7	319	i 6 9	− 1	11 12	+ 6	—	—	—
Calcutta	E.	42·8	268	i 8 3a	+ 2	i 14 28	+ 2	i 9 50	PP	19·6
Almata		46·4	301	i 8 31	+ 1	i 15 29	+11	—	—	—
Batavia		47·6	221	i 8 41	+ 2	i 15 42	+ 7	i 10 31	PP	23·5
Dehra Dun	N.	48·5	283	e 5 32	?	—	—	i 13 29	?	e 22·6
Murgab		49·6	295	8 56	+ 1	16 6	+ 3	—	—	—
Andijan		50·2	297	i 9 1?	+ 1	e 16 27?	+16	—	—	—
Tchimkent		51·9	300	i 9 13	+ 1	i 16 37	+ 2	—	—	—
Tashkent		52·3	299	i 9 17	+ 2	e 16 43	+ 3	—	—	—
Obi-garm		52·7	296	i 9 18	0	—	—	—	—	—
Kulyab		52·9	295	i 9 21	+ 1	i 16 57	+ 9	—	—	—
Hyderabad	N.	53·4	267	9 20	− 4	16 54	− 1	11 11	PP	26·2
Stalinabad		53·4	296	i 9 23	− 1	i 16 59	+ 4	—	—	—
Samarkand		54·5	298	i 9 26?	− 6	i 17 6?	− 4	—	—	—
College		55·0	30	e 9 33	− 2	i 17 14	− 3	e 11 38	PP	e 23·4
Sverdlovsk		55·1	219	i 9 35	− 1	i 17 14	− 4	—	—	—
Bombay		57·4	272	i 9 57	+ 4	i 17 56	+ 7	21 46	SS	30·1
Colombo	E.	57·7	255	9 55	0	17 58	+ 5	—	—	28·9

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kodaikanal	E.	57·8	261	i 10 2	+ 7	i 17 52	− 2	21 32	SS	27·5
Honolulu		59·5	82	e 10 8	+ 1	i 18 12	− 4	e 22 59	SS	e 24·7
Ashkabad		61·4	298	i 10 22	+ 2	i 18 46	+ 6	—	—	—
Brisbane		62·4	162	i 10 24	− 3	i 18 52	− 1	i 12 34	PP	e 30·7
Sitka		62·4	38	i 10 26	− 1	i 18 56	+ 3	i 12 56	PP	i 25·5
Baku		66·5	304	i 10 56?	+ 2	e 19 55?	+11	—	—	—
Perth		67·2	198	i 11 2	+ 4	19 57	+ 5	i 13 27	PP	—
Moscow		67·6	322	i 10 57	− 4	i 19 52	− 5	—	—	—
Riverview		68·1	166	i 11 5k	+ 1	i 20 7	+ 4	i 24 24	SS	e 30·5
Grozny		68·2	308	11 4	0	20 5	+ 1	—	—	—
Apia		68·5	123	e 11 8	+ 2	i 20 8	0	—	—	28·7
Piatigorsk		69·6	310	e 11 15	+ 2	20 19	− 2	—	—	—
Erevan		70·4	305	e 11 20	+ 2	20 39	+ 9	—	—	—
Helsinki		71·3	331	i 11 22a	− 1	e 20 16	−25	e 14 0	PP	e 33·5
Sotchi		72·0	311	i 11 30	+ 2	20 50	+ 1	i 14 13	PP	—
Victoria		72·6	43	11 30	− 1	20 52	− 4	25 33	SS	32·5
Theodosia		73·9	313	e 11 39	0	21 9	− 1	—	—	—
Upsala		74·4	332	i 11 39a	− 3	i 21 11	− 5	e 14 28	PP	e 36·5
Simferopol		74·8	314	11 46	+ 2	—	—	—	—	—
Yalta		75·0	313	e 11 44	− 1	21 22	− 1	—	—	—
Scoresby Sund		75·5	352	i 11 48k	0	21 15	−13	14 29	PP	—
Ferndale		76·2	50	e 10 56	−56	e 21 35	− 1	e 12 9	PcP	—
Ukiah		77·6	52	e 11 57	− 3	i 21 50	− 1	e 14 44	PP	e 32·2
Warsaw		77·7	324	i 12 0a	0	i 21 52	0	i 14 59	PP	e 37·5
Hungry Horse		78·0	40	i 12 1	− 1	e 21 45	−10	e 14 55	PP	—
Mineral	N.	78·0	49	e 11 55	− 7	—	—	—	—	—
Auckland		78·6	148	—	—	22 5	+ 3	26 55	SS	—
Berkeley		79·0	52	i 12 6a	− 1	i 22 4	− 2	i 15 18	PP	—
Copenhagen		79·2	331	i 12 8	0	i 22 6	− 2	15 6	PP	—
Branner		79·3	52	e 12 8	− 1	e 22 6	− 3	e 13 3	?	—
Saskatoon		79·3	34	12 10	+ 1	i 22 10	+ 1	15 13	PP	37·5
Santa Clara		79·4	52	i 12 9	0	e 22 12	+ 2	—	—	e 34·6
Ksara		79·5	303	i 12 11a	+ 1	e 22 27	+16	—	—	—
Lick		79·7	52	i 12 10	− 1	e 22 11	− 2	—	—	—
Bucharest		79·8	316	i 12 13	+ 1	i 22 16	+ 2	15 10	PP	37·5
Arapuni		79·9	148	—	—	22 32	+16	27 26	SS	40·6
Istanbul		80·0	312	12 13?	0	22 15?	− 2	—	—	—
Butte	N.	80·2	41	e 12 12	− 2	i 22 16	− 3	e 15 14	PP	e 34·0
Raciborzu		80·5	324	i 12 17	+ 2	e 22 26	+ 4	e 15 21	PP	e 42·5
Bozeman		81·2	41	e 12 19	0	i 22 27	− 2	e 15 27	PP	e 34·1
Potsdam		81·3	329	i 12 21	+ 1	i 22 29	− 1	i 15 24	PP	e 41·8
Reykjavik		81·6	350	i 12 22	+ 1	i 22 39	+ 6	e 23 28	PS	e 40·3
Budapest		81·7	322	12 22	0	i 22 38	+ 4	15 30	PP	41·5
Tinemaha		82·0	51	e 12 25	+ 2	e 22 37	0	—	—	—
Collmberg		82·1	328	i 12 27	+ 3	i 22 41	+ 3	i 15 29	PP	e 37·5
Prague		82·3	326	i 12 24a	− 1	e 22 38	− 2	15 32	PP	e 39·5
Kalossa		82·4	322	12 27	+ 2	22 46	+ 5	e 15 40	PP	e 42·5
Santa Barbara		82·6	54	i 12 27	+ 1	e 22 41	− 2	i 12 35	PcP	—
Wellington	Z.	82·6	151	12 21	− 5	22 39	− 4	17 39	PPP	40·0
Haiwee		82·8	51	e 12 28	+ 1	e 22 43	− 2	e 12 36	PcP	—
Jena		83·0	327	i 12 28	0	e 22 44	− 3	e 15 39	PP	e 39·7
Logan		83·2	44	i 12 26	− 3	i 22 46	− 3	e 15 33	PP	e 36·5
Aberdeen		83·3	339	i 12 28	− 2	i 22 48	− 2	i 15 35	PP	47·3
Christchurch		83·3	154	12 36	+ 6	22 55	+ 5	15 28	PP	39·7
Mount Wilson		83·8	53	i 12 32a	0	e 22 53	− 2	i 12 40	PcP	—
Pasadena		83·8	53	i 12 30a	− 2	i 22 52	− 3	i 12 39	PcP	i 34·6
Salt Lake City		83·8	44	e 12 30	− 2	i 22 52	− 3	e 24 2	PPS	e 36·5
Riverside		84·4	53	i 12 34a	− 2	e 22 59	− 2	i 12 43	PcP	—
Edinburgh		84·7	338	12 36	− 1	22 59	− 5	15 51	PP	—
De Bilt		84·8	332	i 12 37a	0	i 22 58	− 7	i 15 52	PP	e 40·5

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Boulder City		84·9	50	i 12 37	− 1	e 23 17	+11	i 13 9		?	—
Helwan		84·9	302	i 12 37k	− 1	i 23 1	− 5	15 56		PP	—
Durham		85·1	337	i 12 37	− 2	i 23 8	0	i 15 57		PP	—
Palomar		85·1	53	i 12 37	− 2	i 23 6	− 2	i 15 54		PP	—
La Jolla		85·2	54	e 12 39	0	e 23 6	− 3	—		—	—
Pierce Ferry		85·3	49	i 12 39	− 1	e 23 4	[+ 1]	—		—	—
Stuttgart		85·6	327	i 12 41a	0	i 23 4	[− 1]	i 16 1		PP	e 45·5
Triest		85·7	323	i 12 41a	− 1	i 23 14	0	i 15 57		PP	—
Ivigtut		86·1	2	e 12 42	− 2	i 23 15	− 3	23 6		SKS	40·5
Uccle		86·1	332	i 12 43a	− 1	i 23 8	[0]	i 16 4		PP	e 47·5
Strasbourg		86·4	328	i 12 45a	0	i 23 12	[+ 2]	i 16 6		PP	44·5
Chur		86·9	325	i 12 47	− 1	e 23 8	[− 5]	—		—	—
Zürich		86·9	327	e 12 46a	− 2	e 23 10	[− 3]	e 16 9		PP	—
Basle		87·2	327	e 12 48	− 1	e 23 14	[− 1]	e 16 14		PP	—
Salo		87·3	325	i 12 49a	− 1	i 23 28	− 1	e 23 10		SKS	—
Kew		87·4	334	i 12 50a	0	i 23 16	[− 1]	i 16 14		PP	e 48·5
Padova		87·4	324	i 12 48	− 2	23 12	[− 5]	12 59		pP	e 42·5
Taranto		87·4	318	i 12 42	− 8	e 23 16	[− 1]	16 6		PP	—
Bologna		87·7	323	i 12 52a	0	e 23 10	[− 9]	e 16 19		PP	—
Neuchatel		87·9	327	e 12 56	+ 3	e 23 17	[− 3]	—		—	—
Florence		88·3	323	i 12 56	+ 1	i 23 17	[− 5]	—		—	—
Pavia	Z.	88·3	326	i 12 55	0	—	—	—		—	—
Paris		88·4	331	i 12 55	0	i 23 22	[− 1]	16 20		PP	46·5
Rome		89·0	322	i 12 56a	− 2	i 23 26?	[− 1]	i 13 7		pP	e 41·5
Tucson		89·8	51	i 13 1a	− 1	e 23 47	− 6	i 24 57		PS	e 36·7
Jersey		89·9	334	e 13 0	− 2	e 23 50	− 4	25 3		PS	—
Messina		89·9	317	e 12 55	− 7	e 24 5	+11	—		—	—
Clermont-Ferrand		90·6	329	i 13 5	0	i 24 2	+ 2	i 16 37		PP	43·0
Kirkland Lake		92·1	23	13 16	+ 4	25 23	PS	17 0		PP	57·5
Lincoln	E.	92·1	37	e 13 15	+ 3	i 24 7	− 6	e 16 49		PP	e 37·3
Ville Marie		94·0	23	17 5	PP	24 42	+12	—		—	54·5
Barcelona		94·4	326	e 13 21	− 2	23 55	[− 3]	17 11		PP	e 38·6
Temiskaming		94·8	23	13 24	− 1	25 50	PS	17 8		PP	56·5
Chicago		95·6	31	e 13 26	− 2	i 24 42	− 1	e 17 17		PP	e 38·8
Seven Falls		96·8	17	13 28	− 6	24 52	− 2	17 37		PP	45·5
Shawinigan Falls		96·8	18	e 14 51	?	—	—	e 17 2		PP	39·5
Ottawa		97·0	22	13 26	− 9	24 12	[0]	17 26		PP	46·5
St. Louis		97·0	35	i 13 33	− 2	24 55	0	17 26		PP	—
Algiers		97·6	323	e 13 35	− 3	24 14	[− 1]	i 17 37		PP	48·5
Alicante		98·1	326	i 13 40	0	24 14	[− 4]	14 8		pP	e 47·0
Cleveland		98·4	27	e 13 40a	− 1	i 25 10	+ 3	i 17 40		PP	43·0
Toledo		98·4	330	i 13 40	− 1	24 19	[0]	17 42		PP	—
Tananarive		98·5	254	13 44	+ 2	24 23	[+ 3]	17 46		PP	50·5
Vermont		98·6	20	e 13 46	+ 4	e 25 5	− 4	e 17 45		PP	e 46·7
New Kensington	E.	99·9	26	i 17 54	PP	i 25 20	0	e 26 51		PS	e 51·4
Pennsylvania		100·3	25	i 17 58	PP	i 25 26	+ 3	e 26 51		PS	—
Granada		100·5	328	i 13 50k	− 1	24 50	{− 7}	i 17 56		PP	55·0
Halifax		100·8	13	18 21	PP	25 33	+ 6	27 17		PS	50·5
Harvard		100·8	20	i 13 52	0	e 24 29	[− 2]	e 17 52		PP	e 56·5
Lisbon		101·5	332	13 50a	− 5	24 35	[+ 1]	18 3a		PP	49·5
Fordham		101·6	21	i 13 56	0	i 24 32	[− 3]	i 18 1		PP	—
Philadelphia		102·0	24	e 13 59	+ 2	i 25 37	0	i 18 4		PP	e 45·0
Georgetown		102·3	26	i 13 57	− 2	i 25 40	0	i 18 4		PP	46·5
Columbia		105·0	31	e 18 32	PP	e 24 54	[+ 3]	e 27 44		PS	e 43·3
Tacubaya	N.	106·2	54	e 18 46	PP	e 25 15	[+19]	e 27 52		PS	e 51·7
Bermuda		112·2	18	e 15 11	P	e 25 46	[+25]	i 18 46		PKP	e 46·0
San Juan		124·8	26	e 20 38	PP	e 26 34	[+29]	e 22 45		PKS	e 52·2
Fort de France		129·9	21	19 12	[0]	—	—	—		—	—
Bogota		133·2	42	e 19 20	[+ 2]	e 22 44	PKS	—		—	—
Huancayo		144·8	61	e 19 41	[+ 2]	e 29 58	{+ 9}	e 23 1		PP	e 62·2
La Paz		153·0	57	i 19 54a	[+ 2]	27 4	[+ 6]	i 24 8		PP	72·0
La Plata	E.	168·6	104	20 8	[0]	31 44	{−12}	23 38		PKS	78·5
	N.	168·6	104	19 50	[−18]	31 56	{ 0}	45 56		SS	88·5
	Z.	168·6	104	20 3	[− 5]	23 57	PKS	20 14		PKP_2	87·5

For Notes see next page.

NOTES TO APRIL 17d. 16h. 11m. 28s.

Additional readings :—
Nanking iN =3m.55s.
Guam e =6m.23s., i =6m.55s.
Calcutta iSSE =16m.30s., iSSSE =17m.25s.
Hyderabad P_cPN =10m.10s., S_cSN =19m.6s., SS =20m.35s.
College eS_cS =19m.12s., eSS =21m.5s.
Bombay PE =11m.42s., SSE =21m.55s.
Brisbane iN =11m.14s. and 13m.9s., iSKS?N =19m.54s., iSSN =23m.1s., iSSE =23m.9s., eQEN =26m.54s.
Sitka iS_cS =20m.18s., iSS =22m.52s.
Riverview iN =11m.20s. and 19m.28s., iZ =19m.38s., iEZ =20m.11s., iE =20m.20s., iN =20m.24s., 20m.29s. and 20m.33s., iZ =20m.38s., iN =20m.51s., iNZ =21m.9s., iE =21m.15s., 21m.24s., and 21m.40s., iN =21m.58s. and 23m.46s., iE =24m.40s., 25m.13s., and 27m.29s.
Sotchi iP_cP =11m.41s.
Victoria e =28m.56s.
Upsala PPE =14m.24s., ePPPE =15m.57s.?, PPPN =16m.10s., eN =20m.7s., iS_cS?N = 21m.38s., PPSE =21m.58s., eN =23m.4s., eSS?N =25m.32s., eSSE =25m.46s., eSSSE =29m.32s., SSS?N =29m.56s.
Scoresby Sund 12m.37s., PPP =16m.27s., 17m.38s., 21m.29s., 21m.37s., 22m.2s., and 23m.20s.
Ukiah eSS =26m.54s., eSSS =29m.50s.
Warsaw P_cPN =12m.14s., iPPZ =14m.54s., iPPPZ =16m.51s., P_cSN =19m.52s., P_cSZ = 19m.55s., SZ =21m.46s., PSZ =22m.25s., PSE =22m.28s., PSN =22m.36s., PPSZ = 22m.46s., PPSE =22m.52s., eSSZ =26m.48s., eSSE =27m.10s., eSSSN =29m.46s., SSSEZ =29m.55s., and many other readings given without phase.
Auckland i =26m.2s., PKKS =33m.22s.
Berkeley iE =23m.42s.
Copenhagen 17m.6s., SS =27m.21s., 29m.31s., 31m.10s.
Saskatoon PS =22m.26s., SS =27m.19s., SSS =30m.50s.
Lick eNZ =12m.17s., eZ =22m.23s.
Bucharest iEN =12m.23s., iPPE =14m.58s., eSN =22m.0s., eSE =22m.4s., eN = 22m.10s., iPSEN =22m.42s., iN =23m.36s., iSSN =27m.31s.
Arapuni Q =34m.44s.
Butte ePPSN =23m.19s., eSSN =27m.26s., eSSSN =31m.0s.
Raciborzu iPPE =15m.25s., ePPP?E =17m.4s.
Bozeman ePPP =17m.31s., iPPS =23m.24s., eSS =27m.18s., i =28m.19s., eSSS = 31m.29s.
Potsdam iSSE =27m.50s., eSSS?N =31m.32s., eE =32m.21s.
Reykjavik ePE =12m.30s., iPPN =14m.57s., iPPP?N =17m.15s., eE =22m.29s., eSS?N =27m.54s., eE =31m.8s.
Budapest PPN =15m.33s., PPPN =17m.45s., SKKSN =22m.59s., PSN =23m.32s., PSE =23m.35s., PPSN =23m.56s., PPSE =23m.59s., SSN =27m.53s., SSE = 28m.14s., SSSEN =32m.14s.
Collmberg eP_cPZ =12m.55s., iZ =13m.27s., iPPPZ =18m.14s.
Prague ePPP =17m.32s., e =18m.56s., eSS =27m.51s., eSSS =31m.32s.?
Kalossa ePPE =15m.53s., eN =19m.35s., eE =19m.48s. and 23m.12s., eN =23m.34s.
Wellington eZ =14m.41s., S_cSZ =22m.53s., SPZ =23m.38s., SSZ =28m.16s., PSPSZ = 29m.56s., S_cSS_cS?Z =35m.32s.
Jena ePPZ =15m.32s., ePPN =15m.36s., eN =18m.57s. and 19m.3s., eE =19m.6s., ePS?N =23m.40s., eSS?N =28m.40s., eE =38m.0s.
Logan e =13m.14s., ePPP? =17m.19s., eS =22m.41s., eSS =27m.55s., eSSS =31m.36s.
Aberdeen iN =18m.53s., iE =19m.10s., iPSEN =23m.47s., iN =28m.0s., iE =29m.0s., iSSSE =32m.10s., iN =40m.46s., iE =41m.0s.
Christchurch eEN =18m.52s., SSEN =27m.59s., eE =36m.7s.
Pasadena eZ =23m.38s., iN =28m.28s. and 32m.12s.
Salt Lake City ePP =15m.34s., eSS? =28m.54s., eSSS =31m.50s.
Edinburgh PS =23m.53s., SS =28m.30s.
De Bilt iPPP =17m.39s., iPS =24m.2s., eSS =28m.44s., eSSS =32m.32s.
Helwan PSN =24m.0s., PPSN =24m.21s.
Durham iP_cPN =12m.48s., iN =12m.53s., iSEN =22m.59s., iPSEN =24m.7s., iE = 24m.53s., iN =24m.58s., iEN =27m.6s., iSSN =28m.58s., iN =29m.38s. and 32m.35s., iE =36m.1s.
Palomar iZ =12m.47s.
Stuttgart iP_cP =12m.53s. a, ePP =15m.45s., iPPP =18m.2s., i =19m.11s., eSS =28m.6s.
Triest iSKS =23m.4s., iPS =24m.9s., iSS =28m.57s.
Ivigtut 24m.5s., SS =28m.2s., SSS =32m.44s.
Uccle SSN =28m.58s.
Strasbourg ePPP =17m.57s., iPPP =18m.2s., iS =23m.23s., iPS =24m.12s., iPPS = 24m.34s., iSS =28m.48s. and 28m.59s., iSSS =32m.57s.
Zürich ePS =24m.25s.
Salo e =23m.41s., 23m.47s., and 24m.38s.
Kew iZ =13m.29s., iSEZ =23m.36s., iPS =24m.27s., iPPSEZ =25m.7s., iZ =27m.0s., iEN =27m.8s., e =27m.58s., eSS =29m.6s., i =35m.39s., iZ =42m.3s., eQEN = 45m.32s.
Padova iPPZ =16m.13s., iN =17m.0s., S =23m.39s.

Continued on next page.

Bologna iZ =13m.32s., eN =15m.16s., e =16m.31s., ePS =23m.38s.
Paris e =14m.16s., iPPP =18m.14s., i =19m.46s., iSKS =23m.25s., i =24m.36s., e = 26m.30s., eSS =29m.45s., eSSS =33m.0s., Q =42m.32s.
Rome iPPZ =16m.27s., iS =23m.50s., ePS?E =24m.42s., iSSN =29m.42s.
Tucson iPP? =16m.11s., e =17m.56s., e =26m.13s., eSS =29m.55s., eSSS =34m.11s.
Jersey PPP =19m.18s.
Clermont-Ferrand iPPP =18m.51s., iSKS =23m.38s., iPS =25m.5s., iSS =30m.8s., iSSS =33m.49s.
Lincoln ePSE =25m.16s., eSS?E =29m.24s., eSSSE =33m.48s.
Barcelona PS? =25m.51s.
Chicago ePPP =19m.34s., eSKS =24m.11s., eS =24m.38s., iPS =25m.50s., iSS = 31m.16s., eSSS =34m.43s.
Seven Falls SKS =24m.6s., PS =25m.51s., PPS =26m.24s., SS =31m.20s., SSS = 36m.38s.
Ottawa PPP =19m.30s., S =24m.52s., PS =26m.8s., SS =31m.27s.
St. Louis SKS =24m.1s.
Algiers PPP =19m.35s., S =26m.5s., PS =27m.17s., e =29m.50s., iSS =31m.56s., SSS = 35m.59s., e =39m.32s.?
Alicante PP =17m.38s., PPP =19m.42s., eS =24m.48s., PS =26m.41s., PPS =27m.18s., SS =31m.22s., SSS =36m.3s., Q =42m.18s.
Cleveland iN =17m.21s., eZ =21m.27s., iEN =21m.33s., iSE =25m.6s., iPSEN = 26m.35s., iSSEN =31m.52s.
Toledo SS =31m.55s.
Tananarive PPPN =20m.19s., SEN =25m.16s., PSEN =26m.39s., SSEN =31m.58s.
Vermont e =19m.5s., eSKS =24m.13s., ePS =26m.24s., ePPS =27m.14s., eSS =31m.40s., eSSS =36m.20s.
New Kensington eSKS?E =24m.0s., eSSE =32m.20s.
Pennsylvania ePKS?NE =20m.3s., eSSNW =32m.15s., ePKP,PKPNW =38m.55s.
Granada PPP =21m.11s., SKS =23m.39s., iS =25m.53s., iSS =32m.22s., SSS =36m.38s.
Halifax SKS =24m.45s., SS =32m.32s.
Harvard eS =25m.23s., e =26m.50s., eQ =49m.2s.
Lisbon PEZ =13m.55s.a, PKP?EZ =17m.45s., Z =22m.12s., EN =22m.50s., SKSN = 24m.31s., PPS?Z =27m.51s., SSS?NZ =36m.46s., Z =42m.14s.
Fordham iPS =27m.4s.
Philadelphia ePKP? =17m.39s., iPPP =20m.11s., e =23m.26s., iSKS =24m.38s., eSKKS =25m.10s., iPS =27m.5s., ePPS =27m.45s., eSS =32m.21s., eSSS =37m.9s.
Georgetown SKS =24m.27s., PS =27m.3s., i =27m.20s.
Columbia eS =25m.52s., eSS =33m.28s., eSSS =37m.32s.
Tacubaya eN =18m.55s., eS?N =25m.57s., eSS?N =33m.9s., eSSN =33m.37s. and 33m.40s., ePKP,PKPN =38m.18s.
Bermuda e =19m.1s., ePPP? =22m.9s., iS? =27m.33s., iPS =29m.21s., iPPS =30m.36s., eSS =35m.18s., eSSS =39m.29s.
San Juan eS? =28m.47s., eSSS =41m.17s., e =45m.40s.
Huancayo eSKS? =27m.37s., eSKSP =33m.6s., eSS =41m.20s., eSSS =47m.20s.
La Paz iZ =20m.18s., SKKS =30m.30s., iSSE =43m.18s., iSSSN =48m.22s.
La Plata E. PP =25m.8s., SKKS(Δ >180°) =33m.32s., SKSP =35m.38s., SKSP (Δ >180°) =39m.2s., PPS =40m.32s., SS =46m.8s., PSS =48m.14s. and 51m.2s., SSS? =53m.2s., SSS =57m.8s. and 60m.26s. ;
La Plata N. PKS? =22m.8s., PP? =26m.14s., SKSP =35m.50s., SKSP(Δ >180°) = 38m.8s., PPS =39m.32s., PSS =48m.8s., SSS =58m.8s.

April 17d. Readings also at 0h. (Mount Wilson, Palomar, Tucson, Boulder City, and Pierce Ferry (2)), 1h. (near Mineral), 3h. (near Berkeley, Branner, and Lick), 6h. (Palomar, Riverside, Tucson, Boulder City, and Pierce Ferry), 12h. (near Mineral), 14h. (near Kulyab), 15h. (Ashkabad, near Murgab, Andijan, Kulyab, Stalinabad, Tashkent, Tchimkent, Samarkand, and Almata), 16h. (near Mineral (2)), 17h. (Stuttgart, Jena, Grozny, Ashkabad, near Kulyab, Obi-garm, Murgab, Stalinabad, Andijan, Samarkand, Tashkent, and Tchimkent), 18h. (Mount Wilson, Pasadena, Riverside, Tucson, and Pierce Ferry), 20h. (Mineral (2)), 22h. (near Berkeley), 23h. (Uccle).

April 18d. 12h. 19m. 51s. Epicentre 2°·2S. 139°·3E. (as on 1947, July 26d.).

$A = -\cdot7576$, $B = +\cdot6516$, $C = -\cdot0382$; $\delta = 0$; $h = +7$;
$D = +\cdot652$, , $E = +\cdot758$; $G = +\cdot029$, $H = -\cdot025$, $K = -\cdot999$

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Guam		16·5	19	i 3 58	+ 4	i 7 22	SS	i 5 18	?	—
Brisbane		28·4	154	i 5 55	− 3	i 10 47	+ 2	i 6 54	PP	i 14·5
Batavia		32·6	262	i 6 29	− 6	i 11 32	−19	i 7 26	PP	22·1
Riverview		33·4	162	i 6 44a	+ 2	i 12 8	+ 5	—	—	—
Miyazaki		34·7	349	7 3	+ 9	12 31	+ 7	—	—	—
Kumamoto		35·8	348	i 7 3	0	12 54	+13	—	—	17·8
Owase		36·2	355	e 7 6	0	—	—	—	—	17·1
Hukuoka		36·6	349	i 7 9	− 1	12 55	+ 2	—	—	17·5
Perth		36·9	214	i 6 4	−68	12 49	− 9	15 14	SS	—
Hamada		37·5	350	7 16	− 1	13 4	− 3	—	—	—
Tokyo		37·7	1	e 7 19	0	13 22	+12	—	—	—
Sendai		40·3	3	7 26	−14	13 48	− 1	—	—	—
Mizusawa		41·2	3	e 7 51	+ 3	e 14 4	+ 2	7 58	P	—
Akita		41·7	1	7 56	+ 4	14 13	+ 3	—	—	—
Aomori		42·8	2	8 1	0	14 27	+ 1	—	—	—
Vladivostok		45·6	353	i 8 24	0	e 15 7	+ 1	—	—	—
Auckland	N.	47·5	141	8 40	+ 2	16 4	+30	10 37	PP	25·1
Arapuni	E.	48·8	143	—	—	16 21	+29	22 9	Q	25·6
Apia		49·7	107	e 9 1?	+ 5	e 16 15?	+11	—	—	e 22·2
Tuai	N.	50·2	141	8 50	−10	—	—	e 9 1	P	—
Wellington		50·3	146	8 58	− 2	16 20	+ 7	11 0	PP	24·4
Christchurch		50·7	149	9 6	+ 3	16 38	+20	11 10	PP	25·9
Calcutta	E.	55·4	300	e 9 33	− 5	i 17 19	− 3	i 11 39	PP	—
Colombo	E.	60·0	279	10 7	− 4	18 13	−10	—	—	32·0
Irkutsk		61·8	337	e 10 22	− 1	i 18 43	− 3	—	—	—
Kodaikanal	E.	62·8	283	i 10 29	− 1	i 18 54	− 4	28 44	Q	30·0
Hyderabad	N.	63·0	291	10 17	−14	18 46	−15	23 11	SS	29·5
Honolulu		65·7	66	—	—	e 19 51	PS	e 24 27	?	e 27·7
Bombay		68·6	291	e 10 59	− 8	e 19 57	−12	13 29	PP	33·9
Almata		71·7	318	i 11 24	− 2	e 20 42	− 3	—	—	—
Murgab		72·3	312	i 11 27	− 2	i 20 48	− 4	—	—	—
Frunse		73·3	316	i 11 34	− 1	—	—	—	—	—
Andijan		74·2	313	11 38	− 2	—	—	—	—	—
Kulyab		75·3	310	i 11 44?	− 3	i 21 25?	− 1	—	—	—
Obi-garm		75·6	311	i 11 45	− 3	i 21 19	−10	—	—	—
Stalinabad		76·3	311	i 11 50?	− 2	i 21 32?	− 5	—	—	—
Tchimkent		76·4	314	i 11 55	+ 2	i 21 34	− 4	—	—	—
Tashkent		76·6	313	i 11 51?	− 3	e 21 32?	− 8	—	—	—
Samarkand		77·9	311	i 12 5	+ 4	i 21 54	0	—	—	—
Ashkabad		84·2	308	i 12 35	+ 1	i 22 56	− 3	—	—	—
College		84·8	24	e 12 41	+ 4	e 23 8	+ 3	e 24 30	PPS	e 33·8
Sverdlovsk		85·6	327	i 12 39	− 2	i 23 8	[+ 3]	—	—	—
Sitka		89·3	33	—	—	i 24 3	+15	e 29 5	SS	e 37·4
Tananarive		90·9	251	18 10	PPP	e 23 59	− 4	25 0	PS	42·5
Baku		91·0	310	e 13 15	+ 8	24 7	+ 4	—	—	—
Grozny		93·5	313	e 13 16?	− 3	23 53	[0]	—	—	—
Erevan		95·1	310	e 13 29	+ 3	23 59	[− 3]	—	—	—
Leninakan		95·6	311	e 13 30	+ 2	e 24 2	[− 2]	—	—	—
Victoria		96·4	42	—	—	e 24 15	[+ 6]	e 31 9?	SS	40·2
Berkeley		98·0	53	i 13 59	+20	i 24 21	[+ 4]	i 17 55	PP	e 44·2
Santa Clara	N.	98·3	53	—	—	e 24 26	[+ 7]	e 35 28	SSS	e 40·7
Lick	E.	98·5	53	i 13 45	+ 3	—	—	e 17 44	PP	—
Moscow		98·5	326	13 38	− 4	24 13	[− 7]	25 1	S	—
Theodosia		101·4	316	e 13 48	− 7	—	—	—	—	—
Pasadena		101·6	56	e 13 57	+ 1	e 32 45	SS	e 18 8	PP	i 41·8
Mount Wilson		101·7	56	e 14 0	+ 4	—	—	e 18 14	PP	—
Riverside	E.	102·3	56	e 14 7	+ 8	—	—	—	—	—
Yalta		102·3	315	e 13 47	−12	24 39	[+ 1]	—	—	—
Ksara		102·4	303	e 13 56	− 3	—	—	28 16	PPS	—
Hungry Horse		102·7	41	e 14 4	+ 4	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Palomar	Z.	102·8	57	i 18 21	PP	—	—	—	—	—
Boulder City		104·1	54	e 18 37	PP	—	—	—	—	—
Butte	N.	104·1	43	—	—	e 33 13	SS	—	—	e 42·5
Pierce Ferry		104·8	54	e 14 11	+ 1	e 24 56	[+ 6]	e 18 36	PP	—
Bozeman		105·2	43	—	—	e 24 58	[+ 7]	e 26 22	S	e 43·2
Logan		105·5	47	e 18 40	PP	e 24 53	[0]	e 26 21	S	e 44·1
Salt Lake City		105·7	48	e 19 0	PP	e 24 59	[+ 5]	e 27 45	PS	e 45·7
Saskatoon		106·3	36	—	—	e 26 30	+17	—	—	44·2
Helwan		106·6	300	14 19	P	25 3	[+ 5]	18 46	PP	—
Upsala		107·3	333	18 51k	PP	25 54	{+ 8}	28 4	PS	e 44·2
Tucson		107·9	57	e 14 34	P	e 26 0	{+10}	e 19 1	PP	e 45·0
Bucharest		108·0	316	e 17 59	[−30]	e 24 55	[− 9]	(34 9?)	SS	34·2
Warsaw		108·7	325	e 17 58	[−32]	e 25 15	[+ 8]	e 18 45	PP	e 54·2
Scoresby Sund		110·7	353	19 17	PP	25 21	[+ 6]	28 47	PS	—
Budapest	E.	111·7	321	19 17	PP	28 57	PS	—	—	60·6
Belgrade		111·7	317	e 18 51	[+14]	e 28 58	PS	e 19 26	PP	—
Copenhagen		111·8	331	19 23	PP	28 52	PS	29 49	PPS	—
Potsdam		113·1	328	e 19 33?	PP	e 25 56	[+31]	e 30 3?	PPS	e 54·2
Prague		113·4	325	e 19 25	PP	e 25 27	[+ 1]	e 35 21	SS	e 55·2
Jena	E.	114·6	326	e 18 51	[+ 9]	—	—	e 19 42	PP	—
Trieste		115·8	321	e 19 42	PP	e 25 32	[− 3]	e 29 22	PS	—
Stuttgart		117·0	325	e 15 4	P	e 27 45	S	e 18 48	PKP	e 57·2
Aberdeen		117·2	338	i 20 32	PP	e 29 45	PS	—	—	57·4
De Bilt		117·3	330	e 20 2	PP	e 25 15	[−25]	e 29 39	PS	e 54·2
Padova		117·5	321	e 20 2	PP	——	—	e 22 53	PPP	—
Bologna		117·8	313	e 18 54	[+ 6]	—	—	—	—	e 62·1
Strasbourg		117·9	326	e 15 12	P	e 25 47	[+ 4]	e 18 53	PKP	57·6
Zürich		118·1	324	e 15 7	P	—	—	e 18 38	PKP	—
Florence		118·2	320	e 20 2	PP	e 25 35	[− 9]	—	—	—
Rome		118·2	317	e 18 58	[+ 9]	e 27 3	{+ 2}	i 29 49	PS	e 42·3
Edinburgh		118·5	337	—	—	e 30 9	PS	—	—	—
Uccle		118·5	330	e 20 5	PP	29 56	PS	36 9?	SS	54·2
Basle		118·6	325	e 19 52	[+62]	e 29 55	PS	e 20 13	PP	—
Durham	E.	118·7	335	20 21	PP	—	—	—	—	—
Pavia		118·9	322	18 52	[+ 1]	—	—	—	—	—
Neuchatel		119·3	324	e 20 5	PP	—	—	—	—	—
Kew		120·4	332	i 20 27	PP	e 27 18	{+ 2}	e 30 11	PS	e 61·1
Paris		120·7	328	e 18 56	[+ 2]	i 30 23	PS	i 20 30	PP	e 58·2
St. Louis		122·1	45	e 19 32	[+35]	e 27 39	{+11}	i 37 47	SSP	—
Clermont-Ferrand		122·2	325	e 18 57	[0]	i 27 26	{− 2}	i 20 32	PP	59·7
Chicago		122·3	40	—	—	e 26 51	[+53]	e 36 58	SS	e 46·4
Jersey		122·8	332	e 17 29	?	—	—	—	—	58·2
Kirkland Lake		123·1	30	e 20 41	PP	—	—	—	—	—
Ville Marie		123·9	30	e 20 42	PP	—	—	—	—	—
Temiskaming		124·6	31	e 19 2	[0]	—	—	—	—	—
Cleveland		126·4	38	e 19 7a	[+ 2]	e 30 46	PS	e 38 14	SS	52·2
Ottawa		127·6	30	e 19 1	[− 6]	(e 38 9?)	SS	e 21 57	PP	38·2
New Kensington	E.	128·1	37	e 22 43	PKS	—	—	e 48 32	?	e 62·5
Seven Falls		128·2	26	e 28 45	?	e 34 15	?	(38 9?)	SS	38·2
Alicante		128·6	320	19 19	[+10]	28 10	{− 1}	26 22	SKS	e 60·3
Vermont		129·0	30	e 17 50	?	e 22 34	PKS	e 33 20	PPS	e 63·4
Toledo		129·9	323	e 19 13	[+ 1]	i 22 39	PKS	i 21 23	PP	—
Georgetown		130·7	37	e 19 21	[+ 8]	i 22 44	PKS	i 21 31	PP	53·4
Columbia		130·9	45	e 22 45	PKS	e 28 23	{− 2}	—	—	e 54·5
Philadelphia		131·1	35	e 21 47	PP	e 22 39	PKS	—	—	e 58·5
Fordham		131·3	33	e 19 19	[+ 5]	i 22 39	PKS	e 21 37	PP	61·2
Granada		131·3	320	i 19 22a	[+ 8]	i 26 33	[+10]	i 21 48	PP	i 67·8
Lisbon		133·6	325	19 17k	[− 2]	e 26 39	[+11]	21 49k	PP	66·5
Bermuda		142·4	34	e 20 22	[+47]	e 41 50	SS	e 33 4	PS	e 59·6
Huancayo		142·8	113	e 19 38	[+ 3]	e 23 49	PKS	e 22 49	PP	e 59·8
Bogota	Z.	146·6	85	e 19 49	[+ 7]	i 19 56	PKP_2	i 23 4	PP	—
La Paz		147·2	126	i 19 52a	[+ 9]	i 20 0	PKP_2	i 23 29	PP	71·2
San Juan		150·3	55	e 19 57	[+ 9]	e 27 28	[+34]	e 23 53	PP	e 61·9

For Notes see next page.

NOTES TO APRIL 18d. 12h. 19m. 51s.

Additional readings :—
Brisbane iN =8m.23s., eQE =12m.47s.
Riverwiew iNZ =6m.56s., iEZ =12m.16s., iN =12m.31s. and 13m.0s., iE =13m.10s., iZ =14m.58s.
Perth i =7m.18s.
Auckland PPPN =11m.35s., iN =17m.6s. and 17m.42s., SSS =21m.10s.
Tuai eN =11m.25s.
Wellington P_cPZ =9m.55s., PPP =12m.2s., S_cP =13m.45s., SS =19m.33s., Q =22m.57s.
Christchurch iZ =12m.31s., SSZ =20m.44s.
Calcutta iPSE =17m.54s., iSSSE =22m.51s.
Hyderabad P_cPN =11m.28s.
Bombay SSN =24m.17s., SSE =24m.25s.
College eSS =29m.21s., eSSS =32m.45s.
Tananarive SS =29m.59s.
Berkeley iE =18m.5s., iSKSN =24m.25s., iSN =24m.55s., iPSE =25m.13s., iZ =26m.51s., iE =33m.7s., iN =41m.9s.
Moscow PP =17m.30s.
Bozeman ePS? =27m.23s., eSS =33m.50s., eSSS? =37m.14s.
Logan ePP =19m.21s., ePPS =29m.19s., eSS? =35m.1s., eSSS =38m.14s.
Salt Lake City eSS =33m.55s.
Helwan iZ =17m.36s. and 17m.53s., eZ =19m.39s., eE =24m.55s., eN =26m.45s., 29m.33s., and 35m.7s.
Upsala eSSN =33m.51s., eSS? =34m.9s., eSSSE =37m.41s.
Tucson ePKP =18m.37s., e =19m.49s., eS =26m.49s., e =28m.33s., eSS =34m.18s., eSSS? =40m.22s.
Warsaw ePPPZ =21m.17s., ePPPE =21m.22s., eSKPZ =25m.15s., eSN =26m.10s., ePSN =28m.12s., PSZ =28m.15s., ePSE =28m.26s., ePKKP =28m.39s., ePPSE =29m.35s., ePPSZ =29m.41s., eSSZ =34m.7s., and many other readings without phase.
Scoresby Sund 24m.39s., SKKS =26m.28s., SS =34m.21s.
Budapest ePN =19m.23s., eE =29m.17s., eSN =29m.25s.
Belgrade ePP =21m.41s.
Copenhagen 27m.3s.
Prague e =27m.9s., ePS =28m.33s., ePPS =29m.45s.
Jena eZ =19m.39s.
Triest ePPP =21m.50s., iSKKS =26m.44s., ePPS =30m.22s., eSS =35m.8s., eSSS =38m.54s.
Stuttgart ePPZ =19m.58s., iPP =20m.1s.k, e =20m.18s., ePPP =23m.14s., ePS =29m.41s., e =31m.59s., eSS =36m.9s.
Aberdeen iE =22m.2s., and 41m.5s., eN =48m.23s.
De Bilt ePPP =22m.33s., eSS =36m.39s.
Bologna e =20m.4s., 30m.35s., and 48m.35s.
Strasbourg ePP =19m.52s. and 19m.55s., e =20m.29s., ePS =29m.47s., e =32m.5s. 34m.56s., eSKKS =36m.45s., e =38m.33s.
Zürich ePP =20m.2s.
Rome ePPZ =19m.56s., ePPPZ =22m.35s., eSKS =24m.38s., eN =27m.48s., eSSN =36m.28s.
Uccle ePKP?EN =20m.10s., eE =25m.38s.
Kew e =21m.14s., eEZ =22m.57s., e =31m.15s., eEZ =37m.13s., eE =38m.5s., eZ =40m.33s., 46m.20s., and 47m.9s., eQEN =56m.9s.
Paris iPP =20m.20s., ePPP =22m.52s., ePKKP =29m.9s., ePPS =31m.31s., e =32m.9s.?, eSS =37m.9s.?, eSSS =42m.9s.?, Q =56m.9s.?
St. Louis ePP? =21m.7s., eS =28m.30s., ePS =31m.5s., ePPS =31m.57s.
Chicago eS =28m.36s.
Cleveland eE =32m.57s., eN =33m.48s.
Alicante PP =21m.12s., PKS =22m.36s., PPP =24m.0s., SS =38m.34s., SSP =38m.48s., SSS =43m.40s.
Vermont eSS? =37m.31s.
Columbia ePPS =33m.53s., eSSS =44m.33s.
Granada PPP =23m.3s., SKP =23m.42s., S =30m.6s., PPS =34m.9s., iSS =39m.8s., SSS =44m.3s.
Lisbon SKP =22m.55s., E =57m.39s., EN =61m.33s.
Bermuda ePP =23m.45s., eSKS =27m.46s., ePPS =35m.47s., eSSS =47m.13s.
Huancayo e =21m.14s., eSKS? =27m.59s., ePPS =35m.25s., eSS =41m.48s.
San Juan eSKKS =31m.2s., e =31m.41s., eSS =42m.59s., eSSS =49m.36s.
Long waves were also recorded at Ivigtut, Helsinki, Barcelona, La Plata, and Tacubaya.

April 18d. Readings also at 0h. (Bogota, La Paz, and near Huancayo), 2h. (Kodaikanal), 3h. (La Paz and Hungry Horse (2)), 5h. (Rome, Ksara, Warsaw, and near Bogota), 6h. (Christchurch and Bogota), 7h. (Paris, Ksara, and near Tacubaya), 9h. (Bucharest and Bogota), 10h. (Mount Wilson, Pasadena, Riverside, Palomar, Hungry Horse (2), Pierce Ferry, Tucson, Bermuda, Bogota, and near Port-au-Prince), 12h. (near Lick), 15h. (Kodaikanal, near Andijan, Obi-garm, Stalinabad, and Kulyab), 21h. (Shasta Dam, near Berkeley, Branner, Santa Clara, Lick, and Mineral), 22h. (Hungry Horse (2), Ksara, near Obi-garm, Stalinabad, and Kulyab), 23h. (Paris, Clermont-Ferrand, Toledo, and Christchurch).

April 19d. Readings at 2h. (near Lick), 3h. (Bogota, La Paz, Fort-de-France, and Pierce Ferry), 5h. (Stalinabad, near Kulyab and Obi-garm), 6h. (La Paz and near Kulyab), 7h. (Mount Wilson, Pasadena, Palomar, Riverside, Boulder City, Pierce Ferry, and Shasta Dam), 9h. (Ksara, near Lick and Branner), 10h. (Mizusawa, Hungry Horse (2), and near Kulyab), 12h. (near Kulyab, 13h. (near Mizusawa), 16h. (Nanking, Hungry Horse, and near Mineral), 17h. (Strasbourg, near Lick and Branner), 18h. (Strasbourg), 19h. (near Branner), 21h. (Hungry Horse and Fresno), 22h. (Kirkland Lake and near Mineral), 23h. (Istanbul, near Obi-garm and near Bogota).

April 20d. 2h. 10m. 58s. Epicentre 14°·0N. 92°·2W. (as on 1945, Dec. 9d.).

$A = -\cdot0373$, $B = -\cdot9700$, $C = +\cdot2404$; $\delta = +8$; $h = +6$;
$D = -\cdot999$, $E = +\cdot038$; $G = -\cdot009$, $H = -\cdot240$, $K = -\cdot971$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Oaxaca		5·3	305	1 19	− 3	2 21	− 4	—	—	—
Merida	z.	7·3	19	1 50	0	3 14	− 1	—	—	—
Tacubaya		8·6	310	2 9	0	3 54	+ 6	3 57	SS	—
Bogota		20·2	116	i 4 49	+10	e 8 44	SS	i 5 7	PPP	—
St. Louis		24·6	4	i 5 24	+ 1	e 9 44	+ 2	i 5 41	pP	—
Tucson		24·9	320	e 5 29	+ 3	e 9 58	+11	i 5 54	PP	e 10·5
San Juan		25·4	77	e 6 14	PP	—	—	—	—	e 10·2
Cleveland		28·9	16	e 6 3	0	e 10 58	+ 5	e 12 54	SSS	14·2
Pierce Ferry		29·4	323	i 6 9	+ 2	—	—	i 6 29	?	e 15·9
Palomar	z.	29·5	316	i 6 11	+ 3	—	—	i 6 26	?	—
Boulder City		29·8	322	i 6 15	+ 4	—	—	i 6 29	?	—
Philadelphia		29·9	27	—	—	e 11 32	+23	—	—	e 13·5
Riverside	z.	30·3	316	e 6 17	+ 2	—	—	—	—	—
Mount Wilson	z.	30·9	316	e 6 22	+ 2	—	—	—	—	—
Pasadena	z.	30·9	316	e 6 29	+ 9	—	—	—	—	—
Fordham		31·2	28	i 6 23	0	—	—	—	—	18·5
Harvard		33·5	28	i 6 42	− 1	—	—	—	—	e 19·0
Ottawa		34·3	2	6 49	− 1	12 2	−15	8 12	PP	15·0
Temiskaming		34·4	16	6 51	0	12 16	− 3	8 16	PPP	16·0
Lick	z.	35·0	317	e 6 57	+ 1	—	—	i 7 2	P	—
Kirkland Lake		35·5	13	7 0	0	i 9 31	?	8 25	PP	16·0
Berkeley		35·7	318	—	—	i 12 40	+ 1	i 12 46	S	e 19·0
Shasta Dam		37·4	321	e 7 16	0	—	—	e 8 55	PP	—
La Paz	E.	38·5	141	e 7 22	− 4	i 12 56	−26	—	—	—
Hungry Horse		38·7	337	i 7 28	+ 1	e 13 29	+ 4	i 8 57	PP	—
Strasbourg		86·1	41	i 12 46	+ 2	—	—	—	—	43·0
Stuttgart		86·9	40	e 12 48	0	—	—	e 16 7	PP	e 44·0
Rome	z.	91·4	46	—	—	e 23 38	[− 3]	—	—	—

Additional readings :—
Bogota iSSEZ = 9m.5s., eS_cSEZ = 16m.14s.
St. Louis esS = 10m.22s.
Tucson i = 5m.34s., e = 6m.20s.
Cleveland cE = 11m.21s.
Shasta Dam eP_cP = 9m.40s.
Hungry Horse iP_cP = 9m.40s., i = 14m.4s.
Long waves were also recorded at Uccle, Kew, and Granada.

April 20d. 4h. 29m. 27s. Epicentre 31°·8S. 179°·5E. Depth of focus 0·060.

$A = -\cdot8515$, $B = +\cdot0074$, $C = -\cdot5244$; $\delta = +10$; $h = +2$;
$D = +\cdot009$, $E = +1\cdot000$; $G = +\cdot524$, $H = -\cdot005$, $K = -\cdot852$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tuai	N.	7·2	205	1 46	− 1	3 13	+ 1	—	—	—
Hastings		8·1	194	—	—	3 33?	+ 3	—	—	—
New Plymouth	E.	8·5	210	2 6	+ 4	3 45	+ 7	—	—	—
Wellington		10·2	200	2 21	0	4 1	−12	—	—	—
Kaimata		12·5	209	—	—	4 57	− 4	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		12·9	203	—	—	5 4	− 5	—	—	—
Apia		19·6	28	3 58k	− 2	e 7 14	0	—	—	—
Riverview		23·9	257	i 4 41a	+ 1	e 8 28	+ 2	—	—	i 10·7
La Jolla	z.	87·7	49	e 12 5	+ 1	—	—	—	—	—
Lick	z.	88·0	43	i 12 6	0	—	—	—	—	—
Pasadena	z.	88·0	47	i 12 5k	− 1	—	—	—	—	—
Mount Wilson	z.	88·1	47	i 12 6k	0	—	—	—	—	—
Palomar		88·3	49	i 12 7k	0	—	—	—	—	—
Riverside	z.	88·4	47	i 12 9k	+ 2	—	—	—	—	—
Shasta Dam		89·9	40	e 12 13	− 1	—	—	e 13 51	pP	—
Boulder City		91·3	48	i 12 22	+ 1	—	—	—	—	—
Tucson		91·6	53	i 12 23k	+ 1	—	—	—	—	—
Pierce Ferry		91·9	48	i 12 23	− 1	—	—	e 14 0	pP	—
Ksara		149·5	283	e 21 28	?	e 23 5	?	—	—	—
Helwan	z.	152·6	274	e 21 19	?	e 21 42	?	—	—	—
Copenhagen		154·4	344	19 27	[+24]	—	—	—	—	—
Istanbul		154·6	300	e 20 44	?	21 31	?	—	—	—
Stuttgart	z.	161·5	339	e 19 59	[+48]	e 22 31	PKS	—	—	—
Strasbourg		162·1	342	e 19 59	[+47]	—	—	—	—	—
Rome		165·5	318	e 24 18	PP	e 24 59	?	e 25 27	?	—

Additional readings :—
Palomar eZ = 12m.30s. and 14m.4s.
Riverside eZ = 12m.25s.
Tucson e = 12m.39s.
Stuttgart eL? = 28m.33s.
Strasbourg e = 22m.27s. and 28m.33s.

April 20d. Readings also at 1h. (near Tacubaya), 2h. (near Lick), 4h. (Andijan, near Kulyab, Obi-garm, and Stalinabad), 5h. (Istanbul, Pierce Ferry, Shasta Dam, Hungry Horse, Tucson, Palomar, and near Mineral (2)), 6h. (near Tacubaya), 9h. (near Fresno), 11h. (Batavia and Tacubaya), 13h. (near Tacubaya (2)), 14h. (near Tacubaya and near Stuttgart), 15h. (near Branner and Lick), 16h. (Rome, Stuttgart, Alicante, and Istanbul), 17h. (Ksara, near Branner and Lick), 19h. (Vladivostok, Irkutsk, Sverdlovsk, Calcutta, Stuttgart, Rome, Uccle, De Bilt, Strasbourg, Hungry Horse (3)), Shasta Dam, Nanking, and near Tacubaya. More than one shock). 20h. (Shasta Dam and Triest).

April 21d. 0h.—1h. Formosa.

Nanking e = 58m.49s. and 60m.21s.
Vladivostok eP = 61m.48s., eS = 65m.24s.
Irkutsk eP = 63m.21s., eS = 68m.20s.
Stalinabad eP = 65m.38s., S = 72m.24s.
Sverdlovsk eP = 66m.23s.
Shasta Dam iP = 70m.8s., i = 70m.18s., e = 73m.6s.
Hungry Horse iP = 70m.9s.
Bogota eEZ = 76m.42s. and 76m.52s.
Long waves were also recorded at several European stations.

April 21d. 2h. Probably off the South American Coast at the Chile-Peru border.

La Paz eP = 25m.44s., iP = 25m.56s., iP_g = 26m.2s., iS = 26m.24s., iS_g = 26m.52s.
Huancayo eP = 27m.4s., eS? = 28m.37s., eL = 29m.9s.
Bogota ePEZ = 30m.8s., eEZ = 34m.34s., eSEZ? = 35m.32s., eEZ = 36m.30s. and 38m.26s.
Tucson eP = 35m.25s., e = 35m.37s.
Palomar ePZ = 35m.53s., eZ = 36m.4s.
Pierce Ferry iP = 35m.55s., i = 36m.5s.
Boulder City iP = 35m.57s., i = 36m.9s.
Riverside iPZ = 35m.57s., iZ = 36m.10s.
Mount Wilson iPZ = 36m.1s., iZ = 36m.12s.
Pasadena ePZ = 36m.2s., iZ = 36m.13s.
Shasta Dam eP = 36m.38s., e = 36m.50s.
Hungry Horse iP = 36m.45s., i = 36m.58s.

April 21d. 15h. 21m. 14s. Epicentre 14°·3S. 167°·3E. (as on 1946, March 15d.).

$A = -·9457$, $B = +·2131$, $C = -·2454$; $\delta = -2$; $h = +6$;
$D = +·220$, $E = +·976$; $G = +·239$, $H = -·054$, $K = -·969$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	E.	18·7	224	i 4 15	− 7	e 7 43	− 5	i 4 33	PP	i 9·4
Apia	E.	20·3	92	e 4 46	+ 6	e 8 40	+17	—	—	—
Auckland	N.	23·5	166	5 36	+24	9 40	+17	—	—	e 11·5
Riverview		24·3	215	i 5 23a	+ 3	i 9 35	− 2	i 5 31	pP	e 11·5
Arapuni	E.	24·8	166	—	—	10 16	+30	—	—	—
Wellington	Z.	27·7	170	5 56	+ 4	10 42	+ 9	i 13 49	Q	16·0
Christchurch		29·5	173	6 12	+ 4	10 57	− 5	11 51	SS	13·9
Vladivostok		65·7	333	i 10 42	− 6	i 19 27	− 7	—	—	—
Berkeley		83·9	49	e 12 34	+ 1	e 24 2	PPS	e 17 8	PP	e 38·9
Lick	Z.	84·1	49	e 12 33	− 1	—	—	—	—	—
Shasta Dam		84·9	45	e 13 11	+33	—	—	—	—	—
Irkutsk		85·6	327	e 12 45	+ 4	i 23 5	[0]	24 20	PS	—
Pasadena		85·6	54	e 12 43	+ 2	—	—	—	—	e 38·8
Mount Wilson	Z.	85·7	54	e 12 40	− 2	—	—	—	—	—
Riverside	Z.	86·1	54	e 12 41	− 3	—	—	—	—	—
Boulder City		88·7	53	e 12 55	− 2	—	—	—	—	—
Bombay		98·7	287	e 13 46?	+ 4	—	—	—	—	—
Tashkent		105·3	310	e 18 31	PP	e 24 21	[−31]	e 27 42	PS	—
Sverdlovsk		111·0	326	e 19 11	PP	26 51?	{+39}	—	—	—
Scoresby Sund		123·6	4	(13 46?)	?	—	—	—	—	13·8
Ksara		132·1	302	e 19 15	[− 1]	33 34	PPS	e 21 39	PP	—
Copenhagen		134·4	341	22 46	PKS	—	—	—	—	—
Istanbul		135·0	315	e 19 18?	[− 3]	—	—	e 22 38?	PKS	e 79·8
Helwan	Z.	136·6	298	e 19 34	[+10]	—	—	e 22 2	PP	—
De Bilt		139·7	343	e 22 22	PP	—	—	e 40 46?	SS	e 73·8
Stuttgart		141·2	337	e 19 22	[−11]	e 30 46	{+78}	e 22 32	PP	e 76·8
Triest		141·6	330	e 23 0	PP	—	—	—	—	—
Strasbourg		141·9	337	e 19 26	[− 8]	e 28 58	{−34}	e 22 33	PP	66·8
Paris		143·4	343	e 23 16	PP	—	—	—	—	78·8
Rome		144·9	327	i 19 34a	[− 5]	e 26 42	[− 5]	e 41 34	SS	—
Clermont-Ferrand		145·9	340	i 19 40	[− 1]	—	—	—	—	78·8
Alicante		153·7	339	e 22 0	?	—	—	e 24 0	PP	e 82·5

Additional readings :—
Brisbane iPN =4m.21s., iN =5m.3s., iSSE =8m.10s.
Riverview iSEZ =9m.38s., iN =9m.44s., iEZ =9m.47s., iZ =10m.6s., iN =10m.16s., iE =10m.29s.
Christchurch QN =11m.56s.
Tashkent SS =33m.10s.
Stuttgart ePKP?Z =19m.29s., eZ =23m.14s.
Strasbourg ePKP =19m.29s., ePP =22m.36s., eSKKS$_2$ =35m.48s., eSS =41m.9s.
Long waves were also recorded at Bermuda, Bogota, Toledo, Helsinki, Prague, and Uccle.

April 21d. 20h. 22m. 3s. Epicentre 19°·3N. 69°·3W.

Intensity V-VI at Port au Prince. Felt less strongly throughout the whole of the Republic of Dominica. Epicentre as adopted.

Bulletin de l'Observatoire Météorologique du Séminaire College, St. Martial, Port au Prince, Haïti. Port au Prince, 1951, pp. 134-136.

$A = +·3339$, $B = -·8835$, $C = +·3285$; $\delta = -3$; $h = +5$;
$D = -·935$, $E = -·353$; $G = +·116$, $H = -·307$, $K = -·944$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince	3·0	255	i 0 48	− 2	—	—	—	—	—
San Juan	3·1	107	i 0 51	0	—	—	—	—	—
Fort de France	9·0	119	e 2 14	+ 1	e 4 9	+11	—	—	—
Bermuda	13·7	17	i 3 46?	+28	i 6 15?	+23	—	—	i 7·7
Balboa Heights	14·3	225	i 3 24	− 2	i 5 58	− 8	—	—	e 7·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		15·3	198	e 3 38	− 1	i 6 30	0	i 3 57	PP	—
Columbia		18·0	328	e 4 9	− 4	e 7 25	− 7	e 4 43	PP	i 8·4
Merida	Z.	19·2	279	i 4 34	+ 6	i 8 19	+20	—	—	—
Philadelphia		21·2	348	i 4 45	− 4	i 8 45	+ 4	—	—	—
Pennsylvania		22·7	343	i 5 3	− 1	i 9 15	+ 6	—	—	—
New Kensington	E.	23·0	340	i 5 10	+ 3	i 9 25	+11	i 5 31	PP	—
Harvard		23·2	357	i 5 8	− 1	i 9 17	− 1	—	—	e 12·0
Cleveland		24·5	338	e 5 20 a	− 2	i 9 53	+13	—	—	—
Vermont		25·3	354	e 5 26	− 4	e 9 39	−15	e 6 16	PP	i 10·0
Halifax		25·7	10	5 54	+21	10 30	+29	11 57	SS	13·0
Oaxaca	E.	26·2	272	e 5 45	+ 7	e 10 30	+21	—	—	—
Ottawa		26·6	350	5 39	− 3	10 11	− 5	6 15	PP	12·8
Chicago		27·3	330	e 5 45	− 3	—	—	i 6 33	PP	—
Shawinigan Falls		27·3	356	5 46	− 2	10 21	− 6	6 18	PP	13·0
Seven Falls		27·8	358	5 56	+ 3	10 40	+ 5	6 41	PP	13·2
Tacubaya		28·2	275	i 5 55	− 1	i 10 40	− 1	i 6 37	PP	—
Temiskaming		28·4	346	5 59	+ 1	10 52	+ 7	11 50	SS	13·2
Ville Marie		29·2	346	6 4	− 1	10 35	−23	—	—	13·0
Kirkland Lake		30·1	346	6 12	− 1	—	—	—	—	—
Huancayo		31·7	191	e 6 27	0	e 11 32	− 5	i 7 57	PP	e 12·8
Lincoln	E.	31·7	320	e 6 27	0	i 11 33	− 4	e 7 11	PP	i 14·3
Guadalajara		32·0	279	e 8 51	?	e 11 17	−25	e 13 13	SS	—
Manzanillo		33·1	276	e 6 42	+ 2	e 11 58	− 1	—	—	e 14·2
Chihuahua	Z.	34·8	293	i 7 0	+ 6	i 12 43	+18	i 8 31	PPP	—
La Paz		35·6	178	i 6 58 a	− 3	i 12 28	−10	i 8 17	PP	18·0
Rapid City	E.	37·6	319	e 7 14	− 4	i 13 7	− 1	—	—	i 15·4
Tucson		39·3	299	i 7 30	− 2	e 13 23	−11	i 8 55	PP	i 16·3
Montezuma		41·7	179	e 8 13	+21	e 14 33	+23	—	—	e 17·4
Salt Lake City		42·1	311	e 7 51	− 4	i 14 13	− 3	e 9 31	PP	i 17·2
Logan		42·4	313	e 7 51	− 7	i 14 10	−10	—	—	i 17·2
Pierce Ferry		42·6	303	e 7 56	− 3	e 14 10	−13	i 9 52	PP	—
Boulder City		43·2	302	e 8 3	− 1	e 14 25	− 7	i 9 49	PP	—
Bozeman		43·3	318	e 8 6	+ 1	i 14 29	− 4	e 9 48	PP	i 19·6
Saskatoon		43·8	328	8 11	+ 2	i 14 37	− 3	10 4	PPP	i 19·8
Butte	N.	44·4	318	e 8 12	− 2	i 14 41	− 8	e 9 31	PP	i 19·2
Ivigtut		44·4	15	e 8 10	− 4	e 14 47	− 2	17 51	SS	20·0
La Jolla		44·8	298	e 8 17	0	e 14 57	+ 2	—	—	—
Riverside		45·0	300	i 8 18	− 1	i 15 0	+ 2	—	—	—
Mount Wilson		45·6	300	e 8 23	− 1	e 15 10	+ 4	—	—	—
Pasadena		45·7	300	i 8 23	− 1	i 15 10	+ 2	i 10 16	PP	e 22·0
Haiwee		45·7	303	i 8 24	0	i 15 11	+ 3	—	—	—
Tinemaha		46·1	304	i 8 25	− 3	i 15 18	+ 4	—	—	—
Hungry Horse		46·2	320	i 8 25	− 3	e 15 1	−14	(i 18 43)	SS	i 18·7
Santa Barbara		47·0	300	i 8 34	− 1	e 15 28	+ 2	—	—	—
Fresno	Z.	47·3	303	i 8 36	− 1	—	—	i 18 53	SS	—
Lick		48·8	304	i 8 51	+ 2	e 15 56	+ 4	i 10 52	PP	e 25·0
Santa Clara		49·1	304	i 8 54	+ 3	i 16 7	+11	i 20 11	PSS	e 26·7
Grand Coulee		49·2	318	i 8 47	− 5	i 15 57	− 1	—	—	—
Mineral	E.	49·2	307	e 8 51	− 1	—	—	e 14 56	?	e 26·4
Branner		49·3	304	i 8 55	+ 2	e 16 2	+ 3	—	—	e 25·8
Berkeley		49·4	304	e 8 50	− 3	i 16 3	+ 3	i 10 40	PP	e 24·8
Shasta Dam		49·9	308	e 8 51	− 6	e 16 4	− 3	e 10 30	PP	—
Ukiah		50·3	306	e 9 1	+ 1	i 16 18	+ 5	e 11 3	PP	e 21·3
Ferndale	E.	51·3	307	e 9 2	− 6	i 16 20	− 6	—	—	e 28·0
Victoria		52·2	317	9 17	+ 2	17 34	+55	20 9	SS	24·0
Reykjavik	N.	54·9	23	e 9 38	+ 3	e 17 17	+ 1	e 20 52	SS	e 26·4
La Plata	E.	55·0	168	9 39	+ 4	17 9	− 8	11 50	PP	33·4
	N.	55·0	168	9 29	− 6	16 57	−20	11 9	PP	33·6
	Z.	55·0	168	9 33	− 2	17 15	− 2	10 9	PeP	27·6
Lisbon		55·1	56	9 35 k	− 1	17 21	+ 3	11 37 a	PP	25·1

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Scoresby Sund		58·4	17	9 57 a	− 3	18 5	+ 3	11 34	PP		—
Toledo		59·1	55	i 10 4	0	18 13	+ 2	12 16	PP		—
Granada		59·5	58	i 10 7 a	0	i 18 19	+ 3	i 12 22	PP	i	27·8
Jersey		60·8	44	e 10 20	+ 4	e 18 39	+ 6	22 49	SS		28·0
Edinburgh		60·9	36	10 19	+ 2	18 36	+ 2	12 36	PP		—
Sitka		61·1	326	i 10 20	+ 2	i 18 34	− 3	i 14 13	PPP	i	24·7
Aberdeen		61·6	34	i 10 23	+ 1	i 18 48	+ 5	i 12 36	PP		29·1
Durham		61·6	38	i 10 24	+ 2	i 18 48	+ 5	i 10 32	pP		—
Alicante		61·9	56	i 10 27	+ 3	18 52	+ 5	11 22	PcP		28·3
Kew	z.	62·1	41	i 10 23	− 2	e 18 47	− 2	i 10 28	pP	e	29·0
Barcelona		63·7	52	10 41	+ 5	i 19 17	+ 7	13 5	PP	e	26·8
Paris		63·8	44	e 10 35	− 1	i 19 11	0	e 12 59	PP	e	29·0
Clermont-Ferrand		64·2	48	e 10 39	0	e 19 20	+ 4	i 11 20	PcP		29·7
Algiers		64·8	58	i 10 49	+ 6	i 19 33	+10	i 11 25	PcP	e	27·0
Uccle	E.	65·0	42	e 10 41	− 3	i 19 26	0	i 23 38	SS	e	30·0
De Bilt		65·5	40	e 10 45	− 2	e 19 35	+ 3	e 13 26	PP	e	30·0
Neuchatel		66·8	46	e 10 55	− 1	e 19 57	+ 9	—	—		—
Basle		67·2	45	e 11 2	+ 4	e 19 59	+ 7	—	—		—
Strasbourg		67·3	45	e 10 57	− 2	i 20 0	+ 6	i 13 28	PP	i	30·1
College		67·8	334	e 11 0	− 2	i 19 53	− 7	e 15 0	PPP	e	27·2
Zürich		67·9	45	e 10 58	− 4	e 19 50	−11	e 13 32	PP		—
Stuttgart		68·2	45	e 11 1	− 3	e 20 7	+ 3	e 13 22	PP	e	31·0
Pavia	z.	68·5	48	i 11 11	+ 5	—	—	—	—		—
Chur		68·6	47	e 11 11	+ 4	e 20 13	+ 4	—	—		—
Salo		69·4	48	e 11 10	− 2	20 32	+14	i 21 16	PS		—
Jena		69·6	42	e 11 13	0	e 20 26	+ 5	e 14 3	PP	e	33·2
Copenhagen		69·7	36	e 11 12 k	− 2	i 20 23	+ 1	21 20	ScS		—
Bologna		70·2	49	e 11 15 a	− 2	e 20 31	+ 3	e 13 54	PP		—
Florence		70·2	49	e 11 19	+ 2	e 20 29	+ 1	—	—	e	33·5
Potsdam	E.	70·3	40	i 11 22	+ 5	i 20 34	+ 5	e 15 19	PPP	e	33·0
	N.	70·3	40	i 11 25	+ 8	i 20 37	+ 8	i 21 25	PPS	e	30·0
Collmberg		70·4	42	e 11 20	+ 2	—	—	i 14 21	PP	e	29·3
Padova		70·5	47	i 11 26?	+ 8	20 40	+ 8	e 14 6	PP	e	33·0
Rome		71·4	51	e 11 21 k	− 3	i 20 37	− 5	i 13 39	PP	e	33·6
Prague		71·5	42	e 11 23	− 1	e 20 38	− 5	e 14 9	PP	e	31·0
Triest		71·7	47	e 11 31	+ 5	i 20 44	− 1	i 12 0	pP		—
Upsala	E.	72·0	32	11 29 k	+ 1	e 20 41	− 8	i 14 11	PP	e	31·0
	N.	72·0	32	i 11 33	+ 5	e 20 51	+ 2	e 14 25	PP	e	32·0
Raciborzu		73·9	42	e 11 42	+ 3	e 21 9	− 1	i 12 9	PcP	e	35·0
Catania		74·2	55	e 11 36	− 4	—	—	—	—	e	35·0
Messina		74·4	54	e 11 47	+ 5	—	—	—	—	e	34·0
Budapest		74·9	45	11 48	+ 4	21 24	+ 2	e 14 46	PP	e	35·0
Kalossa		75·1	45	e 11 52	+ 6	e 21 27	+ 3	—	—	e	35·5
Taranto		75·2	52	11 52	+ 6	21 28	+ 3	—	—	e	38·7
Warsaw	E. or N.	75·2	39	e 11 55	+ 9	e 21 28	+ 3	12 2	PcP	e	31·0
	Z.	75·2	39	i 11 52 a	+ 6	e 21 31	+ 6	14 48	PP	e	34·0
Helsinki		75·6	31	e 11 48 a	0	e 21 27	− 2	—	—	e	27·0
Belgrade		76·5	47	i 11 59	+ 5	e 21 30	− 9	e 12 27	PcP	e	36·0
Bucharest		80·5	46	e 12 24 k	+ 9	e 22 23	+ 1	i 15 22	PP		38·0
Honolulu		81·9	290	e 12 24	+ 1	e 22 29	− 7	e 16 35	PP	e	33·6
Moscow		83·4	33	e 12 29	− 1	i 22 47	− 4	28 9	SS		—
Istanbul		83·6	49	i 12 33	+ 2	22 44	− 9	—	—		—
Simferopol		85·7	44	e 12 44?	+ 2	e 23 2	[− 3]	—	—		—
Yalta		85·9	45	i 12 40	− 3	23 13	− 3	—	—		—
Theodosia		86·5	44	e 12 49	+ 3	—	—	—	—		—
Helwan		89·4	59	i 13 3 a	+ 3	23 57	+ 8	16 35	PP		—
Sotchi		89·9	44	13 7	+ 5	e 23 35	[+ 3]	—	—		—
Ksara		91·4	54	e 13 10 k	+ 1	23 50	{− 2}	—	—		—
Piatigorsk		91·8	43	e 13 19	+ 8	e 23 42?	[− 1]	e 16 55	PP		—
Sverdlovsk		93·4	26	e 13 17	− 1	i 23 51	[− 1]	i 17 13	PP		—
Leninakan		93·9	45	e 13 32	+11	—	—	—	—		—
Grozny		93·9	43	13 25	+ 4	23 56	[+ 1]	i 17 30	PP		—
Erevan		94·6	46	e 13 39	+15	—	—	—	—		—
Ashkabad		104·8	42	e 18 40	PP	e 24 56	[+ 6]	e 27 54	PS		—
Apia		106·0	261	e 18 36	PP	e 24 57	[+ 2]	e 27 57?	PS	e	50·4
Irkutsk		108·5	5	e 14 39	P	25 8	[+ 2]	19 9	PP		—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Samarkand		108·5	35	e 18 51	PP	—	—	—	—	—
Tashkent		108·5	32	e 14 32?	P	i 25 3?	[− 3]	i 19 0?	PP	—
Frunse		109·8	28	e 19 13	PP	—	—	—	—	—
Almata		110·4	25	e 19 16	PP	e 28 41	PS	—	—	—
Andijan		110·4	31	e 14 43	P	e 25 19	[+ 5]	e 19 10	PP	—
Obi-garm		110·7	33	e 14 44?	P	e 25 12	[− 3]	—	—	—
Kulyab		111·3	34	e 14 52?	P	i 25 21	[+ 3]	—	—	—
Murgab		113·1	31	14 59	P	25 30	[+ 5]	19 22	PP	—
Vladivostok		114·9	343	e 15 4	P	25 36	[+ 4]	i 19 47	PP	—
Tananarive		120·6	102	e 20 28	PP	25 56	[+ 4]	23 8	PPP	e 57·8
Dehra Dun	N.	121·5	33	e 24 21	PPP	—	—	—	—	e 69·4
Auckland	N.	121·8	239	e 22 27?	PPP	e 32 21	PPS	—	—	—
Wellington		121·8	234	20 31	PP	25 59	[+ 3]	27 28	SKKS	56·0
Christchurch		123·3	231	20 39	PP	e 26 4	[+ 3]	22 9	SKP	58·0
Bombay		126·9	48	19 8	[+ 2]	e 26 11	[− 1]	e 21 16	PP	60·0
Hyderabad	N.	131·7	44	22 43	PKS	—	—	—	—	—
Calcutta	E.	133·0	29	e 19 26	[+ 8]	i 26 55	[+28]	22 55	PKS	—
Kodaikanal	E.	136·0	51	e 22 31	PP	i 26 1	[−31]	—	—	—
Colombo	E.	140·0	54	19 33	[+ 2]	—	—	—	—	70·4
Brisbane	N.	140·5	251	i 19 22	[− 9]	i 29 9	{−15}	e 22 25	PP	i 46·0
Riverview		141·3	240	e 19 20	[−13]	i 26 33	[− 8]	e 22 31	PP	65·8
Batavia	Z.	166·4	17	i 20 8	[+ 1]	—	—	—	—	—

Additional readings :—
Bogota iP = 3m.42s.
Columbia e = 4m.43s., i = 7m.41s.
Cleveland iPZ = 5m.24s.k, iZ = 5m.41s. and 5m.50s.
Vermont iP = 5m.31s., e = 7m.39s.
Halifax i = 6m.0s.
Ottawa i = 5m.43s., SSN = 11m.27s., iN = 12m.9s.
Chicago i = 6m.11s. and 9m.12s.
Shawinigan Falls i = 5m.51s., PPP = 6m.35s., SS = 11m.38s.
Seven Falls PPP = 6m.57s., SS = 11m.56s.
Tacubaya iPN = 5m.58s., eN = 6m.5s., iPPPE = 6m.52s. and 6m.55s., iZ = 7m.13s., eN = 7m.53s., iE = 8m.58s., eN = 9m.43s., iE = 10m.1s., iSN = 10m.28s., eSSN = 11m.34s., iSSN = 11m.43s. and 11m.46s.
Ville Marie i = 6m.9s. and 8m.55s.
Huancayo iP = 6m.30s., i = 6m.57s. and 7m.14s.
Lincoln iP = 6m.30s., i = 12m.5s. and 12m.35s.
Guadalajara eE = 9m.43s.
Manzanillo ePN = 6m.50s., eE = 11m.12s. and 12m.34s.
Chihuahua iSSZ = 14m.47s.
La Paz iPPPZ = 8m.38s., P_cP = 9m.15s., iSSZ = 14m.57s., S_cSZ = 17m.13s.
Rapid City iPE = 7m.18s.
Tucson i = 7m.44s. and 8m.28s., iPPP = 9m.21s., i = 13m.38s.
Salt Lake City e = 8m.58s. and 14m.57s., i = 15m.35s., e = 16m.17s.
Logan eS = 14m.5s., i = 14m.22s.
Pierce Ferry iPPP = 10m.15s.
Boulder City iPPP? = 10m.43s.
Bozeman iP = 8m.10s., i = 15m.20s. and 16m.21s., iSS = 17m.53s.
Saskatoon SSS = 18m.7s.
Butte iSSN = 18m.10s.
Ivigtut i = 8m.18s., 10m.12s., and 14m.56s., SSS = 18m.39s.
Mount Wilson iZ = 8m.31s. and 8m.46s.
Pasadena iZ = 8m.37s., iP_cPZ = 9m.37s., iS_cPZ = 14m.4s., iS_cSN = 18m.20s., iE = 21m.50s.
Hungry Horse i = 15m.15s.
Fresno eZ = 27m.3s.
Lick iN = 8m.54s.
Branner iN = 9m.10s.
Berkeley iN = 8m.57s., 11m.3s., and 13m.6s., eSSE = 20m.11s.
Shasta Dam eP_cP = 10m.10s., ePPP = 11m.54s.
Ukiah eS_cS = 18m.57s., eSS = 20m.5s.
Ferndale eN = 9m.14s.
Victoria iN = 19m.11s., SSS = 21m.33s.
La Plata E. P_cP = 10m.11s., PPP = 12m.45s., P_cS? = 13m.45s., S? = 16m.27s., S_cS = 19m.15s., SS = 20m.45s., SSS = 22m.39s., and 23m.21s., Q = 25m.51s.
La Plata N. P_cP = 10m.9s., PPP = 12m.45s., i = 13m.3s., P_cS = 14m.9s., S_cS = 19m.15s., SS = 21m.9s., Q = 26m.9s.
La Plata Z. 10m.45s., PPP = 12m.39s. and 18m.9s., SS = 21m.39s.
Lisbon iP = 9m.41s.a, NZ = 10m.13s., Z = 10m.16s., EN = 11m.25s., PPPE = 12m.45s. and 12m.51s., N = 16m.31s., Z = 16m.57s., iS = 17m.26s., S_cS = 19m.31s., SSZ = 21m.17s., SSSN = 23m.6s.

Continued on next page.

Scoresby Sund 10m.2s. and 10m.49s., PP =12m.15s., 13m.59s., 17m.31s., and 18m.14s., SS =22m.9s.
Granada P_cP =11m.1s., PPP =13m.39s., P_cS =15m.4s., PS =18m.43s., S_cS =20m.13s., iSS =22m.28s., SSS =25m.13s.
Edinburgh P_cP =11m.2s., PPP =14m.3s., P_cS =15m.3s., PS =18m.47s., S_cS =20m.7s.
Sitka iS_cS =20m.11s., i =21m.46s., iSS =22m.21s.
Aberdeen iEN =20m.13s., iN =23m.19s., iE =23m.29s.
Durham iE =12m.35s., 13m.35s., and 14m.54s., iN =15m.8s. and 15m.38s., isSEN = 19m.0s., iEN =22m.40s.
Alicante P_cP =10m.52s., PP =12m.57s., PPP =14m.27s., P_cS =15m.7s., PS =19m.31s., PPS =19m.47s., S_cS =19m.55s., SS =22m.59s., SSS =25m.39s., Q =26m.56s.
Kew iP_cPZ =10m.52s., iPPZ =12m.58s., iPPP?Z =15m.2s., iP_cSZ =15m.20s., eSSZ = 19m.6s., eSSSZ =23m.6s.
Barcelona PPP =14m.14s., SS =23m.32s.
Paris i =10m.40s., eS =19m.17s., iPS =19m.38s., i =21m.59s. and 22m.13s., iSS = 23m.26s., eSSS =26m.5s., eQ =27·0m.
Clermont-Ferrand iP =10m.44s., i =10m.51s., iPP =13m.6s., iPPP =14m.48s., iS = 19m.28s., iSS =23m.44s., iSSS =26m.57s.
Algiers i =11m.12s.
Uccle eEN =10m.47s., iSN =19m.34s., eQN =27·0m.
De Bilt iP =10m.53s.k, eSS =23m.27s., eSSS =27m.3s.
Strasbourg iP =11m.2s., iPP =13m.32s., iPPP =15m.2s., iPS? =20m.10s., iS_cS = 21m.2s. and 21m.6s., iSS =24m.2s. and 24m.11s., iSSS =27m.24s.
College e =20m.49s., iS_cS =20m.59s., eSS =24m.11s.
Zürich eP =11m.5s.k.
Stuttgart ePZ =11m.5s.k, iP =11m.9s., e =12m.4s., iPP =13m.41s., ePPP =15m.34s., ePS =21m.2s., eSS =24m.37s., eSSS =28m.1s.
Salo iZ =11m.17s. and 11m.23s.
Jena ePZ =11m.16s., ePS?E =21m.13s., ePS?N =21m.19s., eSSE =25m.4s., eSSN = 25m.13s., eSSSEN =28m.15s.
Copenhagen iP =11m.17s., 13m.47s., and 17m.23s.
Bologna e =11m.20s.
Potsdam iPSE =21m.16s., eSSE =25m.12s., eSSS?E =28m.47s.?
Collmberg iZ =11m.26s., 12m.2s., 12m.10s., and 12m.30s.
Padova eEN =11m.56s., ePPPN =15m.42s., SSS =28m.2s.
Rome i =11m.28s., iZ =14m.59s., iE =20m.43s., iN =20m.59s.
Prague ePPP =15m.33s., ePS =21m.21s., eSS =25m.33s., eSSS =27m.27s., eSSSS = 29m.3s.
Triest iP =11m.35s.a, iPP =14m.16s., iPPP =15m.32s., iPS =21m.32s., iSSS =27m.59s.
Upsala iE =12m.37s., eN =15m.13s. and 16m.23s., eE =16m.28s. and 17m.46s., PSE = 21m.15s., PPS?N =21m.34s., eE =22m.57s.?, eSSN =25m.17s., eSSS?N =27m.39s.
Raciborzu ePPE =14m.23s., ePPN =14m.29s.
Catania e =11m.47s.
Budapest iPE =11m.51s., PPE =14m.56s., iN =15m.36s., PPPE =16m.40s., eSN = 21m.28s., PSN =21m.51s., PSE =22m.1s., SSE =26m.18s., SSSE =29m.40s., iN = 32m.40s.
Kalossa eN =13m.10s., eE =13m.13s., eN =13m.35s. and 15m.26s.
Warsaw PPPZ =16m.41s., ePPPE =16m.46s., iSE =21m.34s., PSN =22m.9s., PPSE = 22m.31s., ePPSZ =22m.37s., SSZ =26m.6s., SSE =26m.16s., SSN =26m.19s., SSSE =29m.6s., and many other readings given without phase.
Helsinki e =11m.53s.
Belgrade iPP =14m.16s., ePPP =16m.44s.
Bucharest iE =17m.39s., iN =22m.38s., iPSE =22m.49s.
Honolulu i =19m.3s., e =24m.27s.
Helwan eZ =16m.15s., PPPZ =18m.39s., SKSEN =23m.34s., PSE =25m.3s., SSE = 29m.57s.
Sverdlovsk iPPP =19m.13s., iSS =30m.33s.
Ashkabad eSS =33m.21s.
Apia eSSEN =28m.45s., eQN =44m.27s.
Irkutsk PPP =21m.14s., iS =26m.38s.
Tashkent iPPP =21m.17s.?, iSKKS =25m.57s.?, iPS =28m.21s.?, SS =34m.3s.?
Andijan ePS =28m.25s.
Murgab PS =29m.6s.
Vladivostok SKKS =26m.41s., iS =27m.25s., iPS =29m.27s., iSS =35m.27s.
Tananarive SKKS =27m.29s., PS =30m.20s., PPS =31m.28s., SS =36m.51s., SSP =37m.11s., SSS =41m.10s.
Wellington PS =30m.28s., PPS =31m.56s., PPPSZ =32m.25s., PPP?Z(Δ >180°) = 37m.27s.
Christchurch PPP?EN =25m.13s., eEN =36m.7s., SSEN =38m.23s., SSSEN =41m.57s., QN =47m.17s.
Bombay eSKSE =26m.15s., SKKSE =28m.3s., iPSE =31m.15s., ePSN =31m.18s., SSN =38m.10s., SSE =38m.20s.
Calcutta iPPPE =24m.18s., PSE =32m.14s., PPSE =34m.13s., iSSPE =40m.50s.
Brisbane eSSS?N =32m.41s., iN =36m.54s., iQN =41m.59s.; readings wrongly identified.
Riverview ePKPE =19m.26s., ePPN =22m.36s., iEZ =23m.12s., iN =23m.22s., iE = 26m.55s., 27m.31s., and 28m.5s., iN =28m.14s., eSKKSE =29m.24s., iE =29m.38s., iPSZ =32m.53s., iPSE =32m.56s., iPPSE =35m.4s., iPPSZ =35m.8s., iE =36m.4s., 41m.51s., and 42m.59s., iN =43m.5s., eN =50m.57s., eQE =56m.45s.

April 21d. 20h. 32m. 19s. Epicentre 19°·3N. 69°·3W. (as on 20h. 22m.).

		Δ	Az.	P.	O−C.
		°	°	m. s.	s.
Tucson		39·3	299	i 7 30	− 2
Pierce Ferry		42·6	303	i 7 54	− 5
Boulder City		43·2	302	i 8 6	+ 2
Palomar		44·5	299	i 8 16	+ 1
La Jolla	z.	44·8	298	e 8 17	0
Riverside	z.	45·0	300	i 8 19a	0
Mount Wilson	z.	45·6	300	i 8 24a	0
Pasadena	z.	45·7	300	i 8 25	+ 1
Tinemaha	z.	46·1	304	i 8 28a	0
Santa Barbara	z.	47·0	300	i 8 35a	0
Shasta Dam		49·9	308	e 8 54	− 3
Toledo		59·1	55	i 10 10	+ 6
Stuttgart	z.	68·2	45	e 11 4	0

April 21d. 20h. 59m. 11s. Epicentre 19°·3N. 69°·3W. (as at 20h. 32m.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Balboa Heights		14·3	225	i 3 23	− 3	i 5 58	− 8	—	—	—
Bogota		15·3	198	i 3 39	0	i 6 41	+11	—	—	—
Fordham		21·8	352	i 4 55	− 1	i 8 55	+ 3	—	—	—
Cleveland	z.	24·5	338	i 5 23k	+ 1	—	—	—	—	—
St. Louis		26·5	322	i 5 39	− 2	—	—	—	—	i 12·6
Tacubaya	E.	28·2	275	i 5 52	− 4	—	—	—	—	—
Huancayo		31·7	191	e 6 27	0	e 11 41	+ 4	—	—	—
La Paz		35·6	178	i 6 59	− 2	i 12 34	− 4	—	—	—
Tucson		39·3	299	i 7 32a	0	—	—	—	—	—
Logan		42·4	313	i 7 53	− 5	—	—	—	—	—
Pierce Ferry		42·6	303	i 7 58	− 1	—	—	i 9 24	PP	—
Boulder City		43·2	302	i 8 5	+ 1	—	—	i 9 49	PP	—
Palomar		44·5	299	i 8 15a	0	—	—	—	—	—
La Jolla	z.	44·8	298	e 8 17	0	—	—	—	—	—
Riverside	z.	45·0	300	i 8 18a	− 1	—	—	—	—	—
Mount Wilson	z.	45·6	300	i 8 24a	0	—	—	—	—	—
Pasadena		45·7	300	i 8 24a	0	—	—	—	—	—
Haiwee	z.	45·7	303	i 8 27a	+ 3	—	—	—	—	—
Tinemaha	z.	46·1	304	i 8 27a	− 1	—	—	—	—	—
Hungry Horse		46·2	320	i 8 27	− 1	e 15 10	− 5	—	—	—
Santa Barbara	z.	47·0	300	i 8 34a	− 1	—	—	—	—	—
Grand Coulee		49·2	318	i 8 50	− 2	i 15 56	− 2	—	—	—
Berkeley	N.	49·4	304	e 8 51	− 2	e 15 33	−27	—	—	—
Shasta Dam		49·9	308	e 8 53	− 4	—	—	—	—	—
Toledo		59·1	55	i 10 6	+ 2	18 15	+ 4	—	—	—
Granada		59·5	58	i 10 5k	− 2	—	—	i 12 28a	PP	—
Alicante		61·9	56	10 31	+ 7	18 48	+ 1	13 3	PP	e 28·7
Paris		63·8	44	10 37	+ 1	—	—	—	—	—
Clermont-Ferrand		64·2	48	e 10 40	+ 1	e 18 0	?	—	—	—
Strasbourg		67·3	45	i 11 0	+ 1	—	—	i 11 36	PcP	—
Stuttgart	z.	68·2	45	e 11 5	+ 1	—	—	—	—	—
Salo		69·4	48	e 11 5	− 7	20 20	+ 2	—	—	—
Jena	N.	69·6	42	e 11 18	+ 5	e 20 24	+ 3	—	—	—
Copenhagen		69·7	36	11 18	+ 4	—	—	—	—	—
Bologna		70·2	49	e 11 33	+16	e 20 27	− 1	—	—	—
Padova		70·5	47	e 11 26?	+ 8	e 20 37	+ 5	—	—	—
Triest		71·7	47	i 11 32	+ 6	i 20 47	+ 2	—	—	—
Belgrade		76·5	47	e 12 1	+ 7	e 22 43	+64	—	—	—
Sotchi		89·9	44	e 13 6	+ 4	e 23 24	[− 8]	—	—	—
Ksara		91·4	54	12 49?	−20	e 23 43?	[+ 2]	—	—	—
Batavia	z.	166·4	17	i 20 6	[− 1]	—	—	—	—	—

For Notes see next page.

NOTES TO APRIL 21d. 20h. 59m. 11s.

Additional readings :—
Cleveland iZ = 6m.43s.
Tacubaya PZ = 5m.55s., PN = 5m.58s.
Tucson i = 7m.54s.
Alicante SS = 23m.3s., SSS = 25m.57s.
Paris iP = 10m.43s.
Clermont-Ferrand iP = 10m.46s.
Salo i = 11m.16s.

April 21d. 21h. 6m. 25s. (I) } Epicentre 19°·3N. 69°·3W.
21h. 26m. 22s. (II) } (as at 20h.).

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
II Cleveland	Z.	24·5	338	e 5 22a	0	—	—
II Huancayo		31·7	191	e 6 28	+ 1	—	—
I Tucson		39·3	299	i 7 32a	0	—	—
II		39·3	299	i 7 33a	+ 1	—	—
I Pierce Ferry		42·6	303	i 7 58	− 1	—	—
II		42·6	303	i 7 57	− 2	—	—
I Boulder City		43·2	302	i 8 5	+ 1	—	—
II		43·2	302	e 8 6	+ 2	—	—
I Palomar	Z.	44·5	299	i 8 14	− 1	—	—
II		44·5	299	i 8 15a	0	—	—
I La Jolla	Z.	44·8	298	e 8 18	+ 1	—	—
II	Z.	44·8	298	e 8 17	0	—	—
I Riverside	Z.	45·0	300	i 8 18a	− 1	—	—
II	Z.	45·0	300	i 8 19a	0	—	—
I Mount Wilson		45·6	300	i 8 26a	+ 2	—	—
II		45·6	300	i 8 24a	0	—	—
I Pasadena		45·7	300	i 8 26a	+ 2	—	—
II	Z.	45·7	300	i 8 24	0	—	—
I Haiwee	Z.	45·7	303	i 8 27a	+ 3	—	—
I Tinemaha		46·1	304	i 8 27a	− 1	—	—
II		46·1	304	i 8 27a	− 1	—	—
I Hungry Horse		46·2	320	i 8 26	− 2	e 15 13	− 2
II		46·2	320	i 8 26	− 2	—	—
I Santa Barbara	Z.	47·0	300	i 8 36a	+ 1	—	—
II	Z.	47·0	300	i 8 35a	0	—	—
II Fresno	Z.	47·3	303	i 8 36	− 1	—	—
I Shasta Dam		49·9	308	e 8 53	− 4	—	—
II		49·9	308	e 8 54	− 3	—	—
I Toledo		59·1	55	e 10 7	+ 3	—	—
I Stuttgart	Z.	68·2	45	e 11 8	+ 4	—	—
II	Z.	68·2	45	e 11 2	− 2	—	—
II Tamanrasset		69·2	72	i 11 13a	+ 3	—	—

April 21d. 22h. 2m. 35s. Epicentre 19°·3N. 69°·3W. (as at 21h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Fort de France		9·0	119	e 2 12	− 1	—	—	—	—
Harvard		23·2	357	i 5 11	+ 2	i 9 10	− 8	—	—
Cleveland		24·5	338	i 5 24k	+ 2	i 9 43	+ 3	i 5 57	PP
St. Louis		26·5	322	i 5 39	− 2	i 10 26	+12	—	—
Tacubaya	E.	28·2	275	5 56	0	—	—	—	—
Huancayo		31·7	191	e 6 27	0	e 11 45	+ 8	—	—
La Paz	Z.	35·6	178	i 6 57	− 4	—	—	—	—
Tucson		39·3	299	i 7 32a	0	—	—	—	—
Pierce Ferry		42·6	303	i 7 57	− 2	—	—	—	—
Boulder City		43·2	302	e 8 4	0	—	—	—	—
Palomar		44·5	299	i 8 14	− 1	—	—	—	—
Riverside	Z.	45·0	300	i 8 18	− 1	—	—	—	—
Mount Wilson	Z.	45·6	300	i 8 22	− 2	—	—	—	—
Pasadena	Z.	45·7	300	i 8 23	− 1	—	—	—	—
Tinemaha	Z.	46·1	304	i 8 26a	− 2	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Hungry Horse		46·2	320	i 8 27	− 1	—	—	—	—
Santa Barbara	z.	47·0	300	e 8 33	− 2	—	—	—	—
Fresno	z.	47·3	303	i 8 35	− 2	—	—	—	—
Shasta Dam		49·9	308	e 8 53	− 4	—	—	—	—
Toledo		59·1	55	e 10 7	+ 3	—	—	—	—
Paris		63·8	44	e 10 45	+ 9	—	—	—	—
Strasbourg		67·3	45	e 11 11	+12	—	—	—	—
Stuttgart	z.	68·2	45	e 11 5	+ 1	—	—	—	—
Tamanrasset		69·2	72	e 11 15	+ 5	—	—	—	—
Collmberg	z.	70·4	42	e 11 20	+ 2	—	—	—	—
Rome	z.	71·4	51	e 11 31	+ 7	—	—	—	—

Additional readings :—
Cleveland iZ = 5m.33s., 5m.45s., and 5m.51s., eN = 9m.56s.
Shasta Dam i = 9m.1s.
Strasbourg i = 11m.20s. and 11m.37s.
Stuttgart eZ = 11m.13s.
Tamanrasset iP = 11m.23s. a.

April 21d. 23h. 42m. 42s. Epicentre 38°·8N. 20°·6E. (as on 1946, November 21d.).

Fore-shock of destructive earthquake on 22d.

A = +·7314, B = +·2749, C = +·6240 ; δ = −11 ; h = −1 ;
D = +·352, E = −·936 ; G = +·584, H = +·220, K = −·781.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto	3·1	304	1 2	P_g	e 1 24	− 5	1 35	S*	—
Messina	4·0	263	e 0 57	− 7	e 1 41	−11	—	—	—
Catania	4·6	255	—	—	e 2 48	S_g	—	—	—
Belgrade	6·0	359	—	—	e 2 51	+ 8	i 3 24	S_g	—
Rome	6·9	299	e 1 50	+ 5	e 3 35	S*	—	—	—
Bucharest	7·0	35	e 2 0	P*	i 3 59	S_g	—	—	5·3
Triest	8·5	326	e 2 54	P_g	e 4 30	S*	—	—	—
Bologna	9·0	312	e 2 54	P_g	e 5 15	S_g	—	—	—
Prague	12·1	341	e 2 53	− 4	e 5 7	− 7	—	—	e 6·5
Zürich	12·3	316	e 3 1	+ 2	—	—	—	—	e 7·2
Stuttgart	12·9	324	e 3 0	− 7	—	—	—	—	e 7·7
Tamanrasset	20·5	223	e 4 36	− 6	—	—	—	—	—

Additional readings :—
Belgrade e = 3m.40s.
Rome i = 4m.2s., iN = 4m.19s.
Bucharest eN = 2m.36s., eE = 2m.43s.
Triest eP_gP_g? = 3m.30s., iS_gS_g = 5m.19s.
Long waves were also recorded at Padova, Budapest, Warsaw, and Ksara.

April 21d. Readings also at 0h. (Hungry Horse), 1h. (near Mineral), 2h. (Shasta Dam), 3h. (near Kulyab), 6h. (Scoresby Sund), 7h. (Hungry Horse, Pierce Ferry, and Shasta Dam), 9h. (Stuttgart and near Alicante), 10h. (Apia, near Berkeley, Branner, and Lick), 12h. (Mount Wilson, Pasadena, Riverside, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Mizusawa, Stuttgart, and near Alicante), 13h. (Ashkabad, Kulyab, Obi-garm, Stalinabad, Tashkent, and Bombay), 16h. (Alicante, Stalinabad, near Kulyab, and Obi-garm), 19h. (Andijan, Frunse, Tashkent, near Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 20h. (Belgrade, and Huancayo), 21h. (Mizusawa, Bologna, Salo, Padova, and Stuttgart), 22h. (near Tacubaya), 23h. (near Kulyab, Murgab, and Obi-garm).

April 22d. 0h. 28m. 18s. Epicentre 19°·3N. 69°·3W. (as on 21d.).

$A = +\cdot3339$, $B = -\cdot8835$, $C = +\cdot3285$; $\delta = -3$; $h = +5$;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		3·1	107	i 0 50	− 1	—	—	—	—	—
Fort de France		9·0	119	e 2 20	+ 7	e 4 15	+17	—	—	—
Bermuda		13·7	17	i 3 45?	+27	i 6 15?	SS	i 6 35?	SSS	i 7·3
Balboa Heights		14·3	225	i 3 27	+ 1	e 6 4	− 2	—	—	—
Bogota		15·3	198	e 3 37	− 2	i 6 33	+ 3	i 3 41	PP	8·7
Columbia		18·0	328	e 4 8	− 5	e 7 30	− 2	—	—	e 8·3
Mobile		20·5	308	e 5 47	+65	9 41	+74	—	—	—
Georgetown		20·7	344	i 4 42	− 2	i 8 22	− 9	—	—	—
Philadelphia		21·2	348	i 4 47	− 2	i 8 51	+10	i 4 50	P	e 9·9
Fordham		21·8	352	i 4 59	+ 3	i 8 58	+ 6	—	—	—
Pennsylvania		22·7	343	e 5 4	0	i 9 15	+ 6	—	—	—
New Kensington	E.	23·0	340	e 5 20	+13	i 9 21	+ 7	i 5 35	PP	i 12·3
Harvard		23·2	357	i 5 10	+ 1	i 9 17	− 1	—	—	—
Cleveland		24·5	338	e 5 19k	− 3	i 9 41	+ 1	i 6 1	PP	—
Vermont		25·3	354	e 5 24	− 6	e 9 57	+ 3	—	—	—
Halifax		25·7	10	e 5 55	+22	e 10 30	+29	11 54	SSS	14·7
St. Louis		26·5	322	e 5 38	− 3	i 10 14	0	—	—	—
Ottawa		26·6	350	5 43	+ 1	10 18	+ 2	6 16	PP	12·7
Chicago		27·3	330	e 5 49	+ 1	i 10 24	− 3	e 6 46	PPP	i 12·0
Shawinigan Falls		27·3	356	5 48	0	10 26	− 1	6 37	PP	13·6
Seven Falls		27·8	358	5 57	+ 4	10 38	+ 3	11 46	SS	12·7
Tacubaya		28·2	275	i 6 0	+ 4	e 10 43	+ 2	—	—	e 18·7
Temiskaming		28·4	346	5 59	+ 1	10 36	− 9	i 6 55	PP	12·9
Villa Marie		29·2	346	6 5	0	10 42	−16	i 6 58	PP	14·2
Kirkland Lake		30·1	346	6 12	− 1	—	—	—	—	—
Lincoln	E.	31·7	320	e 6 21	− 6	e 11 35	− 2	e 7 32	PP	e 13·2
Huancayo		31·7	191	e 6 27	0	i 11 32	− 5	i 7 23	PP	e 12·7
La Paz		35·6	178	i 6 58a	− 3	i 12 30	− 8	i 8 21	PP	28·2
Rapid City	E.	37·6	319	e 7 15	− 3	e 13 3	− 5	e 8 4	?	e 15·3
Tucson		39·3	299	e 7 30	− 2	i 13 39	+ 5	i 8 57	PP	i 16·5
Salt Lake City		42·1	311	e 7 56	+ 1	i 14 18	+ 2	e 9 44	PP	e 17·1
Logan		42·4	313	e 7 51	− 7	i 14 17	− 3	e 9 37	PP	e 17·4
Pierce Ferry		42·6	303	i 7 55	− 4	—	—	i 9 45	PP	—
Boulder City		43·2	302	i 8 4	0	—	—	—	—	—
Bozeman		43·3	318	e 8 9	+ 4	e 14 30	− 3	i 9 54	PP	e 19·5
Saskatoon		43·8	328	8 13	+ 4	14 43	+ 3	10 17	PPP	20·7
Butte	N.	44·4	318	e 8 15	+ 1	e 14 43	− 6	e 18 6	SS	e 19·4
Ivigtut		44·4	15	—	—	e 14 47	− 2	18 5	SS	21·7
Palomar		44·5	299	e 8 14	− 1	—	—	i 8 19	P	—
Riverside	Z.	45·0	300	i 8 17a	− 2	—	—	—	—	—
Mount Wilson	Z.	45·6	300	i 8 22a	− 2	—	—	—	—	—
Pasadena		45·7	300	e 8 20	− 4	i 15 13	+ 5	—	—	e 20·7
Haiwee	Z.	45·7	303	i 8 27	+ 3	—	—	—	—	—
Tinemaha		46·1	304	i 8 25a	− 3	e 15 18	+ 4	—	—	—
Hungry Horse		46·2	320	i 8 24	− 4	e 15 12	− 3	—	—	—
Santa Barbara	Z.	47·0	300	i 8 33	− 2	—	—	—	—	—
Fresno	Z.	47·3	303	i 8 36	− 1	—	—	e 21 37	Q	e 29·3
Lick		48·8	304	i 8 47	− 2	e 15 59	+ 7	—	—	e 26·6
Santa Clara		49·1	304	e 8 55	+ 4	e 16 12	PPS	e 20 26	SSS	e 27·1
Grand Coulee		49·2	318	e 8 47	− 5	i 15 55	− 3	—	—	—
Berkeley		49·4	304	e 8 52	− 1	i 16 3	+ 3	i 10 56	PP	e 25·7
Shasta Dam		49·9	308	e 8 51	− 6	—	—	i 9 0	P	—
Ukiah		50·3	306	e 9 3	+ 3	e 16 12	− 1	e 10 56	PP	e 21·9
Victoria		52·2	317	—	—	e 16 40	+ 1	e 19 2	?	25·7
La Plata	E.	55·0	168	9 30	− 5	17 8	− 9	12 36	PPP	23·3
	N.	55·0	168	9 33	− 2	17 6	−11	11 24	PP	26·0
	Z.	55·0	168	9 32	− 3	—	—	11 36	PP	31·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lisbon		55·1	56	9 36k	0	17 19	+ 1	21 4	SS	25·7
Scoresby Sund		58·4	17	9 59	− 1	18 2	0	18 15	PS	—
Toledo		59·1	55	i 10 3	− 1	18 13	+ 2	12 19	PP	—
Granada		59·5	58	i 10 9k	+ 2	i 18 18	+ 2	i 12 37	PP	i 27·9
Jersey		60·8	44	e 10 21	+ 5	e 18 33	0	—	—	—
Edinburgh		60·9	36	10 18	+ 1	18 35	+ 1	22 36	SS	—
Sitka		61·1	326	e 14 0	PPP	e 18 32	− 5	e 22 26	SS	e 24·6
Aberdeen		61·6	34	i 10 26	+ 4	i 18 39	− 4	i 25 14	SSS	27·3
Durham		61·6	38	i 10 23	+ 1	i 18 45	+ 2	i 22 33	SS	—
Alicante		61·9	56	i 10 20	− 4	18 44	− 3	11 15	pP	28·3
Kew	z.	62·1	41	e 10 27	+ 2	e 18 49	0	e 11 4	PcP	e 28·7
Barcelona		63·7	52	e 10 47	+11	19 10	0	13 6	PP	e 30·3
Paris		63·8	44	i 10 38	+ 2	i 19 11	0	e 23 5	SS	e 29·7
Clermont-Ferrand		64·2	48	i 10 45	+ 6	i 19 20	+ 4	i 20 35	ScS	29·7
Algiers		64·8	58	10 43	0	i 19 25	+ 2	—	—	27·7
Uccle	F.	65·0	42	e 10 43a	− 1	i 19 24	− 2	e 23 36	SS	e 29·7
De Bilt		65·5	40	i 10 46	− 1	i 19 34	+ 2	e 13 12	PP	e 30·7
Basle		67·2	45	e 10 53	− 5	e 19 53	+ 1	e 12 3	?	—
Strasbourg		67·3	45	e 10 59	0	i 19 52	− 2	e 13 23	PP	31·8
College		67·8	334	e 11 3	+ 1	e 19 52	− 8	e 24 14	SS	e 26·9
Zürich		67·9	45	e 11 0	− 2	e 20 2	+ 1	—	—	—
Stuttgart		68·2	45	e 11 1	− 3	e 20 2	− 2	e 24 12	SS	e 31·7
Pavia	z.	68·5	48	e 11 9	+ 3	—	—	—	—	—
Chur		68·6	47	e 11 7	0	e 20 12	+ 3	—	—	—
Tamanrasset		69·2	72	e 11 11	+ 1	e 20 20	+ 4	39 23	P'P'	—
Salo		69·4	48	11 10	− 2	20 18	0	—	—	—
Jena		69·6	42	e 11 14	+ 1	e 20 22	+ 1	e 25 0	SS	e 33·3
Copenhagen		69·7	36	11 15	+ 1	i 20 23	+ 1	—	—	—
Bologna		70·2	49	e 11 18	+ 1	e 20 17	−11	—	—	—
Florence		70·2	49	i 11 23	+ 6	i 20 31	+ 3	—	—	—
Potsdam		70·3	40	e 11 24	+ 7	i 20 32	+ 3	e 25 6	SS	e 31·7
Collmberg	z.	70·4	42	e 10 19	−59	—	—	i 10 25	?	e 36·6
Padova		70·5	47	11 25?	+ 7	20 36	+ 4	i 21 30	PPS	—
Rome		71·4	51	e 11 21	− 3	i 20 40	− 2	i 21 14	PS	—
Prague		71·5	42	e 11 19?	− 5	e 20 39?	− 4	e 14 0	PP	e 32·7
Triest		71·7	47	i 11 31a	+ 5	i 20 45	0	i 14 13	PP	—
Upsala		72·0	32	11 30a	+ 2	20 44?	− 5	14 22	PP	e 31·7
Raciborzu		73·9	42	e 11 40	+ 1	e 21 7	− 3	e 12 5	PcP	e 36·2
Catania		74·2	55	e 11 42	+ 2	e 21 6	− 8	—	—	—
Budapest		74·9	45	e 11 49	+ 5	21 22	0	e 21 19	S	e 35·0
Kalossa	E.	75·1	45	e 11 16	−30	—	—	—	—	—
Taranto		75·2	52	11 49	+ 3	—	—	—	—	—
Warsaw		75·2	39	i 11 52a	+ 6	21 26	+ 1	e 21 59	PS	e 37·7
Helsinki		75·6	31	e 11 52a	+ 4	e 21 26	− 3	—	—	e 34·7
Belgrade		76·5	47	e 11 54	0	e 21 36	− 3	e 13 34	?	—
Bucharest		80·5	46	e 12 23	+ 8	i 22 22	0	—	—	37·7
Honolulu		81·9	290	—	—	e 22 54	+18	e 26 52	?	e 34·0
Moscow		83·4	33	12 32	+ 2	i 22 51	0	—	—	—
Istanbul		83·6	49	i 12 36	+ 5	22 44	− 9	—	—	—
Simferopol		85·7	44	12 54	+12	—	—	—	—	—
Yalta		85·9	45	e 12 48	+ 5	23 3	[− 4]	—	—	—
Theodosia		86·5	44	e 12 53	+ 7	23 7	[− 4]	23 25	SKKS	—
Helwan		89·4	59	i 13 3a	+ 3	23 30	[+ 1]	23 51	S	—
Sotchi		89·9	44	e 13 7	+ 5	e 23 24?	[− 8]	—	—	—
Ksara		91·4	54	e 13 12k	+ 3	23 50	[+ 9]	—	—	—
Sverdlovsk		93·4	26	e 13 32	+14	23 50	[− 2]	i 24 32	S	—
Grozny		93·9	43	13 27	+ 6	23 57	[+ 2]	—	—	—
Leninakan		93·9	45	e 13 24?	+ 3	—	—	—	—	—
Ashkabad		104·8	42	—	—	e 24 49	[− 1]	—	—	—
Irkutsk		108·5	5	i 18 59	PP	i 25 8	[+ 2]	i 26 33	S	—
Tashkent		108·5	35	e 14 30	P	i 25 57	{+ 2}	i 25 8	SKS	—
Andijan		110·4	31	18 47	[+13]	26 17	{+ 9}	—	—	—
Almata		110·4	25	e 19 14	PP	—	—	—	—	—
Obi-garm		110·7	33	14 43	P	i 25 19	[+ 4]	e 19 16	PP	—
Kulyab		111·3	34	14 30?	P	i 25 18?	[0]	i 28 47?	PS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Murgab		113·1	31	e 14 50	P	i 25 25	[0]	i 26 26 SKKS	—
Vladivostok		114·9	343	i 19 39	PP	i 25 34	[+ 2]	26 44 SKKS	—
Dehra Dun	N.	121·5	33	e 5 6	?	e 11 12	?	— —	—
Christchurch		123·3	231	e 29 42	PKKP	—	—	— —	e 56·7
Bombay		126·9	48	e 21 10	PP	e 28 0	{+ 1}	— —	—
Calcutta	E.	133·0	29	e 22 51	PKS	e 32 45	?	— —	—
Kodaikanal	E.	136·0	51	21 42	PP	—	—	— —	—
Colombo	E.	140·0	54	e 23 12	PKS	e 29 22	{+ 1}	— —	75·2
Riverview		141·3	240	i 19 28k	[− 5]	e 29 32	{+ 3}	i 23 12 PKS	—

Additional readings :—
Bogota iSS = 6m.52s.
Philadephia iS = 8m.24s.
Cleveland iP = 5m.24s.a, iZ = 5m.33s., iE = 5m.37s., iZ = 5m.45s. and 5m.53s., iN = 6m.4s., iZ = 6m.9s. and 6m.12s., iSN = 9m.44s.
Ottawa i = 5m.47s., SS = 11m.44s.
Chicago eS = 10m.18s., i = 10m.56s.
Shawinigan Falls SS = 11m.33s.
Tacubaya eE = 6m.4s., eN = 7m.45s., iSEN = 10m.47s.
Temiskaming i = 6m.3s., PP = 6m.33s.
Ville Marie i = 6m.10s., PP = 6m.34s., SS = 11m.49s.
Huancayo i = 6m.55s. and 8m.47s.
La Paz iPPPZ = 8m.42s., iSSE = 15m.10s.
Tucson iP = 7m.36s., eS = 13m.17s., e = 14m.32s. and 15m.1s.
Salt Lake City eS = 14m.2s.
Logan i = 7m.57s.
Bozeman iS = 14m.37s., iScS? = 17m.50s.
Saskatoon SSS = 18m.15s.
Lick iZ = 8m.51s.
Berkeley iPZ = 8m.57s., iScSN = 18m.52s., iSSE = 20m.24s., iSSSZ = 21m.6s.
Shasta Dam e = 11m.33s.
Ukiah eScS = 8m.50s.
La Plata E. PcP = 10m.50s., PcS = 14m.37s., ScS = 19m.18s., SS = 20m.36s.
La Plata N. PcP = 10m.30s., PPP = 12m.12s., i = 12m.42s., ScS = 19m.12s., SS = 21m.0s., SSS = 23m.12s.
La Plata Z. PcS? = 14m.0s., PS = 18m.0s.
Lisbon iPEZ = 9m.41s.a, eZ = 9m.52s., Z = 11m.1s., E = 11m.8s., ScSE? = 19m.26s., E = 20m.30s., 23m.31s., EZ? = 24m.24s.
Scoresby Sund 21m.54s.
Granada PcP = 11m.4s., PPP = 13m.52s., PcS = 14m.37s., PS = 18m.37s., ScS = 20m.31s., iSS = 22m.52s., SSS = 24m.55s.
Edinburgh ScS = 20m.6s.
Sitka i = 19m.12s., iScS = 20m.8s.
Aberdeen N = 11m.25s., iEN = 20m.14s.
Alicante PcP = 10m.48s., PcS = 14m.52s., PS = 19m.24s., PPS = 19m.44s., ScS = 19m.52s., SS = 23m.0s., SSS = 25m.44s., Q = 27m.2s.
Kew iPPZ = 10m.30s., iZ = 10m.43s.
Paris iP = 10m.42s., e = 10m.56s., iS = 19m.14s., iScS = 20m.30s., e = 22m.16s.
Clermont-Ferrand i = 21m.16s.
Uccle ePNZ = 10m.46s., iEZ = 10m.49s., eSE = 19m.20s., iE = 20m.41s., eEN = 26m.42s.?
De Bilt iP = 10m.52s.a, iPS = 20m.0s., iScS = 20m.48s., eSS = 23m.42s., eSSS = 27m.0s.
Strasbourg iP = 11m.4s., ePPP? = 14m.39s., e = 14m.42s., iS = 19m.57s., iScS = 20m.53s. and 20m.56s., e = 24m.2s., iSS = 24m.29s., iSSS = 27m.10s. and 27m.23s.
College ePPP = 15m.3s., eScS? = 20m.54s.
Stuttgart iP = 11m.10s.a, i = 11m.48s.a, iS = 20m.7s., ePS = 21m.0s., eSSS = 27m.42s.
Tamanrasset iP = 11m.19s.a.
Salo iEZ = 11m.18s., PS = 25m.11s.
Jena ePN = 11m.18s., ePS?E = 21m.3s., ePS?N = 21m.12s.
Copenhagen 11m.18s. and 21m.14s.
Potsdam ePN = 11m.27s., ePSE = 21m.14s., ePPSE = 21m.20s., ePPSN = 21m.23s., eSSS?E = 28m.42s.
Rome i = 11m.29s., iZ = 13m.22s., ePPZ = 13m.50s., iZ = 22m.6s., iSSE = 25m.6s., eSSSE = 28m.20s.
Prague P = 11m.27s., ePPP = 16m.0s., ePS = 21m.24s., eSS = 25m.12s., eSSS? = 28m.12s.
Triest iPS = 21m.27s., eSS = 25m.27s.
Upsala PP?N = 14m.38s., PPPE = 16m.13s., PPPP?N = 17m.34s., ScS? = 21m.30s., eN = 24m.22s. and 26m.42s., eSSSE = 28m.42s.?
Warsaw ePPZ = 15m.2s., ePSE = 21m.52s., ePSZ = 21m.58s., PPSZ = 22m.15s., eZ = 22m.56s., eSSE = 25m.46s., eE = 28m.11s., SSSN = 29m.18s.
Bucharest eS?N = 22m.32s.
Helwan PPZ = 16m.31s., PSE = 24m.57s.
Sverdlovsk PS = 25m.40s.
Tashkent ePP = 18m.41s.?, iPS = 28m.15s., SS = 34m.18s.
Obi-garm iSKKS = 26m.16s., iPS = 28m.40s.
Kulyab ePP = 19m.7s.?, SKKS = 26m.6s.?.
Vladivostok iSS = 35m.18s.
Long waves were also recorded at Christchurch, Wellington, Tananarive, and Manzanillo.

April 22d. 10h. 42m. 45s. Epicentre 38°·8N. 20°·6E. (as on 21d.).

Destructive on the island of Leucade. Felt at Preveza, Agrinion, Zante, Missolonghi, and Corfu. Report from the station at Athens of damage in the villages of Vassilike, St. Pierre, Dragan Camillon, Athanion, Kalamitsion, and Eglouvi (Dr. Galanopolous, Athens).
Epicentre 38°·5N. 20°·5E. Magnitude 6¾.

P. E. Valle.
Il térremoto jonico del 22 Aprile, 1948. Annali di Geofisica, Vol. IV, 1951, pp. 241-245.

$A = +\cdot7314$, $B = +\cdot2749$, $C = +\cdot6240$; $\delta = -11$; $h = -1$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·1	304	0 43	− 8	—	—	—	—	—
Messina		4·0	263	e 0 59	− 5	i 1 44	− 8	i 1 3	P	—
Catania		4·6	255	e 1 5	− 7	e 2 0	− 7	—	—	—
Belgrade		6·0	359	i 1 31	− 1	i 3 8	S*	i 2 1	P_g	i 3·3
Istanbul		6·9	68	i 1 48	+ 3	i 3 14	+ 9	—	—	—
Rome		6·9	299	e 1 42k	− 3	i 3 0	− 5	i 1 47	PP	i 3·9
Bucharest		7·0	35	e 1 53	+ 7	i 3 20	S*	i 2 17	P_g	e 4·2
Campulung		7·3	26	e 1 53	+ 3	(3 15)	0	—	—	3·3
Kalossa		7·8	353	2 1	+ 3	3 25	− 3	e 2 36	P_g	3·8
Triest		8·5	326	e 2 4	− 3	i 3 38	− 7	i 2 34k	P*	i 4·9
Florence		8·6	308	e 2 10	+ 1	i 3 53	+ 5	—	—	—
Budapest	E.	8·8	353	2 13	+ 2	3 57	+ 4	i 3 10	?	4·7
Bologna		9·0	312	e 2 13k	0	i 3 49	− 9	e 4 25	S*	—
Padova		9·3	317	2 18	+ 1	4 0	− 5	—	—	4·9
Salo		10·1	315	2 24	− 4	i 4 18	− 7	e 2 28	P	—
Pavia		10·6	310	e 2 35	− 1	e 4 59	SS	—	—	—
Chur		11·4	318	e 2 47	0	e 4 56	0	—	—	i 6·9
Raciborzu		11·4	352	e 2 22	−25	e 4 42	−14	e 2 42	P	e 5·8
Yalta		11·6	57	2 52	+ 2	—	—	—	—	—
Simferopol		11·8	54	e 3 2	PP	e 5 39	SS	—	—	—
Prague		12·1	341	i 2 55a	− 2	i 5 13	− 1	—	—	e 5·8
Zürich		12·3	316	e 2 54	− 5	e 5 16	− 2	—	—	—
Helwan		12·6	132	2 57	− 6	5 23	− 3	3 6	PP	—
Theodosia		12·6	56	e 3 6	+ 3	—	—	—	—	—
Basle		12·9	317	e 3 3	− 4	e 5 31	− 2	e 5 43	SS	—
Neuchatel		12·9	314	e 3 2	− 5	—	—	—	—	e 8·2
Stuttgart		12·9	324	e 3 1	− 6	i 5 40	+ 7	i 3 5a	P	e 6·6
Ksara		13·3	107	e 3 13	0	6 11?	SSS	—	—	—
Warsaw		13·4	1	e 3 16a	+ 2	e 5 50	+ 5	3 29	PP	e 8·2
Strasbourg		13·5	321	i 3 12	− 3	i 5 53	+ 6	i 3 17	PP	6·7
Collmberg	Z.	13·6	339	e 3 11	− 6	—	—	i 3 31	PP	i 6·3
Jena		13·7	335	e 3 16	− 2	e 6 9	+17	e 6 19	SS	e 6·9
Algiers		14·0	267	3 15	− 7	i 5 57	− 2	3 25	PP	6·8
Barcelona		14·4	286	e 3 23	− 4	e 5 56	−13	—	—	7·0
Potsdam		14·6	341	e 3 33	+ 3	i 6 16	+ 3	i 3 41	PP	8·1
Clermont-Ferrand		14·7	304	e 3 33	+ 2	i 6 21	+ 5	i 3 50	PPP	7·5
Sotchi		15·2	65	3 34	− 4	—	—	—	—	—
Paris		16·4	313	e 3 54	+ 1	i 6 58	+ 2	i 4 10	PP	e 8·2
Alicante		16·5	275	i 3 50	− 4	7 6	+ 8	4 2	PP	e 8·5
Uccle		16·6	324	e 3 53	− 3	i 7 9	+ 9	i 4 2	PP	e 8·0
De Bilt		17·1	326	i 4 2a	0	i 7 24	+12	—	—	e 8·7
Piatigorsk		17·7	65	e 4 14	+ 4	7 36	+10	—	—	—
Copenhagen		17·8	344	e 4 8a	− 3	7 23	− 5	—	—	—
Leninakan		17·8	76	e 4 14	+ 3	—	—	—	—	—
Toledo		19·1	283	i 4 24	− 3	7 57	0	—	—	—
Granada		19·2	274	i 4 24k	− 4	i 7 28	−31	4 38	PP	i 12·7
Jersey		19·3	312	e 4 24	− 5	e 8 15	+13	—	—	9·8
Grozny		19·5	68	4 37?	+ 6	i 8 27?	+21	—	—	—
Moscow		20·4	29	4 42	+ 1	8 28	+ 3	—	—	—
Tamanrasset		20·5	223	e 4 36	− 6	e 8 19	− 8	i 4 39	P	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Upsala		21·2	355	4 43	− 6	e 8 39	− 2	5 12	PP	e 10·8
Helsinki		21·6	6	i 4 52a	− 2	i 8 48	− 1	—	—	e 11·2
Durham		21·9	326	i 5 1	+ 4	i 8 53	− 1	i 9 1	S	—
Baku		22·6	76	e 5 11	+ 8	e 9 21	+14	—	—	—
Lisbon		23·2	281	5 3k	− 6	i 9 20	+ 2	5 41	PP	12·8
Edinburgh		23·3	326	5 15	+ 5	9 26	+ 6	—	—	—
Aberdeen		23·7	330	i 4 23	−51	i 9 29	+ 2	i 10 32	SS	11·6
Ashkabad		29·5	79	e 6 10	+ 2	11 4	+ 2	—	—	—
Sverdlovsk		31·8	42	6 26	− 2	i 11 36	− 2	—	—	—
Reykjavik		35·6	330	e 7 1	0	e 12 47	+ 9	e 9 18	?	e 17·0
Samarkand		35·6	74	e 6 51	−10	—	—	—	—	—
Tashkent		37·0	71	e 7 14?	+ 1	e 12 52?	− 7	—	—	—
Stalinabad		37·3	74	i 7 14	− 2	i 13 2	− 2	—	—	—
Obi-garm		37·9	74	i 7 19	− 1	e 13 9	− 4	—	—	—
Kulyab		38·2	75	i 7 24	+ 1	i 13 18	+ 1	—	—	—
Scoresby Sund		38·6	340	7 29	+ 3	13 27	+ 4	8 57	PP	—
Andijan		39·4	71	e 6 36	−57	—	—	—	—	—
Frunse		40·5	67	e 7 25	−17	—	—	—	—	—
Murgab		41·2	73	i 7 50	+ 2	14 3	+ 1	—	—	—
Almata		42·1	65	e 7 54	− 1	e 14 12	− 4	—	—	—
Ivigtut		46·9	322	i 8 36	+ 2	e 15 23	− 2	18 51	SS	22·3
Dehra Dun	N.	47·4	82	e 10 15?	PP	e 17 10	?	—	—	—
Bombay		49·2	98	e 8 53	+ 1	e 15 54	− 4	19 42	SS	24·4
Hyderabad	N.	54·4	96	e 9 26	− 5	17 0	− 9	—	—	—
Irkutsk		57·0	47	e 9 51	+ 1	e 17 39	− 4	—	—	—
Kodaikanal	E.	58·0	104	i 10 40	PcP	i 18 0	+ 3	—	—	—
Calcutta	E.	59·3	85	10 52	PcP	e 18 12	− 2	i 22 42	SS	30·7
Colombo	E.	61·9	106	10 24	0	18 49	+ 2	—	—	37·7
Tananarive		62·7	151	14 14	PPP	19 5	+ 8	23 8	SS	e 30·7
Seven Falls		63·7	311	10 35	− 1	19 16	+ 6	23 45	SS	30·3
Harvard		66·5	307	i 10 58	+ 4	e 19 46	+ 2	—	—	e 31·7
Vermont		66·5	309	e 13 0	PP	e 19 45	+ 1	e 23 49	SS	e 32·1
Bermuda		67·2	294	e 11 53?	+55	e 20 28?	+36	e 26 49?	SSS	e 32·3
Ottawa		67·5	312	11 2	+ 2	19 51	− 5	24 33	SS	31·8
Kirkland Lake		68·5	315	i 11 10	+ 4	—	—	—	—	—
Temiskaming		68·8	313	e 11 7	− 1	—	—	i 11 11	P	37·7
Ville Marie		68·8	314	e 11 9	+ 1	—	—	e 11 13	P	34·3
Fordham		68·9	306	i 11 11	+ 2	i 20 18	+ 5	—	—	—
Philadelphia		70·2	305	e 12 28	?	e 20 27	− 1	e 24 51	SS	e 30·2
New Kensington	E.	72·7	309	—	—	e 21 3	+ 6	—	—	e 38·8
Cleveland		73·2	310	i 11 37	+ 2	i 21 3	+ 1	e 25 47	SS	31·3
Fort de France		74·6	276	e 11 44	+ 1	—	—	—	—	—
San Juan		76·2	283	—	—	e 21 31	− 5	e 29 50	SSS	e 32·4
College		76·3	356	—	—	e 21 39	+ 2	—	—	e 33·6
Chicago		76·6	314	—	—	e 21 35	− 5	e 26 27	SS	e 34·4
Columbia		77·5	304	—	—	e 21 51	+ 1	e 29 59	SSS	e 32·5
Vladivostok		77·5	45	i 11 59	0	i 21 47	− 3	—	—	—
Saskatoon		78·5	330	—	—	e 22 2	+ 1	e 30 39	SSS	37·3
St. Louis		80·2	313	i 12 17	+ 3	i 22 22	+ 3	—	—	—
Sitka		81·9	347	—	—	e 22 47	+11	e 23 39	PS	e 37·5
Lincoln	E.	82·2	318	e 12 28	+ 4	e 22 40	+ 1	e 31 35	SSS	e 37·4
Rapid City	E.	83·1	323	e 12 35	+ 6	e 22 51	+ 3	e 23 55	PS	—
Hungry Horse		84·3	332	e 12 31	− 4	—	—	i 12 40	PcP	—
Bozeman		85·3	328	e 12 47	+ 7	e 23 15	+ 5	e 28 36	SS	e 35·3
Butte	N.	85·7	330	—	—	e 23 17	+ 3	—	—	—
Grand Coulee		86·5	334	e 12 46	0	—	—	—	—	—
Victoria		87·4	337	—	—	e 23 39	+ 9	—	—	41·3
Logan		88·9	327	e 13 24	+26	e 23 18	[− 6]	—	—	e 36·6
Salt Lake City		89·7	326	—	—	e 23 37	[+ 6]	e 24 57	PS	e 38·8
Batavia	Z.	90·9	97	i 12 58	− 9	(24 15?)	+12	—	—	24·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		94·0	332	e 14 9	?	—	—	e 15 9	?	—
Pierce Ferry		94·5	324	e 13 31	+ 8	—	—	e 16 48	PP	—
Boulder City		95·0	325	e 13 32	+ 6	—	—	—	—	—
Tinemaha	z.	95·5	328	e 13 27	− 1	—	—	—	—	—
Tucson		96·1	321	e 13 34	+ 3	e 24 12	[+ 5]	e 17 32	PP	e 40·1
Berkeley		96·4	331	e 17 26	PP	e 24 32	−18	—	—	e 47·2
Fresno	z.	96·4	329	i 13 39	+ 7	—	—	i 17 32	PP	—
Riverside	z.	97·8	326	e 13 42	+ 4	—	—	e 17 40	PP	—
Mount Wilson	z.	97·9	326	e 13 42	+ 3	—	—	e 17 38	PP	—
Pasadena	z.	98·0	326	e 13 39	0	—	—	e 17 26	PP	—
Palomar		98·1	325	i 13 49	+ 9	—	—	i 17 38	PP	—
Santa Barbara	z.	98·4	327	e 13 46	+ 5	—	—	e 17 44	PP	—
La Paz		99·2	256	e 13 37	− 8	i 25 1	−13	i 26 39	PS	46·8
Huancayo		102·0	264	—	—	e 30 48	?	e 38 11	?	e 42·3
Riverview		140·2	99	i 23 54	PKS	e 41 18	SSP	e 56 3	Q	e 63·3

Additional readings :—
Messina iE = 1m.38s.
Catania P* = 1m.9s., eSN = 1m.46s., eS* = 1m.52s.
Belgrade i = 2m.47s.
Bucharest iE = 2m.25s.
Kalossa eE = 2m.6s., PPN = 2m.40s., eE = 2m.49s., iN = 2m.53s.
Triest i = 3m.55s.
Bologna iE = 3m.33s.
Salo iZ = 2m.48s.
Raciborzu ePZ = 2m.39s.
Helwan SEN = 5m.9s.
Stuttgart e = 4m.3s.
Warsaw iPNZ = 3m.19s.k, PPPZ = 3m.41s., iSE = 5m.54s., SSN = 6m.8s., SSZ = 6m.12s., SSSEN = 6m.27s., SSSZ = 6m.32s.
Strasbourg iS = 5m.56s.
Collmberg iZ = 4m.9s., 5m.3s., and 5m.9s.
Jena ePE = 3m.19s., iN = 3m.32s., eS?N = 6m.13s.
Algiers iPPP = 3m.35s., i = 4m.0s. and 4m.28s.
Potsdam iPPPN = 3m.54s., iPPPE = 3m.58s., iN = 4m.23s., iE = 6m.20s., iSN = 6m.33s., iSE = 6m.36s.
Clermont-Ferrand i = 4m.36s. and 5m.7s.
Paris i = 4m.2s., PPP = 4m.18s., i = 4m.37s., 5m.16s., and 6m.7s., iS = 7m.5s., i = 7m.54s.
Alicante PP = 4m.13s., PPP = 4m.26s., SS = 7m.42s., SSS = 8m.8s., P_cP = 8m.19s., P_cS = 11m.46s.
Uccle iEN = 4m.45s., iZ = 5m.37s.
Copenhagen 5m.24s., i = 7m.36s.
Granada iPP = 5m.16s., pPP = 5m.24s., sS = 8m.55s., SS = 9m.22s., S_cS = 15m.4s.
Upsala PE = 4m.47s., iPPN = 5m.7s., PPPN = 5m.20s., SS?E = 9m.6s.
Lisbon iPEZ = 5m.9s., Z = 6m.10s., N = 10m.9s. and 11m.51s.
Calcutta iSSSE = 25m.30s.
Tananarive SSS = 25m.47s.
Seven Falls SSS = 25m.4s.
Vermont eS_cS? = 20m.37s.
Bermuda e = 22m.57s.?
Philadelphia i = 21m.0s., e = 23m.50s.
Cleveland iNZ = 11m.40s., eSE = 21m.0s., iN = 21m.6s.
San Juan e = 22m.58s.
College e = 25m.43s., eSS? = 27m.8s., eSSS = 29m.54s.
Chicago eSSS = 29m.48s.
Sitka e = 26m.48s., eSSS = 31m.39s.
Rapid City eSSE = 27m.51s., eSSSE = 31m.45s.
Bozeman ePPS = 24m.39s., eSSS = 32m.21s.
Butte eN = 26m.17s. and 28m.0s.
Salt Lake City e = 28m.3s. and 28m.9s.
Tucson e = 13m.44s., eS = 24m.59s., ePS? = 26m.17s., eSS? = 30m.30s., eSSS = 34m.46s.
Berkeley eZ = 18m.14s., iE = 30m.17s., eE = 35m.52s.
Palomar iZ = 14m.41s.
Long waves were also recorded at Christchurch, Wellington, Auckland, Apia, Mizusawa, Honolulu, Ukiah, and Santa Clara.

April 22d. 13h. 9m. 0s. Epicentre 19°·3N. 69°·3W. (as at 0h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince		3·0	255	e 0 48	− 2	i 1 28	+ 1	i 0 58	P_g	i 1·8
San Juan		3·1	107	e 0 56	P*	i 1 30	+ 1	—	—	i 1·7
Fort de France		9·0	119	e 2 22	+ 9	e 4 25	S*	—	—	—
Bermuda		13·7	17	e 3 49?	+31	e 6 19?	+37	—	—	i 7·1
Bogota		15·3	198	i 3 44	+ 5	i 6 39	+ 9	i 3 56	PP	—
Columbia		18·0	328	—	—	e 7 28	− 4	—	—	e 8·7
Georgetown		20·7	344	i 4 43	− 1	i 8 30	− 1	—	—	i 10·7
Philadelphia		21·2	348	e 4 45	− 4	e 8 39	− 2	e 5 27	PP	e 10·5
Fordham		21·8	352	e 4 56	0	e 8 52	0	—	—	—
Pennsylvania		22·7	343	i 5 5	+ 1	i 9 12	+ 3	—	—	—
New Kensington	E.	23·0	340	e 5 11	+ 4	e 9 17	+ 3	—	—	e 13·0
Harvard		23·2	357	i 5 10	+ 1	e 9 16	− 2	—	—	—
Cleveland		24·5	338	e 5 22a	0	i 9 40	0	i 10 33	SS	—
Vermont		25·3	354	e 6 27	PPP	e 10 26	SS	—	—	e 12·9
St. Louis		26·5	322	e 5 38	− 3	e 10 15	+ 1	—	—	—
Ottawa		26·6	350	5 40	− 2	10 14	− 2	—	—	13·5
Chicago		27·3	330	e 5 42	− 6	e 10 20	− 7	e 6 20	PP	e 13·8
Seven Falls		27·8	358	e 6 35	PP	e 12 17	SSS	—	—	12·9
Temiskaming		28·4	346	i 6 2	+ 4	—	—	—	—	—
Ville Marie		29·2	346	i 6 5	0	—	—	—	—	—
Kirkland Lake		30·1	346	i 6 12	− 1	—	—	—	—	—
Huancayo		31·7	191	e 6 31	+ 4	e 11 45	+ 8	—	—	e 18·3
Lincoln	E.	31·7	320	e 6 49	+22	e 11 15	−22	e 8 6	PPP	e 13·8
La Paz		35·6	178	6 32	−29	i 12 36	− 2	i 8 40	PP	19·4
Tucson		39·3	299	e 7 31	− 1	e 13 33	− 1	e 9 5	PP	e 16·5
Salt Lake City		42·1	311	—	—	e 14 4	−12	—	—	e 17·6
Logan		42·4	313	e 7 56	− 2	—	—	—	—	e 22·4
Pierce Ferry		42·6	303	e 8 6	+ 7	—	—	—	—	—
Bozeman		43·3	318	—	—	e 14 31	− 2	—	—	e 17·9
Saskatoon		43·8	328	—	—	e 18 12	S_cS	—	—	22·0
Butte	N.	44·4	318	—	—	e 14 42	− 7	e 18 7	S_cS	e 19·3
Palomar	Z.	44·5	299	e 8 15	0	—	—	—	—	—
Riverside	Z.	45·0	300	i 8 18	− 1	—	—	—	—	—
Mount Wilson	Z.	45·6	300	e 8 23	− 1	—	—	—	—	—
Pasadena	Z.	45·7	300	e 8 23	− 1	—	—	—	—	—
Tinemaha	Z.	46·1	304	i 8 31	+ 3	—	—	—	—	—
Hungry Horse		46·2	320	e 8 25	− 3	—	—	—	—	—
Berkeley	N.	49·4	304	—	—	i 16 2	+ 2	—	—	e 26·0
Scoresby Sund		58·4	17	—	—	18 1	− 1	—	—	28·0
Toledo		59·1	55	e 10 7	+ 3	—	—	—	—	—
Alicante		61·9	56	e 10 20	− 4	18 56	+ 9	11 16	pP	e 28·4
Clermont-Ferrand		64·2	48	e 10 41	+ 2	e 19 21	+ 5	—	—	36·0
De Bilt		65·5	40	—	—	e 19 33	+ 1	—	—	e 31·0
Strasbourg		67·3	45	e 11 0	+ 1	e 19 55	+ 1	—	—	e 30·8
Stuttgart		68·2	45	e 11 4	0	—	—	—	—	e 33·0
Tamanrasset		69·2	72	e 11 17	+ 7	—	—	—	—	—
Padova		70·5	47	e 11 38	+20	—	—	—	—	—
Rome		71·4	51	i 11 27	+ 3	e 20 47	+ 5	21 28	PPS	e 35·3
Triest		71·7	47	e 11 31	+ 5	i 20 45	0	e 14 25	PP	—
Warsaw		75·2	39	e 11 53	+ 7	e 21 27	+ 2	e 22 18	PPS	e 39·0
Istanbul		83·6	49	—	—	e 22 0	−53	—	—	e 45·0
Helwan		89·4	59	e 13 3	+ 3	e 23 33	[+ 4]	—	—	—
Ksara		91·4	54	e 13 12	+ 3	e 23 54?	[+13]	—	—	—
Nanking		128·4	352	e 21 23	PP	e 22 59	PKS	1 23 55	PP	—

Additional readings :—
Philadelphia iS = 8m.47s.
Fordham iP = 5m.3s., iS = 8m.56s.
Cleveland iPEZ = 5m.28s., iE = 9m.47s.
St. Louis eS = 10m.24s.
Chicago e = 10m.52s.
La Paz P = 7m.16s., iSS = 15m.16s.
Alicante PPP = 14m.16s., P_cS = 14m.58s., eS = 18m.16s., S_cS = 19m.20s., SS = 22m.16s., SSS = 25m.8s., Q = 26m.28s.

Continued on next page.

Rome ePP?Z =16m.11s.
Triest ePS =21m.30s.
Warsaw eSZ =21m.22s.
Helwan eZ =14m.30s.
Nanking i =25m.15s.
Long waves were also recorded at Sitka and Ivigtut.

April 22d. 15h.

Suggested as repetition of 10h. shock.

Taranto P =32m.49s., S =33m.25s.
Rome eZ =34m.44s., eE =36m.5s., eN =36m.18s., iQN =36m.42s.
Belgrade e =35m.31s. and 36m.28s.
Prague eP =35m.41s., eS =37m.44s., eL =38·7m.
Triest eP_gP_g? =35m.41s., eS =36m.39s., iS_gS_g? =37m.39s.
Stuttgart ePZ =35m.43s.
Istanbul P =35m.50s., S =37m.16s.
Ksara 36m.
Bologna e =37m.24s.
Kalossa eE =37m.34s., eN =37m.38s.
Warsaw eZ =37m.49s., eLEN =40m.
Budapest ePE =37m.51s., eN =37m.55s.
Strasbourg eS? =38m.30s.
De Bilt e =41m.
Tamanrasset SS? =41m.8s.
Long waves were also recorded at Copenhagen and Clermont-Ferrand.

April 22d. 15h.

Suggested repetition of 10h. shock.

Taranto P =56m.33s., S =56m.51s.
Prague eP =58m.24s., eS =60m.26s., eL =62m.
Rome eN =57m.25s., eZ =58m.27s., eN =58m.48s., e =59m.0s., iQN =59m.31s.
Triest eP_gP_g =58m.27s., eS =59m.30s., iS_gS_g =60m.30s.
Stuttgart ePZ =58m.29s., eL? =63m.
Istanbul P =58m.37s., S =60m.4s.
Belgrade e =58m.56s., i =59m.36s.
Florence eP?N =59m.17s., eS?N =60m.30s.
Bologna e =60m.22s.
Kalossa eN =60m.28s., eE =60m.34s.
Padova e =60m.34s. and 61m.49s.
Budapest eN =60m.50s., eE =60m.55s.
Ksara e =60m.56s.
Long waves were also recorded at Copenhagen and Warsaw.

April 22d. 16h.

Suggested repetition of 10h. shock.

Taranto P =59m.27s., S =60m.13s.
Rome e =60m.39s. and 62m.2s., Q =62m.18s.
Prague eP =61m.34s., eS =63m.37s., eL =65·3m.
Stuttgart ePZ =61m.39s., eL? =66m.
Istanbul P =61m.48s.
Triest e =62m.11s., eS? =62m.30s., eS_gS_g? =63m.21s.
Belgrade e =62m.26s. and 62m.48s.
Ksara e =62m.55s.
Padova e =63m.24s.
Bologna e =63m.29s., eN =64m.9s.
Budapest e =64m.
Florence iEZ =64m.17s.
De Bilt eS =66m.12s., eL =67m.
Long waves were also recorded at Copenhagen and Warsaw.

April 22d. Readings also at 0h. (Hungry Horse (2)), 1h. (Bogota (3), and Hungry Horse), 2h. (Bogota (2), Hungry Horse, and Harvard), 3h. (Nanking), 4h. (Vladivostok, Moscow, Irkutsk, Murgab, Kulyab, Obi-garm, Sverdlovsk, Istanbul, Ksara, Bombay, Helwan, Zürich, Stuttgart (2), Strasbourg, Rome, Bogota (4), Riverside, Tinemaha, Harvard (2), Hungry Horse (4), Boulder City, Tucson, and near Apia; several shocks), 5h. (Warsaw (2), De Bilt, Copenhagen, Uccle, Alicante, Clermont-Ferrand, and Ksara), 6h. (Kodaikanal and Bogota), 7h. (Tacubaya, Bogota, and Hungry Horse), 10h. (Scoresby Sund), 12h. (Fresno), 13h. (La Paz and Hungry Horse (2)), 14h. (Tinemaha and near Mizusawa), 15h. (Prague, Hungry Horse, Tinemaha, and Fort de France), 17h. (Kalossa), 18h. (Rome, Triest, Bogota, Harvard, Hungry Horse, Tucson, Tinemaha, Riverside, Mount Wilson, and Fort de France), 19h. (Bogota, Fort de France, and Harvard), 20h. (Hungry Horse and near Granada), 21h. (Bogota), 22h. (Triest, Rome, Istanbul, near Kulyab, and near Apia), 23h. (near Apia).

April 23d. 5h. Suggested after-shock of 22d. 10h. (Triest and Strasbourg).

Belgrade e = 42m.21s., 43m.55s., and 44m.32s.
Istanbul P = 42m.34s., S = 44m.1s.
Stuttgart ePZ = 43m.16s.?, eL? = 48·8m.
Ksara e = 43m.24s.?
Collmberg eZ = 43m.32s.
Helwan eZ = 44m.8s. and 44m.21s.
Triest eS? = 44m.21s., eS_gS_g? = 45m.26s.
Rome eNZ = 44m.48s.k, eZ = 45m.18s.
Padova e = 45m.13s.
Florence iEZ = 47m.13s.
Long waves were also recorded at Uccle, De Bilt, Warsaw, and Copenhagen.

April 23d. 11h. 50m. 18s. Epicentre 19°·3N. 69°·3W. (as on 22d.).

Intensity IV at Port au Prince ; III at Port-de-Paix. Epicentre as adopted.

Bulletin de l'Observatoire Météorologique du Séminaire Collège, St. Martial, Port au Prince, Haiti. Port au Prince 1951, p. 136.

$A = +·3339$, $B = -·8835$, $C = +·3285$; $\delta = -3$; $h = +5$;

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Port au Prince		3·0	255	i 0 49	− 1	i 1 13	−14	—	—	i 1·3
San Juan		3·1	107	e 0 52	+ 1	i 1 27	− 2	i 1 1	P_g	i 1·6
Fort de France		9·0	119	e 2 16	+ 3	e 4 12	+14	—	—	—
Bermuda		13·7	17	e 3 48?	+30	i 6 22?	+30	—	—	i 6·8
Balboa Heights		14·3	225	i 3 27	+ 1	e 6 2	− 4	—	—	—
Bogota		15·3	198	e 3 43	+ 4	i 6 32	+ 2	i 9 5	P_cP	—
Columbia		18·0	328	e 4 6	− 7	e 7 26	− 6	—	—	e 8·4
Mobile		20·5	308	5 39	+57	9 27	+60	—	—	—
Georgetown		20·7	344	i 4 40	− 4	i 8 31	0	—	—	—
Philadelphia		21·2	348	i 4 46	− 3	i 8 43	+ 2	—	—	i 9·9
Fordham		21·8	352	i 4 55	− 1	i 8 52	0	i 8 44	P_cP	—
Pennsylvania		22·7	343	e 5 6	+ 2	i 9 9	0	—	—	—
New Kensington	E.	23·0	340	e 5 11	+ 4	e 9 20	+ 6	—	—	e 12·6
Harvard		23·2	357	i 5 8	− 1	i 9 14	− 4	—	—	—
Cleveland		24·5	338	i 5 20k	− 2	i 9 38	− 2	i 9 47	Q	—
Vermont		25·3	354	e 5 16	−14	—	—	—	—	i 11·0
Halifax		25·7	10	5 57	+24	10 33	+32	e 10 53	SS	13·7
St. Louis		26·5	322	i 5 36	− 5	i 10 8	− 6	—	—	—
Ottawa		26·6	350	5 42	0	10 14	− 2	6 18	PP	12·7
Chicago		27·3	330	e 5 48	0	i 10 26	− 1	e 6 52	PPP	e 12·1
Shawinigan Falls		27·3	356	5 48	0	10 26	− 1	11 31	SS	13·7
Seven Falls		27·8	358	5 51	− 2	e 11 18	+43	—	—	13·7
Tacubaya		28·2	275	i 5 55	− 1	e 10 44	+ 3	e 12 29	SSS	—
Temiskaming		28·4	346	5 57	− 1	10 40	− 5	6 34	PP	19·7
Ville Marie		29·2	346	6 6	+ 1	10 48	−10	6 49	PP	15·7
Kirkland Lake		30·1	346	6 12	− 1	—	—	6 51	PP	16·7
Huancayo		31·7	191	e 6 27	0	i 11 41	+ 4	e 9 42	?	e 14·0
Lincoln	E.	31·7	320	e 6 26	− 1	e 12 3	+26	—	—	e 15·8
La Paz		35·6	178	i 7 1a	0	i 12 38	0	i 8 25	PP	17·0
Rapid City	E.	37·6	319	e 7 17	− 1	e 13 3	− 5	e 9 12	PPP	e 15·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tucson		39·3	299	i 7 31 a	− 1	e 13 35	+ 1	i 8 59	PP	e 19·3
Salt Lake City		42·1	311	e 7 44	−11	i 14 12	− 4	—	—	e 17·2
Pierce Ferry		42·6	303	i 7 54	− 5	—	—	i 9 46	PP	—
Boulder City		43·2	302	e 8 4	0	—	—	—	—	—
Bozeman		43·3	318	e 8 6	+ 1	e 14 30	− 3	e 17 46	SS	e 20·4
Saskatoon		43·8	328	e 10 6	PP	e 14 41	+ 1	—	—	18·7
Butte	N.	44·4	318	—	—	e 14 44	− 5	e 18 7	SeS	e 20·0
Ivigtut		44·4	15	—	—	e 14 55	+ 6	18 12	SeS	22·4
Palomar		44·5	299	i 8 14 a	− 1	—	—	—	—	—
La Jolla	Z.	44·8	298	e 8 17	0	—	—	—	—	—
Riverside	Z.	45·0	300	i 8 18	− 1	—	—	—	—	—
Mount Wilson	Z.	45·6	300	i 8 23 a	− 1	—	—	—	—	—
Pasadena		45·7	300	i 8 23	− 1	i 15 8	0	—	—	—
Tinemaha	Z.	46·1	304	i 8 27 a	− 1	—	—	—	—	—
Hungry Horse		46·2	320	i 8 26	− 2	e 15 8	− 7	—	—	—
Santa Barbara	Z.	47·0	300	i 8 36 a	+ 1	—	—	—	—	—
Lick	Z.	48·8	304	i 8 48	− 1	—	—	—	—	—
Santa Clara		49·1	304	e 8 51	0	e 16 3	+ 7	—	—	e 27·0
Berkeley		49·4	304	i 9 12	+19	i 16 2	+ 2	i 11 8	PP	e 26·6
Shasta Dam		49·9	308	e 8 52	− 5	—	—	—	—	—
Ukiah		50·3	306	—	—	e 17 12	+59	—	—	e 21·5
La Plata	E.	55·0	168	—	—	17 12	− 5	—	—	27·8
Lisbon		55·1	56	—	—	17 20	+ 2	22 22	SSS	25·9
Scoresby Sund		58·4	17	10 2 a	+ 2	18 2	0	18 15	PS	27·7
Toledo		59·1	55	e 10 9	+ 5	—	—	i 10 14?	?	—
Granada		59·5	58	i 10 19 k	+12	i 18 19	+ 3	12 13	PP	i 28·2
Edinburgh		60·9	36	e 14 42	PcS	—	—	—	—	—
Sitka		61·1	326	—	—	e 20 6	?	e 22 58	SS	e 29·4
Aberdeen		61·6	34	—	—	e 18 40	− 3	e 22 0	?	e 29·3
Alicante		61·9	56	e 8 59	?	—	—	12 59	PP	e 27·1
Paris		63·8	44	e 10 36	0	e 19 9	− 2	e 12 47	PP	e 29·7
Clermont-Ferrand		64·2	48	e 10 40	+ 1	i 19 21	+ 5	i 23 43	SS	29·7
Algiers		64·8	58	10 42	− 1	19 23	0	—	—	30·7
Uccle		65·0	42	e 10 48	+ 4	e 19 26	0	20 42	ScS	e 30·7
De Bilt		65·5	40	i 10 48 k	+ 1	e 19 34	+ 2	e 20 46	ScS	e 29·7
Strasbourg		67·3	45	i 10 59	0	e 19 55	+ 1	e 20 47	ScS	31·4
College		67·8	334	—	—	e 19 55	− 5	e 24 12	SS	e 32·1
Stuttgart		68·2	45	e 11 4	0	e 20 0	− 4	e 24 30	SS	e 31·7
Tamanrasset		69·2	72	e 11 13	+ 3	—	—	—	—	—
Copenhagen		69·7	36	e 11 15 k	+ 1	20 22	0	24 56	SS	34·1
Florence		70·2	49	e 11 27	+10	i 20 46	+18	—	—	—
Padova		70·5	47	e 11 51	+33	—	—	—	—	—
Rome		71·4	51	e 11 24 k	0	i 20 40	− 2	e 14 0	PP	—
Prague		71·5	42	e 11 24	0	e 20 42?	− 1	e 14 14	PP	e 32·7
Triest		71·7	47	i 11 28	+ 2	i 20 44	− 1	e 14 9	PP	—
Upsala		72·0	32	—	—	e 20 42?	− 7	e 28 42?	SSS	e 33·7
Warsaw		75·2	39	e 11 47	+ 1	21 22	− 3	e 14 33	PP	e 37·7
Istanbul		83·6	49	12 32	+ 1	22 55	+ 2	—	—	—
Helwan		89·4	59	e 13 6	+ 6	23 30	[+ 1]	23 52	S	—
Ksara		91·4	54	e 13 10	+ 1	e 23 51	{− 1}	—	—	—
Sverdlovsk		93·4	26	13 18	0	i 24 26	+ 2	e 16 58	PP	—
Irkutsk		108·5	5	e 18 56	PP	i 25 7	[+ 1]	28 15	PS	—
Tashkent		108·5	32	e 18 46	PP	e 25 3	[− 3]	28 20	PS	—
Stalinabad		110·3	33	e 19 1	PP	25 11	[− 2]	28 36	PS	—
Vladivostok		114·9	343	e 19 34	PP	26 24	{−15}	29 22	PS	—
Bombay		126·9	48	e 20 42?	PP	—	—	—	—	—

Additional readings :—
San Juan i = 1m.21s.
Bogota iPEZ = 3m.46s., iEZ = 11m.2s.
Philadelphia i = 6m.4s. and 7m.7s.
New Kensington eE = 6m.43s. and 8m.6s.
Cleveland iZ = 5m.32s.
Ottawa SS = 11m.22s.
Chicago eS = 10m.23s., i = 10m.58s.

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Tacubaya eN =7m.12s., eE =10m.8s. and 10m.14s., eSN =10m.48s., iN =11m.26s., eE =11m.38s. and 11m.43s.
La Paz P_cP =9m.37s., SSN =15m.8s., SSS =15m.42s.
Rapid City eE =14m.48s.
Tucson eP_cP =9m.22s., e =13m.4s. and 15m.18s., eSS =16m.24s.
Bozeman ePP? =10m.10s., e =17m.2s., eS_cS =18m.3s.
Berkeley iE =12m.26s., iS_cSN =18m.44s., iSSE =20m.19s.
Granada P_cP =11m.1s., SS =23m.59s.
Sitka eSSS =24m.42s.
Alicante P_cP =9m.19s., PP =11m.13s., S_cS =18m.55s., SS =21m.25s., SSS =24m.3s., Q =25m.35s.
Paris eS_cS =20m.26s., e =22m.6s., eSS =23m.25s., eSSS =26m.33s.
Clermont-Ferrand eP =10m.44s., iS_cS =20m.38s., i =22m.42s., iSSS =26m.38s.
Uccle eSE =19m.22s., eSSN =23m.18s., eSSE =23m.35s., eSSS?E =27m.12s., eSSSS?E =28m.22s.
Strasbourg eP =11m.2s., e =12m.52s., eSS =23m.52s. and 24m.0s., eSSS =27m.8s.
College eSSS =27m.50s.
Stuttgart ePZ =11m.7s.a, eSSS? =27m.42s.
Copenhagen 21m.18s.
Rome eZ =15m.35s., ePS =21m.14s., eSS?E =25m.0s., eSSS =28m.0s.?
Prague ePPP =15m.54s., eSS =25m.24s., eSSS =29m.0s.
Triest iPS =21m.33s., eSS =25m.35s.
Warsaw eE =21m.32s., eSSE =25m.47s.
Sverdlovsk SKS =23m.48s., ePS =25m.40s., SS =30m.48s.
Irkutsk eS =26m.33s., SS =34m.0s.
Tashkent SKKS =26m.2s.
Stalinabad SKKS =26m.6s., PPS =29m.39s.
Vladivostok PPS =30m.9s., eSS =34m.54s.
Long waves were also recorded at other European stations.

April 23d. 12h. 3m. 48s. Epicentre 19°·3N. 69°·3W. (as at 11h.).

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Bogota		15·3	198	e 3 44	+ 5	e 6 34	+ 4
Harvard		23·2	357	e 5 5	− 4	e 9 12	− 6
Tucson		39·3	299	e 7 35	+ 3	—	—
Pierce Ferry		42·6	303	i 8 0	+ 1	—	—
Boulder City		43·2	302	e 8 7	+ 3	—	—
Palomar	z.	44·5	299	i 8 17	+ 2	—	—
Riverside	z.	45·0	300	e 8 18	− 1	—	—
Mount Wilson	z.	45·6	300	e 8 24	0	—	—
Tinemaha	z.	46·1	304	i 8 30	+ 2	—	—
Shasta Dam		49·9	308	e 8 54	− 3	—	—

Shasta Dam gives also e =9m.52s.

April 23d. 20h. Undetermined shock, North Atlantic.

Scoresby Sund P =19m.58s., L =22m.
Copenhagen eP =22m.40s., S =26m.44s.
Stuttgart ePZ =23m.32s., eS? =28m.38s., eR? =34·5m.
Tucson eP =23m.55s., e =24m.6s.
Ksara eP? =25m.43s.?, eS =36m.21s.
Rome eN =25m.59s. and 30m.19s.
Hungry Horse eP =26m.5s.
Warsaw eE =28m., eLE =32m.
Temiskaming e =37m.13s.
Long waves were also recorded at Kew, Clermont-Ferrand, Uccle, De Bilt, Istanbul, and Philadelphia.

April 23d. Readings also at 5h. (La Plata and Hungry Horse), 6h. (Mizusawa), 7h. (La Paz), 8h. (near Kulyab and Obi-garm), 9h. (Bogota and Hungry Horse), 10h. (Hungry Horse), 11h. (near Kulyab, Obi-garm, Stalinabad, Andijan, and Murgab), 13h. (Theodosia), 14h. (Hungry Horse and Prague), 15h. (near Lick), 16h. (Hungry Horse (2)), 17h. (Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Riverside, Lick, Huancayo, and near La Paz), 18h. (Rome), 23h. (near Mineral).

April 24d. 12h. 29m. 31s. Epicentre 45°·7N. 26°·8E. Depth of focus 0·025.
(as on 1948, March 13d.).

Intensity III at Bucharest. Epicentre 45°·9N. 26°·7E. Depth 150km.

G. Demetrescu and G. Petrescu.
Bulletin séismique de Bucarest, Vol. 14, 1948, p. 13.

$A = +\cdot6255$, $B = +\cdot3160$, $C = +\cdot7133$; $\delta = -10$; $h = -4$;
$D = +\cdot451$, $E = -\cdot893$; $G = +\cdot637$, $H = +\cdot322$, $K = -\cdot701$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Campulung		1·3	254	e 0 32	+ 1	e 0 50	− 6	—	—
Bucharest		1·4	198	i 0 32a	0	e 0 48	−10	i 0 40	?
Istanbul		4·9	160	e 1 29?	P*	e 2 29?	S*	—	—
Yalta		5·3	101	e 1 24	+ 5	2 20	0	—	—
Budapest	N.	5·6	291	e 2 19	?	e 2 54	?	i 3 12	?
Stuttgart	z.	12·4	291	e 2 49	− 2	—	—	—	—
Strasbourg		13·3	290	e 3 2	0	—	—	—	—
Copenhagen		13·5	323	3 5	0	—	—	3 12	PP
Clermont-Ferrand		16·6	279	e 3 40	− 3	—	—	—	—
Paris		16·8	289	i 3 46	+ 1	—	—	—	—

Long waves were recorded at Granada and Alicante.

April 24d. Readings also at 2h. (La Paz), 5h. (Apia and near Mizusawa), 6h. (near Andijan, Tchimkent, Tashkent, Frunse, Obi-garm, Murgab, Stalinabad, Samarkand, Kulyab, Almata, and near Lick), 7h. (near Batavia), 11h. (Bologna, Triest, Rome, Istanbul, and Stuttgart), 12h. (La Paz), 13h. (near Murgab and Kulyab), 14h. (Ksara), 16h. (Helwan, Ksara, Istanbul, Paris, Strasbourg, Jena, Stuttgart, Rome, and Basle), 17h. (Hungry Horse), 19h. (Samarkand and near Murgab, Kulyab, Obi-garm, Andijan, and Stalinabad), 21h. (Tucson, Tacubaya, and near Ottawa).

April 25d. Readings at 0h. (Hungry Horse), 1h. (Hungry Horse), 2h. (Tucson), 3h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Riverside, Tinemaha, Ville Marie, Temiskaming, Fort de France, Bogota, and near Batavia), 7h. (Hungry Horse and near Mineral), 8h. (Murgab, near Kulyab, Obi-garm, Stalinabad, and near Mineral), 9h. (Shasta Dam, near Obi-garm, Kulyab, and Stalinabad), 12h. (Fresno and near Apia), 15h. (Rome), 16h. (Pavia and near Batavia), 17h. (near Mizusawa), 19h. (Tacubaya), 20h. (Mount Wilson, Tinemaha, Haiwee, Tucson, near Pierce Ferry, and Boulder City), 22h. (Tucson and near Tacubaya), 23h. (Istanbul).

April 26d. 3h. Undetermined shock.

La Paz iPN = 8m.44s., iN = 9m.14s., iSEN = 10m.44s., iS_g = 12m.0s.
La Plata PE = 10m.6s., P?Z = 10m.9s., E = 10m.24s., S?E = 12m.54s., N = 12m.56s., LE = 13·8m.
Huancayo eP? = 10m.7s.
Bogota ePZ = 12m.53s., eZ = 15m.46s.
Harvard i = 17m.30s. and 17m.45s.
Tucson iP = 17m.40s., i = 17m.48s., ipP = 17m.55s., i = 18m.15s.
Palomar iPZ = 18m.5s.k, ipPZ = 18m.20s.
Pierce Ferry iP = 18m.8s., ipP = 18m.24s.
Riverside iPZ = 18m.11s.k, ipPZ = 18m.26s.
Boulder City iP = 18m.11s., ipP = 18m.26s.
Mount Wilson iPZ = 18m.14s.k, ipPZ = 18m.29s.
Pasadena iPZ = 18m.14s., ipPZ = 18m.29s.
Tinemaha iPZ = 18m.26s., ipPZ = 18m.41s.
Shasta Dam eP = 18m.49s., epP = 19m.5s.
Hungry Horse iP = 18m.59s., ipP = 19m.14s.

April 26d. 7h. 24m. 13s. Epicentre 35°·3N. 44°·6E. (as on 1946, March 2d.).

A = +·5824, B = +·5743, C = +·5752; δ = −13; h = 0;
D = +·702, E = −·712; G = +·410, H = +·404, K = −·818.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan	4·9	356	e 1 28	P*	—	—	—	—	—
Leninakan	5·5	355	e 1 25?	0	—	—	—	—	—
Baku	6·6	38	e 2 13	P_g	—	—	—	—	—
Ksara	7·4	260	e 1 49	− 3	4 19?	+61	—	—	—
Grozny	8·1	6	e 2 0?	− 2	e 4 10?	S*	—	—	—
Sotchi	9·1	337	e 2 14	0	—	—	—	—	—
Yalta	12·2	322	e 3 17	PPP	—	—	—	—	—
Istanbul	13·5	300	e 3 22	PP	—	—	—	—	6·9
Samarkand	18·3	70	e 4 15	− 2	—	—	—	—	—
Stalinabad	19·6	72	i 4 34	+ 2	—	—	—	—	—
Obi-garm	20·3	72	e 4 40	0	—	—	—	—	—
Tashkent	20·3	65	e 4 37	− 3	e 8 20	− 3	—	—	—
Kulyab	20·6	75	e 4 46	+ 3	—	—	—	—	—
Tchimkent	20·7	62	e 4 49	+ 5	—	—	—	—	—
Moscow	21·0	350	e 4 45	− 2	e 8 34	− 3	—	—	—
Andijan	22·5	68	e 5 4	+ 2	—	—	—	—	—
Sverdlovsk	24·1	22	5 20	+ 2	9 34	0	—	—	—

Long waves were recorded at Copenhagen and Helwan.

April 26d. 9h. 25m. 35s. Epicentre 53°·1N. 35°·1W.

Fore-shock of large shock at 9h. 32m.

A = +·4933, B = −·3467, C = +·7977; δ = −13; h = −7;
D = −·575, E = −·818; G = +·653, H = −·459, K = −·603.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		23·9	85	e 5 17	+ 1	—	—	—	—	—
Uccle	z.	24·2	79	e 5 37	+18	—	—	—	—	—
Toledo		24·9	109	e 5 26	0	—	—	—	—	—
Clermont-Ferrand		25·7	91	e 5 35	+ 2	—	—	e 6 12	PP	—
Strasbourg		27·1	82	e 5 49	+ 3	—	—	—	—	—
Stuttgart		27·9	80	e 5 54?	0	—	—	—	—	e 15·4
Jena	N.	28·4	76	e 5 58	0	—	—	—	—	—
Kirkland Lake		28·6	279	e 6 0	0	—	—	—	—	—
Ville Marie		28·6	278	e 5 53	− 7	—	—	—	—	—
Collmberg	z.	29·1	74	e 10 56	S	(e 10 56)	0	—	—	—
Hungry Horse		47·8	299	e 8 39	− 2	—	—	—	—	—
Pierce Ferry		55·8	287	e 9 40	− 1	—	—	—	—	—
Boulder City		56·4	287	e 9 46	+ 1	—	—	—	—	—
Tucson		56·7	281	e 9 47	− 1	—	—	—	—	—
Shasta Dam		57·3	296	e 10 0	+ 8	—	—	—	—	—
Riverside	z.	59·2	288	e 10 5	0	—	—	—	—	—
Palomar	z.	59·4	286	e 10 7	+ 1	—	—	—	—	—

Collmberg also gives iZ = 11m.4s., eZ = 12m.8s.
Long waves were also recorded at Copenhagen, Helsinki, and Scoresby Sund.

April 26d. 9h. 32m. 21s. Epicentre 53°·1N. 35°·1W. (as at 9h. 25m.).

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ivigtut	10·8	324	—	—	e 5 3	SS	—	—	5·6
Reykjavik	13·0	27	e 2 8	−61	e 5 58	SS	—	—	e 6·3
Scoresby Sund	18·5	13	4 19a	0	7 55	+11	—	—	—
Aberdeen	19·2	64	e 4 23	− 5	i 8 12	+13	—	—	—
Durham	19·7	72	i 4 33	− 1	8 21	+11	i 8 33	SS	—
Jersey	21·0	86	e 4 48	+ 1	e 8 46	+ 9	—	—	11·6
Kew	21·2	80	e 4 36	−13	—	—	i 5 27	PPP	e 10·6
Seven Falls	23·5	271	5 13	+ 1	9 37	+14	—	—	11·7
Paris	23·9	85	i 5 17	+ 1	e 9 38	+ 8	i 5 48	PP	e 11·7
Uccle	24·2	79	e 5 18a	− 1	e 9 39	+ 4	—	—	e 11·7

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
De Bilt		24·3	75	i 5 20	0	e 9 39	+ 2	e 7 11	?	e 11·7
Toledo		24·9	109	i 5 26	0	9 56?	+ 9	—	—	—
Clermont-Ferrand		25·7	91	i 5 33	0	i 10 8	+ 7	i 6 11	PP	12·7
Harvard		26·4	262	e 5 40	0	e 10 16	+ 4	—	—	e 13·6
Granada		27·0	113	i 5 48k	+ 3	i 10 6	−16	5 57	pP	13·6
Strasbourg		27·1	82	e 5 46	0	e 10 27	+ 3	—	—	e 13·2
Ottawa		27·3	271	5 48	0	10 27	0	—	—	13·7
Copenhagen		27·4	65	e 5 49	0	—	—	—	—	13·7
Basle		27·5	84	e 5 51	+ 1	—	—	—	—	e 15·0
Stuttgart		27·9	80	e 5 53a	− 1	—	—	—	—	e 13·7
Alicante		28·0	107	e 5 58	+ 3	10 2	−36	—	—	e 11·9
Zürich		28·2	84	e 5 44	−12	—	—	e 6 39	PP	—
Jena	N.	28·4	76	e 5 58	0	—	—	e 9 18	P_cP	—
Kirkland Lake		28·6	279	i 6 0	0	—	—	—	—	—
Ville Marie		28·6	278	i 6 0	0	—	—	—	—	16·2
Temiskaming		28·7	276	i 5 59	− 2	—	—	—	—	—
Fordham		28·8	261	e 6 8	+ 6	—	—	—	—	—
Upsala		29·2	56	e 5 57a	− 8	e 11 5	+ 7	—	—	e 14·6
Prague		30·4	75	—	—	e 10 39?	−37	—	—	e 15·6
Padova		31·6	84	e 6 49	+23	—	—	—	—	—
Triest		32·1	83	i 6 29k	− 2	e 11 46	+ 3	e 6 39	pP	e 17·0
Cleveland		33·0	269	e 6 39	0	e 12 2	+ 5	e 7 55	PP	—
Warsaw		33·3	68	e 6 42	+ 1	—	—	—	—	e 17·6
Rome		33·5	90	e 6 42	− 1	e 12 4	− 1	e 7 41	PP	—
Chicago		36·5	275	e 7 9	0	e 12 53	+ 2	e 14 25	SS	e 17·1
St. Louis		40·0	273	i 7 39	+ 1	e 13 48	+ 4	—	—	—
Moscow		40·6	56	e 7 44	+ 1	e 13 58	+ 4	—	—	—
Istanbul		43·9	79	i 8 11	+ 1	14 42	0	—	—	—
Yalta		44·8	72	e 8 17	0	—	—	—	—	—
Hungry Horse		47·8	299	i 8 39	− 2	—	—	—	—	—
Sverdlovsk		50·7	45	i 9 4	+ 1	16 20	+ 2	—	—	—
Salt Lake City		51·4	290	e 9 12	+ 3	e 16 32	+ 4	—	—	e 24·7
Grozny		52·0	66	e 9 11	− 2	—	—	—	—	—
Ksara		52·7	82	e 9 21	+ 3	e 16 50	+ 4	—	—	—
Helwan	z.	52·8	88	e 9 21	+ 2	e 16 51	+ 4	—	—	—
Pierce Ferry		55·8	287	e 9 40	− 1	—	—	—	—	—
Boulder City		56·4	287	e 9 45	0	—	—	—	—	—
Tucson		56·7	281	e 9 47	− 1	—	—	—	—	e 26·0
Mineral	z.	57·1	295	i 9 49	− 1	—	—	—	—	—
Shasta Dam		57·3	296	e 9 50	− 2	—	—	—	—	—
Tinemaha	z.	57·6	290	i 9 56	+ 2	—	—	—	—	—
Bogota	z.	57·9	228	e 10 0	+ 4	—	—	—	—	—
Fresno	z.	58·7	291	i 10 2	0	e 18 14	+ 8	—	—	—
Riverside	z.	59·2	288	i 10 5	0	—	—	—	—	—
Tacubaya	N.	59·2	261	i 10 8	+ 3	—	—	—	—	—
Lick	z.	59·3	293	i 10 7	+ 1	—	—	—	—	—
Palomar		59·4	286	i 10 7a	+ 1	—	—	—	—	—
Mount Wilson	z.	59·5	288	e 10 7	0	—	—	—	—	—
Pasadena	z.	59·6	288	e 10 5	− 3	—	—	—	—	—
Tashkent		65·7	54	e 10 47	− 1	—	—	—	—	—
Samarkand		65·8	57	e 10 49	0	—	—	—	—	—
Stalinabad		67·6	55	i 11 2	+ 1	i 19 59	+ 2	—	—	—
Obi-garm		67·9	55	i 11 4	+ 2	—	—	—	—	—
Kulyab		68·6	56	e 11 9	+ 2	e 20 13	+ 4	—	—	—
La Paz	z.	74·9	213	i 11 46	+ 2	—	—	—	—	—

Additional readings :—
Paris e =7m.58s.
Clermont-Ferrand iPPP =6m.27s., iSS =11m.8s.
Granada iPP =6m.42s., P_cP =9m.8s.
Strasbourg eP =5m.51s., e =10m.58s.
Triest iPPP =7m.35s., esS =12m.2s., eSS =13m.16s.
Cleveland ePE =6m.42s., eSEN =12m.8s.
Rome ePPPZ =7m.59s., eSSN =13m.53s.
Tucson e =9m.57s. and 10m.22s.
Long waves were also recorded at Potsdam.

April 26d. Readings also at 1h. (Samarkand, near Kulyab (2), Stalinabad, and Obi-garm), 4h. (Upsala), 5h. (Andijan, near Obi-garm, Kulyab, and Stalinabad), 6h. (Hungry Horse), 8h. (Ksara), 9h. (Helwan and Istanbul), 10h. (Hungry Horse, Tucson, Tinemaha, Riverside, Stuttgart, Kew, Paris, De Bilt, and Uccle), 11h. (Boulder City, Tucson, Hungry Horse, Pierce Ferry, Riverside, Tinemaha, and Harvard), 12h. (near Apia), 13h. (Upsala), 14h. (near Oaxaca and Tacubaya), 16h. (Hungry Horse), 18h. (Huancayo and near Mineral), 19h. (La Paz and near Branner), 20h. (near Lick and Branner), 21h. (Rome, Triest, Stuttgart, Strasbourg, and Helwan), 22h. (Ksara,) 23h. (Ksara and Hungry Horse.

April 27d. 20h. 22m. 23s. Epicentre 36°·8N. 121°·4W. (as on 1947, Aug. 10d.).

Intensity VI at Hollister, felt less strongly at Morgan Hill, Salinas, etc.
Epicentre 36°·46′N. 121°16′W.

L. M. Murphy, F. P. Ulrich.
United States Earthquakes, 1948, Serial No. 746, Washington, 1951, p.15, with macroseismic chart, p. 13.

A = −·4182, B = −·6851, C = +·5964 ; δ = −5 ; h = 0 ;
D = −·854, E = +·521 ; G = −·311, H = −·509, K = −·803.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Lick		0·6	339	i 0 15	0	i 0 26	0	—	—	—
Santa Clara		0·6	321	i 0 17	+ 2	i 0 28	+ 2	—	—	—
Branner	E.	0·9	314	i 0 20	0	—	—	—	—	—
Berkeley		1·3	327	i 0 25	0	i 0 47	+ 3	—	—	—
San Francisco		1·3	319	i 0 26	+ 1	i 0 45	+ 1	—	—	—
Tinemaha		2·5	89	i 0 44	+ 1	i 1 21	S_g	—	—	—
Santa Barbara	Z.	2·7	149	i 0 43	− 2	—	—	—	—	—
Mineral		3·5	357	i 0 59	+ 2	i 1 54	S_g	i 1 49	S*	—
Mount Wilson	Z.	3·7	132	i 0 58	− 2	—	—	—	—	—
Pasadena	Z.	3·7	134	i 0 57	− 3	—	—	—	—	—
Shasta Dam		4·0	359	e 1 7	+ 3	i 1 47	− 5	i 1 27	P_g	i 2·3
Riverside	Z.	4·3	128	i 1 5	− 3	—	—	—	—	—
Boulder City		5·3	96	i 1 40	P_g	i 2 43	S*	—	—	—

Additional readings :—
Lick iE = 24s.
Berkeley iZ = 28s., iN = 32s., iS_gN = 49s.
San Francisco iS_gE = 48s.
Mineral iE = 1m.6s.

April 27d. Readings also at 2h. (Hungry Horse, Shasta Dam, Tucson, Mount Wilson, Riverside, Bogota, Kew, near Kulyab, and near San Juan), 4h. (near Samarkand), 11h. (near Alicante), 12h. (near Alicante), 16h. (Shasta Dam, near Lick, Santa Clara, Branner, Berkeley, San Francisco, near Mizusawa, near Obi-garm, Kulyab, Stalinabad, Andijan, Tashkent, and Samarkand), 20h. (near Berkeley (2), San Francisco (2), Lick (5), Branner (2), Santa Clara, and Shasta Dam (2)), 21h. (Shasta Dam, near Lick, Branner, Santa Clara, San Francisco, and Berkeley), 22h. (near Lick, Branner, Santa Clara, Berkeley, and San Francisco), 23h. (near Lick, Berkeley, and San Francisco).

April 28d. 12h. 1m. 49s. Epicentre 10°·5N. 62°·6W. Depth of focus 0·010.

A = +·4526, B = −·8732, C = +·1811 ; δ = +12 ; h = +6 ;
D = −·888, E = −·460 ; G = +·083, H = −·161, K = −·984.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fort de France	4·4	19	i 0 4	−62	i 0 52	−64	—	—	—
San Juan	8·5	337	e 2 3	+ 1	i 3 27	−10	—	—	i 4·0
Port-au-Prince	12·4	312	e 3 6	PP	e 5 10	− 1	i 3 11	PPP	e 5·8
Bogota	12·8	244	i 2 57	− 3	i 5 36	SS	i 3 13	pP	7·2
Balboa Heights	16·8	266	e 3 48	− 2	e 6 44	− 9	—	—	—
Bermuda	21·8	355	i 4 37	− 8	e 8 28	− 7	i 5 29	PPP	e 10·3
Huancayo	25·7	209	i 5 25	+ 2	e 9 43	+ 1	i 5 46	pP	e 11·0
La Paz	27·4	191	i 5 41k	+ 3	i 10 20	+10	i 6 31	PP	12·2
Georgetown	31·1	338	i 6 11	0	11 9	+ 1	i 6 32	pP	—
Philadelphia	31·4	342	e 6 16	+ 2	e 11 16	+ 3	e 6 35	pP	e 13·0

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		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Fordham		31·8	344	i 6 17	0	—	—	i 7 26	PP	—
Harvard		32·8	348	i 6 26	0	—	—	i 7 46	PP	e 15·2
Cleveland		35·1	335	i 6 46a	0	e 12 12	+ 2	i 7 6	pP	—
Tacubaya	N.	36·4	288	i 6 59	+ 2	i 12 37	+ 7	—	—	—
Ottawa		36·5	345	6 58	0	11 29	−63	7 19	pP	15·2
St. Louis		37·4	324	i 7 6	+ 1	i 12 43	− 3	i 7 24	pP	—
Chicago		38·2	328	e 7 13	+ 1	e 12 58	0	e 7 37	pP	e 18·4
Temiskaming		38·7	342	7 18	+ 2	—	—	7 39	pP	—
Ville Marie		39·4	342	7 24	+ 2	—	—	7 45	pP	—
Kirkland Lake		40·3	342	7 30	+ 1	—	—	7 51	pP	—
Lincoln	E.	42·6	321	e 7 44	− 4	e 17 37	S_cS	e 9 29	PP	—
La Plata	E.	45·4	174	8 5	− 5	18 5	SS	9 29	P_cP	21·9
	N.	45·4	174	—	—	14 36	− 8	18 53	SSS	24·0
	Z.	45·4	174	8 10	0	—	—	—	—	—
Rapid City	E.	48·4	321	i 8 35	+ 1	e 15 36	+10	i 8 55	pP	e 19·6
Tucson		49·4	304	i 8 42a	0	e 15 55	+15	i 9 1	pP	e 23·7
Pierce Ferry		52·9	308	i 9 9	+ 1	i 14 3	S_cP	i 9 29	pP	—
Boulder City		53·5	307	i 9 13	0	e 14 7	S_cP	i 9 34	pP	—
Palomar		54·6	304	i 9 21a	0	i 14 12	S_cP	i 9 41	pP	—
Saskatoon		54·7	329	—	—	i 16 56	+ 4	—	—	24·2
La Jolla	Z.	54·8	303	e 9 22a	0	—	—	e 9 44	pP	—
Riverside	Z.	55·1	305	i 9 25a	+ 1	i 14 14	S_cP	i 9 46	pP	—
Mount Wilson	Z.	55·7	305	i 9 29a	0	i 14 17	S_cP	i 9 50	pP	—
Pasadena		55·8	305	i 9 28a	− 1	e 17 9	+ 2	i 9 48	pP	—
Haiwee	Z.	56·0	307	i 9 32	+ 1	—	—	i 9 52	pP	—
Tinemaha		56·5	308	i 9 34a	0	—	—	i 9 54	pP	—
Hungry Horse		57·0	322	i 9 37	− 1	e 17 22	− 1	i 10 5	pP	—
Santa Barbara	Z.	57·1	305	i 9 39a	0	—	—	—	—	—
Lick	Z.	59·2	308	i 9 53	0	—	—	i 10 17	pP	—
Toledo		59·3	50	i 9 56	+ 2	18 3	+10	10 37	sP	—
Berkeley		59·7	308	e 9 59	+ 2	i 18 20	+22	—	—	e 30·3
Shasta Dam		60·4	311	e 9 58	− 3	e 19 40	S_cS	i 10 21	pP	—
Alicante		61·7	52	—	—	e 18 33	+10	—	—	e 34·8
Clermont-Ferrand		65·6	45	i 10 37	+ 1	i 19 25	+13	i 10 58	pP	30·2
Paris		65·8	41	i 10 38	+ 1	i 19 19	+ 5	i 10 56	pP	e 31·2
Uccle		67·4	39	e 10 48	+ 1	—	—	—	—	—
Basle		69·0	43	e 10 58	+ 1	e 18 18	?	e 15 22	PPP	—
Strasbourg		69·2	42	e 10 58	0	e 19 59	+ 4	e 11 37	pP	—
Stuttgart		70·2	42	e 11 3	− 1	—	—	e 11 23	pP	—
Salo		70·8	46	e 11 9a	+ 1	e 20 19	+ 5	e 11 31	pP	—
Bologna		71·3	47	e 12 11?	+60	e 21 25	+66	—	—	—
Padova		71·7	46	e 11 17	+ 4	—	—	—	—	—
Sitka		71·9	327	e 11 14	0	e 20 27	+ 1	e 13 55	PP	e 29·4
Jena	E.	72·0	40	e 11 15	0	—	—	—	—	—
Rome		72·0	49	i 11 16a	+ 1	i 20 32	+ 5	e 11 43	pP	—
Potsdam		73·0	38	i 11 22	+ 1	i 20 43	+ 4	i 11 48	pP	—
Triest		73·0	45	i 11 21a	0	i 20 43	+ 4	i 11 47	pP	—
Warsaw	Z.	77·9	38	11 49?	0	—	—	—	—	—
Istanbul		84·4	49	i 12 22	− 1	e 22 34	− 5	—	—	—
Helwan		88·2	60	i 12 44k	+ 3	23 3	[+ 4]	13 11	pP	—
Ksara		91·2	56	e 13 1	+ 6	i 23 58	+15	—	—	—

Additional readings :—
Fort de France eP_g =12s., sP_g =15s., e =33s. and 37s.
San Juan iP =2m.6s., i =2m.14s.
Port au Prince i =3m.15s. and 5m.28s.
Bogota iPP =3m.2s., iSS =6m.5s.
Bermuda i =5m.3s. and 8m.49s.
Huancayo ePP? =6m.3s., eP_cP? =8m.27s.
La Paz iPPPE =6m.43s., iE =11m.19s., SS =11m.41s.
Georgetown sS =15m.21s.
Philadelphia ePP =7m.16s., isS =11m.59s.
Fordham i =6m.46s., e =7m.46s.
Harvard i =6m.46s. and 7m.26s.
Cleveland esPE =7m.22s., iSSE =14m.29s., esSSE =15m.21s.
St. Louis i =7m.33s.
Chicago ePP =8m.39s., eS_cS =17m.11s.

Continued on next page.

La Plata SN =15m.19s., SE =15m.22s., N =18m.2s., SSSE =19m.23s., QN =22m.15s.
Rapid City ePPE =10m.31s.
Tucson i =8m.55s., ePP =10m.46s., ePPP =11m.26s., iS_cP =13m.49s., eS_cS? =18m.24s.
Palomar iSEN =19m.1s.
Riverside iZ =9m.55s.
Pasadena iS_cPZ =14m.17s., iS_cSE =19m.7s.
Hungry Horse iS_cS =19m.16s.
Lick ipP =9m.57s.
Shasta Dam ePPP =13m.48s., iS_cP =14m.35s.
Clermont-Ferrand i =11m.31s.
Paris iP =10m.42s., e =19m.45s.
Strasbourg ePP =13m.30s., esS? =20m.50s.
Stuttgart iZ =11m.9s.k, esSS? =25m.41s., e =33m.41s.
Salo eZ =11m.51s.
Sitka esS? =21m.13s.
Rome iN =11m.58s., isSN =21m.18s., e =25m.9s.
Triest esS? =21m.26s.
Helwan iS =23m.26s., eZ =25m.14s.

April 28d. 14h. Explosion. Epicentre 48°16′N. 8°7′E.

J. P. Rothé and E. Peterschmitt.
Etude séismique des explosions de Haslach ; Annales de l'Institut de Physique du Globe de Strasbourg, 3ème partie, Géophysique, t. V, p. 13-38, 14 Fig.

H. Reich, G. A. Schulze, O. Fortsch.
Das geophysikalische Ergebniss der Sprengung von Haslach im südlichen Schwarzwald, Geologische Rundschau, Vol. 36, 1948, pp. 85-96, 5 Fig.

Strasbourg (0°·4) iP_g =29m.57s., iS_g =30m.4s.
Ebingen (0°·6) e =30m.8s., eS_g? =30m.9s.
Basle (0°·8) eP_g? =30m.6s., eS_g =30m.16s.
Stuttgart (0°·9) e =30m.5s?, i =30m.10s., e =30m.17s., iS_g =30m.20s., iZ =30m.23s.
Zürich (1°·0) iP =30m.7s., e =30m.19s., eS_g =30m.22s.
Neuchatel (1°·5) eP =30m.14s., iS_g =30m.37s.
Chur (1°·7) eP =30m.19s., eS_g? =30m.45s.
Jena (3°·4) eE =31m.37s. and 31m.44s., eEN =31m.48s., eN =31m.52s.
Uccle (3°·5) e =10m.31s.

April 28d. Readings also at 0h. (near Lick), 1h. (Berkeley), 2h. (Pierce Ferry (2)), 7h. (near Branner, Santa Clara (2), San Francisco (3), and Berkeley (3)), 8h. (Samarkand, near Kulyab, and Stalinabad), 9h. (Palomar, Riverside, Boulder City, Pierce Ferry, and Tucson), 11h. (near Tchimkent), 12h. (Kirkland Lake, Ville Marie, Temiskaming, and near Apia), 13h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, Riverside, Sitka, and near Alicante), 14h. (Philadelphia), 16h. (near Kulyab, Obi-garm, Stalinabad, and Samarkand), 17h. (Mineral), 18h. (Mineral and Mizusawa), 19h. (Istanbul, Stuttgart, and near Lick), 20h. (Hungry Horse, Shasta Dam, Harvard, Bogota (2), Fort-de-France, and near Port-au-Prince).

April 29d. 0h. 33m. 41s. Epicentre 45°·7N. 26°·8E. Depth of focus 0·025.
(as on 24d.).

Intensity III-IV at Bucharest. Epicentre 45°·9N. 26°·7E. Depth of focus 150km.

G. Demetrescu and G. Petrescu.
Bulletin séismique de Bucarest, Vol. 14, 1948, p. 14.

$A = +·6255$, $B = +·3160$, $C = +·7133$; $\delta = -10$; $h = -4$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Bucharest	1·4	198	i 0 27	− 5	i 0 45	−13	—	—	—
Istanbul	4·9	160	i 1 11	− 3	—	—	e 1 51	?	—
Yalta	5·3	101	e 1 20	+ 1	2 22	+ 2	—	—	—
Kalossa	5·5	281	e 1 19	− 3	—	—	—	—	—
Budapest	5·6	291	1 17	− 6	e 2 21	− 6	e 1 25	pP	3·1
Theodosia	6·1	93	e 1 30	+ 1	e 2 43	+ 4	—	—	—
Sotchi	9·4	98	e 2 14	+ 2	—	—	—	—	—
Stuttgart	12·4	291	e 2 45	− 6	—	—	e 2 58	pP	—
Grozny	13·7	93	e 3 8	+ 1	—	—	—	—	—
Hungry Horse	80·3	335	i 11 53	+ 2	—	—	—	—	—

April 29d. 15h. 15m. 55s. Epicentre 50°·8N. 154°·2E. Depth of focus 0·015.
(as on 1948, Mar. 23d.).

$A = -·5713$, $B = +·2762$, $C = +·7728$; $\delta = -11$; $h = -6$;
$D = +·435$, $E = +·900$; $G = -·696$, $H = +·336$, $K = -·635$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Vladivostok		17·0	252	e 3 51	0	e 6 57	+ 3	—	—
Irkutsk		30·6	293	e 6 32	pP	—	—	—	—
Sverdlovsk		51·4	315	i 8 59	+ 5	e 16 15	+13	—	—
Hungry Horse		55·8	53	i 9 27	+ 1	—	—	—	—
Shasta Dam		56·1	65	i 9 27	− 1	—	—	—	—
Lick	z.	58·8	68	i 9 47	0	—	—	—	—
Tinemaha	z.	60·9	66	i 10 2	+ 1	—	—	i 10 33	pP
Haiwee	z.	61·8	67	i 10 7	0	—	—	—	—
Mount Wilson	z.	63·0	68	i 10 15a	− 1	—	—	i 10 43	pP
Pasadena	z.	63·0	68	i 10 14a	− 2	—	—	i 10 41	pP
Riverside	z.	63·6	68	i 10 18a	− 1	—	—	i 10 46	pP
Boulder City		63·7	64	i 10 20	0	—	—	i 10 47	pP
Pierce Ferry		64·1	64	i 10 22	− 1	—	—	i 10 49	pP
Tucson		68·7	65	i 10 52a	0	—	—	i 11 20	pP
St. Louis		74·6	47	i 11 27	0	—	—	e 15 42	PPP
Stuttgart	z.	76·4	337	e 11 41	+ 4	—	—	—	—
Paris		77·8	341	e 11 51?	+ 7	—	—	—	—

Additional readings :—
Tinemaha iZ = 10m.39s.
Haiwee iZ = 10m.47s.
Tucson i = 11m.29s.

April 29d. Readings also at 1h. (near Kulyab), 3h. (Apia (2), Paris, Stuttgart, Istanbul, Hungry Horse, Shasta Dam, Tucson, and near Balboa Heights), 5h. (Hungry Horse, Shasta Dam, Tucson, and Riverside), 7h. (Shasta Dam), 8h. (Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, and Santa Barbara), 9h. (near Bombay and near Lick), 10h. (Alicante), 12h. (Apia, Istanbul, near Kulyab, near Branner and Lick), 14h. (near Toledo and near Mizusawa), 16h. (Istanbul, near Branner and Lick), 21h. (Harvard, La Paz, Bogota, Huancayo, Hungry Horse, Shasta Dam, Tucson, Pasadena, Mount Wilson, Riverside, Istanbul, Rome, and near Taranto), 22h. (Rome).

April 30d. 4h. 11m. 51s. Epicentre 19°·3N. 69°·3W. (as on 23d.).

$A = +·3339$, $B = -·8835$, $C = +·3285$; $\delta = -3$; $h = +5$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		3·1	107	e 0 57	P*	i 1 35	S*	—	—	i 1·9
Fort de France		9·0	119	e 2 15	+ 2	—	—	—	—	—
Bogota		15·3	198	e 3 42	+ 3	e 6 35	+ 5	—	—	—
Philadelphia		21·2	348	e 5 2	PP	e 8 39	− 2	e 9 44	?	e 15·2
Harvard		23·2	357	i 5 9	0	i 9 9	− 9	—	—	—
Cleveland		24·5	338	e 5 25	+ 3	e 9 43	+ 3	—	—	—
St. Louis		26·5	322	e 5 34	− 7	e 10 17	+ 3	—	—	—
Temiskaming		28·4	346	e 6 9	+11	—	—	—	—	—
Tucson		39·3	299	i 7 30	− 2	—	—	e 9 4	PP	—
Pierce Ferry		42·6	303	e 7 57	− 2	—	—	—	—	—
Palomar	z.	44·5	299	i 8 14	− 1	—	—	—	—	—
Riverside	z.	45·0	300	i 8 17	− 2	—	—	—	—	—
Mount Wilson	z.	45·6	300	i 8 22	− 2	—	—	—	—	—
Pasadena		45·7	300	e 8 22	− 2	—	—	—	—	e 32·2
Tinemaha	z.	46·1	304	e 8 25	− 3	—	—	—	—	—
Hungry Horse		46·2	320	i 8 25	− 3	—	—	—	—	—
Shasta Dam		49·9	308	e 8 51	− 6	—	—	—	—	—
Tamanrasset		69·2	72	11 12	+ 2	—	—	—	—	—

Tucson also gives e = 7m.45s., i = 8m.3s.
Long waves were also recorded at Istanbul.

April 30d. 14h. 50m. 42s. Epicentre 35°·9N. 31°·1E.

Epicentre 35°·9N. 30°·7E. Depth of focus 100km. (Strasbourg).

A = +·6952, B = +·4194, C = +·5838 ; δ = +2 ; h = 0 ;
D = +·517, E = −·856 ; G = +·500, H = +·302, K = −·812.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ksara		4·4	117	e 1 16	+ 6	i 2 5	+ 3	—	—	—
Istanbul		5·4	343	1 25	+ 1	3 13	S_g	—	—	—
Helwan		6·0	178	1 36	+ 4	2 42	− 1	2 3	S_g	—
Yalta		8·9	14	e 2 10	− 2	—	—	—	—	—
Bucharest		9·3	338	e 2 24	+ 7	e 4 0	− 5	—	—	5·3
Simferopol		9·3	13	2 20	+ 3	—	—	—	—	—
Theodosia		9·7	18	e 2 20	− 2	—	—	—	—	—
Sotchi		10·1	38	i 2 26	− 2	—	—	—	—	—
Leninakan		11·2	60	e 2 44	0	—	—	—	—	—
Erevan		11·4	64	e 2 50	+ 3	—	—	—	—	—
Belgrade		12·0	321	e 3 9	PP	e 4 58	−13	—	—	e 6·6
Piatigorsk		12·3	45	e 2 39	−20	—	—	—	—	—
Grozny		13·5	52	e 3 18	+ 3	—	—	—	—	—
Budapest		14·6	326	e 4 8	+38	—	—	—	—	—
Baku		15·4	68	e 3 49	+ 9	e 6 41	+ 9	—	—	—
Rome		15·7	298	e 3 45k	+ 1	e 6 47	+ 8	—	—	e 9·1
Triest		16·3	312	e 3 53	+ 1	i 7 1	+ 8	i 4 2	PP	—
Padova		17·0	306	e 4 34	PPP	—	—	—	—	—
Warsaw		17·8	340	e 4 13	+ 2	e 7 25	− 3	e 4 32	PP	e 9·3
Prague		18·6	326	e 4 31?	+10	e 7 47?	+ 1	e 4 39	PPP	e 9·3
Moscow		20·3	11	4 36	− 4	8 17	− 6	e 4 47	pP	—
Zürich		20·3	312	e 4 38k	− 2	e 8 21	− 2	—	—	—
Jena	N.	20·6	324	e 4 42	− 1	e 8 26	− 3	e 5 2	PP	—
Stuttgart		20·6	317	i 4 42k	− 1	i 8 28	− 1	i 5 6	PP	e 9·3
Potsdam		20·9	329	i 4 59	+13	i 8 35	0	i 9 6	SS	e 11·3
Basle		21·0	312	e 4 46	− 1	e 8 36	− 1	—	—	—
Strasbourg		21·3	316	i 4 51	+ 1	i 8 43	0	e 5 18	PP	e 12·0
Clermont-Ferrand		23·2	304	e 5 11	+ 2	—	—	—	—	—
Copenhagen		23·5	334	e 5 28	+16	9 25	+ 2	—	—	—
Uccle		24·3	317	e 5 18	− 2	e 10 8?	+31	—	—	e 13·3
Paris		24·6	311	i 5 23	0	—	—	i 5 52	PP	—
Tamanrasset		25·8	247	e 5 35	+ 1	—	—	—	—	—
Sverdlovsk		28·8	35	e 5 58	− 4	e 10 38	−13	e 6 13	pP	—
Stalinabad		30·0	73	e 6 10	− 2	i 11 2	− 8	—	—	—
Andijan		32·5	70	e 6 32	− 2	—	—	—	—	—
Frunse		34·0	65	e 6 48	0	e 12 6	− 7	—	—	—
Murgab		34·0	74	6 38	−10	—	—	—	—	—
Hungry Horse		90·4	338	i 13 2	− 2	—	—	—	—	—

Additional readings :—
Bucharest eE = 3m.31s., eEN = 4m.21s.
Triest esS? = 7m.21s.?
Warsaw ePE = 4m.16s., eN = 7m.19s., eSE = 7m.33s., eSN = 7m.39s., SSE = 7m.46s.
Stuttgart iZ = 5m.2s., eZ = 5m.26s.
Potsdam ePN = 5m.2s., eSN = 8m.31s.
Tamanasset iP = 5m.38s.k, i = 5m.57s.
Long waves were also recorded at De Bilt and Alicante.

April 30d. Readings also at 0h. (Istanbul), 2h. (Pierce Ferry, Huancayo, Bogota, La Paz, and near Tacubaya), 3h. (Istanbul), 4h. (Pasadena, Mount Wilson, Riverside, Tinemaha, Tucson, Hungry Horse, Pierce Ferry, Shasta Dam, Temiskaming, Ville Marie, and La Paz), 5h. (near Lick and near Apia), 6h. (Huancayo), 7h. (Kodaikanal, near Oaxaca, Tacubaya, and near Apia (2)), 8h. (near Kulyab, Obi-garm, and Stalinabad), 9h. (Boulder City, Shasta Dam, Tucson, Palomar, Tacubaya, and near Sotchi), 10h. (Tacubaya and near Hungry Horse), 12h. (Bombay, Ksara, Bogota, La Paz (2), Huancayo, Hungry Horse, Pierce Ferry, Tucson, Mount Wilson, and Riverside), 14h. (La Paz, Hungry Horse, Pierce Ferry, Tucson, Palomar, and Riverside), 19h. (near Granada).

May 1d. 1h. 37m. 41s. Epicentre 28°·5N. 103°·6E. (as on 1940, November 6d.).

$A = -\cdot2070$, $B = +\cdot8555$, $C = +\cdot4747$; $\delta = +7$; $h = +2$;
$D = +\cdot972$, $E = +\cdot235$; $G = -\cdot112$, $H = +\cdot461$, $K = -\cdot880$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	15·0	250	e 4 36	+61	i 7 32	+69	i 7 59	SS	—
Irkutsk		23·7	2	5 13	− 1	9 25	− 2	—	—	—
Hyderabad	N.	25·6	251	e 5 39	+ 7	9 57	− 2	—	—	—
Almata		26·0	313	5 42	+ 6	—	—	—	—	—
Murgab		26·6	301	5 34	− 8	9 54	−22	—	—	—
Vladivostok		27·0	50	e 6 2	+17	e 10 40	+18	—	—	—
Frunse		27·4	310	e 5 52	+ 3	—	—	—	—	—
Andijan		28·3	304	e 5 57	0	—	—	—	—	—
Bombay	N.	29·7	259	—	—	e 11 4	− 2	—	—	e 15·5
Kulyab		29·8	298	i 6 7	− 4	i 11 6	− 1	—	—	—
Obi-garm		29·9	300	i 6 8?	− 4	i 10 58?	−11	—	—	—
Stalinabad		30·6	300	i 6 14	− 4	i 11 16	− 4	—	—	—
Tashkent		30·7	305	e 6 8?	−11	e 11 4?	−17	—	—	—
Samarkand		32·1	300	e 6 47	+16	—	—	—	—	—
Moscow		53·6	322	e 9 24	− 1	—	—	—	—	—
Ksara		57·3	294	e 9 53	+ 1	e 19 18	?	—	—	—
Stuttgart		71·9	317	e 11 26?	− 1	—	—	e 19 25	?	e 36·8
Rome		72·4	309	—	—	e 28 41	SSS	—	—	—
Strasbourg		72·8	317	—	—	e 27 27	?	—	—	e 36·3
Paris		75·9	318	e 11 49	− 1	—	—	—	—	e 39·3
Tamanrasset		86·1	294	e 12 46	+ 2	—	—	—	—	—
Hungry Horse		96·4	25	e 13 40	+ 8	—	—	—	—	—
Bogota	Z.	147·0	356	e 19 52	[+ 9]	—	—	i 19 55	PKP$_3$	—

Long waves were also recorded at other European stations.

May 1d. 22h. 42m. 2s. Epicentre 53°·6N. 159°·5E. (as on 1945, February 28d.).

Strasbourg suggests depth of 100km.

$A = -\cdot5583$, $B = +\cdot2087$, $C = +\cdot8030$; $\delta = +6$; $h = -7$;
$D = +\cdot350$, $E = +\cdot937$; $G = -\cdot752$, $H = +\cdot281$, $K = -\cdot596$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vladivostok		21·0	251	e 4 49	+ 2	e 8 55	SS	—	—	—
Irkutsk		32·6	291	e 6 36	+ 1	15 58	L	—	—	(16·0)
Sitka		35·8	57	e 7 6	+ 3	i 12 38	− 3	e 8 24	PP	e 15·3
Grand Coulee		49·2	61	i 8 52	0	—	—	—	—	—
Hungry Horse		51·5	58	i 9 8	− 1	e 18 46	S$_e$S	i 14 9	?	—
Sverdlovsk		51·7	317	9 7	− 4	e 17 14	?	—	—	—
Shasta Dam		52·1	71	e 9 13	− 1	—	—	e 9 42	pP	—
Lick	Z.	54·8	73	i 9 35	+ 1	—	—	—	—	—
Fresno	Z.	56·3	72	i 9 46	+ 1	—	—	—	—	—
Tinemaha	Z.	56·9	71	i 9 50	+ 1	—	—	i 10 19	pP	—
Andijan		57·0	295	e 9 44	− 6	—	—	—	—	—
Haiwee	Z.	57·7	72	i 9 55	0	—	—	—	—	—
Tashkent		58·2	298	e 9 49	− 9	—	—	—	—	—
Mount Wilson	Z.	59·0	73	i 10 5$_a$	+ 1	—	—	i 10 34	pP	—
Pasadena		59·0	73	i 10 5$_a$	+ 1	—	—	i 10 34	pP	—
Boulder City		59·6	70	i 10 8	0	—	—	i 10 37	pP	—
Riverside	Z.	59·6	73	i 10 8$_a$	0	—	—	i 10 20	pP	—
Pierce Ferry		59·9	69	i 10 10	0	—	—	i 10 39	pP	—
Palomar		60·3	73	i 10 13	0	—	—	i 10 41	pP	—
Kulyab		60·4	294	i 10 12	− 1	e 18 57	PPS	—	—	—
Stalinabad		60·5	296	e 10 12	− 2	e 18 57	PPS	—	—	—
Tucson		64·6	69	i 10 42$_a$	+ 1	—	—	i 11 11	pP	—
Theodosia		70·8	321	—	—	21 10	PS	—	—	—
Leninakan		70·9	313	e 11 26	+ 5	e 21 38	+62	—	—	—
Stuttgart	Z.	74·9	340	e 11 42$_k$	− 2	—	—	—	—	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		76·1	345	i 11 50	− 1	—	—	—	—	—
Ksara		80·2	314	e 8 46	?	—	—	e 12 11	P	—
Toledo	z.	85·8	347	i 12 41	− 1	—	—	—	—	—

Additional readings :—
Sitka eS? =12m.30s.
Pasadena iZ =10m.24s.
Riverside eZ =10m.37s.
Palomar eZ =10m.51s.
Long waves were also recorded at Alicante.

May 1d. Readings also at 0h. (near Mizusawa), 1h. (Pierce Ferry, Hungry Horse, Tucson, Bogota, La Paz, Paris, and Tamanrasset), 2h. (Brisbane, near Berkeley, Branner, Lick, and Fresno), 3h. (La Paz, Bogota, Samarkand, Andijan, near Stalinabad, Murgab, Obi-garm, and Kulyab), 7h. (Tucson), 8h. (La Paz), 9h. (Mizusawa and near Irkutsk), 10h. (Hungry Horse, Pierce Ferry, Stuttgart, Basle, Paris, near Obi-garm, Kulyab, and Stalinabad), 14h. (Tashkent, near Almata, Frunse, Andijan, and La Paz), 15h. (Pierce Ferry, Hungry Horse, Tucson, Istanbul, Ksara, De Bilt, and Scoresby Sund), 16h. (Tacubaya and Tucson), 17h. (Ksara, Obi-garm, Kulyab, Stalinabad, and near Ashkabad), 18h. (near La Paz), 20h. (Hungry Horse), 22h. (Klyuchi and Riverview).

May 2d. 0h. 50m. 31s. Epicentre 36°·8N. 142°·9E. Depth of focus 0·005.

Intensity IV at Hukusima ; II-III at Onahama and at Mito. Epicentre 36°·8N. 142°·9E. Depth 60km. Macroseismic radius 200-300km.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1948, Tokyo, 1950, p. 12.

$A = -·6405,\ B = +·4844,\ C = +·5960\ ;\quad \delta = +10\ ;\quad h = 0\ ;$
$D = +·603,\ E = +·798\ ;\quad G = -·475,\ H = +·360,\ K = -·803.$

	△	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Onahama	1·6	276	0 24k	− 3	0 30	−17	—	—
Mito	2·0	260	0 30	− 2	0 51	− 6	—	—
Hukusima	2·2	297	0 29	− 6	0 46	−16	—	—
Sendai	2·2	313	0 27k	− 8	0 50	−12	0 44	?
Kakioka	2·3	257	0 35	− 2	0 58	− 6	—	—
Tukubasan	2·3	257	0 36	− 1	0 47	−17	—	—
Utunomiya	2·4	266	0 29	− 9	0 46	−21	—	—
Mizusawa	2·7	330	0 38	− 4	1 11	− 3	0 41	P
Tokyo	2·8	248	0 46	+ 2	1 14	− 3	—	—
Kumagaya	2·9	259	0 35k	−10	0 55	−24	—	—
Yokohama	2·9	244	0 51	+ 6	1 20	+ 1	—	—
Miyako	3·0	346	0 41	− 6	1 8	−14	—	—
Maebasi	3·1	264	0 46a	− 2	1 21	− 3	—	—
Mera	3·1	235	0 57	+ 9	1 29	+ 5	—	—
Morioka	3·2	335	0 49	0	1 15	−12	—	—
Osima	3·5	236	0 57	+ 3	1 33	− 1	—	—
Hunatu	3·6	251	0 57	+ 2	1 35	− 2	—	—
Misima	3·6	244	1 0	+ 5	1 41	+ 4	—	—
Akita	3·7	324	0 54	− 2	1 31	− 8	—	—
Nagano	3·8	270	1 4	+ 6	—	—	—	—
Shizuoka	4·1	245	1 2	0	1 46	− 3	—	—
Aomori	4·4	338	1 9	+ 3	2 0	+ 3	—	—
Omaesaki	4·4	242	1 15	+ 9	2 15	+18	—	—
Toyama	4·6	269	1 6	− 3	2 1	− 1	—	—
Wazima	4·8	279	1 19	+ 7	—	—	—	—
Nagoya	5·1	254	1 16	0	2 12	− 2	—	—
Gihu	5·2	257	1 19	+ 2	—	—	—	—
Hikone	5·6	256	1 22	− 1	2 25	− 2	—	—
Hungry Horse	71·2	43	e 11 23	+ 9	—	—	—	—
Pierce Ferry	78·3	54	e 12 13	+18	—	—	—	—
Stuttgart z.	85·4	331	e 12 34	+ 2	—	—	—	—

Mizusawa also gives SN =1m.8s.

May 2d. 7h. Undetermined shock.

Mizusawa ePE =38m.9s., eSE =39m.25s.
Shasta Dam iP =47m.40s., ipP =47m.55s.
Hungry Horse iP =48m.3s.
Tinemaha iPZ =48m.22s., ipPZ =48m.42s.
Mount Wilson iPZ =48m.30s., ipPZ =48m.50s.
Pasadena iPZ =48m.30s., ipPZ =48m.50s., eZ =49m.9s.
Riverside iPZ =48m.32s., ipPZ =48m.52s.
Palomar iPZ =48m.37s., ipPZ =48m.57s.
Boulder City eP =48m.37s., epP =48m.57s.
Pierce Ferry eP =48m.38s., epP =48m.58s.
Haiwee epPZ =48m.45s.
Tucson eP =49m.22s., epP =49m.40s.

May 2d. 12h. 17m. 0s. Epicentre 50°·2N. 89°·5E.

Epicentre as suggested by stations of the U.S.S.R.

A = +·0056, B = +·6427, C = +·7662 ; δ = +16 ; h = −5 ;
D = +1·000, E = −·009 ; G = +·007, H = +·766, K = −·643.

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Semipalatinsk	5·9	276	e 1 40	+ 9	i 2 45	+ 5	—
Irkutsk	9·5	72	e 2 29	+ 9	—	—	—
Almata	11·0	236	e 2 51	+ 9	e 4 48	+ 1	—
Frunse	12·6	240	e 3 2	− 1	—	—	—
Andijan	15·2	238	e 3 32	− 6	—	—	—
Tchimkent	15·8	248	e 3 42	− 3	e 6 21	−21	—
Tashkent	16·6	245	e 4 1	+ 5	—	—	—
Obi-garm	18·2	238	i 4 4	−12	i 7 20	−17	—
Sverdlovsk	18·3	302	i 4 14?	− 3	e 7 28?	−11	—
Kulyab	18·7	236	i 4 9	−13	e 7 25	−23	—
Stalinabad	18·8	239	i 4 11	−12	i 7 27	−23	—
Samarkand	19·0	245	e 4 15	−11	i 7 33	−22	—
Ashkabad	25·2	252	e 5 30	+ 1	e 9 41?	−11	—
Ksara	42·1	268	—	—	e 17 23	SS	e 19·3
Stuttgart	49·7	301	e 8 57	+ 1	—	—	e 27·3
Paris	53·3	305	e 9 25	+ 2	—	—	—
Hungry Horse	79·8	16	i 12 23	+11	—	—	—

Long waves were also recorded at other European stations.

May 2d. Readings also at 0h. (Andijan, near Obi-garm, Stalinabad, and Kulyab), 7h. (Samarkand, near Obi-garm, Kulyab, Stalinabad, and Andijan), 8h. (Dehra Dun), 10h. (near Balboa Heights), 11h. (Hungry Horse and near Tacubaya), 13h. (Klyuchi), 16h. (near Grozny), 17h. (near Piatigorsk), 18h. (Strasbourg), 19h. (near Batavia), 20h. (near Ottawa), 23h. (near Tacubaya).

May 3d. 12h. Undetermined shock. South Atlantic.

La Paz ePEN =11m.28s., iS =21m.28s., L =37m.18s.
Tamanrasset eP =11m.31s.
Helwan iPZ =12m.5s.k, S?N =22m.33s., PS?N =23m.20s.
Ksara iP =12m.28s.a, PS =24m.33s.
Istanbul eP? =13m.11s.?, PP =17m.0s., S =24m.17s.
Alicante e =16m.34s. and 18m.42s., eL =46m.26s.
Strasbourg ePP =17m.40s., ePPP =20m.32s., ePPS =27m.36s., eSS =32m.19s., L =48m.
Stuttgart ePP?Z =17m.45s., eSS? =32m.14s.
De Bilt ePP =18m.30s., eL =55m.
Tucson iPKP =19m.8s., i =19m.14s. and 19m.20s.
Palomar iPKPZ =19m.12s., iZ =19m.20s.
Pierce Ferry ePKP =19m.14s.
Riverside iPKPZ =19m.15s.k, iZ =19m.23s.
Pasadena iPKPZ =19m.18s.k, iZ =19m.27s., iPPZ =21m.47s.
Mount Wilson iPKPZ =19m.18s.k, iZ =19m.26s., iPPZ =21m.47s.
Hungry Horse ePKP =19m.19s.
Haiwee ePKP, =19m.21s., eZ =19m.29s.
Tinemaha iPKPZ =19m.22s., iZ =19m.31s.
Fresno ePZ =19m.22s.
Lick iZ =19m.25s.
Shasta Dam ePKP =19m.33s., e =19m.40s.
Boulder City ePKP =19m.35s.
Christchurch SNZ =37m.50s., QN =39m.50s., SS?Z =40m.15s., RNZ =42m.10s.
Long waves were also recorded at Auckland and at other European stations.

May 3d. 13h. 31m. 19s. Epicentre 34°·6S. 105°·4W.

A = −·2191, B = −·7953, C = −·5652; δ = −4; h = +1;
D = −·964, E = +·266; G = +·150, H = +·545, K = −·825.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		35·4	58	i 7 0	0	i 12 36	+ 2	i 8 29	PP	e 17·3
La Paz		37·9	71	i 8 57	PP	—	—	—	—	18·1
Tucson		66·7	355	e 10 55	0	—	—	e 11 1	P_cP	—
Palomar	z.	68·4	350	e 11 7	+ 1	—	—	i 11 17	P_cP	—
Riverside	z.	69·1	349	e 11 8	− 2	—	—	e 11 22	P_cP	—
Pasadena	z.	69·4	349	e 11 12	0	—	—	—	—	—
Mount Wilson	z.	69·5	349	e 11 14	+ 2	—	—	e 11 19	P_cP	—
Pierce Ferry		70·8	353	e 11 22	+ 2	—	—	—	—	—
Haiwee	z.	71·3	349	i 11 36	P_cP	—	—	—	—	—
Tinemaha	z.	72·3	349	i 11 31	+ 2	—	—	i 11 39	P_cP	—
Lick	z.	73·2	346	e 11 25	−10	—	—	—	—	—
Shasta Dam		76·5	347	e 11 53	− 1	—	—	—	—	—
Hungry Horse		82·9	355	e 12 29	+ 1	—	—	—	—	—

Additional readings :—
Huancayo i = 12m.42s.
Tucson e = 11m.59s. and 12m.47s.

May 3d. 13h. Undetermined shock. South Atlantic.

Huancayo eP? = 54m.34s., eS_cS? = 65m.3s., eL = 73m.12s.
La Paz iPZ = 54m.48s., iZ = 64m.38s.
Tamanrasset iP = 54m.49s.a.
Helwan iPZ = 55m.22s.k, eZ = 57m.23s., S?N = 65m.42s., PS?N = 66m.30s.
Bombay eN = 55m.29s., eE = 65m.53s., eN = 66m.4s.
Ksara iP = 55m.46s.a, PS = 67m.48s.
Istanbul PZ = 56m.16s., SZ = 67m.18s.
Rome ePZ = 56m.20s., ePP = 60m.7s., eS = 67m.45s., eSS? = 74m.3s., eL? = 89m.54s.
Strasbourg eP = 57m.0s., ePP = 61m.0s., ePPP = 63m.18s., ePS = 70m.15s. and 70m.32s., eSS = 75m.24s., and 75m.27s., eL = 91·5m.
Stuttgart eP? = 57m.0s., ePP? = 61m.1s., ePPP?Z = 63m.18s., eSS = 75m.32s., e = 78m.15s., eR? = 93m.
Alicante eP? = 58m.2s., PP = 62m.6s., PPP = 63m.55s., S = 69m.16s., PS = 70m.30s., PPS = 71m.9s., SS = 75m.34s., SSS = 79m.14s., G = 83m.42s., L = 87m.26s.
Triest ePP = 60m.30s.
Paris ePP = 61m.6s., ePPS = 71m.7s., eSS = 75m.36s., eL = 94m.
Potsdam eN = 61m.27s., eZ = 61m.30s., eN = 70m.45s., eNZ = 76m.12s., eLNZ = 94m.
De Bilt ePP = 61m.28s., ePS = 71m.48s., eSS = 76m.30s., eL = 98m.
Copenhagen 61m.54s., 69m.5s., PS = 71m.19s., SS = 76m.9s., L = 96m.
Padova e = 62m.5s.
Tucson iPKP = 62m.26s., i = 62m.38s., and 62m.48s.
Palomar iPKPZ = 62m.31s.a, iZ = 62m.39s.
Pierce Ferry ePKP = 62m.32s., e = 65m.30s.
Riverside iPKPZ = 62m.33s., iZ = 62m.41s.
Boulder City ePKP = 62m.34s.
Pasadena iPKPZ = 62m.36s.k, iZ = 62m.45s.
Mount Wilson iPKPZ = 62m.36s., iZ = 62m.45s.
Hungry Horse ePKP? = 62m.37s., ePKP = 62m.44s.
Santa Barbara ePKPZ = 62m.39s.
Warsaw eN = 62m.40s., eE = 62m.48s., 68m.45s., and 69m.55s., eL = 102m.
Haiwee ePKPZ = 62m.41s.
Tinemaha iPKPZ = 62m.41s.
Fresno ePZ = 62m.41s.
Shasta Dam ePKP = 62m.46s.
Lick eZ = 62m.47s.
Kodaikanal eE = 64m.54s.
Long waves were also recorded at Kew, Uccle, Toledo, Clermont-Ferrand, and Christchurch.

May 3d. Readings also at 0h. (Hungry Horse), 3h. (Riverview and near Apia), 4h. (near Apia), 5h. (Scoresby Sund and near Grozny), 9h. (Kulyab, Stalinabad, Andijan, Ksara, near Lick, and Branner), 12h. (Bogota and Bombay), 14h. (near Tacubaya), 17h. (Stuttgart, Pasadena, Palomar (2), Riverside, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Tucson (2), and Hungry Horse), 18h. (Ksara, Hungry Horse, and near Balboa Heights), 19h. (De Bilt, Paris, and Potsdam), 21h. (Mount Wilson, Pasadena, Riverside, Tinemaha, Hungry Horse, Tucson (2), Pierce Ferry, Shasta Dam, La Paz, Helwan, Ksara, and De Bilt), 22h. (Istanbul, De Bilt, and near Branner).

May 4d. Readings at 0h. (near Kulyab, Obi-garm, and Stalinabad), 2h. (near Berkeley, Branner, and San Francisco), 4h. (La Paz and La Plata), 5h. (Hungry Horse, Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, and Tinemaha), 6h. (Tucson and Pierce Ferry), 8h. (Hungry Horse, Boulder City, Pierce Ferry, Tucson, and near San Juan), 13h. (Bogota), 15h. (near Grozny, Piatigorsk, and Leninakan), 16h. (Istanbul), 19h. (Ksara, Bombay, Murgab, Samarkand, Ashkabad, Tashkent, Leninakan, Andijan, near Kulyab, Stalinabad, Obi-garm, and near Branner), 20h. (Istanbul), 21h. (Grand Coulee), 22h. (De Bilt), 23h. (Grand Coulee, near Hungry Horse, and near Andijan).

May 5d. 8h. 31m. 46s. Epicentre 30°·5N. 78°·5E.

$A = +\cdot1721$, $B = +\cdot8458$, $C = +\cdot5050$; $\delta = +2$; $h = +2$;
$D = +\cdot980$, $E = -\cdot199$; $G = +\cdot101$, $H = +\cdot495$, $K = -\cdot863$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Murgab		8·7	335	2 9	− 1	3 43	− 7	—	—
Kulyab		10·3	318	e 2 36	+ 4	i 4 30	0	—	—
Obi-garm		10·9	321	i 2 42	+ 2	i 4 39	− 5	—	—
Stalinabad		11·3	318	i 2 45	− 1	i 4 48	− 6	—	—
Andijan		11·4	336	e 2 45	− 2	e 4 45	−11	—	—
Calcutta	E.	11·8	130	—	—	e 5 6	0	—	—
Bombay		12·6	205	e 3 6	+ 3	e 5 46	SS	e 3 13 PP	6·6
Frunse		12·7	347	—	—	5 23	− 5	—	—
Almata		12·8	355	3 9	+ 3	4 52	−38	—	—
Hyderabad	N.	13·1	180	e 3 4	− 6	—	—	—	—
Samarkand		13·1	317	e 3 12	+ 2	e 5 29	− 9	—	—
Tashkent		13·1	328	e 3 10?	0	e 5 13?	−25	—	—
Kodaikanal	E.	20·2	183	—	—	e 9 35	+74	e 11 57 Q	12·7
Sverdlovsk		29·1	340	6 4	0	—	—	—	—

Additional readings :—
Calcutta iE = 6m.17s., 6m.39s., and 6m.54s.
Bombay QEN = 5m.33s.

May 5d. Readings also at 0h. (near Apia), 1h. (Murgab, near Kulyab, Stalinabad, and Obi-garm), 2h. (near Apia), 5h. (Hungry Horse and near Mineral (2)), 6h. (Boulder City, Hungry Horse, Pierce Ferry, Tucson, Pasadena, Mount Wilson, Riverside, Tinemaha, near Mineral and near Kulyab), 7h. (Istanbul), 8h. (Bogota, Fort de France, Pierce Ferry and Ksara), 9h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Riverside, and Palomar), 10h. (Alicante and Istanbul), 11h. (near Granada and Alicante), 17h. (Shasta Dam, Vladivostok, Potsdam, Uccle, Strasbourg, and Clermont-Ferrand), 19h. (Sotchi, near Frunse, near Kulyab, Samarkand, Stalinabad, Andijan, and near Ottawa), 20h. (La Paz), 21h. (near Lick and Branner), 22h. (near Kulyab, Obi-garm, Stalinabad, near Lick and Branner (2)), 23h. (Istanbul, Helwan, Ksara, Bogota, near Lick (2), and Branner (2)).

May 6d. Readings at 0h. (Pierce Ferry and Tucson), 2h. (Nanking and near Lick), 3h. (Boulder City, Pierce Ferry, Shasta Dam, Tucson, Lick, Palomar, Riverside, Mount Wilson, Pasadena, Haiwee, Tinemaha, Stuttgart, and Copenhagen), 5h. (near Obi-garm), 6h. (Riverview, Stuttgart, Shasta Dam, Batavia, Tashkent. Kulyab, Stalinabad, Obi-garm, Sverdlovsk, and Vladivostok. More than one shock), 7h. (Granada and Potsdam), 8h. (Haiwee, Pasadena, Mount Wilson, Riverside, Palomar, La Jolla, Boulder City, Pierce Ferry, Tucson (2), Istanbul, Paris, Stuttgart, Mizusawa, Auckland, and Apia), 9h. (Rome, Copenhagen, Hungry Horse, Shasta Dam, near Obi-garm, Kulyab, and Stalinabad), 12h. (near Mizusawa), 13h. (Palomar, Riverside, Mount Wilson, Pierce Ferry, Tucson, and near La Paz), 14h. (Paris, Stuttgart, and Hungry Horse), 16h. (near Istanbul), 19h. (Istanbul) 20h. (Zürich), 21h. (near Lick and Branner), 22h. (Boulder City, Grand Coulee, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, and near Mineral), 23h. (near Tamanrasset).

May 7d. 12h. Undetermined shock. Canada.

Shawinigan Falls P = 2m.45s., S = 2m.57s.
Ottawa P = 2m.54s., S = 3m.13s. and 3m.18s.
Seven Falls P = 3m.6s., S = 3m.36s.
Vermont iP = 3m.20s., i = 4m.12s.
Harvard iP = 3m.25s. and 3m.30s., e = 3m.48s., iS = 4m.5s. and 4m.18s.
Temiskaming P = 3m.28s., 4m.27s.
Ville Marie P = 3m.32s., S = 4m.40s.
Kirkland Lake P = 3m.40s., S = 5m.5s.
Fordham iZ = 3m.45s., 3m.52s., 4m.36s., and 4m.47s., iE = 4m.55s.
Philadelphia eP = 5m.3s., e = 5m.23s.
St. Louis eN = 8m.15s., iN = 9m.41s., iE = 9m.45s.
Long waves were recorded at Hungry Horse and Tucson.

May 7d. 14h. 57m. 24s. Epicentre 40°·0N. 19°·0E (as on 1939, Aug. 9d.).

Intensity III at Taranto, II at Brindisi.
Epicentre 39°·5N. 18°·0E. (Rome).
38°·75N. 18°·75E. (Strasbourg).

Bulletin séismique mensuel de l'Instituto Nazionale de Geofisica, Roma.

$A = +\cdot7263$, $B = +\cdot2501$, $C = +\cdot6402$; $\delta = -8$; $h = -2$;
$D = +\cdot326$, $E = -\cdot946$; $G = +\cdot605$, $H = +\cdot208$, $K = -\cdot768$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		1·4	291	0 27	0	0 41	− 5	—	—	—
Messina		3·2	238	e 0 37	?	i 1 5	−27	i 0 59	P	—
Catania		3·9	232	e 0 46	−16	e 1 22	−28	—	—	—
Belgrade		4·9	13	i 1 16	− 1	e 2 12	− 3	i 1 38	P_g	i 2·9
Rome		5·3	293	i 1 19k	− 3	e 2 27	+ 2	—	—	3·1
Kalossa		6·6	0	e 2 39	+58	i 3 57	+59	e 3 1	P*	4·6
Bucharest		6·8	48	e 1 50	+ 6	—	—	e 2 29	P_g	4·1
Triest		6·8	328	i 1 45	+ 1	i 3 6	+ 3	—	—	—
Florence	z.	6·9	306	e 1 45	0	—	—	e 2 5	P*	—
Padova		7·0	313	e 1 59k	P*	3 29	S*	—	—	—
Bologna	z.	7·3	311	i 1 51k	+ 1	—	—	—	—	—
Budapest	E.	7·5	1	e 2 50	+57	e 4 2	S_g	—	—	4·6
Istanbul		7·7	79	i 1 54	− 2	e 4 26	+61	—	—	—
Salo		8·4	315	i 2 5k	− 1	e 3 37	− 6	—	—	—
Pavia		8·9	309	e 2 13	+ 1	e 4 23?	S*	—	—	—
Chur		9·7	318	e 2 25	+ 3	e 4 23	+ 8	—	—	—
Raciborzu		10·1	357	e 2 52	PPP	—	—	—	—	e 5·9
Prague		10·6	344	e 1 54	?	—	—	—	—	—
Zürich		10·6	317	e 2 34	− 2	e 4 34	− 3	—	—	—
Basle		11·2	316	e 2 42	− 2	—	—	e 2 54	PP	—
Neuchatel		11·2	313	e 2 42	− 2	—	—	—	—	—
Stuttgart		11·2	325	e 2 43	− 1	e 5 20	SSS	e 2 52	PP	e 6·1
Strasbourg		11·8	321	e 2 58	+ 5	—	—	—	—	6·8
Jena		12·1	337	e 2 57	0	e 5 11	− 3	—	—	e 7·5
Yalta		12·1	63	e 2 42?	−15	—	—	—	—	—
Warsaw		12·3	6	e 3 12	+13	e 5 39	SS	e 5 42	SSS	e 6·7
Clermont-Ferrand		13·1	301	i 3 7	− 3	—	—	—	—	7·1
Helwan		14·3	132	i 3 5a	−21	e 5 30	−36	3 17	PP	—
Paris		14·7	312	e 3 30	− 1	—	—	i 3 41	PP	e 9·6
Ksara		14·8	109	e 3 17?	−15	e 6 19	+ 1	—	—	—
Alicante		15·2	270	e 4 13	+35	e 6 29	+ 1	—	—	e 8·5
De Bilt		15·4	326	i 3 44k	+ 4	e 6 55	SS	—	—	e 8·6
Sotchi		15·9	70	e 3 43	− 4	—	—	—	—	—
Granada		17·9	268	i 4 14	+ 2	7 24	− 6	—	—	—
Leninakan		18·9	79	e 4 32	+ 8	—	—	—	—	—
Moscow		20·0	33	e 3 41?	−56	e 8 21?	+ 4	—	—	—
Grozny		20·2	72	e 4 41	+ 2	8 25	+ 4	—	—	—
Baku		23·6	78	e 5 11	− 2	e 9 21	− 4	—	—	—
Sverdlovsk		31·7	44	i 6 25	− 2	e 11 37	0	—	—	—
Hungry Horse		82·7	331	i 12 22	− 5	—	—	—	—	—

For Notes see next page.

NOTES TO MAY 7d. 14h. 57m. 24s.

Additional readings :—
Belgrade i = 1m.58s., iS_g = 2m.44s.
Bologna eZ = 1m.57s., e = 3m.31s.
Budapest ePN = 2m.56s.
Stuttgart e = 3m.3s. and 3m.23s.
Strasbourg e = 6m.18s.?, and 6m.29s.?
Jena ePE = 3m.0s.
Helwan eZ = 3m.12s., eNZ = 5m.22s.
Paris i = 3m.37s.
Long waves were also recorded at Collmberg, Potsdam, and Helsinki.

May 7d. Readings also at 2h. (La Paz and Istanbul), 3h. (Hungry Horse), 4h. (Shasta Dam and near Erevan), 5h. (Palomar, Mount Wilson, Tinemaha, Boulder City, Pierce Ferry, Hungry Horse (2), Shasta Dam, Tucson, Mizusawa, and near Leninakan), 7h. (Batavia, Andijan, Obi-garm, Stalinabad, Samarkand, Sverdlovsk, Leninakan, and Moscow), 8h. (Mount Wilson, Pasadena, Palomar, Pierce Ferry, Shasta Dam, Tucson, Hungry Horse, and Huancayo), 9h. (Hungry Horse and Tacubaya), 10h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Stuttgart, and Ksara), 11h. (near Kulyab, Obi-garm, Stalinabad, and Murgab), 12h. (near Berkeley, Branner, Lick, Fresno, and near Stalinabad), 13h. (Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, Riverside, and Tinemaha), 14h. (near Kulyab, Obi-garm, and Stalinabad), 16h. (near Balboa Heights), 18h. (De Bilt, Copenhagen, and Hungry Horse), 19h. (near Branner), 22h. (near Kulyab, Stalinabad, Obi-garm, Murgab, Samarkand, Andijan, and Tashkent).

May 8d. 0h. Mexico.

Oaxaca PZ = 40m.41s., LZ = 41m.24s.
Vera Cruz PEN = 40m.51s., LEN = 41m.44s.
Tacubaya PEN = 41m.27s., SN = 42m.34s.
Tucson iP = 44m.38s.a, i = 45m.30s., e = 48m.22s. and 49m.9s.
Palomar iPZ = 45m.21s.a, ipPZ = 45m.57s.
Riverside iPZ = 45m.25s., epPZ = 46m.2s.
Pasadena iPZ = 45m.31s.
Mount Wilson iPZ = 45m.32s., ipPZ = 46m.9s., eZ = 46m.25s.
Lick iPZ = 46m.9s., iZ = 46m.45s.
Hungry Horse iP = 46m.36s.
Grand Coulee eP = 46m.53s.
Stuttgart eZ = 52m.57s.
Istanbul i = 53m.53s.

May 8d. 2h. 46m. 31s. Epicentre 44°·7N. 150°·3E. Depth of focus 0·005.

A = −·6195, B = +·3534, C = +·7010 ; δ = +7 ; h = −3 ;
D = +·495, E = +·869 ; G = −·609, H = +·347, K = −·713.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nemuro		3·6	250	0 52	− 3	1 30	− 7	—	—	—
Sapporo		6·8	257	1 37k	− 2	2 43	−13	—	—	—
Mori		7·5	254	1 46	− 3	3 3	−11	—	—	—
Aomori		8·0	245	1 53	− 3	3 17	− 9	—	—	—
Miyako		8·0	234	1 50	− 6	3 13	−13	—	—	—
Morioka		8·4	237	1 57	− 5	3 22	−14	—	—	—
Mizusawa	E.	8·8	234	2 4	− 3	3 31	−15	—	—	—
Sendai		9·5	231	2 12	− 5	3 50	−13	—	—	—
Hukusima		10·1	230	2 22	− 3	4 9	− 8	—	—	—
Onahama		10·5	226	2 38	+ 8	4 27	0	—	—	—
Aikawa		11·2	238	2 44	+ 4	—	—	—	—	—
Mito		11·2	225	2 40	0	4 28	−16	—	—	—
Utunomiya		11·3	228	2 37	− 4	4 47	+ 1	—	—	—
Kakioka		11·4	226	2 40	− 2	4 36	−13	—	—	—
Tukubasan		11·5	226	2 50	+ 6	4 38	−13	—	—	—
Kumagaya		11·9	228	2 43	− 6	4 47	−14	—	—	—
Maebasi		11·9	230	2 43	− 6	4 46	−15	—	—	—
Tokyo		12·0	226	2 55	+ 5	4 54	− 9	—	—	—
Yokohama		12·3	225	3 3	+ 9	5 0	−10	—	—	—
Wazima		12·5	239	2 54	− 3	5 6	− 9	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shizuoka		13·3	227	3 19	+11	5 25	− 9	—	—	—
Vladivostok		13·4	269	e 3 3	− 6	i 5 31	− 6	—	—	—
Gihu		13·9	233	3 11	− 4	—	—	—	—	—
Nagoya		13·9	232	3 22	+ 7	—	—	—	—	—
Hikone		14·3	234	3 18	− 3	—	—	—	—	—
Kameyama		14·5	232	3 27	+ 4	—	—	—	—	—
Kyoto		14·8	234	3 24	− 3	—	—	—	—	—
Osaka		15·1	234	3 30	− 1	6 31	+14	—	—	—
Kobe		15·3	235	3 18	−15	—	—	—	—	—
Sumoto		15·7	234	3 30	− 8	6 35	+ 4	—	—	—
Koti		17·1	235	3 57	+ 1	—	—	—	—	—
Hukuoka		18·9	241	4 17a	− 1	7 40	− 3	—	—	—
College		39·0	37	e 7 24	+ 2	e 13 18	+ 2	—	—	e 17·1
Sitka		46·1	46	i 8 20	+ 1	e 15 3	+ 3	e 10 17	PP	e 18·7
Almata		51·1	297	e 8 59	+ 1	—	—	—	—	—
Frunse		52·8	297	i 9 10	− 1	e 16 35	+ 2	—	—	—
Sverdlovsk		54·0	317	i 9 17	− 3	i 16 42	− 7	i 17 21	sS	—
Andijan		55·3	296	i 9 29	0	i 17 10	+ 4	—	—	—
Murgab		55·6	293	e 9 30	− 1	17 10	0	—	—	—
Tchimkent		56·2	299	i 9 34	− 2	i 17 17	− 1	—	—	—
Tashkent		57·0	298	i 9 40	− 1	i 17 27	− 2	—	—	—
Obi-garm		58·2	295	i 9 48	− 2	i 17 37	− 8	—	—	—
Kulyab		58·5	294	i 9 52	0	i 17 52	+ 3	—	—	—
Stalinabad		58·8	295	i 9 53	− 1	i 17 51	− 2	i 10 16	pP	—
Grand Coulee		59·1	51	i 9 55	− 1	—	—	e 12 9	PP	—
Samarkand		59·3	297	i 9 57	0	i 17 58	− 1	—	—	—
Shasta Dam		61·3	60	i 10 10	− 1	—	—	e 11 17	PcP	—
Hungry Horse		61·6	59	i 10 13	0	e 18 28	0	e 19 59	sS	—
Lick	z.	63·7	63	i 10 27	0	—	—	i 10 39	pP	—
Moscow		65·0	325	10 32	− 3	19 4	− 7	10 55	pP	—
Scoresby Sund		65·0	358	i 10 33a	− 2	19 12	+ 1	—	—	—
Tinemaha	z.	66·0	61	i 10 43	+ 1	—	—	i 11 13	PcP	—
Santa Barbara	z.	66·7	64	i 10 47a	+ 1	—	—	i 11 22	PcP	—
Haiwee	z.	66·8	62	i 10 47a	0	—	—	i 11 5	pP	—
Mount Wilson	z.	67·9	63	i 10 54a	0	—	—	i 11 12	pP	—
Pasadena		67·9	63	i 10 53a	− 1	—	—	i 11 13	pP	—
Bombay		68·2	275	e 10 55	− 1	e 19 45	− 4	e 19 40	S	—
Riverside	z.	68·5	63	i 10 57a	− 1	—	—	i 11 15	pP	—
Upsala		68·8	337	10 57a	− 2	e 19 50	− 7	e 13 56	PP	e 29·2
Boulder City		68·9	60	i 11 1	+ 1	—	—	i 11 18	pP	—
Baku		69·3	308	11 6	+ 4	20 10	+ 7	—	—	—
Palomar		69·3	63	i 11 2a	0	—	—	i 11 19	pP	—
Pierce Ferry		69·3	59	i 11 3	+ 1	—	—	i 11 20	pP	—
Grozny		69·6	312	e 11 5	+ 1	20 3	− 3	—	—	—
Piatigorsk		70·5	314	e 11 9	− 1	20 14	− 3	—	—	—
Brisbane	n.	71·9	177	i 11 26	+ 8	—	—	i 11 47	pP	—
Erevan		72·4	309	e 11 23	+ 2	20 43	+ 5	—	—	—
Leninakan		72·4	311	e 11 18	− 3	20 36	− 2	—	—	—
Sotchi		72·6	314	e 11 22	0	20 41	0	—	—	—
Ivigtut		73·4	10	i 11 24	− 3	—	—	—	—	—
Theodosia		73·7	318	e 11 26?	− 3	20 53?	0	—	—	—
Copenhagen		73·8	337	i 11 28	− 1	20 53	− 1	—	—	36·5
Tucson		73·8	61	i 11 30a	+ 1	—	—	i 11 49	pP	e 34·8
Warsaw		74·0	331	e 11 29a	− 1	e 20 58?	+ 2	11 46	pP	e 34·5
Yalta		74·7	318	e 11 34	0	21 2	− 2	—	—	—
Aberdeen	n.	76·0	345	—	—	i 21 16	− 3	—	—	47·0
Potsdam		76·5	335	e 11 47	+ 2	e 21 26	+ 2	e 21 44	PS	—
Raciborzu		76·8	331	e 11 46	0	e 21 32?	+ 5	e 15 2	PP	—
Kirkland Lake		77·5	32	11 49	− 1	—	—	12 9	pP	—
Durham		78·1	344	11 52	− 2	i 21 38	− 3	i 22 9	sS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Prague		78·1	333	e 11 51	− 3	e 21 37	− 4	—	—	e 36·5
Jena		78·2	334	e 11 53	− 1	—	—	e 12 42	?	—
Riverview	N.	78·2	179	—	—	e 21 49	+ 7	—	—	—
Bucharest		78·4	323	e 11 56	+ 1	e 21 48	+ 4	—	—	35·5
Ville Marie		78·5	33	11 57	+ 1	—	—	12 17	pP	—
De Bilt		79·0	340	i 11 57a	− 2	e 21 49	− 2	e 15 19	PP	e 36·5
Temiskaming		79·1	33	11 58	− 1	—	—	12 18	pP	—
Istanbul		79·7	319	i 12 3	+ 1	e 21 57	− 1	—	—	—
Uccle		80·4	340	i 12 5a	− 1	e 22 5	0	e 12 23	pP	e 36·5
St. Louis		80·7	44	i 12 7	− 1	e 22 10	+ 1	i 12 28	pP	—
Kew		80·9	342	i 12 8	− 1	—	—	i 12 35	pP	—
Stuttgart		80·9	336	i 12 8a	− 1	e 22 9	− 2	e 22 49	sS	e 40·5
Strasbourg		81·5	336	i 12 11a	− 1	e 22 16	− 1	e 22 54	sS	39·5
Ksara		81·8	310	i 12 14	+ 1	22 24	+ 4	i 12 36	pP	—
Triest		82·2	331	e 12 15	0	i 22 23	− 1	i 23 9	PS	—
Zürich		82·3	335	e 12 15a	− 1	e 22 27	+ 2	—	—	—
Basle		82·5	336	e 12 16a	− 1	e 22 26	− 1	—	—	—
Cleveland	Z.	82·5	37	i 12 16a	− 1	—	—	i 12 34	pP	—
Paris		82·7	340	i 12 19k	+ 1	e 22 31	+ 2	i 12 34	pP	e 45·5
Salo		83·3	333	e 12 21a	0	22 36	+ 1	e 12 35	pP	—
Padova		83·8	332	12 22	− 2	22 39	− 1	e 26 34	?	—
Bologna		84·0	332	e 12 25a	0	e 22 46	+ 4	—	—	—
Florence	Z.	84·7	331	e 12 29a	+ 1	—	—	—	—	—
Clermont-Ferrand		85·4	338	i 12 32	0	e 23 6	+10	—	—	42·0
Harvard		85·5	30	i 12 32	0	—	—	i 12 53	pP	e 49·2
Rome		85·9	330	i 12 33a	− 1	i 22 59	− 2	e 12 49	pP	42·6
Fordham		86·1	32	i 12 34	− 1	e 23 4	+ 1	—	—	—
Philadelphia		86·3	33	—	—	i 23 5	+ 1	—	—	e 37·7
Helwan		87·3	310	i 12 41k	0	23 15	+ 1	i 13 0	pP	—
Toledo		92·7	341	i 13 3	− 3	—	—	i 16 44	PP	—
Alicante		93·2	337	13 12	+ 4	24 16	+ 9	16 53	PP	e 46·1
Granada		95·1	339	i 13 16k	− 1	25 10	PS	e 17 28	PP	i 47·5
Bogota		116·9	51	e 17 31	?	—	—	e 18 39	PP	—
Huancayo		129·3	65	i 19 6	[+ 4]	—	—	e 21 12	PP	—
La Paz	N.	137·2	61	19 21	[+ 5]	i 22 53	PKS	—	—	—

Additional readings :—
Sitka ePcP? =9m.31s., i =15m.11s. and 15m.35s., e =17m.43s.
Hungry Horse i =11m.12s., ePKP,PKP =39m.11s.
Lick iZ =11m.3s.
Moscow sP =11m.5s.
Haiwee iZ =11m.16s.
Mount Wilson iZ =11m.7s., iPKP,PKPZ =39m.13s.
Riverside iPKP,PKPZ =39m.12s.
Upsala S_cSE =20m.52s., S_cSN =20m.56s., eE =21m.15s.
Boulder City iPKP,PKP =38m.43s.
Palomar iZ =11m.35s., iPKP,PKPZ =39m.6s.
Tucson i =12m.8s. and 12m.45s., e =13m.11s., ePP =14m.13s., e =14m.52s. and 15m.17s., ePKP,PKP =38m.57s.
Warsaw P_cPZ =11m.43s., PPSN =21m.41s.
Raciborzu eN =15m.53s., ePPPN =16m.29s.?
Durham iEN =21m.44s.
St. Louis e =22m.39s.
Kew iE =12m.17s. and 12m.40s.
Strasbourg e =14m.10s. and 22m.32s., eS_cS =22m.37s., ePPS =23m.4s.
Triest ePP =15m.3s.
Cleveland iZ =12m.27s.
Harvard iPP =15m.49s.
Rome eSS =29m.17s., eSSS =33m.1s.
Helwan iZ =13m.14s. and 13m.21s., eZ =15m.34s., iN =23m.44s.
Toledo iPP =14m.15s.
Alicante PPP =18m.51s., SKS =23m.43s., PS =25m.22s., PPS =25m.52s., SS =30m.43s., SSS =34m.28s.
Granada PPS =26m.58s., SS =32m.34s.
Bogota eSKPEZ =19m.49s., ePPP?EZ =20m.28s.
Long waves were also recorded at Helsinki and La Plata.

May 8d. 8h. Sea of Okhotsk, according to U.S.S.R.
Vladivostok eS =37m.33s.
Sverdlovsk P =39m.59s.?, S =46m.20s.?
Andijan eP =40m.19s., eS =47m.6s.
Hungry Horse iP =41m.0s., i =41m.44s.
Shasta Dam iP =41m.6s.
Moscow eP =41m.12s.
Tinemaha iPZ =41m.38s.
Haiwee ePZ =41m.43s.
Pasadena iPZ =41m.50s.
Mount Wilson iPZ =41m.51s.
Riverside iPZ =41m.53s.
Boulder City iP =41m.55s.
Pierce Ferry iP =41m.57s.
Palomar iPZ =41m.59s.
Tucson iP =42m.25s.
Stuttgart ePZ =42m.44s.
Tashkent eS =47m.23s.
Istanbul e =51m.

May 8d. Readings also at 0h. (near Lick (2)), 2h. (near Kulyab, Obi-garm, and Stalinabad), 3h. (near Lick), 4h. (Tacubaya, Huancayo, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wlison, Riverside, Palomar, and Istanbul), 5h. (Istanbul), 6h. (Boulder City, Hungry Horse, Pierce Ferry, Tucson, Pasadena Mount Wilson, Riverside, Palomar, Haiwee, Tinemaha, Granada, and near Apia), 7h. (Brisbane, Auckland, Arapuni, Christchurch, Wellington, Lick, Boulder City, Shasta Dam, Tucson, Riverside, Palomar, Stuttgart (2), and Ksara), 8h. (near Mineral), 9h. (near Stuttgart), 10h. (Grand Coulee, Hungry Horse, Tucson, Mount Wilson, and Riverside), 11h. (near Istanbul), 13h. (Batavia and near Kulyab), 15h. (Stuttgart), 20h. (near Andijan and near Ashkabad), 21h. (near Tacubaya).

May 9d. 2h. 9m. 2s. Epicentre 32°·0N. 131°·5E.

Intensity VI at Miyazaki and Kumamoto ; V at Shimidu, Murotomisaki, and Matsuyama ; IV at Oita and Aso-San ; II-III at Unzendake, Toyooka, Yonago, and Tottori.
Epicentre as adopted. Macroseismic radius over 300km. Shallow. Slight damage to roofs and walls.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, 1948, Tokyo, 1950, p.13-14, Macroseismic chart p.13.

$A = -\cdot5629$, $B = +\cdot6364$, $C = +\cdot5273$; $\delta = -9$; $h = +2$;
$D = +\cdot749$, $E = +\cdot663$; $G = -\cdot349$, $H = +\cdot395$, $K = -\cdot850$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Miyazaki	0·1	—	0 12	+ 4	0 20	+ 7	—	—	—
Kagosima	0·8	242	0 24	+ 6	0 35	+ 4	—	—	—
Kumamoto	1·1	321	0 28a	+ 6	0 51	+12	—	—	—
Unzendake	1·3	305	0 30k	+ 5	—	—	—	—	—
Hukuoka	1·8	330	0 37a	P_g	1 10	S_g	—	—	—
Izuka	1·8	338	0 34	+ 2	1 11	S_g	—	—	—
Hirosima	2·5	18	0 34	− 9	—	—	—	—	—
Muroto	2·6	60	0 29k	−15	1 1	−16	—	—	—
Hamada	2·9	9	0 51	+ 3	1 37	S_g	—	—	—
Sumoto	3·7	49	0 57a	− 3	1 48	+ 3	—	—	—
Siomisaki	3·9	66	1 2	0	1 58	+ 8	—	—	—
Kobe	4·1	48	1 4	− 1	1 56	+ 1	—	—	—
Osaka	4·3	50	1 12	+ 4	2 16	S*	—	—	—
Owase	4·5	61	1 5	− 6	1 55	−10	—	—	—
Toyooka	4·5	37	0 58	−13	2 6	+ 1	—	—	—
Kyoto	4·7	48	1 12	− 2	2 21	S*	—	—	—
Kameyama	5·0	54	1 18	0	2 31	S*	—	—	—
Hikone	5·1	49	1 17	− 3	—	—	—	—	—
Gihu	5·6	51	1 20	− 7	2 22	−11	—	—	—
Nagoya	5·6	54	1 26	− 1	—	—	—	—	—
Omaesaki	6·3	63	1 43	+ 7	3 12	S*	—	—	—
Shizuoka	6·5	61	1 41	+ 2	—	—	—	—	—
Toyama	6·7	43	1 46	+ 4	3 16	S*	—	—	—
Hunatu	7·0	58	1 43	− 3	—	—	—	—	—
Wazima	7·0	38	1 47	+ 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nagano		7·3	48	2 16	P*	3 51	S_g	—	—	—
Mera		7·5	65	1 57	+ 4	—	—	—	—	—
Kumagaya		7·8	55	1 54	− 4	3 40	+12	—	—	—
Tokyo		7·8	59	1 57	− 1	3 22	− 6	—	—	—
Aikawa		8·2	49	2 1	− 2	—	—	—	—	—
Tukubasan		8·3	57	2 3	− 1	3 42	+ 2	—	—	—
Utunomiya		8·3	54	2 3	− 1	—	—	—	—	—
Kakioka		8·4	57	2 3	− 3	—	—	—	—	—
Moti		8·6	57	2 8	− 1	—	—	—	—	—
Onahama		9·2	55	2 33	PP	4 3	0	—	—	—
Hukusima		9·4	49	2 16	− 2	—	—	—	—	—
Sendai		9·9	48	2 41	PP	—	—	—	—	—
Akita		10·4	40	2 43	+ 9	4 33	+ 1	—	—	—
Mizusawa	E.	10·6	45	2 50	PPP	e 5 10	SS	—	—	—
Nanking		10·8	270	2 39	0	5 15	SS	—	—	6·1
Morioka		11·0	43	2 56 a	PPP	—	—	—	—	—
Vladivostok		11·1	1	i 2 48	+ 5	i 4 58	+ 9	—	—	—
Aomori		11·6	37	3 0	PP	—	—	—	—	—
Mori		12·5	33	3 13	PP	—	—	—	—	—
Sapporo		13·5	32	3 32	PP	5 55	+ 8	—	—	—
Guam		22·1	144	e 4 32	−27	i 8 29	−29	—	—	—
Irkutsk		28·3	323	5 59	+ 2	10 56	+13	—	—	—
Almata		43·9	302	8 13?	+ 3	14 58?	+16	—	—	—
Batavia		44·7	216	e 8 18	+ 2	i 14 58	+ 4	i 9 55	PP	29·0
Dehra Dun	N.	45·4	282	—	—	e 18 40	SS	—	—	e 23·4
Murgab		46·8	294	8 36	+ 3	—	—	—	—	—
Andijan		47·6	298	e 8 40	+ 1	—	—	—	—	—
Tchimkent		49·4	300	i 8 55	+ 2	i 16 17	+17	—	—	—
Tashkent		49·8	299	e 8 57	+ 1	i 16 20	+14	—	—	—
Hyderabad	N.	49·9	266	e 8 57	0	16 17	+10	10 58	PP	24·2
Kulyab		50·1	294	i 8 59	0	i 16 24	+14	—	—	—
Obi-garm		50·1	296	i 8 59	0	i 16 21	+11	—	—	—
Stalinabad		50·8	296	i 9 4	0	i 16 27	+ 7	—	—	—
Samarkand		51·9	297	e 9 18	+ 6	—	—	—	—	—
Sverdlovsk		53·6	320	e 9 24	− 1	i 17 10	+12	—	—	—
Bombay		54·0	271	e 9 30	+ 2	i 17 25	+22	21 58	?	—
Colombo	E.	54·1	254	9 41	+12	17 19	+14	—	—	28·7
College		57·6	29	e 9 57	+ 3	e 17 53	+ 2	e 21 26	SS	e 23·4
Ashkabad		58·8	298	e 10 3	+ 1	—	—	—	—	—
Brisbane	N.	62·6	158	i 10 25	− 3	—	—	—	—	—
Honolulu		63·1	80	10 43	+11	e 19 2	0	—	—	e 26·5
Baku		64·2	303	10 43	+ 4	—	—	—	—	—
Sitka		65·3	37	i 10 48	+ 2	i 19 34	+ 5	i 23 54	SS	i 27·6
Grozny		66·0	307	e 10 48	− 2	—	—	—	—	—
Moscow		66·3	322	10 48	− 4	19 41	− 1	—	—	—
Piatigorsk		67·5	308	e 11 2	+ 2	—	—	—	—	—
Riverview		68·0	162	i 11 14 a	+11	i 20 3	+ 1	i 11 25	pP	e 31·0
Erevan		68·1	304	e 11 9	+ 5	—	—	—	—	—
Leninakan		68·3	305	e 11 3	− 2	—	—	—	—	—
Sotchi		69·9	309	e 11 13	− 2	—	—	—	—	—
Helsinki		70·4	330	i 11 18	0	i 20 29	− 1	e 25 4	SS	e 33·0
Apia		70·9	120	e 11 28	+ 7	e 20 28	− 8	e 21 19	PS	—
Yalta		73·1	312	i 11 35	+ 1	—	—	—	—	—
Upsala		73·6	332	11 36 a	− 1	e 21 13?	+ 6	e 14 20	PP	e 34·0
Victoria		75·7	42	11 13	−36	20 47	−43	21 9	?	—
Warsaw		76·5	324	e 11 54	0	e 21 40	+ 1	22 28	PS	e 40·0
Ksara		77·1	301	e 11 56	− 1	22 54	PS	—	—	—
Bucharest		78·1	315	e 12 0	− 2	e 22 1	+ 5	—	—	40·0
Istanbul		78·1	311	e 12 1	− 1	21 59?	+ 3	—	—	—
Copenhagen		78·4	330	e 12 3	− 1	22 1	+ 1	15 4	PP	38·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grand Coulee		78·5	41	e 12 4	0	e 22 21	+20	—	—	—
Raciborzu		79·2	323	e 12 16	+ 8	e 22 37	PS	e 15 23	PP	e 41·0
Auckland	N.	79·6	146	12 22	+12	22 11	− 1	23 2	PS	37·0
Budapest	N.	80·3	320	12 13	− 1	22 42	+22	—	—	e 43·0
Potsdam		80·3	327	e 12 16	+ 2	e 22 23	+ 3	e 12 30	pP	e 39·0
Shasta Dam		80·6	47	e 12 14	− 2	e 22 24	+ 1	i 12 29	PcP	—
Hungry Horse		80·9	38	i 12 16	− 1	e 22 21	− 5	e 23 7	sS	—
Arapuni	E.	81·0	146	—	—	e 22 28	+ 1	—	—	—
Collmberg		81·0	326	e 12 19	+ 1	e 22 32	+ 5	i 12 35	PcP	e 40·9
Kalossa		81·0	320	e 12 19	+ 1	e 24 20	?	e 12 46	PcP	e 43·5
Ukiah		81·0	49	e 13 29	+71	e 23 31	+64	e 24 15	PS	e 35·2
Prague		81·1	324	12 21	+ 3	e 22 27	− 1	e 27 58	SS	e 40·0
Belgrade		81·2	317	i 12 19	0	e 22 34	+ 5	—	—	e 44·0
Jena		81·9	326	e 12 22	− 1	e 22 37	+ 1	e 15 39	PP	e 39·5
Saskatoon		82·0	32	12 26	+ 3	22 37	0	27 40	SS	37·0
Berkeley		82·3	50	e 12 22	− 3	i 22 44	+ 4	i 12 30	PcP	e 34·7
Helwan		82·5	300	i 12 27k	+ 1	22 44	+ 2	15 41	PP	—
Aberdeen		82·9	336	i 12 29	+ 1	i 22 43	− 3	e 28 39	SS	38·7
Lick	Z.	83·0	50	i 12 27	− 1	—	—	i 12 42	pP	—
Wellington	Z.	83·1	149	12 38a	+ 9	22 53	+ 5	15 33	PP	37·0
Butte	N.	83·2	39	e 12 29	0	e 22 49	0	e 16 1	PP	e 34·4
De Bilt		84·0	330	i 12 34a	+ 1	i 22 56	− 1	i 12 47a	pP	e 41·0
Christchurch		84·1	151	12 40	+ 6	22 58	0	15 52	PP	—
Bozeman		84·2	39	e 12 38	+ 4	e 22 58	− 1	e 28 49	SS	e 35·2
Edinburgh		84·3	336	—	—	e 22 53	− 7	—	—	—
Triest		84·4	321	i 12 36	0	i 22 56	− 5	i 15 55	PP	e 43·2
Stuttgart		84·5	325	e 12 34	− 2	e 22 56	− 6	e 12 46	pP	e 42·0
Durham		84·6	334	i 12 37	+ 1	i 22 58	− 5	i 16 2	PP	—
Fresno	Z.	84·6	50	i 12 36	0	—	—	—	—	—
Strasbourg		85·3	326	i 12 40a	0	e 23 4	[+ 1]	e 16 3	PP	e 42·0
Tinemaha		85·3	49	i 12 41	+ 1	e 23 36	+26	—	—	—
Uccle		85·3	330	e 12 41a	+ 1	e 23 2	[− 1]	e 16 0	PP	e 41·5
Taranto		85·7	315	12 52	+10	23 6	[+ 1]	—	—	35·6
Zürich		85·8	325	e 12 41a	− 1	e 23 4	[− 2]	—	—	—
Santa Barbara	Z.	85·9	51	e 12 45	+ 2	—	—	—	—	—
Haiwee	Z.	86·1	50	i 12 41	− 3	—	—	—	—	—
Padova		86·1	322	12 49	+ 5	23 12	[+ 4]	16 1	PP	—
Salo		86·1	323	e 12 44	0	e 23 8	[0]	—	—	—
Basle		86·2	325	e 12 43	− 1	e 23 21	+ 2	—	—	—
Logan		86·3	42	e 12 41	− 4	e 23 9	[0]	i 23 39	ScS	e 36·2
Bologna		86·4	322	e 12 50a	+ 5	e 23 28	+ 7	—	—	e 47·2
Kew		86·7	332	i 12 47a	0	e 23 9	[− 3]	e 16 11	PP	e 56·0
Florence		86·9	320	e 12 48	0	e 23 14	[+ 1]	—	—	—
Neuchatel		86·9	325	e 12 46	− 2	e 23 14	[+ 1]	—	—	—
Salt Lake City		86·9	43	e 12 51	+ 3	i 23 29	+ 3	e 24 24	PS	e 36·5
Pavia		87·0	323	e 12 58	+10	—	—	—	—	e 46·0
Ivigtut		87·1	0	e 12 55	+ 6	e 23 31	+ 3	—	—	42·0
Pasadena		87·1	51	i 12 50	+ 1	i 23 26	− 2	e 16 17	PP	e 35·9
Mount Wilson	Z.	87·2	51	e 12 48	− 1	—	—	i 12 51	P	—
Rome		87·5	319	i 12 50a	− 1	i 23 18	[+ 1]	e 16 29	PP	e 41·9
Paris		87·6	328	i 12 54	+ 3	i 23 35	+ 3	i 16 17	PP	e 44·0
Riverside	Z.	87·8	51	e 12 51	− 1	—	—	—	—	—
Boulder City		88·2	48	e 12 53	− 1	e 23 40	+ 2	—	—	—
La Jolla	Z.	88·5	52	e 13 3	+ 7	—	—	—	—	—
Palomar		88·5	51	i 12 57	+ 1	e 23 42	+ 1	—	—	—
Pierce Ferry		88·6	47	e 12 56	0	e 23 45	+ 3	e 16 42	PP	—
Clermont-Ferrand		89·6	326	e 13 0	− 1	i 23 35	[+ 5]	i 16 36	PP	43·5
Tucson		93·1	49	e 13 17a	0	e 24 28	+ 6	i 17 10	PP	e 40·1
Barcelona		93·3	325	—	—	e 24 10	−14	e 25 55	PS	e 47·7
Lincoln	E.	95·0	35	e 17 10	PP	e 26 11	PS	—	—	e 43·2

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kirkland Lake	95·4	21	13 42	+14	—	—	17 28	PP	—
Alicante	96·9	324	13 28	− 6	24 11	[0]	25 57	PS	e 43·9
Temiskaming	97·0	21	e 15 23	?	—	—	—	—	—
Toledo	97·5	327	i 13 37	0	i 24 17	[+ 3]	e 17 37	PP	i 44·1
Seven Falls	98·7	15	18 5	PP	24 43	{− 2}	32 21	SSP	44·0
Ottawa	99·1	20	13 42	− 2	24 42	{− 6}	17 32	PP	46·0
Granada	99·4	325	e 13 56k	+10	24 45	{− 5}	i 32 22	SS	i 51·1
St. Louis	99·7	32	e 13 48	+ 1	i 25 22	+ 4	i 25 45	sSKS	—
Vermont	100·6	18	e 17 27	PP	—	—	—	—	e 40·4
Lisbon	100·7	330	—	—	24 52	{− 7}	32 46	SS	47·0
Cleveland	100·8	25	e 13 54	+ 2	i 25 24	− 3	e 18 6	PP	49·2
New Kensington E.	102·3	24	—	—	e 25 0	{−11}	e 33 2	SS	e 57·0
Harvard	102·9	17	e 18 22	PP	—	—	—	—	e 51·0
Fordham	103·8	19	e 18 18	PP	i 25 6	[+21]	e 27 54	PS	53·0
Philadelphia	104·3	21	e 18 32	PP	e 25 53	− 3	e 27 45	PS	e 48·5
Georgetown	104·6	23	—	—	i 25 8	[+19]	33 29	SS	62·0
Columbia	107·6	28	—	—	e 25 22	[+20]	e 33 54	SS	e 43·4
Bermuda	114·2	15	e 20 41	?	e 30 25	PPS	—	—	e 47·2
San Juan	127·1	21	e 20 22	[+76]	e 28 2	{+ 1}	e 38 28	SS	e 52·4
Bogota	136·2	39	e 19 24	[0]	—	—	e 22 11	PP	—
Huancayo	148·3	57	i 19 50	[+ 5]	e 26 49	[− 2]	i 22 33	PP	e 70·2
La Paz	156·4	53	i 19 58	[+ 2]	—	—	i 20 22	pPKP	79·0

Additional readings :—
Hyderabad S_cSN =19m.1s.
College ePP =12m.18s., ePPP =13m.27s., i =18m.18s., e =19m.12s.
Brisbane iN =10m.58s. and 11m.45s.
Honolulu e =11m.52s. and 19m.26s.
Sitka i =11m.0s., iP_cP? =11m.24s., e =12m.18s., ePPP? =15m.6s., i =20m.0s., 20m.24s., and 20m.46s., iS_cS =21m.3s.
Riverview iSN =19m.53s., iEZ =20m.7s., iPS =20m.24s., iN =20m.43s., iS_cSEN = 21m.10s., iE =21m.19s., iN =21m.26s., iSSE =24m.25s., iN =24m.45s., eN = 25m.58s., iQE =27m.45s.
Apia eN =23m.47s.
Upsala P_cP =11m.46s.a, ePPE =14m.41s., ePPP =16m.17s., PPPPN =17m.44s., SE = 21m.25s., PPSN =22m.19s., eSS?E =25m.34s., eSSN =25m.58s.
Warsaw ePE =11m.57s., eP_cPZ =12m.6s., eSZ =21m.57s., SE =22m.0s., eS_cSE = 22m.19s., PSEN =22m.31s., ePPSE =22m.55s., eSSN =27m.1s., eSSSN =30m.44s., eSSSE =30m.54s.
Copenhagen 12m.15s., i =22m.20s., SS =27m.14s.
Grand Coulee i =12m.18s.
Raciborzu ePEN =12m.20s., eN =12m.33s., eE =12m.43s., eN =14m.49s.
Auckland S_cSN =22m.29s., PSN =22m.43s., SSS =30m.28s.
Shasta Dam e =13m.35s., and 22m.46s.
Hungry Horse i =12m.27s. and 12m.31s., e =22m.46s., iPKKP =30m.54s., ePKP, PKP =38m.28s., ePKP,PKP,PKP =58m.55s.
Collmberg iP_cPZ =12m.50s
Ukiah e =23m.43s. and 25m.23s., eSS =28m.49s., eSSS? =32m.39s.
Prague e =12m.28s. and 18m.34s., ePS =22m.48s., eSSS =31m.16s.
Belgrade ePP =14m.18s., ePPP =16m.26s.
Jena eZ =12m.34s., eN =12m.37s., eEN =22m.58s.
Berkeley iZ =12m.38s., iN =14m.0s., iSKSE =23m.6s.
Helwan iZ =12m.37s., eZ =15m.4s., eN =23m.4s., eEN =23m.49s.
Aberdeen eEN =32m.14s.
Lick eE =12m.36s., iPPZ =15m.42s.
Wellington P_cPZ =12m.46s., PPPZ =17m.26s., SZ =22m.41s., PSZ =23m.4s., PPSZ = 23m.43s., QZ =33m.28s.
Butte eN =12m.42s. and 17m.1s., eS_cSN =23m.11s., iN =23m.27s., ePPSN =24m.15s., eN =25m.12s., eSSN =28m.14s., eSSS?N =32m.1s.,
De Bilt iPP =15m.50s., isS =23m.16s., eSS =28m.40s.
Christchurch eEZ =19m.58s., S?Z =22m.48s., R? =28m.8s.
Bozeman ePP? =15m.28s., iS_cS =23m.23s.
Triest iS =23m.18s., eSSS =32m.53s.
Stuttgart iP =12m.38s.a, ePP =15m.55s., e =19m.15s., iS =23m.20s., e =23m.45s. and 27m.16s., eSS =28m.58s., eSSS =32m.52s.
Durham iP_cPN =12m.51s., iSEN =23m.17s., iN =29m.10s.
Fresno eN =12m.44s., iZ =12m.50s.
Strasbourg iS =23m.26s. and 23m.29s., eSS =29m.0s., eSSS? =32m.58s.
Tinemaha i =12m.51s.
Uccle eP_cP?Z =12m.52s., ePPN =15m.56s., ePPPEN =17m.40s., eN =19m.28s., iSE = 23m.20s., iSN =23m.25s., eSSEN =28m.58s., eSSSEN =32m.28s.
Zürich e =12m.50s., eS =23m.26s.

Continued on next page.

Padova e =23m.33s.
Salo e =23m.38s.
Basle e =12m.56s.
Logan iP =12m.45s.
Kew iP_cPZ =12m.59s., eS?E =23m.31s., iPSEZ =23m.44s., eEN =35m.51s., eZ = 36m.39s., eEN =37m.47s., eZ =38m.39s., eQ =43m.58s.
Florence ePS?E =23m.48s.
Salt Lake City e =13m.2s. and 15m.26s., ePP =16m.39s., eSKS =23m.21s., iS =23m..53s, ePPS =25m.49s., eSS =29m.49s., eSSS =33m.31s.
Ivigtut e =13m.0s., S =23m.46s.
Pasadena iZ =12m.57s., eSKSN =23m.22s., iSN =23m.50s., eSSN =29m.16s.
Rome e =22m.28s., iPS =23m.54s., eSS =29m.44s.
Paris i =13m.6s., e =23m.4s., eSKS =23m.21s., e =28m.51s., eSS =29m.58s.?, eSSS = 33m.58s.?
Boulder City i =13m.9s.
Palomar i =13m.9s.
Pierce Ferry i =13m.55s.
Clermont-Ferrand iS? =24m.10s., iPS =25m.21s., iSS =30m.7s., eSSS =34m.8s.
Tucson i =13m.31s. and 13m.48s., e =14m.8s., eSKS =23m.23s., ePS =25m.41s., ePPS =26m.44s., eSS =31m.30s., eSSS =35m.18s.
Lincoln eSKSE =23m.16s., eSE =24m.22s., eE =30m.32s.
Alicante PP =17m.8s., S =24m.32s., PPS =26m.23s., SS =31m.10s., Q =39m.22s.
Toledo e =39m.30s.
Seven Falls SSS =35m.58s.?
Ottawa PS =26m.13s., SS =31m.16s.
Granada iPP =18m.3s., PPP =20m.6s., PS =26m.27s., PPS =27m.6s., SSS =36m.16s.
St. Louis e =13m.59s., ePP =17m.54s., iPKP? =18m.3s., iSKS? =24m.45s., iSS? = 32m.19s.
Vermont e =21m.1s., ePPS =26m.25s.
Cleveland eZ =14m.4s., eSKSE =24m.48s., iSE =25m.48s.
New Kensington eSE =25m.46s., eE =26m.2s.
Philadelphia iSKS =25m.8s., ePPS =28m.18s., eSS =32m.41s.
Columbia eS =26m.22s., eSSS =38m.9s.
Bermuda e =21m.43s., eSKS =28m.2s., e =29m.11s., ePPS =31m.34s., eSS =36m.3s., eSSS? =40m.31s.
San Juan e =21m.43s., ePP =22m.30s., ePKS =24m.24s., e =31m.6s. and 31m.30s., eSKSP =32m.16s., ePS =32m.48s., ePPS =33m.52s., ePKP,PKP? =39m.20s., eSSS =43m.14s.
Huancayo eSS =42m.42s., e =43m.45s., eSSS? =49m.8s.
La Paz iPPZ =24m.6s.
Long waves were also recorded at Tananarive, Reykjavik and Pennsylvania.

May 9d. 8h. 16m. 4s. Epicentre 22°·5S. 176°·2W. (as on 1946, Sept. 14d.).

$A = -\cdot 9228$, $B = -\cdot 0613$, $C = -\cdot 3805$; $\delta = +10$; $h = +4$;
$D = -\cdot 066$, $E = +\cdot 998$; $G = +\cdot 380$, $H = +\cdot 025$, $K = -\cdot 925$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		9·6	27	2 19	− 2	4 3	− 9	—	—	—
Auckland	N.	16·3	207	(4 14)	PPP	4 14	PPP	—	—	7·1
Christchurch		22·9	200	(5 8)	+ 2	5 8	P	9 16	Q	12·4
Brisbane		28·3	253	i 7 24	?	—	—	i 13 16	Q	i 16·2
Riverview		30·8	240	e 6 26	+ 6	e 11 42	+19	e 7 30	PP	e 15·2
Berkeley		78·6	41	e 12 6	+ 1	i 22 7	+ 5	i 35 18	Q	e 40·0
Lick	Z.	78·6	41	e 12 3	− 2	—	—	i 12 27	P_cP	—
Pasadena		78·8	45	i 12 4	− 2	—	—	—	—	e 45·9
Mount Wilson	Z.	79·0	45	i 12 6	− 1	—	—	i 12 20	P_cP	—
Palomar	Z.	79·2	47	i 12 7	− 1	—	—	—	—	—
Riverside	Z.	79·3	45	i 12 6k	− 3	—	—	—	—	—
Haiwee	Z.	80·2	44	i 12 14	0	—	—	—	—	—
Shasta Dam		80·3	38	i 12 14	0	—	—	—	—	—
Tinemaha	Z.	80·6	43	i 12 13	− 3	—	—	—	—	—
Vladivostok		80·9	323	e 12 20	+ 3	e 22 37	+11	—	—	—
Boulder City		82·1	46	e 11 27	−57	—	—	—	—	—
Pierce Ferry		82·8	46	e 11 26	−61	—	—	—	—	—
Tucson		82·8	50	e 12 26	− 1	—	—	e 24 4	PPS	e 37·5
Tacubaya		86·0	67	i 12 49	+ 6	—	—	i 12 52	P_cP	—
Grand Coulee		86·8	34	e 12 47	0	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Salt Lake City		86·8	43	—	—	e 23 25	0	—	—	e 54·3
Sitka		86·8	20	—	—	e 23 30	+ 5	e 30 16	?	e 37·5
Hungry Horse		89·7	36	e 12 58	− 3	—	—	—	—	—
Saskatoon		95·8	35	—	—	e 24 38	− 7	—	—	48·9
Bombay		115·9	287	—	—	e 25 56?	[+21]	—	—	—
Sverdlovsk		126·6	325	e 19 6	[+ 1]	e 38 8?	SS	e 21 9	PP	—
Ashkabad		131·1	302	e 22 50	PKS	—	—	—	—	—
Moscow		138·5	332	e 22 21	PP	—	—	—	—	—
Grozny		139·7	310	23 9	PKS	—	—	—	—	—
Leninakan		141·8	308	19 52?	[+18]	—	—	—	—	—
Theodosia		145·8	319	e 19 48	[+ 7]	—	—	—	—	—
Copenhagen		146·2	351	i 19 45	[+ 4]	—	—	—	—	—
Yalta		146·8	318	e 19 49	[+ 7]	—	—	—	—	—
Warsaw		147·5	341	e 19 48	[+ 5]	e 42 24	SS	e 23 7	PP	e 81·9
Potsdam	z.	149·3	348	e 19 48	[+ 2]	—	—	(e 25 56?)	?	e 25·9
Ksara		149·7	298	e 19 54	[+ 7]	—	—	23 37?	PP	—
De Bilt		150·4	357	e 19 48	[0]	—	—	—	—	e 80·9
Kew		150·9	4	e 19 49	[0]	—	—	—	—	—
Istanbul		151·8	317	19 51	[+ 1]	—	—	e 23 34	PP	—
Stuttgart		153·4	352	e 19 54	[+ 2]	e 27 2	[+ 4]	e 36 56	PPS	e 87·9
Paris		153·7	2	i 20 2	[+ 9]	—	—	e 23 52	PP	e 80·9
Strasbourg		153·8	354	e 19 56	[+ 3]	e 44 33	SSP	e 23 45	PP	e 80·9
Helwan	z.	154·3	291	e 20 8	[+14]	—	—	—	—	—
Triest		155·5	343	e 20 27	PKP_2	—	—	e 24 24	PP	—
Salo		156·3	349	e 20 32	PKP_2	—	—	—	—	—
Clermont-Ferrand		156·8	0	e 19 59	[+ 2]	e 27 14	[+12]	e 24 14	PP	83·9
Rome		159·3	342	e 19 57a	[− 3]	—	—	e 24 38	PP	—
Toledo		161·4	19	e 20 1	[− 1]	—	—	—	—	—
Alicante		163·8	12	20 4	[− 1]	—	—	21 48	PKP_2	84·3
Granada		164·0	22	i 20 57k	[+52]	i 45 15	SS	21 30	PKP_2	79·7

Additional readings :—
Christchurch eZ = 7m.58s.
Riverview ePPPZ = 7m.52s., iE = 8m.3s., eQN = 13m.44s.
Berkeley iSN = 22m.10s.
Tucson i = 12m.51s., e = 13m.14s. and 13m.42s., ePPS = 25m.40s., eSSS? = 33m.47s.
Sverdlovsk SKSP = 31m.17s.
Warsaw ePKPN = 19m.59s., ePKPE = 20m.3s., eZ = 21m.34s., eE = 24m.4s., eN = 24m.19s., eE = 42m.31s.
Strasbourg $ePKP_2$ = 21m.13s., e = 24m.2s., 32m.56s., and 39m.16s.
Helwan iZ = 20m.26s., eZ = 20m.59s. and 21m.26s.
Clermont-Ferrand i = 20m.37s.
Rome $ePKP_2Z$ = 20m.43s., eSKKS? = 31m.49s., ePSKS = 34m.52s., ePPS = 37m.47s., eSS? = 43m.28s.
Alicante PP = 25m.34s.
Granada SKP = 24m.39s., iPP = 25m.38s., SKKS = 32m.5s., SSS = 50m.57s.
Long waves were also recorded at Arapuni, Wellington, Huancayo, La Paz, and other North American and European stations.

May 9d. Readings also at 0h. (near Obi-garm, Stalinabad, and Kulyab), 2h. (Helwan and near Lick), 3h. (Brisbane and near Lick), 4h. (near Fresno and Lick), 5h. (near Kulyab, Obi-garm, Stalinabad, and near Mineral), 6h. (near Lick, Berkeley, and Branner), 7h. (near Kulyab, Obi-garm, and Stalinabad), 8h. (near Andijan), 9h. (Pierce Ferry, Hungry Horse, and Tucson), 10h. (Tucson and Stuttgart), 11h. (La Paz), 12h. (Auckland, Arapuni, Wellington, Stuttgart, Tucson, Shasta Dam, Boulder City, Tinemaha, near San Francisco, Lick, Berkeley, and Branner), 13h. (near Alicante), 15h. (near Istanbul), 16h. (Auckland), 20h. (La Paz), 23h. (near Lick (2)).

May 10d. 9h. 6m. 2s. Epicentre 18°·3N. 145°·2E. Depth of focus 0·015.
(as on 1948, Feb. 14d.).

A = −·7802, B = +·5422, C = +·3121 ; δ = +10 ; h = +5 ;
D = +·571, E = +·821 ; G = −·256, H = +·178, K = −·950.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tokyo		18·0	346	e 4 4	+ 1	7 16	0	—	—
Nagoya		18·3	341	4 9	+ 3	7 34	+11	—	—
Maebasi		18·8	345	4 18	+ 6	7 40	+ 7	—	—
Hukusima		19·8	349	4 24	+ 2	7 58	+ 5	—	—
Sendai		20·2	352	4 25	− 2	8 0	− 1	—	—
Wazima		20·4	342	e 4 31	+ 2	8 3	− 2	—	—
Mizusawa		21·1	352	4 37	+ 1	e 8 19	+ 1	—	—
Akita		21·8	351	4 47	+ 4	8 29	− 1	—	—
Vladivostok		27·2	338	i 6 8	PP	e 9 53	− 8	—	—
Batavia	z.	45·0	242	i 8 10	+ 6	—	—	i 8 57	pP
Almata		62·0	311	e 10 9	0	—	—	—	—
Andijan		65·4	308	e 10 33	+ 2	—	—	—	—
Tchimkent		67·4	310	e 10 45	+ 1	e 19 31	+ 4	—	—
Bombay		68·1	284	—	—	e 19 37	+ 1	—	—
Sverdlovsk		71·9	326	i 11 9	− 2	20 11	− 9	—	—
Shasta Dam		80·1	51	i 11 54	− 3	—	—	i 12 42	pP
Grand Coulee		80·4	43	e 11 58	− 1	e 21 42	−11	e 12 45	pP
Lick	z.	81·6	54	i 12 4	− 1	—	—	i 12 46	pP
Fresno	z.	83·1	55	i 12 12	− 1	—	—	i 13 10	pP
Hungry Horse		83·4	41	i 12 12	− 2	i 22 12	−11	i 12 58	pP
Santa Barbara	z.	83·9	56	i 13 4	pP	—	—	—	—
Tinemaha		84·2	53	i 12 17	− 1	—	—	i 13 2	pP
Grozny		84·3	314	e 12 20	+ 1	—	—	—	—
Moscow		84·6	328	e 12 18	− 2	e 22 22	−13	—	—
Haiwee	z.	84·7	54	i 12 20	− 1	—	—	i 13 8	pP
Pasadena		85·2	56	i 12 20	− 3	—	—	e 13 5	pP
Mount Wilson	z.	85·3	56	i 12 22	− 2	—	—	i 13 6	pP
Riverside	z.	85·9	56	e 12 27	0	—	—	i 13 14	pP
La Jolla	z.	86·4	57	e 13 16	pP	—	—	—	—
Leninakan		86·5	312	13 20?	pP	22 34?	[− 7]	—	—
Boulder City		87·2	53	i 12 32	− 1	—	—	i 13 19	pP
Pierce Ferry		87·8	53	i 12 34	− 2	—	—	i 13 20	pP
Tucson		91·6	55	i 12 53	− 1	—	—	i 13 42	pP
Stuttgart	z.	102·6	331	e 18 41	PP	—	—	—	—
Vera Cruz	E.	109·2	62	i 19 59	?	—	—	—	—
La Paz		148·2	93	i 19 30	[+ 3]	—	—	—	—

Additional readings :—
Lick iZ = 12m.18s. and 12m.52s.
Hungry Horse i = 13m.43s. and 30m.19s.
Tinemaha iZ = 12m.35s.
Pasadena iNZ = 13m.10s.
Mount Wilson iZ = 13m.11s.
Tucson i = 14m.1s., e = 14m.31s. and 14m.45s., ePP? = 16m.27s., epPP = 16m.45s.
Long waves were also recorded at Uccle.

May 10d. Readings also at 3h. (Granada), 4h. (Collmberg), 5h. (near Almata), 6h. (Samarkand, near Andijan, Kulyab, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 7h. (Tinemaha, Boulder City, Pierce Ferry, and Mount Wilson), 9h. (Tacubaya, Tucson, Boulder City, Pierce Ferry, Mount Wilson, Pasadena, Palomar, and Tinemaha), 11h. (Upsala and near Alicante), 13h. (La Paz, near Branner, Lick (3), and near Mizusawa), 14h. (Uccle), 17h. (Hungry Horse), 18h. (near Kulyab, Obi-garm, Murgab, and Stalinabad), 19h. (near La Paz and near San Juan), 21h. (Istanbul), 23h. (near Lick).

May 11d. 8h. 55m. 46s. Epicentre 17°·4S. 71°·0W. Depth of focus 0·005.

Intensity VII over an area of 3500 sq. km. Damage and casualties heavy, particularly at Moquequa ; VI at Arequipa, Tacua, and Carumas ; V at Mollendo. Macroseismic area 287,000 sq. km.

E. Silgado.
Datos simologicos del Peru, 1948. Instituto Geologico del Peru, Bol. 13, Lima, 1949, pp. 14, 24-29 map of epicental region, p. 8.

A = +·3109, B = −·9028, C = −·2972 ; δ = +3 ; h = +5 ;
D = −·946, E = −·326 ; G = −·097, H = +·281, K = −·955.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz	Z.	2·9	72	i 0 46k	+ 1	—	—	—	—	—
Montezuma		5·6	159	i 1 49	+26	i 2 47	+20	—	—	i 3·0
Huancayo		6·8	321	i 1 44	+ 5	i 2 30	−26	i 2 2	pP	i 3·1
La Plata	E.	21·0	148	4 36	− 4	8 20	− 5	i 4 50	pP	10·6
	N.	21·0	148	4 36	− 4	8 25	0	4 50	pP	10·4
	Z.	21·0	148	4 37	− 3	8 23	− 2	4 50	pP	10·7
Bogota		22·1	352	i 4 50	− 1	i 8 52	+ 7	i 5 16	PP	—
Balboa Heights		27·5	342	i 5 44	+ 2	i 10 24	+ 7	—	—	—
Fort de France		33·4	18	i 6 26	− 8	—	—	—	—	—
San Juan		35·9	8	i 6 52	− 4	i 12 18	−10	i 7 8	pP	i 14·7
Vera Cruz		44·0	325	i 8 5	+ 2	i 14 35	+ 6	i 8 20	pP	e 23·1
Tacubaya		45·9	322	8 18	0	i 15 3	+ 6	i 8 34	pP	—
Bermuda		49·9	7	i 8 48	− 1	i 15 51	− 2	i 9 6	pP	i 21·6
Columbia		52·0	349	e 9 3	− 2	e 16 20	− 2	e 9 20	pP	e 21·5
Georgetown		56·3	356	i 9 35	− 1	i 17 9	−11	e 22 54	SSS	25·2
Philadelphia		57·2	357	i 9 41	− 2	e 17 16	−16	i 9 56	pP	e 23·4
Fordham		58·0	358	i 9 46	− 2	—	—	—	—	—
New Kensington	E.	58·2	352	e 9 47	− 3	i 17 49	+ 4	e 12 54	PP	e 25·3
Pennsylvania	N.W.	58·3	353	i 9 50	0	i 17 45	− 1	e 10 34	PcP	—
Cleveland		59·4	350	i 9 57k	− 1	i 17 57	− 3	i 10 14	pP	26·8
Harvard		59·6	0	i 9 58	− 1	e 17 56	− 7	i 10 15	pP	e 29·2
Chicago		60·9	345	i 10 5	− 3	i 18 15	− 5	i 10 21	pP	e 24·8
Vermont		61·6	358	i 10 18	+ 5	e 18 22	− 6	i 10 34	pP	i 26·4
Halifax		62·1	6	10 13	− 3	18 27	− 8	24 8	SS	29·2
Tucson		62·4	322	i 10 19a	+ 1	e 18 40	+ 1	i 10 36	pP	e 24·4
Lincoln	E.	62·6	338	i 10 20	0	i 18 38	− 3	i 10 36	pP	e 26·0
Ottawa		62·6	356	10 19a	− 1	18 40	− 1	i 10 35	pP	29·2
Seven Falls		64·2	0	10 32	+ 2	19 0	− 1	19 32	PS	28·2
Temiskaming		64·2	354	10 35	+ 5	e 19 5	+ 4	10 50	pP	34·2
Ville Marie		64·9	352	10 33	− 2	e 19 8	− 2	10 47	pP	33·2
Kirkland Lake		65·7	353	10 40	0	—	—	10 55	pP	40·2
La Jolla		66·7	318	i 10 49a	+ 3	e 19 40	+ 9	i 11 5	pP	—
Palomar		66·8	319	e 10 48	+ 1	i 19 43	+10	i 11 6k	pP	—
Pierce Ferry		67·0	323	i 10 49	+ 1	e 18 41	−54	i 11 6	pP	—
Boulder City		67·4	322	i 10 52	+ 1	e 18 42	−58	i 11 9	pP	—
Riverside		67·5	319	i 10 53a	+ 2	e 19 52	+11	i 11 10	pP	—
Mount Wilson		68·1	319	i 10 57a	+ 2	e 19 55	+ 7	i 11 14	pP	—
Pasadena		68·1	319	i 10 57a	+ 2	i 19 54	+ 6	i 11 13k	pP	—
Salt Lake City		69·2	328	i 11 6	+ 4	i 20 3	+ 2	i 11 18	pP	e 28·0
Haiwee		69·3	321	i 11 5a	+ 3	e 20 14	+11	i 11 22	pP	—
Santa Barbara		69·3	318	i 11 4a	+ 2	i 20 11	+ 8	i 11 21	pP	—
Logan		69·9	329	i 11 4	− 2	i 20 12	+ 2	i 11 21	pP	e 29·4
Tinemaha		70·1	321	i 11 10	+ 3	i 20 23	+11	i 11 27	pP	—
Fresno		70·8	320	i 11 13	+ 1	e 20 27	+ 7	i 11 29	pP	—
Lick	Z.	72·4	319	i 11 22	+ 1	e 20 43	+ 5	i 11 40	pP	—
Bozeman		72·5	332	e 11 25	+ 3	i 20 43	+ 3	e 11 43	pP	e 30·2
Santa Clara		72·6	319	i 11 25	+ 3	i 20 52	+11	e 11 39	pP	—
Branner		72·7	319	e 11 26	+ 3	e 20 51	+ 9	—	—	—
Berkeley		73·1	319	i 11 28	+ 3	i 20 46	0	i 14 31	PP	e 36·1
Butte	N.	73·5	331	e 11 22	− 6	e 20 50	− 1	e 11 46	pP	e 29·6
Mineral	E.	74·2	322	e 11 35	+ 3	e 21 5	+ 6	—	—	—

Continued on next page,

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Ukiah		74·4	320	i 11 39	+ 6	i 21 13	+12	e 11 55	pP		e 32·2
Shasta Dam		74·9	322	i 11 36	0	e 21 10	+ 4	i 11 53	pP		—
Hungry Horse		75·9	332	i 11 41	0	e 21 19	+ 2	i 11 58	pP		—
Saskatoon		75·9	338	11 40	− 1	21 18	+ 1	26 14	SS		34·2
Ferndale		76·0	321	e 11 50	+ 8	e 21 28	+ 9	—	—		—
Grand Coulee		77·9	329	i 11 55	+ 3	e 21 46	+ 7	i 12 12	pP		—
Seattle		79·4	327	e 12 0	− 1	e 21 58	+ 3	e 26 52	SS		e 34·9
Ivigtut		80·4	11	i 12 4	− 2	i 22 4	− 1	i 12 21	pP		36·2
Lisbon		80·4	44	i 12 5a	− 1	i 22 7	+ 2	i 12 22	pP		35·5
Victoria		80·5	327	11 22?	−45	21 25?	−42	11 37?	pP		37·2
Granada		83·4	48	i 12 20a	− 2	i 22 38	+ 2	12 35	PcP		i 41·1
Toledo		84·4	45	i 12 26	− 1	i 22 49	+ 3	i 12 42	pP		44·4
Tamanrasset		84·8	64	i 12 28a	− 1	e 22 34	−16	i 12 46a	pP		—
Alicante		86·2	48	i 12 33	− 2	i 23 1	− 3	12 55	pP		e 40·5
Barcelona		89·3	46	e 12 48	− 2	23 12	[− 1]	i 23 31	S		e 38·2
Sitka		91·6	330	e 13 20	pP	e 23 28	[+ 2]	i 23 58	sSKS		e 37·4
Clermont-Ferrand		91·7	43	i 13 1	− 1	i 23 55	+ 1	i 13 20	pP		44·2
Kew		92·0	36	i 13 1	− 2	—	—	i 13 19	pP		e 46·2
Edinburgh		92·4	32	—	—	23 59	− 1	23 31	SKS		—
Paris		92·5	40	i 13 3k	− 2	e 24 0	− 1	i 13 21	pP		e 45·2
Durham		92·7	33	i 13 6	0	24 4	+ 1	i 13 22	pP		—
Honolulu		93·3	292	i 18 6	PP	e 23 47	[+11]	e 24 17	pP		e 38·7
Aberdeen		93·6	31	i 12 52	−18	i 23 40	[+ 3]	—	—		46·4
Scoresby Sund		94·0	15	i 13 12a	0	i 24 20	+ 6	i 13 30	pP		—
Uccle		94·4	38	i 13 13a	− 1	i 23 42	[0]	i 13 30	pP		—
Neuchatel		94·6	42	e 13 14	− 1	e 23 45	[+ 2]	—	—		—
Basle		95·2	42	e 13 16a	− 2	e 24 24	0	i 13 34	pP		—
De Bilt		95·3	37	i 13 17a	− 1	e 24 32	+ 7	i 13 34k	pP		e 47·2
Pavia		95·4	44	e 13 22	+ 4	—	—	—	—		—
Strasbourg		95·7	41	i 13 17a	− 3	e 24 16	SKKS	i 13 35	pP		44·2
Wellington	z.	95·7	224	13 22	+ 2	25 20	PS	13 38	pP		44·2
Zürich		95·8	42	i 13 19a	− 1	e 23 51	[+ 2]	i 13 35	pP		—
Apia		95·9	254	—	—	e 24 26	− 4	—	—		e 44·2
Christchurch		96·0	222	13 23	+ 2	24 15	−16	17 29	PP		44·0
Chur		96·2	43	e 13 21a	− 1	—	—	i 13 38	pP		—
Florence		96·4	47	e 13 25	+ 2	—	—	e 17 29	PP		—
Salo		96·5	45	13 23a	0	i 24 36	+ 1	13 42	pP		—
Stuttgart		96·6	41	i 13 23a	− 1	e 24 34	− 2	i 13 41k	pP		e 47·2
Bologna		96·7	45	e 13 23a	− 1	e 24 39	+ 2	e 13 39	pP		—
Rome		96·7	49	i 13 23a	− 1	i 23 56	[+ 2]	i 13 41	pP		—
Padova		97·1	45	e 13 32	+ 6	—	—	13 51	pP		—
Catania		97·4	53	e 13 26	− 2	e 24 0	[+ 2]	e 13 46	pP		—
Auckland	N.	97·8	228	17 29	PP	i 31 48	SS	—	—		49·2
Jena	E.	98·7	40	e 13 33	0	—	—	e 13 52	pP		—
Triest		98·7	45	i 13 32a	− 1	i 24 57	+ 3	i 13 50	pP		—
Potsdam		100·0	38	i 13 39a	0	i 25 9	+ 4	i 13 56	pP		—
College		100·1	335	e 15 44	?	e 25 4	− 2	e 17 54	PP		e 40·6
Prague		100·3	41	e 13 38	− 3	e 24 13	[+ 1]	e 17 38	PP		e 41·2
Copenhagen		100·6	35	i 13 41a	− 1	25 17	+ 7	i 13 58	pP		—
Kalossa		102·4	45	e 14 15	pP	—	—	e 14 24	?		—
Raciborzu		102·6	41	e 13 55	+ 4	e 17 32	PP	e 14 14?	pP		—
Budapest	E.	102·7	45	14 4	+13	e 24 26	[+ 2]	—	—		e 49·2
Belgrade		103·1	48	13 53	0	e 24 28	[+ 2]	i 14 10	pP		—
Upsala		104·2	32	e 16 3	?	e 25 33	− 7	i 18 29	PP		—
Warsaw		104·8	40	13 59a	− 1	24 37	[+ 4]	18 15	PP		e 47·2
Helsinki		107·9	31	e 17 37	PKP	e 24 51	[+ 4]	i 18 41	PP		e 47·2
Istanbul		108·7	52	14 17	P	26 32	S	—	—		—
Helwan		108·9	64	14 21	P	24 51	[0]	18 42	PP		—
Tananarive		109·6	118	18 21	PP	28 24	PS	—	—		54·2
Ksara		113·3	61	e 14 41	P	28 56	PS	i 19 20	PP		—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Moscow		114·7	36	e 18 16	[−17]	e 25 10	[− 5]	e 18 33 pPKP	—
Riverview		115·1	218	i 19 32k	PP	e 26 40	SKKS	— —	e 53·5
Leninakan		119·9	53	e 18 41?	[− 1]	29 32?	SP	e 20 0? PP	—
Grozny		121·1	50	e 18 50	[+ 5]	—	—	— —	—
Baku		124·5	53	e 20 28	PP	—	—	— —	—
Sverdlovsk		126·7	31	e 15 39?	P	27 40	SKKS	i 18 57 PKP	—
Samarkand		137·4	51	e 19 20	[+ 4]	—	—	e 23 9 PKS	—
Tashkent		138·5	47	e 19 12	[− 6]	i 28 52	SKKS	e 21 50 PP	—
Stalinabad		139·1	50	i 19 21	[+ 2]	i 22 57	PKS	i 19 39 pPKP	—
Obi-garm		139·7	50	i 19 24	[+ 3]	—	—	i 22 59 PKS	—
Kulyab		140·1	52	19 22	[+ 1]	—	—	i 22 59 PKS	—
Andijan		140·8	47	e 19 20	[− 3]	e 23 4	PKS	e 23 21 pPKS	—
Frunse		141·3	42	e 19 20	[− 3]	—	—	— —	—
Murgab		142·9	49	19 26	[0]	—	—	— —	—
Mizusawa		144·7	315	e 19 35	[+ 6]	20 24	?	— —	—
Irkutsk		145·0	6	i 19 31	[+ 1]	—	—	22 50 PKS	—
Bombay		145·6	82	i 19 32	[+ 1]	42 22	SS	i 23 11 PP	55·5
Vladivostok		147·8	328	i 19 37	[+ 2]	i 29 56	SKKS	i 23 10 PP	—
Kodaikanal	E.	148·6	98	i 18 14	?	36 54	PPS	— —	50·6
Colombo	E.	149·7	107	19 43	[+ 5]	30 33	SKKS	— —	73·0
Hyderabad	N.	150·9	86	e 19 48	[+ 9]	—	—	— —	64·0
Batavia	Z.	156·5	175	i 19 49	[+ 2]	—	—	i 20 16 pPKP	—
Calcutta	E.	159·9	72	e 19 56	[+ 5]	e 44 3	SS	e 24 17 PP	—

Additional readings and notes :—
La Paz iP = 50s. and 54s.
La Plata E. 5m.44s., 6m.2s., 6m.32s., 7m.32s., and 8m.50s.
La Plata N. 5m.56s., 7m.2s., 8m.14s., and 8m.50s.
La Plata Z. 4m.56s., 5m.14s., 5m.26s., 8m.56s., 9m.20s., and 9m.38s.
Bogota iPPP = 5m.23s., iSS = 9m.41s.
San Juan i = 7m.51s., iP_cP? = 8m.39s., i = 12m.40s.
Vera Cruz ipPN = 8m.23s., iE = 9m.5s., iN = 9m.13s. and 12m.2s., eZ = 14m.23s., iZ = 14m.46s., isSN = 15m.17s., iE = 17m.17s., iN = 17m.29s. and 19m.2s.
Tacubaya iPEN = 8m.21s., iSEN = 15m.6s., iSS?N = 19m.0s.
Bermuda ePP = 10m.4s., ePPP? = 12m.2s., i = 16m.11s., esS? = 16m.40s., e = 17m.44s., iSS = 19m.40s.
Columbia ePP? = 10m.52s., ePPP = 12m.30s., isS = 16m.48s., e = 17m.20s., eS_cP? = 18m.44s., eSS = 20m.20s.
Philadelphia iP_cP = 10m.52s., iPP = 12m.12s., iPPP = 12m.45s., i = 14m.28s., isS? = 18m.14s., eS_cP = 19m.26s.
New Kensington isSE = 18m.16s., iS_cP?E = 19m.40s., eSSE = 22m.55s.
Pennsylvania iNW = 13m.52s.
Cleveland isSE = 18m.26s.
Harvard esS = 18m.26s., eS_cS? = 19m.41s., eQ = 24·2m.
Chicago e = 11m.16s., ePPP = 14m.14s., isS = 18m.42s., iS_cP? = 19m.50s., i = 20m.22s.
Vermont e = 11m.48s., ePP = 12m.47s., ePPP? = 14m.29s., i = 18m.32s., iS_cP? = 20m.6s., eSS = 22m.44s.
Halifax i = 20m.23s.
Tucson i = 11m.5s., iPP = 12m.37s., ipPP = 12m.49s., ipPPP = 13m.51s., i = 18m.52s., isS = 19m.7s., eSS = 21m.23s., esSS = 22m.57s.
Lincoln iE = 18m.54s.
Ottawa e = 19m.50s., SS = 22m.44s.
Seven Falls SSS = 24m.52s.
Kirkland Lake i = 11m.12s., e = 13m.25s.
La Jolla isP = 11m.17s., ePKP,PKPZ = 39m.36s.
Palomar isPZ = 11m.12s., iN = 11m.29s., iE = 11m.50s., iZ = 20m.10s., eZ = 32m.19s., iZ = 32m.39s., iPKP,PKPZ = 39m.14s., ipPKP,PKPZ = 39m.31s.
Pierce Ferry i = 12m.37s., ePKP,PKP? = 38m.9s.
Boulder City iP_cP? = 12m.15s., iPP = 13m.25s., ePPP = 14m.48s., ePKP,PKP = 39m.15s.
Riverside iZ = 11m.22s. and 11m.26s., iPKP,PKPZ = 39m.16s., ipPKP,PKPZ = 39m.30s.
Mount Wilson eEN = 20m.27s., iPKP,PKPZ = 39m.13s., ipPKP,PKP = 39m.30s.
Pasadena isPZ = 11m.18s., iZ = 11m.38s. and 12m.25s., iSSN = 24m.5s., iSSE = 24m.20s., eSSSEN = 27m.56s., iPKP,PKPZ = 39m.11s., ipPKP,PKPZ = 39m.30s.
Salt Lake City isP = 11m.36s., i = 11m.50s., iPPP = 15m.30s., isS = 20m.30s., i = 20m.57s., and 21m.54s., isSS = 25m.16s.
Haiwee iZ = 11m.54s., ePKP,PKPZ = 39m.10s.
Santa Barbara isP = 11m.35s., iPKP,PKPZ = 39m.9s., epPKP,PKPZ = 39m.27s.
Logan isP = 11m.39s., iPP = 13m.52s., epPP = 14m.6s., esS? = 20m.37s., eSS = 24m.35s.
Tinemaha isPZ = 11m.39s., iPKP,PKPZ = 39m.8s., ipPKP,PKPZ = 39m.26s.
Fresno iNZ = 11m.38s., iZ = 13m.8s., iN = 13m.12s., iPPZ = 14m.11s., iZ = 14m.25s.
Lick eEN = 20m.46s.

Continued on next page.

Bozeman i =11m.59s., ePP =14m.30s., isS =21m.10s., esPS =21m.50s., eSS =25m.24s., eSSS =28m.36s.
Santa Clara isSZ =21m.23s.
Berkeley iE =11m.43s., iZ =14m.36s., iSE =20m.54s., iN =21m.10s., iSSEN =25m.54s.
Butte iN =11m.29s., isP?N =12m.1s., esPP?N =14m.42s., eN =21m.21s., and 22m.50s., eSSN =25m.38s
Ukiah e =13m.0s., ePP =14m.19s., ePPP =16m.37s., isS? =21m.35s., esPS? =22m.39s., eSS =26m.23s., eSSS? =31m.2s.
Shasta Dam i =12m.10s., ePKP,PKP =39m.4s., epPKP,PKP =39m.22s.
Hungry Horse e =21m.51s., ePKP,PKP? =38m.53s.
Grand Coulee ePKP,PKP =39m.11s.
Seattle e =12m.34s. and 13m.2s.
Ivigtut 16m.34s., iSKS =22m.21s., SSS =30m.56s.
Lisbon 12m.32s., Z =12m.58s., N =13m.4s., S_cS?EN =22m.20s., E =22m.42s.
Victoria PS =21m.56s., SS =25m.29s.?
Granada PP =15m.39s., SKKS =22m.56s., PPS =23m.59s., SS =28m.1s., SSS =31m.35s.
Toledo iPP =15m.58s., esPP =16m.38s., eSP =24m.13s.
Tamanrasset eSS =23m.23s., e =23m.45s., ePKP,PKP =38m.44s., ipPKP,PKP =39m.4s.k.
Alicante PP =15m.49s., PPP =17m.42s., PS =24m.7s., PPS =24m.29s., sS =25m.25s., SS =28m.27s., Q =34m.31s.
Sitka e =16m.8s. and 17m.0s., ipS? =24m.36s., ipPS =25m.12s., isPS? =25m.48s., eSS =30m.11s., eSSS =34m.4s., iPKP,PKP =39m.34s.
Clermont-Ferrand i =17m.47s., iSKS =23m.33s., iPS =25m.12s., iPPS =25m.39s., iSS =29m.56s., iSSS =33m.27s.
Kew eEZ =31m.47s., and 32m.38s.
Edinburgh PS =25m.19s.
Paris iPP =16m.39s., ipPP =17m.0s., eSKS =23m.29s., ePS =25m.10s., e =25m.38s., ePPS =25m.51s., eSS =29m.58s., PKP,PKP =38m.29s.
Durham SKSEN =23m.34s., EN =24m.32s., iE =25m.27s.
Honolulu isPS =25m.28s., e =26m.24s., eSS =30m.25s., eSSS =34m.31s.
Aberdeen iEN =15m.42s., iE =38m.7s.
Scoresby Sund i =13m.51s., 23m.44s., SS =30m.38s.
Uccle ePPE =16m.39s., ePSEN =25m.34s., eSSE =31m.9s., eEN =33m.14s.?
Basle ePP =17m.24s.
De Bilt iPPP =19m.24s., eSKS? =23m.49s., ePS =25m.44s., eSS =30m.44s.
Strasbourg ePP =16m.59s., epPP =17m.23s., ePPP =19m.35s., eSKS =23m.51s., esS =24m.57s., ePS =25m.42s., eSS =30m.29s. and 30m.40s.
Wellington sPZ =13m.58s., PPZ =17m.14s., pPPZ =17m.38s., PPP?Z =19m.18s., eZ =20m.14s., ScSPZ =26m.13s., PKP,PKPZ =38m.19s.,
Zürich ePP =17m.21s., eS =24m.18s.
Christchurch eZ =16m.44s., PPPZ =20m.6s., PSNZ =25m.58s., QN =39m.4s.
Salo i =14m.1s., e =17m.52s., and 23m.50s.
Stuttgart eZ =14m.32s., ePP =17m.14s., e =21m.19s., eSKS =23m.56s., ePS =25m.59s., ePKP,PKP?Z =38m.18s., e =43m.14s.
Bologna ePP? =17m.38s.
Rome ePP =17m.10s., SS =31m.17s.
Triest iPP =17m.11s., iSKS =24m.7s., iPS =25m.49s., eSS =32m.7s., eSSS =35m.41s.
Potsdam iPN =13m.43s., ipPN =14m.1s., eE =16m.43s., eZ =16m.58s., iE =17m.4s., iZ =17m.41s., iN =24m.13s., iSKSE =24m.17s., iE =24m.42s., ipSN =25m.37s., iZ =26m.35s.,
College eSKS =24m.14s., epS =26m.1s., ePPS =26m.55s., eSS =31m.44s., eSSS =36m.15s.,
Prague ePS =24m.50s.
Copenhagen 17m.28s., SKS =24m.19s., 26m.40s. and 27m.8s.
Raciborzu eEN =18m.59s.
Belgrade e =15m.48s., ePP? =16m.51s.
Upsala eE =16m.58s., PP?N =18m.36s., eSKSE =24m.27s., SN =25m.41s., eN =26m.29s., ePSE =27m.35s., eN =30m.41s., eSSE =33m.14s.?, eSSSN =36m.50s.
Warsaw ePEN =14m.3s., ePPPZ =20m.24s., eSKSN =24m.40s., SKKSE =25m.22s., eSN =25m.35s., SE =25m.42s., eSZ =25m.47s., PSZ =27m.19s., PSE =27m.23s., ePPSE =27m.56s., ePKKPZ =30m.3s., eSSZ =32m.30s., eSSN =32m.44s., ePKKS?Z =33m.56s., and many other readings given without phase.
Helsinki i =18m.58s.
Helwan iZ =14m.37s. and 17m.43s., SN =26m.32s., iN =26m.57s., PSZ =27m.56s., iZ =28m.41s.
Moscow iPP =19m.26s., ipPP =19m.44s.
Riverview i =19m.50s., iZ =19m.56s., i =20m.5s., iZ =20m.35s., ePPZ =20m.57s., iN =27m.2s., eSKKSN =27m.24s., iSKKSE =27m.29s., eSN =28m.37s., epSN =29m.10s., isS?Z =29m.21s., iEN =29m.30s., iN =29m.58s., eE =30m.2s., iPSN =30m.37s., iPPSN =31m.48s., eE =35m.46s., eQN =49m.2s., the record appears to be wrongly interpreted.
Sverdlovsk ipPKP =19m.14s., iPP =20m.51s., PS =30m.47s., SS =37m.32s., SSS =42m.50s.
Tashkent iPKS =22m.55s., ePS =32m.16s.
Stalinabad SS =40m.20s.
Bombay eN =41m.36s.
Vladivostok iPS =33m.35s., eSS =42m.8s.
Kodaikanal ?E =21m.31s., iE =28m.21s., eE =28m.34s., 29m.4s., and 30m.9s.
Calcutta eE =35m.23s.

May 11d. 9h. 33m. 51s. Epicentre 17°·4S. 71°·0W. Depth of focus 0·005. (as at 8h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Paz		2·9	72	i 0 41	− 4	i 1 11	− 8	—	—	—
Huancayo		6·8	321	i 1 51	+12	i 2 58	+ 2	—	—	—
La Plata	E.	21·0	148	4 33	− 7	i 8 25	0	4 57	pP	9·8
	N.	21·0	148	i 4 38	− 2	i 8 31	+ 6	4 56	pP	—
	Z.	21·0	148	4 39	− 1	8 27	+ 2	—	—	9·2
Fort de France		33·4	18	e 6 23	−11	—	—	—	—	—
Tacubaya		45·9	322	i 8 24	+ 6	e 15 21	+24	i 8 42	pP	—
Cleveland	Z.	59·4	350	i 9 58a	0	—	—	i 10 14	pP	—
Harvard		59·6	0	i 9 59	0	—	—	i 10 14	pP	—
Tucson		62·4	322	i 10 20a	+ 2	—	—	i 10 38	pP	—
Temiskaming		64·2	354	10 35	+ 5	—	—	10 51	pP	—
Ville Marie		64·9	352	10 33	− 2	—	—	—	—	—
Kirkland Lake		65·7	353	10 39	− 1	—	—	10 55	pP	—
La Jolla	Z.	66·7	318	e 10 49	+ 3	—	—	e 11 11	pP	—
Palomar		66·8	319	i 10 49a	+ 2	—	—	i 11 5	pP	—
Pierce Ferry		67·0	323	i 10 50	+ 2	—	—	i 11 12	pP	—
Boulder City		67·4	322	i 10 53	+ 2	—	—	i 11 15	pP	—
Riverside	Z.	67·5	319	i 10 53a	+ 2	—	—	i 11 9	pP	—
Mount Wilson		68·1	319	i 10 57a	+ 2	—	—	i 11 20	sP	—
Pasadena		68·1	319	i 10 57	+ 2	—	—	i 11 13	pP	—
Haiwee		69·3	321	i 11 6	+ 4	—	—	i 11 23	pP	—
Logan		69·9	329	e 11 0	− 6	—	—	i 11 17	pP	—
Tinemaha		70·1	321	i 11 10a	+ 3	—	—	i 11 25	pP	—
Fresno	Z.	70·8	321	i 11 13	+ 1	—	—	—	—	—
Lick		72·4	319	i 11 24	+ 3	—	—	i 11 36	pP	—
Shasta Dam		74·9	322	i 11 37	+ 1	—	—	i 11 59	pP	—
Hungry Horse		75·9	332	i 11 43	+ 2	e 20 34	−43	i 12 0	pP	—
Grand Coulee		77·9	329	e 11 56	+ 4	—	—	—	—	—
Toledo		84·4	45	i 12 26	− 1	—	—	i 12 42	pP	—
Tamanrasset		84·8	64	i 12 29a	0	—	—	i 12 47a	pP	—
Paris		92·5	40	e 13 21	pP	—	—	—	—	—
Strasbourg		95·7	41	e 13 35	pP	—	—	—	—	—
Stuttgart	Z.	96·6	41	e 13 23	− 1	—	—	e 13 41	pP	—

Additional readings :—
La Paz iP =45s. and 49s., iS =1m.17s. and 1m.21s.
La Plata N =5m.9s., E =8m.50s.
Tucson i = 10m.27s., e =12m.27s. and 13m.23s., ePKP,PKP =39m.28s., ipPKP,PKP = 39m.45s.
Palomar isPZ =11m.12s., epPKP,PKP?Z =39m.34s., eZ =39m.54s.
Riverside iZ =11m.20s.
Pasadena isPZ =11m.20s.
Haiwee iZ =11m.28s.
Tinemaha isPZ =11m.33s.
Strasbourg e =14m.43s.
Long waves were recorded at Vera Cruz.

May 11d. Readings also at 1h. (Istanbul), 2h. (near Huancayo), 3h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Fresno, Lick, Shasta Dam, Grand Coulee, Hungry Horse, Istanbul, Uccle, and near Batavia), 4h. (near Obi-garm), 6h. (Andijan, near Kulyab (2), and Murgab), 8h. (Apia and near Andijan), 9h. (Granada (3), Strasbourg, De Bilt, Stuttgart, Potsdam, and Hungry Horse), 10h. (Upsala, near Berkeley, Branner, and Lick), 11h. (Andijan, Samarkand, near Kulyab, Murgab, Obi-garm, and Stalinabad,) 12h. (Paris, Potsdam, Stuttgart, Uccle (2), Mount Wilson, Pasadena, Riverside, Tucson, Shasta Dam, Hungry Horse, and near La Paz), 14h. (Uccle, near Kulyab, Murgab, Obigarm, and Stalinabad), 15h. (Uccle and Upsala), 17h. (near Huancayo), 18h. (Calcutta), 19h. (Andijan, near Kulyab, Murgab, Obi-garm, Tchimkent, and Stalinabad), 20h. (La Jolla, Mount Wilson, Pasadena, Palomar, Riverside, Tucson, Boulder City, and Pierce Ferry).

May 12d. 0h. 57m. 2s. Epicentre 37°·8N. 142°·6E. Depth of focus 0·005.
(as on 1945, May 31d.).

Intensity VI at Naruko, Okawara, and Miyagi Prefecture; V at Hukusima, Mizusawa, and Mito; IV at Sendai, Miyako, Yamagata, Morioka, Titibu, Onahama, and Sakata; II-III at Utunomiya, Tokyo, Tomisaki, Yokohama, Urakawa, Iida, and Osaka. Macroseismic radius >300km. Depth 40km.

Seismo. Bull. Cent. Met. Obs., Japan, 1948, Tokyo, 1950, p.15, with macroseismic chart.

$A = -·6293$, $B = +·4811$, $C = +·6103$; $\delta = -6$; $h = -1$;
$D = +·607$, $E = +·794$; $G = -·485$, $H = +·371$, $K = -·792$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sendai		1·4	289	0 21	− 3	0 40	− 3	—	—	—
Hukusima		1·7	268	0 26k	− 2	0 46	− 4	—	—	—
Mizusawa	E.	1·7	286	i 0 27	− 1	0 37	−13	—	—	—
	N.	1·7	286	i 0 30	+ 2	e 0 42	− 8	—	—	—
Miyako		1·9	345	0 27a	− 4	0 49	− 5	—	—	—
Mito		2·2	230	0 34a	− 1	1 9	+ 7	—	—	—
Morioka		2·2	330	0 32a	− 3	0 58	− 4	—	—	—
Kakioka		2·5	231	0 36a	− 3	1 4	− 5	—	—	—
Utunomiya		2·5	240	0 38	− 1	1 6	− 3	—	—	—
Takubasan		2·6	232	0 38	− 3	1 1	−11	—	—	—
Akita		2·7	315	0 40	− 2	1 14	0	—	—	—
Hatinohe		2·8	343	0 41a	− 3	1 20	+ 3	—	—	—
Kumagaya		3·1	237	0 47a	− 1	1 27	+ 3	—	—	—
Tokyo		3·1	227	0 44	− 4	1 29	+ 5	—	—	—
Maebasi		3·2	244	0 50a	+ 1	1 34	+ 7	—	—	—
Aomori		3·3	335	0 50	− 1	—	—	—	—	—
Yokohama		3·4	223	0 53a	+ 1	1 42	+10	—	—	—
Aikawa		3·5	272	0 51a	− 3	—	—	—	—	—
Mera		3·6	219	0 57	+ 2	1 40	+ 3	—	—	—
Nagano		3·7	254	1 4	+ 8	1 59	+20	—	—	—
Osima		4·0	222	0 58	− 3	1 50	+ 3	—	—	—
Shizuoka		4·4	232	1 4a	− 2	2 4	+ 7	—	—	—
Toyama		4·5	255	1 7a	0	2 11	+12	—	—	—
Wazima		4·5	264	1 10a	+ 3	2 13	+14	—	—	—
Mori		4·6	340	1 3a	− 6	2 11	+ 9	—	—	—
Omaesaki		4·8	229	1 12k	0	2 14	+ 7	—	—	—
Nagoya		5·2	242	1 17a	0	2 19	+ 2	—	—	—
Gihu		5·3	245	1 16k	− 3	2 18	− 1	—	—	—
Sapporo		5·3	349	1 12	− 7	2 24	+ 5	—	—	—
Hikone		5·7	246	1 24a	0	2 34	+ 5	—	—	—
Kameyama		5·8	241	1 24	− 1	2 47	+15	—	—	—
Nemuro		6·0	22	1 20	− 8	2 20	−17	—	—	—
Kyoto		6·2	246	1 31	0	2 51	+10	—	—	—
Osaka		6·2	244	1 34	+ 3	2 59	+18	—	—	—
Owase		6·4	237	1 24	−10	—	—	—	—	—
Toyooka		6·6	253	1 36	− 1	2 56	+ 5	—	—	—
Kobe		6·7	245	1 38	0	2 56	+ 2	—	—	—
Siomisaki		7·0	234	1 40	− 2	2 52	− 9	—	—	—
Sumoto		7·1	244	1 41a	− 3	3 3	− 1	—	—	—
Muroto		8·2	239	1 58a	− 1	3 55	+24	—	—	—
Kôti		8·5	243	2 3a	0	3 51	+13	—	—	—
Hamada		9·0	254	2 11	+ 1	—	—	—	—	—
Vladivostok		9·7	306	i 2 16	− 3	i 4 22	+14	—	—	—
Hukuoka		10·8	251	2 18	−16	4 50	+16	—	—	—
Kumamoto		10·9	246	2 35a	− 1	4 13	−24	—	—	—
Miyazaki		10·9	241	2 36a	0	—	—	—	—	—
Kagosima		11·7	241	2 47	+ 1	—	—	—	—	—
Nanking		20·2	261	4 29	− 3	8 22	+12	—	—	—
Irkutsk		30·3	312	i 6 6	− 1	i 11 4	+ 3	—	—	—
College		47·9	32	e 8 29	− 5	e 15 23	− 2	e 10 29	PP	e 19·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	48·7	268	i 8 39	− 1	i 15 35	− 1	i 10 24	PP	23·8
Almata		49·1	299	i 8 42	− 1	e 15 49	+ 7	—	—	—
Frunse		50·8	298	i 8 56	0	—	—	—	—	—
Murgab		52·9	293	i 9 13	+ 1	i 16 43	+ 9	—	—	—
Andijan		53·1	296	i 9 14	+ 1	—	—	—	—	—
Honolulu		53·5	90	e 9 18	+ 2	i 16 46	+ 4	i 12 28	PPP	e 22·0
Tchimkent		54·5	299	i 9 18	− 5	—	—	—	—	—
Batavia		55·0	226	e 9 24	− 3	i 17 4	+ 2	i 11 16	PP	28·5
Sitka		55·0	42	e 9 24	− 3	e 17 10	+ 8	i 10 14	P_cP	e 22·2
Tashkent		55·1	299	i 9 26	− 2	17 6	+ 2	—	—	—
Sverdlovsk		55·2	319	i 9 29	+ 1	i 17 10	+ 5	—	—	—
Obi-garm		55·8	296	i 9 34	+ 1	i 17 19	+ 6	—	—	—
Kulyab		56·1	294	i 9 34	− 1	i 17 25	+ 8	—	—	—
Stalinabad		56·5	296	i 9 38	0	i 17 28	+ 6	—	—	—
Samarkand		57·3	297	i 9 46	+ 2	—	—	—	—	—
Hyderabad	N.	59·2	269	9 58	+ 1	18 9	+11	12 8	PP	—
Bombay		62·9	274	i 10 23	+ 1	e 18 53	+ 8	i 19 10	PS	31·3
Kodaikanal	E.	64·2	263	e 8 58	?	e 17 34	?	11 8	?	29·6
Colombo	E.	64·3	258	10 32	+ 1	19 45	+43	—	—	38·0
Victoria		65·2	47	9 58?	−39	i 19 43?	+30	—	—	31·0
Seattle		66·3	48	e 12 34	PP	e 20 30	PPS	e 25 40	SSS	e 27·2
Apia		66·8	130	e 11 16	+29	e 19 44	+11	e 25 30	SSS	e 29·0
Moscow		67·3	323	i 10 49	− 1	19 41	+ 2	—	—	—
Grand Coulee		68·1	46	e 10 55	0	e 19 49	+ 1	—	—	—
Baku		68·6	305	11 2	+ 4	—	—	—	—	—
Grozny		69·6	310	e 11 7	+ 3	e 20 18	+12	—	—	—
Helsinki		69·8	333	i 11 5	0	e 20 11	+ 3	i 11 19	pP	e 31·0
Shasta Dam		69·9	54	e 11 7	+ 1	e 20 16	+ 6	—	—	—
Ukiah		70·2	56	e 12 7	+59	e 21 26	S_cS	e 26 46	SSP	e 30·6
Hungry Horse		70·6	44	i 11 11	+ 1	i 20 23	+ 5	—	—	—
Piatigorsk		70·8	312	e 11 12	0	e 20 29	+ 9	21 31	SKS	—
Scoresby Sund		71·4	355	i 11 16a	+ 1	20 33	+ 6	13 38	PP	—
Berkeley		71·5	56	e 11 20	+ 4	i 20 33	+ 5	i 12 4	P_cP	—
Riverview		71·7	173	i 11 27a	+10	i 20 39	+ 9	i 14 14	PP	e 32·3
Santa Clara		72·0	56	e 11 26	+ 7	e 20 46	+12	e 21 11	PS	e 30·2
Erevan		72·1	307	e 11 21	+ 2	—	—	—	—	—
Saskatoon		72·1	38	11 24	+ 5	20 42	+ 7	25 10	SS	36·0
Leninakan		72·2	308	e 11 22	+ 2	—	—	e 11 55	P_cP	—
Lick		72·2	56	i 11 22	+ 2	e 20 42	+ 6	—	—	—
Upsala		72·7	334	i 11 23a	0	20 39	− 3	i 14 10	PP	e 30·0
Butte	N.	72·8	44	e 11 49	sP	e 20 49	+ 6	e 14 47	PP	e 33·7
Sotchi		73·1	312	i 11 25	0	e 20 57	+11	i 11 51	P_cP	—
Bozeman		73·8	44	e 11 45	pP	i 20 59	+ 5	e 15 29	PPP	e 30·1
Fresno	Z.	73·8	56	e 11 30	+ 1	e 20 59	+ 5	i 11 40	pP	e 35·0
Tinemaha	Z.	74·6	56	e 11 37	+ 3	—	—	i 11 45	pP	—
Santa Barbara	Z.	75·2	58	e 11 40	+ 3	—	—	i 11 49	pP	—
Haiwee	Z.	75·3	56	e 11 42	+ 4	—	—	—	—	—
Simferopol		75·4	317	e 11 43	+ 5	—	—	—	—	—
Logan		75·8	48	e 11 38	− 3	i 21 20	+ 4	e 14 40	PP	e 31·8
Mount Wilson	Z.	76·4	58	e 11 44	0	—	—	i 11 54	pP	—
Pasadena		76·4	58	e 11 43	− 1	i 21 25	+ 2	e 26 19	SS	e 31·3
Salt Lake City		76·4	49	e 11 46	+ 2	e 21 24	+ 1	e 15 10	PP	e 31·6
Warsaw		76·9	327	i 11 48a	+ 1	e 21 31	+ 3	e 14 43	PP	e 36·0
Riverside	Z.	77·0	58	e 11 48	0	—	—	i 11 57	pP	—
Boulder City		77·5	55	e 11 51	+ 1	e 21 41	+ 6	i 12 12	pP	—
La Jolla	Z.	77·7	58	e 12 4	pP	—	—	—	—	—
Palomar		77·7	57	e 11 53	+ 2	i 21 41	+ 4	i 12 2	pP	—
Reykjavik	N.	77·7	354	e 11 46	− 5	e 21 45	+ 8	e 22 27	PS	e 38·4
Copenhagen		77·7	334	i 11 52a	+ 1	i 21 42	+ 5	14 46	PP	36·0
Pierce Ferry		77·9	54	i 11 54	+ 2	e 21 46	+ 7	i 14 51	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Raciborzu		79·7	328	e 12 6	+ 4	e 22 15	+17	e 15 11	PP	e 43·0
Auckland	N.	80·0	154	—	—	22 5	+ 4	27 16	SS	37·0
Potsdam		80·0	332	i 12 4a	0	1 22 5	+ 4	e 12 16	PcP	e 38·0
Bucharest		80·1	320	e 12 5	+ 1	e 22 11	+ 9	—	—	37·0
Aberdeen		80·8	342	i 12 4	− 4	i 22 11	+ 1	i 27 32	SS	38·0
Istanbul		80·8	315	i 12 8	0	i 22 15	+ 5	—	—	—
Collmberg		80·9	331	i 12 12	+ 3	i 22 22	+11	e 12 27	pP	e 36·8
Ivigtut		81·0	6	—	—	i 22 16	+ 4	27 25	SS	36·0
Budapest		81·3	325	12 12	+ 1	e 22 14	− 1	—	—	e 42·0
Prague		81·3	329	12 10	− 1	22 18	+ 3	e 15 14	PP	e 38·0
Arapuni	E.	81·4	154	e 20 16	?	—	—	—	—	—
Ksara		81·5	306	i 12 13a	+ 1	22 36?	+19	—	—	—
Jena		81·7	331	e 12 13	0	e 22 22	+ 3	—	—	e 39·5
Kalossa		82·0	325	12 20	+ 6	e 22 48	+26	—	—	e 45·5
Edinburgh		82·2	341	—	—	22 29	+ 5	23 18	PS	—
Tucson		82·4	55	e 12 18a	+ 2	e 22 23	− 3	e 18 17	PPP	e 35·5
Belgrade		82·6	322	i 12 17a	0	e 22 36	+ 8	e 12 45	PcP	43·0
Durham		82·8	340	i 12 20	+ 2	i 22 35	+ 5	i 17 25	PPP	—
De Bilt		83·1	335	i 12 21a	+ 1	i 22 40	+ 7	i 12 38	pP	e 38·0
Wellington		84·0	156	12 25	0	22 45	+ 3	23 3	ScS	39·5
Stuttgart		84·4	331	i 12 28a	+ 1	i 22 53	+ 7	i 12 38a	pP	e 44·0
Uccle		84·5	335	i 12 28a	+ 1	i 21 58?	−49	e 12 48	pP	e 38·5
Lincoln	E.	84·8	42	e 12 16?	−13	e 22 45?	− 5	e 15 44?	PP	e 38·2
Triest		85·0	327	i 12 30a	0	i 22 51	− 1	e 15 14	PP	—
Strasbourg		85·1	332	i 12 31a	+ 1	i 22 58	+ 5	e 15 55	PP	41·0
Christchurch		85·4	159	12 42	+10	22 57	+ 1	16 39	PP	39·0
Kew		85·4	338	i 12 32a	0	e 22 47	[− 1]	e 12 49	pP	e 51·0
Zürich		85·4	331	e 12 34a	+ 2	e 23 2	+ 6	—	—	—
Basle		86·0	331	e 12 35	0	e 23 6	+ 4	e 15 48	PP	—
Kirkland Lake		86·4	27	i 12 37	+ 1	—	—	—	—	58·0
Salo		86·5	329	12 38a	+ 1	e 23 1	− 5	e 23 44	PS	—
Neuchatel		86·7	331	e 12 38	0	e 23 1	− 7	—	—	—
Padova		86·8	328	e 11 58?	−40	—	—	—	—	—
Paris		86·8	335	i 12 39k	+ 1	e 23 19	+10	e 16 2	PP	44·0
Bologna		87·0	328	e 12 41a	+ 2	e 23 8	− 3	e 23 44	PS	e 46·0
Helwan		87·0	306	e 12 40	+ 1	23 23	+12	16 4	PP	—
Pavia		87·3	329	e 12 58?	+17	—	—	—	—	—
Taranto		87·4	321	12 51	+10	23 14	− 1	—	—	35·8
Florence		87·6	327	e 12 43	+ 1	e 23 26	+ 9	—	—	—
Temiskaming		88·0	28	12 44	0	—	—	e 13 6	pP	53·0
Chicago		88·5	36	e 12 49	+ 2	e 23 20	− 5	e 15 57	PP	e 35·7
Rome		88·6	325	i 12 47a	0	i 23 26	0	e 16 17	PP	e 41·4
Clermont-Ferrand		89·2	333	i 12 52	+ 2	i 23 21	−11	i 16 24	PP	45·0
St. Louis		89·7	39	i 12 53	+ 1	23 24	−12	i 13 3	pP	—
Ottawa		90·3	26	12 55	0	23 16	[− 3]	16 16	PP	41·0
Seven Falls		90·3	22	12 56	+ 1	23 44	+ 2	29 34	SS	43·0
Cleveland		91·4	32	e 13 1a	+ 1	i 23 55	+ 4	i 30 11	SS	—
Vermont		91·9	25	e 14 10	+68	e 24 47	PS	e 17 51	PP	e 38·2
Barcelona		93·3	331	e 16 41	PP	23 41	[+ 5]	—	—	e 35·7
Harvard		94·2	25	i 13 14	+ 1	e 24 20	+ 4	e 25 36	PS	e 62·5
Halifax		94·6	19	—	—	e 24 16	− 3	e 29 52	SS	45·0
Philadelphia		95·2	28	e 14 20	+62	e 21 1	?	—	—	e 35·5
Georgetown		95·4	30	e 13 33	+15	i 24 31	+ 5	i 17 23	PP	—
Alicante		96·9	332	13 13	−12	23 37	[−18]	16 57	PP	e 44·1
Toledo		96·9	335	i 13 26	+ 1	i 23 59	[+ 4]	i 17 22	PP	46·8
Columbia		97·9	36	e 17 32	PP	23 56	[− 4]	24 46	S	e 40·4
Tacubaya	E.	98·7	58	—	—	—	—	e 40 49	Q	e 46·6
Granada		99·1	334	13 6a	−29	i 24 55	− 2	e 17 37	PP	i 50·4
Lisbon		99·5	338	13 43	+ 6	24 17	[+ 9]	31 52	SS	41·4
Vera Cruz	N.	100·9	56	—	—	—	—	i 39 5	Q	e 47·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Tananarive		105·2	259	—	—	e 24 56	[+21]	32 8	SS		48·0
Bermuda		105·7	24	e 15 11	P	e 26 48	+56	e 19 23	PP		e 42·3
Tamanrasset		107·5	319	e 14 15	P	—	—	e 18 42	PP		—
San Juan		117·9	31	e 19 56	PP	e 26 31	SKKS	e 30 8	PPS		e 49·9
Fort de France		123·2	28	e 15 53	P	—	—	—	—		—
Bogota		125·8	47	e 18 13	[−42]	—	—	e 18 59	PKP		—
Huancayo		137·5	63	e 19 21	[+ 4]	i 32 37	SKSP	e 22 3	PP		e 56·8
La Paz		145·6	61	i 19 34 a	[+ 3]	i 29 46	SKKS	i 19 42	pPKP		69·5
La Plata	E.	163·2	86	23 16	PKS	31 16	SKKS	24 34	PP		76·0

Additional readings :—
College ePPP? =11m.25s., i =15m.42s., eS_cS? =18m.0s.
Calcutta iSSE =18m.57s.
Honolulu i =17m.0s. and 17m.53s., iS_cS =19m.19s., eSS =20m.29s.
Sitka i =9m.36s., ePP =11m.3s., ePPP =12m.10s., iS =17m.14s., i =17m.49s. and 18m.33s., iS_cS =19m.18s., eSS =21m.7s.
Kodaikanal SSE =21m.34s.
Victoria S =18m.32s.?
Shasta Dam e =12m.58s.
Scoresby Sund 21m.6s., SS =25m.28s.
Berkeley iN =16m.15s., iE =19m.32s., iZ =20m.26s., iPSN =20m.52s., iZ =21m.42s., iSSE =25m.2s., eE =29m.3s.
Riverview iP_cPNZ =11m.44s., isSE =20m.55s., iEN =20m.59s., iE =21m.16s., iSKSN =21m.24s., iE =21m.40s., eSSE =25m.10s., eQ =30m.16s.
Saskatoon SSS =28m.40s.
Lick eEN =11m.25s.
Upsala e =12m.39s., PPPE =15m.42s., iPPPN =15m.47s., eN =17m.49s., PS?E =21m.2s., eE =22m.21s., eN =24m.49s., eSSE =25m.16s., eSSSN =28m.32s.
Butte eN =13m.25s., eS_cS?N =21m.19s., cN =21m.31s., eSSN =26m.14s., eSSSN =29m.14s.
Bozeman i =21m.21s., eS_cS? =22m.25s., eSS =26m.14s., eSSS? =29m.29s.
Fresno ePPZ =14m.16s.
Logan i =12m.6s., ePPP? =16m.40s., iS_cS =22m.14s.
Pasadena iZ =11m.53s.
Salt Lake City iS =21m.30s., i =21m.44s., iS_cS =22m.24s., e =23m.32s., eSS =26m.32s., eSSS? =30m.8s.
Warsaw P_cPZ =12m.6s., ePPE =14m.46s., PPPZ =16m.31s., PPPE =16m.34s., eSN =21m.35s., PSZ =21m.47s., PSE =21m.52s., PSN =21m.55s., PPSN =22m.21s., PPSE =22m.37s., eZ =25m.0s., SSZ =26m.21s., SSN =26m.37s., eE =29m.29s., SSSE =29m.54s., SSSNZ =29m.59s.
Boulder City ePP =14m.48s., ePKKP? =28m.1s., ePKP,PKP? =36m.20s.
Copenhagen 22m.0s., SS =26m.34s.
Pierce Ferry i =12m.4s., ePKKP? =28m.3s.
Raciborzu eE =16m.13s., ePPPEN =16m.52s.
Potsdam ePN =12m.7s., iP_cPEZ =12m.23s., ePPEZ =15m.4s., iZ =16m.23s., iPPPEZ =16m.54s., iEZ =18m.24s., iN =18m.27s., iSKSE =22m.19s., iSKSNZ =22m.23s., iPPSZ =23m.1s., iZ =24m.30s., iSSE =27m.15s., iZ =28m.15s., iE =28m.19s.
Bucharest eS?E =22m.23s., iE =22m.44s.
Aberdeen iN =14m.22s., iSSSEN =31m.42s.
Ivigtut 22m.37s.
Budapest eSKSE =22m.21s., SEN =22m.42s., eE =23m.25s.
Prague ePPP =16m.58s., eSS =26m.58s.
Jena eN =22m.38s., eEN =22m.42s.
Edinburgh SKS =22m.32s., S_cS =22m.44s., SS =27m.51s.
Tucson iP =12m.27s., iS =22m.29s., eS_cS? =23m.24s., e =24m.3s.
Belgrade ePP =13m.49s., ePPP =17m.34s.
Durham iE =23m.42s., iPPSN =23m.51s., iSSE =28m.1s.
De Bilt ePP =15m.38s., ePPP =17m.23s., ePPS =23m.46s.
Wellington S_cS? =23m.52s.
Stuttgart eZ =14m.52s., ePP =15m.52s., ePPP =17m.43s., iS_cS? =23m.12s., ePS =23m.58s., e =26m.12s. and 29m.52s.
Uccle cPPN =15m.51s., eEN =19m.8s., PSN =23m.58s.?, eSSE =27m.58s.?, eN =28m.58s.?, SSSE =31m.58s.?
Lincoln iE =22m.57s.?, eSSE =28m.26s.?
Triest ePPP =17m.44s., iS =23m.7s.
Strasbourg ePPP =17m.40s., iPS =24m.7s. and 24m.12s., eSS =28m.55s., eSSS =33m.2s.
Christchurch iZ =13m.43s., SSNZ =28m.36s., SSS =31m.38s.
Kew eZ =13m.7s., ePPE =15m.39s., eEZ =15m.51s., ePPPEZ =17m.57s., eS =23m.15s., ePSEZ =23m.59s., ePPSEZ =24m.27s., eSSEZ =28m.45s., eQEN =41·0m.
Salo eE =23m.20s.
Paris e =14m.57s., ePPP =17m.48s., eSKS =23m.4s., e =26m.15s., SS =28m.28s., eQ =41·0m.
Bologna ePPS? =24m.58s., eSS =29m.4s.
Helwan eZ =13m.54s. and 15m.54s., eEN =23m.4s. and 24m.50s., SSE =29m.13s.

Continued on next page.

Chicago iS = 23m.30s., ePPS = 24m.53s., eSS = 29m.2s., eSSS = 33m.2s., e = 33m.29s.
Rome e = 17m.57s., eSKS? = 23m.15s., iPS = 24m.35s., eSS = 29m.18s.
Clermont-Ferrand iS = 24m.1s., iSS = 29m.56s., iSSS = 34m.8s., Q = 40·0m.
St. Louis i = 23m.41s., 24m.1s. and 24m.16s.
Ottawa S = 23m.44s., PPS = 25m.2s., SS = 29m.40s.
Seven Falls PPS = 24m.56s., e = 36m.48s.
Cleveland ePE = 13m.5s., eZ = 14m.10s., eSKKSN = 23m.58s., iSKKSN = 24m.1s., iSEN = 24m.17s.
Vermont e = 15m.32s., iS = 25m.2s., i = 25m.8s., eSS = 31m.24s., eSSS = 34m.58s.
Harvard i = 13m.37s., ePPS = 26m.25s., eQ = 52m.10s.
Halifax e = 37m.16s.
Philadelphia iS = 21m.27s.
Georgetown e = 14m.34s.
Alicante PPP = 18m.55s., SKS = 22m.56s., SKKS = 23m.17s., PS = 24m.59s., PPS = 25m.37s., SS = 30m.11s., SSS = 33m.37s., Q = 38m.7s.
Toledo ePS = 25m.24s., ePPS = 27m.10s.
Columbia e = 26m.14s., eSS = 31m.46s., eSSS? = 35m.41s.
Granada PPP = 18m.19s., iSKS = 23m.16s., PS = 26m.49s., SS = 31m.13s., SSS = 34m.46s.
Lisbon E? = 25m.27s.
Bermuda 1 = 27m.0s., ePS = 27m.23s., ePPS = 28m.35s., iPKKP = 30m.18s., eSS = 33m.28s., eSSS = 37m.26s., e = 39m.21s.
San Juan ePP = 21m.36s., eS = 28m.44s., ePPS = 31m.52s., eSS = 37m.20s., eSSS = 42m.44s.
Huancayo iPP = 22m.13s., ePPP = 24m.49s., eSS = 39m.25s., e = 40m.8s., iSSS = 45m.51s.
La Paz iPPZ = 23m.15s., ipPP = 23m.50s., iSS = 41m.50s.
La Plata PPPE = 28m.10s., SKSPE = 35m.22s., SSE = 44m.28s., E = 50m.10s., N = 50m.46s., SSSE = 52m.4s., E = 54m.40s., SSSN = 54m.58s., N = 57m.28s., E = 58m.46s., N = 63m.10s. and 68m.10s., QN = 74m.28s.
Long waves were also recorded at New Kensington and Chur.

May 12d. 1h. 21m. 35s. Epicentre 37°·8N. 142°·6E. Depth of focus 0·005.
(as at 0h.).

Intensity V at Watari and Sanuma (Miyagi Prefecture); IV at Hukusima II-III at Sendai, Miyako, Yamagata, Morioka, Kakioka, Mito, Kumagaya, and Mizusawa.
Macroseismic radius >300km., depth 40km. Epicentre as adopted.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948, Tokyo, 1950, p.16 with macroseismic chart.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Sendai	1·4	289	0 20k	− 4	0 38	− 5	—	—
Hukusima	1·7	268	0 33	+ 5	0 55	+ 5	—	—
Mizusawa	1·7	286	0 27	− 1	0 48	− 2	—	—
Miyako	1·9	345	0 27a	− 4	0 50	− 4	—	—
Mito	2·2	230	0 39	+ 4	—	—	—	—
Morioka	2·2	330	0 31	− 4	0 58	− 4	—	—
Kakioka	2·5	231	0 36a	− 3	—	—	—	—
Utunomiya	2·5	240	0 37a	− 2	1 9	0	—	—
Tukubasan	2·6	232	0 39	− 2	1 9	− 3	—	—
Akita	2·7	315	0 35	− 7	1 11	− 3	—	—
Hatinohe	2·8	343	0 44	0	1 23	+ 6	—	—
Kumagaya	3·1	237	0 45a	− 3	—	—	—	—
Tokyo	3·1	227	0 44	− 4	—	—	—	—
Maebasi	3·2	244	0 49	0	1 31	+ 4	—	—
Yokohama	3·4	223	0 51a	− 1	1 41	+ 9	—	—
Mera	3·6	219	0 56	+ 1	—	—	—	—
Nagano	3·7	254	1 0	+ 4	1 56	+17	—	—
Osima	4·0	222	0 59	− 2	1 53	+ 6	—	—
Shizuoka	4·4	232	1 5	− 1	—	—	—	—
Toyama	4·5	255	1 12a	+ 5	2 16	+17	—	—
Wazima	4·5	264	1 10	+ 3	2 3	+ 4	—	—
Mori	4·6	340	1 8	− 1	2 12	+10	—	—
Nagoya	5·2	242	1 17	0	2 22	+ 5	—	—
Gihu	5·3	245	1 16	− 3	2 19	0	—	—
Sapporo	5·3	349	1 21	+ 2	2 30	+11	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Hikone		5·7	246	1 24	0	2 31	+ 2	—	—
Kameyama		5·8	241	1 25	0	2 34	+ 2	—	—
Osaka		6·2	244	1 38	+ 7	3 0	+19	—	—
Owase		6·4	237	1 21	−13	—	—	—	—
Toyooka		6·6	253	1 36	− 1	2 57	+ 6	—	—
Kobe		6·7	245	1 43	+ 5	3 6	+12	—	—
Siomisaki		7·0	234	1 40	− 2	2 51	−10	—	—
Sumoto		7·1	244	2 2	+18	—	—	—	—
Muroto		8·2	239	1 47	−12	—	—	—	—
Matuyama		8·9	246	2 12	+ 4	3 33	−15	—	—
Hamada		9·0	254	2 13	+ 3	—	—	—	—
Hukuoka		10·8	251	2 35	+ 1	5 0	+26	—	—
Miyazaki		10·9	241	2 33	− 3	—	—	—	—
Shasta Dam		69·9	54	e 11 7	+ 1	—	—	e 14 32	PP
Tinemaha	z.	74·6	56	e 11 34	0	—	—	e 11 42	pP
Mount Wilson	z.	76·4	58	e 11 45	+ 1	—	—	e 11 52	pP
Pasadena	z.	76·4	58	e 11 48	+ 4	—	—	—	—
Riverside	z.	77·0	58	e 11 55	+ 7	—	—	—	—
Palomar	z.	77·7	57	i 12 3	+12	—	—	—	—
Pierce Ferry		77·9	54	i 11 54	+ 2	—	—	—	—
Tucson		82·4	55	e 12 17	+ 1	—	—	e 12 26	pP
Stuttgart	z.	84·4	331	e 12 27	0	—	—	—	—
Strasbourg		85·1	332	e 12 31	+ 1	—	—	—	—
Basle		86·0	331	e 12 36	+ 1	—	—	—	—
Paris		86·8	335	i 12 39	+ 1	—	—	—	—
Alicante		96·9	332	e 12 37	−48	—	—	—	—
Tacubaya	E.	98·7	58	—	—	e 22 19	?	e 26 28	PS
Vera Cruz	z.	100·9	56	—	—	e 27 14	PPS	—	—
Tamanrasset		107·5	319	e 18 42	PP	—	—	—	—

Additional readings :—
Shasta Dam i =11m.14s.
Tacubaya eN =26m.38s.

May 12d. 1h. South America.

La Paz iPZ =44m.15s., iS =44m.38s., iS_E =44m.55s., L =45m.10s.
Montezuma eP =46m.33s.
Bogota iPEZ =48m.20s., iPPEZ =48m.55s., iPPPEZ =49m.21s., iS?EZ =53m.18s., iScP?EZ =55m.1s.
Granada iP =49m.9s.
Harvard iP? =53m.26s., ipP? =53m.47s.
Tucson iP =53m.48s., i =54m.0s. and 54m.11s.
Temiskaming P =53m.58s.
Kirkland Lake P =54m.8s., pP =54m.26s., i =54m.36s.
Palomar ePZ =54m.16s., ipPZ =54m.31s., iZ =54m.44s.
Pierce Ferry iP =54m.17s.
Boulder City iP =54m.21s.
Riverside iPZ =54m.21s.a, ipPZ =54m.36s., iZ =54m.41s.
Mount Wilson iPZ =54m.25s.a, ipPZ =54m.40s., iZ =54m.48s.
Pasadena iPZ =54m.25s., epPZ =54m.37s., iZ =54m.46s.
Haiwee ePZ =54m.34s.
Tinemaha iPZ =54m.38s.a, ipPZ =34m.52s., iZ =55m.1s.
Lick iPZ =54m.57s.
Shasta Dam eP =55m.4s.
Hungry Horse iP =55m.10s.
Tamanrasset iP =55m.56s., ipP =56m.13s.
Toledo P =55m.54s., S_E =56m.12s.(pP?).
Stuttgart eZ =56m.52s.

May 12d. 11h.-12h. Mexico, Tacubaya suggest epicentre 16°22′N. 97°48′W.

Puebla PE =56m.19s., LE =56m.55s.
Tacubaya PEN =56m.28s., LE =57m.13s.
Vera Cruz PN =56m.29s., LN =57m.14s.
Tucson iP =59m.58s.k, e =65m.46s. and 66m.33s.
Palomar iPZ =60m.41s., iZ =60m.48s.
Riverside iPZ =60m.50s.
Mount Wilson iPZ =60m.55s.
Tinemaha iPZ =61m.13s.
Pierce Ferry eP =61m.46s., eS =68m.38s.
Scoresby Sund P =62m.35s., L =65m.
Stuttgart ePZ =66m.5s.?, eL =79m.
Copenhagen 69m.18s., L =73m.
Potsdam eNZ =70m.6s., eL =75m.
Long waves were also recorded at Istanbul, Paris, and Rome.

May 12d. Readings also at 1h. (Helwan, Ksara, Tamanrasset, Murgab, Samarkand, near Kulyab, Obi-garm, Stalinabad, and near Mizusawa (4)), 2h. (La Paz, Hungry Horse (2), and near Mizusawa (2)), 3h. (Dehra Dun and near Mizusawa (2)), 4h. (near Kulyab and Obi-garm), 5h. (near Andijan), 6h. (Stuttgart), 7h. (Pierce Ferry, Obi-garm, near Kulyab, and near Mizusawa), 8h. (Tucson and near Mizusawa), 9h. (near Lick), 10h. (San Francisco, near Berkeley, and Lick (2)), 11h. (Hungry Horse), 12h. (near Tacubaya, Vera Cruz, Mount Wilson, Riverside, Tinemaha, Tucson (2), Boulder City, and Pierce Ferry (2)), 13h. (Mount Wilson, Palomar, Riverside, Tucson, Boulder City, Pierce Ferry, near Oaxaca, Puebla, Tacubaya (2), and Vera Cruz (2)), 14h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, Copenhagen, Potsdam, Rome, and Stuttgart), 15h. (Shasta Dam), 16h. (Mount Wilson, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, and Warsaw), 17h. (near Branner, Lick, and near Mizusawa), 18h. (near Lick), 20h. (Tacubaya and near Oaxaca), 21h. (Shasta Dam), 23h. (Tucson, Boulder City, Pierce Ferry, and Shasta Dam (2)).

May 13d. 14h. Undetermined shock.

Intensity IV at Apia. Epicentre 15°·0S. 173°·0W. Bulletin séismique trimestriel d'Apia, Samoa.

Apia iP =51m.4s.k, iS =51m.24s.
Pasadena iPZ =62m.58s.
Mount Wilson iPZ =62m.59s.
Riverside iPZ =63m.1s.
Palomar iPZ =63m.2s.
Haiwee ePZ =63m.6s.
Tinemaha iPZ =63m.8s.
Tucson iP =63m.24s.k, e =64m.11s.
Hungry Horse iP =63m.56s.
Stuttgart eZ =71m.15s. and 71m.26s.
Strasbourg ePKP =71m.15s., e =71m.26s.
Paris ePKP? =71m.16s.
Istanbul e =71m.17s.
Ksara ePKP =71m.23s., PP =74m.59s.?
Long waves were recorded at Arapuni, Wellington, and Auckland.

May 13d. 20h. 50m. 27s. Epicentre 37°·8N. 142°·6E. (as on 12d.).

Intensity II-III at Hukusima, Onahama, Tukubasan. Epicentre 37°·8N. 142°·4E. Macroseismic radius 200-300km. Shallow.

Seismo. Bull. Cent. Met. Obs., Japan, 1948, Tokyo, 1950, p.17 with macroseismic chart.

	△	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Sendai	1·4	289	0 27a	0	0 46	0	—
Onahama	1·6	237	0 29	− 1	0 39	−12	—
Mizusawa	1·7	286	0 34	+ 3	0 55	+ 1	—
Miyako	1·9	345	0 40	P_g	1 7	S_g	—
Mito	2·2	230	0 36	− 2	—	—	—
Morioka	2·2	330	0 42a	+ 4	1 15	S_g	—
Kakioka	2·5	231	0 38a	− 5	1 7	− 7	—
Utunomiya	2·5	240	0 39	− 4	1 10	− 4	—
Tukubasan	2·6	232	0 38	− 6	—	—	—
Akita	2·7	315	0 52	+ 7	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Hatinohe		2·8	343	0 53	+ 6	—	—	—
Kumagaya		3·1	237	0 47	− 4	1 25	− 4	—
Tokyo		3·1	227	0 48k	− 3	—	—	—
Maebasi		3·2	244	0 51	− 1	—	—	—
Yokohama		3·4	223	0 54	− 1	1 23	−14	—
Aikawa		3·5	272	0 54	− 3	—	—	—
Mera		3·6	219	1 2	+ 4	—	—	—
Nagano		3·7	254	1 1	+ 1	—	—	—
Hunatu		3·8	235	0 59	− 2	1 41	− 6	—
Osima		4·0	222	1 0	− 4	1 43	− 9	—
Shizuoka		4·4	232	1 5	− 5	2 7	+ 5	—
Wazima		4·5	264	1 10	− 1	2 22	S*	—
Mori		4·6	340	1 16	+ 4	—	—	—
Nagoya		5·2	242	1 20	− 1	2 21	− 1	—
Gihu		5·3	245	1 20	− 2	2 24	− 1	—
Hikone		5·7	246	1 26	− 2	2 32	− 3	—
Kameyama		5·8	241	1 35	+ 6	2 34	− 4	—
Osaka		6·2	244	1 45	+10	3 1	+13	—
Owase		6·4	237	1 40	+ 2	2 45	− 8	—
Toyooka		6·6	253	1 32	− 9	2 58	0	—
Sumoto		7·1	244	1 39	− 9	2 38	−32	—
Koti		8·5	243	2 4	− 3	—	—	—
Hamada		9·0	254	2 26	+13	—	—	—
Vladivostok		9·7	306	i 2 23	+ 1	e 4 21	+ 6	—
Hukuoka		10·8	251	2 38	− 1	—	—	—
Miyazaki		10·9	241	2 38	− 2	—	—	—
Tashkent		55·1	299	e 9 33?	− 3	—	—	—
Hungry Horse		70·6	44	e 11 15	− 4	—	—	—
Tinemaha	z.	74·6	56	e 11 46	+ 3	—	—	—
Mount Wilson	z.	76·4	58	e 11 57	+ 4	—	—	—
Riverside	z.	77·0	58	e 11 57	+ 1	—	—	—
Boulder City		77·5	55	e 12 5	+ 6	—	—	—
Copenhagen		77·7	334	11 58	− 2	—	—	41·6
Pierce Ferry		77·9	54	e 12 2	+ 1	—	—	—
Tucson		82·4	55	e 12 28	+ 3	—	—	—
Stuttgart	z.	84·4	331	e 12 34	− 2	—	—	—
Paris		86·8	335	12 45	− 2	—	—	e 53·6

Long waves were also recorded at Warsaw, De Bilt, Potsdam, and Rome.

May 13d. 23h. 50m.49s. Epicentre 2°·0N. 124°·0E. Depth of focus 0·030.
(as on 1942, August 24d.).

Felt at Ternate (Moluccas). Epicentre 2°·0N. 124°·0E.
Bulletin séismique trimestriel de Batavia.

$A = -·5589$, $B = +·8285$, $C = +·0347$; $\delta = -1$; $h = +7$;
$D = +·829$, $E = +·559$; $G = -·019$, $H = +·029$, $K = -·999$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	z.	19·0	245	i 3 16	−51	e 6 45	−41	—	—	—
Osaka		34·2	17	6 27	+ 1	11 31	− 4	—	—	—
Toyooka		34·8	16	6 31	0	11 40	− 5	—	—	—
Hikone		35·0	19	6 31	− 2	11 42	− 6	—	—	—
Nagoya		35·1	19	6 33	− 1	11 45	− 4	—	—	—
Maebasi		37·0	20	6 50	0	12 9	− 9	—	—	—
Wazima		37·2	17	6 48	− 3	12 5	−16	—	—	—
Hukusima		38·7	22	7 3	− 1	12 38	− 6	—	—	—
Sendai		39·3	22	7 8	− 1	12 29	−24	—	—	—
Calcutta	E.	40·2	303	e 6 24	−52	—	—	—	—	—
Vladivostok		41·6	9	i 7 26	− 2	e 13 21	− 5	e 8 18?	pP	—
Mori		42·6	17	7 34	− 2	13 34	− 7	—	—	—
Riverview		43·9	147	i 7 47a	+ 1	i 14 1	+ 1	e 8 37	pP	—
Irkutsk		52·7	345	i 8 54	0	16 2	0	i 9 45	pP	—
Bombay		52·8	292	e 8 42	−12	e 16 6	+ 2	e 8 55	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Murgab		58·3	315	9 35	+ 1	17 18	+ 2	—	—	—
Almata		58·6	322	i 9 37	+ 1	—	—	—	—	—
Andijan		60·4	316	e 9 42	− 6	—	—	—	—	—
Kulyab		61·1	313	e 9 55	+ 2	e 17 53	+ 1	—	—	—
Obi-garm		61·5	314	i 9 56	+ 1	i 17 58	+ 1	—	—	—
Stalinabad		62·1	314	i 10 0	+ 1	e 18 4	− 1	—	—	—
Tashkent		62·8	316	i 10 5	+ 1	i 18 14	0	e 10 58	pP	—
Tchimkent		62·9	317	i 10 5	+ 1	i 18 17	+ 2	—	—	—
Samarkand		63·8	313	i 10 11	+ 1	—	—	—	—	—
Sverdlovsk		74·0	329	i 11 12	− 1	i 20 21	− 4	—	—	—
Baku		76·6	311	i 11 33	+ 6	e 20 59	+ 5	—	—	—
Grozny		80·1	313	11 51	+ 5	—	—	—	—	—
Erevan		80·7	310	e 11 55	+ 6	—	—	—	—	—
Leninakan		81·2	311	e 11 59?	+ 7	e 21 51?	+ 9	—	—	—
Sotchi		84·5	313	e 12 8	− 1	—	—	—	—	—
Moscow		86·4	325	12 17	− 1	22 31	− 2	13 11	pP	—
Ksara		87·3	303	i 12 26k	+ 3	22 56	+15	—	—	—
Simferopol		88·5	315	—	—	e 22 38	[+ 4]	—	—	—
Helwan		91·3	299	12 44	+ 3	22 51	[+ 1]	e 13 39	pP	—
Istanbul		92·4	311	i 12 46	0	i 22 56	[0]	—	—	—
Warsaw		96·4	323	e 17 0	PP	e 23 20	[+ 2]	—	—	—
Copenhagen		100·3	328	e 17 32	PP	i 23 38	[+ 1]	—	—	—
Potsdam		101·0	325	i 17 40k	PP	i 23 42	[+ 1]	—	—	e 46·2
Triest		102·6	318	e 13 39	+ 7	i 23 48	[0]	—	—	—
Rome		104·5	314	e 19 22	?	e 24 42	−27	—	—	e 64·6
Stuttgart		104·6	322	e 13 42	P	e 23 57	[− 1]	e 18 7	PP	—
Strasbourg		105·5	322	i 18 14	PP	—	—	e 20 18	PPP	—
De Bilt		105·7	326	—	—	e 24 11?	[+ 8]	—	—	—
Shasta Dam		106·4	46	e 17 56	PKP	—	—	e 18 12	PP	—
Lick	z.	107·9	49	i 18 23	PP	—	—	—	—	—
Paris		108·6	323	e 18 35	PP	e 28 11?	PS	—	—	—
Hungry Horse		109·1	36	e 14 0	P	—	—	e 17 29	?	—
Tinemaha	z.	110·6	50	e 18 8	[+ 3]	—	—	i 18 38	PP	—
Mount Wilson	z.	111·6	52	e 18 10	[+ 3]	—	—	e 18 43	PP	—
Riverside	z.	112·2	52	e 18 11	[+ 3]	—	—	e 18 49	PP	—
Palomar	z.	112·8	52	i 18 59	PP	—	—	—	—	—
Boulder City		113·5	49	e 18 14	[+ 3]	—	—	e 19 4	PP	—
Pierce Ferry		114·1	49	e 19 10	PP	—	—	—	—	—
Tamanrasset		115·2	296	e 18 8	[− 6]	—	—	e 19 18	PP	—
Tucson		118·0	52	i 18 22	[+ 2]	—	—	i 19 36	PP	—
La Paz		161·3	141	19 43	[+10]	—	—	—	—	—

Additional readings :—
Riverview iP_cPZ =9m.31s., ePPZ =9m.36s., ePPPZ =10m.21s., iS_cPZ =12m.57s. eP_cSN =13m.13s., esSN =15m.17s., iN =15m.34s., iS_cSEN =17m.16s., iSSEZ = 17m.22s., iN =17m.38s., isSSE =18m.26s., isSSN =18m.29s.
Irkutsk epP* =9m.36s., PP* =10m.52s., PP =11m.6s., sS =17m.34s.
Moscow SKS =22m.17s.
Helwan PP?Z =16m.26s.
Warsaw eSKS?Z =23m.25s., eN =25m.1s. and 26m.57s.
Copenhagen 18m.47s. and 25m.26s.
Rome e =28m.44s. and 44m.54s.
Stuttgart eZ =19m.22s., e =20m.25s., 25m.47s., and 28m.17s.
Strasbourg e =19m.5s.
Tamanrasset e =20m.11s.
Tucson e =19m.15s., 20m.21s., 21m.33s., and 21m.58s.

May 13d. Readings also at 1h. (La Paz and near Apia), 3h. (Balboa Heights and near Lick), 6h. (Istanbul and Batavia), 8h. (Kulyab, Obi-garm, Stalinabad, and near Ashkabad), 9h. (La Paz and near Batavia), 12h. (near Berkeley, Branner, Lick, and Fresno), 13h. (Christchurch and near Mizusawa), 15h. (near Lick (2), and near Apia), 17h. (Mineral and near Tacubaya), 18h. (near Kulyab, Obi-garm, and Stalinabad), 19h. (Christchurch and near Branner and Mineral), 20h. (near Istanbul), 23h. (near Murgab).

May 14d. 13h. 19m. 10s. Epicentre 37°·8N. 142°·6E. Focus at Base of Superficial Layers. (as on 13d.).

Intensity V at Matusima, Watari, Miyagi Pref.; IV at Onahama, Sendai, Hukusima, Miyako, Kakioka, Morioka, Tukubasan; II-III at Mizusawa, Mito, Tokyo, Sakata. Epicentre 37°·9N. 142°·2E. Macroseismic radius >300km. Depth of focus 40km.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1948, Tokyo 1950, p.18 with macroseismic chart.

$A = -\cdot 6293,\ B = +\cdot 4811,\ C = +\cdot 6103;\quad \delta = -6;\quad h = -1.$

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sendai		1·4	289	0 26	+ 3	0 40	− 1	—	—	—
Onahama		1·6	237	0 23	− 3	0 38	− 8	—	—	—
Hukusima		1·7	268	0 29k	+ 1	0 50	+ 1	—	—	—
Mizusawa		1·7	286	0 33	+ 5	0 55	+ 6	—	—	—
Miyako		1·9	345	0 32a	+ 1	0 57	+ 3	—	—	—
Mito		2·2	230	0 37	+ 2	1 10	+ 9	—	—	—
Morioka		2·2	330	0 38a	+ 3	1 9	+ 8	—	—	—
Kakioka		2·5	231	0 35a	− 4	0 58	−11	—	—	—
Utunomiya		2·5	240	0 36	− 3	1 4	− 5	—	—	—
Tukubasan		2·6	232	0 36k	− 5	1 1	−10	—	—	—
Hatinohe		2·8	343	0 44	+ 1	1 19	+ 3	—	—	—
Kumagaya		3·1	237	0 44k	− 4	1 24	0	—	—	—
Tokyo		3·1	227	0 45a	− 3	1 26	+ 2	—	—	—
Maebasi		3·2	244	0 48a	− 1	—	—	—	—	—
Aomori		3·3	335	0 56	+ 5	—	—	—	—	—
Yokohama		3·4	223	0 49	− 3	1 33	+ 1	—	—	—
Aikawa		3·5	272	0 53	0	—	—	—	—	—
Hunatu		3·8	235	0 55	− 3	1 41	− 1	—	—	—
Osima		4·0	222	0 58	− 2	1 50	+ 3	—	—	—
Shizuoka		4·4	232	1 4	− 2	1 56	− 1	—	—	—
Toyama		4·5	255	1 5a	− 3	2 19	+19	—	—	—
Wazima		4·5	264	1 12a	+ 4	2 13	+13	—	—	—
Mori		4·6	340	1 7	− 2	2 23	+21	—	—	—
Omaesaki		4·8	229	1 18k	+ 6	—	—	—	—	—
Gihu		5·3	245	1 12	− 7	2 14	− 6	—	—	—
Sapporo		5·3	349	1 23	+ 4	2 29	+ 9	—	—	—
Hikone		5·7	246	1 23a	− 1	2 25	− 5	—	—	—
Kameyama		5·8	241	1 22a	− 4	2 46	+14	—	—	—
Nemuro		6·0	22	1 47	+18	—	—	—	—	—
Kyoto		6·2	246	1 28	− 4	2 40	− 2	—	—	—
Osaka		6·2	244	1 33	+ 1	2 48	+ 6	—	—	—
Owase		6·4	237	1 32	− 2	2 46	− 1	—	—	—
Toyooka		6·6	253	1 34a	− 3	2 47	− 5	—	—	—
Kobe		6·7	245	1 36	− 3	3 8	+13	—	—	—
Siomisaki		7·0	234	1 39	− 4	2 48	−14	—	—	—
Sumoto		7·1	244	1 43	− 1	—	—	—	—	—
Muroto		8·2	239	2 32	+32	—	—	—	—	—
Koti		8·5	243	2 1	− 3	3 30	−10	—	—	—
Matuyama		8·9	246	2 2	− 7	—	—	—	—	—
Hamada		9·0	254	2 12	+ 1	—	—	—	—	—
Vladivostok		9·7	306	i 2 20	0	i 4 21	+12	—	—	—
Kumamoto		10·9	264	2 35	− 2	—	—	—	—	—
Miyazaki		10·9	241	2 32	− 5	4 33	− 6	—	—	—
Kagosima		11·7	241	2 41	− 7	—	—	—	—	—
Nanking		20·2	261	e 4 30	− 5	—	—	—	—	—
College		47·9	32	e 8 55	+18	e 15 36	+ 5	e 11 0	PP	e 19·6
Calcutta	E.	48·7	268	e 8 16	−27	e 18 30	?	—	—	—
Almata		49·1	299	e 8 46	0	—	—	—	—	—
Frunse		50·8	298	e 9 0	+ 1	—	—	—	—	—
Murgab		52·9	293	9 15	0	16 48	+ 8	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Andijan		53·1	296	e 9 17	+ 1	e 16 48	+ 5	—	—	—
Batavia		55·0	226	e 9 41	+11	i 17 8	0	—	—	—
Sitka		55·0	42	e 9 53	+23	e 17 18	+10	e 21 10	SS	e 22·5
Tashkent		55·1	299	e 9 30?	− 1	e 17 12?	+ 2	—	—	—
Sverdlovsk		55·2	319	i 9 32	0	i 17 13	+ 2	—	—	—
Obi-garm		55·8	296	i 9 36	0	i 17 21	+ 2	—	—	—
Kulyab		56·1	294	i 9 37	− 1	i 17 25	+ 2	—	—	—
Stalinabad		56·5	296	i 9 40	− 1	i 17 30	+ 2	—	—	—
Samarkand		57·3	297	e 9 48	+ 1	—	—	—	—	—
Bombay	N.	62·9	274	e 10 26	+ 1	e 18 56	+ 5	—	—	—
Ashkabad		64·1	300	10 33	0	19 12	+ 6	—	—	—
Kodaikanal	E.	64·2	263	e 10 27	− 7	—	—	—	—	—
Moscow		67·3	323	i 10 52	− 1	i 19 45	0	—	—	—
Baku		68·6	305	e 11 2?	0	e 20 6?	+ 5	—	—	—
Grozny		69·6	310	e 11 10	+ 2	e 20 14	+ 2	—	—	—
Shasta Dam		69·9	54	e 11 12	+ 2	—	—	e 11 45	?	—
Hungry Horse		70·6	44	e 11 9	− 5	—	—	e 11 15	P	—
Platigorsk		70·8	312	e 11 13	− 2	—	—	—	—	—
Scoresby Sund		71·4	355	11 20	+ 1	20 38	+ 5	21 1	PS	—
Riverview		71·7	173	—	—	i 20 39	+ 2	e 31 26	Q	e 33·7
Leninakan		72·2	308	e 11 2?	−21	—	—	—	—	—
Upsala		72·7	334	e 11 23	− 3	e 20 49?	+ 1	e 25 28	SS	e 36·8
Sotchi		73·1	312	e 11 27	− 2	—	—	—	—	—
Tinemaha	z.	74·6	56	e 11 39	+ 1	—	—	e 11 54	PcP	—
Santa Barbara	z.	75·2	58	e 11 23	−18	—	—	—	—	—
Haiwee	z.	75·3	56	e 11 44	+ 2	—	—	e 12 2	PcP	—
Mount Wilson	z.	76·4	58	e 11 50	+ 2	—	—	i 12 2	PcP	—
Pasadena	z.	76·4	58	e 11 48	0	—	—	e 11 59	PcP	—
Warsaw		76·9	327	e 11 42	− 9	e 21 41	+ 6	e 14 45	PP	e 39·8
Riverside	z.	77·0	58	e 11 52	+ 1	—	—	e 12 6	PcP	—
Boulder City		77·5	55	e 11 56	+ 2	—	—	—	—	—
Copenhagen		77·7	334	e 11 55	0	21 46	+ 2	14 52	PP	40·8
Palomar	z.	77·7	57	e 12 7	+12	—	—	—	—	—
Pierce Ferry		77·9	54	e 11 58	+ 2	—	—	—	—	—
Potsdam		80·0	332	i 12 8a	0	i 22 11	+ 3	i 15 9	PP	e 42·8
Bucharest	N.	80·1	320	e 12 9	+ 1	e 22 15	+ 6	—	—	—
Aberdeen		80·8	342	—	—	i 21 44	−32	—	—	e 43·7
Istanbul		80·8	315	i 12 11	− 1	e 22 20	+ 4	—	—	—
Prague		81·3	329	—	—	e 22 20	− 1	—	—	e 39·8
Ksara		81·5	306	i 12 17a	+ 1	22 28	+ 5	—	—	—
Jena	N.	81·7	331	e 12 10	− 7	—	—	e 12 17	PcP	—
Tucson		82·4	55	e 12 23	+ 3	—	—	i 12 32	PcP	e 38·0
Belgrade		82·6	322	e 12 18	− 3	e 22 36	+ 1	e 15 33	PP	45·8
De Bilt		83·1	335	e 12 24	0	e 22 50	+10	—	—	e 40·8
Stuttgart		84·4	331	e 12 31a	+ 1	e 22 55	+ 2	e 15 44	PP	e 44·8
Triest		85·0	327	e 12 34	+ 1	i 22 55	[+ 3]	e 15 56	PP	—
Strasbourg		85·1	332	e 12 34a	0	e 23 1	+ 2	e 15 57	PP	e 38·8
Kew		85·4	338	e 17 53	PPP	—	—	—	—	e 41·8
Basle		86·0	331	e 12 40	+ 2	e 23 9	+ 1	—	—	—
Salo		86·5	329	e 14 24	?	e 30 40	?	—	—	—
Padova		86·8	328	e 13 9	+27	e 22 58	[− 5]	—	—	—
Paris		86·8	335	e 12 44	+ 2	e 23 20	+ 4	—	—	e 47·8
Bologna		87·0	328	e 12 36k	− 7	e 23 38	+20	—	—	—
Helwan		87·0	306	i 12 43k	0	23 8	[+ 3]	16 5	PP	—
Rome		88·6	325	e 13 25	+34	i 23 26	− 7	e 16 21	PP	e 42·3
Clermont-Ferrand		89·2	333	e 16 27	PP	—	—	—	—	47·8
Seven Falls		90·3	22	—	—	e 23 50	+ 2	—	—	36·8
Alicante		96·9	332	—	—	e 34 27	?	—	—	e 54·0
Toledo		96·9	335	17 23	PP	—	—	—	—	—
Granada		99·1	334	—	—	e 35 42	SSS	52 26	Q	i 54·2
Bermuda		105·7	24	e 27 5	PS	e 30 10	?	—	—	e 59·4
Tamanrasset		107·5	319	18 45	PP	—	—	—	—	—
La Paz		145·6	61	i 19 42	[+ 7]	—	—	23 10	PP	67·0

For Notes see next page.

Notes to May 14d. 13h. 19m. 10s.

Additional readings :—
College eS_cS =15m.58s., eSS =18m.28s.
Sitka e =12m.26s. and 18m.8s., eS_cS =19m.9s.
Bombay eSE =19m.18s.
Riverview eE =20m.59s.
Upsala ePPN =13m.56s., iS_cS?N =21m.28s., eE =22m.9s., eSSS?N =27m.50s.?
Warsaw iPZ =11m.53s., P_cPZ =12m.5s., ePPPZ =16m.40s., eSZ =21m.48s., eS_cSN = 21m.59s., PSN =22m.26s.
Copenhagen 26m.38s.
Potsdam ePE =12m.11s., iP_cPZ =12m.21s., iS_cSN =22m.28s., iPSZ =23m.7s.
Tucson i =13m.3s. and 13m.28s.
Belgrade e =14m.50s.
Stuttgart eP_cP?Z =12m.45s., eS =23m.6s., eS_cS? =23m.14s.
Triest iS =23m.18s., iPS =24m.15s.
Strasbourg e =12m.50s., eS =23m.20s., eSS =29m.26s.
Helwan eSNZ =23m.26s., iN =23m.38s.
Rome e =18m.49s. and 33m.34s.
Long waves were also recorded at Uccle, Neuchatel, Bucharest, Huancayo, Auckland, and Wellington.

May 14d. 18h. 39m. 40s. Epicentre 44°·1N. 148°·2E. (as on 1946, December, 21d.).

A = −·6130, B = +·3801, C = +·6926 ; δ = −6 ; h = −3 ;
D = +·527, E = +·850 ; G = −·589, H = +·365, K = −·721.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		7·2	230	1 45	− 4	3 0	−13	e 1 50	P	—
Vladivostok		11·9	271	i 2 52	− 2	i 5 9	0	—	—	—
College		40·4	35	e 7 44	+ 3	e 13 49	− 1	—	—	e 16·5
Sitka		47·6	45	e 8 42	+ 3	e 15 38	+ 3	e 18 33	S_cS	e 19·3
Almata		50·0	295	e 8 59	+ 1	—	—	—	—	—
Frunse		51·7	296	e 9 13	+ 2	—	—	—	—	—
Calcutta	E.	53·2	266	e 9 20	− 2	16 41	−11	—	—	e 25·1
Sverdlovsk		53·5	316	e 9 22	− 2	i 16 57	0	—	—	—
Andijan		54·2	294	e 9 32	+ 3	e 17 11	+ 5	—	—	—
Murgab		54·4	291	9 31	0	17 13	+ 4	—	—	—
Tashkent		55·9	296	e 9 41	− 1	e 17 26	− 3	—	—	—
Obi-garm		57·1	294	i 9 49	− 1	i 17 42	− 3	—	—	—
Kulyab		57·6	293	i 9 51	− 3	i 17 49	− 2	—	—	—
Stalinabad		57·7	294	i 9 54	− 1	i 17 55	+ 2	—	—	—
Samarkand		58·3	296	e 9 59	0	—	—	—	—	—
Shasta Dam		62·9	58	e 10 27	− 3	—	—	—	—	—
Hungry Horse		63·2	48	i 10 30	− 2	—	—	—	—	—
Hyderabad	N.	63·6	269	e 10 46	+11	19 22	+14	—	—	30·8
Berkeley		64·7	61	—	—	e 19 14	− 8	e 27 14	Q	e 31·8
Moscow		64·7	324	10 39	− 3	e 19 20	− 2	—	—	—
Butte	N.	65·4	48	e 11 45	+58	e 19 32	+ 2	e 20 43	S_eS	e 29·5
Scoresby Sund		65·6	357	10 49	+ 1	19 30	− 3	—	—	—
Bombay		66·7	274	e 10 55	0	—	—	—	—	—
Tinemaha	Z.	67·7	59	e 11 5	+ 4	—	—	—	—	—
Baku		68·4	306	e 11 8	+ 2	e 20 16?	+ 9	—	—	—
Haiwee	Z.	68·4	59	e 11 6	0	—	—	—	—	—
Upsala		68·8	335	e 10 54	−14	e 21 3	+52	e 27 58	SSS	e 34·3
Grozny		68·9	310	e 11 4	− 5	e 20 14	+ 1	—	—	—
Kodaikanal	E.	69·1	264	e 11 3	− 7	—	—	—	—	—
Mount Wilson	Z.	69·6	61	e 11 12	− 1	—	—	—	—	—
Pasadena	Z.	69·6	61	e 11 9	− 4	—	—	e 11 18	P	e 36·8
Piatigorsk		69·9	312	e 11 9	− 6	—	—	—	—	—
Riverside	Z.	70·2	61	e 11 16	− 1	—	—	—	—	—
Boulder City		70·5	58	e 11 17	− 1	—	—	i 11 29	P_cP	—
Palomar	Z.	70·9	62	e 11 23	+ 2	—	—	—	—	—
Pierce Ferry		70·9	58	e 11 19	− 2	—	—	—	—	—
Leninakan		71·6	309	e 11 38?	+13	e 20 58?	+14	—	—	—
Sotchi		72·0	313	e 11 29	+ 1	—	—	—	—	—
Theodosia		73·1	317	e 11 35	+ 1	—	—	—	—	—
Copenhagen		73·8	336	e 11 36	− 2	21 6	− 3	i 11 39	P	—

Continued on next page,

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Warsaw		73·9	329	e 11 37a	− 2	e 21 11	+ 1	21 44?	PS	e 36·3
Yalta		74·1	317	e 11 37	− 3	e 21 6	− 6	—	—	—
Tucson		75·4	58	e 11 44	− 3	—	—	—	—	—
Potsdam		76·5	334	i 11 56k	+ 2	i 21 40	+ 1	—	—	e 40·3
Collmberg	Z.	77·4	332	e 11 59	+ 1	—	—	—	—	—
Riverview		77·5	177	e 12 23	P_cP	i 21 47	− 3	e 22 8	PS	31·5
Bucharest	N.	78·0	321	e 12 3	+ 1	e 21 57	+ 2	—	—	—
Prague		78·0	331	e 11 57	− 5	e 21 50	− 5	—	—	e 37·3
Jena	N.	78·2	333	e 12 2	− 1	e 22 8	+11	—	—	—
De Bilt		79·1	337	e 12 10k	+ 2	e 22 8	+ 1	—	—	e 36·3
Istanbul		79·2	317	e 12 7	− 1	22 21	+13	—	—	—
Belgrade		80·1	324	e 12 14	+ 1	e 22 16	− 2	e 19 48	?	—
Stuttgart		80·8	334	e 12 16	− 1	e 22 23	− 2	e 12 26	P_cP	e 42·3
Kew		81·0	341	i 12 19	+ 1	e 22 43	+16	—	—	e 42·3
Ksara		81·0	308	e 12 17	− 1	23 35?	PS	—	—	—
Strasbourg		81·4	334	e 12 20	0	e 22 25	− 6	e 15 29	PP	e 40·3
Triest		82·0	329	e 12 30	+ 7	e 22 50	+13	e 15 20	PP	—
St. Louis		82·2	42	e 12 21	− 3	e 22 36	− 3	—	—	—
Zürich		82·3	334	e 12 23	− 2	e 22 39	− 1	—	—	—
Basle		82·4	334	e 12 25	0	e 22 41	0	—	—	—
Paris		82·8	337	e 12 28	+ 1	22 47	+ 2	—	—	e 42·3
Seven Falls		82·9	25	—	—	e 22 48	+ 2	—	—	33·3
Salo		83·2	332	e 12 26	− 3	e 23 0	+11	—	—	—
Clermont-Ferrand		85·4	336	e 12 42	+ 2	e 23 20	+ 9	e 24 8	PS	41·3
Rome		85·7	328	e 12 46	+ 4	e 23 14	0	e 23 6	SKS	e 41·0
Helwan		86·6	309	12 45	− 1	23 38	+15	13 29	pP	—
Philadelphia		87·7	32	—	—	e 23 28	− 5	—	—	e 47·1
Alicante		93·2	336	12 17	−60	e 24 49	[+58]	34 41	SSS	e 46·4
Granada		95·2	338	—	—	e 24 10	[+ 8]	27 46	PPS	i 49·6
Bermuda		98·2	28	e 18 43	PP	e 26 6	+61	e 27 43	PPS	e 42·1
La Paz		138·8	59	e 19 44	[+16]	—	—	—	—	—

Additional readings :—
Butte eN =19m.51s.
Upsala eS?E =20m.57s., eN =28m.20s.?
Warsaw iPZ =11m.40s.k, eSZ =21m.17s., PS?Z =21m.48s., PPS?E =22m.17s. and 22m.23s., eN =22m.48s.
Potsdam eSKSZ =21m.54s.
Stuttgart eS_cS? =22m.43s., eSSS =31m.20s.
Strasbourg eSS =28m.20s., eSSS =31m.29s.
Triest ePPP =16m.52s.
Paris i =12m.38s., eS =23m.1s., eSSS =33m.20s.
Clermont-Ferrand e =23m.50s.
Rome ePP =16m.0s., eSS? =29m.53s., eSSS? =32m.53s., e =37m.47s.?
Bermuda eSS =32m.56s.
Long waves were also recorded at Auckland, Wellington, Uccle, Neuchatel, Vermont, Salt Lake City, and Huancayo.

May 14d. 22h. 31m. 42s. Epicentre 54°·3N. 161°·5W. (as on 1941, November 6d.).

U.S.S.R. suggest a depth of 60km.

$A = -·5559$, $B = -·1860$, $C = +·8102$; $\delta = +4$; $h = -7$;
$D = -·317$, $E = +·948$; $G = -·768$, $H = -·257$, $K = -·586$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		12·6	28	i 2 56	− 7	i 5 13	−13	i 3 16	PP	i 5·4
Sitka		14·9	69	e 3 30	− 4	i 5 54	−26	i 3 57	PP	i 6·2
Victoria		24·3	88	4 29?	−51	8 54?	−43	5 2?	PP	10·8
Seattle		25·3	89	e 6 12	+42	e 10 28	+34	i 10 38	SS	i 11·0
Grand Coulee		27·1	85	e 5 45	− 1	e 10 18	− 6	i 5 48	P	—
Ferndale		28·3	103	e 5 50	− 7	e 10 40	− 3	e 6 24	PP	—
Shasta Dam		29·3	101	e 6 5	− 1	e 11 5	+ 6	i 16 49	S_cS	e 13·7
Hungry Horse		29·8	81	e 6 7	− 4	e 11 58	+51	—	—	—
Ukiah		29·9	104	e 7 9	+57	i 12 12	+63	e 9 29	P_cP	i 13·7
Mineral	E.	30·0	101	e 6 16	+ 4	e 11 9	− 1	—	—	e 13·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Berkeley		31·3	105	e 6 23	− 1	e 11 30	− 1	—	—	e 14·1
San Francisco		31·3	105	e 6 31	+ 7	e 11 36	+ 5	—	—	e 14·5
Branner		31·6	106	e 6 26	0	e 11 43	+ 8	—	—	e 14·7
Santa Clara		31·8	105	i 6 32	+ 4	i 11 42	+ 4	—	—	e 14·9
Butte	N.	31·9	83	e 6 33	+ 4	i 11 34	− 6	i 8 0	PPP	i 12·7
Lick		32·0	105	i 6 28	− 2	e 11 42	0	—	—	e 14·8
Saskatoon		32·2	71	6 31	− 1	11 42	− 3	12 36	?	14·7
Bozeman		32·9	84	e 6 44	+ 6	i 11 48	− 8	e 7 56	PP	e 12·9
Honolulu		33·0	173	e 6 41	+ 2	i 12 1	+ 4	e 7 58	PP	e 14·1
Fresno	Z.	33·5	104	i 6 44	+ 1	i 12 11	+ 6	—	—	e 15·6
Tinemaha		34·1	102	i 6 49	+ 1	i 12 21	+ 7	i 17 7	ScS	—
Logan		34·8	88	e 6 51	− 3	i 12 30	+ 5	i 8 18	PP	i 15·1
Haiwee		35·0	102	i 6 56	0	e 12 28	0	i 13 15	S_cP	—
Santa Barbara		35·2	106	i 7 4	+ 6	i 17 23	S_cS	i 13 17	S_cP	—
Salt Lake City		35·4	90	e 7 2	+ 2	i 12 29	− 5	i 8 55	P_cP	i 14·9
Nemuro		35·7	275	7 6	+ 4	—	—	—	—	—
Mount Wilson		36·3	104	e 7 7	0	e 12 45	− 3	i 7 22	?	—
Pasadena		36·3	104	i 7 5k	− 2	i 12 46	− 2	i 8 27	PP	i 15·8
Riverside		36·8	104	i 7 10	− 1	i 13 22	S_cP	—	—	—
Boulder City		36·9	100	i 7 12	0	e 12 56	− 2	i 7 38	pP	—
Pierce Ferry		37·2	99	i 7 15	0	e 12 57	− 5	i 9 14	PPP	—
Palomar		37·6	105	e 7 16	− 2	i 13 11	+ 3	i 8 28	PP	—
La Jolla		37·7	106	i 7 19	0	e 13 12	+ 2	e 17 38	S_cS	—
Sapporo		38·3	278	7 29	+ 5	13 20	+ 1	—	—	17·7
Mizusawa		41·0	273	7 52	+ 6	13 45	−14	—	—	—
Sendai		41·7	272	7 54	+ 2	14 11	+ 1	—	—	20·1
Tucson		41·8	100	i 7 53	0	i 14 12	+ 1	i 9 56	P_cP	e 17·6
Hukusima		42·3	272	7 56	− 1	14 14	− 5	—	—	17·7
Vladivostok		43·8	283	i 8 9	0	i 14 41	+ 1	—	—	—
Tokyo		44·1	270	8 14	+ 2	14 54	+ 9	—	—	22·1
Lincoln	E.	44·2	78	e 8 12	0	i 14 40	− 6	e 9 40	PP	i 18·1
Wazima		44·6	274	8 21	+ 5	14 59	+ 7	18 19	S_cS	—
Nagoya		46·1	272	8 32	+ 4	—	—	—	—	21·1
Chihuahua	Z.	47·3	99	i 8 25	−12	i 15 12	−19	i 19 13	SS	i 22·4
Osaka		47·4	272	8 40	+ 2	15 28	− 4	—	—	21·5
Sumoto		47·9	272	8 44	+ 2	15 40	+ 1	e 19 37	SS	—
Siomisaki		48·0	271	e 8 47	+ 4	15 49	+ 8	18 59	ScS	—
Chicago		48·7	73	e 8 44	− 4	i 15 44	− 6	e 11 27	PPP	i 20·2
Kirkland Lake		48·7	62	8 45	− 3	15 48	− 2	i 10 53	PP	24·3
Koti		49·2	273	8 56	+ 4	19 37	SS	—	—	—
St. Louis		49·4	77	i 8 50	− 3	i 15 50	−10	—	—	—
Ville Marie		49·5	63	8 52	− 2	15 55	− 7	9 7	?	25·3
Temiskaming		50·2	63	8 57	− 3	16 7	− 4	9 12	?	24·3
Hukuoka		51·1	275	e 9 9	+ 3	16 26	+ 2	—	—	22·1
Kumamoto		51·4	275	e 9 11	+ 2	16 35	+ 7	—	—	22·9
Scoresby Sund		52·2	17	9 10k	− 5	16 29	−10	20 11	SS	—
Cleveland		52·3	69	e 9 10	− 5	i 16 21	−19	i 11 23	PP	—
Ottawa		52·8	62	9 15	− 4	i 16 38	− 9	11 18	PP	i 23·9
Ivigtut		53·4	34	i 9 18	− 6	i 16 47	− 8	20 36	SS	24·3
Shawinigan Falls		53·5	59	9 18	− 6	16 45	−12	11 21	PP	25·3
New Kensington	E.	54·0	69	e 9 24	− 4	e 17 24	+21	e 19 6	ScS	e 28·6
Seven Falls		54·1	57	9 26	− 3	16 55	−10	11 34	PP	23·3
Vermont		54·7	61	i 10 29	+56	i 18 1	+48	e 12 38	PP	e 24·1
Pennsylvania	N.	54·8	68	e 9 37	+ 3	i 17 5	− 9	i 20 53	SS	—
Manzanillo		55·7	105	e 9 44	+ 4	e 17 26	0	e 21 16	SS	e 26·5
Georgetown		56·5	68	i 9 44	− 2	i 17 30	− 7	—	—	—
Philadelphia		56·8	67	i 9 45	− 3	i 17 34	− 7	e 11 49	PP	e 25·3
Harvard		56·9	62	i 9 46	− 3	i 17 35	− 7	e 21 24	SS	e 25·3
Reykjavik		57·8	20	e 9 54	− 1	17 53	− 1	e 13 19	PPP	e 25·4
Columbia		57·9	75	e 9 50	− 6	i 17 52	− 3	i 21 49	SS	e 24·0

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Guam		58·4	248	e 10 2	+ 2	i 18 1	− 1	12 16	PP		—
Tacubaya		58·4	101	i 10 3	+ 3	i 18 4	+ 2	e 22 0	SS		e 29·1
Nanking		58·9	283	9 57	− 6	18 7	− 1	—	—		—
Halifax		59·3	56	10 6	0	18 3	−11	21 54	SS		27·3
Oaxaca	E.	61·6	99	—	—	e 18 38	− 5	—	—		—
Semipalatinsk		63·6	321	e 10 45?	+10	e 19 13?	+ 5	—	—		—
Sverdlovsk		64·0	336	i 10 36	− 2	i 19 39	PS	i 10 54	pP		—
Helsinki		65·8	357	i 10 46	− 3	e 19 28	− 7	e 20 29	PPS		e 29·3
Upsala		66·2	2	i 10 48a	− 4	19 32	− 8	23 37	SS		e 27·3
Aberdeen		67·6	12	i 11 0	− 1	i 19 53	− 4	i 23 49	SS		32·9
Bermuda		68·1	64	i 12 3	+59	i 20 56	+53	e 14 53	PP		e 28·1
Apia		68·4	190	e 11 18	+12	20 8	+ 1	e 27 48	Q		e 30·8
Edinburgh		68·7	13	e 11 5	− 2	20 4	− 6	13 35	PP		—
Moscow		69·2	348	i 11 8	− 2	i 20 7	− 9	e 11 26	pP		—
Durham		70·0	12	i 11 13	− 2	i 20 20	− 6	i 13 56	PP		—
Copenhagen		70·3	3	i 11 15a	− 2	i 20 23	− 6	15 32	PPP		—
Almata		70·8	319	i 11 20	0	i 20 36	+ 1	—	—		—
Frunse		72·0	320	i 11 28	0	i 20 53	+ 4	—	—		—
De Bilt		73·4	8	i 11 34a	− 2	e 21 4	− 1	—	—		e 35·3
Kew		73·4	12	i 11 34	− 2	i 21 1	− 4	e 14 24	PP		e 41·3
Potsdam		73·6	4	i 11 35a	− 2	i 21 5	− 2	i 25 34	SS		e 31·3
Warsaw		73·8	358	i 11 37a	− 1	21 9	0	e 14 15	PP		e 32·3
Tchimkent		74·3	323	i 11 39	− 2	i 21 13	− 2	—	—		—
Uccle		74·6	11	e 11 39a	− 4	i 21 14	− 4	e 14 35	PP		e 37·3
Collmberg		74·7	5	e 11 41	− 2	i 21 18	− 1	e 14 27	PP		e 33·4
Andijan		74·7	321	i 11 47	+ 4	i 21 23	+ 4	—	—		—
Jena		75·0	5	e 11 42	− 3	e 21 18	− 5	e 14 32	PP		e 36·3
Tashkent		75·3	323	i 11 46	− 1	i 21 22	− 4	—	—		—
Prague		76·0	4	i 11 50a	− 1	i 21 29	− 5	e 14 36	PP		e 32·3
Raciborzu		76·0	1	e 11 49	− 2	—	—	e 14 37	PP		e 32·3
Murgab		76·1	318	11 53	+ 2	21 35	0	—	—		—
Paris		76·4	12	i 11 52	− 1	i 21 37	− 1	i 14 34	PP		e 34·3
Stuttgart		77·0	7	i 11 56a	0	i 21 40	− 5	e 22 18	PS		e 35·3
Strasbourg		77·1	8	i 11 55a	− 2	i 21 44	− 2	i 14 57	PP		—
Obi-garm		77·5	321	i 11 59	0	i 21 49	− 1	—	—		—
Samarkand		77·6	324	i 12 2	+ 2	i 21 53	+ 2	—	—		—
Stalinabad		77·9	322	i 12 1	0	i 21 54	0	—	—		—
Balboa Heights		78·1	91	e 12 4	+ 2	—	—	—	—		—
Basle		78·1	9	e 11 59a	− 3	e 21 58	+ 2	i 12 6	P		—
Kulyab		78·1	321	i 12 4	+ 2	i 21 57	+ 1	—	—		—
San Juan		78·4	75	e 12 0	− 4	i 22 0	0	e 15 4	PP		e 30·6
Zürich		78·4	8	e 12 2	− 2	e 21 58	− 2	e 15 1	PP		—
Budapest		78·6	0	12 6	+ 1	22 0	− 2	22 38	PS		e 32·3
Neuchatel		78·6	9	e 12 4	− 1	e 21 58	− 4	—	—		—
Clermont-Ferrand		79·5	10	i 12 10	0	i 22 9	− 2	i 15 12	PP		33·3
Kalossa		79·5	0	e 12 17	+ 7	e 22 12	+ 1	15 28	PP		e 30·8
Piatigorsk		79·8	343	i 12 15	+ 3	i 22 13	− 1	—	—		—
Grozny		80·0	340	e 12 18	+ 5	i 22 16	− 1	—	—		—
Theodosia		80·0	349	i 12 14	+ 1	i 22 14	− 3	—	—		—
Salo		80·2	6	e 12 13a	− 1	i 22 17	− 2	i 23 18?	PPS		—
Simferopol		80·2	350	12 17	+ 3	22 21	+ 1	—	—		—
Pavia		80·3	7	e 12 18	+ 4	—	—	e 12 25	PcP		—
Triest		80·4	4	i 8 18a	?	i 22 15	− 6	i 22 46	PS		i 33·4
Padova		80·5	5	i 12 14k	− 1	i 22 19	− 3	—	—		e 39·3
Yalta		80·7	349	i 12 12?	− 4	i 22 21	− 3	—	—		—
Sotchi		80·8	345	12 21	+ 4	—	—	—	—		—
Belgrade		81·1	359	i 12 18a	0	i 22 23	− 5	e 15 20	PP		36·3
Bologna		81·4	5	e 12 20a	0	e 22 28	− 3	e 15 32	PP		e 38·5
Dehra Dun	N.	81·4	311	e 11 4	?	e 21 0	?	—	—		—
Bucharest		81·5	355	e 12 19	− 2	i 22 26	− 6	—	—		35·3

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		81·9	337	i 12 24	+ 1	24 9	PPS	—	—	—
Florence		82·1	6	e 12 24	0	22 34	− 4	e 27 56	SS	—
Leninakan		82·8	341	12 30	+ 3	22 50	+ 5	—	—	—
Calcutta	E.	83·0	299	i 12 28k	0	i 22 48	+ 1	i 15 41	PP	e 39·9
Barcelona		83·6	12	i 12 31	0	i 22 51	− 2	15 47	PP	e 39·3
Rome		84·0	4	i 12 31	− 2	i 22 54	− 3	i 15 45	PP	e 41·8
Fort de France		84·1	73	e 12 35	+ 1	e 22 57	− 1	—	—	—
Toledo		84·2	18	i 12 33	− 1	i 22 59	0	i 15 53	PP	39·1
Lisbon		84·3	338	12 34a	− 1	22 59	− 1	15 52	PP	40·3
Istanbul		84·6	353	i 12 33	− 3	i 23 1	− 2	—	—	—
Bogota	Z.	84·8	89	i 12 41	+ 4	e 23 11	+ 6	i 14 54	PP	41·3
Taranto		85·6	2	12 45	+ 4	23 17	+ 4	15 19	PP	—
Alicante		86·3	16	i 12 43	− 2	i 23 20	0	24 28	PS	i 40·5
Granada		86·9	18	i 12 46k	− 2	i 23 24	− 2	i 16 7	PP	i 39·5
Messina		87·8	4	e 12 55	+ 3	e 23 37	+ 3	—	—	e 39·3
Brisbane		90·4	219	i 13 15	+11	e 23 35	[0]	e 29 51	SS	i 41·4
Ksara		91·0	346	e 13 9	+ 2	e 24 9?	+ 6	—	—	—
Hyderabad	N.	92·2	304	13 15	+ 2	24 0	[+14]	16 53	PP	42·6
Auckland	N.	93·1	199	e 14 42	?	23 45	[− 6]	17 8	PP	41·3
Bombay		93·6	309	e 13 21	+ 2	i 23 57	[+ 4]	i 17 7	PP	45·0
Arapuni	E.	94·1	198	e 14 48	?	24 30	− 1	—	—	34·3
Helwan		95·5	348	i 13 28k	0	24 0	[− 4]	17 17	PP	—
Batavia		96·0	267	e 14 27	+57	25 5	[+58]	i 18 18	PP	48·3
Riverview		96·8	218	i 13 37a	+ 3	i 24 12	[+ 1]	e 17 34	PP	e 44·5
Huancayo		97·4	100	i 12 51	−46	e 24 6	[− 8]	e 31 39	SS	e 40·0
Wellington		97·4	198	13 42	+ 5	24 54	− 5	24 4	SKS	40·6
Kodaikanal	E.	98·9	302	13 43	0	e 25 16	+ 5	17 38	PP	47·8
Christchurch		99·9	199	13 54	+ 6	24 24	[− 3]	17 54	PP	45·5
Colombo	E.	100·5	297	13 53	+ 2	i 24 37	[+ 8]	—	—	54·6
Tamanrasset		102·4	12	i 14 4a	+ 5	—	—	—	—	—
La Paz		105·2	96	e 14 11	0	i 24 51	[0]	i 18 48	PP	47·3
Perth		111·3	244	—	—	i 26 2	{−12}	i 38 33	SSS	—
La Plata	E.	125·1	101	20 18	PKP_2	26 7	[+ 1]	20 46	PP	59·2
	N.	125·1	101	20 18	PKP_2	26 10	[+ 4]	30 54	PS	65·5
Tananarive		138·3	317	22 19	PP	29 28	{+17}	32 38	PS	63·0
Johannesburg		151·0	341	e 20 0	[+11]	i 27 6	[+11]	e 23 36	PP	e 76·3

Additional readings :—
College i = 3m.22s.
Ferndale iSE = 12m.44s., iSN = 13m.6s.
Shasta Dam i = 6m.12s. and 7m.6s., iS_cP = 12m.55s.
Hungry Horse iP = 6m.14s., i = 6m.20s., eP_cP = 8m.28s., iPKP,PKP? = 38m.12s.
Ukiah iP_cP = 8m.29s., i = 12m.39s.
Berkeley iZ = 6m.34s., iE = 7m.0s.
Branner iN = 6m.39s.
Butte eN = 6m.49s. and 7m.2s., eP_cPN = 8m.59s., eSN = 11m.28s., iN = 12m.10s. and 12m.27s.
Lick eE = 6m.33s., iZ = 12m.5s.
Bozeman eP_cP = 8m.53s.
Honolulu ePPP = 8m.18s.
Tinemaha i = 6m.56s., E = 7m.4s. and 9m.28s., iS_cPNZ = 13m.10s.
Logan iP = 6m.56s., i = 7m.41s., iP_cP = 8m.58s., i = 9m.48s., eS = 11m.58s.
Haiwee iZ = 7m.4s. and 9m.32s.
Salt Lake City i = 7m.18s. and 9m.15s.
Pasadena iZ = 7m.14s. and 7m.21s., eSE = 12m.25s., iS_cPZ = 13m.19s., eQEN = 15m.0s.
Riverside iZ = 7m.17s. and 7m.26s.
Boulder City i = 7m.18s., iPP = 8m.30s., iPPP = 8m.52s., i = 13m.22s.
Palomar i = 7m.18s., iZ = 7m.24s., iEZ = 7m.33s., iS_cPZ = 13m.44s., iZ = 15m.6s., iS_cSEN = 17m.34s.
La Jolla iZ = 7m.36s., iS_cPZ = 13m.27s.
Mizusawa eSN = 13m.42s.
Tucson i = 7m.58s., iS = 13m.42s., e = 15m.58s.
Lincoln ePPP?E = 11m.42s., eSE = 14m.32s., eE = 16m.56s.
Chicago e = 9m.25s., eP_cP = 10m.43s., i = 16m.1s., iS_cS = 18m.42s.
Kirkland Lake PP = 9m.2s.
Scoresby Sund 11m.15s., 12m.26s., 16m.59s., iS_cS = 19m.8s.
Cleveland iPZ = 9m.17s.
Ottawa i = 19m.6s., SS = 20m.8s., SSS = 21m.40s.
Ivigtut 9m.39s., i = 17m.7s., iS_cS = 19m.10s., SSS = 21m.42s.

Continued on next page.

Shawinigan Falls i=9m.23s., SS=20m.19s.
New Kensington iE=9m.33s., eS?E=16m.40s.
Seven Falls e=18m.51s., SS=20m.50s.
Vermont iS_cS=20m.15s., iSS=21m.40s.
Pennsylvania iS_cSNW=19m.21s.
Manzanillo iZ=10m.0s., eZ=13m.22s., eSZ=17m.34s., eN=24m.4s., eE=26m.24s.
Philadelphia iP_cP=10m.22s., i=11m.16s., iS_cS=19m.37s., iSS=21m.27s.
Harvard e=22m.6s.
Reykjavik iPEN=9m.59s., eP_cP?N=11m.20s., eN=11m.48s. and 21m.54s.
Columbia ePPP=13m.38s., eS=17m.42s., iS_cS=19m.43s.
Tacubaya ePE=9m.5s. and 10m.6s., eE=10m.17s., iN=11m.24s., eSN=17m.52s., iSN=17m.58s., eS_cS?N=19m.52s., eN=22m.30s., eZ=24m.33s., eSSSE=24m.39s., 24m.44s. and 24m.54s., iSSSN=24m.58s., eN=25m.54s., eE=28m.44s.
Halifax e=19m.40s.
Sverdlovsk iPP=12m.58s., iPPP=14m.32s.
Upsala PE=10m.54s., iN=11m.38s., PP=13m.0s., eE=14m.8s., iS_cSE=20m.42s., iN=21m.2s., eSSSN=26m.18s.?
Aberdeen iPPEN=12m.55s., iPPPN=15m.17s., iE=20m.52s. and 27m.28s.
Bermuda e=12m.51s. and 16m.23s., eS=20m.48s., iS_cS?=21m.45s., iSS=24m.47s., i=25m.18s.
Edinburgh P_cS=15m.33s., SKS=20m.59s., SS=24m.25s.
Durham iP_cPN=11m.41s., iEN=20m.41s., iPSN=20m.56s., iPPSN=21m.11s., iSSN=25m.1s., iSSSN=27m.56s.
Copenhagen 21m.15s., 25m.12s., and 25m.42s.
Kew iP_cP=11m.40s., eZ=15m.26s., ePPP?EZ=15m.56s., ePSZ=21m.50s., eSSZ=26m.30s., eQ=27m.18s.?, eE=29m.38s.
Potsdam iPE=11m.39s., iPPEZ=14m.9s., iPPPZ=16m.5s., iPSZ=21m.24s., iSSN=25m.24s.
Warsaw ePE=11m.44s., eE=12m.26s., ePPE=14m.4s., ePPPE=16m.6s., PPPZ=16m.10s., SZ=21m.5s., PSN=21m.24s., PSZ=21m.27s., PSE=21m.33s., PPSZ=21m.42s.,? PPSN=21m.50s., SSE=25m.59s., SSN=26m.5s., SSZ=26m.11s., eE=27m.42s., eN=27m.47s., iZ=28m.5s., SSSE=28m.57s., SSSN=29m.4s., SSSZ=29m.9s., eN=30m.8s., PKKPE=30m.49s., PKKPZ=30m.56s.
Uccle iEZ=11m.45s., eN=13m.29s., and 20m.27s.?, iPS?N=22m.7s., SSN=25m.58s.
Collmberg iZ=11m.46s., iP_cPZ=12m.0s., ePPSEN=22m.27s., iSSEN=27m.4s., iSSSEN=30m.0s.
Jena iZ=12m.1s., eZ=14m.26s., eN=21m.57s., 26m.18s., 29m.38s., and 29m.46s., eZ=29m.58s.
Prague ePPP=16m.10s., eSS=26m.48s., eSSS=30m.18s.
Raciborzu eE=14m.28s., i=21m.35s.
Paris i=12m.3s., 12m.18s., and 16m.11s., iPPP=16m.35s., i=26m.9s., iSS=26m.39s., eSSS=30m.18s.
Stuttgart iP=12m.1s.k, iP_cP=12m.14s.a, i=12m.32s.k and 12m.46s., ePP=14m.18s., eS=21m.18s., eSS=26m.48s., e=31m.33s.
Strasbourg iPP=14m.53s. and 15m.0s., iPS=22m.29s. and 22m.34s., iSS=26m.42s., 26m.49s., and 26m.53s.
San Juan iP=12m.7s., i=14m.9s., ePPP=16m.58s., eS=21m.44s., iS=21m.50s., eSS=26m.36s., eSSS?=29m.38s.
Budapest SE=22m.3s., PSN=22m.27s., eSSE=26m.58s., SSN=27m.33s., eSSSN=30m.33s., SSSE=30m.48s.
Clermont-Ferrand iSS=26m.57s.
Kalossa PPPE=17m.17s., ePPPN=17m.22s., PSN=21m.46s., eSSE=27m.36s.
Salo iPZ=12m.18s., iZ=12m.33s., iN=12m.40s., iE=22m.30s., iN=22m.34s.
Triest iPPP=16m.46s., iSS=27m.23s.
Padova i=22m.38s.
Belgrade e=13m.55s.
Bologna e=15m.0s., ePPP=17m.12s., iS=22m.35s., ePS?=22m.48s.
Bucharest iN=22m.43s.
Florence iZ=12m.28s.
Calcutta iPPPE=17m.32s., iPSE=23m.36s., iSSE=28m.24s., iSSSE=31m.36s.
Barcelona PPP=17m.25s., PS?=23m.35s.
Rome iPPP=17m.59s., i=23m.12s., ePS=23m.35s., eSS=28m.52s., e=34m.45s.
Toledo iPS=23m.58s., iSS=28m.39s., iSSS=32m.33s.
Lisbon iP_cP=12m.40s., eZ=15m.25s., Z=15m.41s., SE=22m.55s., S=23m.2s., PPSN=24m.7s., QE=34m.42s.
Bogota iZ=12m.55s. and 13m.47s.
Alicante P_cP=12m.53s., PP=16m.20s., PPP=18m.8s., SKS=22m.54s., S_cS=23m.26s., PPS=24m.42s., SS=28m.55s., SSS=32m.44s., Q=35m.4s.
Granada P_cP=12m.58s., PPP=17m.55s., SKS=23m.7s., SKKS=23m.37s., PS=24m.2s PPS=24m.47s., SS=28m.40s., SSS=32m.43s., Q=38m.12s.
Brisbane iN=13m.30s. 14m.1s., 14m.28s., and 15m.27s., iPSE=24m.27s.
Auckland iN=17m.24s., PPPN=19m.10s., PSN=25m.43s., PPSN=26m.9s., iN=27m.18s., SSN=30m.36s., SSSN=34m.24s.
Bombay iPPN=17m.10s., iSKS?N=24m.14s., iSE=24m.45s., iSSE=31m.19s.
Arapuni eE=18m.18s., 20m.48s., and 28m.18s.?
Helwan eN=21m.4s., SKKSN=24m.18s., PSN=25m.56s., PPSN=26m.18s., SSN=31m.2s.
Batavia SSEN=33m.58s.

Continued on next page.

Riverview iZ =17m.48s., iSKKSN =24m.31s., iE =24m.34s., iSE =25m.5s., iZ = 25m.9s., iE =25m.17s., iN =25m.24s., iE =25m.27s., iPSN =26m.18s., iPSE = 26m.22s., iPPSN =27m.1s., iN =27m.22s., iSSE =31m.31s., iSSPN =31m.45s., iE =32m.17s., iSSSN =35m.18s., iS_cS,S_cSE =37m.15s., iS_cS,S_cSN =37m.30s., eQ = 40m.24s.
Huancayo iPP =16m.45s., eSSS =35m.38s.
Wellington e =23m.59s., SS =30m.48s., SSS =33m.48s.
Kodaikanal SKSE =24m.13s., SKKS =24m.43s., eSE =26m.41s., SSE =32m.1s.
Christchurch PPPEN =19m.46s., PS? =26m.49s., SS =31m.46s., SSS =35m.57s., QEN =41m.23s.
Tamanrasset e =16m.51s., i =17m.26s.
La Paz iPKP =18m.0s., iSKKS =25m.58s., iZ =27m.40s., iSSN =33m.26s., iSSSN = 38m.6s.
Perth i =30m.21s.
La Plata E. E =22m.1s., SKKS =27m.40s., PS =31m.4s., SS =37m.5s., SSS =42m.0s., E =46m.6s., Q? =52m.36s.
La Plata N. PP =21m.12s., N =22m.0s., SKKS =27m.42s., SS =37m.50s., PSS = 40m.42s., SSS? =42m.18s., SSS =46m.2s., Q =52m.29s.
Tananarive PKS =23m.8s., PPS =34m.31s., SS? =41m.28s., SSS? =46m.18s., e = 49m.36s.
Johannesburg $iPKP_2N$ =20m.24s., eSKKS?N =30m.6s., eSKSPN =33m.48s., eN = 38m.6s. and 49m.18s.?

May 14d. Readings also at 0h. (Calcutta, Bogota, and near Mizusawa (2)), 2h. (La Paz, near Harvard, near Lick, Branner, San Francisco, Fresno, and Berkeley), 4h. (near Leninakan and Erevan), 5h. (near Lick and near Mizusawa), 6h. (Hungry Horse), 10h. (Ksara, Istanbul, La Paz, near Alicante, near Branner, and Lick), 11h. (near Alicante), 12h. (Stuttgart, Collmberg, and near Granada), 13h. (near Granada and near Apia), 15h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, Tinemaha, and near Mizusawa), 16h. (near Tacubaya), 17h. (Istanbul, near Leninakan (2), Erevan, Grozny, and Piatigorsk), 18h. (Klyuchi, Collmberg, Aberdeen, Vladivostok, near Tacubaya (2), and near Mizusawa), 19h. (Mount Wilson (2), Pasadena, Riverside, Tinemaha, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam (2), Tucson, Copenhagen, Stuttgart (2), Paris, Mizusawa (2), near Frunse, Andijan, Obi-garm, Kulyab, Stalinabad, and near Leninakan), 21h. (near Branner and near Sotchi), 22h. (Lick), 23h. (Copenhagen, Stuttgart, Hungry Horse, and Shasta Dam).

May 15d. 2h. 41m. 43s. Epicentre 54°·3N. 161°·5W. (as on 14d.).
U.S.S.R. suggest focal depth of 60km.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		12·6	28	e 3 5	+ 2	e 5 25	− 1	e 3 16	pP	e 5·8
Sitka		14·9	69	e 3 39	+ 5	e 6 5	−15	—	—	e 6·4
Victoria		24·3	88	4 42?	−38	8 54?	−42	5 16?	PP	—
Grand Coulee		27·1	85	e 5 47	+ 1	e 11 17	+53	e 5 58	pP	—
Shasta Dam		29·3	101	e 6 8	+ 2	e 11 0	+ 1	i 9 11	P_cP	e 16·7
Hungry Horse		29·8	81	i 6 10	− 1	—	—	i 6 21	pP	—
Lick	Z.	32·0	105	i 6 33	+ 3	—	—	i 6 43	pP	—
Fresno	Z.	33·5	104	e 6 47	+ 4	—	—	i 6 57	pP	—
Tinemaha		34·1	102	i 6 52	+ 4	i 12 20	+ 6	i 9 27	P_cP	—
Haiwee		35·0	102	i 6 59	+ 3	—	—	i 9 30	P_cP	—
Santa Barbara	Z.	35·2	106	i 7 11	+13	—	—	—	—	—
Mount Wilson	N.	36·3	104	e 7 14	+ 7	—	—	e 7 21	pP	—
Pasadena		36·3	104	e 7 11	+ 4	e 12 49	+ 1	e 8 28	PP	e 17·2
Riverside	Z.	36·8	104	i 7 15	+ 4	—	—	e 8 41	PP	—
Boulder City		36·9	100	i 7 15	+ 3	—	—	i 7 26	pP	—
Pierce Ferry		37·2	99	i 7 17	+ 2	—	—	i 7 28	pP	—
Palomar		37·6	105	i 7 21	+ 3	i 13 10	+ 2	i 7 32	pP	—
La Jolla	Z.	37·7	106	e 7 25	+ 6	—	—	i 7 34	pP	—
Tucson		41·8	100	i 7 55a	+ 2	e 13 41	−30	e 9 44	P_cP	e 16·1
Vladivostok		43·8	283	i 8 7	− 2	—	—	i 8 26	pP	—
Lincoln	E.	44·2	78	e 8 39	+27	e 15 42	+56	—	—	e 18·4
Chicago		48·7	73	e 9 42	+54	e 16 39	+49	—	—	e 19·0
Kirkland Lake		48·7	62	i 8 46	− 2	—	—	e 8 58	pP	—
St. Louis		49·4	77	i 8 50	− 3	i 15 51	− 9	i 9 1	pP	—
Ville Marie		49·5	63	e 8 51	− 3	—	—	e 9 3	pP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Temiskaning		50·2	63	e 8 56	− 4	—	—	e 9 9	pP	—
Scoresby Sund		52·2	17	9 11	− 4	—	—	—	—	25·3
Cleveland		52·3	69	i 9 12a	− 3	e 16 29	−11	—	—	—
Seven Falls		54·1	57	—	—	e 16 57	− 8	—	—	28·3
Fordham		56·9	65	i 9 46	− 3	i 17 36	− 6	—	—	—
Sverdlovsk		64·0	336	10 33	− 5	19 25	+12	i 10 51	pP	—
Moscow		69·2	348	e 11 6	− 4	e 20 25	+ 9	e 11 24	pP	—
Copenhagen		70·3	3	i 11 13a	− 4	—	—	i 11 31	pP	—
De Bilt	z.	73·4	8	i 11 33	− 3	—	—	i 11 52	pP	—
Potsdam		73·6	4	i 11 34	− 3	i 21 19	+12	i 11 52	P_cP	—
Warsaw		73·8	358	e 11 35a	− 3	e 21 1	− 8	—	—	e 40·3
Andijan		74·7	321	e 11 35	− 8	—	—	—	—	—
Collmberg	z.	74·7	5	i 11 43	0	—	—	—	—	—
Jena	N.	75·0	5	e 11 42	− 3	—	—	e 11 59	pP	—
Paris		76·4	12	i 11 51	− 2	—	—	—	—	—
Stuttgart		77·0	7	i 11 54a	− 2	e 21 34	−11	i 12 11	pP	—
Strasbourg		77·1	8	i 11 55	− 2	—	—	—	—	—
Obi-garm		77·5	321	i 11 59	0	i 22 4	+14	—	—	—
Samarkand		77·6	324	e 11 57	− 3	—	—	—	—	—
Stalinabad		77·9	322	i 11 59	− 2	i 22 6	+12	12 17	PP	—
Basle		78·1	9	e 12 0	− 2	—	—	—	—	—
Kulyab		78·1	321	i 12 2	0	i 22 12	+16	—	—	—
Zürich		78·4	8	e 12 14	+10	—	—	—	—	—
Clermont-Ferrand		79·5	10	e 12 2	− 8	—	—	—	—	—
Piatigorsk		79·8	343	e 12 9	− 3	—	—	—	—	—
Simferopol		80·2	350	e 12 16?	+ 2	—	—	—	—	—
Salo		80·2	6	12 12a	− 2	e 22 47	+28	—	—	—
Triest		80·4	4	e 12 32	+17	e 22 51	+30	—	—	—
Padova		80·5	5	e 12 19	+ 4	—	—	—	—	—
Yalta		80·7	349	e 12 13	− 3	—	—	—	—	—
Bologna		81·4	5	e 12 19a	− 1	e 22 48	+17	—	—	—
Leninakan		82·8	341	e 12 28?	+ 1	—	—	—	—	—
Rome		84·0	4	e 12 31	− 2	e 23 9	+12	—	—	—
Toledo		84·2	18	i 12 32	− 2	—	—	e 15 45	PP	—
Alicante		86·3	16	11 45	−60	e 23 31	+11	15 1	PP	e 48·3
Granada		86·9	18	i 12 44k	− 4	23 41	+15	i 16 3	PP	39·2
Helwan		95·5	348	e 13 25	− 3	24 17	[+13]	e 17 32	PP	—
Tamanrasset		102·4	12	e 13 58	− 1	—	—	e 19 17	PP	—

Additional readings :—
Shasta Dam i = 6m.19s., e = 12m.6s. and 12m.48s.
Lick iZ = 13m.21s.
Timenaha iZ = 7m.3s., 7m.7s., and 7m.52s., iS_cP = 13m.7s., iZ = 13m.24s., eZ = 13m.44s.
Haiwee iZ = 7m.9s. and 9m.41s.
Pasadena iEZ = 7m.20s., iZ = 7m.25s., iP_cPZ = 9m.27s., iZ = 9m.45s., iS_cPZ = 13m.36s.
Riverside iZ = 7m.24s., iP_cPZ = 9m.32s., iZ = 9m.47s.
Boulder City iP_cP = 9m.47s., e = 13m.16s.
Pierce Ferry iPP = 8m.11s.
Tucson i = 8m.6s., 9m.3s., 9m.49s., and 10m.3s.
Lincoln eE = 16m.37s.
Ville Marie e = 11m.5s.
Temiskaming e = 10m.28s.
Warsaw eS?N = 20m.52s.
Collmberg iZ = 12m.1s., eZ = 12m.33s.
Paris e = 12m.14s., and 13m.5s.
Strasbourg i = 12m.13s., e = 12m.44s.
Padova e = 12m.37s.
Toledo 12m.45s.
Alicante Q = 37m.19s.
Granada P_cP = 13m.2s., PPS = 24m.50s., SS = 29m.41s.
Helwan eZ = 13m.44s.
Tamanrasset e = 17m.19s.
Long waves were also recorded at Vermont.

May 15d. 3h. 45m. 17s. Epicentre 54°·3N. 161°·5W.
(as at 2h.).

		△	Az.	P.	O−C.	Supp.
		°	°	m. s.	s.	m. s.
Shasta Dam		29·3	101	e 6 5	− 1	e 6 13 pP
Hungry Horse		29·8	81	i 6 5	− 6	— —
Tinemaha	z.	34·1	102	e 6 54	+ 6	i 9 23 P_cP
Haiwee	z.	35·0	102	e 7 4	+ 8	--- —
Riverside	z.	36·8	104	e 7 14	+ 3	i 9 7 P_cP
Boulder City		36·9	100	e 7 9	− 3	— —
Pierce Ferry		37·2	99	e 7 13	− 2	i 7 22 pP
Palomar	z.	37·6	105	i 7 23	+ 5	— —
Tucson		41·8	100	e 7 51	− 2	i 9 47 P_cP
Paris		76·4	12	e 11 49	− 4	— —
Stuttgart	z.	77·0	7	e 11 50	− 6	— —
Strasbourg		77·1	8	e 11 52	− 5	— —

Additional readings :—
Tinemaha eZ =7m.4s.
Riverside eZ =7m.47s.
Tucson i =8m.3s. and 9m.58s.

May 15d. 5h. Central America.

Oaxaca eE =39m.47s.
Tacubaya PE =40m.2s., iE =41m.6s., SE =41m.33s.
St. Louis iP =43m.9s., ipP =43m.29s., eS =47m.41s.
Tucson iP =43m.12s.a, ipP =43m.31s., i =43m.46s., 44m.5s., and 44m.45s., e =47m.37s.
Pierce Ferry, iP =43m.14s.
Boulder City iP =43m.57s., epP? =44m.19s.
Palomar iPZ =43m.57s., ipPZ =44m.16s.
Riverside ePZ =44m.1s.
Tinemaha iPZ =44m.22s., ipPZ =44m.43s.
Shasta Dam eP =45m.1s., epP =45m.19s.
Hungry Horse iP =45m.14s., i =45m.23s.
Grand Coulee eP? =45m.30s.

May 15d. Readings also at 0h. (Auckland, Wellington, Copenhagen, Paris, Strasbourg, Stuttgart, Tamanrasset, Kulyab, Stalinabad, Tucson (3), Hungry Horse (2), near Lick, near Calcutta, near Leninakan, and near Piatigorsk), 3h. (Kulyab, Obi-garm, near Samarkand, Stalinabad, near Batavia, near Balboa Heights and near Lick), 4h. (Jena, Basle, Zürich, Clermont-Ferrand, Stuttgart, near Paris and Strasbourg), 6h. (near Batavia (2)), 7h. (Bogota, Huancayo, and Hungry Horse), 10h. (near Lick), 11h. (Mizusawa), 16h. (Hungry Horse), 17h. (Granada, La Paz, and La Plata), 18h. (Christchurch, Pasadena (2), Palomar (2), Riverside (2), Tinemaha (2), Tucson (2), Boulder City (2), Pierce Ferry (2), Shasta Dam, Berkeley, San Juan, Alicante, Aberdeen, Kew, Durham, Copenhagen, De Bilt, Uccle, Strasbourg, Stuttgart, Clermont-Ferrand, Potsdam, Paris, Triest, Warsaw, Istanbul, and Bombay), 19h. (Palomar, Tinemaha, Tucson, Boulder City, Pierce Ferry, and near Tacubaya), 20h. (Batavia), 21h. (Tucson), 22h. (Bogota, Huancayo, La Paz, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse, and Stuttgart).

May 16d. 21h. 16m. 31s. Epicentre 37°·8N. 143°·3E.

Intensity II-III at Onahama. Macroseismic radius 200-300km. Suggested depth 50km. Epicentre as adopted.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948, Tokyo, 1950, p.19, with macroseismic chart.

$A = -·6351$, $B = +·4734$, $C = +·6103$; $\delta = -7$; $h = -1$;
$D = +·598$, $E = +·802$; $G = -·489$, $H = +·365$, $K = -·792$.

	△	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Sendai	1·9	284	0 36a	+ 2	—	—	—
Miyako	2·1	331	0 45	+ 8	1 8	+ 4	—
Onahama	2·1	246	0 43a	+ 6	1 5	+ 1	—
Hukusima	2·2	269	0 43a	+ 5	1 9	+ 3	—
Mizusawa	2·2	308	0 36	− 2	1 23	+17	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Morioka		2·5	325	0 42$_a$	− 1	1 16	+ 2	—
Mito		2·7	238	0 55	+10	1 37	+18	—
Kakioka		3·0	238	0 52	+ 2	—	—	—
Utunomiya		3·0	245	0 51	+ 1	1 34	+ 7	—
Hatinohe		3·1	333	1 9	P$_g$	2 1	S$_g$	—
Akita		3·2	308	1 2	P$_g$	2 0	S$_g$	—
Kumagaya		3·5	243	0 57	0	1 55	S$_g$	—
Tokyo		3·5	234	1 0	+ 3	2 5	S$_g$	—
Aomori		3·6	328	0 51	− 7	—	—	—
Yokohama		3·8	232	1 3	+ 2	—	—	—
Aikawa		4·0	275	1 3	− 1	2 19	S$_g$	—
Nagano		4·2	256	1 15	P*	2 16	S$_g$	—
Hunatu		4·3	239	1 9	+ 1	—	—	—
Shizuoka		4·9	236	1 21	+ 4	2 29	S*	—
Wazima		5·1	267	1 22	+ 2	2 29	S*	—
Nagoya		5·7	245	1 35	+ 7	2 46	S*	—
Gihu		5·8	247	1 27	− 2	2 30	− 8	—
Hikone		6·2	248	1 38	+ 3	2 59	S*	—
Kameyama		6·2	244	2 15	P$_g$	3 19	S$_g$	—
Kyoto		6·7	248	1 29	−13	2 48	−12	—
Osaka		7·0	246	2 15	P$_g$	3 34	S*	—
Toyooka		7·2	254	1 50	+ 1	3 24	S*	—
Kobe		7·3	247	2 43	?	—	—	—
Sumoto		7·6	246	1 33	−22	—	—	—
Hamada		9·5	256	3 40	S	(3 40)	−30	—
Vladivostok		10·2	305	i 2 28	− 3	i 4 36	+ 9	—
Irkutsk		30·7	312	e 6 16	− 3	e 11 19	− 2	—
Frunse		51·3	298	e 9 13	+ 5	—	—	—
Murgab		53·4	293	9 24	0	16 55	0	—
Tashkent		55·5	299	e 9 36	− 3	e 17 19	− 5	—
Sverdlovsk		55·6	319	i 9 38	− 2	17 23	− 2	—
Obi-garm		56·3	296	i 9 46?	+ 1	i 17 31?	− 3	—
Kulyab		56·6	294	i 9 47	0	i 17 37	− 1	—
Stalinabad		57·0	296	e 9 49	− 1	i 17 39	− 4	—
Samarkand		57·8	297	e 9 59	+ 4	—	—	—
Bombay		63·4	274	e 10 52	+18	e 19 11	+ 5	—
Moscow		67·5	323	e 10 59	− 1	e 19 54	− 2	—
Baku		69·0	305	e 11 53?	+44	e 20 59?	+45	—
Shasta Dam		69·4	54	e 11 11	− 1	—	—	—
Grozny		70·0	310	e 11 39	P$_e$P	—	—	—
Hungry Horse		70·2	44	e 11 16	− 1	—	—	—
Sotchi		73·5	312	e 11 24	−12	—	—	—
Tinemaha	z.	74·1	56	e 11 40	0	—	—	—
Warsaw		77·2	327	e 11 58	+ 1	e 22 0	+13	e 43·5
Copenhagen		77·9	334	e 12 1	0	21 53	− 1	40·5
Istanbul		81·2	315	e 12 19	0	e 22 7	−22	—
Tucson		81·9	55	e 12 28	+ 5	—	—	—
Stuttgart		84·7	331	e 12 36	− 1	—	—	e 46·5
Paris		87·0	335	e 12 49	+ 1	—	—	50·5
Rome		88·9	326	e 13 2	+ 4	e 22 57	−47	e 49·0

Additional readings :—
Mizusawa ePN =39s.
Tinemaha eZ =11m.51s.
Copenhagen 12m.10s.
Tucson e =12m.39s. and 13m.10s.
Stuttgart eZ =12m.46s.
Long waves were also recorded at Berkeley and at other European stations.

May 16d. Readings also at 0h. (Samarkand, near Kulyab, Murgab, Obi-garm, and Stalinabad), 1h. (Batavia and near Mizusawa), 6h. (near Hungry Horse), 8h. (Bogota, Huancayo, La Paz, Tucson, Hungry Horse, Samarkand, near Kulyab, Murgab, Obi-garm, and Stalinabad), 10h. (Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Hungry Horse (2), Istanbul, Paris, Granada, and near Mizusawa), 11h. (Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and near Mizusawa), 12h. and 14h. (near Mizusawa), 17h. (Huancayo and near Mizusawa), 19h. (Pasadena, Tinemaha, Tucson, Pierce Ferry, and Shasta Dam), 21h. (Tucson, Berkeley, Lick, Mineral, and Shasta Dam), 22h. (near Mizusawa), 23h. (Lick).

May 17d. 13h. 33m. 27s. Epicentre 6°·7S. 153°·0E. (as on 1948, March 11d.).

$A = -·8850$, $B = +·4509$, $C = -·1159$; $\delta = -3$; $h = +7$;
$D = +·454$, $E = +·891$; $G = +·103$, $H = -·053$, $K = -·993$.

Identification uncertain.

		△	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Brisbane		20·7	179	i 4 45	+ 1	i 8 49	+18	5 7	PP		i 12·8
Riverview		27·1	183	i 5 46a	0	i 11 7	+43	e 12 3	Q		e 13·4
Batavia		45·9	268	e 8 25	− 1	e 15 38	+27	—	—		—
Vladivostok		53·2	341	e 9 26	+ 4	e 16 22	−30	—	—		—
Bombay		82·9	290	e 19 38?	?	e 22 44?	− 2	—	—		—
Frunse		86·1	314	e 12 57	+13	e 22 46?	[−22]	—	—		—
Obi-garm		88·9	309	e 13 11	+13	23 32	[+ 6]	—	—		—
Stalinabad		89·6	308	i 13 13	+12	e 23 33	[+ 3]	—	—		—
Tashkent		89·7	311	—	—	e 23 16	[−15]	e 24 16	PS		—
Shasta Dam		90·2	309	e 12 46	−18	—	—	—	—		—
Fresno	z.	91·7	53	e 13 13	+ 3	—	—	—	—		—
Pasadena	z.	92·7	56	e 12 52	−23	—	—	—	—		—
Tinemaha	z.	93·0	54	e 12 55	−22	—	—	—	—		—
Haiwee	z.	93·1	54	e 13 25	+ 8	—	—	—	—		—
La Jolla	z.	93·4	57	e 13 24	+ 6	—	—	—	—		—
Riverside	z.	93·4	56	e 12 55	−23	—	—	—	—		—
Palomar	z.	93·7	57	e 12 57	−23	—	—	—	—		—
Boulder City		95·6	54	e 13 29	+ 1	—	—	—	—		—
Pierce Ferry		96·3	54	e 13 11	−21	—	—	—	—		—
Hungry Horse		96·9	42	e 13 12	−22	—	—	—	—		—
Tucson		98·7	58	e 13 24	−18	—	—	e 17 53	PP		—
Stuttgart	z.	128·1	331	e 18 52?	[−16]	—	—	—	—		—

Additional readings :—
Brisbane iPE =4m.50s., iN =5m.57s. and 6m.46s., iE =9m.13s., iSSN =9m.25s.
Shasta Dam i =13m.13s.
Pasadena iZ =13m.22s.
Riverside iZ =13m.22s.
Palomar iZ =13m.24s. and 13m.35s.
Pierce Ferry e =13m.35s. and 14m.14s.
Hungry Horse i =13m.37s.
Stuttgart eZ =19m.20s.
Long waves were also recorded at Potsdam.

May 17d. 17h. 48m. 28s. Epicentre 54°·3N. 161°·5W. (as on 15d.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		12·6	28	e 3 1	− 2	e 5 0	−26	—	—	e 5·4
Sitka		14·9	69	i 3 34	0	e 5 55	−25	—	—	e 6·2
Victoria		24·3	88	5 22	+ 2	9 28	− 9	5 54	PP	11·5
Seattle		25·3	89	e 5 48	+18	e 9 41	−13	—	—	e 10·3
Grand Coulee		27·1	85	e 5 49	+ 3	e 10 43	+19	e 9 10	PcP	—
Shasta Dam		29·3	101	i 6 19	+13	e 11 1	+ 2	i 9 14	PcP	e 14·0
Hungry Horse		29·8	81	e 6 10	− 1	e 11 27	+20	i 9 16	PcP	—
Ukiah		29·9	104	e 7 28	+76	e 12 18	+69	e 8 8	PP	e 14·4
Mineral	E.	30·0	101	e 6 17	+ 5	e 11 12	+ 2	—	—	—
Berkeley		31·3	105	e 6 28	+ 4	i 11 35	+ 4	i 9 54	PcP	e 14·8
Branner		31·6	106	e 7 30	+64	e 11 44	+ 9	—	—	—
Santa Clara		31·8	105	e 6 34	+ 6	e 11 47	+ 9	—	—	e 15·0
Butte	N.	31·9	83	e 6 45	+16	e 11 50	+10	—	—	e 13·3
Lick		32·0	105	i 6 33	+ 3	e 11 45	+ 3	i 9 23	PcP	—
Saskatoon		32·2	71	6 35	+ 3	11 45	0	—	—	14·1
Bozeman		32·9	84	e 6 52	+14	e 11 50	− 6	—	—	e 14·4
Honolulu		33·0	173	e 6 49	+10	e 12 9	+12	—	—	e 14·4
Fresno	z.	33·5	104	e 6 48	+ 5	e 12 37	+32	—	—	—
Tinemaha		34·1	102	i 6 53k	+ 5	e 12 20	+ 6	i 9 28	PcP	—
Logan		34·8	88	e 6 54	0	e 12 20	− 5	e 8 1	PP	e 14·6

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Haiwee		35·0	102	e 7 0	+ 4	e 12 30	+ 2	—	—	—
Santa Barbara	z.	35·2	106	i 7 23	+25	—	—	—	—	—
Salt Lake City		35·4	90	e 7 11	+11	e 12 35	+ 1	e 8 52	PcP	e 15·4
Mount Wilson		36·3	104	e 7 12	+ 5	—	—	—	—	—
Pasadena		36·3	104	i 7 11	+ 4	i 12 50	+ 2	i 9 35	PcP	e 16·8
Riverside	z.	36·8	104	i 7 16k	+ 5	—	—	i 9 48	PcP	—
Boulder City		36·9	100	i 7 16	+ 4	e 13 1	+ 3	e 8 21	PP	—
Pierce Ferry		37·2	99	i 7 18	+ 3	e 13 4	+ 2	i 9 38	PcP	—
Palomar		37·6	105	e 7 21	+ 3	i 13 11	+ 3	—	—	—
La Jolla	z.	37·7	106	e 7 21	+ 2	e 13 14	+ 4	—	—	—
Tucson		41·8	100	i 7 57	+ 4	i 14 19	+ 8	i 9 53	PcP	e 17·2
Vladivostok		43·8	283	i 8 10	+ 1	i 14 41	+ 1	—	—	—
Lincoln	E.	44·2	78	e 7 58	−14	e 14 23	−23	—	—	e 18·0
Kirkland Lake		48·7	62	e 8 46	− 2	—	—	e 10 54	PP	—
St. Louis		49·4	77	e 8 51	− 2	i 15 52	− 8	i 9 8	pP	—
Temiskaming		50·2	63	e 8 56	− 4	e 16 20	+ 9	—	—	—
Scoresby Sund		52·2	17	9 11a	− 4	16 27	−12	11 11	PP	23·5
Cleveland		52·3	69	e 9 14	− 1	e 16 30	−10	i 9 26	pP	23·7
Ottawa		52·8	62	9 16	− 3	16 39	− 8	20 14	SS	25·5
Ivigtut		53·4	34	i 9 22	− 2	i 16 49	− 6	9 36	pP	25·5
New Kensington	E.	54·0	69	e 9 51	+23	e 16 56	− 7	e 17 51	PS	e 26·6
Seven Falls		54·1	57	9 27	− 2	16 57	− 8	19 32	SS	25·5
Vermont		54·7	61	e 10 31	+58	e 17 44	+31	e 20 12	ScS	e 27·2
Georgetown		56·5	68	e 9 47	+ 1	i 17 27	−10	—	—	25·5
Philadelphia		56·8	67	i 9 47	− 1	i 17 34	− 7	e 19 16	ScS	e 24·6
Fordham		56·9	65	i 9 45	− 4	i 17 35	− 7	—	—	—
Harvard		56·9	62	i 9 47	− 2	e 17 35	− 7	—	—	e 28·7
Reykjavik	N.	57·8	20	e 8 38	−77	—	—	—	—	e 29·8
Columbia		57·9	75	—	—	e 17 44	−11	e 19 40	ScS	e 23·1
Tacubaya		58·4	101	e 10 1	+ 1	e 18 1	− 1	e 18 36	sS	—
Halifax		59·3	56	—	—	e 18 2	−12	—	—	27·5
Sverdlovsk		64·0	336	i 10 35	− 3	19 6	− 7	—	—	—
Upsala		66·2	2	i 10 51	− 1	e 19 21	−19	e 11 17	PcP	e 27·5
Aberdeen		67·6	12	i 10 53	− 8	i 19 48	− 9	e 27 18	SSS	e 33·9
Bermuda		68·1	64	e 12 7	+63	e 20 57	+54	e 25 42	SS	e 29·4
Edinburgh		68·7	13	—	—	e 20 2	− 8	—	—	—
Moscow		69·2	348	e 11 7	− 3	e 20 5	−11	—	—	—
Durham		70·0	12	i 11 16	+ 1	i 20 21	− 5	i 20 40	PS	—
Copenhagen		70·3	3	e 11 14	− 3	20 21	− 8	20 44	PS	—
Almata		70·8	319	e 11 21	+ 1	—	—	—	—	—
Frunse		72·0	320	e 11 32	+ 4	—	—	—	—	—
Kew		73·4	12	e 11 36	0	e 21 6	+ 1	—	—	e 36·5
Potsdam		73·6	4	i 11 36?	− 1	i 21 2	− 5	i 11 53	PcP	e 32·5
Warsaw		73·8	358	11 36a	− 2	e 21 3	− 6	11 53	PcP	e 33·5
Tchimkent		74·3	323	e 11 43	+ 2	—	—	—	—	—
Uccle		74·6	11	11 41a	− 2	e 21 8	−10	e 25 50	SS	e 36·5
Andijan		74·7	321	e 11 45	+ 2	—	—	—	—	—
Collmberg	z.	74·7	5	e 11 44	+ 1	—	—	i 11 57	pP	—
Jena		75·0	5	e 11 44	− 1	e 21 20	− 3	e 14 37	PP	—
Tashkent		75·3	323	e 11 46	− 1	e 21 25	− 1	—	—	—
Cheb		75·9	5	—	—	e 21 32	0	e 25 40	SS	e 30·7
Prague		76·0	4	e 11 48	− 3	e 21 23	−11	e 14 56	PP	e 29·5
Murgab		76·1	318	11 54	+ 3	21 38	+ 3	—	—	—
Paris		76·4	12	e 11 51	− 2	e 21 28	−10	i 12 5	PcP	e 37·5
Stuttgart		77·0	7	e 11 54	− 2	e 21 40	− 5	i 12 9k	PcP	41·5
Strasbourg		77·1	8	e 11 54	− 3	e 21 40	− 6	e 14 52	PP	36·5
Obi-garm		77·5	321	i 12 0	+ 1	i 21 47	− 3	—	—	—
Samarkand		77·6	324	e 12 12	+12	—	—	—	—	—
Stalinabad		77·9	322	i 12 1	0	i 21 52	− 2	—	—	—
Basle		78·1	9	e 12 1	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		78·1	321	i 12 2	0	i 21 54	− 2	—	—	—
San Juan		78·4	75	e 12 5	+ 1	e 21 50	−10	e 15 20	PP	e 32·4
Zürich		78·4	8	e 11 59	− 5	e 21 59	− 1	e 14 30	PP	—
Budapest		78·6	0	12 7	+ 2	e 21 47	−15	—	—	e 35·5
Neuchatel		78·6	9	e 12 3	− 2	—	—	—	—	—
Clermont-Ferrand		79·5	10	e 12 9	− 1	e 22 26	+15	e 15 15	PP	38·5
Kalossa	E.	79·5	0	e 12 28	+18	—	—	—	—	—
Grozny		80·0	340	i 12 17	+ 4	—	—	—	—	—
Simferopol		80·2	350	e 12 19	+ 5	—	—	—	—	—
Pavia		80·3	7	e 12 26?	+12	—	—	—	—	—
Triest		80·4	4	e 12 39	+24	e 22 39	S_cS	i 14 57	PP	—
Padova		80·5	5	e 12 19	+ 4	22 25	+ 3	—	—	—
Yalta		80·7	349	12 16	0	—	—	—	—	—
Sotchi		80·8	345	e 12 16	− 1	22 36	S_cS	—	—	—
Belgrade		81·1	359	i 12 24	+ 6	e 22 32	+ 4	—	—	39·5
Bologna		81·4	5	e 12 20a	0	e 22 45	S_cS	e 15 40	PP	—
Ashkabad		81·9	330	e 12 23	0	—	—	—	—	—
Baku		81·9	337	12 28	+ 5	e 22 41?	+ 5	—	—	—
Florence	Z.	82·1	6	e 12 25	+ 1	—	—	—	—	—
Calcutta	E.	83·0	299	e 12 43	+15	e 23 3	S_cS	—	—	—
Erevan		83·3	340	e 12 34	+ 4	—	—	—	—	—
Rome		84·0	4	e 12 33a	0	e 22 52	− 5	e 15 41	PP	e 41·1
Toledo		84·2	18	i 12 33	− 1	i 23 8	+ 8	e 24 53	PPS	e 45·5
Lisbon		84·3	338	12 31	− 4	23 15	+15	—	—	—
Istanbul		84·6	353	i 12 34	− 2	22 59	− 4	—	—	—
Alicante		86·3	16	13 5	+20	23 28	+ 8	16 17	PP	e 41·7
Granada		86·9	18	13 0	+12	23 19	[+ 6]	16 21	PP	45·3
Ksara		91·0	346	e 13 23?	+16	e 24 16	+13	—	—	—
Hyderabad	N.	92·2	304	—	—	e 24 6	− 8	—	—	—
Bombay	N.	93·6	309	e 13 1	−18	—	—	—	—	—
Helwan		95·5	348	e 13 14	−14	24 16	[+12]	13 44	pP	—
Riverview	E.	96·8	218	—	—	i 25 7	+13	e 35 19	SSS	e 46·2
Huancayo		97·4	100	e 13 41	+ 4	e 24 56	− 3	i 17 27	PP	e 42·2
Kodaikanal	E.	98·9	302	—	—	e 23 37	?	—	—	—
La Paz		105·2	96	i 13 42	−29	i 24 54	[+ 3]	—	—	49·2

Additional readings :—
College i = 3m.16s., e = 3m.48s.
Sitka i = 3m.44s. and 4m.20s.
Victoria SS = 10m.17s.
Shasta Dam iS_cP? = 12m.51s., ePKP,PKP = 38m.13s.
Hungry Horse i = 6m.22s.
Ukiah i = 12m.47s.
Berkeley iE = 6m.36s., iN = 7m.26s., iZ = 7m.38s.
Lick eEN = 6m.36s.
Fresno iZ = 7m.9s. and 8m.27s.
Tinemaha iZ = 7m.1s., iS_cP = 13m.9s.
Logan i = 7m.10s.
Haiwee iZ = 7m.7s.
Salt Lake City e = 7m.19s. and 11m.22s.
Pasadena iEZ = 7m.20s., iZ = 9m.46s., iS_cPZ = 13m.17s., iSSEZ = 15m.31s.
Riverside iZ = 7m.26s. and 9m.59s.
Boulder City iPPP = 8m.56s., iP_cP = 9m.38s.
Palomar i = 7m.32s.
La Jolla iZ = 7m.26s. and 7m.35s.
Tucson i = 8m.8s., 8m.13s., 10m.5s., and 10m.45s.
Lincoln eE = 14m.37s.
Kirkland Lake e = 8m.56s.
St. Louis iP = 8m.54s., e = 10m.58s.
Temiskaming i = 9m.31s., e = 9m.39s.
Scoresby Sund 19m.3s.
Cleveland iSE = 16m.33s., isSE = 16m.54s., eE = 18m.57s., eN = 19m.0s., eEN = 19m.17s.
Ottawa SSS = 21m.37s.
Ivigtut i = 17m.4s.
Vermont e = 10m.51s., eSS = 21m.45s.
Philadelphia eSS = 21m.25s.
Columbia e = 18m.4s.
Tacubaya eN = 16m.51s.
Upsala eN = 20m.59s.

Continued on next page.

Bermuda e =12m.26s., i =21m.38s.
Durham iSKSN =21m.9s.
Copenhagen i =11m.17s., and 11m.32s.
Kew iZ =11m.46s., eE =13m.35s. and 31m.34s.
Potsdam ePPZ =14m.8s., iPSEN =21m.19s., iPPSEN =22m.3s.,
Warsaw iPZ =11m.39s.k, ePPN =14m.14s., ePPZ =14m.18s., ePPPN =16m.2s., ePPPZ =16m.14s., eZ =18m.25s., eSZ =21m.16s., ePSE =21m.28s., ePSN = 21m.35s., ePPSE =21m.46s., ePPSN =21m.49s., eZ =22m.8s.
Uccle eSKSN =21m.32s.
Jena eS?N =21m.33s.
Prague e =21m.17s., ePS? =22m.14s.
Paris iP =11m.54s., ePP =14m.46s., eS =21m.46s., e =22m.52s. and 30m.52s.
Stuttgart iP =11m.58s.k, e =14m.8s., ePS? =22m.41s., eSSS? =31m.8s., eQ? =36·5m.
Strasbourg i =12m.9s. and 12m.12s., eS =21m.43s., ePS =22m.41s., eSS =26m.48s.
San Juan ePPP =17m.10s., iS_cS =22m.32s., e =23m.22s., eSS =27m.25s., eSSS = 30m.37s.
Triest iPPP =16m.23s., ePS =23m.23s., eSS =28m.8s., eSSS =30m.55s.
Belgrade e =12m.32s. and 12m.56s.
Bologna iZ =12m.24s.k, ePPP =17m.36s., ePS =23m.35s.
Rome iZ =12m.50s., e =23m.10s., ePS =23m.32s., e =23m.51s., eSS =28m.16s., eSSS = 32m.32s.?,
Lisbon P =12m.36s.a.
Alicante PPP =18m.13s., PS =24m.13s., PPS =24m.41s., SS =28m.57s., Q =35m.37s.
Granada iS =23m.40s.
Helwan eZ =13m.29s., PPZ =17m.8s., pPPZ =17m.34s.
Riverview eE =25m.22s., iE =25m.27s., eE =36m.19s., eQE =39·5m.
Huancayo eSKS =24m.4s., eSS =31m.20s.
Long waves were also recorded at Apia, Barcelona, and Helsinki.

May 17d. Readings also at 3h. (near Andijan, Kulyab (2), Murgab, Obi-garm (2), Stalinabad (2), and near Istanbul), 4h. (Stuttgart, Tucson, and near Mizusawa), 5h. (Granada), 6h. (Bogota and Mizusawa), 7h. (Harvard), 8h. (Upsala, Apia, and Brisbane), 10h. (La Paz, Upsala, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and near Tashkent), 11h. (Almata, Tashkent, Tchimkent, near Andijan, Murgab, Obi-garm, Samarkand, and Stalinabad), 12h. (Upsala and Warsaw), 14h. (Apia, Hungry Horse, and Vladivostok), 15h. (Huancayo), 16h. (Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Batavia, Stalinabad, and near Kulyab), 17h. (Calcutta and Stuttgart), 19h. (Shasta Dam and near Berkeley).

May 18d. Readings at 1h. (Helwan, Ksara, Istanbul, Stalinabad, Kulyab, Obi-garm, Tashkent, Andijan, and Sverdlovsk), 3h. (Istanbul), 8h. (near Apia), 10h. (Branner, Berkeley, Ferndale, San Francisco, Fresno, Mineral, Lick (2), Boulder City, Hungry Horse (2), Pierce Ferry, Shasta Dam (2), Tucson, Pasadena, Riverside, Palomar, Haiwee, La Jolla, Santa Barbara, Tinemaha, Murgab, Tashkent, Sverdlovsk, and Istanbul), 12h. (Tinemaha, Shasta Dam, and near San Juan), 16h. (Shasta Dam), 17h. (Tucson), 18h. (Branner), 22h. (Alicante).

May 19d. 10h. United States.
Tucson iP =4m.56s., i =5m.20s., iS =6m.26s., iL =6m.44s.
Palomar iP?Z =5m.47s., iZ =8m.12s.
Pierce Ferry iP =5m.58s., eS? =8m.52s.
Riverside eP?Z =5m.59s.
Boulder City eP =6m.0s., eS? =8m.50s.
Tinemaha iPZ =6m.30s.a.
Shasta Dam eP =7m.33s., i =8m.5s.
Hungry Horse iP =8m.26s.
Butte eN =10m.10s., eLN =15m.30s.
Salt Lake City e =11m.8s., eL =11m.50s.
Lincoln eE =13m.32s., eLE =13m.58s.
Temiskaming e =20m.48s.
Long waves were also recorded at Pasadena and Philadelphia.

May 19d. 17h. 52m. 10s. Epicentre 39°·3N. 41°·2E.
(as on 1947, July 27d.).

$A = +\cdot5838$, $B = +\cdot5111$, $C = +\cdot6308$; $\delta = -5$; $h = -1$;
$D = +\cdot659$, $E = -\cdot752$; $G = +\cdot475$, $H = +\cdot416$, $K = -\cdot776$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Erevan		2·7	71	0 45	0	i 1 33	S_g	i 0 56	P_g	—
Sotchi		4·5	324	1 9	− 2	—	—	—	—	—
Piatigorsk		4·9	15	e 1 25	P*	2 31	S*	—	—	—
Grozny		5·3	39	e 1 23	+ 1	—	—	—	—	—
Ksara		7·0	220	e 1 49	+ 3	e 3 59	S_g	—	—	—
Theodosia		7·2	324	e 1 52	+ 3	—	—	—	—	—
Yalta		7·4	317	1 52	0	3 24	+ 6	—	—	—
Simferopol		7·7	319	e 1 51?	− 5	—	—	—	—	—
Istanbul		9·4	285	2 28	+10	5 24	S_g	—	—	—
Helwan	z.	12·6	224	e 3 2	− 1	—	—	e 3 17	PP	e 7·2
Moscow		16·6	354	e 3 54	− 2	—	—	—	—	—
Warsaw		19·0	321	e 4 27	+ 1	e 7 54	− 1	8 14	SS	e 10·8
Stalinabad		21·5	82	e 4 52	0	—	—	—	—	—
Tashkent		21·5	75	e 4 45?	− 7	—	—	—	—	—
Sverdlovsk		21·7	30	e 4 52	− 3	e 8 46	− 5	—	—	—
Rome		21·9	288	—	—	e 9 9	+15	—	—	—
Obi-garm		22·1	82	e 5 0?	+ 1	—	—	—	—	—
Kulyab		22·3	84	e 5 3?	+ 2	—	—	—	—	—
Stuttgart		24·7	305	e 5 24	0	e 10 0	+16	e 5 29	P	e 15·2
Copenhagen		25·2	321	5 29	0	—	—	—	—	13·8
Murgab		25·5	82	5 33	+ 1	—	—	—	—	—
Tucson		104·2	336	e 30 10	PKKP	—	—	e 30 41	?	—
La Paz		115·1	269	22 8	PPP	—	—	—	—	41·8
Huancayo		118·0	278	—	—	e 34 13	?	e 39 4	SSS	e 44·3

Additional readings :—
Warsaw eSN = 7m.59s.
Huancayo e = 35m.8s. and 36m.17s.
Long waves were also recorded at Potsdam, De Bilt, Strasbourg, and Upsala.

May 19d. Readings also at 0h. (Branner), 3h. (near Kulyab, Murgab, Stalinabad, and Obi-garm), 5h. (Paris, near Kulyab, Obi-garm, Stalinabad, and Murgab), 6h. (Hungry Horse, Shasta Dam (2), Tucson (2), Tinemaha (2), Stuttgart (2), and Apia), 7h. (Hungry Horse (2), Pierce Ferry, Shasta Dam (2), Tucson (2), Tinemaha (2), La Paz, Copenhagen, Stuttgart, near Murgab, Obi-garm, and Andijan), 8h. (Bogota), 9h. (Tacubaya and near Mizusawa), 10h. (Mizusawa), 13h. (Boulder City, Grand Coulee, Pierce Ferry, Stuttgart), 16h. (Tucson, near Alicante, near Kulyab (2), Obi-garm (2), and Stalinabad (2)), 18h. (Stuttgart), 19h. (Strasbourg, Rome, and Ksara), 20h. (Istanbul), 21h. (near Salo), 23h. (near Branner and near Lick).

May 20d. 7h. 13m. 46s. Epicentre 71°·5N. 8°·0W.
(as on 1946, April 9d.).

$A = +\cdot3161$, $B = -\cdot0444$, $C = +\cdot9477$; $\delta = +3$; $h = -13$;
$D = -\cdot139$, $E = -\cdot990$; $G = +\cdot938$, $H = -\cdot132$, $K = -\cdot319$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		4·7	265	1 18	+ 4	2 16	+ 6	—	—	—
Copenhagen		18·1	140	4 10	− 4	—	—	4 13	P	9·2
Ivigtut		18·7	258	e 4 29	+ 7	8 26	SS	4 52	PP	9·9
De Bilt		20·3	156	e 4 43	+ 3	e 8 19	− 4	—	—	e 9·7
Potsdam	E.	21·4	144	—	—	e 9 48	SSS	—	—	e 13·2
Uccle	z.	21·5	161	e 4 51	− 1	—	—	—	—	—
Collmberg	z.	22·4	147	e 5 1	− 1	—	—	—	—	—
Warsaw		23·2	132	e 5 7	− 2	e 9 17	− 1	e 9 10	S	e 11·2
Paris		23·3	163	5 7	− 3	e 9 19	− 1	—	—	e 12·7
Strasbourg		24·1	154	e 5 20	+ 2	e 9 38	+ 4	e 10 14	SS	e 14·2

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Stuttgart		24·2	152	e 5 18	− 1	e 9 43	+ 8	—	—	e 14·2
Basle		25·1	154	e 5 26	− 2	—	—	e 6 55	?	—
Zürich		25·4	154	e 5 32	+ 1	—	—	—	—	—
Clermont-Ferrand		26·4	163	e 5 40	0	—	—	—	—	14·2
Triest		28·0	147	e 5 58	+ 3	—	—	—	—	—
Alicante		33·4	171	e 3 54	?	e 8 29	?	—	—	e 14·5
Istanbul		35·6	129	e 8 14?	PP	—	—	—	—	—
Ksara		44·2	125	—	—	e 14 17	−29	—	—	e 20·3
Hungry Horse		49·7	304	e 9 4	+ 8	—	—	—	—	—
Shasta Dam		59·0	308	e 10 10	+ 6	—	—	—	—	—
Pierce Ferry		61·0	298	e 10 27	+ 9	—	—	—	—	—
Tinemaha	z.	61·3	302	e 10 28	+ 8	—	—	—	—	—
Tucson		63·7	294	e 10 44	+ 8	—	—	—	—	—
Pasadena	z.	64·0	301	e 10 42	+ 4	—	—	—	—	—

Strasbourg also gives e = 5m.40s.
Long waves were also recorded at Helsinki.

May 20d. 15h. Undetermined Shock. East Indies.

Batavia eP = 23m.1s.
Brisbane iPN = 31m.42s., iN = 32m.26s. and 34m.39s.
Murgab P = 35m.12s., S = 43m.25s.
Kulyab iP = 35m.26s., eS = 43m.52s.
Andijan eP = 35m.26s.?, iS = 43m.57s.?.
Obi-garm eP = 35m.32s., eS = 44m.1s.
Stalinabad eP = 35m.33s., eS = 44m.0s.
Shasta Dam ePKP = 43m.17s., i = 44m.20s.
Hungry Horse iPKP = 43m.24s.
Tinemaha iPKPZ = 43m.27s., iZ = 44m.49s., and 46m.48s.
Riverside iPKPZ = 43m.28s., iZ = 44m.55s.
Pasadena iPKPZ = 43m.28s.k, eZ = 43m.49s., iZ = 44m.53s.
Haiwee iPKPZ = 43m.28s.
Boulder City iPKP = 43m.33s., e = 45m.7s.
Pierce Ferry iPKP = 43m.34s., i = 45m.8s.
Tucson iPKP = 43m.42s., i = 46m.41s.
La Paz ePZ = 44m.0s.
Harvard iP = 44m.10s., i = 44m.20s., 44m.59s., and 45m.19s.
Tashkent eS = 44m.13s.
Palomar iZ = 44m.59s. and 45m.8s.
Sverdlovsk S = 46m.43s.?
Ksara ePKP? = 88m.17s.

May 20d. Readings also at 0h. (near Tacubaya), 1h. (near Lick), 2h. (Huancayo and Shasta Dam), 3h. (near Andijan, Tashkent, Murgab, Obi-garm, Kulyab, Stalinabad, and Almata,) 5h. (Andijan, Murgab, Kulyab, Tashkent, near Almata, and Frunse), 8h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Palomar, Pasadena, Riverside, Tinemaha, near Lick, near La Paz (2), and near Mizusawa), 9h. (Tucson), 16h. (Arapuni, Wellington, Auckland, near Murgab, Andijan, Obi-garm Kulyab, Frunse, Tashkent, Stalinabad, and Almata), 17h. (La Paz, De Bilt, Clermont-Ferand, and Granada), 18h. (Stuttgart, Huancayo, near Lick, and Branner), 19h. (Tacubaya, Hungry Horse, Pierce Ferry, and Santa Clara), 21h. (Almata, near Andijan, Tashkent, Frunse, Obi-garm, Stalinabad, and near Tacubaya).

May 21d. 15h. 38m. 20s. Epicentre 33°·0N. 123°·5W.

Epicentre as suggested by Pasadena.

$A = -·4638$, $B = -·7007$, $C = +·5421$; $\delta = -4$; $h = +1$;
$D = -·834$, $E = +·552$; $G = -·299$, $H = -·452$, $K = -·840$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Santa Barbara		3·5	65	i 0 57	0	i 1 42	+ 2	—	—
Branner	E.	4·5	13	i 1 13	+ 2	i 2 7	+ 2	1 1 23	P*
Lick	z.	4·6	19	i 1 14	+ 2	i 2 8	+ 1	—	—
Pasadena		4·6	74	i 1 12	0	i 2 8	+ 1	—	—
Mount Wilson		4·7	74	i 1 15	+ 1	i 2 12	+ 2	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Fresno	z.	4·8	38	i 1 18	+ 3	i 2 21	+ 9	—	—
Berkeley		5·0	11	i 1 18	0	i 2 18	0	1 1 23	P•
Riverside		5·2	77	i 1 20	− 1	e 2 22	0	—	—
La Jolla		5·3	90	i 1 19	− 3	i 2 22	− 3	—	—
Haiwee		5·5	54	i 1 28	+ 3	i 2 38	+ 8	—	—
Palomar		5·6	85	i 1 24	− 3	i 2 30	− 3	—	—
Tinemaha		5·9	45	i 1 35	+ 4	i 2 45	+ 5	—	—
Boulder City		7·7	65	e 1 56	0	—	—	—	—
Shasta Dam		7·7	6	e 1 57	+ 1	e 3 29	+ 4	—	—
Pierce Ferry		8·4	65	i 2 7	+ 1	—	—	—	—
Tucson		10·7	91	e 2 39	+ 1	—	—	—	—
Hungry Horse		16·9	22	e 3 56	− 3	—	—	—	—

May 21d. 18h. 38m. 36s. Epicentre 50°·0S. 115°·0W.

Approximate Determination.

A = −·2727, B = −·5848, C = −·7639; δ = −10; h = −5;
D = −·906, E = +·423; G = +·323, H = +·692, K = −·645.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		49·9	55	e 8 52	− 5	i 16 8	+ 1	i 21 1	SSS	i 22·9
La Paz		50·3	66	i 9 0	0	i 16 12	− 1	19 44	SS	23·6
Tucson		82·0	4	e 12 23	0	—	—	—	—	—
Palomar	z.	83·0	359	i 12 19	− 9	—	—	—	—	—
Riverside	z.	83·7	358	e 12 32	0	—	—	—	—	—
Mount Wilson	z.	83·9	358	e 12 34	+ 1	—	—	—	—	—
Boulder City		85·6	1	e 12 40	− 1	—	—	—	—	—
Haiwee	z.	85·8	358	e 12 48	+ 6	—	—	—	—	—
Pierce Ferry		85·8	2	e 12 43	+ 1	—	—	—	—	—
Tinemaha	z.	86·8	358	e 12 47	0	—	—	—	—	—
Shasta Dam		90·6	355	e 13 4	− 1	—	—	i 13 14	P_cP	—
Stuttgart	z.	144·4	70	e 19 33	[− 5]	—	—	—	—	—
Ksara		153·2	117	e 19 59	[+ 7]	—	—	36 53	PPS	—

Long waves were also recorded at De Bilt, Clermont-Ferrand, Wellington, and Christchurch.

May 21d. 19h. 53m. 34s. Epicentre 11°·4S. 75°·4W.
(as on 1948, Feb 2d.).

A = +·2472, B = −·9489, C = −·1964; δ = +9; h = +7;
D = −·968, E = −·252; G = −·050, H = +·190, K = −·981.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		0·7	174	i 0 18	+ 1	i 1 30	+62	—	—	i 2·0
La Paz		8·7	126	2 16	+ 6	4 0	+10	—	—	5·2
Tucson		55·1	323	i 9 36s	0	—	—	—	—	—
Palomar	z.	59·5	320	i 10 21	+14	—	—	—	—	—
Pierce Ferry		59·6	324	i 10 8	0	—	—	—	—	—
Boulder City		60·0	324	e 10 11	0	—	—	—	—	—
Riverside	z.	60·2	320	i 10 13	+ 1	—	—	—	—	—
Mount Wilson	z.	60·8	320	i 10 17a	+ 1	—	—	—	—	—
Pasadena	z.	60·8	320	e 10 16	0	—	—	—	—	—
Tinemaha	z.	62·8	322	i 10 30a	0	—	—	—	—	—
Shasta Dam		67·6	324	i 10 57	− 4	—	—	—	—	—
Hungry Horse		68·6	333	i 11 4	− 3	—	—	—	—	—

La Paz also gives P = 2m.38s., S_e = 5m.2s.

May 21d. Readings also at 0h. (near Obi-garm, Stalinabad, and near Lick), 1h. (Ksara, near Istanbul, and near Apia), 4h. (Ksara), 5h. (near Murgab, Obi-garm, Kulyab, and Stalinabad), 6h. (near Apia), 7h. (Andijan, near Kulyab, Obi-garm, Stalinabad, and Murgab), 8h. (Shasta Dam and near Tananarive), 13h. (near Obi-garm, Kulyab, Murgab, and Stalinabad), 16h. (near Lick, Berkeley, near Kulyab, and Stalinabad), 18h. (near Kulyab), 19h. (Bogota), 20h. (Tashkent, Samarkand (2), near Kulyab (2), Stalinabad (2), Murgab (2), and Andijan), 22h. (La Paz), 23h. (near Kulyab (2), and Stalinabad (2)).

May 22d. 5h. 7m. 40s. (I) } Epicentre 33°·3N. 23°·5E.
5h. 27m. 26s. (II) } (as on 1941, May 3d.).

$A = +·7681$, $B = +·3340$, $C = +·5464$; $\delta = +9$; $h = +1$;
$D = +·399$, $E = -·917$; $G = +·501$, $H = +·218$, $K = -·838$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Helwan	7·5	115	e 2 2	+ 9	3 26	+ 6	—	—	—
II		7·5	115	—	—	i 3 22	+ 2	—	—	i 4·4
I	Messina	8·1	309	e 2 25	P*	e 3 32	− 3	—	—	—
II		8·1	309	e 3 30	S	(e 3 30)	− 5	3 38	S	—
I	Taranto	8·7	327	2 7	− 3	e 3 19	−31	—	—	e 5·0
I	Istanbul	8·9	28	e 2 14	+ 2	e 3 32	−23	—	—	—
II		8·9	28	e 2 16	+ 4	—	—	—	—	—
I	Ksara	10·3	85	e 2 28?	− 4	—	—	—	—	e 5·4
I	Belgrade	11·8	349	e 2 39	−14	e 4 56	−10	—	—	i 6·4
I	Rome	12·2	318	e 4 33	?	e 6 17	L	—	—	(e 6·3)
I	Padova	14·4	324	e 3 42	+15	6 45	+36	—	—	e 7·8
II		14·4	324	e 4 22	+55	—	—	—	—	—
I	Triest	14·4	332	e 2 59?	−28	e 5 14?	?	—	—	i 6·8
II		14·4	332	e 3 33?	+ 6	e 5 53?	−16	—	—	—
I	Bologna	14·6	323	e 3 40	+10	e 6 26	+13	—	—	e 8·5
I	Chur	17·2	326	e 4 5	+ 2	e 7 18	+ 4	—	—	—
I	Leninakan	17·9	60	e 4 9?	− 3	—	—	—	—	—
I	Prague	18·0	342	e 3 51	−22	e 7 33	+ 1	—	—	e 9·3
II		18·0	342	e 4 37	+24	e 8 3	+31	—	—	e 9·8
I	Zürich	18·0	327	e 4 13k	0	e 7 38	+ 6	—	—	—
II		18·0	327	e 4 12	− 1	e 7 23	− 9	—	—	—
I	Basle	18·6	327	e 4 20	− 1	e 7 46	0	—	—	e 10·6
II		18·6	327	e 4 22	+ 1	e 7 56	+10	—	—	—
I	Neuchatel	18·6	326	e 4 21	0	—	—	—	—	—
II		18·6	326	e 4 19	− 2	—	—	—	—	—
I	Stuttgart	18·8	331	e 4 20	− 3	e 7 51	+ 1	—	—	e 11·3
II		18·8	331	e 4 18	− 5	—	—	—	—	e 10·6
I	Warsaw	19·0	357	e 5 43	?	(e 8 20?)	+25	—	—	e 8·3
I	Strasbourg	19·3	329	e 4 28	− 1	e 7 56	− 6	i 4 40	PP	e 9·9
II		19·3	329	e 4 26	− 3	e 7 51	−11	—	—	—
I	Jena E.	19·7	340	e 4 32	− 2	e 8 22	+12	e 5 27	PP	—
I	Clermont-Ferrand	20·0	315	i 4 41	+ 4	—	—	—	—	—
II		20·0	315	i 4 51	+14	—	—	i 4 57	PP	—
I	Alicante	20·1	293	e 5 9	+31	e 9 1	+42	—	—	e 9·9
I	Grozny	20·1	54	4 22	−16	—	—	—	—	—
I	Potsdam	20·5	343	e 4 40	− 2	i 8 24	− 3	—	—	e 11·3
I	Paris	22·1	322	5 0	+ 1	e 9 2	+ 4	—	—	e 13·3
II		22·1	322	i 5 2	+ 3	e 9 6	+ 8	—	—	e 14·6
I	Baku	22·2	64	e 5 12	+12	e 8 56	− 4	—	—	—
I	Granada	22·4	289	i 5 45a	+43	i 9 27	+23	6 18	PP	12·3
I	Uccle	22·4	329	5 3	+ 1	e 9 7	+ 3	—	—	e 11·9
II		22·4	329	e 5 5	+ 3	e 8 34?	?	—	—	e 12·6
I	De Bilt	23·0	332	e 5 13	+ 6	e 9 9	− 5	—	—	e 11·8
I	Toledo	23·0	295	5 19	+12	—	—	e 5 36	PP	—
I	Copenhagen	23·7	345	5 10	− 4	—	—	—	—	11·3
I	Moscow	24·5	21	e 5 21	− 1	e 9 17	−23	—	—	—
I	Andijan	39·3	65	e 7 33?	+ 1	—	—	—	—	—
I	Hungry Horse	90·3	334	e 13 8	+ 4	e 23 36	[+ 1]	—	—	—
II		90·3	334	e 13 5	+ 1	—	—	—	—	—
I	Shasta Dam	99·9	335	e 23 9	?	—	—	—	—	—
I	La Paz N.	100·2	257	i 25 30	S	(i 25 30)	+ 8	—	—	—

Additional readings :—
Helwan I. eZ = 2m.13s. and 3m.13s.
Bologna I. e = 4m.14s.
Prague I. eE = 7m.27s.
Stuttgart I. eZ = 4m.32s., 4m.39s., and 10m.39s.
Strasbourg I. eS = 7m.50s.
Paris I. iP = 5m.5s.
Uccle I. eSN = 9m.14s.
Toledo I. e = 5m.26s., 6m.11s., i = 6m.34s., e = 6m.52s. and 7m.44s.
Hungry Horse I. i = 13m.20s.
Long waves to shock II were also recorded at Potsdam and Rome.

May 22d. 8h. 39m. 39s. Epicentre 44°·8N. 10°·3E. (as on 1940, May 1d.).

$A = +·7004$, $B = +·1273$, $C = +·7023$; $\delta = -1$; $h = -4$;
$D = +·179$, $E = -·984$; $G = +·691$, $H = +·126$, $K = -·712$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Bologna		0·8	112	0 18	0	0 31	0	—	—
Salo		0·8	11	0 19	+ 1	i 0 35	+ 4	—	—
Pavia		0·9	296	e 0 14	− 6	e 0 37	+ 3	—	—
Florence	z.	1·2	146	e 0 34	+10	—	—	—	—
Padova		1·2	105	0 26	+ 2	0 45	+ 4	—	—
Chur		2·1	345	e 0 38	+ 1	e 1 8	+ 4	—	—
Zürich		2·8	335	e 0 47	0	e 1 33	S_g	e 0 55	P_g
Basle		3·3	326	e 1 14	P_g	e 1 48	S_g	—	—
Stuttgart		4·1	349	e 1 19?	P_g	e 1 49	− 6	e 2 17	S_g
Strasbourg		4·2	337	e 1 22	P_g	e 2 24	S_g	—	—
Clermont-Ferrand		5·2	284	e 1 47	P_g	1 3 1	S_g	—	—
Collmberg	z.	6·7	14	—	—	e 2 43	−17	—	—

Additional readings :—
Pavia eEN = 19s.
Stuttgart eZ = 1m.27s., e = 2m.31s.
Strasbourg e = 2m.33s.

May 22d. 18h. 57m. 33s. Epicentre 42°·5S. 172°·9E.
(Fore shock of large Earthquake at 19h.).

Intensity VI+ in the epicentral district.

R. C. Hayes.
"Earthquakes in New Zealand during the Year 1948," New Zealand Journal of Science and Technology, Sect. B, Vol. 31, No. 1, July, 1949, p. 37. Map of epicentral region p. 38.

$A = -·7338$, $B = +·0914$, $C = -·6731$; $\delta = -12$; $h = -3$;
$D = +·124$, $E = +·992$; $G = +·668$, $H = -·083$, $K = -·740$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		1·0	191	0 22	+ 1	—	—	—	—	—
Kaimata		1·1	269	0 22	0	0 37	− 2	—	—	—
Wellington		1·8	49	0 33?	+ 1	0 56	0	—	—	—
New Plymouth	E.	3·5	15	0 57	0	—	—	—	—	—
Tuai	N.	4·9	43	e 1 14	− 3	2 10	− 5	—	—	—
Arapuni	E.	4·9	27	i 1 33	P_g	i 2 33	S*	—	—	—
Auckland	N.	5·8	15	e 1 27	− 2	2 48	+10	—	—	—
Riverview		19·1	290	i 4 30k	+ 3	i 8 9	+12	i 4 49	PP	e 9·4
Brisbane		22·1	307	i 4 58	− 1	i 9 9	+11	—	—	i 11·2
Ksara		145·4	270	i 19 41k	[+ 1]	e 30 39	{+47}	—	—	—
Stuttgart	z.	167·0	304	e 21 11	PKP_2	—	—	—	—	—

Additional readings :—
Riverview i = 4m.41s., iSN = 8m.12s.
Brisbane iPN = 5m.1s., iN = 6m.11s.

May 22d. 19h. 21m. 24s. Epicentre 42°·5S. 172°·9E. (as at 18h.).

Intensity VIII throughout the South Island, particularly noticeable at Waiau, where chimney stacks were overthrown, and Hammer. Several after-shocks. Epicentre as adopted.

R. C. Hayes.
"Earthquakes in New Zealand during the year 1948," New Zealand Journal of Science and Technology, Sect. B., Vol. 31, No. 1, July, 1949, p. 37. Map of the epicentral region, p. 38.

$A = -·7338$, $B = +·0914$, $C = -·6731$; $\delta = -12$; $h = -3$;
$D = +·124$, $E = +·992$; $G = +·668$, $H = -·083$, $K = -·740$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Christchurch		1·0	191	0 22	+ 1	—	—	—	—	—
Kaimata		1·1	269	0 23	+ 1	0 40	+ 1	—	—	—
Wellington		1·8	49	0 32?	0	0 55	− 1	—	—	—
New Plymouth	E.	3·5	15	0 57	0	—	—	—	—	—
Arapuni	E.	4·9	27	i 1 36	P_g	2 30	S*	—	—	—
Tuai	N.	4·9	43	1 15	− 2	2 13	− 2	—	—	—
Auckland	N.	5·8	15	1 27	− 2	2 27	−11	—	—	—
Riverview		19·1	290	i 4 29a	+ 2	i 8 8	+11	i 4 58	PPP	e 9·0
Brisbane		22·1	307	i 4 57	− 2	i 9 5	+ 7	i 5 28	PP	i 11·1
Apia		31·5	31	—	—	e 13 36?	SS	—	—	—
Batavia		68·3	283	e 11 3	− 2	e 20 3	− 3	—	—	37·6
La Plata	E.	90·0	140	—	—	23 36	[+ 3]	29 48	SS	43·9
	N.	90·0	140	—	—	23 36	[+ 3]	26 6	PPS	43·6
Vladivostok		92·9	331	e 13 5	−11	i 24 20	0	—	—	—
Huancayo		97·4	114	e 13 58	+21	i 24 23	[+ 9]	e 16 46	PP	e 41·8
La Paz		98·8	122	i 13 50	+ 7	i 24 29	[+ 7]	i 17 48	PP	46·0
Pasadena		98·9	52	e 13 44	+ 1	—	—	i 17 50	PP	e 40·3
Mount Wilson	Z.	99·1	52	e 13 41	− 3	—	—	i 17 47	PP	—
Palomar	Z.	99·1	53	e 13 43	− 1	—	—	—	—	—
Riverside	Z.	99·3	52	e 13 45	0	—	—	e 17 48	PP	—
Lick	Z.	99·3	47	e 17 54	PP	i 27 35	PPS	—	—	—
Berkeley		99·4	47	e 18 12	PP	e 26 46	PS	—	—	e 46·2
Fresno	Z.	99·9	49	e 13 46	− 2	—	—	e 17 54	PP	—
Tananarive		100·8	232	—	—	—	—	e 41 6	Q	e 47·6
Tinemaha	Z.	101·0	50	e 13 56	+ 3	—	—	e 18 0	PP	—
Calcutta	E.	101·1	290	i 17 26	PP	e 25 13	−17	—	—	46·5
Shasta Dam		101·4	44	e 14 2	+ 7	—	—	e 18 59	PP	—
Tucson		102·0	57	e 13 58	+ 1	—	—	e 18 16	PP	—
Boulder City		102·2	52	e 13 59	+ 1	—	—	e 17 59	PP	—
Pierce Ferry		102·8	53	e 14 7	+ 6	—	—	e 18 32	PP	—
Hyderabad	N.	104·8	280	—	—	e 24 59	[+ 9]	—	—	—
Victoria		106·5	39	—	—	—	—	e 42 36?	Q	49·6
Sitka		108·7	27	—	—	e 25 12	[+ 5]	e 30 2	PPS	e 45·1
Bombay	N.	109·8	278	e 19 59	?	—	—	—	—	—
Irkutsk		111·4	321	e 19 18	PP	e 25 19	[+ 1]	e 28 40	PS	—
Kulyab		123·0	293	i 18 59	[0]	—	—	—	—	—
Stalinabad		124·0	293	e 19 1	[0]	27 48	{+ 7}	i 20 46	PP	—
San Juan		124·9	97	e 22 23	PKS	e 26 4	[− 2]	e 27 46	SKKS	e 49·2
Tashkent		125·0	297	e 18 44	[−18]	e 25 56	[−10]	e 22 17	PKS	—
Cleveland		126·4	64	i 19 6	[+ 1]	—	—	i 24 33	PP	54·2
Philadelphia		130·0	69	—	—	e 22 40	PKS	e 45 9	SSS	e 65·1
Temiskaming		130·2	59	e 19 36	[+24]	—	—	i 24 36	PPP	—
Ville Marie		130·2	59	e 19 6	[− 6]	e 37 21	?	i 24 15	PPP	—
Fordham		131·3	67	e 22 40	PKS	e 28 25	{− 3}	—	—	—
Ottawa		131·9	62	19 15	[− 1]	39 36?	SS	22 42	PKS	63·6
Bermuda		134·0	82	e 24 1	?	e 38 38	SS	e 41 46	SSP	e 52·8
Sverdlovsk		135·7	312	e 19 35	[+12]	e 32 58	PS	e 22 46?	PP	—
Baku		137·9	287	e 23 9	PKS	—	—	—	—	—
Grozny		141·8	290	e 23 11	PKS	24 15	?	—	—	—
Leninakan		142·3	285	—	—	29 43	{+ 8}	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Piatigorsk		143·9	290	e 19 45	[+ 8]	—	—	e 34 13	PS	—
Ksara		145·4	270	e 19 43	[+ 3]	e 30 26	{+34}	—	—	—
Sotchi		146·1	288	e 19 39	[− 2]	34 22	PS	—	—	—
Helwan		146·8	260	e 19 48	[+ 6]	26 47	[− 2]	34 27	PS	—
Moscow		148·4	310	e 19 49	[+ 4]	—	—	—	—	—
Ivigtut		149·2	38	e 19 54	[+ 8]	25 48	[−65]	—	—	74·6
Scoresby Sund		150·9	10	20 20	PKP_2	—	—	—	—	—
Istanbul		153·1	279	e 19 50	[− 2]	—	—	e 24 4	PP	—
Tamanrasset		157·7	213	e 19 58	[0]	—	—	e 24 11	PP	—
Warsaw		158·7	307	e 60 29	Q	—	—	—	—	e 78·6
Prague		163·4	305	e 52 6	?	—	—	—	—	e 71·6
Jena	E.	164·7	307	e 21 2	PKP_2	—	—	—	—	—
Triest		164·7	289	e 20 9	[+ 3]	e 34 8	PSKS	e 24 5	PP	—
Rome		165·5	274	e 20 8	[+ 2]	e 31 45	{+ 4}	e 21 10	PKP_2	e 78·6
Padova		166·1	288	e 21 26	?	—	—	—	—	—
Stuttgart		167·0	304	e 20 4	[− 3]	e 28 6	[+56]	e 21 10	PKP_2	e 86·6
Salo	z.	167·0	290	e 20 6	[− 1]	—	—	e 21 10	PKP_2	—
De Bilt		167·3	323	e 20 6	[− 2]	e 37 48	PPS	e 25 0	PP	e 78·6
Strasbourg		167·9	305	e 21 16	PKP_2	e 45 46	SS	e 25 6	PP	60·6
Uccle		168·6	322	—	—	e 31 36?	{−20}	e 49 36?	?	e 77·6
Kew		169·9	334	e 36 37?	PSKS	—	—	—	—	e 83·6
Paris		170·8	—	e 20 12	[+ 2]	e 48 44	SS	e 21 35	PKP_2	e 83·6
Clermont-Ferrand		172·0	—	e 20 13	[+ 3]	32 21	{+ 8}	e 21 39	PKP_2	82·6
Alicante		173·5	—	20 13	[+ 2]	47 2	SS	25 46	PP	e 82·9
Granada		174·1	—	i 20 15a	[+ 4]	27 9	[− 4]	i 21 46	PKP_2	i 87·5
Lisbon		175·9	—	20 13a	[+ 1]	54 36?	SSS	21 36?	PKP_2	84·0

Additional readings :—
Riverview i = 4m.33s., iE = 8m.16s., iN = 8m.29s., iE = 8m.53s.
Brisbane iPEN = 5m.3s., iN = 6m.32s. and 6m.53s., iSN = 9m.10s., iN = 9m.32s., iSSE = 9m.38s.
La Plata SSN = 31m.6s., SSSN = 32m.30s., SSSE = 34m.6s., QN = 37m.54s.
Huancayo e = 17m.38s., iPS = 26m.11s., eSS = 31m.25s., iSS = 31m.42s., eSSS = 35m.27s.
La Paz PSNZ = 26m.48s., SSEN = 32m.16s.
Berkeley iZ = 22m.23s., eEN = 41m.18s.
Sitka eSSS = 38m.56s.
Bombay eE = 10m.15s.
Stalinabad PKS = 22m.37s.
San Juan e = 29m.19s., ePS = 31m.2s., ePPS = 32m.18s., eSS = 37m.12s., eSSS = 42m.4s.
Tashkent eSKKS = 27m.38s.
Cleveland iZ = 19m.15s. and 33m.47s.
Fordham e = 37m.19s.
Ottawa eE = 38m.24s., SSS = 45m.54s.
Helwan eN = 21m.30s.
Rome eSKPZ = 23m.45s., ePPZ = 24m.53s., ePSKSE = 35m.40s., eE = 40m.5s., eSSE = 45m.34s., eSSSE = 51m.55s.
Stuttgart ePKP$_2$? = 21m.18s., ePP? = 25m.1s., eZ = 34m.49s. and 43m.41s., eSS? = 46m.54s., e = 51m.36s., eSSS? = 53m.54s.
Salo eZ = 20m.29s.
Strasbourg e = 21m.49s., e = 39m.51s., 40m.3s., and 49m.36s.
Paris ePP = 25m.28s.? and 26m.33s., ePPP = 29m.40s., e = 34m.36s.?
Clermont-Ferrand ePP = 25m.31s., ePPP = 29m.39s., eSSP = 48m.23s.
Alicante PPS = 40m.9s., SSS = 53m.56s.
Granada pPKP = 20m.45s., pPKP$_2$ = 22m.21s., iPP = 25m.35s., pPP = 26m.16s., sSKS = 29m.14s., iSKKS = 32m.25s., sSKKS = 33m.36s., SKSP = 36m.4s., sSKSP = 36m.58s. PPS = 39m.58s., iSS = 47m.7s., sSS = 48m.25s., SSS = 54m.17s.
Lisbon PPZ = 25m.41s., Q? = 74m.36s.?
Long waves were also recorded at Honolulu, Bogota, and other American and European stations.

May 22d. 19h. 36m. 10s. I
19h. 53m. 43s. II
20h. 1m. 18s. III
21h. 21m. 57s. IV
} Epicentre 42°·5S. 172°·9E. (as at 19h. 21m.).

			△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
			°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Kaimata		1·1	269	0 25	+ 3	0 39?	0	—	—	—
II			1·1	269	0 22	0	0 39	0	—	—	—
III			1·1	269	0 22	0	0 38	− 1	—	—	—
IV			1·1	269	0 22	0	—	—	—	—	—
I	Wellington		1·8	49	0 32?	0	0 57	+ 1	—	—	—
II			1·8	49	0 31	− 1	0 56	0	—	—	—
III			1·8	49	0 30	− 2	0 55?	− 1	—	—	—
IV			1·8	49	0 32	0	0 55	− 1	—	—	—
I	New Plymouth	E.	3·5	15	0 57	0	1 40	0	—	—	—
II		E.	3·5	15	0 57	0	i 1 37	− 3	—	—	—
III		E.	3·5	15	0 57	0	1 40	0	—	—	—
IV		E.	3·5	15	0 57	0	1 37	− 3	—	—	—
I	Tuai	N.	4·9	43	1 11	− 6	2 8	− 7	—	—	—
II		N.	4·9	43	e 1 16	− 1	2 11	− 4	—	—	—
III		N.	4·9	43	1 19	+ 2	2 14	− 1	—	—	—
IV		N.	4·9	43	1 17	0	i 2 12	− 3	—	—	—
I	Arapuni	E.	4·9	27	—	—	i 3 2	?	—	—	—
II		E.	4·9	27	—	—	e 2 35	S^*	—	—	—
III		E.	4·9	27	e 1 42	P_g	2 48	S_g	—	—	—
IV		E.	4·9	27	—	—	2 51	S_g	—	—	—
I	Auckland	N.	5·8	15	1 24	− 5	2 34	− 4	—	—	—
II		N.	5·8	15	1 46	P^*	3 8	S_g	—	—	—
III		N.	5·8	15	1 25	− 4	2 58	S^*	—	—	—
IV		N.	5·8	15	i 2 42	S	(i 2 42)	+ 4	i 4 4	?	—
I	Riverview		19·1	290	i 4 27a	0	i 7 47	−10	i 4 43	PP	—
III			19·1	290	i 4 28k	+ 1	i 7 59	+ 2	i 5 1	PP	e 9·4
IV			19·1	290	i 4 32a	+ 5	i 8 9	+12	i 4 49	PP	e 8·8
I	Brisbane	N.	22·1	307	i 4 56	− 3	—	—	—	—	—
III			22·1	307	i 4 59	0	i 9 5	+ 7	i 5 44	PP	i 11·6
IV			22·1	307	i 4 58	− 1	i 9 3	+ 5	i 5 26	PP	i 11·6
III	La Paz		98·8	122	13 52	+ 9	—	—	—	—	—
I	Pasadena	Z.	98·9	52	i 13 40	− 3	—	—	e 17 39	PP	—
I	Mount Wilson	Z.	99·1	52	i 13 44	0	—	—	i 17 43	PP	—
I	Palomar	Z.	99·1	53	i 13 46	+ 2	—	—	i 17 49	PP	—
I	Riverside	Z.	99·3	52	i 13 41	− 4	—	—	e 17 45	PP	—
I	Tucson		102·0	57	e 13 30	−27	—	—	e 14 1	P	—
III			102·0	57	e 14 2	+ 5	—	—	—	—	—
I	Boulder City		102·2	52	i 13 11	−47	—	—	e 18 11	PP	—
I	Pierce Ferry		102·8	53	e 13 11	−50	—	—	—	—	—
III			102·8	53	e 16 47	?	—	—	—	—	—
III	Cleveland	Z.	126·4	64	i 19 2	[− 3]	—	—	—	—	—
I	Ksara		145·4	270	i 19 38k	[− 2]	e 30 6	{+14}	—	—	—
III			145·4	270	i 19 40k	[0]	e 30 8	{+16}	—	—	—
I	Tamanrasset		157·7	213	i 19 56k	[− 2]	—	—	e 24 7	PP	—
III			157·7	213	i 19 57a	[− 1]	—	—	i 24 8a	PP	—
IV			157·7	213	e 20 0	[+ 2]	—	—	e 24 10	PP	—
III	Jena	N.	164·7	307	e 21 6	PKP_2	—	—	—	—	—
I	Stuttgart	Z.	167·0	304	e 21 7	PKP_2	—	—	e 24 58	PP	—
II		Z.	167·0	304	e 21 7	PKP_2	—	—	—	—	—
III		Z.	167·0	304	e 20 2	[− 5]	—	—	e 21 8	PKP_2	—
IV		Z.	167·0	304	e 21 11	PKP_2	—	—	—	—	e 98·0
I	Strasbourg		167·9	305	e 21 12	PKP_2	—	—	e 24 54	PP	—
III			167·9	305	e 21 14	PKP_2	—	—	e 25 3	PP	—
IV			167·9	305	e 21 16	PKP_2	—	—	e 46 48	SS	—
III	Granada		174·1	—	i 19 52k	[−19]	32 4	{−18}	21 40	PKP_2	—
IV			174·1	—	25 32a	PP	—	—	—	—	i 88·2
III	Toledo		176·5	—	e 20 12	[0]	—	—	e 26 3	PP	—

Additional readings :—
Riverview III iN =4m.31s., iN =8m.9s., iZ =8m.14s.,
Riverview IV iSN =8m.12s., iZ =8m.15s.
Brisbane I iN =6m.11s. and 6m.27s., III iSN =9m.11s., iSSEN =9m.33s., IV iN = 5m.52s.

Continued on next page.

Jena III eE =21m.10s.
Stuttgart III ePP?Z =24m.59s.
Strasbourg IV e? =42m.35s.
Granada III pPKP =20m.25s., iPP =25m.34s.
Long waves were also recorded at Toledo to shock I, and at Potsdam, De Bilt, Paris, and Alicante to shock IV.

May 22d. 19h. 36m. 38s. Epicentre 52°·8N. 168°·2W. Depth of focus 0·010.
(as on 1942, March 20d.).

$A = -·5943$, $B = -·1242$, $C = +·7945$; $\delta = -15$; $h = -6$;
$D = -·204$, $E = +·979$; $G = -·778$, $H = -·162$, $K = -·607$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		15·9	33	e 3 38	− 1	—	—	—	—	e 7·8
Sitka		19·3	64	e 4 25	+ 5	e 8 0	+12	i 5 18	PP	e 8·7
Grand Coulee		31·3	79	i 6 16	+ 3	—	—	—	—	—
Shasta Dam		33·1	93	e 6 32	+ 3	i 12 10	?	i 6 54	pP	—
Hungry Horse		34·0	75	i 6 37	+ 1	i 12 12	+18	i 8 32	PP	—
Berkeley		34·9	97	e 6 46	+ 2	—	—	e 7 2	pP	—
Branner		35·3	97	i 6 49	+ 2	—	—	—	—	—
Lick	z.	35·6	97	e 6 52	+ 2	—	—	i 7 9	pP	—
Fresno	z.	37·2	96	i 7 5a	+ 2	—	—	i 7 27	pP	—
Tinemaha		37·9	94	i 7 11a	+ 2	e 16 59	S_cS	i 7 34	pP	—
Haiwee		38·6	94	i 7 16a	+ 1	—	—	i 7 32	pP	—
Santa Barbara		38·8	98	i 7 18a	+ 1	—	—	i 7 40	pP	—
Mount Wilson		39·9	97	i 7 25a	− 1	12 38	S_cP	i 7 49	pP	—
Pasadena		39·9	97	i 7 24a	− 2	e 13 16	− 7	i 7 43	pP	—
Riverside	z.	40·5	97	i 7 29a	− 2	i 12 40	S_cP	i 7 52	pP	—
Boulder City		40·7	93	i 7 32	0	—	—	i 7 56	pP	—
Pierce Ferry		41·1	92	i 7 36	0	—	—	i 7 58	pP	—
Palomar		41·2	97	i 7 36	0	e 17 18	S_cS	i 7 58	pP	—
La Jolla		41·3	98	i 7 37a	0	—	—	—	—	—
Tucson		45·6	93	i 8 9	− 3	—	—	i 8 33	pP	e 28·1

Additional readings :—
Shasta Dam iPP =8m.28s.
Tinemaha iZ =7m.42s. and 8m.46s., iSP_cPZ =12m.31s.
Haiwee iZ =7m.42s. and 8m.48s.
Pasadena iZ =7m.48s., iS_cPZ =12m.38s., iS_cSEN =17m.8s.
Riverside iZ =7m.36s.
Boulder City ePP =8m.57s.
Pierce Ferry iP_cP =9m.30s.
Palomar iZ =8m.9s., iE =9m.35s., iS_cPZ =12m.44s.
Tucson isP =8m.47s., iP_cP =9m.15s., epPP =10m.34s.

May 22d. Readings also at 1h. (Apia (2), Fresno, near Almata, Andijan, and Frunse), 2h. (Tinemaha, Tucson, and near Lick), 5h. (Brisbane, near Alicante and near Andijan), 9h. (Fresno, near Berkeley, Lick, and near Stuttgart), 10h. (near Alicante), 11h. (Haiwee, Mount Wilson, Palomar, Tinemaha, Tucson, Boulder City, Pierce Ferry, and Shasta Dam), 12h. (Paris, Istanbul, Pierce Ferry, and Tinemaha), 14h. (Brisbane and Huancayo), 17h. (Fresno and Lick), 19h. (Collmberg), 20h. (Fresno, near Berkeley, Branner, and Lick (4)), 23h. (Stuttgart, Tucson, Shasta Dam, near Tacubaya, and Mizusawa).

May 23d. 3h. South America.
La Plata PE =48m.57s., PN =49m.0s., SE =50m.42s., SN =50m.48s., LE =51·4m.
Tucson eP =57m.51s., epP =58m.26s.
Pierce Ferry iP =58m.17s., epP =58m.52s.
Riverside iPZ =58m.19s., epPZ =58m.54s.
Boulder City iP =58m.20s., epP =58m.53s.
Mount Wilson iPZ =58m.22s.
Pasadena iPZ =58m.22s.
Haiwee ePZ =58m.30s.
Tinemaha iPZ =58m.34s., epPZ =59m.9s.
Shasta Dam eP =58m.56s., epP =59m.31s.
Hungry Horse iP =59m.5s., i =59m.39s.
Bologna eN =59m.50s., e =62m.4s.
Stuttgart eZ =60m.49s.
Paris e =60m.51s.

May 23d. 4h. 12m. 29s. Epicentre 16°·1S. 168°·3E. Depth of focus 0·015.
(as on 1947, Nov. 5d.).

$A = -·9413$, $B = +·1949$, $C = -·2756$; $\delta = -1$; $h = +6$;
$D = +·203$, $E = +·979$; $G = +·270$, $H = -·056$, $K = -·961$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane		18·1	229	i 4 1	− 3	i 7 16	− 3	i 4 18	PP	i 8·8
Apia		19·4	86	i 4 18a	0	i 7 54	+ 8	—	—	—
Auckland	N.	21·5	166	4 41	+ 1	i 8 42	+17	i 9 25	sS	—
Arapuni	E.	22·8	165	e 5 19	PP	9 31	sS	—	—	12·5
Riverview		23·5	217	i 4 58a	− 1	i 8 59	− 1	i 5 26	pP	e 11·7
Tuai	E.	23·9	163	5 4	+ 1	9 10	+ 3	15 48	S_cS	—
Wellington		25·7	170	5 17	− 3	9 15	−22	5 47	pP	—
Kaimata		26·5	175	5 30	+ 3	9 51	+ 1	—	—	—
Christchurch		27·6	173	e 5 31?	− 6	—	—	—	—	—
Guam		37·5	320	e 7 8	+ 5	e 15 36	SS	—	—	—
Honolulu		49·9	43	—	—	e 15 36	− 5	—	—	e 20·6
Perth		50·0	242	—	—	i 15 31	−11	i 16 31	sS	—
Mizusawa		60·5	337	9 55	− 4	10 23	pP	—	—	—
Batavia		60·9	272	e 9 56	− 5	i 18 0	− 7	i 21 53	SS	30·5
Vladivostok		67·7	333	i 10 41	− 5	i 19 24	− 7	i 11 20	pP	—
Branner	Z.	84·2	49	e 12 38	+20	—	—	i 13 2	pP	—
Ukiah		84·2	47	—	—	e 23 30	PS	e 24 39	sS	e 35·1
Berkeley		84·3	49	i 12 19	0	i 22 35	+ 3	e 12 53	pP	e 34·8
Santa Clara		84·3	49	e 12 20	+ 1	e 22 34	+ 2	e 13 2	pP	—
Lick	Z.	84·6	49	i 12 20	0	—	—	i 12 43	pP	—
Shasta Dam		85·5	46	e 12 23	− 2	e 22 40	− 4	e 12 46	pP	—
Fresno	Z.	85·7	50	i 12 27	+ 1	—	—	e 15 41	PP	—
Pasadena		85·9	53	i 12 26	− 1	i 22 47	0	i 12 48	pP	e 35·1
Mount Wilson	Z.	86·0	53	i 12 27	0	—	—	i 12 47	pP	—
Riverside	Z.	86·4	53	i 12 30	+ 1	—	—	i 12 52	pP	—
Sitka		86·5	27	e 13 7	sP	i 22 52	− 1	e 15 47	PP	e 36·1
Palomar		86·6	55	i 12 30	0	i 22 42	[0]	i 12 54	pP	—
Haiwee	Z.	86·8	51	e 12 32	+ 1	—	—	i 13 0	pP	—
Tinemaha		86·9	50	i 12 33	+ 2	e 23 2	+ 5	i 12 53	pP	—
Calcutta	E.	87·1	295	—	—	i 22 38	[− 7]	i 24 6	PS	—
Irkutsk		87·6	326	12 31	− 4	22 43	[− 5]	24 3	PS	—
Victoria		88·2	39	12 31?	− 7	22 13?	−56	—	—	—
Boulder City		89·1	52	e 12 42	0	—	—	—	—	—
Pierce Ferry		89·8	52	i 12 46	+ 1	—	—	i 13 12	pP	—
Colombo	E.	90·4	277	e 18 1	PPP	i 23 1	[− 4]	—	—	—
Tucson		91·0	57	i 12 52	+ 1	e 23 41	+ 7	i 13 36	pP	e 41·8
Salt Lake City		92·9	48	e 13 42	pP	e 23 51	0	e 23 20	SKS	e 37·5
Bombay		100·1	286	e 18 8	PP	i 23 52	[− 5]	—	—	—
Almata		101·8	312	—	—	i 24 1	[− 5]	—	—	—
Frunse		103·5	311	—	—	i 24 9	[− 5]	—	—	—
Andijan		104·8	308	e 18 9	PP	e 24 16?	[− 4]	e 25 1	SKKS	—
Kulyab		106·3	306	—	—	i 24 24	[− 2]	—	—	—
Obi-garm		106·5	307	—	—	i 24 24	[− 3]	—	—	—
Tashkent		107·1	309	e 13 57	P	e 27 29	SP	e 17 56?	PP	—
Stalinabad		107·2	307	e 13 59	P	i 24 27	[− 3]	i 18 19	PP	—
Samarkand		108·7	307	—	—	24 53	[+16]	—	—	—
Huancayo		111·1	110	e 17 51	?	e 25 44	SKKS	i 19 5	PP	e 46·2
Sverdlovsk		113·0	325	e 18 41	PP	i 24 49	[− 5]	e 27 56	SP	—
Cleveland		115·5	52	—	—	i 24 58	[− 5]	e 28 22	SP	—
La Paz		115·6	118	e 18 51	pPKP	25 5	[+ 1]	i 29 11	PS	—
Bogota		117·8	93	—	—	e 25 12	[0]	e 29 44	PS	—
Ottawa		118·8	46	18 33	[− 1]	25 13	[− 2]	29 37	PS	60·5
Philadelphia		120·4	52	—	—	(e 27 50)	?	—	—	e 27·8
Baku		121·8	308	—	—	e 29 55	PS	—	—	—
Grozny		124·5	312	e 18 44	[0]	e 25 30	[− 3]	i 27 10	SKKS	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		125·3	4	20 30	PP	—	—	—	—	—
Moscow		125·6	328	e 18 45	[− 1]	e 25 33	[− 4]	i 20 35	PP	—
Piatigorsk		126·2	314	e 20 0	PP	—	—	—	—	—
Leninakan		126·3	310	e 18 56	[+ 8]	—	—	—	—	—
San Juan		128·1	78	e 22 10	PKS	e 25 13	[−31]	—	—	e 49·4
Theodosia		131·8	317	e 21 16	?	—	—	i 22 22	PKS	—
Simferopol		132·1	318	e 22 29	PKS	—	—	—	—	—
Fort de France		132·4	85	e 23 8	?	—	—	—	—	—
Ksara		133·8	301	e 19 3	[+ 1]	34 33	PPS	i 22 14	PKS	—
Warsaw		135·6	331	19 5	[0]	22 20	PKS	21 40	PP	e 64·5
Copenhagen		136·4	341	21 43	PP	i 22 22	PKS	24 47	PPP	—
Istanbul		137·0	314	e 19 4	[− 4]	i 22 16	PKS	—	—	—
Helwan		138·3	297	19 10	[0]	28 36	SKKS	19 51	pPKP	—
Raciborzu		138·4	332	e 21 22	PP	e 25 4	[−62]	e 22 38	PKS	—
Potsdam		138·8	337	e 19 55	pPKP	e 28 40	SKKS	i 21 57	PP	e 70·5
Prague		140·1	334	—	—	e 34 13	PPS	—	—	—
Jena	N.	140·5	336	e 19 6	[− 8]	—	—	e 22 8	PP	—
De Bilt		141·7	343	e 19 7	[− 9]	e 28 56	SKKS	i 22 20k	PP	e 63·5
Uccle		143·1	344	e 19 14a	[− 5]	e 29 0	SKKS	e 22 25	PP	e 63·5
Stuttgart		143·2	337	i 19 13k	[− 6]	e 29 3	SKKS	e 19 54	pPKP	—
Kew		143·6	348	—	—	e 34 31?	PPS	—	—	—
Triest		143·6	330	i 19 15	[− 5]	i 29 5	SKKS	e 19 49	pPKP	—
Strasbourg		143·9	339	i 19 16k	[− 4]	e 29 11	SKKS	e 20 3	pPKP	e 63·5
Chur		144·6	335	e 19 18	[− 3]	—	—	e 22 38	PP	—
Zürich		144·6	336	e 19 18k	[− 3]	e 29 10	SKKS	e 22 32	PP	—
Basle		144·8	337	e 19 20k	[− 2]	e 29 15	SKKS	e 22 37	PP	—
Salo		145·2	333	e 19 20k	[− 2]	—	—	e 20 4	pPKP	—
Padova		145·4	331	i 19 21	[− 2]	e 29 13	SKKS	22 44	PP	—
Paris		145·4	334	i 19 23	[0]	e 28 47	SKKS	i 20 4	pPKP	e 72·5
Bologna		145·6	330	e 19 23k	[0]	—	—	e 20 4	pPKP	—
Pavia		146·1	334	e 19 25	[+ 1]	—	—	e 19 29	PKP	—
Florence		146·2	329	e 19 23k	[− 1]	e 29 20	SKKS	e 22 47	PP	—
Rome		146·9	325	i 19 25k	[− 1]	e 41 31	SS	i 20 27	pPKP	—
Messina		147·5	320	e 19 27	[0]	—	—	—	—	—
Clermont-Ferrand		147·9	341	i 19 29	[+ 2]	i 29 36	SKKS	i 20 13	pPKP	43·5
Toledo		155·4	346	i 20 3	[+25]	e 30 14	SKKS	e 23 39	PP	—
Alicante		155·7	339	20 2	[+24]	27 14	[+44]	20 34	pPKP	e 73·8
Lisbon	Z.	157·4	355	i 20 11a	[+31]	—	—	23 49	PP	—
Granada		157·8	343	i 20 12	[+31]	i 30 26	SKKS	20 30	pPKP	80·8
Tamanrasset		162·5	296	e 19 46a	[0]	e 34 23	PSKS	e 20 31	pPKP	—

Additional readings and note :—
Brisbane iPPN = 4m.13s., iN = 4m.47s. and 5m.9s., iSSN = 7m.44s., iN = 8m.22s., iS_cSEN = 15m.30s.
Apia iN = 4m.21s.
Auckland iN = 15m.30s.
Riverview iP_cPNZ = 8m.40s., iS_cSEN = 15m.52s. and many other readings given without phase.
Wellington i = 5m.22s., PP = 6m.11m., sS = 10m.24s., SS = 11m.0s., S_cS = 15m.30s.
Perth i = 18m.15s. and 20m.4s.
Batavia ePP = 11m.55s.
Branner eE = 12m.43s., iZ = 12m.46s.
Ukiah eSS = 29m.11s.
Berkeley iZ = 13m.1s., eN = 14m.2s., iSNZ = 22m.27s., iN = 23m.45s. and 28m.11s.
Santa Clara eZ = 15m.37s., esSE = 23m.45s.
Lick iZ = 12m.40s., 13m.4s., and 15m.35s.
Fresno eZ = 12m.44s.
Pasadena eZ = 13m.8s., iPPEZ = 15m.50s., eSE = 22m.18s., iE = 23m.39s.
Riverside iZ = 13m.11s., iPPZ = 15m.54s.
Sitka eS = 22m.39s., iPS = 23m.58s., i = 24m.18s., eSS = 28m.35s., eSSS = 31m.55s.
Palomar iZ = 13m.14s., iPPE = 15m.56s.
Haiwee ipPZ = 12m.52s., iPPZ = 15m.58s.
Tinemaha iZ = 13m.17s., iPPZ = 15m.59s.
Victoria PP = 15m.13s.?, eN = 23m.31s.?.
Pierce Ferry iPP = 16m.22s.
Tucson i = 13m.21s., ipPP? = 16m.31s., eSKS = 21m.55s., e = 24m.47s., eSS = 29m.50s.
Salt Lake City e = 16m.23s., ePS = 25m.4s., eSS = 30m.4s., eSSS = 33m.55s.
Stalinabad SKKS = 25m.12s., S = 25m.41s., PS = 27m.43s.

Continued on next page.

Huancayo ePS =28m.33s., isSS =34m.39s., eSSS? =39m.51s.
Sverdlovsk iSKKS =25m.51s.
Cleveland eSKKSE =26m.10s., eSEN =27m.4s., eSSN =35m.13s.
La Paz iN =27m.4s., iE =30m.19s.
Bogota ePSEZ =32m.27s.
Ottawa SS =36m.31s.?.
Scoresby Sund 21m.28s., 29m.39s., and 33m.13s., eZ =35m.46s.
Moscow eSKKS =27m.19s., PPS =31m.11s.
San Juan eSPP =22m.58s., eSKS =24m.9s., ePS =29m.1s., ePSP =30m.24s., eSS = 35m.19s., esSS =36m.46s., ePKP,PKP? =38m.3s., e =39m.19s.,eSSS =40m.27s., readings wrongly identified.
Warsaw SKPE =22m.36s., SKPN =22m.39s., eE =23m.39s., PPPZ =24m.30s., PPSZ =33m.53s., eEN =33m.58s., eE =40m.50s., eN =40m.56s.,
Copenhagen 23m.25s.
Helwan eZ =19m.23s., sPZ =20m.6s., PPZ =22m.9s., iZ =22m.26s., eE =22m.39s.
Raciborzu eE =21m.26s., eEN =22m.51s.
Potsdam ePP?EN =22m.2s., iZ =22m.29s. and 23m.49s., iPPP?E =24m.54s., iZ = 35m.4s., eNZ =41m.43s.
De Bilt ipPP =22m.36s., eZ =34m.10s., ePPS =34m.52s.
Uccle eEN =40m.31s.?.
Stuttgart eZ =21m.38s., ePP =22m.26s., eSKPZ =22m.40s.
Triest iPP =22m.30s., isPP =23m.37s., iPSKS =33m.0s., eSSS =47m.24s.
Strasbourg iPP =22m.33s., ePPP =25m.37s., ePPS =34m.40s., eS =41m.1s., e = 42m.57s., eSSS? =46m.29s.
Chur i =19m.21s.a.
Salo eZ =19m.34s., e =22m.28s.
Paris iPP =22m.43s., e =23m.10s., ePPP =25m.53s., e =38m.9s., eSS =41m.31s.?.
Bologna e =26m.36s. and 29m.46s.
Rome iPKP,Z =20m.8s., iSKPZ =22m.47s.
Clermont-Ferrand isPKP =20m.34s., iPP =22m.57s., ipPP =24m.1s.
Alicante PKS =23m.42s., PP =24m.22s., PPP =27m.58s., SKKS =31m.2s., SS = 44m.46s.
Lisbon Z =23m.52s.
Granada PKP_2 =21m.5s., PP =23m.32s., pPP =24m.26s., sPP =25m.2s., sSKKS = 31m.14s., SKSP =35m.5s., PPS =38m.15s., SS =43m.16s., SSS =50m.25s.
Tamanrasset ePP =24m.18s., ePPP =28m.1s.
Long waves were also recorded at Ivigtut, Helsinki, and Harvard.

May 23d. 9h. 13m. 14s. Epicentre 37°·0N. 122°·0E.

A = −·4243, B = +·6789, C = +·5992 ; δ = −2 ; h = −1 ;
D = +·848, E = +·530 ; G = −·318, H = +·508, K = −·801.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		5·6	209	(e 1 27)	0	(2 38)	+ 5	(1 49)	P_g	—
Vladivostok		9·7	48	i 2 22	0	—	—	—	—	—
Mizusawa	E.	15·2	76	3 42	+ 4	5 37	−51	—	—	—
Irkutsk		19·7	327	4 30	− 4	8 7	− 3	—	—	—
Frunse		36·4	295	e 7 19	+11	—	—	—	—	—
Murgab		37·7	287	7 15	− 4	13 7	− 3	—	—	—
Andijan		38·4	292	e 7 25	0	e 13 21	+ 1	—	—	—
Tashkent		40·6	293	e 7 34?	− 9	e 13 45?	− 9	—	—	—
Obigarm		40·9	290	7 46	0	i 13 57	− 1	—	—	—
Kulyab		41·0	288	e 7 46	0	e 14 1	+ 2	—	—	—
Stalinabad		41·6	290	e 7 52	+ 1	i 14 12	+ 4	—	—	—
Samarkand		42·7	291	e 8 16	+16	—	—	—	—	—
Sverdlovsk		44·7	317	e 8 14	− 2	e 14 46	− 8	—	—	—
Bombay		46·5	261	—	—	e 15 26	+ 7	—	—	—
Baku		54·9	298	—	—	e 17 28	+12	—	—	—
Grozny		56·7	302	e 9 56	+ 8	—	—	—	—	—
Moscow		57·4	318	e 9 51	− 2	—	—	—	—	—
Warsaw		67·7	320	e 11 51	+50	e 26 24	?	—	—	e 35·8
Ksara		67·8	297	e 11 8	+ 6	e 20 7	+ 7	—	—	—
Istanbul		68·8	306	e 9 46?	?	—	—	e 12 41	?	—
Stuttgart		75·9	321	e 11 55	+ 5	—	—	e 13 36	?	e 40·8
Strasbourg		76·7	322	—	—	e 25 28	?	e 31 15	Q	e 36·4
Rome		78·5	314	e 16 28	PPP	e 22 46	PS	—	—	e 37·8
Paris		79·1	324	e 11 51?	−17	—	—	—	—	—
Hungry Horse		81·5	35	i 12 20	− 1	i 22 10	−22	e 12 25	P_cP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shasta Dam		82·8	44	e 12 26	− 1	—	—	i 12 54	?	—
Lick	z.	85·5	46	i 12 42	+ 1	—	—	i 15 31	PP	—
Tinemaha	z.	87·6	44	i 12 53	+ 2	—	—	i 12 58	P_cP	—
Haiwee	z.	88·4	44	e 12 57	+ 2	—	—	—	—	—
Mount Wilson	z.	89·7	46	i 13 3	+ 2	—	—	i 16 39	PP	—
Pasadena	z.	89·7	46	i 13 2	+ 1	—	—	—	—	—
Boulder City		90·3	43	i 13 5	+ 1	—	—	—	—	—
Riverside	z.	90·3	46	i 13 5	+ 1	—	—	—	—	—
Pierce Ferry		90·6	42	e 13 7	+ 2	—	—	—	—	—
Granada		90·7	320	—	—	34 4	SSS	—	—	i 45·1
Palomar	z.	91·1	46	i 13 8	0	—	—	i 16 38	PP	—
Tucson		95·3	43	i 13 28	+ 1	—	—	e 17 22	PP	—

Additional readings and notes :—
Nanking, readings increased by 2 minutes. $P^* = (1m.43s.)$, $S_g = (3m.8s.)$.
Hungry Horse S given as P for another shock.
Tinemaha iZ = 13m.13s.
Mount Wilson iZ = 13m.8s.
Tucson i = 13m.34s. and 14m.3s., e = 15m.15s.
Long waves were also recorded at Calcutta, Sitka, Philadelphia, and at other European stations.

May 23d. 15h. 28m. 57s. Epicentre 41°·0N. 44°·5E.
(as on 1938, Jan. 6d.).

A = +·5399, B = +·5305, C = +·6535 ; $\delta = -2$; $h = -2$;
D = +·701, E = −·713 ; G = +·466, H = +·458, K = −·757.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Leninakan		0·5	247	i 0 15	+ 1	—	—
Erevan		0·8	180	i 0 18	0	0 32	+ 1
Grozny		2·5	22	i 0 47	+ 4	1 25	S_g
Piatigorsk		3·2	341	—	—	i 1 36	+ 4
Baku		4·2	100	e 1 23	P_g	e 2 27	S_g
Sotchi		4·4	307	—	—	i 2 10	S*
Ksara		9·9	227	e 2 29	+ 4	e 5 30	S_g
Istanbul		11·7	275	i 2 43	− 8	6 53	?
Samarkand		17·2	93	e 4 3	0	—	—
Tashkent		18·7	80	e 4 11	−11	—	—
Stalinabad		18·8	88	e 4 25	+ 2	—	—
Sverdlovsk		19·0	28	i 4 21	− 5	7 55	0
Obi-garm		19·5	88	4 30	− 1	—	—
Kulyab		19·8	90	e 4 38	+ 3	—	—
Andijan		21·0	81	e 4 49	+ 2	—	—
Frunse		22·4	75	e 5 6	+ 4	—	—
Stuttgart	z.	26·0	300	e 5 31	− 5	—	—
Hungry Horse		89·0	346	e 12 30	−28	—	—

Hungry Horse also gives e = 12m.52s.
Long waves were recorded at Warsaw and Potsdam.

May 23d. Readings also at 0h. (near Kulyab, Obi-garm, Stalinabad, and Samarkand), 1h. (near Tananarive), 2h. (Tacubaya), 4h. (Stuttgart, Fresno, Brisbane, and near Ottawa), 5h. (near Kulyab), 10h. (near Mizusawa, near Kulyab, Obi-garm, Stalinabad, Andijan, and Samarkand), 11h. (Potsdam, Stuttgart, Hungry Horse, and Pierce Ferry), 12h. (Brisbane, Stuttgart, Mizusawa, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson (2), Riverside (2), Palomar, Haiwee, Santa Barbara, Tinemaha (2), near Lick, near Obi-garm, Stalinabad, and Kulyab), 14h. (Warsaw), 16h. (Andijan, Tashkent, Samarkand, near Kulyab, Obi-garm, and Stalinabad), 17h. (Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, and Tinemaha), 19h. (Balboa Heights), 20h. (Stuttgart, Fresno, Lick, Boulder City, College, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Riverside, Haiwee, and Tinemaha), 22h. (Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, and Tinemaha).

May 24d. 10h. Undetermined shock.

Apia iP = 37m.55s., iS = 38m.17s.
Shasta Dam iP = 44m.45s., i = 44m.54s., eP_cP = 48m.2s., iS_cP = 51m.30s.
Hungry Horse eP = 44m.50s., iP = 44m.54s., i = 47m.52s., 48m.3s., and 51m.30s.
Branner iPZ = 45m.14s., iZ = 45m.19s.
Tinemaha ePZ = 45m.29s., iZ = 45m.37s., eP_cPZ = 48m.6s., iZ = 48m.16s., iS_cP = 51m.47s.
Pasadena ePZ = 45m.44s.
Haiwee iZ = 45m.45s., iP_cPZ = 48m.19s.
Mount Wilson ePZ = 45m.46s., iZ = 46m.4s., eP_cPZ = 48m.22s.
Pierce Ferry eP = 45m.53s.
Palomar ePZ = 45m.57s., iZ = 46m.6s., iP_cPZ = 48m.26s.
La Jolla ePZ = 45m.58s.
Riverside eP?Z = 45m.59s., iP_cPZ = 48m.23s., iS_cPZ = 51m.55s.
Boulder City eP = 45m.59s., eP_cP = 48m.19s.
Tucson eP = 46m.33s., i = 46m.42s. and 46m.50s., iP_cP = 48m.40s.
Stuttgart eZ = 50m.34s. and 50m.48s.

May 24d. Readings also at 1h. (near Granada), 2h. (La Paz), 3h. (Stalinabad, near Kulyab, and Obi-garm), 4h. (Calcutta, Bombay, Istanbul, Stalinabad, Kulyab, Obi-garm, and Tashkent), 5h. (near Berkeley, Branner, Fresno, and Lick), 6h. (near Granada), 7h. (near Klyuchi), 8h. (near Lick and near Alicante), 9h. (Tacubaya), 10h. (Istanbul, Tucson (3), near Shasta Dam, Boulder City (3), Pierce Ferry (2), Lick, Fresno, Haiwee (2), La Jolla, Mount Wilson (3), Pasadena, Palomar (3), Riverside (2), Santa Barbara, and Tinemaha (2)), 11h. (Tashkent, Kulyab, Stalinabad, Obi-garm, Samarkand, near Almata, Frunse, and Andijan), 12h. (Andijan, Samarkand, near Murgab, Obi-garm, and Stalinabad), 13h. (Balboa Heights, Andijan, near Kulyab, Obi-garm, Stalinabad, Murgab, and near Lick), 16h. (Basle), 17h. (Huancayo, San Francisco, Tucson, near Berkeley, Branner, and Lick), 18h. (Ksara), 19h, (Pierce Ferry), 20h. (Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, and Tinemaha), 21h. (Tacubaya).

May 25d. 7h. 11m. 24s. Epicentre 30°·0N. 100°·0E. (as on 1941, August 2d.).

A = −·1506, B = +·8543, C = +·4975 ; δ = +2 ; h = +2 ;
D = +·985, E = +·174 ; G = −·086, H = +·490, K = −·868.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	12·8	237	e 2 53	−13	i 5 35	+ 5	i 5 13	?	—
Nanking		16·3	78	3 39	−13	7 1	+ 8	—	—	i 8·2
Dehra Dun	N.	19·0	276	e 4 6?	−20	e 7 12?	−43	—	—	—
Irkutsk		22·5	7	i 5 0	− 2	—	—	—	—	—
Almata		22·7	313	i 5 5	+ 1	i 9 32	+23	5 23	pP	—
Hyderabad	N.	23·3	242	5 19	+ 9	9 32	+12	6 2	PPP	—
Frunse		24·0	309	i 5 18	+ 1	i 9 55	+23	5 36	pP	—
Andijan		24·9	303	e 5 27	+ 1	10 9	+22	5 42	pP	—
Semipalatinsk		25·2	330	e 5 27	− 2	i 10 15	+23	—	—	—
Hukuoka		26·0	74	5 31	− 5	10 14	+ 8	5 45	pP	—
Kulyab		26·2	296	i 5 39	+ 1	i 10 23?	+14	—	—	—
Kumamoto		26·3	75	e 5 34	− 5	10 20	+ 9	—	—	12·0
Obi-garm		26·4	298	i 5 52	+12	i 10 39	+27	—	—	—
Bombay		27·0	252	e 5 44	− 1	e 10 21	− 1	—	—	11·7
Stalinabad		27·1	298	e 5 46	0	i 10 35	+11	i 6 4	pP	—
Tashkent		27·3	303	i 5 48	0	e 10 43?	+16	—	—	—
Samarkand		28·6	303	i 5 58	− 2	i 11 16	+28	i 6 15	pP	—
Vladivostok		28·6	54	i 5 53?	− 7	i 10 46?	− 2	i 6 10	pP	—
Kôti		28·7	74	6 4	+ 3	11 39	+49	7 0	PP	12·1
Kodaikanal	E.	28·8	233	i 6 6	+ 4	i 11 3	+12	12 28	SS	14·7
Colombo	E.	29·8	224	6 17	+ 6	i 11 37	+30	—	—	21·0
Osaka		30·3	72	6 16	+ 1	11 48	+33	—	—	13·8
Toyama		31·6	67	6 34	+ 8	12 4	+29	—	—	14·2
Tokyo		33·7	69	e 7 12	+27	12 44	+36	—	—	15·7
Akita		34·1	63	e 6 45	− 3	13 23	+69	—	—	—
Mizusawa		34·8	63	7 12	+18	14 49	SS	—	—	—
Ashkabad		35·2	295	6 58	0	12 37	+ 6	e 14 14	SS	—
Batavia		36·6	168	e 7 5	− 5	i 12 57	+ 4	e 8 30	PP	19·6
Sverdlovsk		38·3	326	i 7 23	− 1	i 13 44	+25	i 7 42	pP	—
Guam		44·4	102	e 8 13	− 1	—	—	i 9 39	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		44·8	303	8 16	− 1	—	—	i 8 42	pP	—
Erevan		45·9	299	e 8 8	−18	—	—	—	—	—
Leninakan		46·3	300	e 8 30?	+ 1	—	—	e 8 50?	pP	—
Sotchi		49·1	304	e 8 30	−21	e 9 2	sP	—	—	—
Klyuchi		49·5	40	e 4 55	?	—	—	—	—	—
Theodosia		52·1	306	—	—	e 16 53	+15	—	—	—
Simferopol		53·0	306	e 9 28?	+ 7	e 17 14?	+24	9 55?	sP	—
Ksara		53·8	291	i 9 27k	+ 1	17 22?	+21	—	—	—
Helsinki		57·1	326	e 9 49	− 1	e 17 51	+ 6	—	—	e 29·6
Istanbul		57·3	302	i 10 41	+49	i 18 48	+61	—	—	—
Helwan	E.	58·6	288	—	—	23 24	?	—	—	—
Bucharest		58·7	307	e 10 2	0	e 18 4	− 2	e 12 28	PP	27·6
Warsaw		60·4	317	e 10 10k	− 3	18 36	+ 8	12 40	PP	e 25·6
Upsala		60·8	325	10 18a	+ 2	e 18 36?	+ 3	11 8	PcP	e 27·6
Belgrade		62·5	307	i 10 27a	− 1	e 19 15	PPS	e 12 0	PP	—
Raciborzu		62·6	314	e 10 29	+ 1	—	—	e 14 35	PPP	28·6
Budapest		62·7	311	10 31	+ 2	19 10	+13	12 58	PP	e 29·6
Kalossa	N.	63·0	310	e 10 40	+ 9	e 19 28	PPS	e 12 48	PP	e 28·1
Perth		63·4	165	10 49	+15	19 4	− 2	i 23 58	?	—
Copenhagen		64·5	322	10 38	− 3	19 23	+ 4	13 21	PP	—
Prague		64·9	315	e 10 48	+ 5	e 19 35	+11	e 13 24	PP	e 28·6
Potsdam		65·1	318	e 10 42	− 3	i 19 31	+ 4	i 14 42	PPP	e 28·6
Collmberg		65·4	317	e 10 56	+ 9	e 19 45	+15	—	—	e 26·9
Taranto		66·1	304	10 51	0	19 32	− 7	13 4	PP	35·1
Cheb		66·2	316	e 10 53	+ 1	e 19 45	+ 5	e 20 11	PPS	e 31·5
Jena		66·4	316	e 10 48	− 5	e 19 44	+ 1	—	—	e 32·6
Triest		66·8	310	i 10 58k	+ 2	i 19 49	+ 1	i 24 5	SS	—
Messina		68·1	303	e 11 0	− 4	e 20 21	+18	e 11 18	PcP	—
Padova		68·4	310	10 36?	−30	—	—	—	—	—
Stuttgart		68·6	315	e 11 4k	− 3	i 20 20	+11	e 24 50	SS	e 31·6
Catania		68·7	302	e 11 6	− 1	e 20 18	+ 8	e 11 28	PcP	—
Bologna		68·8	310	e 11 7	− 1	e 20 34	+23	e 11 27	PcP	—
Salo		68·9	312	e 11 7	− 2	e 20 19	+ 6	i 11 28	PcP	—
Rome		69·0	307	e 11 4	− 5	e 20 19	+ 5	e 13 45	PP	e 35·6
Chur		69·1	313	e 11 8	− 2	e 20 14	− 1	i 11 28	PcP	—
Florence		69·1	309	e 11 20	+10	e 20 35	+20	i 11 29	PcP	—
Strasbourg		69·5	315	e 11 10k	− 2	i 20 29	+ 9	i 20 42	PS	32·3
Zürich		69·5	314	e 11 9k	− 3	e 20 37	+17	e 13 48	PP	—
De Bilt		69·7	319	e 11 13	− 1	e 20 27	+ 5	i 20 47	PS	e 31·6
Pavia		69·9	312	e 11 54	+39	—	—	—	—	—
Basle		70·1	313	e 11 12k	− 4	e 20 44	+17	e 11 34	PcP	—
Tananarive		70·1	233	e 11 23	+ 7	e 20 31	+ 4	14 0	PP	e 30·5
Neuchatel		70·7	313	e 11 17	− 3	e 20 42	+ 8	—	—	—
Uccle		70·7	318	e 11 19	− 1	i 20 35	+ 1	e 13 46	PP	—
Aberdeen	N.	71·5	326	i 11 43	+19	i 20 47	+ 4	i 21 5	PS	35·9
Scoresby Sund		71·7	343	11 27	+ 1	20 52	+ 7	25 25	SS	—
Durham		72·3	323	11 45	+16	21 17	PS	11 59	PcP	—
Edinburgh		72·6	325	11 44	+13	e 20 43	−13	21 13	PS	—
Paris		72·6	316	e 11 29	− 2	i 21 3	+ 7	i 12 29	pP	e 35·6
Kew		73·1	320	e 11 30	− 4	e 21 3	+ 2	e 21 21	PS	45·6
Clermont-Ferrand		73·6	313	e 11 37	0	i 21 17	+10	i 14 42	PP	35·6
Reykjavik		75·8	338	e 12 6	+16	e 21 51	+20	e 22 37	PPS	37·0
Barcelona		76·2	310	12 7	+15	21 58	+22	26 59	SS	36·4
Brisbane		76·4	133	i 11 52	− 1	e 21 43	+ 5	i 14 54	PP	i 38·0
Alicante		79·4	308	e 12 10	+ 1	i 22 12	+ 2	12 23	pP	e 37·8
Riverview		79·8	139	12 13k	+ 1	i 22 16	+ 2	i 15 10	PP	34·6
Toledo		81·0	311	i 12 19	+ 1	i 22 40	+13	i 12 37	PcP	37·1
Sitka		81·2	27	e 12 16	− 3	e 22 31	+ 2	i 15 46	PP	e 32·3
Granada		82·1	308	i 12 27	+ 3	i 22 43	+ 5	i 15 51	PP	i 42·0
Tamanrasset		82·6	292	e 12 25	− 1	—	—	—	—	e 39·0

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Lisbon		85·0	312	12 37	− 1	23 0	[− 1]	23 5	S		46·9
Ivigtut		85·5	345	e 12 42	+ 1	e 23 8	− 4	i 12 54	PcP		40·6
Johannesburg		88·7	239	—	—	i 23 36	− 7	i 24 0	?		e 33·6
Honolulu		89·5	66	e 13 11	+11	e 23 43	− 7	e 30 17	SSP		e 37·0
Victoria		92·7	27	12 48	−27	23 34	[−14]	—	—		40·6
Seattle		93·9	27	e 16 7	?	e 25 18	PS	e 26 32	PPS		e 38·7
Saskatoon		94·9	16	17 30	PP	24 47	+10	26 36	PPS		45·6
Apia		95·3	103	—	—	e 24 54	+13	—	—		e 38·6
Hungry Horse		96·3	22	i 13 28	− 4	e 24 6	[− 2]	i 17 14	PP		i 38·4
Auckland	N.	96·6	129	e 18 31	?	24 18	[+ 8]	26 19	PS		—
Arapuni	E.	97·8	130	—	—	e 24 24	[+ 8]	32 24	?		43·1
Butte	N.	98·8	22	e 17 49	PP	e 25 6	− 4	e 26 39	PS		e 40·0
Christchurch		98·8	136	14 22	?	35 41	SSS	—	—		47·9
Wellington		98·9	133	13 36	− 7	24 10	[−12]	17 48	PP		45·8
Shasta Dam		99·4	32	e 13 47	+ 1	e 24 41	[+17]	e 17 43	PP		—
Bozeman		99·6	21	e 17 48	PP	e 26 23	+66	e 27 1	PS		e 43·4
Ukiah		100·3	33	e 14 10	+20	e 25 8	−15	e 32 48	SSP		e 42·1
Berkeley		101·8	33	e 14 11	+15	e 26 29	+54	i 18 20	PP		e 54·2
Santa Clara		102·3	33	e 14 8	+ 9	e 24 56	[+18]	e 18 16	PP		e 45·8
Lick		102·5	33	e 14 13	+13	—	—	i 18 8	PP		e 46·6
Logan		102·8	23	e 14 2	+ 1	e 24 44	[+ 4]	e 18 20	PP		e 46·8
Seven Falls		102·8	353	18 31	PP	25 45	+ 1	27 18	PS		45·6
Ville Marie		103·0	1	e 14 54	+52	—	—	e 18 18	PP		50·6
Shawinigan Falls		103·5	354	—	—	e 24 52	[+ 8]	e 36 36?	SSS		—
Salt Lake City		103·7	24	e 18 20	PP	e 24 55	[+10]	e 27 56	PS		e 42·2
Temiskaming		103·7	359	e 14 6	+ 1	—	—	e 16 42	?		50·6
Fresno		103·8	32	e 13 59	− 6	e 25 11	{−11}	e 18 18	PP		e 57·0
Halifax		104·2	347	e 20 36?	PPP	e 33 36?	SSP	e 39 36	Q		47·6
Tinemaha	z.	104·2	31	e 14 30	+23	—	—	i 18 34	PP		—
Vermont		104·6	354	e 19 47	?	e 24 47	[− 2]	e 25 56	S		e 46·1
Ottawa		104·9	356	14 26	+16	24 51	[+ 1]	18 30	PP		47·6
Haiwee	z.	105·2	31	e 18 21	PP	—	—	—	—		—
Boulder City		106·7	29	e 15 8	?	—	—	e 18 45	PP		e 63·6
Pasadena		106·7	33	e 18 30	PKP_2	e 26 23	+ 7	e 18 58	PP		i 44·0
Mount Wilson	z.	106·7	33	e 18 41	PP	—	—	i 30 19	PKKP		—
Pierce Ferry		106·9	28	e 14 58	P	—	—	e 18 42	PKP		e 58·6
Riverside	z.	107·2	33	e 18 29	PKP_2	—	—	i 30 10	PKKP		—
Harvard		107·4	352	e 14 35	P	e 25 3	[+ 2]	e 18 49	PP		e 63·6
Lincoln	E.	107·8	13	e 19 41	PP	e 25 4	[+ 1]	e 26 32	S		e 47·4
Palomar	z.	108·0	32	i 18 50	PP	—	—	e 29 54	PKKP		—
Chicago		108·2	6	e 18 47	PP	e 24 47	[−18]	e 28 27	PS		e 44·9
Cleveland		108·9	2	e 18 22	[− 9]	e 25 11	[+ 3]	e 19 17	PP		—
Fordham		109·3	354	e 14 46	P	e 25 14	[+ 5]	e 18 0	PKP		—
New Kensington	E.	109·8	0	e 18 13	PKP	e 27 12	S	e 19 27	PP		e 52·8
Philadelphia		110·3	356	e 17 57	[−37]	e 25 18	[+ 5]	e 19 30	PP		e 56·6
Florissant		110·9	8	e 19 13	PP	e 25 27	[+11]	i 28 17	PS		—
Georgetown		111·4	357	e 19 22	PP	e 35 10	SS	—	—		55·6
Tucson		111·5	28	e 14 59	P	e 25 18	[0]	i 18 40	PKP		e 46·2
Columbia		116·3	1	e 20 1	PP	e 29 47	PS	e 36 5	SS		e 52·3
Chihuahua	z.	116·6	26	—	—	e 33 37	?	—	—		e 55·1
Tacubaya		127·5	23	e 20 13	PP	e 25 21	[−52]	—	—		57·7
San Juan		130·1	343	e 19 30	[+18]	e 25 56	[−24]	e 21 17	PP		e 58·4
Fort de France		132·0	335	e 19 8	[− 8]	—	—	—	—		—
Bogota		145·1	350	i 19 36	[− 3]	e 29 59	{+ 8}	i 19 42	PKP_2		68·6
La Plata	E.	160·8	250	21 0	[+58]	31 6	{−11}	24 54	PP		77·6
	N.	160·8	250	20 48	[+46]	44 48	SS	67 12	Q		81·0
Huancayo		161·6	345	i 20 19	[+17]	i 45 53	SSP	i 24 49	PKS		1 65·2
La Paz		162·7	318	i 20 18	[+14]	44 56	SS	i 24 42	PP		74·1

Additional readings :—
Hyderabad iN =9m.46s.
Hukuoka PP =6m.0s., SS =11m.14s.
Bombay iS?EN =10m.43s.
Samarkand iPP =7m.42s., ipPP =7m.59s., esS =11m.45s.
Mizusawa ePN =7m.21s., eSE =14m.52s.
Batavia iSSEN =15m.39s.

Continued on next page.

Helsinki e =10m.8s.
Bucharest iE =10m.18s. and 10m.33s., iP$_c$PE =11m.8s., eS?N =18m.18s., iE =18m.31s., iS$_c$SE =19m.46s., iN =20m.16s.
Warsaw iPZ =10m.16s.a, ePN =10m.25s., P$_c$PN =11m.1s., PPPZ =14m.10s., ePPPN = 14m.16s., PSZ =18m.48s., S$_c$SN =21m.12s., iZ =21m.52s., SSN =22m.34s., eZ =24m.15s.
Upsala i =10m.35s., ePPE =13m.4s., ePPPE =14m.14s., S$_c$SN =20m.26s., eSS?E = 23m.13s., eSS?N =23m.27s., eSSSN =25m.3s.
Belgrade iP$_c$P =10m.36s., ePPP =14m.1s.
Raciborzu iP =10m.47s., iN =10m.57s., iP$_c$P? =11m.26s., ePP?N =13m.26s.
Budapest PPE =13m.7s., PPPE =14m.40s., PSE =19m.22s., PSN =19m.26s., iN = 22m.43s., SSE =23m.22s., SSN =23m.34s., SSSE =26m.4s., SSSN =26m.44s.
Kalossa PPE =13m.29s., PSE =19m.45s.
Copenhagen 10m.55s., i =10m.59s., PPP =14m.38s., SS =24m.12s., SSS =26m.40s.
Prague iE =10m.59s., iNZ =11m.4s., ePPP =14m.42s., eSS =24m.6s.
Potsdam ePN =10m.46s., iPEZ =10m.49s.k, iP$_c$P?EZ =11m.3s., iP$_c$P?N =11m.6s., iSN =19m.36s., iSZ =19m.44s., iSSSN =26m.40s., iSSSZ =26m.46s.
Cheb i =11m.11s., ePP =13m.47s., ePPP =15m.25s., e =21m.5s., eSS =23m.58s., eSSS =27m.6s.
Jena ePEN =10m.51s., eN =11m.6s., eS?N =19m.53s.
Triest i =11m.14s.k, iPP =12m.39s., iPPP =14m.43s., i =20m.7s. and 21m.10s.
Stuttgart iP =11m.10s.a, iP$_c$P? =11m.25s.k, eSSS =28m.6s.
Bologna i =11m.53s.
Salo iN =21m.33s.
Rome iZ =11m.26s. and 11m.42s., ePS =20m.55s.
Florence eSSS? =28m.48s.?
Strasbourg i =11m.17s., 11m.31s., and 13m.7s., ePP =14m.9s., iPPP =15m.49s., e = 19m.50s., iPPS =20m.57s., iS$_c$S =21m.11s., iSS =25m.29s. and 25m.49s., i = 26m.38s., iSSS =28m.23s. and 28m.34s., i =28m.43s. and 29m.9s.
Zürich i =11m.30s.
Tananarive P$_c$P =11m.46s., iPS =20m.47s., S$_c$S =21m.27s., SS =25m.7s., SSS =28m.15s.
Uccle iE =11m.36s., iZ =11m.39s., eSE =20m.9s., eSN =20m.17s., iN =20m.39s., iSSN =24m.55s., iSSE =25m.9s., iSSS?E =28m.44s., iSSS?N =28m.59s.
Aberdeen iN =23m.10s., iSSN =26m.1s., iSSSN =29m.24s.
Scoresby Sund i =11m.44s., 14m.26s., 14m.54s., 16m.14s., 21m.1s., 21m.45s.
Durham EN =21m.1s.
Edinburgh SS =25m.21s.
Paris iP$_c$P? =11m.44s., iPP =14m.37s., ePPP =16m.23s., ePS? =22m.11s., e =24m.27s., eSS =26m.20s., esSS =29m.20s., e =31m.20s. and 34m.6s., eQ =34m.36s.
Kew eP$_c$PEZ =11m.52s., eEZ =12m.0s., eSSE =24m.47s., eE =26m.15s. and 33m.1s.
Clermont-Ferrand iP =11m.57s., i =13m.7s. and 17m.48s., iS$_c$S =21m.33s., iSS = 26m.22s., iSSS =29m.59s.
Reykjavik eN =14m.27s., eSSN =27m.8s., eEN =32m.22s.
Barcelona SSS? =30m.38s.
Brisbane iPEN =11m.58s., iN =12m.2s., 14m.46s., and 16m.11s., iE =16m.14s., iSE = 21m.48s., iQE =31m.57s.
Alicante PP =15m.19s., PPP =17m.7s., PS =22m.49s., PPS =23m.3s., SS =24m.21s., SSS =27m.23s., Q =33m.3s.
Riverview iPZ =12m.19s., iZ =13m.19s., iSKSEN =22m.24s., iS$_c$SEN =22m.33s., iE = 22m.47s., iEN =23m.17s., eSSN =27m.18s., eSSE =27m.39s., iE =27m.56s., iSSSN =29m.42s., eN =29m.53s., iE =31m.16s., iN =33m.27s., eQN =33m.36s.
Sitka iP =12m.36s., e =14m.55s., i =16m.14s. and 22m.48s., iS$_c$S =23m.14s., i =24m.24s., eSS =28m.40s., eSSS =31m.14s.
Granada P$_c$P =12m.40s., PPP =17m.16s., SKS =22m.33s., PS =23m.49s., PPS = 24m.13s., iSS =28m.40s., SSS =31m.32s.
Lisbon Z =12m.44s.k, iZ =12m.58s.k, E =13m.19s., PPN =16m.2s., Z =16m.15s., EN = 16m.18s., EN =23m.30s., E =25m.26s. and 27m.7s., SS?N =28m.36s., SSS?N = 32m.18s., EN =44m.42s.
Ivigtut 13m.26s.
Victoria PP =16m.34s., SKS =23m.7s., PS =24m.21s., PPS =24m.43s.
Saskatoon SKS =24m.18s., SN =25m.9s., SS =31m.44s., SSS =36m.6s.
Hungry Horse i =13m.34s., iPP =16m.55s., eS? =23m.23s., i =30m.31s.
Auckland iN =22m.47s. and 23m.41s., SN =25m.6s., iN =25m.44s., eN =30m.26s., SSN =31m.6s.
Butte iN =18m.3s., ePPP?N =20m.7s., eSN =25m.35s., eN =26m.15s., ePPSN = 27m.35s., eSSN =31m.39s., eSSSN =35m.41s., eN =36m.59s.
Christchurch PSEN =24m.58s., PPSEN =26m.34s., SSEN =30m.52s., SSSSEN = 39m.30s., QEN =42m.1s.
Wellington i =17m.12s., PPP =19m.45s., iZ =22m.22s., S =24m.58s., PS =26m.25s., ScSPZ =26m.48s., PPSZ =28m.10s., iZ =28m.51s., SS =31m.13s., SSS =35m.57s., Q =40m.36s.
Shasta Dam e =13m.59s., i =14m.16s.
Bozeman e =18m.6s., eSKS =24m.39s., ePPS =28m.1s., eSS =33m.4s., eSSS =37m.23s.
Ukiah ePP =18m.48s., e =25m.44s., eS =26m.8s., ePS =27m.20s., ePPS =28m.13s., eSSS =36m.48s.
Berkeley iZ =19m.31s., ePPPZ =21m.11s., iZ =28m.8s.
Santa Clara eN =31m.44s., eSSN =34m.7s., eSSSN =37m.8s.
Lick eN =18m.59s., eZ =28m.54s.

Continued on next page.

Logan eS =25m.53s., ePS =26m.54s., ePKP,PKP? =38m.28s.
Seven Falls SKS =24m.54s., S =26m.9s., PPS =30m.52s., e =33m.2s., SS =36m.54s.
Ville Marie e =19m.0s.
Salt Lake City eS =26m.6s., eSS =33m.42s., eSSS =37m.42s., e =39m.11s.
Fresno eZ =21m.58s.
Vermont ePS =27m.54s., ePPS =29m.2s., e =30m.4s. and 31m.12s., eSS =34m.6s.
Ottawa PPP =20m.57s., PS =27m.31s., SS =33m.11s., SSS =37m.36s.?.
Boulder City ePKKP? =30m.11s.
Pasadena ePPPZ =21m.33s., eSKSEN =25m.11s., ePSZ =28m.2s., eEN =28m.13s., ePKKPZ =30m.0s., iZ =30m.10s., eSSEN =33m.54s., eSSSEN =38m.24s.
Pierce Ferry ePKKP =30m.8s.
Harvard eS =26m.12s., e =28m.5s.
Lincoln eE =20m.56s., eSSE =33m.38s., eE =43m.18s.
Palomar iZ =30m.25s.
Chicago e =25m.57s., eS =26m.39s., eSS =34m.33s., eSSS =38m.57s.
Cleveland eSEN =26m.51s., iPSN =28m.51s., iPPSN =29m.35s., eSSE =34m.24s., iE =34m.33s., iN =34m.57s., iSSSE =38m.30s.
Fordham ePP =19m.10s., iPS? =29m.46s.
New Kensington eSSSE =38m.59s., eSKPP?E =42m.38s.
Philadelphia eS =26m.56s., ePS? =28m.6s., ePPS? =29m.15s., eSS =34m.27s.
Florissant e =19m.21s., i =19m.32s., ePPP =21m.45s., eSKKS? =26m.48s., ePPS? =29m.32s., i =30m.53s., e =31m.14s., eSS? =34m.54s.
Georgetown eS =27m.0s., ePS =29m.8s.
Tucson ePKP =18m.23s., ePP =19m.30s., e =21m.57s., eS =26m.59s., e =27m.20s., ePS =29m.18s., ePKKP =29m.43s., ePPS =30m.1s., eSS =35m.39s., eSSS =39m.58s.
Columbia e =22m.17s., eS =27m.31s., eSSS =40m.19s., e =43m.59s.
Tacubaya eE =20m.35s., eZ =20m.39s., eE =21m.54s., eN =21m.59s., eE =25m.28s.
San Juan iPP =21m.42s., e =21m.46s., ePKS =22m.51s., e =27m.14s., eSKSP =30m.50s., e =36m.0s., ePPS? =37m.44s., eSS =43m.58s., eSSS =49m.4s.
Bogota iEZ =20m.12s., eEZ =31m.31s.
La Plata E. 22m.42s., PPP =28m.18s., PPP(Δ >180°) =32m.24s., SKSP =35m.12s., E =36m.48s., PPS =38m.54s., SS =45m.12s., SSS? =52m.6s., 57m.48s., Q =67m.36s.
La Plata N. SKSP? =36m.48s., 42m.18s., SSS =53m.42s., 59m.12s., and 61m.12s., Q =67m.12s.
La Paz SKSN =26m.38s., PPPNZ =28m.21s., iPPSE =37m.36s., iSSPE =45m.54s., iSSSZ =50m.54s.
Long waves were also recorded at Vera Cruz, Branner, Mineral, and Ferndale.

May 25d. 12h. 29m. 5s. Epicentre 20°·0N. 69°·5W. (as on 1945, Jan. 22d.).

$A = +\cdot3293$, $B = -\cdot8808$, $C = +\cdot3400$; $\delta = -15$; $h = +5$;
$D = -\cdot937$, $E = -\cdot350$; $G = +\cdot119$, $H = -\cdot318$, $K = -\cdot940$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
San Juan		3·6	116	e 0 35	−23	i 1 29	−13	—	—	i 1·6
Fort de France		9·6	122	e 1 58	−23	—	—	—	—	—
Bogota		15·9	197	e 3 42	− 5	e 6 38	− 6	—	—	—
Harvard		22·5	357	i 4 57	− 5	i 8 56	− 9	—	—	—
Temiskaming		27·7	347	e 5 55	+ 3	10 55	+22	—	—	—
Ville Marie		28·4	345	e 6 1	+ 3	e 12 37	SSS	—	—	—
La Paz		36·3	178	e 8 3	+56	—	—	—	—	—
Tucson		38·7	297	e 7 35	+ 7	—	—	e 7 39	P	—
Pierce Ferry		42·0	302	i 7 54	0	—	—	—	—	—
Boulder City		42·7	302	e 8 0	0	—	—	—	—	—
Palomar	z.	44·0	298	e 8 14	+ 3	—	—	—	—	—
Riverside	z.	44·5	299	i 8 14	− 1	—	—	—	—	—
Mount Wilson	z.	45·2	299	e 8 19	− 1	—	—	—	—	—
Pasadena	z.	45·2	299	e 8 19	− 1	—	—	i 8 25	P	—
Haiwee	z.	45·3	302	e 8 26	+ 5	—	—	—	—	—
Hungry Horse		45·5	319	i 8 20	− 3	—	—	—	—	—
Tinemaha	z.	45·6	303	i 8 22	− 2	—	—	i 8 29	P	—
Shasta Dam		49·3	307	e 8 48	− 5	—	—	—	—	—
Clermont-Ferrand		63·9	48	e 10 29	− 8	—	—	—	—	—
Stuttgart	z.	67·9	44	e 10 48	−14	—	—	—	—	—

Additional readings :—
Riverside iZ =8m.21s. and 9m.2s.
Mount Wilson eZ =8m.26s. and 8m.51s.

May 25d. 15h. 13m. 11s. Epicentre 43°·5N. 126°·5W. (as on 1947, Sept. 22d.).

$A = -·4329$, $B = -·5850$, $C = +·6859$; $\delta = +9$; $h = -3$;
$D = -·804$, $E = +·595$; $G = -·408$, $H = -·551$, $K = -·728$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ferndale		3·4	150	e 0 59	+ 4	e 1 41	+ 4	e 1 53	S_g	—
Shasta Dam		4·1	131	i 1 5	0	e 2 24	S_g	—	—	e 4·7
Seattle		5·0	33	(e 1 26)	P*	e 2 55	S_g	—	—	(e 3·2)
Ukiah		5·0	149	(e 1 19)	+ 1	(e 2 37)	S*	—	—	(e 2·7)
Branner		6·9	150	i 1 40	− 5	e 3 6	+ 1	i 1 57	P*	e 4·4
Grand Coulee		6·9	47	i 1 44	− 1	—	—	—	—	—
Lick		7·1	147	i 1 46	− 2	i 3 4	− 6	—	—	e 4·3
Santa Clara	z.	7·1	149	(e 1 46)	− 2	(e 4 1)	S_g	—	—	—
Fresno	z.	8·5	140	i 2 6	− 1	—	—	—	—	—
Tinemaha	z.	9·0	133	e 2 16	+ 3	—	—	—	—	—
Haiwee		9·8	135	i 2 28	+ 4	—	—	—	—	—
Hungry Horse		9·9	56	i 2 25	0	—	—	—	—	e 5·8
Butte	N.	10·2	71	e 3 6	PPP	e 4 58	SSS	—	—	e 5·3
Santa Barbara	z.	10·5	147	e 2 34	− 1	—	—	—	—	—
Logan		11·0	94	e 2 43	+ 1	e 5 1	+14	e 2 49	PP	e 5·8
Bozeman		11·2	73	e 2 43	− 1	e 5 39	SS	e 5 49	SSS	e 7·0
Salt Lake City		11·2	99	e 2 43	− 1	e 5 17	SS	—	—	e 5·6
Mount Wilson		11·3	142	i 2 46a	0	—	—	—	—	—
Pasadena		11·4	142	i 2 46	− 1	e 5 5	+ 9	—	—	e 5·5
Boulder City		11·7	126	i 2 55	+ 4	—	—	—	—	e 7·9
Riverside		11·9	140	i 2 52	− 2	—	—	—	—	—
Pierce Ferry		12·1	123	i 2 59	+ 2	—	—	—	—	e 7·6
Palomar		12·6	140	i 3 2a	− 1	—	—	i 3 13	PP	—
Sitka		14·7	342	i 3 20	−11	e 6 11	− 5	—	—	e 6·9
Saskatoon		15·9	50	2 56	−51	6 48	+ 4	—	—	8·8
Tucson		16·7	127	i 3 58a	+ 1	e 7 2	− 1	i 4 11	PP	e 7·5
Lincoln	E.	22·2	87	e 5 24	PP	e 9 40	SS	—	—	e 12·3
Florissant		27·5	88	e 5 47	− 3	—	—	—	—	—
Cleveland		32·9	77	e 6 34	− 4	e 12 0	+ 4	—	—	—
Ville Marie		32·9	67	e 6 25	−13	—	—	—	—	19·8
Temiskaming		33·2	68	e 6 49	+ 9	—	—	e 8 1	PP	19·8
Honolulu		34·2	241	e 8 52	PPP	—	—	—	—	e 14·2
Ottawa		35·8	69	6 14	−49	12 49	+ 8	8 25	PP	18·8
Georgetown		37·0	79	7 12	− 1	—	—	—	—	23·1
Philadelphia		38·0	78	—	—	e 13 19	+ 5	—	—	e 16·2
Fordham		38·6	76	i 8 58	PP	e 13 30	+ 7	—	—	21·8
Harvard		39·6	72	e 7 11	−24	—	—	e 9 8	PP	—
Copenhagen		75·3	23	—	—	21 29	+ 3	—	—	40·8
Paris		77·8	33	e 11 57	− 4	—	—	e 12 1	P	—
Sverdlovsk		79·9	357	12 5	− 7	22 4	−12	—	—	—
Warsaw		80·6	20	e 11 32	−44	—	—	e 11 49	?	—
Granada		84·4	43	11 16k	−80	—	—	—	—	41·6
Alicante		85·0	41	e 12 59	+21	—	—	—	—	e 41·5

Additional readings and notes :—
Seattle Readings reduced by 1 minute.
Ukiah Readings reduced by 1 minute.
Santa Clara Readings reduced by 30 minutes.
Palomar iN = 4m.2s.
Tucson i = 4m.20s. and 4m.47s.
Long waves were also recorded at other European stations.

May 25d. 16h. 20m. 37s. Epicentre 30°·0N. 100°·0E. (as at 7h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	12·8	237	—	—	e 5 25	− 5	—	—	i 7·0
Nanking		16·3	78	e 3 41	−11	—	—	—	—	e 8·3
Irkutsk		22·5	7	e 5 5?	+ 3	e 9 12	+ 7	—	—	—
Almata		22·7	313	5 8	+ 4	9 29	+20	—	—	—
Andijan		24·9	303	e 5 28	+ 2	—	—	—	—	—

Continued on next page.

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Kulyab		26·2	296	i 5 42?	+ 4	i 10 26?	+17	—	—	—
Obi-garm		26·4	298	i 5 39	− 1	i 10 24	+12	—	—	—
Bombay		27·0	252	e 10 20	S	(e 10 20)	− 2	—	—	e 14·7
Stalinabad		27·1	298	i 5 46	0	i 10 34	+10	e 6 5	pP	—
Tashkent		27·3	303	e 5 44	− 4	—	—	—	—	—
Samarkand		28·6	303	e 6 3	+ 3	—	—	—	—	—
Vladivostok		28·6	54	e 5 51	− 9	—	—	—	—	—
Sverdlovsk		38·3	326	7 24	0	13 29	+10	—	—	—
Grozny		44·8	303	e 8 27	+10	—	—	—	—	—
Leninakan		46·3	300	e 8 27?	− 2	—	—	—	—	—
Ksara		53·8	291	e 9 27	+ 1	e 17 47	+46	—	—	—
Copenhagen		64·5	322	—	—	19 29	+10	—	—	—
Stuttgart		68·6	315	e 11 3	− 4	—	—	—	—	e 37·4
Paris		72·6	316	e 11 31	0	—	—	—	—	—
Hungry Horse		96·3	22	e 13 26	− 6	—	—	—	—	—

Long waves were also recorded at other European stations.

May 25d. 18h. 43m. 18s. Epicentre 30°·0N. 100°·0E. (as at 16h.).

		△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Calcutta	E.	12·8	237	e 3 2	− 4	i 5 14	−16	i 5 42	SS	—
Nanking		16·3	78	e 3 44	− 8	—	—	—	—	i 8·5
Irkutsk		22·5	7	e 5 1	− 1	—	—	—	—	—
Almata		22·7	313	5 6	+ 2	9 20	+11	—	—	—
Hyderabad	N.	23·3	242	e 5 18	+ 8	9 29	+ 9	—	—	—
Frunse		24·0	309	e 5 19	+ 2	—	—	—	—	—
Kulyab		26·2	296	i 5 39?	+ 1	i 10 17?	+ 8	—	—	—
Obi-garm		26·4	298	i 5 41	+ 1	i 10 17	+ 5	—	—	—
Bombay		27·0	252	e 6 13	PP	e 10 42	+20	—	—	—
Stalinabad		27·1	298	i 5 46	0	i 10 28	+ 4	—	—	—
Tashkent		27·3	303	e 5 49	+ 1	e 10 28	+ 1	—	—	—
Vladivostok		28·6	54	e 5 50	−10	—	—	—	—	—
Sverdlovsk		38·3	326	7 27	+ 3	i 13 20	+ 1	—	—	—
Grozny		44·8	303	e 8 12	− 5	—	—	—	—	—
Ksara		53·8	291	e 9 26	0	—	—	—	—	—
Istanbul		57·3	302	e 9 43?	− 9	—	—	—	—	e 29·7
Copenhagen		64·5	322	10 44?	+ 3	19 21	+ 2	—	—	—
Potsdam	N.	65·1	318	—	—	e 19 28	+ 1	—	—	e 30·7
Stuttgart		68·6	315	e 11 4	− 3	e 20 2	− 7	—	—	e 37·7
Rome		69·0	307	e 20 13	S	(e 20 13)	− 1	—	—	e 34·7
Strasbourg		69·5	315	11 20	+ 8	—	—	—	—	34·7
Paris		72·6	316	11 30	− 1	—	—	i 11 44	?	e 34·7
Clermont-Ferrand		73·6	313	e 11 30	− 7	—	—	—	—	—
Tamanrasset		82·6	292	e 12 27	+ 1	—	—	—	—	—
Hungry Horse		96·3	22	i 13 29	− 3	—	—	i 13 45	PcP	—
Bogota	Z.	145·1	350	i 19 40	[+ 1]	—	—	—	—	—
La Paz	Z.	162·7	318	i 18 58	[−65]	—	—	i 23 26	PP	—

Rome also gives eS? =28m.3s., e =31m.37s. and 32m.51s.
Long waves were also recorded at Helwan, Sitka, and at other European stations.

May 25d. Readings also at 0h. (Palomar, Pasadena, Riverside, Tinemaha, Hungry Horse (2), Pierce Ferry, Shasta Dam, Tucson, Mizusawa, Stuttgart, and near Apia), 2h. (Palomar, Mount Wilson, Pasadena, Riverside, Tucson, and Tinemaha), 4h. (Palomar, Riverside, Tinemaha, Pierce Ferry, Shasta Dam, Tucson, Stuttgart, Apia, Almata, near Andijan, Kulyab, Obi-garm, Stalinabad, Tashkent, Samarkand, Frunse, and near Mizusawa; two shocks), 8h. (Stuttgart), 9h. (Upsala), 10h. (Stuttgart, near Barcelona, and Clermont-Ferrand), 11h. (Samarkand and near Andijan, Tashkent, Frunse, and Stalinabad), 12h. (Pierce Ferry, Shasta Dam, Tucson, Palomar, Tinemaha, Riverside, and near Mizusawa), 13h. (Alicante), 14h. (Stuttgart (2)), 16h. (near Andijan), 17h. (Salt Lake City, Boulder City, Hungry Horse, Shasta Dam, near Kaimata, Christchurch, Tuai, New Plymouth, Wellington, and Auckland), 18h. (Berkeley, Branner, Lick, and Ksara), 20h. (near Lick), 22h. (near Tacubaya, near Branner, and Lick), 23h. (Christchurch, La Paz, near Mineral (2), and near San Juan).

May 26d. 2h. Undetermined shock.

Irkutsk eP =47m.57s.?, eS =52m.11s.
Almata P =48m.2s.
Frunse eP =48m.15s.
Kulyab eP =48m.33s., eS =53m.31s.
Obi-garm eP =48m.35s.
Stalinabad iP =48m.42s., eS =53m.40s.
Tashkent eP =48m.43s., eS =53m.45s.
Calcutta eE =50m.2s.
Bombay eEN =53m.21s. and 57m.35s.
Stuttgart ePZ =53m.57s., eL =81m.
Sverdlovsk S =56m.23s.
Mizusawa SE =64m.58s.
Long waves were also recorded at Copenhagen, Potsdam, De Bilt, and Granada.

May 26d. 9h. 16m. 53s. Epicentre 56°·3N., 153°·8W.

$A = -\cdot5001$, $B = -\cdot2461$, $C = +\cdot8302$; $\delta = -10$; $h = -8$;
$D = -\cdot442$, $E = +\cdot897$; $G = -\cdot745$, $H = -\cdot367$, $K = -\cdot557$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		9·1	16	e 2 12	− 2	e 4 8	+ 8	—	—	e 4·3
Sitka		10·2	75	e 2 28	− 3	i 4 17	−10	i 3 21	?	i 4·5
Victoria		20·0	99	3 41?	−56	7 29?	−48	8 18?	SS	9·1
Seattle		21·1	100	e 4 44	− 4	e 9 33	+54	—	—	e 10·2
Grand Coulee		22·7	96	e 5 2	− 2	e 9 20	+11	—	—	—
Hungry Horse		25·3	90	i 5 28	− 2	e 9 59	+ 5	—	—	—
Shasta Dam		25·7	113	i 5 35	+ 2	e 10 7	+ 6	e 12 56	ScP	—
Ukiah		26·5	116	e 6 39	+58	e 11 22	+68	e 11 35	SS	e 12·9
Butte	N.	27·4	93	e 5 47	− 2	e 10 26	− 2	—	—	e 12·3
Saskatoon		27·5	78	5 32	−18	10 17	−13	—	—	13·1
Berkeley		27·9	117	i 5 56	+ 2	i 10 44	+ 7	i 6 27	PP	e 12·3
Branner	z.	28·3	117	i 5 57	0	—	—	i 7 54	?	—
Bozeman		28·5	93	e 6 7	+ 8	e 10 45	− 1	—	—	e 13·4
Santa Clara		28·5	117	e 6 2	+ 3	e 10 47	+ 1	—	—	e 12·7
Lick	z.	28·7	117	e 5 58	− 3	e 11 28	?	—	—	—
Fresno	z.	30·1	115	e 6 12	− 1	—	—	i 7 18	PP	—
Tinemaha		30·5	113	i 6 19	+ 2	e 11 26	+ 8	e 16 43	ScS	—
Salt Lake City		31·3	101	e 6 29	+ 5	e 11 33	+ 2	e 12 47	ScP	e 13·4
Haiwee	z.	31·4	114	i 6 27	+ 2	—	—	i 9 19	PcP	—
Santa Barbara	z.	31·9	118	e 6 29	0	—	—	—	—	—
Mount Wilson	z.	32·9	116	i 6 38k	0	i 13 19	ScP	i 9 20	PcP	—
Pasadena		32·9	116	i 6 37k	− 1	i 11 57	+ 1	i 9 19	PcP	e 13·9
Boulder City		33·2	111	i 6 41	+ 1	—	—	—	—	—
Riverside	z.	33·4	116	i 6 42k	0	i 13 7	ScP	i 6 51	?	—
Pierce Ferry		33·5	110	i 6 43	0	—	—	i 6 59	?	i 15·5
Palomar		34·2	116	i 6 49k	0	i 12 19	+ 3	i 17 14	ScS	—
La Jolla	z.	34·4	117	e 6 51	0	—	—	—	—	—
Honolulu		35·1	186	e 9 44	PcP	—	—	—	—	e 15·4
Tucson		38·1	110	i 7 19k	− 3	e 13 20	+ 4	e 9 38	PcP	e 16·4
St. Louis		44·7	86	i 8 16	0	e 14 59	+ 5	—	—	—
Ville Marie		44·7	69	8 16	0	e 14 55	+ 1	—	—	27·1
Temiskaming		45·3	69	8 19	− 2	e 15 1	− 1	—	—	27·1
Cleveland		47·5	76	e 8 37	− 1	e 15 30	− 4	e 10 31	PP	—
Vladivostok		47·5	287	i 8 36	− 2	i 15 30	− 4	—	—	—
Ottawa		47·9	68	8 39	− 3	15 39	0	10 32	PP	22·1
Scoresby Sund		48·9	20	8 49	− 1	15 55	+ 2	10 47	PP	—
Ivigtut		49·2	39	i 8 51	− 1	e 15 58	0	19 31	SS	25·0
New Kensington	E.	49·2	75	e 8 52	0	e 15 57	− 1	e 10 50	PP	e 25·9
Seven Falls		49·2	64	8 52	0	—	—	10 55	PP	24·1
Vermont		49·9	68	e 8 33	−24	e 17 3	+56	i 19 41	SS	e 24·4
Pennsylvania	N.W.	50·0	74	—	—	i 16 7	− 2	i 18 44	ScS	—
Georgetown		51·7	75	e 9 6	− 5	—	—	e 9 11	P	—
Philadelphia		52·0	73	—	—	i 16 35	− 1	e 18 56	ScS	e 24·7
Fordham		52·1	71	e 9 12	− 2	i 16 39	+ 1	—	—	—
Harvard		52·1	68	i 9 12	− 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Columbia		53·2	82	—	—	e 16 50	− 2	e 19 9	ScS	e 22·3
Irkutsk		54·2	313	e 9 29?	0	17 3	− 3	—	—	—
Halifax		54·6	61	—	—	e 16 9	−62	—	—	26·1
Bermuda		63·3	71	—	—	e 20 14	ScS	e 24 17	?	e 27·1
Sverdlovsk		63·8	340	i 10 35	− 1	i 19 11	0	—	—	—
Aberdeen	N.	64·6	17	—	—	e 26 52	SSS	—	—	—
Edinburgh		65·6	18	—	—	e 28 7	?	—	—	—
Copenhagen		67·8	9	11 0	− 2	i 20 1	+ 1	—	—	—
Moscow		67·9	354	11 0	− 2	19 59	− 2	—	—	—
De Bilt		70·6	14	e 11 20 a	+ 1	e 20 37	+ 4	e 25 7	SS	e 36·1
Potsdam		71·1	9	i 11 23 k	+ 1	e 20 37	− 1	i 15 49	PPP	e 32·1
Uccle		71·7	16	e 11 36	+10	—	—	—	—	e 38·1
Warsaw		71·7	4	e 11 25 a	− 1	e 20 47	+ 2	e 14 1	PP	e 37·1
Almata		72·0	324	11 27	− 1	20 51	+ 2	—	—	—
Jena	N.	72·5	10	e 11 29	− 1	—	—	—	—	—
Frunse		73·1	325	e 11 35	+ 1	—	—	—	—	—
Cheb		73·4	10	—	—	e 21 13	+ 8	e 29 31	SSS	—
Paris		73·4	17	i 11 34	− 2	e 21 5	0	e 14 30	PP	e 38·1
Prague		73·5	8	e 11 26	−10	e 21 7?	+ 1	—	—	e 39·1
San Juan		73·6	81	e 11 39	+ 2	e 21 1	− 6	e 14 41	PP	e 30·1
Stuttgart		74·3	12	e 11 40	− 1	e 21 18	+ 3	e 14 26	PP	e 38·1
Strasbourg		74·4	13	e 11 41	− 1	e 21 18	+ 2	e 14 24	PP	e 38·1
Basle		75·4	14	e 11 48	+ 1	e 21 29	+ 2	e 12 49	?	—
Andijan		75·7	326	e 11 49?	0	e 21 36?	+ 6	—	—	—
Zürich		75·7	13	e 11 46	− 3	—	—	e 12 38	?	—
Tashkent		76·1	328	e 11 50	− 1	e 21 33	− 2	—	—	—
Clermont-Ferrand		76·5	17	i 11 54	0	i 21 44	+ 5	i 14 47	PP	37·1
Triest		77·9	9	e 12 12	+11	e 26 34	SS	e 15 14	PP	—
Samarkand		78·3	330	e 12 5	+ 2	—	—	—	—	—
Obi-garm		78·4	327	i 12 2	− 2	i 21 58	− 2	—	—	—
Stalinabad		78·8	327	i 12 5	− 1	i 22 3	− 1	—	—	—
Kulyab		79·1	326	e 12 9	+ 1	i 22 7	0	—	—	—
Grozny		79·4	346	e 12 12	+ 3	22 10	0	—	—	—
Bogota		80·5	96	e 12 13	− 2	e 22 17	− 5	e 15 27	PP	35·1
Lisbon		80·7	28	12 17	+ 1	22 25	+ 1	—	—	46·2
Toledo		80·8	24	i 12 17	0	i 22 28	+ 3	e 12 49	PcP	46·5
Rome		81·5	10	e 12 21	0	e 22 33	+ 1	e 23 12	PS	—
Leninakan		82·1	347	e 12 26	+ 2	—	—	—	—	—
Ashkabad		82·2	335	e 12 24	0	—	—	—	—	—
Alicante		83·0	21	e 12 40	+12	i 22 51	+ 4	23 36	PS	e 39·8
Istanbul		83·0	358	12 25	− 3	22 52	+ 5	—	—	—
Granada		83·5	24	i 12 35 k	+ 4	i 22 48	− 4	i 15 44	PP	i 39·9
Bombay		84·5	316	e 17 16	PPP	e 24 1	PS	—	—	—
Ksara		90·1	353	i 13 4	+ 1	e 23 59	+ 4	16 35	PP	—
Helwan		94·1	356	13 28	+ 6	23 55	[− 1]	24 33	S	—

Additional readings :—
Shasta Dam i = 5m.44s., ePcP = 8m.17s., e = 10m.21s.
Butte ePPN = 7m.41s., iN = 10m.33s. and 10m.55s.
Berkeley iN = 12m.15s.
Fresno iZ = 7m.57s.
Tinemaha iZ = 6m.28s., iScSPZ = 12m.57s.
Haiwee eZ = 6m.50s.
Pasadena iZ = 6m.46s. and 6m.56s., iE = 12m.14s., iScPZ = 13m.3s.
Boulder City i = 6m.50s., ePcP = 8m.43s.
Palomar iNZ = 6m.58s., ScPZ = 13m.21s.
Tucson i = 7m.39s., iPP = 8m.20s., e = 9m.54s. and 13m.41s.
Ville Marie PP = 8m.25s., i = 8m.57s.
Temiskaming PP = 8m.28s., i = 8m.45s.
Cleveland eZ = 8m.45s., eE = 10m.40s., ePS?E = 16m.8s., eSSE = 18m.27s., eN = 19m.21s.
Ottawa SS = 18m.32s.
Scoresby Sund 19m.28s.
New Kensington eScSE = 18m.42s.
Vermont ePP? = 11m.53s., e = 20m.29s.
Philadelphia eSS = 20m.14s.
Columbia eSS = 20m.41s.
De Bilt eSSS = 28m.37s.
Potsdam iPPPN = 15m.55s., iSEN = 20m.41s., iPSN = 21m.5s.

Continued on next page.

Uccle eE = 20m.7s.?, eN = 24m.7s.?
Warsaw ePE = 11m.36s., ePPPZ = 15m.46s., eSZ = 20m.38s., ePSZ = 21m.8s., ePSN = 21m.26s., eN = 26m.32s.
Paris eSS = 25m.22s.
San Juan e = 13m.33s., eScS? = 22m.39s., eSS = 26m.14s.
Stuttgart e = 19m.34s.
Strasbourg eS = 21m.22s., eSS = 26m.7s., e = 28m.37s.
Bogota eSSE = 27m.37s.
Lisbon Z = 22m.29s.
Rome e = 27m.44s.
Alicante PP = 16m.4s.
Granada PcP = 12m.56s., PPP = 17m.38s., PS = 23m.25s., PPS = 24m.18s., iSS = 29m.6s., SSS = 32m.51s.
Helwan PPZ = 17m.7s., eZ = 17m.52s.
Long waves were also recorded at Kodaikanal, La Paz, Upsala, Auckland, Christchurch, and Wellington.

May 26d. 13h. 40m. 49s. Epicentre 30°·0N., 100°·0E. Rough. (as on 25d.).

$A = -\cdot1506$, $B = +\cdot8543$, $C = +\cdot4975$; $\delta = +2$; $h = +2$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Calcutta	E.	12·8	237	—	—	e 5 44	SS	e 6 34	Q	i 7·8
Irkutsk		22·5	7	e 5 2	0	e 9 10	+ 5	—	—	—
Almata		22·7	313	5 6	+ 2	9 20	+11	—	—	—
Frunse		24·0	309	e 5 22	+ 5	—	—	—	—	—
Andijan		24·9	303	—	—	e 10 8	+21	—	—	—
Kulyab		26·2	296	e 5 40	+ 2	e 10 16	+ 7	—	—	—
Obi-garm		26·4	298	i 5 42	+ 2	i 10 18	+ 6	—	—	—
Bombay		27·0	252	e 8 48	PcP	—	—	—	—	e 14·5
Stalinabad		27·1	298	e 5 47	+ 1	i 10 27	+ 3	—	—	—
Tashkent		27·3	303	e 5 49	+ 1	—	—	—	—	—
Samarkand		28·6	303	e 6 1	+ 1	—	—	—	—	—
Vladivostok		28·6	54	—	—	e 10 41	− 7	—	—	—
Sverdlovsk		38·3	326	—	—	13 19	0	—	—	—
Ksara		53·8	291	—	—	e 17 13	+12	—	—	e 25·9
Stuttgart		68·6	315	e 11 4	− 3	—	—	—	—	e 40·2
Hungry Horse		96·3	22	i 13 28	− 4	—	—	—	—	—
Ottawa		104·9	356	—	—	e 24 39	[−11]	—	—	36·2
Cleveland	E.	108·9	2	—	—	e 28 46	PS	—	—	—
Bogota		145·1	350	i 19 34	[− 5]	—	—	—	—	—

Cleveland also gives eS?N = 28m.53s., eSS?N = 30m.58s., eSS?E = 31m.3s.
Long waves were also recorded at Potsdam, De Bilt, Granada, and Scoresby Sund.

May 26d. 14h. Mexico.

Tacubaya PN = 0m.3s., eE = 1m.6s., eN = 1m.20s., eE = 1m.24s., iSE = 1m.34s., eE = 1m.40s.
Manzanillo eEN = 0m.29s. and 1m.41s.
Tucson iP = 1m.19s., i = 1m.38s., 1m.50s., 2m.13s., and 2m.25s., eS = 3.58s., eL = 4m.6s.
Palomar ePZ = 1m.57s., iZ = 2m.11s.
Pasadena ePZ = 2m.9s., eLN = 5·7m.
Riverside ePZ = 2m.10s.
Mount Wilson ePZ = 2m.15s.
Pierce Ferry eP? = 2m.18s.
Boulder City eP? = 2m.19s.
Haiwee eP?Z = 2m.41s.
Tinemaha eP?Z = 2m.48s.
Salt Lake City eP? = 2m.56s., e = 7m.10s., eL = 8m.56s.
Fresno ePZ = 2m.58s.
Berkeley eZ = 3m.7s., iN = 7m.29s.
Sitka eP? = 3m.36s., e = 12m.36s., eL = 20m.34s.
Lick ePZ = 3m.9s.
Hungry Horse iP? = 4m.12s.
Bozeman eP? = 4m.40s., eS = 8m.22s., eL = 12m.34s.
Butte eS?N = 8m.18s., eLN = 13m.26s.
Long waves were also recorded at Seattle, Istanbul, De Bilt, Potsdam, and Stuttgart.

May 26d. 16h. 24m. 37s. Epicentre 40°·0N. 19°·0E. (as on 7d.).

$A = +\cdot7263$, $B = +\cdot2501$, $C = +\cdot6402$; $\delta = -8$; $h = -2$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto	1·4	191	0 29	+ 2	1 13	?	—	—	—
Messina	3·2	238	e 0 57	+ 5	e 1 24	− 8	—	—	—
Belgrade	4·9	13	e 1 26	P•	e 3 1	S_g	—	—	—
Rome	5·3	293	e 1 19	− 3	e 2 15	−10	—	—	e 2·7
Triest	6·8	328	e 1 42	− 2	e 3 6	+ 3	—	—	—
Istanbul	7·7	79	e 0 23?	?	—	—	—	—	—
Prague	10·6	344	e 3 23	?	—	—	—	—	—
Stuttgart	11·2	325	e 2 30	−14	—	—	—	—	e 7·3
Ksara	14·8	109	2 23?	?	e 6 3	−15	—	—	—
Copenhagen	16·3	347	—	—	7 17	SS	—	—	9·4

Long waves were also recorded at Warsaw, Potsdam, De Bilt, Paris, Strasbourg, and Clermont-Ferrand.

May 26d. Readings also at 0h. (near Tananarive), 1h. (Hungry Horse, Pierce Ferry, Shasta Dam, Tucson, Riverside, Palomar, and Tinemaha), 2h. and 4h. (near Tacubaya), 6h. (Granada), 9h. (Hungry Horse), 10h. (near Obi-garm), 11h. (Alicante and Granada), 12h. (Uccle, near Lick, and near Obi-garm), 13h. (Ashkabad, Frunse, Almata, near Samarkand, Stalinabad, Tashkent, Obi-garm, Kulyab, and Andijan), 16h. (Padova, Messina, and Rome), 17h. (Pierce Ferry and De Bilt), 19h. (Mineral, Shasta Dam, near Boulder City, Pierce Ferry, Berkeley, Branner, and Lick), 20h. (near Lick).

May 27d. 7h. 32m. 21s. Epicentre 36°·2N. 24°·5E. Epicentre quoted by Strasbourg.

$A = +\cdot7360$, $B = +\cdot3354$, $C = +\cdot5880$; $\delta = -7$; $h = 0$;
$D = +\cdot415$, $E = -\cdot910$; $G = +\cdot535$, $H = +\cdot244$, $K = -\cdot809$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Istanbul	6·0	35	e 1 13	−19	—	—	—	—	—
Taranto	7·1	309	1 44	− 4	i 2 58	−12	2 12	PP	—
Messina	7·4	288	e 1 54	+ 2	3 6	−12	—	—	—
Catania	7·7	283	2 11	P*	e 2 52	?	—	—	—
Helwan	8·5	136	i 2 10a	+ 3	3 42	− 3	—	—	—
Belgrade	9·1	342	e 2 23	+ 9	—	—	—	—	—
Ksara	9·6	101	e 2 26	+ 5	e 4 11	− 1	—	—	—
Rome	10·9	305	e 2 53	+13	e 4 49	+ 5	—	—	e 6·4
Triest	12·4	323	—	—	i 5 3	−18	—	—	—
Padova	12·7	315	—	—	e 5 49	+21	—	—	—
Warsaw	16·2	352	e 3 57	+ 7	(e 6 39?)	−12	—	—	e 6·6
Zürich	16·3	318	e 3 45	− 7	e 6 52	− 1	i 3 59	PP	—
Stuttgart	16·8	324	e 3 58	0	e 7 4	− 1	—	—	—
Basle	16·9	317	e 3 58	− 1	e 7 4	− 3	—	—	—
Strasbourg	17·5	322	e 4 7	0	e 7 19	− 2	—	—	—
Clermont-Ferrand	18·7	307	e 4 20	− 2	—	—	—	—	—
Alicante	20·0	284	e 4 29	− 8	e 7 25	−52	—	—	—
Paris	20·5	316	e 4 56	+14	e 8 16	−11	i 5 5	PP	—
Copenhagen	21·2	342	4 45	− 4	8 34	− 7	—	—	—
Tamanrasset	21·2	236	e 4 49	0	—	—	—	—	—
Hungry Horse	88·1	334	i 12 49	− 5	—	—	—	—	—
Tucson	100·1	323	e 12 38	?	—	—	i 13 45	P	—

Additional readings :—
Helwan eZ = 2m.27s.
Stuttgart e = 4m.22s. and 6m.43s.
Basle e = 4m.38s.
Strasbourg e = 4m.45s.

May 27d. Readings also at 1h. (near Mizusawa), 2h. (near Lick), 3h. (Jena), 4h. (Tucson), 6h. (Bogota, Mount Wilson, Palomar, Tinemaha (2), Tucson (2), Boulder City, Pierce Ferry (2), Shasta Dam, Hungry Horse, Salt Lake City, and Istanbul), 7h. (near Mineral and near Salo), 8h. (Andijan, near Kulyab, Obi-garm, and Stalinabad), 10h. (Istanbul, Arapuni, Auckland, Christchurch, Wellington, Frunse, Tashkent, near Andijan, Kulyab, Obi-garm, Samarkand, Stalinabad, Tucson, and near Lick), 11h. (Sitka, near Mineral, Stuttgart, near Basle, Zürich, Bologna, Padova, and Salo), 14h. (Shasta Dam), 15h. (Paris), 16h. (near Kulyab and Stalinabad), 17h. (De Bilt), 19h. (near Fresno), 21h. (Istanbul (2)), 22h. (Barcelona and Istanbul).

May 28d. 5h. 36m. 8s. Epicentre 13°·1S. 76°·2W. Focus at base of Superficial Layers.

Destructive at Canete (VII), serious damage and many casualties. Intensity V-VI at Chincha and Lunahuana; V at Pisco. Macroseismic area 90,000 sq. km. Epicentre as adopted.

E. Silgado.
Datos sismologicos del Peru, 1948.
Instituto Geologico del Peru, Bol. 13, Lima, 1949, pp.16 and 30-34. Four photographs and map p. 8.

$A = +\cdot2324$, $B = -\cdot9462$, $C = -\cdot2252$; $\delta = +2$; $h = +6$;
$D = -\cdot971$, $E = -\cdot239$; $G = -\cdot054$, $H = +\cdot219$, $K = -\cdot974$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		1·3	39	i 0 35	+13	—	—	—	—	—
La Paz		8·5	114	i 2 16a	+12	i 4 4	+24	i 2 24	pP	—
Bogota		17·7	7	i 4 11	+ 5	i 7 42	+23	i 4 24	PP	—
Balboa Heights		22·2	352	i 4 57	+ 2	—	—	—	—	—
La Plata	E.	27·3	145	5 40	− 4	10 58	+39	6 10	PP	12·9
	N.	27·3	145	5 58	+14	11 4	+45	7 28	PPP	12·8
Fort de France		31·4	30	e 6 20	0	—	—	—	—	—
San Juan		32·8	18	e 6 19	−13	e 11 44	− 2	e 7 20	PP	e 13·4
Tacubaya		39·4	325	i 7 32	+ 4	e 13 50	+23	—	—	—
Georgetown		51·7	359	e 9 7	+ 1	e 16 26	+ 2	—	—	—
Florissant		53·3	347	e 9 16	− 2	e 16 41	− 5	e 9 28	pP	—
Fordham		53·7	3	i 9 22	+ 1	e 16 53	+ 2	—	—	—
Cleveland		54·5	355	e 9 24a	− 3	e 16 57	− 5	i 9 38	pP	26·5
Harvard		55·5	6	i 9 35	+ 1	e 17 18	+ 3	i 9 49	pP	e 28·1
Tucson		56·0	325	i 9 36a	− 2	e 17 24	+ 2	i 9 51	pP	e 22·6
Ottawa		58·2	1	9 53	0	17 52	+ 1	23 40	SSS	29·9
Temiskaming		59·5	358	10 0	− 2	—	—	10 14	pP	—
La Jolla	z.	60·2	320	e 10 7	0	—	—	i 10 21	pP	—
Palomar		60·3	322	i 10 10a	+ 2	—	—	i 10 25	pP	—
Pierce Ferry		60·6	325	i 10 10	0	—	—	i 10 24	pP	—
Boulder City		60·9	324	i 10 12	0	—	—	i 12 26	pP	—
Riverside		61·1	321	i 10 12a	− 1	—	—	i 10 27	pP	—
Mount Wilson		61·6	321	i 10 16a	0	—	—	i 10 31	pP	—
Pasadena		61·6	321	i 10 16a	0	i 18 36	+ 1	i 10 30	pP	—
Santa Barbara	z.	62·8	320	e 10 38	+14	—	—	i 10 57	pP	—
Haiwee	z.	62·9	323	i 10 25a	0	—	—	i 10 39	pP	—
Tinemaha		63·7	323	i 10 30a	0	—	—	i 10 45	pP	—
Fresno	z.	64·4	322	e 10 33	− 2	—	—	e 10 42	pP	—
Lick	z.	65·9	321	i 10 44	0	—	—	i 10 57	pP	—
Berkeley		66·6	321	i 10 48	− 1	i 19 39	+ 3	i 11 3	pP	e 33·3
Shasta Dam		68·5	323	i 10 59	− 2	e 20 52	+53	i 11 14	pP	—
Hungry Horse		69·8	334	i 11 8	− 1	e 20 8	− 7	—	—	—
Granada		84·4	50	12 41k	+11	i 23 4	+11	23 54	PS	i 39·5
Toledo		85·1	47	i 12 38	+ 4	e 23 15	+16	e 15 24	PP	—
Sitka		85·4	332	e 12 42	+ 7	e 22 55	− 7	e 13 0	pP	e 35·1
Alicante		87·1	49	e 13 17	+33	i 23 57	+38	—	—	—
Tamanrasset		87·5	66	i 12 51a	+ 5	—	—	—	—	—
Scoresby Sund		91·2	16	—	—	23 35	[+ 4]	23 58	S	—
Stuttgart		96·7	42	e 13 31	+ 3	e 26 10	PS	—	—	e 46·9
Istanbul		110·0	51	—	—	e 26 52?	?	—	—	—
Ksara		115·5	59	e 29 24	PS	—	—	—	—	—

For Notes see next page.

Notes to May 28d. 5h. 36m. 8s.

Additional readings :—
La Paz iZ = 4m.20s., iS = 4m.36s., iS_g = 5m.2s.
Bogota iSS = 8m.38s.
La Plata E = 6m.57s. and 7m.23s., N = 8m.43s., E = 8m.52s., N = 9m.58s.
San Juan eP_cP? = 8m.5s., iS = 11m.47s.
Tacubaya eE = 13m.56s. and 18m.0s.
Florissant esS = 17m.1s., eS_cS = 18m.59s.
Tucson i = 9m.57s., iP_cP = 10m.40s., iPP = 11m.31s., ePPP? = 13m.28s., eS_cS = 19m.18s.
Temiskaming e = 12m.36s.
Boulder City iPP = 12m.5s.
Mount Wilson ePKP,PKPZ = 39m.38s.
Pasadena iZ = 10m.46s., eZ = 12m.46s., ePKP,PKPZ = 39m.36s.
Tinemaha iZ = 10m.51s.
Lick eEN = 10m.48s., iZ = 11m.15s.
Shasta Dam i = 12m.18s., e = 13m.17s., ePKP,PKP = 39m.17s.
Granada PPS = 24m.29s., iSS = 28m.44s.
Toledo eP_cP = 12m.42s., eSS? = 29m.50s., eSSS? = 31m.42s.
Sitka iS = 23m.4s., e = 23m.28s. and 31m.6s.
Scoresby Sund PS = 25m.10s.
Long waves were also recorded at De Bilt, Potsdam, Warsaw, and Wellington.

May 28d. 10h. 43m. 37s. Epicentre 18°·9N. 68°·9W. (1947, July 23d.).

A = +·3408, B = −·8833, C = +·3220 ; δ = +5 ; h = +5 ;
D = −·933, E = −·360 ; G = +·116, H = −·300, K = −·947.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
San Juan		2·7	101	e 0 47	+ 2	i 1 30	+11	i 1·6
Bogota		15·1	200	e 3 42	+ 6	e 6 36	+11	—
Philadelphia		21·7	348	e 2 58	−117	—	—	e 10·1
Harvard		23·6	357	e 5 9	− 4	e 9 17	− 8	—
Tucson		39·8	298	e 7 44	+ 8	—	—	—
Pierce Ferry		43·1	303	e 8 3	− 1	—	—	—
Hungry Horse		46·7	320	e 8 27	− 5	—	—	—
Tinemaha	z.	46·7	304	e 8 31	− 1	—	—	—
Shasta Dam		50·4	308	e 9 5	+ 4	—	—	—
Istanbul		83·6	49	e 14 23?	?	—	—	—

Additional readings :—
Philadelphia e = 3m.16s.
Tucson e = 8m.10s.
Tinemaha iZ = 8m.46s.

May 28d. 14h. 45m. 8s. Epicentre 43°·7N. 147°·6E. (as on 1943, November 9d.).

A = −·6124, B = +·3886, C = +·6884 ; δ = −6 ; h = −3 ;
D = +·536, E = +·844 ; G = −·581, H = +·369, K = −·725.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mizusawa		6·7	229	e 1 44	+ 2	2 45	−15	—	—	—
Vladivostok		11·4	272	i 2 47	0	i 4 57	+ 1	—	—	—
Almata		49·8	296	e 8 56	0	—	—	—	—	—
Frunse		51·5	296	e 9 11	+ 2	—	—	—	—	—
Sverdlovsk		53·4	318	i 9 22	− 2	e 16 58	+ 3	—	—	—
Andijan		54·0	295	—	—	e 17 7	+ 4	—	—	—
Obi-garm		56·8	294	i 9 48	0	—	—	—	—	—
Kulyab		57·2	293	e 9 51	0	17 48	+ 2	—	—	—
Stalinabad		57·5	294	i 9 53	0	e 17 48	− 2	—	—	—
Samarkand		58·1	296	e 9 56	− 2	—	—	—	—	—
Hungry Horse		63·7	47	i 10 34	− 2	—	—	—	—	—
Moscow		64·7	324	10 40	− 2	—	—	—	—	—
Scoresby Sund		65·1	357	—	—	19 39	+12	—	—	28·9
Tinemaha	z.	68·2	59	e 11 3	− 1	—	—	—	—	—
Haiwee	z.	69·0	59	e 11 25	+16	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Mount Wilson	z.	70·1	61	e 11 29	+13	—	—	—	—	—
Pasadena	z.	70·1	61	e 11 6	−10	—	—	—	—	—
Riverside	z.	70·7	61	e 11 33	+13	—	—	—	—	—
Sotchi		71·9	314	e 11 27	0	—	—	—	—	—
Copenhagen		74·0	335	11 39	0	—	—	—	—	36·9
Tucson		76·0	58	e 11 50	− 1	—	—	—	—	—
Potsdam		76·6	334	e 11 55	+ 1	—	—	—	—	e 40·9
Jena	E.	78·2	332	e 12 2	− 1	—	—	—	—	—
Ksara		80·9	307	e 12 17	0	—	—	—	—	—
Stuttgart		80·9	333	e 12 18	+ 1	—	—	—	—	e 43·9
Strasbourg		81·6	334	e 12 22	+ 1	—	—	e 28 21	SS	e 43·2
Paris		82·9	337	e 12 29	+ 1	—	—	—	—	—
Clermont-Ferrand		85·3	336	e 12 42	+ 2	—	—	—	—	44·9
Helwan	z.	86·4	309	e 12 46	+ 1	—	—	—	—	—

Additional readings :—
Hungry Horse i =10m.48s.
Tinemaha iZ =11m.20s. and 11m.24s.
Mount Wilson eZ =12m.18s.
Pasadena eZ =11m.30s.
Tucson e =11m.59s.
Stuttgart eZ =12m.30s.
Strasbourg e =16m.42s. and 19m.22s.
Helwan eZ =13m.6s.
Long waves are also recorded at other European stations.

May 28d. 23h. 48m. 3s. Epicentre 37°·8N. 142°·6E. Depth of focus 0·005.
(as on 1948, May 14d.).

Intensity IV at Sendai ; II-III at Hukusima, Utunomiya, Morioka, Onahama, and Kakioka.
Epicentre 37°·6N. 142°·7E. Focal depth 40km. Macroseismic radius 200-300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948, Tokyo, 1950, p. 20.

$A = -\cdot6293,\ B = +\cdot4811,\ C = +\cdot6103\ ;\quad \delta = -6\ ;\quad h = -1\ ;$

	△	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Sendai	1·4	289	0 26k	+ 2	0 45	+ 2	—
Onahama	1·6	237	0 27	0	0 36	−11	—
Hukusima	1·7	268	0 24	− 4	0 45	− 5	—
Mizusawa	1·7	286	i 0 33	+ 5	0 55	+ 5	—
Miyako	1·9	345	0 35	+ 4	1 1	+ 7	—
Mito	2·2	230	0 34	− 1	1 2	0	—
Morioka	2·2	330	0 40a	+ 5	1 10	+ 8	—
Kakioka	2·5	231	0 36	− 3	1 8	− 1	—
Utunomiya	2·5	240	0 38	− 1	1 6	− 3	—
Akita	2·7	315	0 42	0	1 18	+ 4	—
Hatinohe	2·8	343	0 37	− 7	1 3	−14	—
Kumagaya	3·1	237	0 46	− 2	1 25	+ 1	—
Tokyo	3·1	227	0 48k	0	1 22	− 2	—
Maebasi	3·2	244	0 50	+ 1	1 32	+ 5	—
Aomori	3·3	335	1 2	+11	1 52	+23	—
Yokohama	3·4	223	0 51	− 1	1 34	+ 2	—
Aikawa	3·5	272	0 56	+ 2	1 45	+11	—
Mera	3·6	219	1 1	+ 6	1 50	+13	—
Nagano	3·7	254	1 0	+ 4	1 53	+14	—
Hunatu	3·8	235	0 57	− 1	1 40	− 2	—
Osima	4·0	222	0 59	− 2	—	—	—
Shizuoka	4·4	232	1 2	− 4	2 8	+11	—
Toyama	4·5	255	1 9	+ 2	2 5	+ 6	—
Wazima	4·5	264	1 24	+17	—	—	—
Mori	4·6	340	1 25	+16	2 24	+22	—
Nagoya	5·2	242	1 17	0	2 19	+ 2	—
Gihu	5·3	245	1 21	+ 2	2 21	+ 2	—
Hikone	5·7	246	1 26	+ 2	2 30	+ 1	—
Kameyama	5·8	241	1 27	+ 2	2 43	+11	—
Osaka	6·2	244	1 38	+ 7	2 57	+16	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Owase	6·4	237	1 31	− 3	2 57	+11	—
Toyooka	6·6	253	1 37	0	2 41	−10	—
Kobe	6·7	245	1 51	+13	3 21	+27	—
Kôti	8·5	243	2 51	+48	—	—	—
Hamada	9·0	254	3 23	?	—	—	—
Tucson	82·4	55	e 12 43	+27	—	—	—
Stuttgart	84·4	331	e 12 32	+ 5	—	—	e 47·0
Paris	86·8	335	e 12 46	+ 8	—	—	e 51·0

Tucson gives also e = 13m.11s. and 13m.27s.
Long waves were also recorded at Warsaw, De Bilt, Potsdam, Clermont-Ferrand, Triest, and Granada.

May 28d. Readings also at 5h. (Tacubaya (2), Cleveland, Frunse, Tashkent, Samarkand, near Andijan, Kulyab, Obi-garm, and Stalinabad), 6h. (Hungry Horse), 7h. (Tucson), 9h. (Clermont-Ferrand), 11h. (near Lick and near Mineral), 12h. (near Mineral (2)), 14h. (Sitka, near Stalinabad and near Salo), 15h. (Huancayo, Samarkand, near Andijan, Kulyab, Obi-garm, and Stalinabad), 16h. (near Tacubaya), 17h. (Balboa Heights, Tacubaya, near Oaxaca, and near Bogota ; also Strasbourg, Clermont-Ferrand, and near Kew, felt at Downham Market, Felixstowe, Sudbury, Cambridge, and Peterborough ; L. L. Alexander " Report on an earthquake tremor in East Anglia, May 28th, 1948," Meteorological Magazine, Vol. 78, p.1949, pp. 135-139, with macroseismic chart p. 136, suggested epicentre 52°·6N. 0°·4E.), 18h. (La Paz), 19h. (La Plata), 20h. (Christchurch), 23h. (near Kulyab, Obi-garm, and Stalinabad).

May 29d. 4h. 48m. 54s. Epicentre 45°·7N. 26°·8E. Depth of focus 0·015.
(as on 1948, April 29d.).

Intensity V-VI at Bucharest. Epicentre 45°·9N., 26°·7E. Depth 150km.

G. Demetrescu and G. Petrescu, Bulletin séismique de Bucarest, Vol. 14, 1948, p. 17.

A = +·6255, B = +·3160, C = +·7133 ; δ = −10 ; h = −4 ;
D = +·451, E = −·893 ; G = +·637, H = +·322, K = −·701.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bucharest	1·4	198	i 0 30	+ 2	i 0 48	0	—	—	0·8
Belgrade	4·5	262	i 1 7k	− 1	i 1 54	− 5	i 1 28	PP	—
Istanbul	4·9	160	i 1 12	− 1	2 6	− 3	—	—	—
Simferopol	5·2	96	i 1 21	+ 4	i 2 20	+ 4	—	—	—
Kalossa	5·5	281	1 22	+ 1	2 51	SS	e 2 1	?	3·1
Budapest	5·6	291	i 1 23	+ 1	i 2 34	+ 8	—	—	3·1
Theodosia	6·1	93	i 1 33	+ 4	—	—	—	—	—
Raciborzu	7·3	310	e 1 42	− 3	—	—	i 1 54	PP	e 6·7
Warsaw	7·5	332	1 48k	0	3 15	+ 3	3 27?	SS	—
Taranto	8·7	237	e 2 32	PPP	i 3 34	− 7	—	—	—
Triest	9·1	275	i 2 11	+ 2	e 4 2	+11	—	—	i 5·1
Prague	9·4	303	i 2 15k	+ 2	e 3 56	− 2	e 2 36	PP	e 5·1
Bologna	11·0	269	e 2 33	− 2	e 4 48	+12	—	—	—
Rome	11·0	255	i 2 31	− 4	e 4 36	0	i 2 46	PP	—
Florence	11·2	266	e 2 35	− 2	e 4 38	− 3	—	—	e 5·9
Potsdam	11·2	312	i 2 35k	− 2	i 4 44	+ 3	—	—	e 6·1
Jena	11·4	303	e 2 38	− 2	e 4 54	+ 9	e 2 41	pP	—
Salo	11·6	275	e 2 39	− 4	e 4 57	+ 7	i 2 46	P	e 6·4
Piatigorsk	11·7	91	2 38?	− 6	5 4?	+11	i 2 50?	pP	—
Chur	12·0	282	e 2 44	− 4	e 5 6	+ 6	i 2 55	pP	—
Moscow	12·1	30	2 49	0	4 52	−10	—	—	—
Pavia	z. 12·4	270	i 2 59	+ 6	—	—	—	—	—
Stuttgart	12·4	291	i 2 50k	− 3	e 5 14	+ 5	i 3 8a	PP	e 6·1
Zürich	12·7	284	e 2 54k	− 3	e 5 25	+ 9	—	—	—
Leninakan	13·3	105	i 3 12	+ 7	i 5 58	SS	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		13·3	290	i 3 3k	− 2	e 5 33	+ 3	—	—	i 7·3
Basle		13·4	285	e 3 2	− 4	e 5 43	+11	—	—	e 9·2
Copenhagen		13·5	323	i 3 4k	− 3	5 28	− 7	3 12	P	—
Grozny		13·7	93	i 3 14	+ 4	—	—	i 3 29	pP	—
Ksara		13·8	146	i 3 13k	+ 2	e 5 48	+ 6	—	—	—
Neuchatel		13·8	283	e 3 10	− 1	e 5 52	+10	—	—	—
Erevan		14·1	107	i 3 21	+ 6	e 6 1	SS	—	—	—
Helsinki		14·5	356	i 3 16	− 4	i 5 45	−13	i 3 23	PP	e 7·1
Upsala		15·2	342	i 3 26k	− 3	i 6 11	− 3	i 3 40	PP	e 7·4
De Bilt		15·6	304	i 3 34k	0	e 6 30	+ 7	—	—	e 8·1
Uccle		15·8	297	i 3 37k	+ 1	e 6 32	+ 4	e 4 15	pP	e 8·1
Helwan		16·2	166	i 3 42k	+ 1	i 6 42	+ 6	e 7 26	SSS	—
Clermont-Ferrand		16·6	279	i 3 48	+ 2	i 6 51	+ 5	i 4 13	PP	8·1
Paris		16·8	289	i 3 47	− 2	i 6 51	+ 1	i 4 24	PP	e 10·2
Kew		18·8	298	e 4 15	+ 3	e 7 36	+ 3	e 4 53	pP	e 10·1
Durham		20·2	307	i 4 29	+ 2	i 8 5	+ 4	—	—	—
Aberdeen	N.	21·2	315	i 2 36	?	i 8 23	+ 3	—	—	—
Alicante		21·5	260	4 50	+10	8 34	+ 9	5 10	PP	10·0
Toledo		23·3	267	i 4 56	− 1	i 9 0	+ 4	i 5 34	PP	10·8
Sverdlovsk		23·7	50	i 5 1	0	i 9 7	+ 4	—	—	—
Granada		24·2	261	i 5 34	+28	i 9 9	− 3	6 11	pP	—
Tamanrasset		28·7	224	e 5 47a	0	—	—	i 6 18a	pP	—
Tashkent		30·9	82	e 6 7	0	e 11 0	0	—	—	—
Stalinabad		31·7	87	i 6 16?	+ 2	i 11 15?	+ 3	—	—	—
Obi-garm		32·2	86	i 6 22	+ 4	i 11 21	+ 1	—	—	—
Kulyab		32·7	89	i 6 28	+ 6	i 11 38	+10	—	—	—
Andijan		33·2	83	6 16	−11	—	—	—	—	—
Frunse		33·9	77	e 6 37	+ 4	—	—	—	—	—
Scoresby Sund		34·2	333	6 36	+ 1	13 49	SS	7 47	PP	—
Almata		35·4	75	e 6 44	− 1	—	—	—	—	—
Ville Marie		67·1	315	i 10 39	− 3	—	—	i 11 14	pP	—
Temiskaming		67·3	314	i 10 41	− 2	—	—	i 11 16	pP	—
Hungry Horse		80·3	335	i 11 57	− 1	—	—	i 12 32	pP	—
Shasta Dam		89·7	336	e 12 44	− 1	—	—	—	—	—
Pierce Ferry		91·2	328	i 12 33	?	—	—	i 13 2	P	—
Boulder City		91·6	329	i 12 54	0	—	—	—	—	—
Tinemaha	z.	91·8	332	i 12 56	+ 2	—	—	—	—	—
Lick	z.	92·6	335	i 9 48	?	—	—	i 12 58	P	—
Branner	z.	92·7	335	i 9 42	?	—	—	—	—	—
Tucson		93·4	325	e 12 17	?	—	—	i 13 3	P	—
Mount Wilson		94·3	331	e 13 6	0	—	—	—	—	—

Additional readings :—
Belgrade iP_g =1m.21s., iS_g =2m.13s.
Budapest iE =2m.8s., iN =2m.11s., iE =2m.47s., iN =2m.50s.
Raciborzu e =5m.0s.
Warsaw ePEN =1m.51s., SZ =3m.24s., SSZ =3m.34s.
Prague e =4m.26s.
Bologna eN =4m.0s.
Rome iZ =3m.6s., eSN =4m.31s., eN =4m.41s. and 4m.55s.
Potsdam iZ =2m.44s., iE =3m.10s., iZ =3m.13s., iSNZ =4m.48s., iS*EZ =5m.39s., iS_gN =5m.46s.
Jena eN =5m.56s.
Salo iN =3m.21s.
Stuttgart i =3m.28s.a, eS =4m.56s.
Strasbourg i =3m.8s. and 3m.39s., iS =5m.38s., i =6m.45s.
Grozny i =3m.40s.
Upsala iS =6m.4s., iSS =6m.20s., SSS? =6m.38s.
Uccle iS =6m.39s.
Helwan eZ =4m.13s., iNZ =4m.20s., eZ =4m.50s.
Clermont-Ferrand i =4m.30s.
Paris e =9m.16s. and 9m.37s.
Kew eP_cPE =8m.25s.
Durham iEN =8m.15s. and 8m.20s.
Alicante PPP =5m.20s., P_cP =9m.19s., P_cS =13m.8s.
Toledo iPPP =5m.42s., eP_cP =8m.27s., eSS =9m.49s.
Granada iPP =6m.36s., sS =9m.23s.
Tamanrasset ePP =6m.40s.
Lick iP_cPZ =9m.58s., iZ =10m.49s.
Branner eN =9m.47s., eE =9m.50s.
Tucson e =13m.39s., ePP? =16m.57s.

May 29d. 14h. 2m. 3s. Epicentre 36°·5N. 117°·0E.

Very approximate determination.

A = −·3658, B = +·7180, C = +·5922; δ = +3; h = 0;
D = +·891, E = +·454; G = −·269, H = +·528, K = −·806.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		4·7	161	e 1 10	− 4	2 17	+ 7	i 1 23	P*	—
Vladivostok		13·2	55	e 3 39	PPP	—	—	—	—	—
Irkutsk		18·1	333	4 27	+13	e 8 3	SS	—	—	—
Calcutta		28·4	249	—	—	e 11 46	+61	—	—	i 16·8
Almata		31·2	296	e 6 22	− 1	—	—	—	—	—
Andijan		34·8	291	e 6 58	+ 4	—	—	—	—	—
Tashkent		37·1	293	e 7 10	− 4	e 12 54	− 7	—	—	—
Obi-garm		37·2	288	e 7 12	− 3	e 12 57	− 5	—	—	—
Kulyab		37·3	286	i 7 10	− 6	e 12 53	−11	—	—	—
Stalinabad		38·0	288	e 7 16	− 5	e 13 3	−11	—	—	—
Sverdlovsk		42·3	317	—	—	e 14 19	0	e 17 39	SS	—
Bombay		42·5	257	—	—	e 13 35	?	—	—	—
Moscow		55·1	317	e 9 39	+ 3	—	—	—	—	—
Ksara		64·4	294	10 57?	+17	e 21 13	?	—	—	—
Stuttgart	z.	73·7	319	e 11 41	+ 3	—	—	—	—	—
Hungry Horse		84·1	31	e 12 47	+13	—	—	—	—	—
Alicante		85·8	315	e 22 48	SKS	(e 22 48)	[−18]	—	—	e 46·4
Shasta Dam		85·9	41	e 13 5	+22	—	—	—	—	—
Tinemaha	z.	90·7	41	e 13 22	+16	—	—	—	—	—

Nanking also gives i = 2m.27s.
Long waves were recorded at College, Scoresby Sund, and European stations.

May 29d. Readings also at 1h. (near Mizusawa), 2h. (Helwan and Ksara), 3h. (near Mizusawa), 4h. (Bucharest and Shasta Dam), 5h. (Haiwee, Pasadena, Tinemaha, Pierce Ferry, Shasta Dam, Tucson, Clermont-Ferrand (2), and near Lick), 6h. (Granada and Scoresby Sund), 7h. (Potsdam, Stuttgart, and Nanking), 8h. (Scoresby Sund, and Istanbul), 10h. (near Salo, Bologna, Padova, Zürich, Strasbourg, and Stuttgart), 12h. (La Paz, Bogota, Huancayo, and Harvard), 14h. (Paris, Strasbourg, Clermont-Ferrand, Triest, Toledo, and Stuttgart), 16h. (near Andijan), 17h. (Belgrade), 18h. (near Tacubaya), 19h. (Mount Wilson, Pasadena, Riverside, Tinemaha, Hungry Horse, Pierce Ferry, Shasta Dam, and Tucson), 20h. (Belgrade, Pierce Ferry, Tucson, Tinemaha, Riverside, Salt Lake City, Vera Cruz, near Manzanillo, and Tacubaya), 21h. (near Obi-garm, Stalinabad, and Kulyab).

May 30d. Readings at 5h. (Istanbul, Ksara, Helwan, Stalinabad, Kulyab, Tashkent, and Obi-garm), 10h. (Ivigtut), 11h. (near Kulyab, Obi-garm, and Stalinabad), 12h. (near Kulyab, Stalinabad, and Obi-garm), 13h. (Bologna), 14h. (Tacubaya and Tucson), 17h. (Bologna (5)), 19h. (Stuttgart, Strasbourg, near Basle, and Zürich), 20h. (Shasta Dam), 21h. (near Andijan), 22h. (near Grozny).

May 31d. 3h. Undetermined shock.

Shasta Dam eP = 15m.40s., i = 15m.51s., 16m.37s., and 17m.16s.
Berkeley iPZ = 16m.16s., eE = 17m.54s.
Grand Coulee iP = 16m.18s., e = 17m.43s.
Branner iPZ = 16m.22s., iZ = 16m.28s.
Lick iPZ = 16m.25s., iZ = 18m.44s.
Santa Clara eZ = 16m.34s.
Fresno eZ = 16m.43s. and 19m.0s.
Hungry Horse iP = 16m.59s., i = 19m.36s., eS = 22m.15s.
Pasadena iPNZ = 17m.24s.k, eLE = 20·3m.
Mount Wilson iPNZ = 17m.25s.k.
Riverside iPZ = 17m.30s.k.
Pierce Ferry eP = 17m.34s.
Palomar iP = 17m.41s.k, iZ = 17m.44s.
Sitka eP? = 18m.6s., eS = 21m.25s., eL = 22m.12s.
Ukiah eS? = 18m.10s., eL = 18m.42s.
Tucson eP = 18m.34s.k, i = 18m.42s. and 18m.46s., e = 20m.56s.
Salt Lake City eS? = 19m.23s., eL = 20m.30s.
Butte eS?N = 19m.28s., eLN = 20m.20s.
Ottawa eZ = 21m.40s., L = 34m.
Long waves were also recorded at Philadelphia.

May 31d. 8h. Undetermined shock.

Pasadena suggests Tonga Islands. Depth 320kms.

Apia iP = 26m.55s.a, eS = 29m.25s.
Brisbane iN = 29m.27s., iPP?E = 29m.35s., iN = 30m.2s., iS?E = 32m.27s., iL?E = 34m.47s.
Riverview iP?EZ = 29m.58s., iS?N = 35m.16s., iS_cS?N = 39m.8s.
Lick iPZ = 35m.35s., iZ = 36m.53s.
Pasadena iPZ = 35m.36s., epPZ = 36m.51s.
Mount Wilson iPNZ = 35m.37s.k, epPZ = 36m.53s.
Palomar iP = 35m.37s., ipPNZ = 36m.54s., i = 37m.24s.
Riverside iPZ = 35m.39s., iZ = 35m.47s., ipPZ = 36m.55s.
Haiwee iPZ = 35m.44s., epPZ = 37m.2s.
Shasta Dam iP = 35m.44s., ipP = 37m.2s.
Tinemaha iPZ = 35m.45s.a, ipPZ = 37m.2s.
Boulder City iP = 35m.49s., ipP = 37m.7s.
Tucson iP = 35m.55s.k, i = 36m.12s., ipP = 37m.12s., i = 37m.53s.
Pierce Ferry iP = 35m.57s., ipP = 37m.14s.
Hungry Horse iP = 36m.27s., e = 40m.17s.
Strasbourg e = 42m.32s. and 47m.14s.
Stuttgart ePZ = 43m.1s., eZ = 43m.34s. and 47m.10s.
Batavia 44m.
Toledo iPZ = 44m.14s., eS = 52m.10s., eSKS = 54m.8s., L = 61m.13s.

May 31d. 14h. 56m. 44s. Epicentre 84°·5N. 100°·0E.

$A = -·0168$, $B = +·0950$, $C = +·9953$; $\delta = -7$; $h = -13$;
$D = +·985$, $E = +·174$; $G = -·173$, $H = +·980$, $K = -·097$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		23·0	313	5 8	+ 1	9 39	SS	—	—	12·3
Sverdlovsk		29·3	226	e 6 9	+ 3	e 11 9	+10	—	—	—
Copenhagen		34·6	277	—	—	12 23	+ 1	—	—	—
Warsaw		37·2	267	—	—	e 16 16	SSS	—	—	e 21·3
Stuttgart		41·8	277	e 7 52	− 1	—	—	—	—	e 24·3
Strasbourg		42·1	279	e 8 3	+ 8	—	—	—	—	—
Tashkent		44·2	215	e 8 21?	+ 9	—	—	—	—	—
Hungry Horse		46·5	32	i 8 30	− 1	—	—	e 8 39	P	—
Rome		48·3	273	—	—	e 15 46	+ 1	—	—	e 24·3
Shasta Dam		53·7	41	e 9 25	− 1	—	—	—	—	—
Tinemaha	z.	57·5	37	i 9 55	+ 2	—	—	—	—	—
Haiwee	z.	58·5	37	e 10 1	+ 1	—	—	—	—	—
Pierce Ferry		58·7	33	i 10 2	0	—	—	—	—	—
Mount Wilson	z.	60·4	37	i 10 13	0	—	—	—	—	—
Pasadena	z.	60·4	37	i 10 13	0	—	—	—	—	—
Riverside	z.	60·6	37	e 10 14	− 1	—	—	—	—	—
Palomar		61·3	36	i 10 19	− 1	—	—	—	—	—
Tucson		62·7	29	i 10 29	0	—	—	—	—	—

Long waves were also recorded at Istanbul, Ksara, Potsdam, and Paris.

May 31d. Readings also at 3h. (near Kulyab, Obi-garm, and Stalinabad), 4h. (Istanbul and near Lick), 5h. (near Mizusawa), 6h. (Shasta Dam and Tinemaha), 7h. (Stuttgart, College, Sitka, Palomar, Mount Wilson, Riverside, Boulder City, Pierce Ferry, and Tucson), 8h. (Pierce Ferry), 10h. (Tucson and Hungry Horse), 14h. (near Kulyab (2), Stalinabad (2), Obi-garm (2), Samarkand, Andijan (2), Frunse, Almata, and Tashkent), 18h. (Vladivostok, Kulyab, Stalinabad, Sverdlovsk, Istanbul, Mizusawa, and Hungry Horse), 19h. (Durham, Edinburgh, College, Sitka, Lick, Mount Wilson, Pasadena, Palomar, Riverside, Boulder City, Hungry Horse, Pierce Ferry, Shasta Dam, and Tucson), 20h. (Rome, Granada, and Triest), 21h. (Istanbul, Rome, near Tacubaya, and near Ottawa), 22h. (Mizusawa, Hungry Horse, Istanbul, Ksara, Rome, Triest, Warsaw, Granada, Potsdam, Cheb, Uccle, Copenhagen, De Bilt, Stuttgart, Strasbourg, Clermont-Ferrand, and Paris).

June 1d. 3h. 19m. 54s. Epicentre 6°·5N. 94°·5E.
(as on 1939, Jan. 10d., and fore-shock of June 1d. 18h.).

$A = -·0780$, $B = +·9906$, $C = +·1125$; $\delta = +3$; $h = +7$;
$D = +·997$, $E = +·078$; $G = -·009$, $H = +·112$, $K = -·994$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Colombo	E.	14·5	272	3 32	+ 4	—	—	—	—	8·6
Kodaikanal	E.	17·2	287	e 4 5	+ 2	—	—	—	—	—
Batavia		17·6	137	i 3 40	−28	e 6 40	−43	—	—	i 9·1
Hyderabad	N.	19·0	307	4 24	− 2	8 7	+12	—	—	10·4
Bombay	N.	24·4	303	e 5 40	+19	—	—	—	—	—
Kulyab		38·5	328	e 7 26	0	e 13 24	+ 2	—	—	—
Obi-garm		39·1	329	—	—	e 13 30	− 1	—	—	—
Stalinabad		39·5	328	e 7 34	0	i 13 37	0	—	—	—
Frunse		40·2	337	e 7 53	+13	—	—	—	—	—
Samarkand		41·3	327	e 7 46	− 3	—	—	—	—	—
Tashkent		41·3	331	e 7 48	− 1	e 13 6	−58	—	—	—
Irkutsk		46·3	8	e 9 0?	+31	—	—	—	—	—
Vladivostok		49·1	36	e 8 48?	− 3	—	—	—	—	—
Sverdlovsk		56·8	339	9 48	0	17 43	+ 2	—	—	—
Ksara		60·4	304	e 10 26?	+13	e 20 26	?	—	—	—
Helwan		63·5	300	—	—	e 19 12	+ 5	—	—	—
Moscow		66·4	329	10 51	− 2	19 42	− 1	—	—	—
Potsdam	N.	79·6	322	—	—	e 22 9	− 3	—	—	e 48·1
Copenhagen		80·2	325	—	—	22 17	− 2	—	—	—
Stuttgart	Z.	82·1	318	e 12 21	− 3	—	—	—	—	—
Tamanrasset		86·6	292	i 12 47 a	+ 1	—	—	e 16 7	PP	—
Tucson		134·5	30	e 19 32	[+12]	—	—	—	—	—

Additional readings :—
Potsdam eE = 22m.24s.
Tamanrasset $ePcP$ = 13m.3s.
Long waves were also recorded at other European stations.

June 1d. 18h. 56m. 13s. Epicentre 6°·5N. 94°·5E. (as at 3h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Colombo	E.	14·5	272	3 28	0	—	—	—	—	7·8
Kodaikanal	E.	17·2	287	i 4 6	+ 3	i 7 34	+20	—	—	9·3
Batavia		17·6	137	e 3 10	−58	i 6 18	−65	—	—	i 8·8
Hyderabad	N.	19·0	307	4 25	− 1	8 3	+ 8	—	—	—
Bombay		24·4	303	e 5 24	+ 3	e 9 48	+ 9	—	—	12·9
Dehra Dun	N.	28·3	329	e 8 2	?	—	—	—	—	—
Nanking		34·1	39	e 6 48	0	—	—	—	—	—
Kulyab		38·5	328	i 7 25	− 1	i 13 19	− 3	—	—	—
Obi-garm		39·1	329	i 7 31	0	i 13 31	0	—	—	—
Andijan		39·4	334	e 7 34	+ 1	e 13 38	+ 3	—	—	—
Stalinabad		39·5	328	i 7 36	+ 2	i 13 34	− 3	—	—	—
Almata		39·7	340	i 7 39	+ 3	i 13 44	+ 4	—	—	—
Frunse		40·2	337	i 7 45	+ 5	e 13 52	+ 4	—	—	—
Samarkand		41·3	327	e 7 47	− 2	—	—	—	—	—
Tashkent		41·3	331	e 7 45	− 4	—	—	—	—	—
Tchimkent		41·9	333	i 7 54	0	—	—	—	—	—
Irkutsk		46·3	8	e 8 29	0	15 17	+ 1	—	—	—
Vladivostok		49·1	36	i 8 45	− 6	i 15 51	− 5	—	—	—
Baku		52·2	317	e 9 31?	+16	—	—	—	—	—
Tananarive		52·7	240	e 13 10	?	e 16 46	0	19 5	ScS	23·0
Grozny		56·3	319	e 9 43	− 2	—	—	—	—	—
Leninakan		56·5	315	e 10 0?	+14	—	—	—	—	—
Sverdlovsk		56·8	339	9 48	0	i 17 41	0	—	—	—
Ksara		60·4	304	e 10 15	+ 2	—	—	—	—	—
Sotchi		60·4	317	e 10 12	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Helwan		63·5	300	e 10 14	−20	19 7	0	12 42	PP	—
Yalta		64·5	316	e 10 25?	−16	—	—	—	—	—
Moscow		66·4	329	10 50	− 3	19 38	− 5	—	—	—
Riverview		66·9	131	i 11 13	P_cP	i 19 41	− 8	i 13 8	PP	e 31·2
Istanbul		67·3	312	10 17	−42	19 23	−31	—	—	—
Belgrade		74·1	314	e 11 41	+ 1	20 45	−27	e 13 5	PP	54·8
Warsaw		74·8	322	e 11 44s	0	e 21 15	− 5	e 12 3	P_cP	e 39·8
Raciborzu		76·3	320	e 11 47?	− 5	—	—	—	—	—
Upsala		77·8	330	e 12 5	+ 4	e 21 47	− 6	e 15 13	PP	e 35·8
Prague		78·7	320	e 12 9?	+ 3	e 22 2	− 1	e 14 50	PP	e 40·8
Triest		78·9	315	e 12 1	− 6	e 21 51	−14	e 14 52	PP	—
Potsdam		79·6	322	—	—	e 22 24	+12	—	—	e 43·8
Rome		79·8	311	e 12 6	− 6	e 22 3	−11	e 27 23	SS	e 35·8
Cheb		80·0	319	—	—	e 22 47?	+30	—	—	e 42·8
Copenhagen		80·2	325	12 12	− 2	22 17	− 2	—	—	—
Jena	N.	80·5	320	e 12 15	0	—	—	—	—	—
Bologna		80·6	314	e 12 17	+ 1	e 22 34?	+11	—	—	—
Florence	E.	80·7	313	e 12 19	+ 3	—	—	—	—	—
Salo		81·2	315	e 12 18	− 1	e 22 30	+ 1	—	—	—
Chur		81·9	316	e 12 10	−13	—	—	e 18 2	PPP	—
Stuttgart		82·1	318	e 12 21	− 3	e 22 36	− 2	e 23 24	PS	e 44·8
Zürich		82·5	317	e 12 22	− 4	e 22 38	− 4	—	—	—
Strasbourg		83·0	318	e 12 27	− 1	e 22 47	0	e 15 57	PP	e 41·5
Basle		83·2	317	e 12 26	− 3	—	—	—	—	—
Neuchatel		83·6	316	e 12 27	− 4	—	—	—	—	—
De Bilt		84·5	322	i 12 43	+ 7	e 22 47	−15	e 23 5	ScS	e 39·8
Uccle		85·1	321	e 12 49	+10	e 23 2	[+ 1]	e 28 41	SS	e 43·8
Clermont-Ferrand		86·4	315	e 14 59	?	i 23 38	+17	—	—	—
Paris		86·5	319	e 12 44	− 2	e 23 21	− 1	e 16 10	PP	e 43·8
Tamanrasset		86·6	292	e 12 47k	+ 1	—	—	e 16 24	PP	—
Kew		88·0	322	e 12 51	− 2	e 23 18	[− 3]	e 29 55	SS	e 56·8
Aberdeen	N.	88·2	327	—	—	—	—	e 40 18	Q	e 47·3
Durham		88·2	325	—	—	e 23 17	[− 5]	23 39	S	—
Edinburgh		89·0	326	—	—	e 23 47	+ 2	—	—	—
Alicante		89·9	308	13 21	+19	e 23 58	+ 4	17 2	PP	e 44·2
Scoresby Sund		92·4	343	—	—	23 39	[− 8]	24 19	S	42·8
Toledo		92·4	310	e 13 12	− 2	—	—	i 34 47	SSS	56·7
Granada		92·5	308	e 11 0k	?	22 59	?	19 38	PPP	i 43·8
Shasta Dam		122·1	33	e 18 56	[− 1]	—	—	—	—	—
Bozeman		123·2	21	e 20 57	PP	e 37 59	SS	e 23 24	PPP	e 60·2
Seven Falls		125·0	348	—	—	—	—	e 37 53	SS	51·8
Tinemaha	z.	126·9	33	e 19 5	[− 1]	—	—	—	—	—
Ottawa		127·6	352	e 19 7	[0]	—	—	i 16 37	P	54·8
Mount Wilson	z.	129·1	36	e 19 11	[+ 1]	—	—	e 21 18	PP	—
Pasadena	z.	129·1	36	e 19 7	[− 3]	—	—	—	—	—
Boulder City		129·6	31	e 19 7	[− 4]	e 23 10	PKS	—	—	—
Harvard		129·6	347	e 21 17	PP	—	—	—	—	e 71·8
Riverside	z.	129·7	36	e 19 8	[− 3]	—	—	—	—	—
Pierce Ferry		129·9	30	e 19 11	[− 1]	—	—	i 21 49	PP	—
Palomar		130·4	35	e 19 16	[+ 3]	—	—	e 22 29	PKS	—
Cleveland		132·1	357	e 22 47	PKS	—	—	—	—	64·0
Philadelphia		132·8	349	e 16 39	?	e 39 36	SS	e 22 21	PP	e 66·4
Tucson		134·5	30	e 19 10	[−10]	—	—	e 22 46	PP	—
Bermuda		136·5	334	—	—	—	—	e 41 8	SS	e 71·9
Fort de France		147·9	311	e 19 41	[− 3]	—	—	—	—	—
La Paz		160·3	239	20 0	[− 1]	i 27 14	[+ 9]	24 31	PP	77·8
Bogota	E.	164·1	314	e 20 23	[+18]	—	—	e 21 27	PKP,	e 93·8
Huancayo		168·6	241	e 20 10	[+ 2]	e 46 11	SS	e 25 9	PP	e 74·0

Additional readings :—
Tananarive e = 13m.37s. and 18m.15s., SSS? = 22m.20s.
Helwan SSS = 26m.29s.
Riverview iN = 14m.14s., ePPSE = 20m.25s., eE = 22m.5s., eN = 22m.37s., eQ?N = 29m.17s.

Continued on next page.

Warsaw ePN =12m.6s., ePE =12m.9s., eZ =17m.3s. and 18m.19s., ePcSZ =19m.18s., ePPSN =21m.54s., ePPSZ =21m.57s., eSSN =26m.7s., eN =30m.1s., ePKKPZ = 30m.25s., eZ =32m.3s.
Upsala eN =12m.33s., eSSE =27m.25s., eN =28m.5s., eSSSN =30m.47s.?
Prague ePS =22m.47s., eSS =27m.29s., eSSS =30m.29s.
Triest ePS =22m.44s.
Rome eN =19m.22s. and 33m.29s.
Copenhagen e =12m.19s. and 23m.2s.
Jena eE =13m.16s., eN =13m.31s.
Bologna e =12m.34s.
Stuttgart e =12m.59s., eSS =28m.8s., e =34m.5s.
Zürich e =13m.11s.
Strasbourg e =13m.7s., ePPP =17m.50s., eS =22m.50s., ePPS =24m.18s., e =24m.57s., eSS =27m.32s., eSSS =32m.47s.
Uccle eN =35m.5s.
Paris e =23m.33s., ePS =24m.37s., eSS =29m.47s.?
Tamanrasset e =13m.26s.
Durham E =23m.22s., N =23m.31s.
Alicante PS =25m.6s., PPS =26m.41s., Q =36m.56s.
Scoresby Sund 24m.32s., SS =30m.41s.
Granada PP =14m.47s.a, PS =24m.18s., iSS =30m.8s., SSS =33m.50s.
Cleveland eZ =22m.53s.
Philadelphia e =20m.6s.
La Paz iZ =30m.15s.
Long waves were also recorded at Christchurch, Wellington, Butte, Salt Lake City, Sitka, Ivigtut, and Helsinki.

June 1d. Readings also at 0h. (near Granada), 1h. (near La Paz), 2h. (Shasta Dam), 3h. (near Tacubaya), 4h. (near Kulyab, Obi-garm, and Stalinabad), 6h. (Christchurch), 10h. (Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and Ksara), 13h. (Branner), 14h. (Kew), 16h. (De Bilt), 19h. (near Apia), 20h. (Copenhagen, Strasbourg, and Stuttgart), 21h. (Alicante and near Lick), 22h. (Bombay).

June 2d. 13h. 38m. 48s. Epicentre 13°·0N. 94°·0W.

A = −·0680, B = −·9723, C = +·2235; δ = −6; h = +6;
D = −·998, E = +·070; G = −·016, H = −·223, K = −·975.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Vera Cruz	E.	6·5	342	1 41	+ 2	2 50	− 5	—	—	—
Puebla		7·2	327	i 1 55	+ 6	i 3 11	− 2	e 2 27	P_g	—
Tacubaya		8·1	323	i 2 4	+ 2	i 3 45	+10	—	—	4·1
Manzanillo		11·6	303	e 2 49	− 1	e 5 9	+ 8	—	—	—
Bogota	z.	21·4	111	i 5 9	+18	—	—	—	—	—
Tucson		24·6	324	i 5 22	− 1	e 9 43	+ 1	—	—	e 10·6
San Juan		27·4	75	e 6 24	PP	e 10 32	+ 4	—	—	e 11·9
La Jolla	z.	29·0	317	e 6 4	0	—	—	—	—	—
Palomar		29·1	319	i 6 4k	0	—	—	—	—	—
Chicago		29·2	8	e 6 40	PP	e 10 39	−19	—	—	e 11·8
Pierce Ferry		29·2	326	i 6 5	0	—	—	—	—	—
Boulder City		29·6	325	i 6 7	− 2	—	—	—	—	e 18·2
Riverside	z.	29·8	319	i 6 10k	− 1	—	—	i 9 19	P_cP	—
Cleveland		30·4	18	e 6 35	+19	e 11 49	+33	—	—	—
Mount Wilson	z.	30·4	319	i 6 16k	0	—	—	—	—	—
Pasadena		30·4	319	i 6 17	+ 1	—	—	i 9 22	P_cP	e 15·3
Huancayo		31·0	143	e 6 41	+20	e 11 58	+32	—	—	e 13·7
Haiwee	z.	31·5	322	i 6 26	0	—	—	—	—	—
Santa Barbara	z.	31·6	318	e 6 16	−10	—	—	—	—	—
Salt Lake City		31·8	334	e 6 20	− 8	e 11 47	+ 9	—	—	e 13·2
Tinemaha		32·4	322	e 6 32k	− 2	—	—	i 9 26	P_cP	—
Logan		32·6	335	—	—	e 11 40	−11	—	—	e 16·8
Fresno	z.	33·1	321	e 6 40	0	—	—	—	—	—
Berkeley		35·3	320	i 7 10	+11	i 12 31	− 2	—	—	e 18·0
Bozeman		35·6	340	e 6 56	− 5	e 12 25	−13	e 8 17	PP	e 13·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ville Marie		36·3	16	e 7 54	+47	—	—	—	—	23·7
Mineral	z.	36·5	324	i 7 5	− 4	—	—	—	—	e 22·5
Shasta Dam		37·1	324	e 7 8	− 6	—	—	i 9 38	PcP	—
La Paz		38·9	137	7 30	+ 1	13 56	+28	16 40	SS	17·9
Scoresby Sund		71·9	19	—	—	20 39	− 9	—	—	—
Clermont-Ferrand		85·7	44	—	—	e 23 19	+ 5	—	—	—
Strasbourg		88·0	40	12 52	− 1	23 32	− 4	e 32 7	SSS	48·2
Copenhagen		88·4	33	e 12 57	+ 2	23 27	[+ 4]	—	—	—
Stuttgart		88·8	40	e 13 0	+ 3	e 23 48	+ 4	—	—	e 46·2

Additional readings :—
Bogota iZ = 5m.24s.
Tucson i = 5m.33s. and 6m.2s.
La Jolla iZ = 6m.12s.
Palomar iNZ = 6m.12s.
Riverside iZ = 6m.18s., eZ = 8m.12s.
Cleveland ePZ = 6m.44s., ePEN = 6m.48s., eSE = 11m.59s., eE = 12m.37s., eN = 12m.46s.
Mount Wilson iZ = 6m.23s.
Pasadena iZ = 6m.24s., eZ = 6m.29s. and 9m.0s.
Haiwee iZ = 6m.33s.
Santa Barbara eZ = 6m.27s.
Salt Lake City e = 11m.17s.
Tinemaha iZ = 6m.39s.
Fresno eZ = 7m.59s.
Mineral iZ = 7m.20s.
Shasta Dam i = 7m.20s.
Strasbourg e = 13m.49s. and 26m.17s.
Long waves were also recorded at Ukiah, Sitka, Butte, Philadelphia, Bermuda, Alicante, Granada, Paris, De Bilt, and Istanbul.

June 2d. Readings also at 1h. (near La Paz and near Alicante), 5h. (Andijan, near Kulyab, Obi-garm, and Stalinabad), 6h. and 7h. (near Batavia), 11h. (Brisbane), 13h. (Santa Clara and Stuttgart), 14h. (near Andijan), 15h. (Stuttgart), 16h. (near Batavia and near Murgab), 17h. (Alicante and Toledo), 18h. (near Harvard), 19h. (Branner), 21h. (Bogota), 22h. (Mizusawa, Mount Wilson, Riverside, Tinemaha, Tucson, Bogota, La Paz, and near Huancayo).

June 3d. Readings at 3h. (Shasta Dam and near Mizusawa), 4h. (Grozny), 9h. (near La Paz and near Lick), 10h. (Strasbourg), 13h. (near Lick), 14h. (Bucharest, Warsaw, Stuttgart, and near Istanbul), 15h. (near Lick), 16h. (near Lick and near Murgab), 18h. (near Andijan, Kulyab, Obi-garm, and Stalinabad), 19h. (Huancayo), 22h. (Alicante), 23h. (near Batavia).

June 4d. 4h. 41m. 33s. Epicentre 43°·5N. 5°·5E.

Intensity III at Marseilles. Epicentre as adopted.

J. P. Rothé and N. Dechevoy.
La séismicite de la France de 1940 à 1950; Annales de l'Institut de Physique du Globe de Strasbourg, 3ème partie, Géophysique, Nouvelle série, tome VII, p. 50.

$A = +\cdot7244$, $B = +\cdot0697$, $C = +\cdot6859$; $\delta = +7$; $h = -3$;
$D = +\cdot096$, $E = -\cdot995$; $G = +\cdot683$, $H = +\cdot066$, $K = -\cdot728$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	
Marseilles	0·2	—	—	—	i 0 4?	P_g	i 0 8	P
Clermont-Ferrand	2·8	323	e 0 45	− 2	e 1 36	S_g	e 0 48	P
Basle	4·3	19	e 1 9	+ 1	e 2 9	S*	—	—
Zürich	4·4	28	e 1 2	− 8	e 2 7	+ 5	—	—
Strasbourg	5·3	16	e 1 37	P*	e 2 32	+ 7	i 1 47	P_g
Paris	5·7	340	—	—	e 2 42?	+ 7	—	—
Stuttgart	5·9	25	e 1 41	P*	e 3 9	S_g	e 1 59	P_g

Strasbourg also gives i = 3m.25s.

June 4d. 7h. 27m. 8s. Epicentre 32°·0N. 115°·0W.

Epicentre as suggested by Pasadena.

A = −·3591, B = −·7700, C = +·5273; δ = −10; h = +2;
D = −·906, E = +·423; G = −·223, H = −·478, K = −·850.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
La Jolla		2·1	295	i 0 34	− 3	i 1 36	S_g	—	—	—
Palomar	z.	2·1	311	i 0 33	− 4	—	—	i 0 37	P	—
Riverside		2·8	316	e 0 47	0	i 1 30	S_g	—	—	—
Mount Wilson		3·4	312	i 0 59	+ 4	i 1 47	S*	—	—	—
Pasadena		3·4	311	i 0 58	+ 3	i 1 45	S*	—	—	—
Tucson		3·5	85	i 0 54	− 3	—	—	i 1 9	P_g	i 2·0
Boulder City		4·0	2	e 1 6	+ 2	—	—	e 1 27	P_g	—
Pierce Ferry		4·2	11	e 1 9	+ 2	—	—	e 1 37	P_g	—
Haiwee		4·8	330	e 1 31	P_g	i 2 39	S_g	—	—	—
Tinemaha	z.	5·8	333	i 1 47	P*	—	—	—	—	—
Fresno		6·2	322	e 1 53	P*	i 3 20	S_g	—	—	—

June 4d. 18h. 38m. 11s. Epicentre 36°·0N. 140°·1E. Depth of focus 0·005.
(as on 1942, September 22d.).

Intensity VI at Hiraishi (Tochigi Pref.); V at Tukubasan, Kakioka, Mito, Utunomiya, Tokyo, and Yokohama; IV at Titibu and Ajiro; II-III at Onahama, Hukusima, Osima, Nagano, and Ito. Epicentre 36°·1N. 140°·1E.
Macroseismic radius 200-300km. Depth 40km.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1948, Tokyo 1950, p. 21, with macroseismic chart.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Kakioka		0·2	16	0 7a	− 4	0 15	− 4
Tukubasan		0·2	0	0 19	+ 8	0 24	+ 5
Tokyo		0·4	222	0 14a	+ 2	0 23	+ 1
Mito		0·5	38	0 11k	− 2	0 19	− 4
Kumagaya		0·6	233	0 12k	− 2	0 21	− 4
Yokohama		0·7	213	0 18a	+ 3	0 30	+ 3
Maebasi		0·9	296	0 20k	+ 2	0 33	+ 2
Onahama		1·1	35	0 25	+ 5	0 37	+ 1
Misima		1·3	227	0 24	+ 1	0 38	− 2
Osima		1·4	205	0 22k	− 2	0 39	− 4
Nagano		1·7	294	0 29	+ 1	0 50	0
Shizuoka		1·7	233	0 29	+ 1	0 50	0
Hukusima		1·8	10	0 26k	− 4	0 46	− 6
Sendai		2·3	16	0 36	− 1	0 51	−13
Aikawa		2·4	324	0 35	− 3	1 6	− 1
Nagoya		2·7	252	0 43	+ 1	1 19	+ 5
Gihu		2·8	258	0 41	− 3	1 16	− 1
Hikone		2·9	257	0 50	+ 5	1 28	+ 9
Wazima		2·9	298	0 43	− 2	1 26	+ 7
Kameyama		3·2	249	0 55	+ 6	1 40	S*
Mizusawa	E.	3·2	15	0 49	0	1 25	− 2
Morioka		3·8	12	0 56	− 2	1 51	+ 9
Owase		3·8	241	1 8	+10	1 58	+16
Osaka		4·0	252	1 13	+12	2 7	+20
Kobe		4·2	254	1 5	+ 2	2 8	+16
Toyooka		4·3	266	0 59	− 6	2 10	+16
Siomisaki		4·4	237	1 28	+22	—	—
Sumoto		4·6	251	1 13	+ 4	2 16	+14
Aomori		4·8	6	1 14	+ 2	2 23	+16
Mori		6·1	3	1 41	+11	2 58	+19
Stuttgart	z.	85·0	330	e 12 29	− 1	—	—

June 4d. Readings also at 3h. (near Kulyab, Obi-garm, Stalinabad, near Apia, and near Bogota), 8h. (Stuttgart (2)), 9h. (Piatigorsk), 10h. (near Berkeley), 12h. (near Mizusawa), 13h. (near Batavia), 14h. (near Kulyab, Stalinabad, Obi-garm, and Murgab), 15h. (near Alicante), 22h. (near Istanbul, near Obi-garm, Kulyab, Stalinabad, and Andijan (2)), 23h. (Samarkand, Andijan, near Kulyab, Stalinabad, Obi-garm, Ksara, near Strasbourg, Stuttgart, and Basle).

June 5d. Readings at 0h. (La Paz), 3h. (near Murgab, Obi-garm, Kulyab, Andijan, Samarkand, and Stalinabad), 4h. (near Lick), 5h. and 6h. (near Mizusawa), 8h. (Nanking), 14h. (near Andijan), 16h. (Stuttgart, Ville Marie, Temiskaming, and near Mizusawa), 17h. (Samarkand, near Almata (2), Frunse (2), Murgab, and Andijan (2)), 21h. (La Paz), 22h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Pierce Ferry, Shasta Dam, Tucson, and Huancayo).

June 6d. 14h. 9m. 45s. Epicentre 49°·0N. 8°·3E.

Intensity V at Karlsruhe (Baden); V at Mothern (Alsace); IV-V at Scheibenhardt and Stundwiller; IV at Lauterbourg, Salmbach, Oberseebach, etc.
Epicentre 48°58′N. 8°19′E.

J. P. Rothé and N. Dechevoy.
La séismicite de la France de 1940 à 1950; Annales de l'Institut de Physique du Globe de Strasbourg, 3ème partie, Géophysique, nouvelle série, t. VII, p. 50.

G. Fiedler.
Die Erdbebentätigkeit in Sud-West Deutschland in den Jahren 1880-1950, Diplomar-beit, Stuttgart, 1954, p. 96.

$A = +·6517$, $B = +·0951$, $C = +·7525$; $\delta = +1$; $h = -5$;
$D = +·144$, $E = -·990$; $G = +·745$, $H = +·109$, $K = -·659$.

		Δ	Az.	P.	O−C.	S.	O−C.		Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Strasbourg		0·5	220	i 0 13k	− 1	i 0 20	− 3	—	—	—
Stuttgart		0·6	109	i 0 14a	− 1	i 0 23	− 3	—	—	—
Ebingen		0·9	150	e 0 20	0	i 0 33	− 1	—	—	—
Basle		1·5	198	e 0 28k	0	e 0 52	+ 3	—	—	—
Zürich		1·6	173	e 0 29	− 1	e 0 53	+ 2	e 0 32	P_g	—
Neuchatel		2·2	204	e 0 37	− 1	e 1 11	+ 5	e 0 43	P_g	—
Chur		2·3	158	e 0 40	0	e 1 7	− 2	—	—	—
Jena	N.	2·9	47	e 0 55	+ 7	e 1 34	S_g	—	—	—
Uccle		3·1	307	—	—	e 1 27	− 2	e 1 44	S_g	—
Collmberg		3·8	51	e 1 9	P*	2 5	S_g	i 1 20	P_g	2·3
Paris		3·8	269	i 1 15	P_g	e 2 5	S_g	—	—	i 2·3
Potsdam		4·5	40	—	—	e 2 27	S_g	—	—	—
Clermont-Ferrand		4·8	229	i 1 35	P_g	i 2 39	S_g	—	—	i 2·7

Additional readings:—
Stuttgart i = 17s. and 21s.
Paris iP_g? = 1m.23s., iS_g? = 2m.13s.
Clermont-Ferrand i = 1m.45s., 1m.49s., and 2m.19s.

June 6d. Readings also at 0h. (Montezuma), 1h. (near Messina), 5h. (Istanbul), 6h. (Messina, Ksara, and near Mizusawa), 7h. (near San Juan), 8h. (Fort de France, Bermuda, Harvard, Mount Wilson, Tinemaha, Boulder City, Pierce Ferry, Tucson, and near Almata), 10h. (near La Paz), 13h. (Alicante), 14h. (near Strasbourg (4), Stuttgart (5), Ebingen, Basle (4), and Zürich (2)), 15h. (Toledo), 17h. (Boulder City, Pierce Ferry, Tucson, Palomar, Tinemaha, near Strasbourg, Stuttgart (3), Ebingen, Basle, Zürich (2), and near Messina), 20h. (near Stuttgart), 21h. (Palomar, Pasadena, Riverside, Tinemaha, Pierce Ferry, Shasta Dam, and Tucson), 22h. (Bogota, Istanbul, and Stuttgart).

June 7d. 7h. 15m. 17s. Epicentre 49°·0N. 8°·3E. (as on 6d.).

Some damage at the epicentre (10km. E.N.E. of Lauterbourg); Intensity VI at Karlsruhe (falling chimneys); IV-V in northern Alsace; III-IV in Switzerland; III at Strasbourg.
Epicentre 48°58′N. 8°20′ E. (Stuttgart). Depth 20km. Magnitude 5.
Irregular macroseismic area of between 30,000 and 40,000 sq. km.

J. P. Rothé and N. Dechevoy.
La séismicite de la France de 1940 à 1950; Annales de l'Institut de Physique du Globe de Strasbourg, 3ème partie, Géophysique, nouvelle série, t. VII, pp. 50, 51; macroseismic chart, p. 51.

G. Fiedler.
Die Erdbebentätigkeit in Sud-West Deutschland in den Jahren 1880-1950, Diplomar-beit, Stuttgart, 1954, p. 96.

Dr. E. Wanner.
Jahresbericht des Erdbebendienstes der Schweiz im Jahre 1948, Zürich, 1949, p. 3.

$A = +\cdot6517$, $B = +\cdot0951$, $C = +\cdot7525$; $\delta = +1$; $h = -5$;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Strasbourg		0·5	220	i 0 13k	− 1	i 0 24	+ 1	i 0 19	S_g	—
Stuttgart		0·6	109	i 0 14a	− 1	i 0 23	− 3	i 0 22	S_g	—
Ebingen		0·9	150	e 0 20	0	i 0 33	− 1	—	—	—
Basle		1·5	198	e 0 28k	0	e 0 51	+ 2	e 0 32	P_g	—
Zürich		1·6	173	e 0 30k	0	e 0 54	+ 3	e 0 33	P_g	—
Neuchatel		2·2	204	e 0 37	− 1	e 1 13	S_g	e 0 44	P_g	—
Chur		2·3	158	e 0 40	0	e 1 16	S_g	e 0 46	P_g	—
Jena		2·9	47	e 0 52	+ 4	e 1 20	− 4	i 1 34	S_g	—
Uccle		3·1	307	e 1 10	P_g	e 1 41	S_g	—	—	—
De Bilt		3·7	329	—	—	e 2 5	S_g	—	—	i 2·3
Salo		3·7	155	e 1 13	P_g	e 2 2	S_g	—	—	—
Collmberg	z.	3·8	51	e 1 1	0	i 1 50	+ 3	i 1 18	P_g	—
Paris		3·8	269	e 1 3	+ 2	e 1 49	+ 2	i 1 19	P_g	i 2·6
Pavia		3·9	170	e 1 22	P_g	e 2 10	S_g	—	—	—
Prague		4·1	73	e 1 13	P*	e 2 6	S*	e 2 18	S_g	—
Potsdam		4·5	40	e 1 27	P_g	i 2 30	S_g	e 1 30	P_g	2·5
Clermont-Ferrand		4·8	229	e 1 23	P*	i 2 39	S_g	i 1 33	P_g	—
Triest		5·0	130	e 1 44	P_g	i 2 23	+ 5	i 2 52	S_g	i 3·0
Padova		5·1	150	1 27	P*	i 2 24	+ 4	—	—	—
Kew		6·0	297	e 2 29	?	e 3 19	S_g	—	—	i 4·0
Raciborzu		6·5	77	—	—	i 3 32	S_g	—	—	i 3·6
Copenhagen		7·2	19	2 25	P_g	—	—	—	—	3·7
Rome		7·7	156	—	—	e 3 44	S*	—	—	e 5·8
Warsaw		8·7	63	3 24	+74	e 4 46	S_g	—	—	e 5·6
Alicante		12·4	214	e 3 0	− 1	—	—	—	—	—
Istanbul		16·6	111	e 4 43?	PPP	—	—	—	—	e 8·7

Additional readings:—
Stuttgart i = 18s.
Jena eP*EN = 55s., eE = 1m.15s.
Uccle eN = 1m.44s., iEZ = 1m.49s., iS_gE = 1m.55s., iZ = 2m.0s., iE = 2m.9s., iZ = 2m.16s., iE = 2m.22s. and 2m.39s.
Salo eZ = 2m.5s., iZ = 2m.11s.
Collmberg iPZ = 1m.8s., iSZ = 2m.4s., iS_gZ = 2m.10s.
Paris eP = 1m.9s., iP_g = 1m.13s., i = 1m.23s., iS? = 2m.5s., iS_g = 2m.9s., i = 2m.13s. and 2m.18s.
Prague eP = 1m.24s., e$P_g S_g$Z = 2m.2s., eZ = 2m.12s., i = 2m.14s.
Potsdam iS?EN = 2m.24s.
Clermont-Ferrand i = 1m.39s.
Kew iZ = 3m.31s., 3m.41s., and 3m.49s.
Warsaw eSZ = 4m.50s., eSSN = 5m.1s., eSSE = 5m.4s., eSSZ = 5m.7s.

June 7d. 15h. 5m. 25s. Epicentre 37°·2N. 118°·7W.

Epicentre as suggested by Pasadena.

$A = -·3834$, $B = -·7004$, $C = +·6020$; $\delta = -4$; $h = -1$;
$D = -·877$, $E = +·480$; $G = -·289$, $H = -·528$, $K = -·799$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Tinemaha		0·4	106	i 0 5k	− 8	i 0 11	−10	—	—
Fresno		1·0	244	i 0 20	− 1	i 0 37	+ 1	—	—
Haiwee		1·2	150	i 0 22k	− 2	i 0 39	− 2	—	—
Lick		2·3	270	i 0 41	+ 1	i 1 15	+ 6	—	—
Branner		2·8	276	i 0 47	0	i 1 20	− 2	i 0 56	P_g
Berkeley		2·9	285	i 0 48	0	i 1 27	+ 3	i 1 31	S*
Santa Barbara		2·9	197	e 0 53	P*	i 1 31	S*	—	—
Mount Wilson		3·0	170	i 0 53	+ 3	i 1 38	S_g	i 0 57	P_g
Pasadena		3·1	172	i 0 56	P*	i 1 40	S_g	—	—
Boulder City		3·3	110	i 0 56	+ 3	e 1 37	+ 2	—	—
Riverside		3·4	161	i 0 55	0	e 1 37	0	—	—
Pierce Ferry		3·9	104	e 0 50	−12	e 1 34	−16	—	—
Shasta Dam		4·5	322	e 1 11	0	e 2 17	S*	—	—
Tucson		8·1	125	e 2 0	− 2	—	—	—	—

Additional readings :—
Branner iZ = 53s., iN = 1m.24s.
Berkeley iN = 54s.

June 7d. Readings also at 0h. (Aberdeen), 2h. (near Lick), 3h. (Lick, Mineral, Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, Palomar, Pierce Ferry, Shasta Dam, and Tucson), 4h. (near Obi-garm), 6h. (near Strasbourg, Ebingen, Stuttgart (2), Basle, Zürich, and near Apia), 7h. (near Stuttgart), 8h. (Messina, near Basle, Zürich, Strasbourg, and Stuttgart), 13h. (Palomar, Riverside, Pasadena, Mount Wilson, Pierce Ferry, Shasta Dam, and Tucson), 14h. (near Lick, Branner, Berkeley, and near Messina (2)), 15h. (near Kulyab, Andijan, Stalinabad, Murgab, near Berkeley, Lick, and Branner), 17h. (Strasbourg), 20h. (La Paz, Granada, Alicante, Uccle, Ksara, Rome, and Clermont-Ferrand), 22h. (Clermont-Ferrand).

June 8d. 3h. 12m. 35s. Epicentre 31°·0S. 59°·0E.

$A = +·4423$, $B = +·7360$, $C = -·5125$; $\delta = -2$; $h = +1$;
$D = +·857$, $E = -·515$; $G = -·264$, $H = -·439$, $K = -·859$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tananarive		15·9	317	i 3 46	− 1	i 6 34	−10	3 53	PP	—
Kodaikanal	E.	44·7	26	—	—	e 14 47	− 7	—	—	—
Batavia		51·1	71	i 8 34	−32	i 16 38	+14	i 9 50	PP	—
Bombay	E.	51·4	17	e 11 1	PP	—	—	—	—	—
Helwan		66·0	334	10 48	− 2	19 39	+ 1	—	—	—
Ksara		68·1	340	i 11 8	+ 4	e 20 13?	+10	—	—	32·9
Kulyab		69·3	9	e 11 12	+ 1	i 20 17?	0	—	—	—
Stalinabad		69·8	8	e 11 13	− 1	e 20 28	+ 5	—	—	—
Obi-garm		70·1	9	e 11 21	+ 5	—	—	—	—	—
Murgab		70·4	12	11 20?	+ 2	20 26?	− 4	—	—	—
Baku		71·5	353	—	—	e 20 51	+ 8	—	—	—
Andijan		72·5	11	e 11 29	− 1	20 57	+ 3	—	—	—
Tashkent		72·6	8	e 11 34	+ 3	e 20 58?	+ 2	—	—	—
Frunse		74·9	12	e 12 5?	+21	—	—	—	—	—
Istanbul		76·9	338	11 55	− 1	21 59	+16	—	—	—
Rome		84·2	327	e 12 23	−11	e 22 57	− 2	e 16 17	PP	—
Triest		86·6	331	e 12 37	− 9	i 23 24	+ 1	—	—	—
Bologna		86·8	329	e 12 48	+ 1	—	—	—	—	—
Moscow		88·3	349	e 12 55?	0	—	—	—	—	—
Alicante		88·5	318	i 13 9	+13	23 48	+ 7	23 18	SKS	e 43·7

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Warsaw		89·3	338	(e 21 25?)	?	—	—	—	—	e 21·4
Granada		89·6	315	12 58k	− 3	i 24 2	+11	23 29	SKS	i 45·9
Zürich		90·2	329	e 13 2a	− 2	—	—	e 16 36	PP	—
Basle		90·8	329	e 13 5	− 1	—	—	—	—	—
Stuttgart		91·0	330	e 13 7	0	e 24 5	+ 2	e 16 48	PP	e 50·4
Strasbourg		91·5	329	e 13 10	0	e 24 9	+ 1	e 25 15	PS	e 45·4
Toledo		91·6	317	i 13 8	− 2	e 24 11	+ 2	e 16 53	PP	45·2
Clermont-Ferrand		91·7	325	e 13 24	+14	e 25 25	PS	—	—	44·4
Potsdam		92·2	334	—	—	e 24 14	0	—	—	e 43·4
Paris		94·1	326	e 13 22	0	—	—	—	—	—
Uccle		94·6	329	—	—	e 25 55	PS	e 31 7	SS	e 46·4
Copenhagen		95·0	336	—	—	31 31	SS	—	—	47·4
De Bilt		95·2	331	—	—	e 24 25?	−15	e 30 25?	SS	e 45·4
Vladivostok		99·5	46	e 13 44	− 2	—	—	—	—	—
Scoresby Sund		115·9	339	—	—	29 25	PS	36 13	SS	—
Ville Marie	z.	144·4	310	e 19 37	[− 1]	—	—	—	—	—
Cleveland		146·7	301	e 19 44	[+ 2]	—	—	e 59 7	Q	—
Shasta Dam		170·3	—	e 20 8	[− 1]	—	—	—	—	—
Mineral	z.	170·7	—	e 21 38	PKP_2	—	—	e 25 30	PP	—
Tucson		172·2	—	e 20 9	[− 1]	e 48 13	SSP	e 25 42	PP	—
Pierce Ferry		172·2	—	e 20 11	[0]	—	—	e 25 26	PP	—
Berkeley	z.	172·9	—	i 25 37	PP	i 32 35	{+17}	i 33 37	?	—
Boulder City		172·9	—	e 20 12	[+ 1]	—	—	e 25 43	PP	—
Tinemaha	z.	173·5	—	e 20 15	[+ 4]	—	—	—	—	—
Lick	z.	173·7	—	e 20 14	[+ 3]	—	—	e 25 35	PP	—
Haiwee	z.	174·3	—	e 20 14	[+ 3]	—	—	—	—	—
Riverside	z.	175·7	—	e 20 14	[+ 2]	—	—	e 25 36	PP	—
Pasadena	z.	176·1	—	e 20 16	[+ 4]	—	—	—	—	e 85·7
Mount Wilson	z.	176·3	—	e 20 15	[+ 3]	—	—	e 21 53	PKP_2	—

Additional readings :—
Tananarive PPP = 4m.7s., SS = 6m.52s.
Rome ePS = 24m.4s.
Alicante PS = 24m.50s., PPS = 25m.20s., SS = 29m.52s., SSS = 33m.32s., Q = 37m.32s.
Granada PS = 25m.12s., SS = 30m.4s.
Strasbourg e = 15m.15s., eSS = 30m.26s.
Toledo ePPP = 19m.8s., eSSS = 33m.26s.
Uccle eE = 34m.48s.
Riverside eZ = 20m.23s.
Long waves were also recorded at Wellington and Kew.

June 8d. 3h. 53m. 20s. Epicentre 3°·5N. 83°·0W. (as on 1945, Nov. 15d.).

A = +·1216, B = −·9908, C = +·0606 ; δ = +14 ; h = +7 ;
D = −·993, E = −·122 ; G = +·007, H = −·060, K = −·998.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota		9·0	83	e 2 13	0	i 4 26	S*	i 4 46	SS	—
Huancayo		17·2	154	e 4 6	+ 3	—	—	—	—	e 8·4
San Juan		22·2	47	e 4 57	− 3	e 9 3	+ 3	e 5 57	PP	e 10·1
La Paz		24·7	143	i 5 24	0	i 9 52	+ 8	—	—	12·9
Tucson		38·7	321	i 7 28a	+ 1	—	—	—	—	—
Ottawa		42·2	8	e 7 55	− 1	—	—	—	—	29·7
Pierce Ferry		43·2	323	i 8 6	+ 2	—	—	—	—	—
Palomar		43·4	317	i 8 6a	0	—	—	—	—	—
Boulder City		43·7	322	i 8 9	+ 1	—	—	—	—	—
Riverside	z.	44·1	317	i 8 12	0	—	—	—	—	—
Mount Wilson	z.	44·7	317	i 8 17	+ 1	—	—	—	—	—
Pasadena	z.	44·7	317	i 8 18	+ 2	—	—	—	—	—
Tinemaha	z.	46·5	321	i 8 31a	0	—	—	—	—	—
Lick	z.	48·9	319	i 8 49	− 1	—	—	—	—	—
Mineral	z.	50·5	322	i 9 2	0	—	—	i 9 8	pP	—

June 8d.10h.-11h. Undetermined shock. Tonga Islands.

Apia ePZ = 57m.21s., eZ = 61m.7s.?
Auckland P?N = 60m.28s., PPN = 61m.17s., S?N = 65m.16s., LN = 68m.8s.
Lick ePZ = 67m.48s., iZ = 67m.53s. and 67m.58s.
Mount Wilson ePZ = 67m.51s.
Pasadena ePZ = 67m.51s., eZ = 68m.0s.
Riverside eP = 67m.51s., eZ = 68m.0s.
Palomar iPZ = 67m.53s., iZ = 68m.2s.
Shasta Dam eP = 67m.58s., i = 68m.7s.
Mineral ePZ = 67m.59s., iZ = 68m.2s. and 68m.8s.
Haiwee ePZ = 67m.59s., eZ = 68m.9s.
Tinemaha ePZ = 68m.0s., eZ = 68m.10s.
Boulder City eP = 68m.8s.
Pierce Ferry eP = 68m.12s.
Tucson iP = 68m.14s., i = 68m.23s.
Vladivostok iP = 68m.23s., eS = 78m.26s.
Wellington i = 69m.0s., L = 71m.?
Arapuni eE = 70m.0s., LE = 71·1m.
Christchurch e = 70m.?
Istanbul e = 75m.
Zürich e = 75m.20s.
Stuttgart eZ = 76m.6s. and 76m.28s.
Collmberg eZ = 76m.8s.
Paris ePKP = 76m.8s., e = 76m.40s., eL = 137m.
Ksara ePKP? = 76m.15s.?, e = 80m.6s.
De Bilt eZ = 76m.20s.
Clermont-Ferrand ePKP$_2$ = 76m.27s.
Long waves were also recorded at Potsdam.

June 8d. 17h. 17m. 46s. Epicentre 37°·1N. 71°·2E. Depth of focus 0·015.
(as on 1939, June 19d.).

A = +·2577, B = +·7569, C = +·6006; δ = +3; h = −1;
D = +·947, E = −·322; G = +·194, H = +·569, K = −·800.

		Δ	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Kulyab		1·4	305	e 0 26	− 2	e 0 51	+ 3
Obi-garm		2·0	324	i 0 36	+ 2	i 1 6	+ 6
Stalinabad		2·4	307	i 0 38	− 2	i 1 11	+ 1
Murgab		2·5	60	0 34?	− 7	i 1 8?	− 4
Andijan		3·8	13	—	—	1 49	+ 6
Tashkent		4·5	341	e 1 8	0	—	—
Tchimkent		5·3	347	i 1 20	+ 2	i 2 25	+ 6
Frunse		6·3	22	i 1 34	+ 2	i 2 53	+10
Almata		7·5	34	1 50	+ 2	3 18	+ 6
Ashkabad		10·2	279	e 2 16	− 8	e 4 6	−11
Sverdlovsk		21·0	345	e 4 36	+ 1	e 8 36	+20
Stuttgart	z.	45·7	305	e 8 10	0	—	—

June 8d. Readings also at 2h. (near Strasbourg and Stuttgart), 3h. (near Branner, Lick, and Berkeley), 5h. (Stuttgart), 8h. (Christchurch, Kulyab, near Andijan, Frunse, Murgab, Obi-garm, Stalinabad, Tashkent, and Tchimkent), 9h. (near Lick), 10h. (Murgab), 12h. (Messina and Shasta Dam), 14h. (Mizusawa, Istanbul, Stuttgart, and near Alicante), 17h. (near Kulyab, Obi-garm, and Stalinabad), 18h. (near Mizusawa), 20h. (Ksara and near Tacubaya), 21h. (Wellington), 22h. (College, Sitka, Shasta Dam, and Pierce Ferry).

June 9d. Readings at 1h. (Stuttgart and Ashkabad), 2h. (Mount Wilson (2), Pasadena, Palomar (2), Tinemaha (2), Boulder City (2), Pierce Ferry (2), Shasta Dam (2), Tucson (2), and Lick), 3h. (Temiskaming, near Seven Falls, Shawinigan Falls, Ottawa, near Harvard, near Stuttgart, and Strasbourg), 5h. (Batavia), 6h. (near Murgab, Andijan, and Kulyab), 8h. (Clermont-Ferrand, Pierce Ferry, near Riverside, Palomar, and Tucson), 12h. (Stuttgart and Wellington), 13h. (Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Lick (2), Mineral, Arapuni, Auckland, Wellington, Strasbourg, and Stuttgart), 15h. (Rome and near Taranto), 16h. (near Mizusawa), 17h. (Pierce Ferry and Shasta Dam), 18h. (Ksara), 19h. (Istanbul, Ksara, Paris, Strasbourg, Stuttgart, Pierce Ferry (2), Shasta Dam, Tucson, Mount Wilson, Pasadena, Palomar, Riverside, and near Apia), 20h. (near La Paz), 21h. (Stuttgart, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Pasadena, Palomar, and Riverside), 23h. (Boulder City, Pierce Ferry, Tucson, Palomar, Riverside, near Puebla, Vera Cruz, Tacubaya, and Oaxaca).

June 10d. 18h. 36m. 0s. Epicentre 30°·2N. 70°·0E.

$A = +·2961$, $B = +·8135$, $C = +·5005$; $\delta = -4$; $h = +2$;
$D = +·940$, $E = -·342$; $G = +·171$, $H = +·470$, $K = -·866$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		7·7	359	e 1 58	+ 2	e 3 42	+17	—	—	—
Stalinabad		8·4	353	i 2 5	− 1	i 3 40	− 3	—	—	—
Obi-garm		8·5	358	e 2 49?	P_g	i 4 22?	S*	—	—	—
Murgab		8·8	21	2 12?	+ 1	—	—	—	—	—
Samarkand		9·8	346	2 25	+ 1	e 4 18	+ 1	—	—	—
Andijan		10·7	10	e 2 38?	0	e 4 33?	− 6	—	—	—
Tashkent		11·1	257	e 2 41	− 2	e 4 41	− 8	—	—	—
Bombay		11·6	167	e 5 20	SS	(e 5 20)	SS	i 6 0	Q	e 6·2
Tchimkent		12·1	259	e 2 54	− 3	e 5 4	−10	—	—	—
Ashkabad		12·3	311	e 3 1	+ 2	—	—	—	—	—
Frunse		13·2	15	e 3 10	− 1	i 5 31	− 9	—	—	—
Almata		14·2	21	e 3 27?	+ 3	e 5 49?	−15	—	—	—
Calcutta	E.	18·1	110	e 7 39	S	(e 7 39)	+ 4	—	—	—
Kodaikanal	E.	21·2	159	—	—	e 8 54	+13	—	—	—
Leninakan		23·7	304	5 31	+17	—	—	e 6 17	PPP	—
Sverdlovsk		27·4	349	5 49	0	—	—	—	—	—
Ksara		29·1	286	—	—	e 10 31?	−25	—	—	e 14·5
Moscow		34·3	327	e 6 56	+ 6	e 12 21	+ 4	—	—	—
Stuttgart		49·1	310	e 8 47	− 4	—	—	—	—	e 29·0
Clermont-Ferrand		53·5	306	—	—	e 22 8	SSS	—	—	35·0
Paris		53·5	311	e 9 21	− 3	—	—	—	—	e 33·0

Calcutta also gives iSE = 9m.37s., P_cPE = 13m.49s., S_cSE = 20m.49s.
Long waves were also recorded at Uccle, De Bilt, Upsala, Rome, Triest, and Hyderabad.

June 10d. Readings also at 1h. (near Bogota), 3h. (Pavia), 4h. (near Stuttgart, Strasbourg, and near Andijan), 8h. (Mineral and near Stuttgart (2)), 11h. (near Mizusawa, near Andijan, Tashkent, Kulyab, Obi-garm, and Frunse), 12h. (near Murgab), 14h. (La Paz (2) and near Andijan), 17h. (Branner), 20h. (Rome, Triest, and Belgrade), 21h. (near Lick).

June 11d. Readings at 0h. (near Andijan), 1h. (Samarkand, near Tashkent, Obi-garm, Frunse, and near Stuttgart), 3h. (La Paz, Bogota, and near Stuttgart), 4h. (Ksara, near Bogota, near Obi-garm, Kulyab, and Andijan), 5h. (near Lick), 6h. (Mineral and near Frunse), 8h. (Raciborzu, Pierce Ferry, near Berkeley, Branner, Fresno, Lick, and Santa Clara), 9h. (near Lick and Branner), 10h. (Berkeley and La Paz), 11h. (near Berkeley, Branner (2), and Lick (2), 14h. (near Kulyab, Murgab, Stalinabad, Andijan, and Obi-garm), 15h. (near Mizusawa), 16h. (near Branner and Lick), 18h. (near Ottawa and near Stuttgart), 20h. (near Bogota), 23h. (near Andijan).

June 12d. 7h. Undetermined shock.

Apia eP?EN = 4m.0s., eS?EN = 4m.50s.
Lick iPZ = 14m.53s.
Mount Wilson iPZ = 14m.56s., iZ = 15m.3s.
Mineral ePZ = 15m.3s.
Tinemaha ePZ = 15m.5s., iZ = 15m.11s.
Pasadena iZ = 15m.5s.
Palomar iZ = 15m.6s.
Shasta Dam eP = 15m.7s.
Haiwee eZ = 15m.10s.
Boulder City eP = 15m.14s., e = 15m.21s.
Pierce Ferry iP = 15m.19s.
Tucson eP = 15m.22s., i = 15m.28s.
Stuttgart eP?Z = 23m.6s., eL? = 30m.
Long waves were also recorded at Auckland, Arapuni, and Wellington.

June 12d. Readings also at 0h. (Shasta Dam, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Riverview, and Tamanrasset), 1h. (Riverview), 8h. (Stuttgart), 10h. (Boulder City, Pierce Ferry, Tucson, Tinemaha, La Paz, and Stuttgart), 11h. (Stuttgart, Pierce Ferry, and Boulder City), 18h. (Apia), 19h. (Apia and near Tacubaya), 21h. (near San Francisco, Berkeley, Branner, Lick, near Kulyab, and near Mizusawa), 22h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Pierce Ferry, Tucson, Shasta Dam, Lick, Batavia, near Obi-garm, Kulyab, Stalinabad, and Andijan; more than one shock), 23h. (Ksara, Pavia, and near Mizusawa).

June 13d. 6h. 33m. 31s. Epicentre 43°·5N. 12°·2E.

Destructive at San Sepulcro (Arezzo), (1 killed, 4 injured); intensity V-VI at Mercatello, Piandimelito (Pesaro), Citerna (Perugia), Chiusi della Verna, Badia Tedalda, Pieve S. Stefano (Arezzo). Followed by numerous aftershocks. Epicentre 43°31′N. 12°8′E.

Bulletins séismiques mensuels de Triest et de l'Instituto Nazionale di Geofisica, Roma.

$A = +\cdot7113$, $B = +\cdot1538$, $C = +\cdot6859$; $\delta = +6$; $h = -2$;
$D = +\cdot211$, $E = -\cdot977$; $G = +\cdot670$, $H = +\cdot145$, $K = -\cdot728$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Florence		0·6	294	e 0 14 a	− 1	i 0 24	− 2	i 0 19	P	—
Padova		1·0	348	0 37	S	(0 37)	+ 1	—	—	—
Bologna		1·2	329	e 0 22 a	− 2	i 0 45	+ 4	e 0 28	P_g	—
Rome		1·6	172	e 0 30	0	i 0 54	+ 3	—	—	—
Salo		2·4	331	0 46 a	+ 5	i 1 13	+ 1	i 1 18	S_g	i 1·6
Triest		2·4	27	e 0 40 k	− 1	i 1 12	0	—	—	—
Pavia		2·8	309	e 0 52	P*	e 1 22	0	e 1 38	S_g	e 1·7
Chur		3·8	332	e 1 2	+ 1	e 1 46	− 1	—	—	—
Neuchatel		5·1	316	e 1 17	− 3	e 2 13	− 7	—	—	—
Stuttgart		5·6	340	e 1 25	− 2	e 2 32	− 1	e 1 56	P_g	—
Messina		5·9	153	—	—	e 3 2	S*	—	—	—
Strasbourg		5·9	330	e 1 30	− 1	e 2 48	+ 8	e 2 0	P_g	—
Belgrade		6·1	74	e 2 6	P_g	e 3 19	S_g	—	—	e 3·8
Budapest		6·3	48	e 2 7	P_g	e 3 19	S*	—	—	4·0
Cheb		6·6	1	e 2 25	P_g	i 3 42	S_g	—	—	e 4·2
Prague		6·7	12	e 2 37	?	e 3 7	+ 7	e 3 40	S_g	e 4·3
Clermont-Ferrand		6·8	292	e 1 49	+ 5	e 3 6	+ 3	—	—	i 4·6
Jena	N.	7·4	357	e 1 51	− 1	e 3 20	+ 2	e 2 12	P*	—
Raciborzu		7·7	30	e 2 51	+55	e 4 55	?	—	—	e 5·1
Collmberg	Z.	7·8	4	e 1 51	− 7	i 3 37	+ 9	i 4 24	S_g	—
Paris		8·6	312	e 2 6	− 3	e 3 42	− 6	i 4 38	S_g	e 5·5
Potsdam	N.	8·9	3	—	—	e 3 53?	− 2	e 5 0	S_g	—
Uccle		9·0	327	e 2 44	P*	e 4 56	S_g	—	—	e 5·3
Tortosa		9·1	257	e 3 51	S	(e 3 51)	− 9	5 0	S_g	5·6
De Bilt		9·8	334	—	—	e 4 39	S*	—	—	e 5·3
Warsaw		10·5	31	e 4 44	S	(e 4 44)	+ 9	e 4 50	SS	e 7·0
Alicante		10·9	246	e 1 37	−63	e 4 40	− 4	—	—	e 5·7
Kew		11·6	318	—	—	e 5 16	SS	—	—	e 6·8
Copenhagen		12·2	1	—	—	6 11	SSS	—	—	—
Granada		13·6	248	3 18 k	+ 1	6 15	SS	3 30	PP	i 7·8
Moscow		20·4	44	e 4 40	− 1	e 8 23	− 2	—	—	—
Helwan		20·5	125	e 4 47	+ 5	—	—	e 5 12	PPP	—
Ksara		20·8	110	e 4 45	0	—	—	—	—	e 10·0
Tamanrasset		21·4	197	e 5 1	+10	—	—	i 5 15	PP	—

Additional readings :—
Padova $P_g = 39$s., e = 43s., S = 59s., $S_g = 1$m.4s.
Rome iP = 37s., $iP_g = 40$s., $iS_g = 1$m.3s.
Salo PZ = 52s., $P_g = 55$s., e = 1m.10s., iS = 1m.15s., iS_gEN = 1m.29s.
Pavia e = 1m.9s.
Stuttgart eZ = 1m.33s., $eP_g = 1$m.47s., eS = 2m.40s., e = 2m.52s., $eS_g = 3$m.9s.
Strasbourg i = 2m.10s., e = 2m.22s., eS = 3m.5s., $eS_g = 3$m.23s.
Belgrade $eP_g = 2$m.29s.
Budapest eE = 2m.29s.
Cheb e = 2m.40s. and 3m.28s., iS = 3m.30s.
Prague e = 2m.50s., e = 4m.11s.
Clermont-Ferrand eP = 2m.8s., iS_g? = 4m.2s.
Jena eN = 2m.56s.
Collmberg iZ = 3m.54s. and 4m.8s.
Paris PP = 2m.21s., eS = 4m.28s. and 4m.34s.
Tortosa S_gE = 4m.54s.
Warsaw eZ = 5m.3s., eE = 5m.8s., eN = 5m.16s., eZ = 5m.23s., eN = 5m.30s., eSE = 6m.16s., eSN = 6m.20s.
Long waves were also recorded at Lisbon, Upsala, and Istanbul.

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained thanks to funding provided by the US National Science Foundation through grant EAR-9725140 (Villaseñor et al., 1997) and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

June 13d. 7h. 56m. 30s. Epicentre 43°·5N. 12°·2E. (as at 6h.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Florence		0·6	294	e 0 15	0	0 25	− 1	—	—	—
Padova		1·0	348	0 39	S	(0 39)	+ 3	e 0 58	?	1·1
Bologna	N.	1·2	329	e 0 24	0	i 0 44	+ 3	e 0 29	P_g	—
Rome		1·6	172	e 0 32	+ 2	i 0 58	+ 7	i 0 40	P_g	i 1·1
Salo		2·4	331	e 0 50	P_g	e 1 12	0	e 1 30	S_g	—
Triest		2·4	27	e 0 42	+ 1	e 1 12	0	i 0 48	P_g	—
Pavia		2·8	309	e 0 52?	P*	—	—	—	—	—
Chur		3·8	332	e 1 2	+ 1	e 1 45	− 2	—	—	—
Zürich		4·7	328	e 1 11	− 3	—	—	—	—	—
Neuchatel		5·1	316	e 1 17	− 3	—	—	—	—	—
Stuttgart		5·6	340	e 1 24	− 3	e 2 28	− 5	—	—	e 3·3
Strasbourg		5·9	330	e 1 30	− 1	e 2 48	+ 8	e 2 3	P_g	i 3·1
Prague		6·7	12	—	—	e 3 38	S_g	—	—	—
Clermont-Ferrand		6·8	292	—	—	e 3 3	0	—	—	i 4·6
Jena	N.	7·4	357	e 1 48	− 4	e 4 3	S_g	e 2 55	?	—

Triest also gives iS_g = 1m.20s.
Long waves were also recorded at Tortosa.

June 13d. Readings also at 1h. (near Obi-garm), 3h. (near Lick), 4h. (near Tacubaya and near Stalinabad), 6h. (Bologna), 7h. (near Kulyab (2)), 8h. (Almata, Samarkand, Stalinabad, near Andijan, Frunse, and Tashkent), 9h. (Klyuchi, near Fresno, and Lick), 10h. (near Mineral), 11h. (Strasbourg, Stuttgart, near Rome, Florence, Pavia, Bologna, and Triest), 12h. (Stuttgart, near Rome, Florence, Bologna, and Triest), 13h. (near Florence), 14h. (Istanbul), 17h. (Stuttgart, near Bologna, Florence, Rome, Triest, and near Kulyab), 19h. (Mount Wilson, Riverside, Tinemaha, Pierce Ferry, Shasta Dam, and Tucson), 20h. (Tchimkent, Frunse, Almata, near Kulyab, Obi-garm, Murgab, Samarkand, Andijan, and Tashkent), 22h. (Boulder City, near Andijan, and Tchimkent), 23h. (near Obi-garm).

June 14d. 9h. 18m. 51s. Epicentre 8°·5S. 74°·0W. Depth of focus 0·020.
(as on 1947, Oct. 17d.).

A = +·2727, B = −·9509, C = −·1468; δ = +13; h = +7;
D = −·961, E = −·276; G = −·040, H = +·141, K = −·989.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Huancayo		3·8	201	i 0 58	− 1	e 1 27	−17	—	—	e 1·6
La Paz		9·8	145	i 2 21	+ 3	i 4 9	+ 3	—	—	5·0
Bogota	z.	13·0	0	e 3 6	+ 6	i 5 46	+25	i 3 41	pP	—
Tucson		53·6	321	i 9 7k	0	—	—	i 9 45	pP	—
Palomar	z.	58·2	318	i 9 39	− 1	—	—	e 10 14	pP	—
Pierce Ferry		58·2	322	e 9 40	0	—	—	—	—	—
Boulder City		58·6	322	i 9 41	− 1	—	—	—	—	—
Riverside	z.	59·0	318	i 9 44	− 1	—	—	e 10 22	pP	—
Mount Wilson	z.	59·5	318	i 9 49	+ 1	—	—	i 10 26	pP	—
Pasadena	z.	59·6	318	e 9 50	+ 1	—	—	—	—	—
Tinemaha	z.	61·4	321	i 10 2k	+ 1	—	—	i 10 35	pP	—
Lick	z.	63·7	319	i 10 17	0	—	—	—	—	—
Mineral	z.	65·5	321	i 10 27	− 1	—	—	—	—	—
Shasta Dam		66·2	322	i 10 31	− 2	—	—	e 10 57	pP	—

Additional readings :—
Bogota is$S_?$Z = 6m.44s.
Tucson i = 10m.4s., e = 10m.49s.
Palomar e = 10m.31s.
Mount Wilson iZ = 10m.39s.
Lick iZ = 10m.21s.
Mineral iZ = 10m.39s.

June 14d. 9h. 56m. 41s. Epicentre 5°·0S. 144°·5E. (as on 1947, March 2d.).

$A = -·8110$, $B = +·5785$, $C = -·0866$; $\delta = -12$; $h = +7$;
$D = +·581$, $E = +·814$; $G = +·071$, $H = -·050$, $K = -·996$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Riverview		29·4	168	i 6 8k	+ 1	i 10 59	− 2	i 16 40	S_cS	e 14·5
Batavia		37·5	267	i 8 54	PP	i 17 44	S_cS	i 10 23	?	—
Mizusawa	E.	44·0	357	e 8 14	+ 3	8 36	?	—	—	—
Vladivostok		49·2	347	i 8 52?	0	i 16 32?	+34	—	—	—
Kulyab		81·1	310	i 12 22	+ 4	—	—	—	—	—
Tashkent		82·3	313	i 12 22	− 3	e 22 59	+19	i 15 36	PP	—
Sverdlovsk		90·8	327	13 6	0	e 23 32?	[− 6]	e 23 59	SKKS	—
Berkeley	E.	95·6	53	—	—	e 23 53	[−11]	e 43 37	Q	e 46·3
Shasta Dam		95·6	49	e 13 27	− 1	—	—	e 17 40	PP	—
Lick	z.	96·1	53	i 13 25	− 6	—	—	—	—	—
Mineral	z.	96·2	49	e 13 30	− 1	—	—	e 17 58	PP	—
Pasadena	z.	98·8	56	i 13 43	0	—	—	—	—	—
Tinemaha	z.	98·8	53	e 13 42	− 1	—	—	e 17 42	PP	—
Mount Wilson	z.	98·9	56	e 13 43	0	—	—	—	—	—
Riverside	z.	99·5	56	e 13 44	− 2	—	—	e 17 16	PP	—
Pierce Ferry		102·2	54	e 13 56	− 2	—	—	e 17 31	PP	—
Moscow		103·6	327	e 18 43	PP	—	—	—	—	—
Tucson		105·1	58	e 17 54	PKP	—	—	e 18 30	PP	—
Ksara		108·2	303	e 19 1	PP	e 28 41	PS	—	—	—
Istanbul		112·3	313	e 18 19?	[−19]	—	—	—	—	—
Stuttgart	z.	122·2	327	e 18 58	[+ 1]	—	—	—	—	—
Paris		125·7	330	19 6	[+ 2]	—	—	—	—	—
Tamanrasset		136·6	298	—	—	32 48	PS	e 39 28	SS	—

Additional readings and note :—
Riverview iNZ =11m.2s., iN =11m.39s. and 13m.3s., iE =13m.38s.
Mizusawa readings are given as for a local shock.
Tashkent ePS =24m.0s.
Shasta Dam e =13m.50s.
Lick iZ =13m.52s.
Mineral eZ =13m.52s.
Pasadena iZ =14m.15s.
Tinemaha e =14m.7s.
Mount Wilson iZ =14m.5s.
Riverside eZ =14m.7s.
Pierce Ferry e =18m.41s.
Tucson e =20m.1s.
Stuttgart eZ =19m.21s.
Long waves were also recorded at De Bilt.

June 14d. 10h. 54m. 45s. Epicentre 37°·4N. 137°·9E. Depth of focus 0·005.

Intensity V at Takada, Wazima, Toyama, and Husiki; IV at Nagano, Aikawa, and Niigata. Seismo. Bull. Cent. Met. Obs., Japan, for the year 1948, Tokyo 1950, p. 22, with macroseimic chart. Epicentre as adopted. Macroseismic area 200-300km., shallow.

$A = -·5909$, $B = +·5339$, $C = +·6048$; $\delta = 0$; $h = -1$;
$D = +·670$, $E = +·742$; $G = -·449$, $H = +·405$, $K = -·796$.

	△	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Aikawa	0·7	24	0 10k	− 5	0 19	− 8
Nagano	0·8	162	0 7	−10	0 21	− 8
Wazima	0·8	269	0 12k	− 5	0 23	− 6
Toyama	0·9	218	0 13a	− 5	0 26	− 5
Kameyama	1·7	136	0 26	− 2	0 49	− 1
Utunomiya	1·8	118	0 26	− 4	0 50	− 2
Hunatu	2·0	160	0 25	− 7	0 57	0
Hukusima	2·1	80	0 30	− 4	0 56	− 3
Tukubasan	2·1	124	0 33	− 1	1 1	+ 2
Kakioka	2·2	123	0 31	− 4	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.
		°	°	m. s.	s.	m. s.	s.
Mito		2·3	116	0 34	− 3	1 10	+ 6
Nagoya		2·3	199	0 42	+ 5	1 12	+ 8
Tokyo		2·3	139	0 38	+ 1	1 7	+ 3
Misima		2·4	160	0 43k	+ 5	1 8	+ 1
Onahama		2·4	101	0 43	+ 5	1 10	+ 3
Yokohama		2·4	144	0 35	− 3	1 15	+ 8
Hikone		2·5	212	0 45	+ 6	1 23	+14
Sendai		2·5	70	0 37	− 2	1 13	+ 4
Kameyama		2·8	204	0 54	+10	1 27	+10
Omaesaki		2·8	175	0 43	− 1	1 18	+ 1
Mera		2·9	148	0 59	+14	1 39	+20
Kyoto		3·0	216	0 55	+ 8	1 47	+25
Mizusawa		3·1	56	0 50	+ 2	1 34	+10
Toyooka		3·1	233	0 51	+ 3	1 31	+ 7
Sumoto		3·9	220	1 13	+14	—	—
Aomori		4·1	32	1 7	+ 5	1 44	− 5
Siomisaki		4·3	205	2 14	S	(2 14)	+20
Shasta Dam		73·1	51	e 11 25	0	—	—
Mineral	z.	73·8	51	i 11 28	− 1	—	—
Tinemaha	z.	77·8	53	i 11 53	+ 1	—	—
Boulder City		80·7	50	e 12 2	− 6	—	—
Pierce Ferry		81·1	50	e 12 12	+ 2	—	—
Stuttgart	z.	82·9	328	e 12 19	0	—	—
Tucson		85·6	52	e 12 34	+ 1	—	—

June 14d. Readings also at 1h. (Stuttgart), 5h. (near Mineral), 7h. (Ksara and near Istanbul), 8h. (Stuttgart), 9h. (De Bilt and Paris), 11h. (Paris), 12h. (Christchurch, Stuttgart, Pierce Ferry, Shasta Dam, near Branner, Lick, and near Tchimkent), 15h. (Brisbane and near Apia), 16h. (Ville Marie and near Ottawa), 21h. (Copenhagen).

June 15d. 11h. 44m. 42s. Epicentre 33°·7N. 135°·8E. (as on 1947, April 11d.).

Intensity VII-VIII at Kawakami (Nara pref.), Udono, Kashiwazaki (Mie pref.), and Togasago (Hyogo pref.); VI at Kobe, Owase, Irako, Osaka, and Sumoto; V at Kôti, Tsuruga, Matsue, and Husiki; IV at Maebasi and Onahama; II-III at Takayama, Saigo, Ito, etc. Macroseismic radius greater than 300km. Slight damage in Nara prefecture and in the epicentral region of Wakayama. In the region of Nishimure (Wakayama pref.) there was much damage: 256 houses destroyed, landslides, and destruction of roads and railways.

Epicentre 33°·8N. 135°·5E. Very shallow.

The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year, 1948 (Tokyo, 1950), pp. 22-23, with macroseismic chart.

$A = -\cdot5977$, $B = +\cdot5812$, $C = +\cdot5523$; $\delta = +7$; $h = +1$;
$D = +\cdot697$, $E = +\cdot717$; $G = -\cdot396$, $H = +\cdot385$, $K = -\cdot834$.

	△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Siomisaki	0·3	186	0 2	− 9	0 9	− 9	—	—	—
Owase	0·5	36	0 16a	+ 2	0 26	+ 3	—	—	—
Osaka	1·0	344	0 20a	− 1	0 33	− 3	—	—	—
Sumoto	1·0	310	0 20	− 1	0 30	− 6	—	—	—
Kameyama	1·3	26	0 26a	+ 1	0 49	+ 5	—	—	—
Kyoto	1·3	357	0 24a	− 1	0 41	− 3	—	—	—
Muroto	1·4	252	0 23a	− 4	0 40	− 6	—	—	—
Nagoya	1·8	33	0 33a	+ 1	0 59	+ 3	—	—	—
Gihu	1·9	24	0 42a	P_g	1 8	S_g	—	—	—
Hikone	1·9	13	0 21a	−13	0 44	−15	—	—	—
Kôti	1·9	268	0 31k	− 3	0 49	−10	—	—	—
Toyooka	2·0	336	0 34a	− 1	1 0	− 2	—	—	—
Omaesaki	2·2	66	0 51k	P_g	1 29	S_g	—	—	—
Matuyama	2·5	273	0 27	−16	0 51	−23	—	—	—
Shizuoka	2·5	57	0 46	+ 3	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Simidu		2·6	249	0 55	P_g	1 26	S_g	—	—	—
Hirosima		2·9	283	0 50a	+ 2	1 20	− 4	—	—	—
Hunatu		3·0	53	1 1k	P_g	1 48	S_g	—	—	—
Misima		3·0	61	1 6k	P_g	1 49	S_g	—	—	—
Osima		3·1	69	0 57	P*	1 35	S*	—	—	—
Toyama		3·2	21	0 54a	+ 2	1 40	S*	—	—	—
Hamada		3·3	298	0 52a	− 1	1 30	− 5	—	—	—
Mera		3·5	69	1 4	P*	1 55	S_g	—	—	—
Nagano		3·6	33	1 0a	+ 2	2 0	S_g	—	—	—
Yokohama		3·6	61	1 8	P_g	2 5	S_g	—	—	—
Kumagaya		3·8	48	1 3	+ 2	1 50	+ 3	—	—	—
Maebasi		3·8	43	0 18?	−43	—	—	—	—	—
Tokyo		3·8	58	1 7a	P*	2 2	S_g	—	—	—
Wazima		3·8	13	1 2	+ 1	2 5	S_g	—	—	—
Izuka		4·2	271	1 9k	+ 2	1 54	− 3	—	—	—
Tukubasan		4·3	53	0 47	−21	—	—	—	—	—
Kakioka		4·4	53	1 18?	+ 8	2 18?	+16	—	—	—
Kumamoto		4·4	260	1 9a	− 1	2 17	S*	—	—	—
Utunomiya		4·4	48	1 18?k	+ 8	2 25?	S_g	—	—	—
Hukuoka		4·5	272	1 12a	+ 1	2 13	S*	—	—	—
Mito		4·7	54	1 18	+ 4	2 29	S*	—	—	—
Aikawa		4·8	24	1 15a	0	2 10	− 2	—	—	—
Unzendake		4·8	260	1 11	− 4	2 20	+ 8	—	—	—
Kagosima		4·9	246	1 20k	+ 3	2 18	+ 3	—	—	—
Mizusawa	E.	6·9	37	1 50	+ 5	3 13	+ 8	—	—	—
Miyako		7·7	39	0 50a	−66	1 37	?	—	—	—
Vladivostok		9·9	343	i 2 23	− 2	i 4 24	+ 4	—	—	—
Nanking		14·4	268	3 26	− 1	6 30	SS	—	—	e 7·6
Klyuchi		28·4	30	e 20 8	?	—	—	e 21 26	?	—
Irkutsk		29·2	320	6 4	− 1	i 10 53	− 5	—	—	—
Calcutta	E.	43·0	268	e 8 1	− 2	i 14 31	+ 2	e 9 31	PP	20·8
Semipalatinsk		43·4	311	e 8 22	+16	—	—	—	—	—
Almata		46·2	301	i 8 29	+ 1	15 9	− 6	—	—	—
Frunse		48·0	300	e 8 42	− 1	e 15 38	− 3	—	—	—
Batavia		48·2	221	i 8 44	0	e 15 20	−23	i 18 21	S_eS	30·3
Dehra Dun	N.	48·5	283	e 13 13	?	e 16 42	+54	—	—	22·6
Murgab		49·4	295	8 51	− 2	15 54	− 6	—	—	—
Andijan		50·0	298	e 8 57	− 1	e 16 7?	− 2	—	—	—
Tchimkent		51·7	301	i 8 22	−49	—	—	—	—	—
Tashkent		52·2	300	i 9 14	− 1	i 16 31	− 8	—	—	—
Kulyab		52·7	295	i 9 18	0	i 16 42	− 4	—	—	—
Stalinabad		53·3	297	i 9 22	− 1	i 16 44	−10	—	—	—
Hyderabad	N.	53·6	268	9 28	+ 3	16 47	−11	19 5	S_eS	25·3
College		54·3	31	e 9 31	+ 1	e 17 3	− 4	e 19 20	S_eS	e 24·6
Samarkand		54·3	298	e 9 32	+ 2	e 17 4?	− 3	—	—	—
Sverdlovsk		54·6	320	9 32	0	17 6	− 5	—	—	—
Bombay		57·6	273	i 9 54	0	e 17 46	− 5	i 12 4	PP	26·7
Colombo	E.	58·0	256	18 7	S	(18 7)	+10	—	—	29·1
Kodaikanal	E.	58·1	262	i 9 55	− 3	i 18 2	+ 4	18 6	PS	27·9
Honolulu		59·3	83	e 10 3	− 3	e 18 31	PPS	—	—	e 24·8
Ashkabad		61·3	299	e 10 17	− 3	18 35	− 4	—	—	—
Sitka		61·7	39	e 10 11	−11	i 18 47	+ 3	e 20 10	S_eS	e 25·8
Brisbane	N.	63·0	163	i 10 36	+ 5	i 19 0	− 1	i 12 46	PP	i 30·2
Baku		66·3	305	10 54	+ 2	e 19 39?	− 3	—	—	—
Moscow		67·1	323	i 10 56	− 1	i 19 43	− 8	—	—	—
Riverview		68·7	167	i 11 2k	− 5	i 20 13	+ 3	i 11 29	P_eP	e 31·8
Erevan		70·1	306	e 11 19	+ 3	e 20 25	− 2	—	—	—
Leninakan		70·3	307	e 11 25	+ 8	—	—	—	—	—
Helsinki		70·7	332	e 11 19	− 1	e 20 25	− 9	—	—	e 38·3
Sotchi		71·6	311	e 11 24	− 1	e 20 36	− 8	—	—	—
Victoria		72·0	44	11 31	+ 3	20 53	+ 4	e 21 45	PPS	32·3
Theodosia		73·6	313	e 11 35	− 2	e 20 57	−10	—	—	—
Upsala		73·9	333	11 44a	+ 5	21 1	− 9	e 29 18?	SSS	e 32·3
Simferopol		74·4	314	11 40	− 2	—	—	—	—	—
Grand Coulee		74·8	43	e 11 44	0	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Scoresby Sund		74·9	353	11 44	0	21 18	− 4	21 50	PS	—
Shasta Dam		76·8	50	i 11 54	− 1	e 21 42	0	e 12 4	PcP	—
Ukiah		77·1	52	e 12 0	+ 3	e 21 49	+ 3	e 26 54	SS	e 31·2
Warsaw		77·3	326	e 11 58a	0	e 21 42	− 6	12 8	PcP	e 35·3
Mineral	z.	77·5	50	i 11 59	0	e 22 8	+18	i 12 9	PcP	—
Berkeley		78·4	53	i 12 4	0	i 22 4	+ 4	i 15 7	PP	e 32·0
Saskatoon		78·6	35	12 9	+ 4	22 2	0	27 18	SS	35·3
Branner		78·7	53	i 12 5	− 1	—	—	e 12 19	PcP	—
Copenhagen		78·7	332	e 12 4k	− 2	21 58	− 5	15 1	PP	—
Santa Clara		78·9	53	e 12 6	− 1	e 22 7	+ 2	—	—	—
Auckland	N.	79·1	149	—	—	22 18	+11	22 42	PS	40·3
Lick	z.	79·1	53	i 12 8	0	—	—	i 12 15	PcP	—
Ksara		79·3	304	i 12 9	0	22 48	PS	—	—	—
Bucharest		79·4	318	e 12 8	− 1	e 22 5	− 5	—	—	33·3
Butte	N.	79·5	41	e 12 8	− 2	e 22 7	− 4	e 27 20	SS	e 33·9
Istanbul		79·6	313	12 7	− 3	22 4	− 8	—	—	—
Arapuni	E.	80·4	149	—	—	21 48	−33	—	—	—
Bozeman		80·6	41	e 12 18	+ 2	i 22 23	0	e 12 27	PcP	e 35·5
Fresno	z.	80·7	53	e 12 16	0	—	—	i 12 29	PcP	—
Potsdam		80·8	330	e 12 25	PcP	e 22 20	− 5	e 16 45	PPP	e 42·3
Reykjavik		80·9	351	—	—	e 22 18	− 8	—	—	47·2
Budapest	E.	81·3	323	e 12 21	+ 1	22 27	− 3	i 12 29	PcP	43·3
	N.	81·3	323	12 33	+13	22 30	0	—	—	42·8
Tinemaha		81·5	51	e 12 22	+ 1	e 22 35	+ 3	i 12 34	pP	—
Collmberg		81·6	328	i 12 14	− 7	e 22 20	−13	e 15 23	PP	e 33·5
Tuai	N.	81·7	149	12 26	+ 4	—	—	—	—	—
Prague		81·8	327	e 12 21a	− 1	22 28	− 7	e 12 31	PcP	e 37·3
Kalossa	N.	82·0	322	e 12 37	PcP	—	—	—	—	e 48·8
Santa Barbara	z.	82·0	54	e 12 27	+ 4	—	—	i 12 37	pP	—
Haiwee		82·2	52	i 12 26	+ 2	e 22 41	+ 2	i 12 35	pP	—
Belgrade		82·3	319	e 12 25	0	e 22 35	− 5	e 15 38	PP	42·3
Jena		82·5	327	e 12 24	− 2	e 22 36	− 6	—	—	e 41·8
Cheb		82·7	327	e 12 29	+ 2	e 22 39	− 5	e 28 18	SS	e 38·3
Aberdeen		82·8	339	i 11 56	−31	i 22 39	− 6	e 28 41	SS	e 42·9
Wellington		82·8	152	—	—	22 47	+ 2	41 18	Q	44·3
Salt Lake City		83·2	46	e 12 29	0	e 22 47	− 2	e 23 33	PS	e 34·9
Pasadena		83·2	54	i 12 29k	0	i 22 48	− 1	i 12 40	pP	i 38·8
Mount Wilson		83·3	54	i 12 30	0	—	—	i 12 43	pP	—
Riverside		83·9	54	i 12 33	0	—	—	i 12 44	pP	—
Edinburgh		84·1	338	e 12 34	0	22 51	− 7	—	—	—
Boulder City		84·3	51	i 12 35	0	—	—	i 16 4	PP	—
De Bilt		84·3	332	e 12 33	− 2	i 22 53	− 7	i 12 42a	PcP	e 40·3
Durham		84·6	337	i 12 45	+ 9	23 4	+ 1	23 52	PS	—
La Jolla	z.	84·6	55	e 12 39	+ 3	—	—	i 12 50	pP	—
Palomar		84·6	53	i 12 36	0	e 23 3	0	i 12 48	pP	—
Helwan		84·7	302	i 12 35a	− 2	22 54	−10	15 48	PP	—
Pierce Ferry		84·8	50	i 12 38	+ 1	—	—	i 15 46	PP	—
Stuttgart		85·1	328	e 12 37k	− 2	e 22 56	[− 5]	e 12 46k	PcP	e 44·3
Triest		85·2	323	e 12 38?	− 1	i 23 15	+ 6	e 15 50	PP	—
Ivigtut		85·4	2	e 12 38	− 2	e 23 10	− 1	i 12 47	PcP	—
Uccle		85·6	332	e 12 39k	− 2	e 23 0	[− 5]	i 24 2	PS	e 44·3
Strasbourg		85·9	328	i 12 42k	− 1	i 23 12	− 4	i 24 9	PS	44·8
Chur		86·4	326	e 12 44	− 1	e 23 3	[− 7]	—	—	e 45·6
Zürich		86·4	328	e 12 44	− 1	e 23 5	[− 5]	e 16 35	PP	—
Basle		86·7	328	e 12 44k	− 3	e 23 20	− 4	—	—	—
Kew		86·8	334	i 12 48	+ 1	e 23 8	[− 5]	e 24 9	PS	e 40·3
Salo		86·8	325	e 12 44	− 3	i 23 19	− 6	e 23 7	SKS	—
Taranto		86·9	318	e 12 52	+ 4	i 23 28	+ 2	—	—	36·1
Padova		87·0	324	e 12 41	− 7	23 20	− 7	23 4	SKS	—
Bologna		87·2	324	i 12 51a	+ 2	e 23 26	− 2	16 22	PP	e 46·5
Neuchatel		87·4	328	e 12 48	− 2	e 23 24	− 6	—	—	—

Continued on next page.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Florence	87·8	323	e 12 55	+ 3	e 23 30	− 4	—	—	—
Pavia	87·8	326	e 12 56	+ 4	—	—	—	—	—
Paris	87·9	332	e 12 51	− 2	e 23 28	− 7	e 16 18	PP	e 46·3
Rome	88·5	322	12 52k	− 4	i 23 17	[− 7]	i 29 26	SS	—
Tucson	89·2	51	i 13 0	+ 1	e 24 2	+15	i 16 30	PP	e 40·0
Jersey	89·4	335	—	—	e 23 46	− 3	e 30 10	SS	50·3
Messina	89·5	318	e 12 58	− 2	e 23 43	− 7	—	—	—
Clermont-Ferrand	90·1	329	i 13 4	+ 1	i 23 55	0	i 16 49	PP	e 40·3
Ville Marie	93·4	23	e 13 32	+14	—	—	—	—	—
Barcelona	94·0	327	—	—	e 24 52	+22	—	—	e 47·8
Chicago	94·9	32	e 17 28	PP	e 24 34	− 3	e 25 50	PS	e 38·1
Tortosa	95·2	327	e 13 32	+ 5	24 18	{− 1}	17 29	PP	e 46·3
St. Louis	96·3	35	e 13 33	+ 1	e 24 10	[+ 2]	e 17 33	PP	—
Ottawa	96·3	21	13 30	− 2	24 4	[− 4]	26 8	PS	43·3
Alicante	97·6	327	e 13 40	+ 2	e 24 36	{− 1}	17 44	PP	e 45·7
Cleveland	97·7	28	e 13 49	+11	e 25 0	− 1	e 24 9	SKS	42·8
Vermont	97·8	21	e 13 34	− 4	e 25 11	+ 9	e 27 24	PPS	e 48·8
Toledo	97·9	329	e 13 36	− 3	e 24 44	{+ 5}	i 17 40	PP	46·9
Granada	100·0	328	14 17k	+29	i 24 24	[− 3]	26 31	PS	i 52·6
Halifax	100·1	13	—	—	e 24 24	[− 3]	—	—	51·3
Harvard	100·1	20	i 13 54	+ 5	e 26 46	PS	i 17 55	PP	e 53·3
Fordham	100·9	22	e 14 1	+ 9	i 24 30	[− 1]	e 18 3	PP	—
Lisbon	100·9	332	17 57?	PP	25 18	−10	33 6	SSP	51·3
Philadelphia	101·3	24	e 18 19	PP	i 24 29	[− 4]	e 20 19	PPP	e 48·8
Tamanrasset	106·5	312	17 48	?	—	—	e 18 27	PKP	—
Bermuda	111·5	18	e 19 32	PP	e 29 49	PS	e 30 36	PPS	e 46·4
Bogota	132·6	41	e 19 34	[+17]	e 22 53	PKS	—	—	—
Huancayo	144·3	59	i 19 39	[+ 1]	e 26 29	[−17]	e 22 58	PP	e 60·2
La Paz	152·5	55	i 19 55k	[+ 4]	30 32	{ 0}	i 23 41	PP	72·6

Additional readings :—
Calcutta iSSE =17m.31s., iSSSE =18m.12s.
Hyderabad SSN =20m.20s.
Bombay eSE =17m.43s., SSE =21m.31s.
Kodaikanal S_cSE =19m.42s.
Sitka iP_cP =10m.24s., eS =18m.40s., i =19m.3s., eSS =22m.42s.
Brisbane iPN =10m.43s., iN =11m.10s. and 11m.42s., iPS?N =19m.19s., iSSN = 23m.13s.
Riverview iNZ =11m.21s., eS?N =19m.57s., iE =20m.19s., iSKS?N =20m.52s., eN = 20m.59s., iN =21m.41s. and 25m.19s., eN =25m.23s., eE =27m.38s.
Upsala eSS =25m.18s.?, eN =29m.42s.
Scoresby Sund 11m.51s., 17m.7s., 26m.42s.
Shasta Dam e =15m.42s. and 25m.42s., i =25m.50s., ePKP,PKP =39m.23s.
Warsaw ePN =12m.1s., ePPZ =15m.10s., ePPPZ =17m.13s., iZ =17m.38s., eSZ = 21m.38s., PSZ =22m.9s., PPSZ =22m.36s., PPSN =22m.43s., SSNZ =26m.44s., eN =28m.51s., SSSZ =29m.32s., SSSN =29m.45s., ePKKPE =30m.44s.
Mineral eE =12m.3s.
Berkeley iZ =12m.18s., eEN =22m.15s.
Copenhagen 27m.18s.
Auckland S_cS?N =22m.59s., SSSN =32m.18s.
Bozeman ePS =23m.50s.
Fresno iPZ =12m.19s., iZ =12m.40s.
Tinemaha iZ =12m.43s., ePKP,PKPZ =39m.2s.
Collmberg eSSS =31m.30s.
Prague eSS =27m.54s., e =32m.30s.
Belgrade ePPP =17m.39s.
Cheb e =22m.59s. and 23m.45s.
Aberdeen eE =40m.29s.
Salt Lake City eSS =28m.3s.
Pasadena iZ =12m.51s., 13m.1s., and 13m.8s., iPPZ =15m.40s., iEN =23m.8s. and 23m.29s., eSSN =28m.12s., eQN =34m.30s.
Mount Wilson iZ =12m.59s.
Riverside iZ =12m.56s.
Boulder City iPKP,PKP =38m.57s.
De Bilt ePP =15m.48s., iPS =23m.44s., eSS =28m.46s.
Durham iSEN =22m.55s., S_eSEN =23m.15s., SSN =28m.24s.
Palomar iZ =12m.59s., iPPZ =15m.54s., iZ =16m.5s., eZ =24m.11s.
Helwan PS =23m.48s.
Pierce Ferry i =12m.56s., ePKP,PKP =38m.46s.
Stuttgart eZ =14m.53s., e =18m.46s., ePS =23m.53s., eSSS =32m.0s., ePKP,PKPZ = 38m.49s.

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Triest ePPP =18m.2s., iSKS =22m.56s., ePPS =24m.31s., eSS =28m.45s.
Ivigtut e =22m.59s., SS =28m.30s.
Uccle ePEN =12m.42s., eZ =14m.20s., iPSN =23m.58s., eSSE =28m.43s., eE =29m.0s., eN =29m.4s., and 42m.18s.?
Strasbourg i =12m.50s.a, e =13m.44s. and 14m.18s., ePP =15m.32s., ePPP =17m.35s., e =19m.36s. and 19m.51s., iS =23m.3s., ePS =23m.55s., iPS =24m.2s., eSS =28m.57s., and 29m.4s., eSSS =32m.42s. and 32m.48s., eSSSS =35m.5s.
Zürich eS =23m.35s.
Kew iZ =13m.6s., eSS?N =29m.41s., eN =33m.56s.
Salo iN =23m.36s.
Bologna e =12m.55s., eS =23m.50s., SS =31m.46s.
Paris iP$_c$P =13m.0s., e =14m.34s., iSKS =23m.13s., iPS =24m.28s., eSSS =33m.18s.?, e =36m.48s. and 43m.18s.?
Rome i =16m.32s., eSKSE =23m.8s.
Tucson e =26m.24s., ePKP,PKP =38m.39s.
Clermont-Ferrand i =13m.11s., iPPP =18m.30s., iSKS =23m.30s., iPS =24m.55s eSSS =34m.18s.
Chicago e =23m.51s., eSS =32m.7s.
Tortosa iN =13m.50s., SKSN =24m.8s., PSE =25m.59s., PPSE =26m.41s., SS?EN =31m.41s., SSS?N =35m.46s.
St. Louis i =17m.38s., iS =24m.53s., iSS =30m.32s.
Ottawa eZ =16m.36s., PPZ =17m.8s., SKKS =24m.44s.
Alicante PPP =19m.48s., SKS =24m.4s., PS =26m.8s., PPS =26m.24s., SS =30m.56s., SSP =31m.10s., SSS =35m.2s., Q =39m.16s.
Vermont e =14m.46s., ePP? =17m.8s., ePS? =25m.57s., eSS? =42m.54s.
Granada PP =16m.52s.a, pPP =17m.45s., sPP =17m.58s., PPP =19m.37s., SKS =23m.21s., S =25m.1s., pS =26m.51s., PS =27m.4s., iSS =31m.20s., SSS =37m.49s.
Harvard e =40m.30s. and 42m.30s.
Fordham i =25m.30s., iPS =26m.57s.
Lisbon EZ =48m.18s.?
Philadelphia ePS =26m.54s.
Tamanrasset iPP =18m.49s.
Bermuda eSS =34m.29s.
Huancayo e =28m.42s., eSKSP =32m.43s., eSS =41m.30s.
La Paz iEN =20m.12s., iPKPS =23m.18s., SSN =43m.18s.

June 15d. 21h. 2m. 4s. Epicentre 26°·3N. 129°·0E. (rough).
(as on 1945, Aug. 14d.).

A = −·5649, B = +·6976, C = +·4407; δ = −3; h = +3;
D = +·777, E = +·629; G = −·277, H = +·342, K = −·898.

		Δ	Az.	P.	O−C.	S.	O−C.	L
		°	°	m. s.	s.	m. s.	s.	m.
Vladivostok		17·0	7	e 3 59	− 2	—	—	—
Frunse		46·9	305	e 8 33	− 1	—	—	—
Andijan		48·6	302	e 8 39	− 8	—	—	—
Tchimkent		50·6	305	e 9 1	− 1	—	—	—
Kulyab		50·7	299	i 9 1	− 2	—	—	—
Tashkent		50·9	303	i 9 2	− 3	e 16 15?	− 6	—
Stalinabad		51·5	300	i 9 7	− 2	—	—	—
Samarkand		52·7	301	e 9 21	+ 3	—	—	—
Sverdlovsk		56·6	322	i 9 44	− 3	—	—	—
Moscow		69·4	323	e 11 8	− 4	—	—	—
Scoresby Sund		81·3	351	—	—	22 39	+ 9	48·9
Copenhagen		82·2	329	12 24	0	22 38	− 1	42·9
Shasta Dam		86·1	46	e 12 46	+ 2	—	—	—
Stuttgart		87·6	325	e 12 51	0	—	—	e 46·9
Lick	z.	88·3	49	i 12 57	+ 2	—	—	—
Strasbourg		88·8	325	—	—	e 23 56?	+12	45·9
Tinemaha	z.	90·7	48	i 13 18	P$_c$P	—	—	—
Paris		91·3	328	e 13 7	− 2	—	—	e 51·9
Pasadena	z.	92·4	50	e 13 14	0	—	—	—
Mount Wilson	z.	92·5	50	e 13 16	+ 2	—	—	—
Boulder City		93·6	48	e 13 23	+ 4	—	—	—
Palomar		93·8	50	e 13 27	P$_c$P	—	—	—
Pierce Ferry		94·1	46	e 13 24	+ 2	—	—	—
Alicante		100·2	322	e 39 18	P′P′	—	—	e 54·9
Granada		102·7	323	i 40 27	?	—	—	55·6
Tamanrasset		106·7	306	e 18 43	[+17]	—	—	—
La Paz	z.	161·3	61	i 20 58	[+56]	—	—	—

Long waves were also recorded at Ksara and at other European stations,

June 15d. Readings also at 0h. (Branner, Bogota, La Paz, and near Huancayo), 1h. (Istanbul, Samarkand, Andijan, near Kulyab, Obi-garm, and Stalinabad), 2h. (Istanbul), 5h. (Tucson, Palomar, Tinemaha, and near Mineral), 6h. (Apia), 9h. (Ksara, Tamanrasset, Stuttgart, and near Istanbul (2)), 10h. (Istanbul (2), Strasbourg, Rome, Warsaw, De Bilt, Triest, Copenhagen, and near Frunse), 11h. (San Francisco), 12h. (Apia and Mineral (2)), 15h. (Ottawa, Tamanrasset, Paris, Strasbourg, Clermont-Ferrand, Stuttgart, Triest (2), Alicante, Granada, De Bilt, and Istanbul), 16h. (Stuttgart, Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Riverside, Palomar, Haiwee, and Tinemaha), 17h. (near Branner (2), Berkeley (2), Lick (2), and San Francisco (2)), 18h. (Florence, Boulder City, Pierce Ferry, Shasta Dam (2), Tucson, Pasadena, Mount Wilson, Riverside, and Palomar), 19h. (Stuttgart, Triest, Rome, and near Florence), 21h. (Bombay).

June 16d. 15h. 47m. 59s. Epicentre 33°·3N. 136°·9E.
Intensity II-III at Tu, Owase, Kasiwara, Osaka. Epicentre as adopted. Macroseismic radius 200·300km. Shallow.
The Seismological Bulletin of the Central Meteorological Observatory, Japan, for the year 1948, Tokyo, 1950, p. 24, with macroseismic chart.

$A = -·6115$, $B = +·5723$, $C = +·5464$; $\delta = +1$; $h = +1$;
$D = +·683$, $E = +·730$; $G = -·399$, $H = +·373$, $K = -·838$.

	Δ	Az.	P.	O−C.	S.	O−C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Owase	1·0	324	0 20	− 1	0 31	− 5	—
Siomisaki	1·0	279	0 22$_a$	+ 1	0 33	− 3	—
Kameyama	1·6	247	0 27	− 3	0 48	− 3	—
Osaka	1·8	321	0 36	+ 4	0 54	− 2	—
Nagoya	1·9	2	0 31	− 3	0 53	− 6	—
Kobe	2·0	315	0 33	− 2	0 48	−14	—
Kyoto	2·0	331	0 37	+ 2	1 1	− 1	—
Sumoto	2·0	303	0 33$_a$	− 2	0 58	− 4	—
Gihu	2·1	357	0 29?	− 8	0 43?	−21	—
Shizuoka	2·2	36	0 39	+ 1	0 57	− 9	—
Muroto	2·3	270	0 39	− 1	1 5	− 4	—
Misima	2·5	42	0 40	− 3	1 8	− 6	—
Osima	2·5	54	0 39	− 4	1 17	+ 3	—
Hunatu	2·7	34	0 44	− 1	1 12	− 7	—
Toyooka	2·8	323	0 49	+ 2	1 18	− 4	—
Tokyo	3·4	44	1 2	P•	—	—	—
Toyama	3·4	4	0 59	+ 4	1 42	+ 5	—
Kumagaya	3·5	35	0 59	+ 2	1 34	− 6	—
Hirosima	3·9	288	1 26	P$_g$	2 13	S$_g$	—
Wazima	4·1	0	1 14	+ 9	2 6	S•	—
Hamada	4·3	293	1 22	P$_g$	2 28	S$_g$	—
Kumamoto	5·2	267	0 46	−35	—	—	—
Sendai	5·9	32	1 29	− 2	2 40	0	—
Stuttgart	85·9	328	e 12 40	− 3	—	—	e 49·0

Long waves were also recorded at De Bilt.

June 16d. Readings also at 0h. (Mount Wilson, Pasadena, Palomar, Tinemaha, Pierce Ferry, Shasta Dam, Tucson, Copenhagen, Paris, Clermont-Ferrand, Stuttgart, Uccle, Warsaw, and Helsinki), 1h. (Alicante, Granada, and Ksara), 2h. (near Kulyab, Stalinabad, and Obi-garm), 5h. (Stuttgart), 6h. (near Stalinabad), 11h. (Palomar, Tinemaha, Pierce Ferry, Tucson, Stuttgart, near Murgab, Almata, and near Sotchi), 12h. (Tananarive, Istanbul, Shasta Dam, near Fresno, Branner, Mineral, and Lick), 13h. (Boulder City, Pierce Ferry, Mount Wilson, Palomar, Pasadena, Tinemaha, Ksara, Paris, Strasbourg, Rome, De Bilt, Granada, Warsaw, Stuttgart (3), near Istanbul, and near La Paz), 14h. (Rome, Triest, Paris, Clermont-Ferrand, Granada, Alicante, Tamanrasset, and Istanbul), 19h. (Istanbul and Ksara), 22h. (Warsaw),

June 17d. 6h. 52m. 27s. Epicentre 37°·8N. 22°·1E. (as on 1942, April 20d.).

$A = +·7340$, $B = +·2980$, $C = +·6103$; $\delta = +3$; $h = -1$;
$D = +·376$, $E = -·927$; $G = +·565$, $H = +·230$, $K = -·792$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		4·6	307	e 1 2	−10	e 2 4	− 3	1 37	PP	—
Messina		5·2	277	e 1 16	− 5	—	—	e 1 56	P_g	—
Catania		5·6	269	e 1 5	−22	—	—	—	—	e 3·4
Istanbul		6·3	57	1 39	+ 3	3 5	S*	—	—	—
Belgrade		7·1	351	e 1 42	− 6	e 4 19	+69	i 2 21	P_g	—
Bucharest		7·2	24	e 1 58	+ 9	e 3 30	S*	—	—	3·6
Rome		8·5	302	e 2 17	+10	e 3 57	+12	—	—	—
Kalossa	N.	9·0	346	e 3 18	?	—	—	—	—	e 5·7
Triest		10·0	324	e 2 25	− 2	i 4 17	− 5	—	—	i 5·8
Padova		10·2	314	e 3 0	?	—	—	—	—	e 5·3
Helwan		11·0	133	2 39	− 3	4 36	− 9	5 47	S_g	—
Salo		11·6	316	e 2 57	+ 7	e 4 51	−10	—	—	—
Ksara		11·9	105	e 2 58	+ 4	e 5 9	0	—	—	—
Pavia		12·2	311	—	—	e 5 1?	−15	—	—	—
Raciborzu		12·6	349	(e 3 31)	+28	e 3 31	P	—	—	—
Prague		13·4	339	—	—	e 6 9?	+24	—	—	e 7·6
Zürich		13·8	318	e 3 23	+ 4	e 5 55	+ 1	—	—	—
Cheb		14·1	334	—	—	e 6 39	+37	—	—	e 9·0
Basle		14·4	317	e 3 24	− 3	e 6 18	+ 9	—	—	e 8·6
Stuttgart		14·4	324	e 3 25	− 2	e 6 33	+24	e 3 37	PP	e 8·4
Warsaw		14·4	358	e 3 37a	+10	e 6 28	+19	e 3 49	PP	e 8·6
Sotchi		14·6	61	e 3 19?	−11	—	—	—	—	—
Strasbourg		15·0	321	e 3 35	0	e 6 28	+ 5	—	—	e 6·8
Jena	N.	15·1	334	e 3 26	−10	e 6 47	+22	—	—	e 8·5
Potsdam		15·9	340	e 3 51	+ 4	e 6 56	+12	e 7 3	SS	e 9·2
Clermont-Ferrand		16·2	305	e 3 52	+ 2	—	—	—	—	i 7·7
Tortosa	E.	17·0	287	e 4 3	+ 2	e 7 4	− 6	—	—	e 13·6
Leninakan		17·1	73	e 4 7	+ 5	—	—	—	—	—
Alicante		17·8	280	i 4 22	+11	7 33	+ 5	—	—	e 8·9
Paris		18·0	315	e 4 12	− 1	e 7 35	+ 3	—	—	e 10·6
Uccle		18·1	322	4 15a	+ 1	e 7 43	+ 8	—	—	e 10·0
De Bilt		18·6	328	i 4 23a	+ 2	e 8 3	+17	—	—	e 10·2
Copenhagen		19·0	345	e 4 25	− 1	8 6	+11	—	—	10·6
Granada		20·4	277	4 46k	+ 5	i 8 29	+ 4	4 59	pP	12·6
Toledo		20·4	284	i 4 35	− 6	e 8 17	− 8	i 4 54	pP	—
Tamanrasset		20·6	230	e 4 38	− 5	e 7 44	−45	—	—	—
Moscow		20·8	26	e 4 46	+ 1	e 8 42	+ 9	—	—	—
Baku		21·7	75	—	—	9 5	+14	—	—	—
Upsala		22·2	354	i 5 1k	+ 1	e 9 3	+ 3	5 25	PP	—
Ashkabad		28·5	79	e 6 13	+14	—	—	—	—	—
Sverdlovsk		31·7	41	i 6 26	− 1	11 39	+ 2	—	—	—

Additional readings :—
Belgrade e =4m.53s.
Bucharest eE =2m.45s.
Helwan S* =5m.19s.
Prague eN =6m.22s.?
Stuttgart eZ =3m.29s.
Warsaw ePN =3m.40s., eSE =6m.33s., eSSZ =6m.40s., eSSE =6m.53s.
Jena eP?E =3m.44s., eS?E =6m.50s.
Granada PP =5m.29s., sS =8m.43s., SS =9m.47s.
Toledo iPPP? =5m.1s.
Tamanrasset eP =4m.41s.
Upsala iSN =9m.6s., eE =9m.13s. and 10m.21s.
Long waves were also recorded at Budapest, Kew, and Helsinki.

June 17d. 14h. 8m. 22s. Epicentre 36°·5N. 49°·0E.

$A = +·5287$, $B = +·6081$, $C = +·5922$; $\delta = +1$; $h = 0$;
$D = +·755$, $E = -·656$; $G = +·389$, $H = +·447$, $K = -·806$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		3·9	10	1 4	+ 2	—	—	—	—	—
Erevan		5·1	317	e 1 32	+12	—	—	—	—	—
Leninakan		5·9	318	e 1 52?	P_e	—	—	—	—	—
Ashkabad		7·6	76	e 1 50	− 5	—	—	—	—	—
Piatigorsk		8·8	331	—	—	e 3 17	−36	—	—	—
Sotchi		10·0	318	e 2 2?	−25	i 3 56?	−26	—	—	—
Ksara		11·1	260	i 2 53	+10	6 10	L	—	—	(6·2)
Theodosia		13·4	314	e 3 23	+ 9	—	—	—	—	—
Samarkand		14·5	72	e 3 24	− 4	e 6 20	+ 9	—	—	—
Stalinabad		15·8	77	i 3 43	− 2	i 6 49	+ 7	—	—	—
Helwan		16·2	251	3 57	+ 7	7 6	+15	8 44	P_eP	—
Istanbul		16·2	292	3 54	+ 4	e 7 52	+61	—	—	—
Tashkent		16·5	67	i 3 54?	0	i 7 7?	+ 9	—	—	—
Tchimkent		16·9	64	e 4 0	+ 1	—	—	—	—	—
Andijan		18·7	70	e 4 19	− 3	—	—	—	—	—
Bucharest		19·1	302	e 4 34	+ 7	e 8 8	+11	—	—	—
Murgab		19·9	77	4 35	− 1	8 16	+ 1	—	—	—
Frunse		20·7	64	e 4 45	+ 1	e 8 36	+ 5	—	—	—
Moscow		20·7	342	i 4 41	− 3	i 8 25	− 6	—	—	—
Sverdlovsk		21·8	17	i 4 53	− 3	i 8 52	0	—	—	—
Warsaw		25·2	318	e 5 30k	+ 1	e 9 58	+ 6	e 6 35	PPP	e 12·6
Raciborzu	N.	26·0	312	e 6 2	+26	—	—	—	—	—
Triest		27·9	301	e 5 40	−14	i 10 58	+21	i 21 31	SS	—
Rome		28·7	293	e 6 0	− 1	e 11 26	+36	—	—	—
Bologna		29·5	299	e 6 11	+ 3	—	—	—	—	—
Florence		29·6	297	e 6 2	− 7	—	—	—	—	—
Potsdam	Z.	29·8	314	i 6 12	+ 1	e 11 42	+35	—	—	—
Upsala		30·9	329	e 6 14	− 6	e 11 20	− 4	e 12 38	SS	e 18·6
Copenhagen		31·3	320	e 6 30	+ 6	11 28	− 3	—	—	—
Stuttgart		31·4	306	e 6 23	− 2	e 11 43	+11	e 13 38	SSS	e 15·9
Strasbourg		32·3	306	e 7 47	PPP	13 13	SS	e 13 58	SSS	20·6
Clermont-Ferrand		35·4	300	e 6 58	− 2	e 12 35	+ 1	e 8 12	PP	17·0
Paris		35·8	305	e 7 2	− 1	e 15 17	SS	e 8 17	PP	e 22·6
Calcutta	E.	36·7	101	—	—	e 13 0	+ 6	—	—	e 18·1
Alicante		39·0	288	e 7 31	+ 1	—	—	—	—	e 24·6
Tamanrasset		39·9	262	i 7 39a	+ 2	—	—	e 9 14	PP	—
Granada		41·6	288	e 7 57	+ 6	—	—	—	—	28·5
Scoresby Sund		49·7	335	8 57	+ 1	—	—	10 54	PP	—
Vladivostok		61·6	56	e 10 18	− 4	—	—	—	—	—
Harvard		84·5	320	i 11 34	−62	—	—	—	—	—

Additional readings :—
Warsaw ePN = 5m.34s., eP_cPZ = 9m.1s., eSN = 10m.2s., eSSZ = 10m.59s., eSSN = 11m.2s., eSSE = 11m.7s., eSSSEN = 11m.23s., eSSSZ = 11m.30s., eP_cSE = 11m.47s. eP_cSZ = 12m.0s.
Raciborzu eE = 6m.8s.
Strasbourg e = 10m.21s., 12m.28s., and 14m.21s.
Paris ePPP = 8m.33s.?
Long waves were also recorded at De Bilt.

June 17d. Readings also at 0h. (Bogota, La Paz (2), Fort de France, Branner, Lick (2), Mineral (2), Stuttgart, and Tamanrasset), 1h. (Lick, Granada, near Andijan, Samarkand, and Stalinabad), 10h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Fresno, and Shasta Dam), 11h. (Almata, Frunse, Stalinabad, and near Andijan), 12h. (near Leninakan), 17h. (near Pierce Ferry), 18h. (Istanbul (2)), 19h. (Stalinabad, near Kulyab, and Obigarm), 20h. (near Ashkabad), 22h. (San Francisco), 23h. (Tchimkent, Tashkent, near Almata, Andijan, Frunse, Kulyab, Murgab, Samarkand, and near Obigarm).

June 18d. 0h. 53m. 49s. Epicentre 6°·5S. 155°·0E. (as on 1943, Dec. 24d.).

$A = -·9006$, $B = +·4200$, $C = -·1125$; $\delta = +14$; $h = +7$;
$D = -·423$, $E = -·906$; $G = +·102$, $H = -·048$, $K = -·994$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Brisbane	N.	20·9	187	i 4 40	− 6	i 8 28	− 7	i 4 57	PP	i 10·4
Riverview		27·4	188	i 5 49k	0	i 10 19	− 9	i 6 3	pP	i 14·6
Apia		33·5	106	i 6 37k	− 6	e 11 52	−13	e 7 45	PP	e 15·2
Auckland	N.	35·2	153	7 2	+ 4	12 18	−13	8 24	PP	—
Arapuni	E.	36·6	153	e 10 5	?	e 12 59	+ 6	—	—	15·8
Tuai	N.	37·9	152	7 12	− 8	12 57	−16	8 48	PP	—
Wellington		38·9	157	7 21	− 8	13 11	−17	16 1	SS	16·2
Christchurch		40·0	161	7 49	+11	13 30	−14	9 14	PP	18·9
Yokohama		44·1	342	8 20	+ 8	14 16	−29	—	—	—
Miyazaki		44·3	332	8 20	+ 7	—	—	—	—	—
Tokyo		44·3	342	e 8 17	+ 4	—	—	—	—	—
Perth		44·4	230	i 17 14	?	i 18 11	SS	—	—	i 21·5
Kagosima		44·5	329	8 19	+ 4	—	—	—	—	—
Kakioka		44·7	344	e 8 19	+ 3	—	—	—	—	—
Kameyama		44·7	339	8 22	+ 6	—	—	—	—	—
Nagoya		44·8	340	8 20	+ 3	—	—	—	—	—
Kumagaya		44·9	342	e 8 23	+ 5	—	—	—	—	—
Osaka		44·9	337	8 23	+ 5	—	—	—	—	—
Sumoto		44·9	337	i 8 19	+ 1	—	—	—	—	—
Hikone		45·1	340	e 8 57	+37	—	—	—	—	—
Maebasi		45·2	342	8 18	− 2	—	—	—	—	—
Kumamoto		45·4	332	8 28	+ 6	—	—	—	—	—
Nagano		45·7	342	e 8 41	+17	—	—	—	—	—
Toyama		46·1	340	8 31	+ 3	—	—	—	—	—
Hukuoka		46·2	332	i 8 32	+ 4	14 2	−73	—	—	18·7
Sendai		46·4	346	8 32	+ 2	15 19	+ 1	—	—	—
Wazima		46·8	341	e 8 37	+ 4	—	—	—	—	—
Aikawa		47·0	343	e 8 46	+11	—	—	—	—	—
Batavia		47·9	268	e 8 30	−12	e 15 34	− 5	e 10 15	PP	—
Aomori		48·9	346	8 51	+ 1	—	—	—	—	—
Sapporo		50·9	348	e 9 8	+ 3	—	—	—	—	—
Vladivostok		53·7	339	i 9 27	+ 1	i 17 1	+ 2	—	—	—
Honolulu		53·9	57	e 9 42	+15	e 16 53	− 9	e 20 39	SS	e 21·8
Klyuchi		62·8	4	e 10 26	− 4	e 18 59	+ 1	—	—	—
Calcutta	E.	71·3	296	e 11 25	+ 2	i 20 47	+ 6	—	—	—
Irkutsk		72·7	330	11 32	0	i 20 59	+ 2	e 11 54	pP	—
Kodaikanal	E.	79·0	282	i 12 4	− 3	i 21 59	− 7	15 3	PP	37·9
Hyderabad	N.	79·2	289	—	—	22 5	− 3	—	—	—
College		82·6	20	e 12 24	− 2	e 22 36	− 7	—	—	e 34·0
Bombay		84·7	290	i 12 52	+15	i 23 17	+13	—	—	38·4
Sitka		84·8	31	e 12 37	0	e 22 56	− 9	e 15 52	PP	e 34·2
Murgab		87·0	309	12 50	+ 2	23 26	− 1	—	—	—
Ukiah		87·7	50	—	—	e 23 20	[+ 1]	—	—	e 31·7
Berkeley		88·2	52	i 12 54	0	i 23 19	[− 3]	i 23 34	S	e 39·2
Santa Clara		88·4	52	e 12 56	+ 1	e 23 33	− 7	e 16 21	PP	e 36·2
Shasta Dam		88·5	49	i 12 55	− 1	e 23 40	− 1	e 23 20	SKS	—
Mineral	Z.	89·2	49	e 12 55	− 4	e 23 29	[+ 1]	e 15 58	PP	—
Victoria		89·3	41	—	—	e 23 28	[− 1]	—	—	37·2
Fresno	Z.	90·0	53	i 13 2	− 1	e 23 29	[− 4]	i 13 16	pP	—
Kulyab		90·2	308	i 13 6	+ 2	i 23 31	[− 3]	—	—	—
Tchimkent		90·9	312	i 13 7	0	i 23 33	[− 5]	—	—	—
Pasadena		91·0	56	i 13 6k	− 1	i 24 0	− 3	i 13 19	pP	e 36·9
Tashkent		91·0	311	i 13 9	+ 2	i 24 1	− 2	i 23 36	SKS	—
Mount Wilson		91·1	56	i 13 7	− 1	e 23 35	[− 4]	i 13 34	pP	—
Tinemaha		91·2	53	i 13 9a	+ 1	e 23 22	[−18]	i 13 29	pP	—
Haiwee	Z.	91·4	54	i 13 9	0	—	—	—	—	—
La Jolla	Z.	91·6	57	e 13 8	− 2	—	—	e 13 28	pP	—
Riverside		91·6	56	i 13 9	− 1	e 23 38	[− 4]	i 13 28	pP	—
Palomar		92·0	57	i 13 11	− 1	i 24 13	+ 1	i 23 41	SKS	—
Samarkand		92·6	309	e 13 17	+ 2	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Boulder City		93·9	54	i 13 50	+29	—	—	e 17 36	PP	—
Pierce Ferry		94·6	54	i 13 23	− 1	e 23 57	[− 2]	i 17 1	PP	—
Butte	N.	96·3	44	—	—	e 24 7	[− 1]	e 28 25	?	e 37·9
Salt Lake City		96·6	50	e 13 44	+11	e 24 11	[+ 1]	e 24 46	S	e 40·0
Tucson		96·9	58	e 13 35	+ 1	e 24 13	[+ 2]	i 17 27	PP	e 40·0
Bozeman		97·4	45	—	—	e 24 12	[− 2]	—	—	e 39·7
Sverdlovsk		97·8	327	i 13 36	− 2	i 24 11	[− 5]	e 26 32	PS	—
Ashkabad		99·2	307	e 13 45	0	e 24 21	[− 2]	e 17 57?	PP	—
Saskatoon		100·2	38	—	—	e 24 41	[+13]	—	—	42·2
Baku		105·7	310	18 22?	PP	e 24 56?	[+ 2]	—	—	—
Leninakan		110·3	311	e 19 9	PP	—	—	—	—	—
Moscow		110·6	328	e 14 34	P	25 9	[− 6]	e 14 49	pP	—
Sotchi		112·7	315	e 18 8	[−30]	—	—	—	—	—
St. Louis		113·3	50	e 18 39	[− 1]	e 26 28	{ 0}	e 19 24	PP	e 51·3
Chicago		114·6	46	e 19 38	PP	e 25 30	[0]	e 29 27	PS	e 48·7
Scoresby Sund		116·1	359	19 52	PP	25 36	[0]	29 38	PS	—
Yalta		116·3	317	19 54	PP	e 26 32	{−17}	e 29 30	PS	—
Ksara		117·7	304	i 20 7	PP	—	—	—	—	—
Upsala		117·8	338	e 19 53	PP	e 25 36	[− 6]	e 30 53	PPS	e 48·2
Ville Marie		118·4	39	e 18 46	[− 4]	e 25 37	[− 7]	—	—	—
Helwan		118·6	301	18 58	[+ 8]	—	—	20 29	PP	—
Cleveland		119·1	46	e 18 50	[− 1]	i 25 41	[− 6]	e 20 8	PP	e 49·8
Warsaw		120·9	329	e 18 58	[+ 3]	e 25 53	[0]	e 20 30	PP	e 59·2
Istanbul		121·0	315	15 21	?	30 17	PS	—	—	—
Ottawa		121·5	39	18 54	[− 2]	25 51	[− 4]	20 32	PP	59·2
Copenhagen		122·7	336	18 58	[0]	25 58	[− 1]	20 34	PP	—
Seven Falls		123·7	35	—	—	e 25 59	[− 3]	e 37 17	SS	52·2
Philadelphia		124·1	45	—	—	e 26 0	[− 3]	e 27 37	SKKS	e 52·3
Potsdam		124·6	333	i 19 0	[− 2]	i 30 48	PS	e 20 52	PP	e 57·2
Fordham		124·7	44	i 19 1	[− 1]	—	—	—	—	52·7
Collmberg	Z.	125·4	332	e 19 4	[+ 1]	—	—	—	—	—
Harvard		125·5	41	e 21 3	PP	—	—	—	—	e 61·2
Prague		125·5	330	e 19 0	[− 3]	—	—	e 32 35	PPS	e 57·2
Jena	N.	126·3	331	e 19 7	[+ 2]	—	—	e 21 3	PP	—
Huancayo		126·7	110	e 20 9	[+63]	e 38 57	SSP	e 22 26	PP	e 53·8
De Bilt		128·2	337	e 21 11	PP	e 38 47	SS	i 22 26	SKP	e 56·2
Triest		128·6	326	e 19 11	[+ 2]	e 38 29	SS	i 22 31	SKP	e 55·2
Stuttgart		128·9	331	e 19 3	[− 7]	e 38 23	SS	e 19 23	pPKP	e 60·2
Uccle		129·5	337	e 19 11	[0]	e 28 11	{− 5}	e 31 23	PS	e 58·2
Strasbourg		129·7	332	i 19 12	[+ 1]	e 26 16	[− 3]	e 21 24	PP	e 60·2
Chur		130·1	329	e 21 28	PP	e 22 35	SKP	—	—	—
Zürich		130·2	331	e 19 6	[− 6]	e 22 33	SKP	e 21 22	PP	—
Padova		130·3	326	e 19 8	[− 5]	e 22 35	SKP	e 23 36	?	—
Salo		130·4	328	19 13a	[0]	i 22 33	SKP	—	—	—
Basle		130·5	331	e 19 8	[− 5]	e 22 34	SKP	e 21 31	PP	—
Bologna		130·7	327	e 19 14	[+ 1]	e 22 36	SKP	—	—	—
Kew		130·7	340	i 19 13	[0]	e 22 35	SKP	i 21 26	PP	e 60·2
Bogota	Z.	131·1	89	i 19 13	[− 1]	i 22 33	SKP	—	—	—
Florence	Z.	131·1	325	e 19 12	[− 2]	e 22 35	SKP	—	—	—
Pavia		131·4	328	—	—	e 22 38?	SKP	—	—	—
La Paz		131·6	119	i 19 16	[+ 1]	i 26 31	[+ 8]	i 22 36	SKP	63·2
Rome		131·6	323	i 19 14	[− 1]	i 22 35	SKP	i 21 37	PP	e 57·2
Paris		131·8	336	e 19 2	[−13]	i 22 39	SKP	i 21 38	PP	e 67·2
Catania		132·3	316	e 20 17	?	e 23 40	?	—	—	—
Clermont-Farrand		133·9	333	e 19 11	[− 8]	i 26 38	[+ 9]	e 22 49	SKP	61·2
Bermuda		135·0	50	e 24 4	?	e 40 0	SS	—	—	e 56·2
San Juan		138·3	67	e 19 55	[+28]	e 28 58	{−13}	e 22 21	PP	e 59·2
Tortosa		138·9	330	19 35	[+ 6]	26 42	[+ 5]	22 8	PP	e 68·2
Alicante		141·3	329	19 30	[− 3]	23 13	PKS	58 16	Q	e 64·2
Toledo		141·8	334	i 19 30	[− 4]	i 26 25	[−17]	i 23 7	PKS	—
Granada		143·8	331	i 19 36k	[− 1]	26 40	[− 5]	i 41 47	SS	i 67·0
Lisbon	Z.	144·9	338	i 19 40a	[+ 1]	22 58	SKP	—	—	—
Tamanrasset		146·4	302	i 19 23a	[−19]	—	—	i 23 8	PP	—

For Notes see next page.

NOTES TO JUNE 18d. 0h. 53m. 49s.

Additional readings :—
Brisbane ePE =4m.43s., iN =5m.5s. and 6m.30s., iSSN =8m.45s., iSSE =9m.0s.
Riverview iE =6m.20s., iPPNZ =6m.45s., iE =7m.15s., iN =9m.52s., isSEZ =10m.47s., iN =11m.5s. and 11m.25s., iE =11m.45s., and 12m.18s., iN =12m.33s., iE = 12m.44s. and 13m.44s.
Auckland iN =7m.59s., P_cPN =9m.51s., SSN =14m.40s., S_cSN =17m.13s.,sS_cSN = 17m.45s.
Tuai iN =14m.34s., S_cSN =17m.21s.
Wellington iZ =7m.51s., i =8m.23s., pPP?Z =8m.55s., PPP =9m.16s., iZ =9m.25s., P_cP =10m.7s., iZ =12m.13s., P_cS =12m.50s., i =13m.49s. and 14m.47s.
Christchurch QEN =15m.36s.
Batavia iSSEN =18m.34s., eSSSEN =20m.30s.
Honolulu e =11m.11s., ePPP? =13m.35s., eS_cS =19m.43s.
Irkutsk pP* =11m.47s., sS* =21m.27s., sS =21m.39s.
Kodaikanal PS =22m.30s.
Sitka eS_cS =23m.44s., eSS? =28m.2s.
Berkeley iE =24m.14s., eN =33m.10s. and 36m.11s.
Shasta Dam ePP =16m.4s.
Fresno iZ =13m.29s., eZ =16m.31s.
Pasadena isPZ =13m.27s., iZ =13m.49s. and 16m.45s., iSKSE =23m.32s., iPSZ = 24m.35s., iPPSE =25m.26s., eSSN =30m.11s.
Riverside iZ =13m.35s.
Palomar iZ =13m.24s., 13m.31s., 16m.47s., and 17m. 9s.
Pierce Ferry i =13m.58s., iPPP? =19m.32s.
Salt Lake City ePP =17m.38s., e =25m.39s., ePS =26m.3s., ePPS =27m.1s., eSS = 31m.11s.
Tucson i =14m.32s., eS? =25m.36s., ePS =26m.11s., ePKKP =30m.50s., ePKP,PKP = 38m.28s.
Sverdlovsk ePP =17m.31s., S =24m.54s.
Moscow ePP =19m.8s., epPP =19m.25s., eSKKS =26m.9s.
St. Louis epPP? =19m.45s., e =19m.56s. and 24m.35s., i =28m.18s., eSS =35m.8s.
Scoresby Sund 27m.36s., PPS =30m.47s., SS =35m.35s.
Upsala eN =27m.45s., eSSSE =40m.11s.?
Ville Marie e =21m.7s., 22m.21s., and 27m.0s.
Helwan PPP =23m.16s.
Cleveland eE =20m.20s., eSKPZ =21m.25s., iPPP?Z =22m.26s., eE =27m.18s. and 29m.19s., eN =30m.15s., eEN =31m.44s., eSSE =36m.17s., eSSN =36m.26s.
Warsaw ePPZ =20m.25s., eSKP?Z =22m.12s., ePPPE =23m.26s., eSKSN =25m.56s., eSKSZ =26m.2s., eSKKSZ =28m.6s., ePSN =30m.9s., ePPSE =31m.44s., ePPSZ = 32m.1s., ePKKSN =32m.32s., ePKKSZ =32m.43s., eSSN =37m.4s., eSSE = 37m.18s., eE =39m.42s., eSSS?E =42m.18s.
Ottawa iZ =22m.29s., SKKS =27m.22s., PPS =31m.53s., eZ =36m.42s., SSS =44m.11s.?
Copenhagen e =26m.56s., 27m.32s., SS =37m.15s.
Seven Falls e =28m.11s.
Philadelphia eSS =37m.29s.
Potsdam iPPZ =20m.49s., ePPSZ =32m.17s.
Fordham i =21m.16s., e =22m.35s.
Prague eZ =19m.56s.
De Bilt eZ =23m.14s.
Triest ePPS =32m.58s., i =41m.1s.
Stuttgart ePKPZ =19m.6s., iPKPZ =19m.11s.k, ePP =21m.21s., eSKP =22m.30s., eZ =23m.23s., ePPS =32m.59s.
Uccle ePP =21m.11s., iSKPZ =22m.27s., iSKPEN =22m.36s., ePPSEN =33m.5s., eSS =39m.11s.
Strasbourg ePP =21m.21s., eSKP =22m.28s. and 22m.33s., e =23m.24s., ePPP = 24m.13s., e =30m.20s. and 30m.24s., ePPS =33m.4s., eSS =38m.58s., eSSS = 43m.31s.
Salo iEN =22m.38s., iZ =23m.31s.
Kew iNZ =22m.39s., eZ =33m.59s.
La Paz iPPZ =21m.49s., iZ =31m.51s.
Rome iZ =23m.33s.
Paris iPKP =19m.16s., e =21m.16s., i =23m.32s. and 23m.36s., ePS =31m.28s., ePPS = 33m.30s., eQ =62m.11s.?
Clermont-Ferrand iSKP =22m.55s., i =23m.46s.
Tortosa SKPEN =23m.6s., PPPE =25m.7s., SKKS?E =28m.49s., SSSE =44m.32s.
Toledo iPP =21m.52s.
Granada PKP_2 =20m.2s.k, SKP =22m.32s., iPP =23m.23s., SKKS =29m.29s., SKSP = 33m.2s., PPS =36m.28s., SSP =43m.28s., SSS =48m.35s.
Lisbon PPEZ =22m.9s.
Tamanrasset iPPP =26m.17s.
Long waves were also recorded at Helsinki, Ivigtut, Aberdeen, and Tananarive.

June 18d. 6h. Peru.

Montezuma e = 8m.1s., eS = 8m.20s., eL = 8m.31s.
La Paz iPZ = 8m.7s.k, iP_g = 8m.23s., iS = 8m.55s., iS_g = 9m.15s.
Tucson iP = 17m.41s.k, i = 17m.47s., e = 18m.13s.
Palomar iPZ = 18m.10s., iZ = 18m.33s.
Pierce Ferry iP = 18m.10s.
Riverside iPZ = 18m.15s.k, iZ = 18m.35s. and 18m.45s.
Mount Wilson iPZ = 18m.18s., iZ = 18m.23s.
Pasadena iPZ = 18m.18s., eZ = 18m.37s.
Tinemaha iPZ = 18m.30s., eZ = 18m.40s., iZ = 18m.53s.
Boulder City iP = 18m.43s.
Shasta Dam iP = 18m.56s.

June 18d. 7h. 27m. 13s. Epicentre 28°·5N. 101°·5E.

A = −·1755, B = +·8625, C = +·4747 ; δ = +5 ; h = +2 ;
D = +·980, E = +·199 ; G = −·095, H = +·465, K = −·880.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Dehra Dun	N.	20·5	281	—	—	e 8 17	−10	—	—	—
Irkutsk		23·8	4	i 5 15?	0	i 9 34?	+ 6	—	—	—
Hyderabad	N.	23·9	247	e 5 19	+ 3	9 38	+ 8	—	—	—
Almata		24·6	314	5 29	+ 6	9 43	+ 1	—	—	—
Murgab		24·9	301	5 25	− 1	9 45	− 2	—	—	—
Frunse		26·0	311	e 5 35	− 1	—	—	—	—	—
Andijan		26·8	305	e 5 44	0	—	—	—	—	—
Bombay		27·9	256	e 10 53	S	(e 10 53)	+16	—	—	(e 15·2)
Kulyab		28·0	298	i 5 54	− 1	—	—	—	—	—
Vladivostok		28·5	51	e 6 0	+ 1	e 10 56	+10	—	—	—
Stalinabad		28·9	300	i 6 2	− 1	—	—	—	—	—
Tashkent		29·2	305	e 6 5?	0	e 10 49?	− 9	—	—	—
Ashkabad		37·0	297	e 7 20	+ 7	—	—	—	—	—
Moscow		52·4	320	e 9 17	+ 1	—	—	—	—	—
Ksara		55·6	293	(e 9 33)	− 7	—	—	(e 12 28)	?	—
Stuttgart		70·6	315	e 11 20	+ 1	—	—	—	—	e 36·8
Kew		75·1	320	—	—	e 22 11	PPS	—	—	e 37·8
Tamanrasset		84·4	292	e 12 39	+ 3	—	—	—	—	—
Bogota	Z.	146·8	352	e 19 49	[+ 7]	—	—	—	—	—

The readings for Ksara have been increased by 5m.
Bombay records S as P and L as S.
Long waves were also recorded at Batavia and at other European stations.

June 18d. 10h. 28m. 32s. Epicentre 51°·5N. 180° (as on 1946, Dec. 25d.).

A = −·6251, B = ·0000, C = +·7806 ; δ = +9 ; h = −6 ;
D = ·000, E = +1·000 ; G = −·781, H = ·000, K = −·625.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		21·3	37	e 5 0	+10	e 9 2	SS	—	—	e 11·7
Vladivostok		33·1	275	e 6 19	−21	e 11 44	−15	—	—	—
Mount Wilson	Z.	47·1	86	i 8 37	+ 2	—	—	—	—	—
Pasadena	Z.	47·1	86	i 8 36	+ 1	—	—	—	—	—
Riverside	Z.	47·7	86	e 8 40	0	—	—	—	—	—
Boulder City		48·0	82	e 9 13	+30	—	—	e 10 31	PP	—
Palomar		48·4	87	i 8 46a	0	—	—	—	—	—
Pierce Ferry		48·4	82	e 8 46	0	—	—	i 9 7	pP	—
La Jolla	Z.	48·5	87	e 8 46	0	—	—	—	—	—
Tucson		52·9	83	i 9 20	0	—	—	—	—	—
Ville Marie		60·4	51	e 10 10	− 3	—	—	—	—	—
Ottawa		63·6	50	e 10 42	+ 7	—	—	—	—	33·5
Frunse		66·0	309	e 10 52	+ 2	—	—	—	—	—
Andijan		68·7	309	e 11 7	0	e 20 15	+ 5	—	—	—
Moscow		68·7	339	e 11 6	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tashkent		69·7	311	e 11 13	− 1	e 20 28	+ 6	—	—	—
Kulyab		72·1	309	i 11 30	+ 2	i 20 57	+ 7	—	—	—
Stalinabad		72·1	310	i 11 27	− 1	i 20 54	+ 4	—	—	—
Stuttgart	z.	79·8	354	e 12 11	− 1	—	—	e 12 21	P	—
Paris		80·0	358	e 12 14	+ 1	—	—	—	—	—
Ksara		89·4	331	(e 13 8)	+ 8	—	—	—	—	—

Additional readings :—
Mount Wilson iZ = 8m.46s. and 8m.58s.
Riverside iZ = 8m.47s. and 8m.54s.
Palomar iZ = 8m.55s. and 9m.7s.
La Jolla eZ = 8m.55s.
Tucson i = 9m.29s., 9m.35s., and 9m.42s.
The reading for Ksara was increased by 2 minutes.
Long waves were also recorded at Copenhagen, Istanbul, and Philadelphia.

June 18d. 10h. 34m. 58s. Epicentre 39°·2N. 123°·4W. (as on 1943, March 11d.).

Intensity VI at Lakeport, Talmage, Ukiah ; V at Clearlake Oaks, etc.
Epicentre 39°4′N. 123°17′W. Macroseismic area 600sq.m.

L. M. Murphy, F. P. Ulrich.
United States Earthquakes, 1948, serial No. 746, Washington, 1951, p.16.

A = −·4277, B = −·6487, C = +·6295 ; δ = +1 ; λ = −1 ;
D = −·835, E = +·550 ; G = −·347, H = −·526, K = −·777.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ukiah		0·1	—	i 0 9	+ 1	—	—	—	—	—
Ferndale	N.	1·5	334	—	—	e 0 43	S*	e 0 47	S_g	e 1·2
Berkeley	N.	1·6	146	e 0 27	− 3	i 0 47	− 4	i 0 31	P_g	—
Shasta Dam		1·7	27	e 0 34	+ 3	i 1 0	S_g	—	—	—
Mineral		1·8	50	e 0 33	+ 1	i 1 0	+ 4	i 0 40	P_g	—
Branner		2·0	152	e 0 32	− 3	i 1 8	S_g	i 0 38	P*	—
Santa Clara		2·2	148	e 1 3	S	(e 1 3)	− 3	e 1 16?	S_g	i 1·5
Lick	N.	2·3	144	e 0 37	− 3	i 1 15	+ 4	i 0 45	P_g	—
Fresno		3·8	130	e 0 58	− 3	i 1 55	S*	e 1 1	P	—
Tinemaha	z.	4·5	116	i 1 13	+ 2	i 1 56	− 9	—	—	—
Haiwee	z.	5·3	124	e 1 30	P*	—	—	—	—	—
Pasadena	z.	6·6	139	e 1 37	− 4	—	—	—	—	—

Additional readings :—
Berkeley iN = 37m., iE = 44s.
Branner iE = 45s.
Lick iN = 1m.21s.
Fresno iZ = 1m.58s., iN = 2m.1s.

June 18d. 16h. Undertermined shock. South Pacific.

Apia ePEN = 49m.20s., S?N = 50m.27s., eLEN = 51m.
Auckland eN = 55m.30s., LN = 58m.9s.
Pierce Ferry eP = 59m.27s.
Riverside ePZ = 59m.38s., eZ = 59m.47s.
Palomar iPZ = 59m.39s., iZ = 59m.50s., eZ = 60m.14s.
Fresno ePZ = 59m.40s.
Shasta Dam eP = 59m.43s.
Tinemaha ePZ = 59m.44s.
Mineral iPZ = 59m.45s., iZ = 59m.55s.
Tucson iP = 59m.57s., i = 60m.23s., eL = 85m.24s.
Wellington eZ = 60m.?, i = 60m.18s., Q? = 62·2m.
Arapuni eE = 61m.
Potsdam eZ = 67m.35s., eLN = 136m.
Ksara ePKP? = 67m.36s.?, PP? = 71m.22s.
Istanbul eP = 67m.37s.?
Stuttgart eZ = 67m.37s.?
Collmberg eZ = 67m.38s.
Paris ePKP = 67m.45s., eL = 132m.
Strasbourg ePKP = 67m.47s.
De Bilt eZ = 68m.
Long waves were also recorded at Philadelphia and Santa Clara.

June 18d. 18h. 44m. 32s. Epicentre 37°·5N. 57°·8E.

$A = +\cdot4238$, $B = +\cdot6730$, $C = +\cdot6062$; $\delta = +1$; $h = -1$;
$D = +\cdot846$, $E = -\cdot533$; $G = +\cdot323$, $H = +\cdot513$, $K = -\cdot795$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Ashkabad		0·6	24	i 0 9	− 6	—	—	—	—	—
Baku		6·8	297	i 1 41	− 3	—	—	—	—	—
Samarkand		7·5	71	e 1 53	0	i 3 39	S•	—	—	—
Stalinabad		8·7	80	i 2 14	+ 4	i 4 7	+17	—	—	—
Kulyab		9·5	84	i 2 23	+ 3	—	—	—	—	—
Obi-garm		9·5	79	i 2 23	+ 3	i 4 20	+10	—	—	—
Tashkent		9·7	63	i 2 19?	− 3	i 4 21	+ 6	—	—	—
Erevan		10·7	289	e 2 35?	− 3	—	—	—	—	—
Leninakan		11·3	291	i 2 20?	−26	—	—	—	—	—
Andijan		11·8	70	e 2 49	− 4	e 5 4	− 2	—	—	—
Murgab		12·8	81	3 5	− 1	—	—	—	—	—
Frunse		13·9	62	e 3 20	− 1	e 6 3	+ 6	—	—	—
Almata		15·7	62	i 3 51	+ 7	e 6 51	+12	—	—	—
Dehra Dun	N.	18·2	106	e 5 58	?	e 8 31	SSS	—	—	—
Ksara		18·2	265	i 4 15	− 1	7 48	+11	—	—	—
Theodosia		18·4	301	e 4 14	− 4	—	—	—	—	—
Simferopol		19·3	300	4 28	− 1	—	—	—	—	—
Semipalatinsk		20·6	44	e 5 12?	PP	e 9 6?	SS	—	—	—
Istanbul		22·5	289	5 1	− 1	9 2	− 3	—	—	—
Bombay		22·7	141	e 5 5	+ 1	e 9 13	+ 4	e 9 21	SS	13·2
Moscow		22·8	330	i 5 5	0	9 12	+ 1	—	—	—
Helwan		23·2	259	i 5 7a	− 2	9 22	+ 4	5 40	PP	—
Hyderabad	N.	27·0	132	—	—	10 42	+20	—	—	—
Warsaw		29·6	312	e 6 11k	+ 2	11 32	+28	12 25	SS	e 18·5
Budapest		30·0	303	6 19	+ 7	e 11 16	+ 6	e 7 22	PPP	e 16·9
Kalossa		30·0	302	e 6 37	+25	e 8 20	?	e 6 46	PP	—
Calcutta	E.	30·2	110	e 7 51	PPP	—	—	—	—	i 15·1
Raciborzu		30·9	308	e 6 30?	+10	e 13 57	SSS	e 7 46	PPP	—
Prague		33·3	307	e 6 38a	− 3	e 11 56	− 6	e 14 57	SSS	e 20·5
Triest		33·6	299	i 6 45	+ 1	e 12 35	+29	i 8 2	PP	—
Upsala		33·9	324	6 47a	0	—	—	—	—	e 18·1
Collmberg	Z.	34·3	308	6 54	+ 4	—	—	8 13	PP	—
Potsdam		34·4	311	i 6 50k	− 1	e 12 20	+ 1	e 6 57	pP	e 20·5
Rome		34·8	292	6 52	− 2	e 12 28	+ 3	8 18	PP	—
Padova		35·0	297	e 7 20	+24	e 12 41	+13	—	—	—
Jena	N.	35·1	307	e 6 59	+ 2	e 12 35	+ 5	e 8 16	PP	—
Copenhagen		35·3	317	7 0	+ 1	12 36	+ 3	—	—	21·5
Bologna		35·4	297	e 6 59k	− 1	e 13 4	+30	e 8 48	PPP	—
Florence	Z.	35·5	296	e 7 1	+ 1	—	—	—	—	—
Irkutsk		35·5	49	e 7 6	+ 6	e 12 42	+ 6	—	—	—
Salo		35·9	299	e 7 3k	− 1	e 13 43	+61	e 7 19	?	—
Stuttgart		36·6	305	e 7 8	− 2	e 12 53	0	e 15 30	SS	e 21·5
Pavia	Z.	36·8	299	e 7 12	+ 1	—	—	—	—	—
Zürich		37·1	302	e 7 11	− 3	—	—	—	—	—
Strasbourg		37·6	305	e 7 17	− 1	e 13 6	− 2	e 8 49	PP	22·0
Basle		37·8	302	e 7 19	− 1	—	—	—	—	—
De Bilt		39·2	310	i 7 33k	+ 2	e 16 28	SS	i 9 10	PP	e 23·5
Uccle		39·7	308	7 38a	+ 2	e 13 38?	− 2	e 9 9	PP	—
Clermont-Ferrand		41·0	300	i 7 47	+ 1	e 14 1	+ 2	i 9 27	PP	27·5
Paris		41·1	305	i 7 47	0	e 16 54	SS	i 9 23	PP	e 19·5
Aberdeen		43·5	318	—	—	e 14 39	+ 3	i 18 6	SSS	28·3
Tortosa	E.	43·9	293	8 12	+ 2	14 23	−19	9 50	PP	e 28·5
Alicante		45·3	290	i 8 23	+ 2	—	—	10 19	PP	25·5
Tamanrasset		47·0	267	e 8 35	0	—	—	e 10 15	PP	—
Toledo		47·5	293	e 8 38	0	—	—	i 10 29	PP	—
Granada		48·0	290	1 8 42k	− 1	15 40	− 1	1 10 35	PP	29·6
Ville Marie		87·3	332	e 12 51	+ 1	—	—	—	—	—
Ottawa		87·5	329	e 12 52	+ 1	—	—	—	—	43·5

For Notes see next page.

NOTES TO JUNE 18d. 18h. 44m. 32s.

Additional readings :—
Warsaw ePN =6m.14s., eSN =11m.40s., P_cSN =12m.32s., eSSE =13m.30s., eSSZ = 13m.45s., eSSSN =14m.4s., eZ =14m.38s.
Budapest PN =6m.35s., eE =11m.31s.
Calcutta iE =11m.51s. and 14m.26s.
Raciborzu ePPP?N =7m.56s., iPPP?E =8m.0s.
Upsala ePN =6m.55s., i =7m.48s., eN =10m.8s., eE =12m.6s., eSE =13m.16s., SN = 13m.20s., eSSN =16m.10s.
Collmberg 7m.45s.
Potsdam esSZ =12m.34s., eZ =15m.34s.
Stuttgart iP =7m.11s.k, eZ =7m.23s.
Strasbourg e =7m.41s., ePPP =9m.5s., e =10m.19s., eS =13m.13s., eSSS =15m.56s., e =20m.43s.
Tortosa PPPE =10m.17s., S_cSE =13m.59s., SSSE =18m.5s.
Alicante PPP =11m.27s.
Toledo e =9m.3s., P_cP =9m.19s., eS =17m.49s.
Granada P_cP =9m.51s.a, PS =17m.21s., iSS =19m.28s.
Long waves were also recorded at Helsinki.

June 18d. Readings also at 0h. (Copenhagen), 3h. (Upsala), 4h. (Mount Wilson, Riverside, Pierce Ferry, and Tucson), 9h. (Stuttgart, near Salo, Florence, Bologna, Rome, Triest, and Padova), 10h. (near Istanbul (2), near Alicante), 11h. (Almata, Frunse, and Andijan), 13h. (Stuttgart (2)), 15h. (Stuttgart (2) and near Kulyab), 16h. (Fresno), 17h. (Mineral), 18h. (near Branner), 19h. (Mineral, Belgrade, and near Ashkabad), 20h. (near Stuttgart and Strasbourg), 21h. (near Murgab).

June 19d. 6h. 18m. 36s. (I) 6h. 57m. 0s. (II) 7h. 5m. 34s. (III) } Epicentre 43°·2S. 169°·2E.

Intensity VI round the epicentre ; IV at Bruce Bay, South Island.

R. C. Hayes.
Earthquakes in New Zealand during year 1948. New Zealand Journal of Science and Technology, Sect. B, Vol. 31, No. 1, July, 1949, p. 39. Map of epicentre p. 38. Epicentre as adopted.

A = −·7183, B = +·1370, C = −·6821 ; δ = −2 ; h = −3 ;
D = +·187, E = +·982 ; G = +·670, H = −·128, K = −·731.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Kaimata	1·8	67	0 32	0	0 55	− 1	—	—	—
II		1·8	67	0 36	+ 4	0 57	+ 1	—	—	—
III		1·8	67	0 36	+ 4	0 56	0	—	—	—
I	Christchurch	2·5	98	0 41	− 2	1 13	− 1	—	—	—
II		2·5	98	0 39	− 4	1 10	− 4	—	—	—
III		2·5	98	0 40	− 3	1 12	− 2	—	—	—
I	Wellington	4·6	67	1 10	− 2	2 2	− 5	—	—	—
II		4·6	67	1 8	− 4	—	—	—	—	—
III		4·6	67	1 10	− 2	2 2	− 5	—	—	—
I	New Plymouth E.	5·5	43	1 28	+ 3	2 31	+ 1	—	—	—
II	E.	5·5	43	e 1 30	+ 5	2 26	− 4	—	—	—
III	E.	5·5	43	1 28	+ 3	2 31	+ 1	—	—	—
I	Tuai N.	7·4	56	1 52	0	—	—	—	—	—
II	N.	7·4	56	1 52	0	—	—	—	—	—
III	N.	7·4	56	1 52	0	—	—	—	—	—
I	Auckland N.	7·6	36	2 6	P*	3 16	− 7	—	—	—
II	N.	7·6	36	—	—	e 3 25	+ 2	—	—	—
III	N.	7·6	36	2 36	P_s	3 51	S*	—	—	—
I	Riverview	16·9	298	i 4 12k	+13	i 7 41	+34	—	—	e 8·7
III		16·9	298	i 4 10k	+11	e 7 37	+30	—	—	e 8·7
I	Brisbane	20·4	315	e 4 52	+11	i 8 55	+30	—	—	—
III		20·4	315	i 4 51	+10	i 8 52	+27	—	—	—
III	Mizusawa E.	85·8	338	—	—	26 32	?	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
I	Ksara	142·7	271	e 19 37	[+ 2]	e 33 42	PS	—	—	—
III		142·7	271	e 19 35	[0]	—	—	e 23 16	PP	—
I	Helwan	144·0	263	i 19 39	[+ 2]	—	—	—	—	—
I	Tamanrasset	155·6	220	e 19 59	[+ 4]	—	—	—	—	—
III	Cheb	162·7	303	—	—	e 35 23	PS	—	—	e 42·1
III	Stuttgart	165·0	300	e 20 8?	[+ 2]	—	—	e 21 7	PKP_2	e 100·4
III	Paris	169·2	306	e 25 16	PP	e 52 26?	SSS	—	—	e 96·4

Additional readings :—
Riverview I iEZ = 4m.33s., iN = 4m.45s., iZ = 7m.45s., eQN = 7m.54s., III iZ = 4m.17s., iN = 7m.44s., iE = 8m.37s.
Brisbane I iSN = 9m.7s., III iS?E = 9m.13s. and 9m.48s.
Long waves were also recorded to shock I at Alicante and Granada, III at Alicante and De Bilt.

Jan. 19d. 17h. 15m. 34s. Epicentre 49°·0N. 8°·3E. (as on 7d.).

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Strasbourg		0·5	220	e 0 13	− 1	i 0 20	− 3	i 0 23	Q
Stuttgart		0·6	109	e 0 12	P_g	i 0 21	− 5	e 0 16	P
Ebingen		0·9	150	e 0 19	− 1	i 0 32	− 2	—	—
Basle		1·5	198	e 0 29	+ 1	e 0 50	+ 1	—	—
Zürich		1·6	173	e 0 30	0	e 0 52	+ 1	—	—
Neuchatel		2·2	204	i 0 42	+ 4	i 1 10	+ 4	—	—
Jena	N.	2·9	47	—	—	e 1 20	− 4	e 1 32	S_g
Uccle		3·1	307	e 1 45	S_g	—	—	—	—

June 19d. 22h. 57m. 28s. Epicentre 53°·1N. 35°·1W. (as on 1948, April 26d.).

A = +·4933, B = −·3467, C = +·7977 ; δ = −13 ; h = −7 ;
D = −·575, E = −·818 ; G = +·653, H = −·459, K = −·603.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Paris		23·9	85	e 5 16	0	e 9 42	+12	e 12·0
Uccle		24·2	79	e 5 23	+ 4	e 9 43	+ 8	e 11·5
De Bilt		24·3	75	i 5 21	+ 1	e 9 47	+10	e 11·5
Clermont-Ferrand		25·7	91	i 5 35	+ 2	i 10 17	+16	13·0
Strasbourg		27·1	82	e 5 47	+ 1	e 10 15	− 9	14·0
Ottawa		27·3	271	e 5 48	0	—	—	14·5
Copenhagen		27·4	65	—	—	11 22	SS	14·5
Stuttgart		27·9	80	e 5 51	− 3	e 10 57	+20	e 14·5
Tamanrasset		43·1	119	i 8 9k	+ 5	—	—	—
Yalta		44·8	72	8 14	− 3	e 14 57	+ 2	—
Helwan		52·8	88	e 9 23	+ 4	—	—	—
Pierce Ferry		55·8	287	e 9 40	− 1	—	—	—
Boulder City		56·4	287	e 9 47	+ 2	—	—	—
Tucson		56·7	281	i 9 47	− 1	—	—	—
Shasta Dam		57·3	296	e 9 48	− 4	—	—	—
Tinemaha	z.	57·6	290	e 9 53	− 1	—	—	—
Fresno	z.	58·7	291	e 10 0	− 2	—	—	—
Riverside	z.	59·2	288	i 10 5	0	—	—	—
Palomar	z.	59·4	286	i 10 5	− 1	—	—	—

Additional readings :—
Paris e = 5m.36s. and 7m.20s.
Clermont-Ferrand i = 9m.33s.
Strasbourg eP = 5m.57s., e = 10m.32s.
Stuttgart e = 8m.5s.
Shasta Dam i = 10m.20s.
Fresno iNZ = 10m.8s.
Long waves were also recorded at Alicante, Potsdam, and Warsaw.

June 19d. 23h. 11m. 16s. Epicentre 12°·4N. 144°·1E. (as on 1946, June 12d.).

$A = -\cdot7914$, $B = +\cdot5729$, $C = +\cdot2134$; $\delta = +7$; $h = +6$;
$D = +\cdot586$, $E = +\cdot810$; $G = -\cdot173$, $H = +\cdot125$, $K = -\cdot977$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Irkutsk		51·0	329	—	—	e 16 21	− 1	—	—
Andijan		67·5	309	e 11 1	+ 1	e 20 0	+ 4	—	—
Kulyab		70·2	306	e 11 14	− 3	—	—	—	—
Tashkent		70·5	310	e 11 19?	+ 1	e 20 25?	− 7	—	—
Stalinabad		70·9	307	e 11 19	− 2	e 20 34	− 2	—	—
Samarkand		72·3	308	e 11 30	+ 1	—	—	—	—
Sverdlovsk		76·1	326	11 48	− 3	e 21 29	− 6	—	—
Shasta Dam		84·7	49	i 12 35	− 2	—	—	—	—
Fresno	z.	87·5	53	e 12 50	− 1	—	—	—	—
Santa Barbara	z.	88·1	55	e 12 56	+ 2	—	—	—	—
Tinemaha		88·6	52	i 12 56	0	—	—	—	—
Haiwee	z.	89·1	53	e 12 58	0	—	—	—	—
Pasadena	z.	89·4	55	i 12 58	− 2	—	—	—	—
Riverside	z.	90·1	55	i 13 0	− 3	—	—	—	—
Palomar		90·7	55	i 13 4	− 2	—	—	—	—
Boulder City		91·6	53	e 13 12	+ 2	—	—	—	—
Pierce Ferry		92·2	52	i 13 11	− 2	—	—	i 13 27	pP
Tucson		95·8	55	e 13 33	+ 4	—	—	—	—

Additional readings :—
Shasta Dam i = 12m.50s.
Tinemaha iZ = 13m.10s.
Haiwee iZ = 13m.12s.
Pasadena iZ = 13m.13s.
Riverside iZ = 13m.16s.
Palomar iZ = 13m.19s.
Tucson e = 13m.51s.
Long waves were also recorded at Potsdam, Paris, Strasbourg, De Bilt, and Uccle.

June 19d. Readings also at 4h. (near Bogota), 8h. (near Frunse), 9h. (Strasbourg), 10h. (Tashkent, near Andijan (2), Kulyab, Murgab, Obi-garm, Samarkand, and Stalinabad), 11h. (Mizusawa, Stuttgart, Stalinabad, and near Kulyab), 14h. (La Paz, Montezuma, Frunse, Samarkand, near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and Tashkent), 15h. (Scoresby Sund), 16h. (Upsala, Ottawa, Berkeley, Branner, near Lick, and near Mineral (2)), 17h. (Tamanrasset, Copenhagen, Warsaw, Potsdam, De Bilt, Uccle, Paris, Strasbourg, Stuttgart, Clermont-Ferrand, Istanbul, Alicante, and Granada), 18h. (Shasta Dam), 20h. (Fresno, Shasta Dam, and near Mineral), 21h. (Boulder City, Pierce Ferry, Shasta Dam, Fresno, near Mineral, and near Obi-garm), 22h. (Lick), 23h. (Ksara, Potsdam, Paris, and Clermont-Ferrand).

June 20d. 0h. 33m. 9s. Epicentre 34°·7N. 137°·9E. Depth of focus 0·040.
(as on 1947, November 30d.).

Intensity V at Tatekura (Ibaragi Prefecture), Higashidate (Hukusima Prefecture); IV at Maebasi, Kakioka, and Mito; II-III at Tokyo, Onahama, Hukusima, Morioka, and Miyako. Epicentre 34°·5N. 138°·E. Depth 300km. Macroseismic radius 300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948, Tokyo, 1950, pp. 24, 25, with macroseismic chart.

$A = -\cdot6114$, $B = +\cdot5524$, $C = +\cdot5667$; $\delta = +10$; $h = 0$;
$D = +\cdot670$, $E = +\cdot742$; $G = -\cdot420$, $H = +\cdot380$, $K = -\cdot824$.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Shizuoka	0·5	57	0 39k	+ 2	1 8	+ 2	—	—	—
Nagoya	0·9	296	0 39a	0	1 12	+ 3	—	—	—
Hunatu	1·1	42	0 42k	+ 2	1 11	0	—	—	—
Gihu	1·2	307	0 41	+ 1	1 12	0	—	—	—
Kameyama	1·2	277	0 36a	− 4	1 6	− 6	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hikone		1·5	293	0 45a	+ 3	1 15	0	—	—	—
Mera		1·6	82	0 45k	+ 2	1 16	0	—	—	—
Yokohama		1·6	63	0 46	+ 3	1 20	+ 4	—	—	—
Tokyo		1·8	57	0 45k	+ 1	1 21	+ 2	—	—	—
Kumagaya		1·9	40	0 47	+ 2	1 21	+ 1	—	—	—
Nagano		2·0	7	0 48	+ 2	1 24	+ 2	—	—	—
Osaka		2·0	271	0 45a	− 1	1 19	− 3	—	—	—
Kobe		2·3	270	0 47	− 1	1 21	− 5	—	—	—
Tukubasan		2·3	29	0 49	+ 1	—	—	—	—	—
Kakioka		2·4	50	0 50k	+ 1	1 27	− 1	—	—	—
Utunomiya		2·4	41	0 51	+ 2	1 28	0	—	—	—
Sumoto		2·5	262	0 49a	− 1	1 27	− 3	—	—	—
Mito		2·7	51	0 54k	+ 2	1 35	+ 2	—	—	—
Toyooka		2·7	288	0 50a	− 2	1 30	− 3	—	—	—
Wazima		2·8	343	0 53	0	1 24	−11	—	—	—
Aikawa		3·3	5	1 0a	+ 2	1 44	0	—	—	—
Onahama		3·3	47	0 59a	+ 1	1 48	+ 4	—	—	—
Muroto		3·4	246	0 57	− 2	1 44	− 2	—	—	—
Hukusima		3·7	33	1 3k	0	1 52	0	—	—	—
Sendai		4·3	33	1 10k	+ 1	2 3	− 1	—	—	—
Hamada		4·8	274	0 59	−16	1 52	−22	—	—	—
Mizusawa	E.	5·1	29	1 20	+ 1	2 20	0	—	—	—
Akita		5·3	18	1 21	0	2 25	0	—	—	—
Miyako		5·9	32	1 26	− 2	2 33	− 5	—	—	—
Miyazaki		6·1	245	1 32	+ 1	—	—	—	—	—
Hukuoka		6·3	263	1 31a	− 2	2 43	− 3	—	—	—
Hatinohe		6·5	25	1 27	− 9	2 38	−13	—	—	—
Kagosima		6·9	245	1 42	+ 1	2 59	− 1	—	—	—
Mori		7·7	15	1 49	− 1	3 11	− 6	—	—	—
Sapporo		8·8	16	2 5k	+ 1	3 41	− 1	—	—	—
Vladivostok		9·6	333	i 2 13	− 1	i 3 59	− 1	—	—	—
Irkutsk		29·7	317	e 5 39	− 3	10 15	− 1	—	—	—
Frunse		49·0	300	e 8 25	+ 5	e 15 1?	0	—	—	—
Andijan		51·1	297	i 8 33	− 2	e 15 27	− 3	—	—	—
Tashkent		53·2	300	e 8 47	− 4	e 15 52	− 6	e 17 44	sS	—
Obi-garm		53·7	296	e 8 52	− 2	e 16 2	− 3	e 9 54?	pP	—
Kulyab		53·9	295	e 8 57?	+ 1	e 16 5?	− 3	e 17 55?	sS	—
Stalinabad		54·4	306	i 8 58	− 2	16 11	− 3	e 10 2	pP	—
Sverdlovsk		55·0	320	9 3	− 1	16 19	− 3	—	—	—
Brisbane	N.	63·5	164	e 10 2	0	—	—	—	—	—
Moscow		67·4	323	e 10 24	− 2	e 18 53	− 5	e 11 30	pP	—
Shasta Dam		74·8	51	e 11 12	+ 2	—	—	e 12 17	pP	—
Copenhagen		78·7	332	11 30	− 2	—	—	—	—	—
Istanbul		80·2	313	e 10 51?	−49	—	—	e 12 51?	PP	—
Pierce Ferry		82·8	51	i 11 55	+ 2	—	—	i 13 2	pP	—
Stuttgart		85·2	329	i 12 3k	− 2	e 22 7	− 2	—	—	e 53·8
Paris		87·8	332	e 12 15	− 3	—	—	—	—	—
Clermont-Ferrand		90·1	330	i 12 28	− 1	—	—	—	—	—
										—

June 20d. 8h. Undetermined shock. Atlantic Ocean, near the Equator.

La Paz PN =50m.22s., iZ =51m.16s., LZ =58m.36s.
Huancayo eP? =50m.46s., eS =55m.11s., eL =55m.41s.
La Plata N =51m.54s., L?N =55m.11s.
Tucson eP =56m.5s., e =56m.31s., eL =83m.16s.
Palomar ePZ =56m.27s.
Riverside ePZ =56m.30s., eZ =56m.50s.
Pierce Ferry eP =56m.36s.
Boulder City eP? =56m.40s.
Pasadena ePZ =56m.40s., eZ =57m.10s., eN =67m.6s., eLE =79·5m.
Tinemaha ePZ =56m.40s., eZ =57m.8s.
Mineral ePZ =57m.18s.
Shasta Dam eP =57m.18s.
Ksara e? =65m.28s., e =80m.54s.
Istanbul e =66m.
Riverview eEN =67m.39s., eN =68m.35s. and 68m.41s., eLZ =84·2m.
Berkeley eN =67m.52s. and 77m.51s., eE =82m.30s., eN =85m.18s.
Long waves were also recorded at Bogota, Apia, Arapuni, Auckland, Christchurch, and Wellington.

June 20d. 14h. 58m. 20s. Epicentre 39°·3N. 41°·2E. (as on 1948, May 19d.).

A = +·5838, B = +·5111, C = +·6308 ; δ = −5 ; h = −1 ;
D = +·659, E = −·752 ; G = +·475, H = +·416, K = −·776.

		Δ	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Leninakan		2·6	54	e 0 4?	?	—	—	—
Erevan		2·7	71	e 0 40	− 5	—	—	—
Baku		6·8	78	e 1 44	0	—	—	—
Ksara		7·0	220	e 1 59?	P*	3 44	S_g	—
Yalta		7·4	317	e 1 57?	+ 5	—	—	—
Istanbul		9·4	285	2 23	+ 5	5 7	S_g	—
Helwan		12·6	224	e 2 59	− 4	—	—	—
Moscow		16·6	354	e 3 56	0	7 2	+ 2	—
Warsaw		19·0	321	e 4 30	+ 4	e 8 6	+11	e 8·6
Tashkent		21·5	75	i 4 53	+ 1	—	—	—
Sverdlovsk		21·7	30	4 54	− 1	8 56	+ 5	—
Stuttgart	z.	24·7	305	e 5 23	− 1	—	—	—
Copenhagen		25·2	321	—	—	9 57	+ 5	15·7
Tamanrasset		34·4	252	i 6 51a	0	—	—	—

Warsaw gives also eE = 4m.33s. and 8m.16s., eN = 8m.29s.
Long waves were also recorded at Collmberg, Potsdam, and De Bilt.

June 20d. 20h. 34m. 35s. Epicentre 36°·9N. 121°·7W. (as on 1948, March 28d.).

A = −·4213, B = −·6821, C = +·5978 ; δ = +12 ; h = −1 ;
D = −·851, E = +·525 ; G = −·314, H = −·509, K = −·802.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	
		°	°	m. s.	s.	m. s.	s.	m. s.	
Lick		0·4	6	i 0 11	− 2	i 0 16	− 5	—	—
Santa Clara		0·5	336	e 0 12	− 2	e 0 21	− 2	—	—
Branner		0·6	323	i 0 15	0	i 0 25	− 1	—	—
San Francisco	E.	1·0	325	e 0 25?	+ 4	—	—	—	—
Berkeley		1·1	335	i 0 23	+ 1	i 0 37	− 2	i 0 26	P_g
Fresno		1·5	96	e 0 30	+ 2	i 0 50	+ 1	—	—
Mineral		3·4	1	i 1 2	P*	i 1 47	S*	i 1 52	S_g
Shasta Dam		3·8	352	e 1 36	P_g	—	—	e 2 5	S_g

Branner gives also iEN = 48s.

June 20d. Readings also at 3h. (near Kulyab (2) and Stalinabad), 4h. (near Andijan, near Berkeley, Branner, Lick, near Reykjavik (2), near Basle, Zürich, Strasbourg, and Stuttgart), 5h. (Stuttgart), 6h. (Lick and near Reykjavik), 7h. (near Strasbourg, Stuttgart, and Uccle), 8h. (Palomar, Pasadena, Tinemaha, Tucson, Pierce Ferry, and Shasta Dam), 10h. (Reykjavik (2), and near Apia), 11h. (Belgrade and Shasta Dam), 14h. (Frunse, Samarkand, Tashkent, near Andijan, Kulyab, Murgab, Obi-garm, Stalinabad, and near Ashkabad), 15h. (near Alicante), 16h. (La Paz, Bogota, and Pierce Ferry (2)), 17h. (Palomar, Pasadena, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, and Shasta Dam), 18h. (near Apia), 19h. (near Ferndale, Mineral, and Shasta Dam), 21h. (Fresno, Mineral, Shasta Dam, Andijan, Ashkabad, Frunse, Samarkand, near Kulyab, Obi-garm, Stalinabad, and Tashkent), 22h. (Fresno and Mineral), 23h. (Ksara (2)).

June 21d. 12h. 5m. 22s. Epicentre 3°·4N. 125°·3E.

A = −·5769, B = +·8147, C = +·0589 ; δ = +2 ; h = +7 ;
D = +·816, E = +·578 ; G = −·034, H = +·048, K = −·998.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia	20·7	243	i 4 45	+ 1	e 8 48	+17	—	—	13·6
Guam	21·7	61	i 3 53	−62	i 7 5	−46	—	—	—
Kagosima	28·4	9	5 58	0	—	—	—	—	—
Miyazaki	28·9	12	6 5	+ 2	10 54	+ 1	—	—	—
Kumamoto	29·7	9	6 4	− 6	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Hukuoka		30·4	9	e 6 15	− 1	11 13	− 3	—	—	15·0
Siomisaki		31·5	18	e 6 38?	+12	—	—	—	—	—
Sumoto		32·1	16	i 7 30	+59	12 42	+59	—	—	—
Kobe		32·5	16	6 35	+ 1	—	—	—	—	—
Osaka		32·5	16	e 6 33	− 1	11 44	− 5	—	—	—
Kameyama		33·0	18	6 39	0	—	—	—	—	—
Toyooka		33·2	16	6 38	− 2	—	—	—	—	—
Hikone		33·3	18	6 47	+ 6	—	—	—	—	—
Omaesaki		33·3	20	6 37	− 4	—	—	—	—	—
Nagoya		33·4	19	6 43	+ 1	—	—	—	—	—
Gihu		33·6	19	e 6 45	+ 1	—	—	—	—	—
Shizuoka		33·7	20	6 30	−15	—	—	—	—	—
Misima		34·0	20	6 49	+ 1	—	—	—	—	—
Hunatu		34·3	20	e 6 50	0	—	—	—	—	17·8
Tokyo		34·8	21	e 6 40	−14	9 50	P_cP	—	—	—
Toyama		34·9	16	7 9	+14	—	—	—	—	—
Kumagaya		35·1	20	7 3	+ 6	—	—	—	—	—
Nagano		35·2	18	e 6 57	− 1	—	—	—	—	—
Mito		35·7	21	e 7 45	+43	13 52	+73	—	—	—
Hukusima		36·9	20	7 12	0	12 57	− 1	—	—	—
Sendai		37·5	21	7 15	− 2	13 4	− 3	—	—	—
Mizusawa	E.	38·4	20	7 33	+ 8	13 17	− 3	—	—	—
	N.	38·4	20	7 30	+ 5	13 20	0	—	—	—
Miyako		39·1	21	e 7 28	− 3	13 27	− 4	—	—	—
Aomori		39·8	19	7 23	−13	—	—	—	—	—
Vladivostok		40·0	8	i 7 37	− 1	i 13 41	− 3	—	—	—
Calcutta	E.	40·5	301	e 8 0	+18	i 14 4	+12	i 9 42	PPP	19·2
Brisbane		40·7	140	i 7 45	+ 1	i 13 48	− 7	i 9 20	PP	i 17·5
Sapporo		42·1	17	e 7 58	+ 3	14 16	0	—	—	—
Riverview		44·3	148	i 8 15a	+ 2	i 14 49	+ 1	i 8 24	pP	—
Colombo	E.	45·4	277	8 25	+ 3	14 58	− 6	—	—	28·2
Kodaikanal	E.	47·9	282	i 8 45	+ 3	i 15 44	+ 5	10 36	PP	23·2
Hyderabad	N.	48·0	290	—	—	15 38	− 3	—	—	—
Irkutsk		51·7	343	9 10	− 1	i 16 30	− 2	—	—	—
Bombay		53·5	291	e 9 27	+ 3	i 17 0	+ 3	20 45	SS	26·4
Murgab		58·2	314	9 59	+ 1	18 0	+ 1	—	—	—
Almata		58·4	320	10 1	+ 1	17 59?	− 3	—	—	—
Frunse		59·7	319	e 10 8	− 1	—	—	—	—	—
Andijan		60·3	315	10 13?	0	18 28?	+ 2	—	—	—
Auckland	N.	61·0	136	12 35	PP	18 38	+ 3	20 4	S_cS	—
Kulyab		61·1	312	i 10 18	0	i 18 36	− 1	—	—	—
Obi-garm		61·5	313	i 10 20	− 1	i 18 36	− 6	—	—	—
Stalinabad		62·1	313	i 10 22	− 3	i 18 48	− 1	—	—	—
Arapuni	E.	62·2	137	—	—	e 20 38	S_cS	—	—	—
Tashkent		62·7	315	i 10 29	0	i 18 59	+ 2	—	—	—
Christchurch		63·1	143	10 36	+ 4	19 2	0	20 28	S_cS	31·1
Wellington		63·2	140	10 29	− 3	18 57	− 6	10 54	pP	29·6
Tuai	N.	63·6	137	10 35	0	19 3	− 5	20 25	S_cS	—
Samarkand		63·8	313	e 10 38	+ 2	—	—	—	—	—
Apia	N.	64·7	107	—	—	e 19 18	− 4	—	—	—
Ashkabad		69·8	309	e 11 15	+ 1	e 20 25	+ 2	—	—	—
Sverdlovsk		73·5	329	i 11 32	− 4	i 20 59	− 7	—	—	—
Honolulu		76·5	69	e 11 55	+ 1	e 21 51	+12	—	—	e 37·7
Baku		76·7	311	e 12 9?	+14	—	—	—	—	—
Grozny		80·1	313	e 12 18	+ 5	—	—	—	—	—
Erevan		80·8	310	—	—	e 22 23	− 2	—	—	—
Leninakan		81·3	311	e 12 21	+ 1	—	—	—	—	—
College		85·6	26	e 12 46	+ 5	e 23 8	− 5	e 15 57	PP	e 37·2
Moscow		85·9	326	i 12 41	− 2	i 23 10	− 6	—	—	—
Ksara		87·6	303	i 12 53	+ 2	e 23 39	+ 7	—	—	—
Theodosia		87·6	315	—	—	e 23 9	[− 9]	—	—	—
Helwan		91·8	300	i 13 11k	0	24 14	+ 3	16 52	PP	—
Sitka		92·2	33	e 13 9	− 4	e 24 19	+ 5	e 16 44	PP	e 37·6
Istanbul		92·5	311	13 15	+ 1	—	—	i 16 59	PP	—
Bucharest	N.	94·2	315	e 15 37	?	e 24 55	+24	—	—	—
Upsala		95·9	331	e 21 38?	?	e 24 10	[+ 4]	e 26 51	PPS	e 41·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Warsaw	E.	96·0	323	e 13 33	+ 3	e 24 53	+ 6	e 17 33	PP	e 42·6
	N.	96·0	323	—	—	e 24 45	− 2	e 24 5	SKS	e 41·6
	Z.	96·0	323	e 13 30a	0	e 25 11	+24	17 29	PP	e 43·6
Belgrade		98·1	316	e 17 33	PP	—	—	—	—	58·6
Copenhagen		99·8	328	17 54	PP	24 25	[− 1]	—	—	—
Prague		100·6	322	e 17 54	PKP	e 24 20	[−10]	e 18 20	PP	e 48·6
Potsdam		100·7	325	e 13 51	− 1	i 25 28	+ 2	i 18 1	PP	e 49·6
Victoria		101·4	39	—	—	e 25 14	−18	—	—	42·6
Triest		102·4	318	e 18 17	PP	i 24 35	[− 4]	e 20 37	PPP	—
Scoresby Sund		103·1	349	18 20	PP	24 48	[+ 6]	19 56	PPP	—
Stuttgart		104·3	322	e 14 7	− 1	e 25 48	− 8	e 18 29	PP	e 51·6
Ukiah		104·3	48	—	—	e 24 51	[+ 4]	27 8	PS	e 48·2
Bologna		104·4	317	e 14 56	+48	e 24 2	[−46]	e 18 25	PP	—
Rome		104·5	315	e 18 26	PP	e 33 19	SS	e 20 46	PPP	e 51·1
Shasta Dam		104·5	47	e 14 8	0	e 24 59	[+11]	i 18 18	PP	—
Mineral	Z.	105·2	47	e 14 15	P	e 27 56	PS	e 18 27	PP	—
De Bilt		105·2	326	e 18 27	PP	e 24 32	[−19]	e 27 58	PS	e 49·6
Strasbourg		105·2	322	e 14 15	P	e 24 50	[− 1]	e 18 33	PP	55·3
Zürich		105·2	321	—	—	e 24 38?	[−13]	—	—	—
Berkeley		105·4	49	e 14 5	P	i 24 52	[0]	e 18 11	PKP	—
Basle		105·7	321	e 15 55	?	—	—	e 20 16	PPP	—
Santa Clara		105·8	49	e 18 31	[+ 6]	e 27 52	PS	—	—	—
Aberdeen		106·3	333	—	—	i 26 11	− 2	e 39 19	SSS	e 54·8
Uccle		106·3	326	e 18 38	PP	e 24 38?	[−18]	—	—	e 52·6
Durham		107·4	331	—	—	e 24 52	[− 9]	—	—	—
Edinburgh		107·5	332	e 22 38	PKS	—	—	—	—	—
Fresno	Z.	107·6	49	e 17 27	PKP	—	—	—	—	—
Paris		108·3	324	e 14 25	P	e 25 2	[− 3]	e 18 58	PP	e 55·6
Tinemaha	Z.	108·7	49	e 14 33	P	—	—	i 19 6	PP	—
Clermont-Ferrand		109·3	321	i 19 6	PP	i 25 12	[+ 3]	i 21 33	PPP	52·1
Saskatoon		109·4	31	e 18 56	PP	e 25 14	[+ 4]	e 28 26	PS	47·6
Pasadena		109·7	52	e 18 1	[−31]	i 25 24	[+13]	i 19 6	PP	e 50·3
Bozeman		110·2	38	e 18 5	[−29]	e 25 11	[− 2]	e 28 34	PS	e 45·9
Riverside	Z.	110·4	52	e 14 43	P	—	—	i 19 18	PP	—
Boulder City		111·6	49	e 18 24	[−12]	—	—	e 18 41	PP	—
Pierce Ferry		112·2	49	e 18 42	[+ 4]	—	—	—	—	—
Tortosa	E.	113·2	317	19 36	PP	29 2	PS	22 18	PPP	e 56·6
Alicante		115·0	315	19 48	PP	23 37	?	—	—	e 52·4
Tamanrasset		115·8	297	i 18 50a	[+ 5]	—	—	e 19 34	PP	e 58·4
Tucson		116·1	51	i 18 49	[+ 4]	i 29 32	PS	e 19 47	PP	e 46·2
Toledo		117·2	318	e 18 47	[0]	e 29 54	PS	e 22 16	PPP	61·4
Granada		117·7	315	i 18 58k	[+10]	25 41	[− 1]	20 19	PP	56·8
Ville Marie		125·0	21	e 19 4	[+ 2]	—	—	—	—	—
Temiskaming		125·7	20	e 19 9	[+ 5]	—	—	e 20 57	PP	—
St. Louis		126·8	34	e 19 12	[+ 6]	e 22 35	PKS	e 21 13	PP	—
Ottawa		127·9	18	i 19 10	[+ 2]	e 32 14	PPS	e 21 13	PP	67·6
Cleveland		129·1	26	e 19 12	[+ 2]	e 26 16	[− 2]	e 21 16	PP	—
Tacubaya	E.	130·7	61	i 19 19	[+ 6]	i 22 44	PKS	e 23 53	PPP	—
Harvard		131·8	16	i 19 12	[− 3]	e 22 38	PKS	i 21 5	PP	e 66·6
Fordham		132·6	19	i 19 18	[+ 1]	i 22 44	PKS	e 21 41	PP	70·0
Philadelphia		132·9	21	e 21 37	PP	e 26 28	[+ 1]	i 22 47	PKS	e 70·1
Georgetown		133·1	23	e 19 9	[− 9]	e 26 17	[−10]	e 21 32	PP	e 65·6
Bermuda		143·2	14	e 19 41	[+ 5]	e 27 14	[+30]	e 22 49	PP	e 68·3
San Juan		155·6	26	e 20 6	[+11]	e 27 20	[+20]	e 24 2	PP	e 83·1
Huancayo		157·8	115	e 19 39	[−19]	e 27 9	[+ 7]	e 24 17	PP	e 76·3
Bogota		159·1	68	i 20 6	[+ 6]	i 27 14	[+10]	20 43	PKP,	e 50·6
La Paz		161·5	137	i 20 7a	[+ 5]	i 45 2	SS	i 24 34	PP	81·0

Additional readings :—
Guam iS =8m.22s.
Calcutta iSSSE =17m.2s.
Brisbane iN =8m.24s., 9m.25s., and 9m.50s., iE =9m.55s., iSE =13m.51s., iSSN = 16m.48s., iE =18m.5s.
Riverview iPPEN =10m.4s., iEN =10m.17s., iPSN =15m.0s., iSSEN =18m.4s., iS_eSN =18m.8s., iNZ =18m.17s., iZ =18m.27s., iN =18m.45s., iSSSN =18m.57s., iN =20m.4s.
Kodaikanal SSE =18m.49s.

Continued on next page.

Bombay SSN = 20m.49s.
Auckland iN = 21m.54s., SSSN = 25m.33s.
Christchurch SSEN = 24m.3s., QEN = 26m.28s.
Wellington sPZ = 11m.8s., P_cPZ = 11m.20s., pP_cPZ = 11m.43s., PPZ = 12m.52s., pPPZ = 13m.12s., P_cS = 15m.16s., pP_cS = 16m.1s., sS = 19m.35s., S_cS = 20m.12s., e = 21m.27s., SS = 22m.49s., iZ = 25m.1s., Q = 26m.28s.
Helwan SKS = 23m.38s.
Sitka iSKS = 23m.37s., ePS = 25m.29s., eSS = 29m.49s.
Upsala ePPSN = 26m.56s., eSSN = 31m.8s., eSSSE = 35m.38s.?,
Warsaw ePPPZ = 19m.26s., ePPPE = 19m.41s., eZ = 22m.3s., eSKSZ = 23m.35s., ePSZ = 25m.46s., ePSN = 26m.0s., ePSE = 26m.5s., ePPSE = 26m.50s., ePPSN = 26m.53s., ePKKPEZ = 28m.22s., eZ = 30m.21s., eE = 30m.30s., eN = 30m.35s., eSSZ = 31m.22s., eSSEN = 31m.26s., eE = 33m.54s., eSSS?N = 35m.9s., eSSSE = 35m.28s., eSSSZ = 35m.32s., eZ = 36m.59s.
Prague ePPP = 21m.9s., e = 25m.56s., ePS = 26m.20s., ePPS = 27m.50s., e = 30m.56s., eSS = 32m.26s., eSSS = 37m.20s.
Potsdam eSKSEN = 24m.30s., ePSE = 26m.56s., ePPS?N = 28m.7s., ePPS?Z = 28m.10s.
Triest ePS = 27m.20s.
Scoresby Sund 25m.41s., SS = 32m.50s.
Stuttgart ePS = 27m.50s., ePPS = 28m.38s., eSS = 33m.6s.
Ukiah eSS = 33m.24s.
Bologna e = 23m.3s.
Shasta Dam e = 17m.43s., i = 18m.42s., e = 22m.50s.
Strasbourg ePP = 18m.38s., e = 19m.51s., ePPP = 20m.48s. and 20m.54s., iS = 26m.5s., eS = 26m.13s. and 26m.46s., ePS = 28m.2s., ePPS = 28m.53s. and 28m.56s., eSS = 33m.45s., e = 35m.57s. and 36m.32s., eSSS = 37m.27s.
Berkeley iEZ = 18m.36s., iZ = 20m.48s., iE = 27m.56s. and 29m.20s.
Durham iE = 25m.9s.
Fresno iZ = 17m.55s.
Paris ePPP = 21m.25s., e = 23m.2s. and 24m.18s., eS = 26m.25s., ePS = 28m.25s. and 28m.33s., ePPS = 29m.38s.?, eSS? = 33m.38s.?, eSSS? = 37m.38s.?, e = 44m.38s.?
Tinemaha iZ = 15m.14s. and 18m.35s.
Clermont-Ferrand iPS = 28m.24s., iSS = 34m.21s., iSSS = 38m.38s.
Pasadena eZ = 18m.37s., ePSEZ = 28m.14s.
Bozeman ePKP? = 18m.56s., e = 23m.26s., 33m.3s., and 41m.59s.
Riverside e = 18m.49s.
Tortosa SKS?E = 27m.24s., SSE = 35m.3s., SSS?E = 38m.36s.
Alicante PS = 27m.23s., SS = 33m.37s.
Tamanrasset ePPP = 22m.20s.
Tucson iPP = 19m.51s., e = 32m.15s.
Toledo ePPP? = 25m.30s.
Granada PS = 30m.12s., PPS = 31m.35s., iSS = 36m.29s., SSS = 41m.17s.
St. Louis eSP = 31m.10s.
Cleveland ePPZ = 21m.19s., eSKPNZ = 22m.31s., ePPPE = 24m.10s., eE = 30m.40s., eN = 31m.1s.
Tacubaya iE = 19m.52s.
Philadelphia ePPP = 24m.19s., eSKSP = 31m.46s., ePPS = 33m.37s., eSS = 39m.1s.
Georgetown i = 19m.20s., iSKP = 22m.42s., e = 24m.11s., eSKKS = 28m.9s., ePS = 31m.57s., e = 33m.6s., and 33m.52s., eSS = 39m.21s.
Bermuda e = 25m.42s. and 33m.40s., ePPS = 35m.28s., eSS = 41m.25s., eSSS = 46m.55s.
San Juan e = 22m.4s. and 24m.37s., eSKSP = 34m.5s., ePPS = 37m.11s., e = 39m.10s.
Huancayo e = 25m.16s., eSKSP = 34m.50s., ePSPS = 45m.24s.
Bogota iSKPEZ = 23m.29s., iPPEZ = 24m.24s., iPPP?EZ = 28m.18s., iPSKPEZ = 35m.29s.?
La Paz iNZ = 25m.2s., iZ = 30m.38s., iEZ = 46m.50s., SSS = 51m.34s.
Long waves were also recorded at Ivigtut.

June 21d. 13h. 7m. 34s. Epicentre 59°·0N. 67°·0W.

Approximate.

A = + ·2022, B = − ·4765, C = + ·8556; δ = −1; h = −9;
D = − ·921, E = − ·391; G = + ·334, H = − ·788, K = − ·518.

		△	Az.	P.	O−C.	S.	O−C.	L.
		°	°	m. s.	s.	m. s.	s.	m.
Seven Falls		12·1	193	2 53	− 4	5 8	− 6	5·8
Shawinigan Falls		12·9	198	3 5	− 2	5 31	− 2	6·4
Ville Marie		13·9	218	e 3 22	+ 1	e 5 56	− 1	i 6·8
Temiskaming		14·3	216	e 3 29	+ 3	e 6 8	+ 2	i 7·8
Ottawa	z.	14·6	205	3 30	0	6 16	+ 3	—
Harvard		16·8	192	e 4 1	+ 3	e 7 0	− 5	—
Cleveland		19·8	214	(i 4 35)	0	—	—	—

Additional readings and note :—
Ville Marie i = 6m.35s. and 6m.40s.
Harvard e = 7m.51s. and 8m.38s.
Cleveland i = (4m.41s.), iEN = (4m,44s.); readings having been diminished by 6m,

June 21d. 13h. 57m. 38s. Epicentre 3°·4N. 125°·3E. (as at 12h.).

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Batavia		20·7	243	i 4 47	+ 3	e 8 49	+18	—	—	15·9
Vladivostok		40·0	8	i 7 38	0	i 13 43	− 1	—	—	—
Brisbane		40·7	140	i 7 42	− 2	i 13 51	− 4	i 9 32	PP	—
Riverview		44·3	148	i 8 15a	+ 2	e 14 49	+ 1	i 8 26	pP	—
Irkutsk		51·7	343	9 9	− 2	e 16 31	− 1	—	—	—
Bombay		53·5	291	e 9 25	+ 1	e 16 59	+ 2	—	—	—
Murgab		58·2	314	9 59	+ 1	17 55	− 4	—	—	—
Almata		58·4	320	e 9 59	− 1	—	—	—	—	—
Frunse		59·7	319	e 10 8	− 1	—	—	—	—	—
Andijan		60·3	315	e 10 12	− 1	—	—	—	—	—
Kulyab		61·1	312	i 10 18?	0	i 18 42?	+ 5	—	—	—
Obi-garm		61·5	313	i 10 21	0	i 18 42	0	—	—	—
Stalinabad		62·1	313	i 10 32	+ 7	i 18 46	− 3	—	—	—
Tashkent		62·7	315	e 10 28	− 1	i 18 53	− 4	—	—	—
Samarkand		63·8	313	e 10 36	0	e 19 11?	0	—	—	—
Ashkabad		69·8	309	e 11 15	+ 1	—	—	—	—	—
Sverdlovsk		73·5	329	i 11 34	− 2	20 58	− 8	—	—	—
Grozny		80·1	313	e 11 48?	−25	—	—	—	—	—
Moscow		85·9	326	e 12 40	− 3	e 23 9	− 7	—	—	—
Ksara		87·6	303	i 12 51	0	e 23 36	+ 4	—	—	—
Helwan		91·8	300	e 13 10	− 1	—	—	e 17 42	PP	—
Istanbul		92·5	311	13 14	0	—	—	i 17 2	PP	—
Potsdam		100·7	325	e 18 1	PP	—	—	—	—	e 51·4
Stuttgart	Z.	104·3	322	e 18 27	PP	—	—	—	—	—
Shasta Dam		104·5	47	e 18 24	PP	—	—	—	—	—
Strasbourg		105·2	322	e 18 29	PP	—	—	—	—	54·9
Tinemaha	Z.	108·7	49	e 18 24	[− 6]	—	—	—	—	—
Riverside	Z.	110·4	52	e 19 18	PP	—	—	—	—	—
Boulder City		111·6	49	e 18 40	[+ 4]	—	—	—	—	—
Pierce Ferry		112·2	49	e 18 41	[+ 3]	—	—	—	—	—
Tamanrasset		115·8	297	18 48	[+ 3]	—	—	e 19 34	PP	—
Tucson		116·1	51	e 18 30	[−15]	—	—	—	—	—
Tacubaya	E.	130·7	61	i 22 43	PKS	—	—	—	—	—
La Paz	Z.	161·5	137	i 20 8	[+ 6]	—	—	i 24 46	PP	—

Additional readings :—
Brisbane iPN =7m.45s., iN =9m.19s., iSSE =16m.54s., iSSN =16m.57s.
Riverview iPSE =14m.59s., iSSN =18m.4s., iE =18m.15s. and 18m.41s., iSSSN = 18m.56s., iE =19m.2s.

June 21d. Readings also at 3h. (Lick), 4h. (Mineral and Ville Marie), 5h. (Helwan, Ksara, Istanbul, Warsaw, Potsdam, Tamanrasset, and near Bogota), 7h. (Mineral), 10h. (Stuttgart), 11h. (Istanbul), 13h. (Tacubaya), 16h. (near Andijan, Kulyab, and Stalinabad), 18h. (Brisbane and near Ottawa), 20h. (Shasta Dam and near Kulyab), 21h. (Ksara, near Branner, and Lick), 22h. (Apia), 23h. (Ashkabad, near Almata, Andijan, Frunse, Kulyab (2), Murgab, Obi-garm, Samarkand, Stalinabad, and Tashkent).

June 22d. Readings at 3h. (La Paz and Bogota), 4h. (Bologna, near Murgab, Obi-garm, and Kulyab), 7h. (near Andijan), 11h. (Alicante), 12h. (near Kulyab, Obi-garm, and Andijan), 13h. (Paris, Apia, Samarkand, near Kulyab, and Andijan), 14h. (near Andijan, Frunse, and Tashkent), 15h. (Bogota and La Paz), 20h. (Branner and near Ottawa), 21h. (Bombay, Riverside, Pierce Ferry, and Tucson), 22h. (Palomar, Boulder City, Shasta Dam, Ottawa, Istanbul, Granada (2), and Alicante).

June 23d. 3h. 43m. 56s. Epicentre 38°·2N. 1°·7W. (as on 1941, November 24d.).

Maximum intensity VIII; intensity VII at Cehegin and Moratalla; VI at Caravaca and Calasparra; V at Mula; IV at Jumilla and Cieza; III at Hellin, Totana, and Yecla; II at Murcia, Albacete, Santiago de la Espada, and Orihuela.
Epicentre 38°8′N., 1°45′W. Macroseismic radius 60km.

A. Rey. Pastor.
Estudio sismotectónico de la Región Sureste de España, Madrid, 1951, macroseismic chart Fig. 20.

A. Rey. Pastor.
Nota acerea del sismo de Cehegin (Murcia) del 23 de Junio de 1948, Observ. Sismológ. de Alicante, Instituto Geográfico y Catastral, with macroseismic chart.

A = +·7875, B = −·0234, C = +·6159; δ = +4; h = −1;
D = −·030, E = −1·000; G = +·616, H = −·018, K = −·788.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Alicante		1·0	81	i 0 21	0	i 0 34	− 2	—	—
Granada		1·8	236	i 0 35$_a$	+ 3	0 56	0	i 0 59 S_g	—
Toledo		2·5	313	i 0 40	− 3	i 1 15	+ 1	i 0 48 P_g	—
Tortosa		3·1	33	0 52	+ 1	1 43	S_g	1 8 P_g	—
Barcelona		4·4	42	e 1 8	− 2	e 2 6	+ 4	—	—
Lisbon		5·9	280	1 28	− 3	2 41	+ 1	3 13 S_g	3·3
Clermont-Ferrand		8·3	24	i 2 5	+ 1	i 3 48	+ 8	i 4 43 S_g	i 6·6
Neuchatel		10·9	33	—	—	e 5 17	SSS	—	—
Paris		11·0	15	e 2 32	−10	e 5 32	SSS	e 2 38 P	i 6·2
Basle		11·5	33	e 4 21	?	—	—	—	e 6·3
Rome		11·5	67	e 1 8	?	—	—	—	—
Zürich		11·9	36	e 3 15	PPP	—	—	—	e 6·4
Strasbourg		12·4	31	—	—	e 5 44	SS	e 5 52 SSS	i 7·0
Stuttgart		13·2	33	e 3 40	PPP	—	—	—	e 7·1
Kew		13·3	4	—	—	e 5 57	SS	—	e 8·9
Uccle		13·3	17	e 4 51	?	e 5 42	0	e 7 14? Q	7·5
Collmberg	z.	16·7	34	i 4 0	+ 3	—	—	—	e 9·2
Warsaw		21·2	41	e 4 53	+ 4	e 8 50	+ 9	—	— e 12·1

Additional readings :—
Alicante i = 27s., 39s., and 49s.
Granada P = 39s., 43s., and 50s., P_gS_g = 1m.9s. and 1m.14s., S = 1m.23s. and 1m.33s.
Toledo P_gE = 44s.
Tortosa iEN = 1m.17s., P_gS_gN = 1m.24s. and 1m.35s., S_gN = 1m.46s., S_g?N = 1m.59s.
Lisbon P*? = 1m.46s., P_gE = 1m.52s., Z = 2m.15s., L?EZ = 2m.27s., SNZ = 2m.30s., eZ = 2m.34s., SSNZ = 2m.49s., SSS?EZ = 3m.0s., S_g? = 3m.9s., N = 9m.30s.
Clermont-Ferrand i = 5m.32s., 5m.42s., and 6m.5s.
Paris e = 5m.58s.
Strasbourg e = 6m.30s., 6m.34s., and 6m.52s.
Kew eE = 7m.24s., eEN = 7m.33s.
Collmberg eZ = 10m.16s., 11m.4s., and 12m.30s.
Warsaw eN = 5m.1s., eE = 8m.55s.
Long waves were also recorded at De Bilt, Copenhagen, Potsdam, Jena, and Durham.

June 23d. Readings also at 0h. (Palomar, Riverside, Tinemaha, Boulder City, Pierce Ferry, Tucson, Ksara, Huancayo, Bogota, and La Paz), 1h. (near Andijan), 2h. (Bogota), 3h. (near Andijan and near Alicante), 6h. (near Alicante), 10h. (near Alicante, Granada, Toledo, and Tortosa), 11h. (Bogota), 12h. (near Murgab and Andijan), 14h. (Stuttgart and Strasbourg), 16h. (De Bilt and near Ashkabad), 17h. (Branner), 18h. and 19h. (near Alicante), 21h. (near Mineral), 23h. (Stuttgart, Copenhagen, and near Mizusawa (2)).

June 24d. 2h.

Intensity VII near the epicentre in the region of the warm springs of Krisuvik, about 29km. to S.-S.W. of Reykjavik. Felt over much of the S.W. of the island.
Epicentre 63°54′N. 22°5′W.

Vedratten 1948, Manadaryfirlitt samid a vedurstofunni, June, p. 24.

Reykjavik iPEN = 6m.32s., SEN = 6m.34s.
Paris eP = 11m.4s., eL = 18m.
Stuttgart ePZ = 11m.31s., eL = 20m.

The main shock at 2h.6m. was followed by many after-shocks, the first reading at Reykjavik being recorded below, together with any readings at other stations.

iE = 2h. 7m.34s.
iE = 2h. 8m.10s.
iE = 2h. 9m.12s.
iE = 2h. 9m.28s.
iE = 2h.10m. 6s.
iE = 2h.10m.18s.
iE = 2h.11m.11s.
iE = 2h.11m.19s.
§ iPE = 2h.11m.54s.

§ Uccle eN = 16m., eLEN = 22m.
§ Paris eP = 16m.26s., eL = 23m.
§ Clermond-Ferrand e = 16m.32s., eL = 23m.12s.
§ Strasbourg eP = 16m.45s., eS? = 21m.11s.
§ Stuttgart eP?Z = 16m.55s., eL = 25m.

iE = 2h.12m.28s.
iE = 2h.12m.51s.
iE = 2h.12m.59s.
iE = 2h.13m.34s.
i?E = 2h.14m.32s.
iE = 2h.14m.43s.
iE = 2h.15m.18s.
iE = 2h.15m.27s.
iE = 2h.15m.44s.
iE = 2h.15m.50s.
iE = 2h.16m.12s.
iE = 2h.16m.15s.
iPE = 2h.16m.20s.
iPE = 2h.17m. 8s.
iE = 2h.18m. 9s.
iE = 2h.21m.36s.
iE = 2h.25m.11s.
iE = 2h.26m.20s.
eP?E = 2h.28m.38s.
iE = 2h.31m.45s.
iE = 2h.35m.42s.
iE = 2h.36m.16s.
iE = 2h.37m.36s.
eE = 2h.40m.52s.
iE = 2h.42m.35s.
iE = 3h. 5m.34s.
iE = 3h.10m.55s.
iE = 3h.12m.10s.
iE = 3h.12m.28s.
iE = 3h.12m.45s.
iE = 3h.13m.29s.
iE = 3h.13m.44s.
iPE = 3h.16m.27s.
iE = 3h.27m. 1s.
iE = 3h.34m. 5s.
iE = 3h.42m.37s.
iE = 3h.43m.25s.
iE = 3h.46m.18s.
iE = 3h.47m.24s.
iE = 3h.48m. 0s.
iE = 3h.48m.48s.
iPE = 3h.50m.54s.
iE = 7h. 3m.21s.
iE = 7h. 8m.37s.
iE = 8h.36m.41s.
iE = 9h.26m.28s.
iE = 9h.27m.21s.
eE = 11h.53m.27s.
iE = 12h.32m. 5s.

§ Long waves at Potsdam, De Bilt, Copenhagen, Ivigtut, Granada, Istanbul, and Scoresby Sund.

June 24d. Readings also at 0h. (Pierce Ferry, Shasta Dam, Tucson, Boulder City, Pasadena, Mount Wilson, Palomar, Riverside, Tinemaha, Uccle, Potsdam, Copenhagen, Istanbul, Granada, Paris, Stuttgart, near Salo, near Zürich, Tashkent, near Andijan, near Reykjavik, and near Lick), 1h. (Alicante), 3h. (near Ferndale and Mineral), 4h. (Ksara, Klyuchi (2), and near Lick), 5h. (Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, Riverside, and Tinemaha), 6h. (Pierce Ferry), 7h. (near Berkeley, Branner, Lick, Fresno, and near Triest), 9h. (Stuttgart (3) and near Murgab). 10h. (Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, Tinemaha, near Lick, and Branner), 11h. (Jena, Tashkent, near Almata, Frunse, and Andijan), 12h. (Branner, Lick, and Fresno), 14h. (Strasbourg and Fresno), 16h. (near Branner (2), Lick (2), Berkeley, and Mineral), 17h. (Fresno, Branner, and near Lick (2)), 19h. (near Ottawa), 21h. (Boulder City, Pierce Ferry, Shasta Dam, Tucson, Riverside, Tinemaha, and Ksara), 23h. (Fresno, Branner, Berkeley, and Lick).

June 25d. 9h. 19m. 13s. Epicentre 1°·8S. 77°·7W. Depth of focus 0·025.
(as on 1940, October 23d.).

A = +·2129, B = −·9766, C = −·0312; δ = +5; h = +7;
D = −·977, E = −·213; G = −·007, H = +·030, K = −1·000.

	Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
	°	°	m. s.	s.	m. s.	s.	m. s.		m.
Bogota	7·3	30	1 40	− 5	2 57	−10	—	—	—
Huancayo	10·5	167	e 2 28	+ 1	e 3 34	?	—	—	e 4·3
La Paz	17·4	148	i 3 52k	0	i 7 11	+13	i 4 13	PP	i 8·0
San Juan	23·1	29	e 4 43	− 7	e 8 38	− 5	—	—	e 9·0
Fort de France	23·2	46	e 4 14	−37	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
St. Louis		41·9	345	i 7 8	−25	e 13 24	−12	i 8 9	pP	—
Tucson		46·1	320	i 8 7k	0	—	—	i 8 50	pP	—
Pierce Ferry		50·7	322	i 8 42	0	—	—	i 9 24	pP	—
Palomar		50·8	318	i 8 44	+ 1	—	—	—	—	—
Boulder City		51·1	321	i 8 44	− 1	—	—	—	—	—
Riverside	z.	51·5	318	i 8 49k	+ 1	—	—	i 9 34	pP	—
Mount Wilson	z.	52·1	318	i 8 52k	0	—	—	i 9 36	pP	—
Pasadena	z.	52·2	318	i 8 52k	− 1	—	—	i 9 35	pP	—
Haiwee	z.	53·2	320	e 9 0	0	—	—	—	—	—
Tinemaha	z.	53·9	320	i 9 6k	0	—	—	i 9 50	pP	—
Fresno	z.	54·7	319	e 9 11	0	—	—	—	—	—
Lick	z.	56·3	319	i 9 23	0	—	—	—	—	—
Mineral	z.	58·0	322	e 9 33	− 2	—	—	—	—	—
Shasta Dam		58·7	322	i 9 36	− 4	—	—	e 10 21	pP	—
Tamanrasset		84·4	68	i 12 13a	+ 1	e 15 26	PP	e 12 59	pP	—
Clermont-Ferrand		84·9	44	i 12 13	− 2	—	—	i 13 0	pP	—
Stuttgart	z.	89·3	42	e 12 5	−31	e 13 19	pP	e 12 33	P	—

Additional readings :—
Bogota iP*EZ = 1m.57s., iP_gEZ = 2m.14s., iS*EZ = 3m.37s. ; readings given as for a surface focus earthquake.
La Paz iPPP = 4m.20s., iSS = 7m.33s.
St. Louis eE = 17m.4s.
Tucson e = 9m.18s.
Riverside e = 10m.10s.
Mount Wilson iZ = 9m.5s., eZ = 10m.4s.
Pasadena iZ = 9m.7s., eZ = 9m.57s.
Lick iZ = 9m.35s.

June 25d. Readings also at 0h. (Istanbul, Samarkand, near Andijan, Kulyab, Stalinabad, and near Lick (2)), 2h. (Pierce Ferry), 3h. (near Tamanrasset), 4h. (Pierce Ferry), 6h. (Sverdlovsk, Kulyab, Stalinabad, Andijan, Tashkent, near Almata, and Frunse), 7h. (near Lick (2)), 11h. (Fresno, Mineral, Branner, near Berkeley, and Lick), 15h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Shasta Dam, Branner (4), Stuttgart, near Ottawa, and near Kulyab), 17h. (Apia, Branner, and near Murgab), 18h. (near Kulyab, Obi-garm, and Stalinabad), 21h. (Jena), 22h. (Fresno, Branner, and near Lick), 23h. (Ksara).

June 26d. Readings at 0h. (Batavia and near Obi-garm), 1h. (Apia, Haiwee, Mount Wilson, Pasadena, Palomar, Riverside, Santa Barbara, Tinemaha, Tucson, Boulder City, Pierce Ferry, Lick, Shasta Dam, Tamanrasset, Paris, and Stuttgart), 2h. (Mount Wilson, Riverside, Tinemaha, Tucson, Shasta Dam, near Kulyab, Obi-garm, and Stalinabad), 4h. (Clermont-Ferrand, Strasbourg, Stuttgart, De Bilt, Potsdam, Prague, Taranto, Rome, Triest, Istanbul, Zürich, Warsaw, Belgrade, Bucharest, and Tamanrasset), 6h. (Stuttgart (2)), 9h. (Stuttgart), 10h. (Mount Wilson, Tinemaha, Tucson, Boulder City, Shasta Dam, and near Apia (2)), 12h. (Haiwee, La Jolla, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, Fresno, and Lick), 13h. (Palomar, Tucson, and Pierce Ferry), 14h. (Dehra Dun), 15h. (near Almata), 16h. (Andijan, Frunse, Murgab, Stalinabad, Tashkent, and Sverdlovsk), 18h. (Strasbourg), 19h. (Mount Wilson, Palomar, Riverside, Tucson, Pierce Ferry, Shasta Dam, and near Apia), 21h. (Toledo and near Mineral).

June 27d. 0h. 8m. 16s. Epicentre 25°·9N. 99°·9E.

A = −·1548, B = +·8873, C = +·4344 ; δ = −3 ; h = +3 ;
D = +·985, E = +·172 ; G = −·075, H = +·428, K = −·901.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Nanking		17·6	65	4 11	+ 3	7 34	+11	—	—	—
Hyderabad	N.	21·6	251	4 53	− 1	8 56	+ 7	9 21	SS	—
Murgab		25·2	306	5 28	− 1	9 51	− 1	—	—	—
Almata		25·5	320	i 5 34	+ 2	10 5	+ 8	—	—	—
Bombay		26·0	260	i 5 42	+ 6	i 10 12	+ 6	i 10 20	?	13·1

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kodaikanal	E.	26·3	238	i 5 42	+ 3	i 10 20	+ 9	11 33	SS	13·6
Irkutsk		26·6	5	5 42	0	—	—	—	—	—
Frunse		26·7	316	e 5 45	+ 2	e 10 21	+ 4	—	—	—
Colombo	E.	26·9	229	6 32	PP	10 42	+22	—	—	—
Andijan		27·2	310	e 5 46	− 1	—	—	—	—	—
Kulyab		28·1	303	i 5 55	0	i 10 38	− 2	—	—	—
Stalinabad		29·1	305	i 5 59	− 5	i 10 52	− 4	—	—	—
Tashkent		29·6	309	i 6 8	− 1	i 11 2	− 2	—	—	—
Batavia		32·6	166	i 6 46	+11	11 57	+ 6	e 13 49	SS	18·7
Ashkabad		37·0	300	e 7 16	+ 3	—	—	—	—	—
Sverdlovsk		41·7	329	i 7 52	0	i 14 7	− 3	—	—	—
Baku		43·7	303	e 8 18	+10	—	—	—	—	—
Grozny		47·0	306	e 8 39	+ 4	15 25	− 1	—	—	—
Leninakan		48·3	303	e 8 43	− 2	—	—	—	—	—
Moscow		53·5	322	e 9 22	− 2	e 16 48	− 9	—	—	—
Ksara		55·3	294	i 9 37	− 1	e 17 24	+ 3	—	—	—
Yalta		55·4	307	i 9 37	− 1	i 17 19	− 3	—	—	—
Istanbul		59·5	304	10 5	− 2	17 58	−18	—	—	—
Helwan		59·9	291	10 8	− 2	18 14	− 7	—	—	—
Warsaw		63·3	318	e 10 32a	− 1	e 19 2	− 2	e 12 53	PP	e 31·7
Upsala		64·1	326	11 5	+27	e 19 9	− 5	e 23 3	SS	e 29·7
Copenhagen		67·6	323	—	—	19 56	− 1	24 1	SS	—
Prague		67·8	316	e 11 13	+11	e 19 58	− 2	e 20 20	PS	e 33·7
Potsdam		68·1	319	i 11 4a	0	e 20 4	+ 1	i 20 21	PS	e 33·7
Jena	N.	69·3	317	e 11 14	+ 3	e 20 11	− 6	—	—	—
Triest		69·4	312	e 11 11	− 1	i 20 14	− 4	e 11 29	pP	—
Bologna		71·4	312	e 11 25	+ 1	—	—	—	—	—
Rome		71·4	308	e 11 19	− 5	e 20 33	− 9	e 14 1	PP	e 35·2
Stuttgart		71·4	316	e 11 23k	− 1	e 20 33	− 9	e 14 5	PP	e 38·7
Salo		71·6	313	e 11 31	+ 6	—	—	—	—	—
Zürich		72·3	314	e 11 30	+ 1	e 20 51	− 1	e 13 1	?	—
Strasbourg		72·4	316	e 11 29	− 1	e 20 48	− 5	e 14 2	PP	e 35·7
De Bilt		72·8	320	i 11 34a	+ 2	e 20 56	− 2	e 25 44?	SS	e 34·7
Basle		72·9	314	e 11 32	− 1	—	—	—	—	—
Uccle		73·7	319	e 11 37	− 1	e 21 14	+ 6	e 25 44?	SS	e 37·4
Durham		75·5	323	—	—	e 21 23	− 5	—	—	e 30·1
Paris		75·6	317	e 11 47	− 1	e 21 26	− 3	e 14 40	PP	e 39·7
Scoresby Sund		75·6	343	11 48	0	21 27	− 2	—	—	—
College		75·7	24	—	—	e 21 29	− 1	—	—	e 34·1
Kew		76·2	320	e 11 53	+ 1	e 21 35	− 1	e 34 7	Q	e 39·7
Clermont-Ferrand		76·4	314	e 11 55	+ 2	e 21 37	− 1	e 29 44	SSS	37·7
Alicante		81·9	308	12 24	+ 1	22 34	− 2	15 38	PP	e 37·8
Toledo		83·7	311	i 12 32	0	e 24 8	+74	—	—	49·3
Tamanrasset		84·0	292	e 12 35k	+ 2	—	—	e 15 49	PP	—
Granada		84·6	308	i 12 39k	+ 3	i 23 3	0	i 28 21	SS	i 47·0
St. Louis		115·1	8	—	—	e 24 54	[−38]	—	—	e 44·8
Bogota	z.	149·1	347	i 19 50	[+ 4]	—	—	e 20 32	PKP,	—
La Paz		165·5	308	20 18	[+12]	—	—	—	—	—

Additional readings :—
Warsaw ePPE =12m.46s., ePPPZ =14m.25s., ePPPE =14m.28s., ePSE =19m.17s., eZ =26m.5s. and 26m.38s.
Upsala eN =19m.25s., eSSSN =25m.19s.
Prague eSS =25m.20s., eSSS =27m.44s.
Potsdam iSE =20m.1s., iSN =20m.7s., eSSS?Z =27m.44s., eSSS?E =27m.50s.
Triest ePP =13m.34s., ePPP =15m.9s., ePS =20m.49s., eSS =24m.43s., eSSS =28m.18s.
Rome SS =24m.16s.
Stuttgart eSS =25m.19s., eSSS =28m.32s.
Strasbourg eP =11m.32s., eSS =25m.26s. and 25m.32s., eSSS =28m.45s., and 28m.52s., e =32m.54s. and 33m.1s.
De Bilt eSSS =28m.44s?
Uccle eSSSN =28m.44s.?
Paris ePPP =16m.23s., ePS =21m.55s., eSS =26m.20s.?, e =30m.44s.?
Kew eE =30m.17s.
Clermont-Ferrand eSS =26m.0s.
Alicante PPP =17m.26s., PS =22m.15s., PPS =23m.34s.
Granada P_cP =12m.52s.k, PP =16m.28s.k, SSS =33m.26s.
St. Louis eS =27m.46s., e =36m.52s.
Long waves were also recorded at Aberdeen, Edinburgh, Helsinki, and Tortosa.

June 27d. 12h. 48m. 18s. Epicentre 17°·0N. 85°·0W.

Epicentre as suggested by Pasadena and by U.S.G.G.S.

$A = +·0834$, $B = -·9532$, $C = +·2906$; $\delta = -1$; $h = +5$;
$D = -·996$, $E = -·087$; $G = +·025$, $H = -·289$, $K = -·957$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Merida		5·8	313	i 1 30	+ 1	2 33	− 5	—	—	—
Tacubaya		13·7	282	i 3 17	− 1	i 5 53	+ 1	—	—	—
Bogota	Z.	16·3	138	i 3 53	+ 1	e 6 59	+ 6	i 4 3	PP	e 13·4
San Juan		18·0	82	e 4 12	− 1	i 7 30	− 2	—	—	i 8·1
St. Louis		22·0	350	i 4 58	0	i 9 1	+ 5	—	—	—
Chihuahua	Z.	22·6	305	i 8 0	?	—	—	—	—	—
Georgetown		22·9	16	i 5 6	0	i 9 16	+ 3	—	—	—
Fort de France		23·0	93	e 5 2	− 5	e 9 14	0	—	—	—
Bermuda		23·9	46	e 5 22	+ 6	e 9 37	+ 7	e 9 50	?	e 10·4
New Kensington	E.	23·9	10	e 5 32	+16	e 9 30	0	e 8 9	?	—
Philadelphia		24·4	19	i 5 22	+ 1	i 9 44	+ 5	i 6 15	PPP	i 10·2
Cleveland		24·6	6	i 5 23	0	e 9 40	− 2	i 9 44	S	i 12·5
Chicago		24·9	354	i 5 23	− 3	i 9 42	− 5	e 6 30	PP	e 10·7
Fordham		25·6	21	5 32	0	10 4	+ 5	—	—	—
Harvard		27·9	22	i 5 51	− 3	i 11 13	+36	i 7 4	PPP	e 14·7
Tucson		27·9	308	i 5 54a	0	i 10 54	+17	i 6 54	PP	e 12·4
Weston		27·9	22	5 55	+ 1	—	—	—	—	—
Ottawa		29·4	13	i 6 5	− 2	11 0	− 1	6 52	PP	14·7
Temiskaming	Z.	30·0	8	i 6 12	0	—	—	i 6 58	PP	—
Huancayo		30·4	161	e 6 19	+ 3	e 11 18	+ 2	e 7 29	PPP	e 12·8
Ville Marie		30·6	7	e 6 16	− 2	—	—	—	—	e 14·0
Rapid City	E.	31·1	334	e 6 23	+ 1	i 11 25	− 3	—	—	i 12·4
Dane	E.	31·2	7	e 6 27	+ 4	—	—	—	—	—
Shawinigan Falls		31·2	17	6 22	− 1	—	—	—	—	16·7
Pierce Ferry		32·0	313	i 6 30	0	—	—	i 8 10	PPP	e 13·1
Seven Falls		32·2	18	6 31	− 1	11 49	+ 4	13 30	SS	15·7
Boulder City		32·5	312	i 6 34	0	e 11 39	−10	i 7 22	PP	—
Halifax		32·9	29	—	—	e 12 2	+ 6	—	—	17·7
Palomar		32·9	306	i 6 39a	+ 1	i 11 56	0	i 7 57	PP	—
La Jolla		33·1	305	i 6 41a	+ 1	e 12 0	+ 1	i 7 38	PP	—
Salt Lake City		33·1	322	e 6 39	− 1	e 11 57	− 2	e 7 57	PP	e 13·5
Riverside		33·6	307	i 6 44a	0	—	—	i 6 57	pP	—
Logan		33·7	323	i 6 43	− 2	e 12 6	− 2	i 7 54	PP	e 22·8
Mount Wilson		34·2	307	i 6 50a	+ 1	—	—	i 7 3	pP	—
Pasadena		34·3	307	i 6 50a	0	i 12 18	+ 1	i 7 2a	pP	e 18·8
Haiwee		34·9	310	i 6 55a	0	—	—	i 8 28	PP	—
Santa Barbara		35·5	307	i 7 2a	+ 2	e 12 41	+ 5	i 8 12	PP	—
Tinemaha		35·5	311	i 7 0a	0	—	—	i 7 14k	pP	—
Bozeman		35·9	329	e 7 4	0	i 12 42	0	e 8 22	PP	e 15·1
Fresno		36·4	310	i 7 8a	0	—	—	i 7 19	pP	e 17·1
Butte	N.	36·9	329	i 7 13	+ 1	e 12 53	− 5	e 8 35	PP	e 15·3
La Paz		37·2	151	7 16a	+ 1	i 12 51	−11	i 8 45	PP	i 18·6
Lick		38·1	310	e 7 23	+ 1	—	—	e 8 55	PP	—
Santa Clara		38·3	310	i 7 26	+ 2	e 13 22	+ 3	—	—	e 22·0
Branner		38·5	310	e 7 27	+ 1	—	—	i 7 40	pP	—
Berkeley		38·7	310	i 7 28	+ 1	i 13 28	+ 3	i 7 40	pP	e 21·5
Saskatoon		39·0	339	6 55	−35	12 25	−64	8 4	PP	16·7
Mineral	Z.	39·2	314	e 7 31	0	—	—	—	—	—
Shasta Dam		39·9	314	e 7 34	− 3	—	—	i 9 7	PP	e 16·7
Ukiah		39·9	312	e 7 52	+15	e 13 46	+ 3	—	—	e 16·9
Grand Coulee		41·5	326	e 7 50	0	—	—	—	—	—
Victoria		44·3	324	i 8 10	− 3	14 46	− 2	18 8	SS	20·7
Ivigtut		51·3	22	—	—	e 16 23	− 3	—	—	25·7
Sitka		55·0	330	e 11 38	PP	i 17 14	− 3	e 20 44	SS	e 22·4
College		63·3	335	—	—	e 18 59	− 5	e 20 10	S_cS	e 25·4

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.			L.
		°	°	m. s.	s.	m. s.	s.	m. s.			m.
Scoresby Sund		65·2	19	10 42k	− 3	19 23	− 5	24 0	SS		—
Lisbon		68·7	54	11 7k	0	20 14	+ 2	11 21	pP		31·7
Toledo		72·5	53	i 11 29	− 1	i 20 56	+ 2	i 11 50	PcP		34·8
Granada		73·2	55	i 11 42k	+ 7	i 21 4	+ 2	i 14 40k	PP		i 34·0
Kew		73·6	40	i 12 35	+58	e 21 1	− 6	e 21 38	PS		e 25·7
Alicante		75·4	54	11 40	− 7	21 24	− 3	22 6	PS		e 35·8
Tortosa		75·7	51	e 12 7	+18	i 21 33	+ 3	21 56	PS		e 33·7
Paris		75·8	43	e 11 48	− 2	e 21 21	−10	e 14 44	PP		e 35·7
Uccle		76·6	40	e 11 54	0	e 21 33	− 7	e 26 31	SS		e 35·7
Clermont-Ferrand		76·7	46	i 11 54	− 1	i 21 41	0	e 26 38	SS		35·7
Barcelona		76·9	50	e 14 4	?	e 21 42	− 1	—	—		e 34·2
De Bilt		76·9	39	i 11 56	0	e 21 42	− 1	e 26 42?	SS		e 39·7
Strasbourg		79·2	42	e 12 7	− 1	e 22 0	− 8	e 15 11	PP		36·0
Basle		79·4	43	e 12 6	− 3	e 22 17	+ 7	—	—		—
Stuttgart		80·1	42	e 12 11	− 2	e 22 7	−11	e 12 26	pP		e 40·7
Copenhagen		80·3	35	e 12 12k	− 2	22 14	− 6	15 16	PP		—
Potsdam		81·5	38	i 12 20a	− 1	i 22 25	− 7	i 12 35	pP		e 34·7
Collmberg	Z.	81·8	39	e 12 23	+ 1	—	—	—	—		—
Salo	E.	81·8	45	e 12 43	+21	—	—	—	—		—
Bologna		82·7	44	e 12 10	−17	e 22 35	− 9	e 16 12	PP		—
Prague		83·0	40	e 12 21	− 7	e 22 47	0	e 28 14	SS		—
Tamanrasset		84·0	68	i 12 41k	+ 8	—	—	e 13 10	?		—
Triest		84·0	44	i 12 33	0	i 22 56	− 1	e 15 40	PP		—
Rome		84·2	48	i 12 22	−12	i 22 56	− 3	23 48	PS		—
Warsaw		86·2	36	e 12 44	0	e 23 2	[− 7]	e 16 3	PP		e 40·7
Moscow		93·0	28	e 13 30?	+13	e 23 44	[− 6]	e 16 54	PP		—
Istanbul		96·0	44	e 2 37?	?	e 17 26	PP	—	—		—
Sverdlovsk		101·0	18	e 13 49	− 4	i 24 28	[− 4]	e 25 25	S		—
Helwan		103·0	53	e 18 12	PP	e 27 32	PS	e 28 12	PPS		—
Ksara		104·4	48	18 28	PP	28 18?	PPS	—	—		—
Vladivostok		111·2	331	e 19 19	PP	e 23 44	?	i 28 51	PS		
Tashkent		117·3	22	e 19 51	PP	e 25 40	[0]	e 29 44	PS		—
Stalinabad		119·5	24	e 20 8	PP	e 27 10	{ 0}	—	—		—
Kulyab		120·5	23	e 20 7	PP	e 27 9	{− 8}	—	—		—
Bombay	E.	138·2	32	e 34 27	PPS	—	—	—	—		—

Additional readings :—
Tacubaya iSEN =5m.27s., iS =5m.57s.
Bogota eZ =6m.5s., eSSZ =7m.29s., eP$_c$P?Z =8m.33s.
Cleveland eE =6m.44s., iN =11m.43s.
Chicago e =7m.25s., eP$_c$P =8m.34s.
Harvard i =6m.19s.
Tucson iP$_c$P =8m.6s.
Ottawa PPP =7m.8s., SS =12m.12s.
Temiskaming i =8m.29s.
Pierce Ferry i =7m.9s., iP$_c$P =8m.34s.
Boulder City i =6m.55s., iP$_c$P =8m.34s., eS$_c$S? =15m.4s.
Palomar iZ =7m.0s. and 7m.15s., eN =10m.36s., eE =16m.7s., iS$_c$SN =17m.6s.
La Jolla iZ =7m.22s.
Salt Lake City ePPP =8m.51s.
Riverside iZ =6m.49s., 7m.19s., 8m.2s., and 8m.21s.
Logan i =6m.59s.
Mount Wilson iZ =7m.52s.
Pasadena iZ =7m.34s. and 7m.57s., eE =15m.7s., iS$_c$SEN =17m.10s.
Haiwee iZ =7m.9s. and 9m.14s.
Santa Barbara iZ =7m.14s., 7m.25s., and 8m.36s.
Tinemaha iEZ =8m.24s.
Bozeman e =7m.32s., ePPP =8m.57s., eP$_c$P =9m.23s., e =13m.48s., eS$_c$S =17m.10s.
Fresno iP$_c$PN =7m.31s., iNZ =8m.37s.
Butte eN =7m.26s.
La Paz iP$_c$P =9m.44s., iS$_c$S =15m.24s., iSS =17m.34s.
Lick iZ =7m.36s. and 7m.46s.
Berkeley iZ =8m.56s., iEZ =9m.5s., iPPN =9m.26s., iN =16m.23s., iE =16m.30s.
Mineral eN =7m.37s., iZ =7m.45s., iPPZ =8m.2s.
Shasta Dam i =6m.47s., iP$_c$P =9m.19s.
Sitka eS$_c$S =19m.2s., e =20m.12s.
Lisbon PP?E =13m.33s., SKSEN =20m.56s., QEN =27·7m.
Toledo iPPPE =14m.56s., iSKSE =21m.22s.
Granada P$_c$P =12m.0s a, PPP =15m.25s., iSS =25m.44s., SSS =30m.4s.
Kew eE =15m.32s.

Continued on next page.

Alicante PPS = 22m.30s., SS = 26m.24s., SSS = 29m.12s., Q = 31m.40s.
Tortosa PcPEN = 12m.32s., PPE = 14m.46s., PPPE = 16m.31s., PPSE = 22m.27s.
Paris ePPP = 16m.28s., eSSS = 29m.24s.
Strasbourg e = 14m.17s. and 18m.2s., ePS = 22m.47s., eSS = 27m.22s., eSSS = 30m.48s.
Stuttgart eZ = 14m.17s., ePPZ = 15m.19s., ePS = 22m.47s., eSSS = 30m.48s.
Potsdam isSN = 22m.41s., eSSS? = 31m.36s.?
Prague e = 27m.7s.
Triest ePPP = 17m.33s., ePS = 23m.35s., eSS = 28m.28s., eSSS = 32m.5s.
Rome PP = 15m.45s., SS = 28m.42s., SSS = 32m.7s.
Warsaw ePPSE = 24m.12s., ePPSZ = 24m.22s.
Sverdlovsk ePP = 18m.0s., ePS = 26m.58s., eSS = 32m.24s.
Helwan e = 26m.9s.
Tashkent ePPP = 22m.29s., SKKS = 26m.52s.
Long waves were also recorded at Vermont, Christchurch, Helsinki, and Reykjavik.

June 27d. 15h. 46m. 16s. Epicentre 36°·3N. 71°·0E. Depth of focus 0·030.
(as on 1947, Jan. 30d.).

A = +·2630, B = +·7638, C = +·5894 ; δ = −5 ; h = 0 ;
D = +·946, E = −·326 ; G = +·192, H = +·557, K = −·808.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Kulyab		1·9	330	i 0 41	+ 1	i 1 12	+ 2	—		—
Stalinabad		2·9	322	i 0 51	+ 1	i 1 27	− 2	—		—
Murgab		3·1	47	0 52	0	1 28	− 5	—		—
Andijan		4·6	14	1 8	− 3	i 1 59	− 6	—		—
Samarkand		4·6	319	i 1 10?	− 1	i 2 5?	0	—		—
Tashkent		5·2	347	i 1 27	+ 9	i 2 12	− 7	—		—
Tchimkent		6·1	351	i 1 27	− 3	i 2 31	− 8	—		—
Frunse		7·1	22	i 1 40	− 2	2 56	− 6	—		—
Almata		8·3	32	i 1 56	− 2	e 3 23	− 7	—		—
Grozny		20·6	299	4 27	+ 4	—	—	—		—
Sverdlovsk		21·7	345	4 35	+ 1	i 8 19	+ 4	—		—
Collmberg	z.	43·2	310	e 7 43	+ 3	—	—	—		—
Copenhagen		43·6	315	7 45	+ 1	—	—	—		—
Stuttgart	z.	46·0	306	e 8 3	0	—	—	—		—
Strasbourg		47·0	306	e 8 10	0	—	—	e 9 4	pP	
Paris		50·4	307	i 8 37	+ 1	—	—	—		—

June 27d. 21h. 39m. 24s. Epicentre 56°·3N. 153°·8W. (as on 1948, May 26d.).

A = −·5001, B = −·2461, C = +·8302 ; δ = −10 ; h = −8 ;
D = −·442, E = +·897 ; G = −·745, H = −·367, K = −·557.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
College		9·1	16	e 2 15	+ 1	e 4 4	+ 4	—	—	i 4·8
Sitka		10·2	75	e 2 41	PP	e 4 48	SS	e 4 1	?	e 5·1
Victoria		20·0	99	4 36	− 1	8 28	+11	4 51	PP	10·3
Seattle		21·1	100	e 4 29	−19	e 8 8	−31	—	—	e 10·3
Grand Coulee		22·7	96	e 5 11	+ 7	—	—	—	—	—
Shasta Dam		25·7	113	e 5 36	+ 3	e 10 11	+10	—	—	—
Mineral	z.	26·4	113	i 5 43	+ 3	—	—	i 6 11	PP	e 13·4
Butte	N.	27·4	93	e 6 42	PP	e 10 41	+13	e 10 58	?	e 12·8
Saskatoon		27·5	78	5 48	− 2	10 0	−30	9 3	?	10·9
Berkeley		27·9	117	e 5 55	+ 1	i 10 44	+ 7	e 10 51	?	e 13·4
Branner	z.	28·3	117	e 5 59	+ 2	—	—	—	—	—
Bozeman		28·5	93	e 8 56	P_cP	e 10 51	+ 5	—	—	e 12·7
Santa Clara		28·5	117	e 6 18	+19	e 10 58	+12	—	—	e 12·8
Fresno		30·1	115	e 6 16	+ 3	—	—	e 7 19	PP	—
Tinemaha	z.	30·5	113	i 6 19	+ 2	—	—	—	—	—
Logan		30·6	100	e 6 10	− 8	e 11 28	+ 8	—	—	e 13·6
Salt Lake City		31·3	101	e 6 58	+34	e 12 7	+36	—	—	e 13·9
Haiwee	z.	31·4	114	i 6 29	+ 4	—	—	—	—	—
Santa Barbara	z.	31·9	118	e 6 33	+ 4	—	—	—	—	—
Mount Wilson	z.	32·9	116	i 6 40	+ 2	—	—	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Pasadena		32·9	116	i 6 36	− 2	i 12 2	+ 6	—	—	e 14·9
Boulder City		33·2	111	i 6 42	+ 2	e 12 59	+59	e 7 50	PP	—
Riverside	Z.	33·4	116	i 6 44	+ 2	—	—	—	—	—
Pierce Ferry		33·5	110	e 6 45	+ 2	e 11 54	−11	—	—	—
Palomar	Z.	34·2	116	i 6 51k	+ 2	—	—	—	—	—
Tucson		38·1	110	i 7 25	+ 3	e 13 20	+ 4	e 8 59	PP	e 16·4
Lincoln	E.	39·6	88	—	—	e 14 26	+48	e 16 20	SS	i 18·9
Chicago		43·9	80	—	—	e 14 44	+ 2	—	—	e 17·9
St. Louis		44·7	86	e 8 20	+ 4	i 14 58	+ 4	i 8 27	P	—
Ville Marie		44·7	69	e 8 18	+ 2	—	—	—	—	—
Cleveland		47·5	76	e 8 46	+ 8	e 15 34	0	e 18 29	SS	21·7
Vladivostok		47·5	287	i 8 33	− 5	i 15 35	+ 1	—	—	—
Ottawa		47·9	68	8 42	0	15 45	+ 6	18 36	SS	23·6
Shawinigan Falls		48·6	65	8 48	+ 1	—	—	—	—	26·6
Scoresby Sund		48·9	20	8 49a	− 1	15 54	+ 1	10 46	PP	—
Ivigtut		49·2	39	—	—	e 16 1	+ 3	—	—	24·6
New Kensington	E.	49·2	75	—	—	e 15 59	+ 1	e 19 49	SS	e 25·1
Seven Falls		49·2	64	8 53	+ 1	16 0	+ 2	19 49	SS	23·6
Vermont		49·9	68	—	—	e 17 12	+65	—	—	e 29·9
Pennsylvania	N.E.	50·0	74	—	—	i 16 15	+ 6	i 18 45	S_cS	—
Georgetown		51·7	75	e 9 22	+11	e 16 36	+ 4	—	—	—
Philadelphia		52·0	73	—	—	e 16 37	+ 1	e 19 9	S_cS	e 26·0
Fordham		52·1	71	e 9 16	+ 2	i 16 44	+ 6	—	—	—
Harvard		52·1	68	i 9 15	+ 1	—	—	—	—	e 30·6
Weston		52·3	68	—	—	16 45	+ 5	—	—	—
Tacubaya	N.	54·6	109	e 9 46	+14	e 17 34	+23	e 12 42	PPP	—
Bermuda		63·3	71	e 10 45	+12	e 19 8	+ 4	—	—	e 26·0
Sverdlovsk		63·8	340	i 10 33	− 3	i 19 8	− 3	—	—	—
Upsala		64·0	5	e 10 36?	− 2	19 9	− 4	13 5	PP	e 27·6
Aberdeen		64·6	17	—	—	i 19 28	+ 7	—	—	e 31·6
Copenhagen		67·8	9	e 11 0	− 2	20 1	+ 1	—	—	32·6
Moscow		67·9	354	e 10 59	− 3	e 19 57	− 4	—	—	—
Kew		70·4	17	e 11 16	− 2	e 20 32	+ 2	e 20 47	PS	e 27·6
De Bilt		70·6	14	i 11 17a	− 2	e 20 38	+ 5	e 13 58	PP	e 36·6
Potsdam		71·1	9	i 11 21a	− 1	i 20 36	− 2	i 20 56	PS	e 40·6
Uccle		71·7	16	e 11 24	− 2	e 20 47	+ 2	e 28 36?	SSS	e 35·6
Warsaw		71·7	4	11 24a	− 2	e 20 47	+ 2	14 2	PP	e 37·6
Almata		72·0	324	11 27	− 1	20 45	− 4	—	—	—
Collmberg	Z.	72·2	8	e 11 30	+ 1	—	—	—	—	—
Jena	N.	72·5	10	e 11 28	− 2	e 20 56	+ 2	—	—	—
Frunse		73·1	325	e 11 32	− 2	e 20 59	− 2	—	—	—
Paris		73·4	17	e 11 35	− 1	i 21 5	0	e 14 25	PP	e 37·6
Prague		73·5	8	e 11 31	− 5	e 21 3	− 3	e 14 30	PP	e 36·6
San Juan		73·6	81	e 11 38	+ 1	e 21 4	− 3	—	—	e 30·5
Stuttgart		74·3	12	e 11 40a	− 1	e 21 17	+ 2	e 14 24	PP	e 38·6
Strasbourg		74·4	13	i 11 40a	− 2	e 21 19	+ 3	e 14 28	PP	37·3
Basle		75·4	14	e 11 46	− 1	—	—	—	—	—
Andijan		75·7	326	e 11 44	− 5	e 21 24	− 6	—	—	—
Zürich		75·7	13	e 11 46	− 3	—	—	—	—	—
Tashkent		76·1	328	i 11 46	− 5	i 21 26	− 9	—	—	—
Clermont-Ferrand		76·5	17	i 11 54	0	i 21 42	+ 3	i 14 45	PP	35·6
Murgab		77·4	324	11 54	− 4	21 43	− 6	—	—	—
Salo		77·6	11	e 12 20	+20	e 22 39	PS	—	—	—
Triest		77·9	9	e 11 46	−15	e 21 47	− 7	—	—	—
Samarkand		78·3	330	e 12 0	− 3	e 21 52	− 7	—	—	—
Bologna		78·8	11	e 12 6a	0	e 22 16	+12	e 15 5	PP	—
Stalinabad		78·8	327	i 12 0?	− 6	i 22 0?	− 4	—	—	—
Belgrade		79·1	4	e 12 6	− 2	e 22 13	+ 6	e 14 56	PP	54·6
Kulyab		79·1	326	i 12 6?	− 2	i 22 0?	− 7	—	—	—
Grozny		79·4	346	12 9?	0	22 7?	− 3	—	—	—
Yalta		79·4	355	i 12 5	− 4	i 22 5	− 5	—	—	—
Lisbon		80·7	28	12 16	0	22 25	+ 1	22 30	S	—
Toledo		80·8	24	i 12 17	0	i 22 28	+ 3	—	—	38·2
Tortosa		80·8	20	—	—	22 25	0	23 11	PS	e 42·6
Rome		81·5	10	e 12 20	− 1	22 33	+ 1	15 29	PP	37·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		81·6	342	e 12 6	−15	—	—	—	—	—
Leninakan		82·1	347	e 12 20	− 4	e 22 30	− 8	—	—	—
Alicante		83·0	21	12 42	+14	22 45	− 2	23 20	PS	38·2
Istanbul		83·0	358	12 27	− 1	23 7	+20	—	—	—
Granada		83·5	24	i 12 29k	− 2	i 23 26	+34	24 11	PPS	i 41·0
Bombay		84·5	316	e 17 13	?	—	—	—	—	—
Ksara		90·1	353	i 13 2	− 1	23 56	+ 1	—	—	—
Helwan		94·1	356	i 13 20k	− 2	24 32	+ 1	23 52	SKS	—
Tamanrasset		99·3	20	e 17 28	PP	—	—	—	—	—
La Paz		101·2	103	13 40	−14	24 37	[+ 4]	—	—	52·1
Riverview	z.	101·2	224	i 22 28	?	—	—	—	—	—

Additional readings :—
Shasta Dam i = 5m.53s., e = 10m.16s.
Cleveland eZ = 9m.10s.
Ottawa SSS = 19m.54s.
Scoresby Sund 16m.11s., 18m.42s., 19m.44s.
Ivigtut 18m.48s. and 20m.0s.
Seven Falls e = 18m.42s.
Upsala eE = 15m.53s., SN = 19m.5s., S_cSN = 20m.27s.
De Bilt ePPP = 15m.36s., ePS = 20m.53s., eSS = 25m.6s.
Potsdam iPSE = 20m.52s.
Uccle eN = 29m.26s.
Warsaw ePN = 11m.43s., eSZ = 20m.43s., eSE = 20m.50s., ePPSN = 21m.13s., ePPSE = 21m.18s., ePPSZ = 21m.26s., eN = 21m.39s., eSSE = 25m.18s.
Paris ePS = 21m.29s., eSS? = 25m.8s., eSSS = 28m.38s., eQ = 34m.36s.
Prague ePPP = 16m.6s., ePS = 21m.24s., eSS = 25m.30s., eSSS = 28m.36s.
San Juan e = 13m.26s., eSS = 26m.42s.
Stuttgart eP_cP = 11m.58s.k.
Strasbourg eP_cP? = 11m.58s., ePS = 21m.50s., eSS = 26m.7s.
Clermont-Ferrand iSS = 26m.35s.
Lisbon S_cSE = 22m.40s., PS?EN = 23m.11s., SSN = 27m.36s.
Toledo i = 12m.32s., 12m.50s., and 22m.42s.
Tortosa S_cSE = 22m.41s., PPSE = 23m.32s.
Rome SS = 27m.56s.
Alicante PPS = 23m.50s., Q = 33m.13s.
Granada P_cP = 12m.56s.k, iPP = 16m.5s.k, iSS = 28m.37s., SSS = 32m.38s.
Helwan PP = 17m.9s., SKKS = 24m.6s.
Long waves were also recorded at Halifax, Ukiah, Honolulu, Wellington, Christchurch, Helsinki, Reykjavik, Calcutta, and Kodaikanal.

June 27d. Readings also at 0h. (near Kulyab, Murgab, Stalinabad, and Andijan), 4h. (near Andijan), 7h. (Kew and near Andijan), 10h. (near Murgab and Andijan), 11h. (Apia and near Mineral), 15h. (Stuttgart), 16h. (near Mineral (3)), 17h. (Stuttgart and near Batavia), 19h. (Frunse, Andijan, Murgab, Stalinabad, Kulyab, Sverdlovsk, Ashkabad, near Almata, and near Mizusawa), 20h. (Potsdam, and Pierce Ferry), 21h. (Strasbourg and near Andijan), 22h. (Ksara, Helwan, and Stuttgart), 23h. (Tamanrasset).

June 28d. 7h. Mesopotamia.

Baku iP = 8m.42s.?
Erevan eP = 9m.13s., iP_g = 9m.19s., iS = 9m.51s., iS_g = 9m.58s.
Leninakan eP = 9m.15s., S_g = 10m.15s.
Istanbul e = 10m., eL? = 18m.
Ksara eP = 10m.17s., S? = 13m.49s.
Tashkent iP = 11m.57s.?, eS = 15m.19s.?
Stalinabad eP = 12m.0s., eS = 15m.19s.
Moscow eP = 12m.11s.
Kulyab iP = 12m.12s.
Sverdlovsk eP = 12m.25s.
Andijan eP = 12m.30s.?
Frunse eP = 12m.41s.
Murgab P = 12m.48s,

June 28d. 7h. 13m. 27s. Epicentre 36°·1N. 136°·2E.

Intensity IX at Hukui; VI at Miyadu, Kanazawa, Tsuruga, Kyoto, and Irako; V at Husiki, Gihu, Osaka, Misima, Karuizawa, Tokusima, and Tu; IV at Ajiro, Saigo, Hunatu, Ito, Owase, and Kôti; II-III at Takamatsu, Aikawa, Kakioka, Tokyo, Mito, and Uwazima. Macroseismic radius 300km.

Seismo. Bull. Cent. Met. Obs., Japan, for 1948, Tokyo, 1950, pp. 25-27, with macroseismic chart.

Much damage caused in epicentral region with heavy casualties. During the ensuing month 958 after-shocks were observed, of which 561 were felt by individuals.

H. Tsuya.
The Fukui earthquakes of June 28, 1948. Report of the Special Committee for the Study of the Fukui Earthquake, 197 pages, with one topographic and geological map, 44 plates and 108 figures. Epicentre 36°7′N. 136°15′E. Depth 33·03 ± ·11km.

S. Omote.
On the after-shocks of the Fukui Earthquake II Bull. Earthquake Research Institute, Tokyo Univ., 1950, Nos. 3-4, pp. 311-319.

N. Nasu.
Block movements along the seismic fault. The Fukui fault and others. Bull. Earthquake Research Institute, Tokyo University, 1949, Nos. 1-4, pp. 27-33.

Anonymous.
The Fukui Earthquake, Hokuriku Region, Japan, 28 June, 1948, Vol. 1, Geology, Vol. II Engineering. From the office of the Engineer-General Far East Command.

$A = -·5845$, $B = +·5606$, $C = +·5866$; $\delta = +1$; $h = 0$;
$D = +·692$, $E = +·722$; $G = -·423$, $H = +·406$, $K = -·810$.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.	Supp. m. s.		L. m.
Gihu	0·8	147	0 18	0	0 31	0	—	—	—
Hikone	0·8	177	0 20a	+ 2	0 33	+ 2	—	—	—
Toyama	1·0	54	0 19a	− 2	0 33	− 3	—	—	—
Nagoya	1·1	146	0 23k	+ 1	0 39	0	—	—	—
Kyoto	1·2	199	0 26a	+ 2	0 42	+ 1	—	—	—
Toyooka	1·2	243	0 25a	+ 1	0 42	+ 1	—	—	—
Kameyama	1·3	170	0 27k	+ 2	0 45	+ 1	—	—	—
Wazima	1·4	24	0 27a	0	0 46	0	—	—	—
Osaka	1·5	201	0 32a	+ 4	0 54	+ 5	—	—	—
Kobe	1·6	210	0 32a	+ 2	1 1	+10	—	—	—
Nagano	1·7	71	0 31	0	0 56	+ 2	—	—	—
Owase	2·0	180	0 36a	+ 1	1 7	+ 5	—	—	—
Sumoto	2·0	212	0 37a	+ 2	1 5	+ 3	—	—	—
Shizuoka	2·1	122	0 37k	0	1 6	+ 2	—	—	—
Hunatu	2·2	106	0 41a	+ 3	1 15	S_g	—	—	—
Omaesaki	2·2	132	0 40	+ 2	1 14	S_g	—	—	—
Maebasi	2·3	83	0 46a	+ 6	1 20	S_g	—	—	—
Kumagaya	2·6	89	0 45a	+ 1	1 23	S_g	—	—	—
Siomisaki	2·7	188	0 47a	+ 2	1 24	S*	—	—	—
Osima	2·9	117	0 49k	+ 1	1 40	S_g	—	—	—
Tokyo	2·9	98	0 53k	P_g	1 31	S*	—	—	—
Utunomiya	2·9	81	0 51k	+ 3	1 28	+ 4	—	—	—
Yokohama	2·9	103	0 49k	+ 1	1 23	− 1	—	—	—
Kakioka	3·2	88	0 53k	+ 1	—	—	—	—	—
Tukubasan	3·2	88	0 52	0	—	—	—	—	—
Mera	3·2	112	0 53	+ 1	1 38	S*	—	—	—
Muroto	3·3	210	0 55a	+ 2	1 37	+ 2	—	—	—
Koti	3·4	222	0 57a	+ 2	1 44	S*	—	—	—
Hirosima	3·5	242	0 59a	+ 2	1 54	S_g	—	—	—
Mito	3·5	84	0 55k	− 2	1 39	− 1	—	—	—
Hamada	3·6	252	0 59	+ 1	2 1	S_g	—	—	—
Matuyama	3·6	233	1 1a	+ 3	2 0	S_g	—	—	—
Hukusima	3·8	63	1 3	+ 2	2 12	S_g	—	—	—
Onahama	3·9	76	1 3	+ 1	1 56	+ 6	—	—	—
Sendai	4·3	58	1 12a	+ 4	2 13	S*	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m.	s.	m.
Simidu		4·3	220	1 8	0	2 10	S*	—	—	—
Mizusawa	E.	5·0	50	1 20	+ 2	2 56	S_g	—	—	—
Izuka		5·1	243	1 20	0	2 29	+ 9	—	—	—
Morioka		5·3	46	1 24a	+ 2	2 49	S*	—	—	—
Hukuoka		5·4	244	1 25a	+ 1	2 49	S*	—	—	—
Kumamoto		5·6	236	1 27a	0	2 51	S*	—	—	—
Miyako		5·8	50	1 29a	0	2 34	− 4	—	—	—
Miyazaki		5·8	225	1 29	0	2 43	+ 5	—	—	—
Aomori		5·9	36	1 35k	+ 4	3 1	S*	—	—	—
Unzendake		5·9	238	1 37	+ 6	3 5	S*	—	—	—
Kagosima		6·5	228	1 40k	+ 1	3 15	S*	—	—	—
Mori		6·9	28	1 49k	+ 4	3 28	S*	—	—	—
Vladivostok		7·8	336	i 1 59	+ 1	i 3 38	+10	—	—	—
Sapporo		8·0	28	2 5	+ 5	3 53	S*	—	—	—
Nemuro		10·2	42	2 27	− 4	4 31	+ 4	—	—	—
Nanking		15·0	259	3 39	+ 4	e 6 39	+16	—	—	—
Guam		23·8	159	i 5 16	+ 1	e 9 17	−11	—	—	—
Irkutsk		27·7	316	i 5 53	+ 1	e 10 39	+ 6	—	—	—
Calcutta	E.	43·5	295	e 8 3	− 4	i 15 0	+24	i 9 46	PP	22·2
Almata		45·3	299	i 8 25	+ 4	i 15 4	+ 2	—	—	—
Frunse		47·1	298	i 8 40	+ 5	i 15 32	+ 4	—	—	—
Andijan		49·2	296	8 51	− 1	15 56	− 2	—	—	—
Batavia	Z.	50·3	219	i 8 58	− 2	e 16 7	− 6	i 10 44	PP	26·6
Tchimkent		50·8	298	e 9 2	− 2	e 16 16	− 4	—	—	—
Tashkent		51·3	297	9 10	+ 2	16 27	+ 1	—	—	—
Kulyab		52·0	293	i 9 15	+ 2	i 16 38	+ 2	—	—	—
College		52·1	31	e 9 14	0	e 16 42	+ 4	e 20 16	SS	e 21·7
Stalinabad		52·6	294	i 9 17	− 1	e 16 40	− 4	—	—	—
Sverdlovsk		53·1	318	i 9 21	0	i 16 48	− 3	—	—	—
Samarkand		53·5	296	i 9 26	+ 2	i 16 55	− 2	—	—	—
Hyderabad	N.	54·0	296	9 31	+ 3	17 1	− 2	11 14	PP	—
Bombay		57·8	271	e 9 51	− 4	e 17 57	+ 3	—	—	—
Honolulu		58·7	84	e 9 53	− 9	e 18 8	+ 2	e 12 16	PP	e 24·0
Kodaikanal	È.	58·8	260	i 10 5	+ 3	i 18 14	+ 7	12 5	PP	28·4
Colombo	E.	58·9	254	10 4	+ 1	18 15	+ 7	—	—	29·0
Sitka		59·6	39	i 10 11	+ 3	e 18 21	+ 4	e 12 32	PP	e 24·2
Ashkabad		60·4	297	e 10 13	0	18 23	− 5	—	—	—
Brisbane		65·2	163	i 10 57	+12	e 19 34	+ 6	i 13 0	PP	i 32·0
Baku		65·3	303	i 10 52	+ 6	—	—	—	—	—
Moscow		65·4	322	i 10 47	0	19 29	− 1	—	—	—
Grozny		66·6	307	10 56	+ 2	e 19 43	− 2	—	—	—
Helsinki		68·8	331	e 11 7	− 1	e 20 1	−10	—	—	e 31·6
Erevan		69·0	305	e 11 13	+ 4	—	—	—	—	—
Leninakan		69·1	306	e 11 10	0	—	—	—	—	—
Apia		70·0	124	e 11 33?	+18	e 20 39?	+13	—	—	e 29·6
Victoria		70·1	44	11 10	− 6	20 29	+ 2	13 56	PP	33·6
Perth		70·3	198	i 10 35	−42	i 20 36	+ 7	—	—	—
Sotchi		70·3	310	11 19	+ 2	e 20 26	− 3	—	—	—
Riverview		71·0	167	e 11 18	− 4	e 20 34	− 3	i 21 28	S_cS	e 31·8
Seattle		71·1	44	e 11 18?	− 4	e 20 28?	−10	—	—	e 28·6
Upsala		71·9	332	11 26	− 1	20 45	− 3	21 33	S_cS	e 32·6
Theodosia		72·2	312	11 30	+ 1	e 20 55	+ 4	—	—	—
Scoresby Sund		72·5	353	11 30	0	20 54	0	—	—	—
Grand Coulee		72·8	42	e 11 33	+ 1	—	—	—	—	—
Simferopol		73·0	313	11 36?	+ 3	21 0?	0	—	—	—
Yalta		73·2	312	i 11 34	− 1	21 0	− 2	—	—	—
Ferndale	E.	73·9	51	e 20 41	S	(e 20 41)	−29	—	—	—
Shasta Dam		75·0	50	i 11 44	− 1	e 21 22	− 1	i 14 23	PP	—
Warsaw	E.	75·5	325	e 11 47	− 1	21 27	− 1	21 55	PS	e 30·6
	N.	75·5	325	e 11 55	+ 7	21 31	+ 3	21 58	PS	e 30·6
	Z.	75·5	325	e 11 48k	0	21 21	− 7	e 14 38	PP	e 34·6
Mineral	Z.	75·7	50	i 11 43	− 6	—	—	i 14 26	PP	—
Saskatoon		76·5	34	11 12	−42	20 45	−54	14 0	PP	33·6
San Francisco	E.	76·6	52	e 11 33?	−21	—	—	—	—	—
Berkeley		76·7	52	i 11 54	− 1	i 21 43	+ 2	i 14 58	PP	i 33·2
Copenhagen		76·8	331	e 11 55	0	21 43	+ 1	i 22 12	PS	33·6

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Branner		77·0	52	e 11 56	0	e 21 53	+ 8	—	—	—
Santa Clara		77·2	52	i 11 58	+ 1	e 22 2	+15	i 12 2	pP	e 32·1
Lick		77·4	52	i 11 58	0	e 22 6	+17	e 22 21	PS	e 32·6
Butte	N.	77·5	41	e 12 1	+ 2	e 21 53	+ 3	e 22 37	PS	e 32·9
Bucharest		77·9	316	e 12 1	0	e 21 49	− 5	e 14 34	PP	36·6
Ksara		78·2	302	i 12 2a	− 1	22 22?	+25	—	—	—
Raciborzu		78·2	324	e 12 14	+11	e 21 23	−34	i 12 33?	PcP	e 37·6
Istanbul		78·3	312	12 1	− 2	21 58	− 1	—	—	—
Bozeman		78·5	41	e 12 6	+ 2	e 22 2	+ 1	e 15 5	PP	e 32·9
Reykjavik	N.	78·6	350	e 12 2	− 3	e 21 51	−11	e 22 36	PS	e 35·4
Fresno		78·9	52	i 12 9	+ 2	e 22 12	+ 7	i 12 20	PcP	—
Potsdam		78·9	328	i 12 6k	− 1	i 22 2	− 3	i 15 12	PP	e 35·6
Budapest	E.	79·6	321	12 13	+ 3	22 16	+ 4	e 15 49	PP	e 38·6
Collmberg	Z.	79·7	326	e 12 15	+ 4	e 22 23	+10	i 12 43	PcP	e 32·4
Tinemaha		79·7	51	i 12 13	+ 2	e 22 26	+13	—	—	—
Prague		80·0	326	e 12 8a	− 5	e 22 15	− 2	12 39	pP	e 35·6
Kalossa		80·3	321	e 12 20	+ 6	e 22 31	[+ 3]	e 15 48	PP	e 42·0
Santa Barbara		80·4	54	i 12 16	+ 1	—	—	—	—	—
Haiwee		80·5	52	i 12 16	+ 1	—	—	i 14 54	PP	—
Aberdeen		80·6	338	—	—	i 22 36	[+ 5]	i 33 12	SSS	39·8
Jena	N.	80·6	327	e 12 10	− 6	e 22 24	+ 1	e 15 26	PP	e 38·6
Belgrade		80·7	319	i 12 16	0	i 22 15	− 9	e 15 41	PP	e 42·6
Logan		80·7	44	e 12 12	− 4	e 22 24	0	i 23 12	ScS	e 33·8
Cheb		80·9	327	e 12 10	− 7	e 22 23	− 3	e 15 15	PP	e 38·6
Auckland	N.	81·0	149	—	—	22 45	+18	—	—	37·6
Salt Lake City		81·3	45	e 12 19	− 1	e 22 34	+ 4	e 27 13	SS	e 33·8
Mount Wilson	Z.	81·6	53	i 12 21	0	—	—	i 15 30	PP	—
Pasadena		81·6	53	e 12 21	0	i 22 32	− 1	—	—	33·0
Riverside		82·2	53	i 12 24	0	—	—	i 15 43	PP	—
Arapuni	E.	82·3	149	—	—	22 45	+ 5	—	—	29·6
De Bilt		82·3	332	i 12 23a	− 2	e 22 41	+ 1	e 28 21	SS	e 37·6
Boulder City		82·6	50	e 12 25	− 1	e 22 59	+16	e 15 34	PP	—
Palomar		82·9	53	i 12 27	− 1	e 22 50	+ 4	i 15 49	PP	—
La Jolla		83·0	54	i 12 31	+ 3	e 22 51	+ 4	—	—	—
Pierce Ferry		83·0	49	e 12 27	− 1	e 22 56	+ 9	i 15 48	PP	—
Ivigtut		83·0	2	e 12 29	+ 1	e 22 47	0	28 14	SS	36·6
Durham	N.	83·1	336	—	—	i 22 43	− 5	—	—	—
Stuttgart		83·3	327	e 12 28	− 2	e 22 49	− 1	e 16 33	PcS	e 42·6
Triest		83·5	323	e 12 29k	− 2	i 22 49	− 3	i 15 40	PP	—
Helwan		83·7	302	i 12 31k	− 1	22 51	− 3	15 41	PP	—
Uccle		83·7	332	e 12 31k	− 1	22 49?	− 5	—	—	—
Rapid City	E.	83·7	38	e 12 34	+ 2	e 22 55	+ 1	e 15 51	PP	e 35·2
Strasbourg		84·0	328	i 12 35k	+ 2	i 22 57	0	e 15 38	PP	38·6
Chur		84·6	326	e 12 37	+ 1	e 22 54	− 9	—	—	—
Zürich		84·6	327	e 12 33k	− 3	e 23 7	+ 4	e 16 0	PP	—
Wellington		84·7	151	—	—	22 45	−19	27 51	SS	40·6
Kew		84·8	334	i 12 38	+ 1	e 23 4	− 1	i 12 47	PcP	e 37·6
Basle		84·9	327	e 12 37	− 1	e 23 10	+ 4	—	—	—
Salo		85·1	324	12 39k	0	e 23 8	0	—	—	—
Padova	Z.	85·2	323	12 37k	− 2	e 23 7	− 2	—	—	—
Bologna		85·5	324	e 12 44k	+ 3	e 23 15	+ 3	e 16 5	PP	e 44·1
Neuchatel		85·6	327	e 12 39	− 2	e 23 18	+ 5	—	—	—
Christchurch		85·9	153	16 58	PP	23 28	+12	28 43	SS	40·9
Paris		86·0	330	i 12 41	− 2	i 23 16	− 1	i 23 8	SKS	44·6
Pavia		86·0	325	e 13 10?	+27	—	—	—	—	—
Florence		86·2	323	e 12 44	0	e 23 27	+ 8	e 24 22	PS	—
Rome		86·9	321	e 12 45k	− 3	i 23 21	− 5	24 19	PS	—
Jersey		87·4	334	—	—	e 23 3	[−14]	—	—	—
Tucson		87·5	51	e 12 51	0	e 23 23	− 8	e 16 18	PP	e 36·1
Messina		87·9	317	e 12 51	− 2	e 23 37	+ 2	e 16 19	PP	—
Clermont-Ferrand		88·2	328	i 12 56	+ 2	i 23 39	+ 1	i 16 19	PP	41·6
Ville Marie		91·0	23	e 13 5	− 2	e 24 3	0	e 16 51	PP	47·0
Temiskaming		91·7	23	i 13 11	+ 1	—	—	—	—	52·6
Barcelona		92·1	327	—	—	e 25 0	PS	—	—	e 42·4
Chicago		92·7	31	e 13 36	+21	e 23 46	[− 2]	e 16 57	PP	e 38·2

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tortosa		93·3	327	e 13 9	− 9	23 50	[− 2]	17 2	PP	42·1
Seven Falls		93·7	18	13 23	+ 3	23 52	[− 2]	17 18	PP	46·6
Shawinigan Falls		93·7	19	13 24	+ 4	—	—	—	—	49·6
Ottawa		93·9	21	13 19	− 2	24 42	+13	17 11	PP	46·6
St. Louis		94·2	35	i 13 22	0	i 23 48	[− 9]	i 17 10	PP	—
Cleveland		95·4	27	e 13 30	+ 2	i 24 56	+14	e 24 13	SKS	—
Vermont		95·5	20	e 19 59	PPP	e 25 5	+23	i 26 4	PS	e 43·9
Alicante		95·8	327	e 13 1	−28	23 51	[−14]	17 27	PP	e 46·0
Toledo		96·0	330	e 13 31	+ 1	e 25 12	+25	i 17 36	PP	45·4
Cincinnati		96·2	30	i 13 33	+ 2	—	—	i 17 29	PP	—
New Kensington	E.	96·9	26	e 17 57	PP	e 24 57	+ 3	e 25 43	PS	e 51·0
Pennsylvania	N.E.	97·3	25	i 13 51	+15	i 24 15	[+ 2]	i 17 41	PP	—
Halifax		97·7	13	17 42	PP	24 15	[0]	26 45	PS	46·6
Harvard		97·8	20	i 13 41	+ 3	—	—	i 17 41	PP	e 46·6
Weston		97·9	20	13 38	− 1	24 16	[0]	17 34	PP	43·3
Granada		98·1	328	18 2k	PP	26 42	PS	i 33 10	SSP	48·6
Fordham		98·6	22	e 13 45	+ 3	i 26 34	PS	i 17 43	PP	50·2
Lisbon		99·0	333	13 46	+ 2	25 14	+ 2	17 48	PP	41·2
Philadelphia		99·0	23	e 17 58	PP	i 25 16	+ 4	e 20 5	PPP	e 45·6
Georgetown		99·3	25	e 13 49	+ 4	e 24 19	[− 5]	e 17 49	PP	—
Tananarive		99·8	254	e 18 19	PP	30 55	?	—	—	e 45·8
Tacubaya	N.	103·9	53	e 14 31	+25	e 24 32	[−14]	i 18 37	PP	51·2
Tamanrasset		105·1	313	e 14 19	+ 7	—	—	—	—	—
Merida		108·6	45	e 14 29	P	e 26 41	S	e 18 59	PP	e 50·0
Bermuda		109·1	18	e 19 15	PP	e 25 33	[+25]	e 26 58	S	e 45·6
San Juan		121·8	25	e 21 6	PP	e 26 47	{−39}	e 30 36	PS	e 47·6
Fort de France		126·9	20	e 18 40	[−26]	—	—	—	—	—
Bogota	Z.	130·6	41	e 19 17	[+ 4]	e 22 12	SKP	e 21 9	PP	—
Huancayo		142·8	57	e 19 36	[+ 1]	e 41 43	SS	e 22 46	PP	e 57·4
La Paz		150·9	53	i 19 54	[+ 5]	27 9	[+14]	23 39	PP	71·6
La Plata	N.	168·4	272	—	—	45 57	SS	47 57	PSS	83·8

Additional readings and notes :—
Nanking S = 6m.47s.
Guam i = 9m.41s.
Calcutta iSSE = 18m.10s., iSSSE = 19m.23s.
Batavia eSSZ = 19m.30s.
College e = 18m.26s.
Honolulu ePPP = 14m.1s., iS = 18m.20s., eS_cS = 20m.5s., eSS = 21m.42s.
Kodaikanal SSE = 21m.57s.
Sitka iPPP? = 13m.58s., iS = 18m.24s.
Brisbane iPN = 11m.0s., iN = 11m.21s., eN = 11m.27s., iN = 12m.50s., eSN = 19m.42s., eN = 19m.47s., iPSN = 20m.3s., iSKSN = 20m.36s., iE = 20m.40s. and 22m.3s., iSSN = 23m.9s., iQE = 27m.53s.
Victoria i = 11m.14s., PS = 20m.59s., SS = 25m.25s., SSS = 27m.57s.
Perth i = 16m.23s. and 22m.8s.
Riverview iZ = 11m.53s., iN = 20m.20s., iSE = 20m.38s., iE = 20m.54s., 21m.10s., and 21m.52s., eQE = 30m.33s.
Upsala eE = 11m.54s., e = 15m.3s., eN = 16m.11s., eSN = 20m.48s., eE = 22m.44s., eN = 23m.4s., eE = 25m.6s., eSSN = 25m.24s., eSSSE = 28m.38s., eSSSN = 28m.43s.
Scoresby Sund 11m.49s. and 22m.20s.
Ferndale eSN = 32m.11s., eE = 33m.37s.
Shasta Dam i = 11m.53s. and 12m.4s., e = 21m.39s.
Warsaw PPSEZ = 22m.15s., SSZ = 26m.25s., SSN = 26m.28s., SSE = 26m.33s., SSSE = 28m.29s., SSSZ = 28m.50s.
Mineral eEN = 11m.49s., eZ = 11m.53s.
Saskatoon PS = 21m.30s., SS = 25m.57s., SSS = 28m.41s.
Berkeley iZ = 12m.8s. and 12m.49s., iE = 14m.41s. and 21m.56s., iZ = 22m.25s., iN = 22m.37s., iZ = 24m.15s., iEN = 24m.31s. and 26m.45s., eQEN = 31m.57s.
Copenhagen 11m.57s. and 12m.12s., i = 12m.24s., eN = 24m.29s.
Santa Clara esSN = 22m.24s.
Lick eZ = 12m.10s.
Butte eN = 19m.8s., ePPSN = 23m.0s., eN = 23m.54s.
Bucharest ePPPN = 16m.17s., iPS?E = 22m.10s.
Raciborzu ePEZ = 12m.22s., iPP?EN = 14m.33s.?
Bozeman e = 12m.53s. and 13m.51s., ePPP = 17m.3s., e = 18m.46s., ePS = 22m.51s., e = 24m.5s., eSS = 27m.26s.
Reykjavik eSS?N = 26m.57s., eEN = 32m.51s.
Fresno iN = 12m.12s. and 12m.23s., eZ = 22m.22s.
Potsdam iZ = 12m.36s., iE = 12m.39s., iZ = 13m.22s., iSKSN = 22m.10s., iPSZ = 22m.48s.

Continued on next page.

Budapest ePPPN =17m.7s., SN =22m.19s., iE =22m.31s., PSN =22m.55s., eSSN = 27m.33s., eSSE =27m.55s., eSSSE =31m.11s.
Collmberg iZ =13m.44s. and 14m.27s., ePPZ =16m.21s., ePPPZ =17m.14s., ePPS = 23m.48s., e =24m.13s., eSS =27m.4s., e =29m.36s.
Tinemaha iZ =12m.26s.
Prague iP =12m.12s.k, ePS =23m.3s., eSS =27m.51s., eSSS =31m.21s.
Kalossa PPE =15m.52s.
Haiwee iZ =12m.25s.
Jena ePE =12m.13s., ePN =12m.17s., eSN =22m.19s., eSKS?N =22m.43s., eSS?E = 27m.37s., eSS?N =27m.42s. and 27m.45s.
Belgrade e =15m.8s., ePPP? =17m.54s., i =24m.15s.
Logan e =24m.12s., eSS =31m.44s.
Cheb e =12m.36s., i =12m.48s., ePS? =22m.39s.?, ePPS? =23m.3s., eSS =27m.51s.
Salt Lake City e =13m.17s., 13m.55s., 23m.45s., and 24m.43s., eSSS =30m.52s.
Mount Wilson iZ =12m.34s.
Pasadena iZ =12m.33s.
Riverside iZ =12m.36s.
Arapuni SS?E =24m.9s., eE =26m.3s.
De Bilt iZ =12m.53s.
Boulder City ePPP? =17m.47s.
Palomar i =12m.31s., iZ =12m.40s., iN =23m.16s., i =23m.43s.
La Jolla iZ =12m.40s.
Pierce Ferry i =17m.6s.
Ivigtut i =22m.59s.
Stuttgart iZ =12m.47s.k, i =13m.0s.k, e =13m.46s. and 19m.7s., eS =22m.59s., ePS = 23m.58s., e =25m.33s., eSS =28m.27s., eSSS =32m.17s.
Triest i =17m.31s.
Uccle iE =12m.52s., iNZ =13m.1s.
Rapid City ePPP?E =18m.22s., ePPSE =24m.3s., eSSE =28m.36s.
Strasbourg i =12m.57s., ePPP =17m.38s., iPPP =17m.43s., iS =23m.1s., iPS =23m.45s. and 23m.51s., iPPS =24m.10s., i =24m.53s., 25m.36s., and 26m.57s., iSS =28m.39s. and 28m.48s., iSSS =32m.3s., i =32m.33s.
Zürich ePS =23m.43s.
Wellington Q =35m.9s.
Kew iPPZ =15m.53s., iSPZ =24m.11s., eSSN =26m.38s., eEN =33m.34s.
Basle e =13m.4s.
Bologna eZ =13m.9s. and 18m.6s., eSE =23m.29s., ePSZ =23m.58s., eE =24m.20s., eSSN =30m.19s.
Christchurch PS?N =25m.11s., SSSE =32m.57s., Q =35m.43s.
Paris i =12m.53s. and 13m.0s., ePS =24m.2s. and 24m.13s., ePPS =24m.58s., eSS = 30m.6s., iSSS =32m.56s., e =34m.58s.?, i =36m.11s., eQ =38·6m.
Florence eSSE? =28m.51s.
Rome i =24m.51s., SS =29m.12s.
Tucson i =13m.3s., iPP =16m.23s., eS_cS =24m.0s., ePS =24m.40s., eSS =29m.37s., eSSS =32m.47s.
Messina e =18m.17s.
Clermont-Ferrand i =13m.25s. and 24m.4s., iSS =30m.10s., iSSS =34m.10s.
Ville Marie iZ =13m.10s., iE =13m.19s.
Temiskaming i =13m.20s. and 13m.26s.
Chicago eS =24m.32s., ePS =25m.39s., eSS =30m.49s., eSSS =34m.35s.
Tortosa PPPN =19m.13s., SN =23m.58s., PSEN =25m.16s., PPSEN =25m.52s., SSEN =30m.14s., SSSEN =33m.58s., QE =37·8m.
Seven Falls S =24m.44s., SS =35m.51s.
Ottawa PPP =19m.20s., e =24m.7s., PS =25m.53s., SS =30m.57s.
Cleveland iSE =25m.0s., iN =25m.13s., iPSN =26m.15s.
Vermont i =27m.40s., eSS =32m.31s.
Alicante PPP =19m.27s., S =24m.17s., PS =25m.39s., PPS =26m.19s., SS =31m.25s., SSS =35m.15s., Q =39m.35s.
Toledo i =13m.46s., iPSE =26m.38s., iE =37m.21s.
Cincinnati i =13m.54s.
New Kensington eSKS?E =23m.45s., ePPSE =27m.3s., eSSE =31m.12s.
Pennsylvania iPKS?NE =19m.49s.
Halifax SS =31m.57s.
Weston S =25m.18s., SS =32m.18s.
Granada PPP =20m.30s.s, SSS =37m.3s.
Lisbon EZ =17m.18s., SN =25m.17s., PSEN =26m.58s., PPSZ =27m.32s., SSE = 31m.26s., EN =32m.33s., SSS =35m.56s.
Philadelphia e =19m.6s., eSKS =24m.19s., i =24m.35s., ePS =26m.40s.
Georgetown e =16m.48s., 21m.29s., and 24m.4s.
Tacubaya ePPPN =20m.50s., eSN =26m.13s., ePSN =27m.53s., ePPSN =28m.50s., eN =32m.19s. and 36m.0s.
Merida eE =22m.8s., ePSE =28m.17s.
Bermuda ePPS? =28m.47s., eSS =34m.16s., eSSS =38m.15s.
San Juan e =23m.43s., eSS =37m.8s.
Bogota ePPPZ =23m.56s., ePPPPZ =25m.58s.
Huancayo e =37m.53s., eSSS =47m.27s.
La Paz iZ =20m.18s., SKKS =30m.25s., PPSN =37m.7s., SSPN =44m.5s., SSS = 48m.41s., Q =64m.15s.
La Plata SSSN =52m.39s., N =56m.39s. and 60m.33s.?, Q =69m.51s.

June 28d. 7h. 19m. 41s. Epicentre 36°·1N. 136°·2E. (as at 7h.13m.).

Intensity V at Irako and Kameyama; IV at Tsuruga, Gihu, and Miyadu; II-III at Hukui, Kanazawa, Hikone, and Nagano. Epicentre 36°·7N. 136°·2E. Macroseimic radius 200-300km.

No records from Japanese stations.

		Δ	Az.	P.	O−C.
		°	°	m. s.	s.
Shasta Dam		75·0	50	i 11 44	− 1
Mineral	z.	75·7	50	i 11 48	− 1
Branner	z.	77·0	52	i 11 56	0
Tinemaha	z.	79·7	51	i 12 12	+ 1
Haiwee	z.	80·5	52	i 12 16	+ 1
Mount Wilson	z.	81·6	53	i 12 21	0
Pasadena	z.	81·6	53	i 12 20	− 1
Riverside	z.	82·2	53	i 12 23	− 1
Boulder City		82·6	50	i 12 25	− 1
Palomar	z.	82·9	53	i 12 28	0
Pierce Ferry		83·0	49	i 12 19	− 9
Stuttgart	z.	83·3	327	e 12 29	− 1
Tucson		87·5	51	i 12 51	0
Cleveland		95·4	27	i 11 17	?

Additional readings :—
Shasta Dam i = 11m.52s. and 12m.7s.
Mineral iZ = 11m.51s.
Cleveland eE = 21m.36s. and 22m.26s.

June 28d. 7h. 29m. 15s. Epicentre 36°·1N. 136°·2E. (as at 7h.19m.).

Intensity IV at Tsuruga and Miyadu; II-III at Hukui and Hikone. Shallow.

	Δ	Az.	P.	O−C.	S.	O−C.
	°	°	m. s.	s.	m. s.	s.
Gihu	0·8	147	0 15	− 3	0 27	− 4
Toyama	1·0	54	0 25	+ 4	0 39	+ 3
Nagoya	1·1	146	0 27	+ 5	0 43	+ 4
Toyooka	1·2	243	0 18	− 6	0 35	− 6
Kameyama	1·3	170	0 22	− 3	0 41	− 3
Wazima	1·4	24	0 13	−12	0 31	−15
Kobe	1·6	210	0 30	0	0 54	+ 3
Nagano	1·7	71	0 32	+ 1	0 56	+ 2
Owase	2·0	180	1 2	S	(1 2)	0
Sumoto	2·0	212	0 16a	?	0 47	?
Shizuoka	2·1	122	0 57	S	(0 57)	− 7
Misima	2·4	114	0 19	?	—	—
Utunomiya	2·9	81	1 13?	S	(1 13?)	−11
Kakioka	3·2	88	1 15	?	—	—
Hirosima	3·5	242	1 40	S	(1 40)	0

Additional readings :—
Owase gives S = 1m.47s.
Hirosima S = 2m.33s.

June 28d. 7h. 39m. 37s. Epicentre 36°·1N. 136°·2E. (as at 7h.29m.).

Intensity V at Hukui and Tsuruga; IV at Wazima and Tu; II-III at Kanazawa, Gihu, Iida, Kameyama, Kashiwara, Sumoto, Tottori, and Kyoto. Macroseismic radius 200-300km. Shallow.

	△ °	Az. °	P. m. s.	O−C. s.	S. m. s.	O−C. s.
Gihu	0·8	147	0 14	− 4	0 23	− 8
Hikone	0·8	177	0 23?	S_g	(0 23?)	S_g
Toyama	1·0	54	0 24	+ 3	0 36	0
Nagoya	1·1	146	0 23	+ 1	0 38	− 1
Kyoto	1·2	199	1 20$_a$	+56	1 41	+60
Toyooka	1·2	243	−0 9	?	0 9	?
Kameyama	1·3	170	0 25	0	0 39	− 5
Kobe	1·6	210	0 33$_a$	+ 3	0 55	+ 4
Nagano	1·7	71	1 9	?	1 34	?
Owase	2·0	180	0 33	− 2	1 6	+ 4
Sumoto	2·0	212	0 32	− 3	1 2	0
Shizuoka	2·1	122	0 27	−10	1 1	− 3
Kameyama	2·6	89	0 29	−15	1 7	−10
Siomisaki	2·7	188	1 53	?	2 31	?
Tokyo	2·9	98	0 53	+ 5	—	—
Yokohama	2·9	103	0 33	−15	1 12	−12
Kakioka	3·2	88	0 53	+ 1	—	—
Hirosima	3·5	242	1 9	P_g	1 55	S_g
Mito	3·5	84	0 52	− 5	1 32	− 8
Hukusima	3·8	63	1 19	P_g	2 19	S_g
Sendai	4·3	58	1 26	P_g	2 29	S_g
Hukuoka	5·4	244	1 38	P^*	2 54	S_g
Kumamoto	5·6	236	1 32	+ 5	3 1	S_g
Miyazaki	5·8	225	1 37	+ 8	3 15	S_g
Miyako	5·8	50	0 6	?	0 26	?

June 28d. 23h. North Pacific.

Victoria iZ =38m.36s., e =42m.34s., eL =44·2m.
Grand Coulee eP =39m.15s.
Shasta Dam eP =39m.35s., e =46m.38s.
Mineral iPZ =39m.43s., iZ =39m.52s. and 40m.0s.
Fresno ePZ =40m.14s.
Tinemaha ePZ =40m.19s., iZ =40m.27s.
Boulder City eP =40m.36s.
Pasadena ePZ =40m.39s., iZ =40m.49s.
Mount Wilson iPZ =40m.40s., iZ =40m.47s.
Riverside iPZ =40m.43s., iZ =40m.50s.
Pierce Ferry eP =40m.45s.
Palomar iP =40m.49s., iZ =40m.57s.
Tucson iP =41m.25s., i =41m.32s.
Ottawa eZ =42m.41s., L =60m.
Sverdlovsk iP =44m.32s., iS =53m.20s.
Stuttgart eZ =45m.38s. and 46m.28s.
Tashkent eS =52m.32s.?
Philadelphia e =53m.13s., eL =62m.30s.
Granada i =56m.57s., L =77·6m.
Ksara e? =57m.16s.
Long waves were also recorded at Sitka and Alicante.

June 28d. Readings also at 0h. (De Bilt), 4h. (near Mineral), 6h. (Stalinabad and near Kulyab), 7h. (near Andijan, Kulyab, Samarkand, and Stalinabad), 8h. (Copenhagen, Paris, Stuttgart, and near Kulyab (3)), 9h. (Wellington and near Mineral), 10h. (La Paz), 11h. (Rome, Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, Boulder City, Pierce Ferry, Shasta Dam, and Mineral), 12h. (La Paz, and near Kulyab), 13h. (Ksara), 15h. (near Istanbul), 16h. (Istanbul, near Basle, Stuttgart, and Zürich), 17h. (near Mineral (2)), 19h. (near Lick), 21h. (near Andijan and Murgab), 23h. (Toledo).

June 29d. 10h. 28m. 33s. Epicentre 15°·3S. 172°·5W. (as on 1947, Sept. 4d.).

Intensity V at Apia. Epicentre 15°·5S. 174°W. Depth of focus 60km. (Gutenberg).

Quarterly Seismological Bulletin, Apia, Samoa.

$A = -\cdot9567$, $B = -\cdot1260$, $C = -\cdot2622$; $\delta = -10$; $h = +6$;
$D = -\cdot131$, $E = +\cdot991$; $G = +\cdot260$, $H = +\cdot034$, $K = -\cdot965$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Apia		1·6	19	i 0 33a	+ 3	i 0 51	0	—	—	—
Auckland	N.	24·3	206	5 17	− 3	9 30	− 7	10 21	sS	—
Arapuni	E.	25·0	203	5 27	0	10 3	+14	e 9 27	P_cP	13·3
Tuai	N.	25·1	200	5 25	− 3	9 44	− 7	—	—	—
New Plymouth	E.	26·5	203	5 40	− 1	10 15	+ 1	—	—	—
Wellington		28·2	202	5 49	− 7	10 33	− 8	6 46	PP	13·0
Kaimata		30·5	204	6 16	− 1	11 10	− 8	e 7 39	PPP	—
Christchurch		30·9	202	6 21	+ 1	10 57	−27	—	—	14·1
Brisbane	E.	34·2	244	i 6 41	− 8	i 12 4	−12	i 8 1	PP	i 17·1
Riverview		37·6	234	i 7 12a	− 6	i 12 53	−15	i 7 35	pP	16·1
Honolulu		39·1	22	i 7 32	+ 1	i 13 33	+ 2	—	—	i 16·4
Guam		51·1	302	i 9 4	− 2	i 16 18	− 6	—	—	—
Perth		66·7	241	i 19 0	?	i 19 34	−12	i 20 47	PPS	i 29·0
Osima		67·6	319	10 59	− 2	—	—	—	—	—
Tokyo		67·9	320	11 4	+ 2	20 2	+ 1	—	—	—
Kakioka		68·0	320	11 2	− 1	20 0	− 2	—	—	—
Misima		68·1	319	e 10 57	− 7	—	—	—	—	—
Shizuoka		68·3	319	11 6	+ 1	20 6	0	—	—	—
Kumagaya		68·4	320	11 7	+ 1	—	—	—	—	—
Hukusima		68·8	322	11 9	+ 1	20 9	− 2	—	—	—
Maebasi		68·8	320	11 13	+ 5	20 16	+ 5	—	—	—
Sendai		68·9	323	11 9	0	20 12	− 1	—	—	32·3
Miyako		69·2	324	e 11 4	− 6	20 10?	− 6	—	—	—
Mizusawa	E.	69·3	323	e 11 9	− 2	20 14	− 3	—	—	—
Nagoya		69·4	318	11 11	− 1	—	—	—	—	—
Kameyama		69·5	318	11 13	+ 1	—	—	—	—	—
Nagano		69·5	319	e 11 7	− 5	—	—	—	—	—
Gihu		69·7	318	11 14	0	—	—	—	—	—
Osaka		70·0	316	11 14	− 1	20 43	+17	—	—	—
Toyama		70·2	319	11 16	− 1	—	—	—	—	—
Akita		70·3	323	12 22	+65	—	—	—	—	—
Sumoto		70·3	316	i 11 19	+ 2	20 21	− 8	—	—	—
Santa Barbara		70·4	45	i 11 19k	+ 1	—	—	—	—	—
Aomori		70·6	324	11 21	+ 2	20 35	+ 2	—	—	—
Branner		70·6	41	e 11 19	0	e 20 35	+ 2	—	—	e 32·6
San Francisco	E.	70·7	41	e 11 27?	+ 7	—	—	—	—	—
Santa Clara		70·7	41	i 11 21	+ 1	e 19 39	−55	—	—	e 31·6
Berkeley		70·8	41	i 11 21	+ 1	i 20 37	+ 2	i 21 2	PS	i 29·7
Lick		70·9	41	e 11 22	+ 1	e 20 34	− 2	e 20 40	PS	e 32·6
Ukiah		71·0	39	e 11 26	+ 4	e 20 38	+ 1	—	—	e 29·6
Ferndale		71·3	37	e 11 4	−19	e 20 7	−34	—	—	—
La Jolla		71·3	47	i 11 24k	+ 1	—	—	i 11 48	P_cP	—
Miyazaki		71·3	311	11 31	+ 8	i 20 47	+ 6	—	—	—
Pasadena		71·3	46	i 11 23k	0	i 20 39	− 2	i 11 47k	pP	e 31·3
Mount Wilson		71·4	46	i 11 24k	0	—	—	—	—	—
Fresno	Z.	71·7	42	i 11 27	+ 1	e 20 59	+14	i 11 54	P_cP	e 32·0
Kagosima		71·8	310	11 26	0	—	—	—	—	—
Palomar		71·8	47	i 11 26k	0	i 20 49	+ 3	i 11 46	P_cP	—
Riverside		71·8	46	i 11 27k	+ 1	—	—	i 11 50	P_cP	—
Sapporo		71·9	327	i 11 26	− 1	i 20 45	− 3	—	—	—
Hamada		72·5	315	11 31	+ 1	20 54	0	—	—	—
Shasta Dam		72·5	38	i 11 31	+ 1	e 20 55	+ 1	e 21 35	sS	e 36·0
Haiwee		72·6	44	i 11 33k	+ 2	—	—	—	—	—
Mineral	Z.	72·8	38	i 11 31	− 1	—	—	—	—	e 33·8
Hukuoka		72·9	313	e 11 24	− 9	20 57	− 2	—	—	—

Continued on next page.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Tinemaha		72·9	43	i 11 34k	+ 1	—	—	i 11 48	PcP	—
Boulder City		74·6	46	e 11 43	0	i 12 18	sP	e 39 37	P′P′	—
Pierce Ferry		75·3	46	i 11 47	0	e 21 37	+11	i 12 14	pP	e 34·5
Tucson		75·6	50	i 11 49k	+ 1	—	—	—	—	—
Victoria		77·0	31	i 11 53	− 3	21 45	0	14 50	PP	32·5
Vladivostok		77·3	321	i 11 57	− 1	i 21 45	− 3	—	—	—
Sitka		78·8	20	i 12 3	− 3	i 21 54	−10	i 12 25	pP	e 32·6
Grand Coulee		78·9	34	e 12 7	0	—	—	—	—	—
Salt Lake City		79·1	42	i 12 7	− 1	e 22 3	− 4	e 12 23	pP	e 31·4
Batavia		79·4	267	e 12 7	− 2	i 21 59	−11	e 14 51	PP	34·0
Logan		79·7	42	i 12 11	0	e 22 11	− 2	i 22 34	sS	e 33·3
Tacubaya		79·9	67	i 12 12	0	e 22 16	0	e 15 10	PP	e 37·1
Bozeman		82·2	39	e 12 25	+ 1	e 22 35	− 4	e 23 35	PS	e 34·2
Rapid City	E.	86·3	41	i 12 46	+ 1	e 23 12	[+ 3]	e 15 41	PP	e 38·4
Saskatoon		87·9	34	12 53	0	23 38	+ 3	16 23	PP	40·5
Lincoln	E.	89·4	48	e 12 58	− 2	e 23 29	[0]	—	—	e 49·8
St. Louis		93·5	51	i 13 18	− 1	i 24 5	{− 3}	i 13 40	pP	—
Huancayo		93·6	103	i 13 24	+ 5	e 23 58	[+ 5]	e 24 41	sS	e 37·5
Chicago		96·3	48	e 13 30	− 2	e 24 1	[− 7]	e 17 25	PP	e 41·2
Irkutsk		97·8	322	13 37	− 1	e 24 45	{+ 6}	e 17 47	PP	—
Cincinnati		98·0	52	i 13 39	0	—	—	i 17 39	PP	e 46·5
La Paz		99·0	110	i 13 47k	+ 3	i 24 22	[0]	i 17 49	PP	47·1
Bogota		99·3	88	e 13 43	− 2	e 24 52	{+ 3}	e 17 49	PP	42·5
La Plata	N.	100·4	131	—	—	25 21	− 3	32 15	SS	49·2
Cleveland		100·7	50	i 13 51k	− 1	i 24 28	[− 2]	i 17 57	PP	e 48·0
Ville Marie		103·1	44	i 14 1	− 1	i 24 38	[− 4]	i 18 17	PP	50·0
Temiskaming		103·3	45	e 14 2	− 1	—	—	e 18 17	PP	49·9
Georgetown		103·6	53	e 14 4	0	i 24 44	[0]	i 18 21	PP	—
Calcutta	E.	104·0	290	e 18 35	PP	i 24 45	[− 1]	—	—	—
Philadelphia		105·2	52	e 14 26	P	i 25 5	[+14]	i 18 48	PP	e 46·0
Ottawa		105·4	46	14 12	P	24 51	[− 1]	18 33	PP	49·5
Fordham		106·3	51	i 14 17	P	i 24 59	[+ 3]	i 18 41	PP	46·0
Vermont		107·1	47	e 18 35	PP	e 25 41	{− 4}	e 29 0	PPS	e 45·8
Harvard		108·2	49	e 18 12	[−17]	e 28 4	PS	i 18 52	PP	e 50·5
Seven Falls		109·0	45	14 29	P	25 6	[− 2]	e 18 33	PKP	51·5
Kodaikanal	E.	111·8	276	e 19 33	PP	—	—	—	—	—
Hyderabad	N.	112·3	283	—	—	27 12	?	—	—	—
Bermuda		112·9	61	e 19 35	PP	e 25 29	[+ 5]	e 29 11	PS	e 47·4
Halifax		114·0	48	19 33	PP	25 29	[+ 1]	29 15	PS	52·5
Almata		115·2	311	e 19 39	PP	—	—	—	—	—
Frunse		117·0	311	e 19 37	PP	—	—	—	—	—
Murgab		117·3	306	18 39	[− 8]	—	—	—	—	—
Andijan		118·8	308	e 19 39?	PP	—	—	—	—	—
Ivigtut		119·5	27	20 11	PP	25 46	[− 2]	30 3	PS	55·5
Tashkent		121·1	309	i 18 54	[− 1]	i 27 18?	{− 3}	e 30 19?	PS	—
Stalinabad		121·8	307	i 19 49?	PP	—	—	—	—	—
Scoresby Sund		122·0	12	18 59	[+ 2]	25 52	[− 5]	i 20 30	PP	—
Sverdlovsk		122·5	329	e 15 27	P	i 27 28	{− 2}	i 18 57	PKP	—
Samarkand		123·0	308	e 18 57	[− 1]	—	—	—	—	—
Reykjavik	N.	127·2	15	—	—	e 28 33	{+32}	—	—	e 61·7
Ashkabad		130·0	307	e 20 13	[+61]	22 37	PKS	—	—	—
Helsinki		133·4	348	e 19 16	[− 2]	i 22 46	PKS	—	—	e 60·5
Moscow		133·5	337	i 19 18	[0]	i 22 46	PKS	i 21 43	PP	—
Upsala		134·9	353	e 21 54	PP	i 22 49	PKS	e 33 56	PPS	e 54·5
Baku		135·5	313	e 23 1	PKS	—	—	—	—	—
Aberdeen	E.	137·6	7	—	—	i 28 13	{−54}	i 40 18	SS	—
Piatigorsk		138·4	322	e 19 19	[− 9]	e 23 6	PKS	—	—	—
Edinburgh		138·6	9	19 26	[− 2]	26 35	[− 2]	—	—	—
Copenhagen		139·5	356	19 21	[− 9]	40 39	SS	i 23 7	PP	—
Warsaw		141·6	347	e 19 25k	[− 8]	e 29 37	{+ 6}	i 22 35	PP	e 67·5
Theodosia		142·2	327	e 19 29	[− 5]	e 23 13	PKS	—	—	—
Potsdam		142·7	354	i 19 31a	[− 4]	e 41 25	SS	i 19 57	pPKP	e 66·5
De Bilt		143·4	1	i 19 30k	[− 6]	i 23 6	PKS	i 22 50k	PP	e 67·5
Kew		143·4	7	i 19 32	[− 4]	e 41 32	SS	i 22 50	PP	e 69·5
Collmberg	Z.	143·8	355	i 19 37	[0]	—	—	e 22 59	PP	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Raciborzu		144·2	348	i 19 40	[+ 2]	—	—	—	—	—
Jena	N.	144·3	354	e 19 37	[− 1]	—	—	—	—	—
Uccle		144·5	4	i 19 37k	[− 1]	e 41 44	SS	i 22 56	PP	67·5
Prague		144·9	352	i 19 36	[− 3]	e 23 27	SKP	e 22 27	PP	e 69·5
Cheb		145·1	354	19 39	[0]	e 33 11	SKSP	e 22 58	PP	e 70·4
Paris		146·3	6	i 19 41	[0]	i 35 24	PPS	e 23 7	PP	e 69·5
Budapest	N.	146·5	346	19 44	[+ 2]	—	—	—	—	e 71·0
Stuttgart		146·6	357	i 19 41k	[− 1]	e 33 20	PSKS	e 23 15	PP	e 68·5
Strasbourg		146·8	358	i 19 43k	[+ 1]	e 23 15	PKS	e 23 32	PP	67·5
Bucharest		147·0	335	e 19 45	[+ 2]	—	—	i 23 11	PP	—
Kalossa	E.	147·4	346	e 19 47	[+ 4]	—	—	e 22 32	PP	—
Basle		147·8	0	e 19 43	[− 1]	—	—	—	—	—
Zürich		148·0	359	e 19 43	[− 1]	—	—	—	—	—
Istanbul		148·2	328	i 19 44	[− 1]	26 51	[0]	—	—	—
Ksara		148·4	311	i 19 45k	[0]	—	—	23 16	PP	—
Neuchatel		148·4	1	e 19 44	[− 1]	—	—	—	—	—
Chur		148·5	357	e 19 44	[− 1]	—	—	—	—	—
Belgrade		148·6	341	i 19 51k	[+ 6]	—	—	—	—	79·5
Triest		149·3	351	e 19 51	[+ 5]	e 42 33	SS	i 20 0	PKP_2	—
Clermont-Ferrand		149·4	6	i 19 47	[+ 1]	i 23 28	PKS	i 23 43	PP	67·5
Salo	Z.	149·7	355	e 19 49k	[+ 2]	—	—	i 20 11	PKP_2	—
Pavia		150·2	358	e 19 48	[0]	—	—	e 19 52	PKP_2	—
Bologna		150·7	355	i 19 49k	[+ 1]	—	—	i 19 56	PKP_2	—
Padova		150·7	353	19 44k	[− 4]	43 18	SS	—	—	—
Lisbon		152·4	28	19 51k	[0]	—	—	i 20 10a	PKP_2	68·5
Rome		153·1	351	i 19 49k	[− 3]	e 43 17	SS	i 20 12	PKP_2	—
Toledo		153·5	20	i 19 54	[+ 2]	i 26 50	[− 8]	i 20 9	PKP_2	67·3
Barcelona		153·6	9	e 19 51	[− 2]	—	—	e 23 36	PP	e 70·6
Helwan		153·7	308	e 29 46	PKKP	e 34 9	PS	—	—	—
Tortosa	E.	153·8	11	20 2	[+ 9]	43 12	SS	27 43	PPP	e 72·5
Alicante		156·0	15	19 58	[+ 2]	27 9	[+ 8]	24 9	PP	e 72·8
Granada		156·1	22	i 19 57a	[+ 1]	i 43 24	SS	20 24k	PKP_2	i 71·7
Catania		156·9	344	e 19 56	[− 1]	—	—	—	—	—
Tamanrasset		172·3	14	i 20 11k	[0]	—	—	i 21 36k	PKP_2	—

Additional readings :—
Auckland pP?N =5m.27s., PPN =6m.5s., SSN =11m.14s., P_cSN =12m.5s., S_cS?N = 15m.44s., iN =19m.29s.
Wellington i =7m.17s. and 7m.39s., P_cP =8m.57s., SS =10m.57s., S_cS =16m.36s.
Brisbane ePN =6m.46s., iN =7m.34s. and 8m.21s., iP_cPN =8m.57s., iEN =11m.56s., iSSE =14m.32s., iQE =14m.57s.
Riverview isPEZ =7m.48s., iPP =8m.42s., isPPE =9m.5s., iSE =12m.49s., iP_cSE = 13m.15s., iP_cSZ =13m.18s., isSE =13m.32s., and other readings given without phase.
Berkeley iPPN =13m.16s., iN =15m.35s., iEN =21m.41s.
Pasadena isPEN =11m.59s., iZ =12m.14s., iQEN =29m.27s.
Mount Wilson iZ =11m.27s. and 11m.43s., eSKP,PKPZ =42m.54s.
Fresno iN =13m.28s., eN =19m.5s.
Palomar iZ =11m.31s. and 14m.1s., ePKP,PKPZ =37m.49s., iSKP,PKPZ =42m.57s.
Riverside iSKP,PKPZ =42m.55s.
Shasta Dam ePKP,PKP =39m.31s.
Pierce Ferry iPP =14m.37s., iPPP =16m.21s., ePKKP =31m.12s., ePKP,PKP = 39m.12s.
Victoria PPP =16m.38s., PS =22m.38s., SS =27m.15s., SSS =30m.9s.
Sitka ePP =15m.6s., epPP =15m.41s., ePPP =16m.55s., eS =21m.51s., ePS =22m.51s., eSS =26m.41s.
Salt Lake City ePP =15m.5s., ePPP? =16m.41s., esS =22m.32s., esPS =23m.43s., eSS =26m.54s.
Batavia iPS =22m.31s., iSSEN =26m.42s.
Logan i =13m.51s., e =16m.7s., ePS =23m.1s., esPS =23m.30s.
Tacubaya ePE =12m.15s. and 12m.20s., eN =12m.27s., iN =13m.13s., eE =13m.20s., eN =13m.25s., ePPE =15m.4s., eE =17m.26s., ePPPN =17m.29s., eN =17m.33s. and 19m.5s., eE =20m.8s., eSN =22m.10s. and 22m.20s.
Bozeman eS_cS =23m.1s., epPS =23m.53s., eSS =27m.56s.
Rapid City eE =13m.55s., ePSE =23m.49s., eSSS?E =31m.58s.
Saskatoon PPS =24m.53s., SS =29m.53s., SSS =33m.3s.
Lincoln eE =15m.48s. and 41m.13s.
St. Louis PP =16m.29s., i =33m.37s.
Huancayo ePP? =16m.59s., epPP =17m.7s., ePPS =26m.2s., eSS =31m.1s.

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Chicago eS =24m.31s., esS? =25m.49s.
Cincinnati i =13m.56s.
La Paz iSKKS =24m.57s., iSN =25m.23s., iSS =32m.10s.
Bogota ePPPEZ =18m.54s., eSKSEZ =24m.19s., eSE =25m.37s., ePSE =26m.48s.
La Plata PPSN =29m.9s., SSSN =36m.3s., QN =44m.14s.
Cleveland eZ =16m.58s., eSKKSE =24m.56s., eSN =25m.31s., ePS?E =27m.4s., eE = 28m.13s., eN =42m.27s.
Georgetown e =17m.1s., iPS =27m.32s.
Philadelphia ePKP =18m.1s., eS =25m.35s., esS =26m.18s., ipPS =28m.5s.
Ottawa SN =26m.7s., PS =27m.52s., SS =33m.42s.
Fordham iPS? =28m.1s.
Vermont e =20m.17s., eS =25m.57s., iPPS =29m.10s.
Harvard ePKS =21m.12s.
Seven Falls PP =19m.0s., PS =28m.26s., SS =34m.33s.
Bermuda ePPS? =30m.25s.
Halifax eN =46m.27s.?
Ivigtut SS =36m.5s., SSS =40m.9s.
Tashkent iPP =20m.10s.
Scoresby Sund 26m.25s., 27m.25s., 28m.0s., 30m.15s., 30m.35s., 32m.10s., SS =37m.3s.
Sverdlovsk iPP =20m.33s., iSS =37m.13s.
Upsala eE =23m.50s. and 24m.40s., ePPPN =24m.55s., eSKSP?N =31m.55s., eE = 37m.27s.?, eSSN =39m.27s.?, eE =40m.27s.?
Copenhagen 22m.20s., 25m.33s.
Warsaw ePKPEN =19m.29s., iSKPN =23m.11s., SKPZ =23m.22s., PPPZ =25m.41s., PSNZ =32m.50s., eSKKS$_2$?N =35m.10s., SKKS$_2$?Z =35m.24s., eSSN =41m.8s., eSS?Z =41m.12s., and many other readings given without phase.
Potsdam ePKPE =19m.34s., iPPE =22m.38s., iPPNZ =22m.43s., ipPPNZ =23m.0s., iPSKSN =32m.53s., ePSKSZ =32m.57s.
De Bilt eSKSP =33m.3s., ePS =33m.19s., eSS =41m.32s.
Kew iN =23m.16s., iZ =24m.48s., eE =30m.18s.
Collmberg eZ =20m.48s., ePP?Z =21m.55s., eZ =24m.44s.
Uccle eE =21m.34s., eSKKSN =30m.14s.
Prague e =20m.4s. and 25m.45s., eSKKS =29m.57s., eSKSP? =32m.33s., ePPS? = 36m.27s., eSS =42m.27s.?, eSSS? =46m.27s.?
Cheb ePS?N =34m.26s., ePPSN =36m.0s., eSS =43m.0s.
Paris i =19m.54s. and 20m.1s., iPP =23m.3s., e =23m.33s., ePPP? =25m.37s., e = 27m.51s., ePS =33m.13s., eSS =41m.27s.?, eSSS =47m.27s.?, e =54m.27s.?, and 63m.27s.?
Stuttgart iPKP =19m.44s.k, ipPKP? =20m.11s.,a, e =20m.45s., ePPP =26m.14s., eSKKS? =29m.8s., e =37m.27s.
Strasbourg iPKP$_2$ =20m.2s., i =21m.20s., eSKP =22m.55s., and 23m.4s., iSKP = 23m.10s., ePPP =26m.22s., eSKKS =29m.56s., eSS? =43m.19s., e =51m.27s.
Kalossa eE =20m.32s., eN =20m.39s.
Belgrade i =19m.56s., e =21m.57s.
Triest ePP =23m.2s., ePSKS =33m.37s., ePPS =36m.28s., eSSS =48m.30s.
Clermont-Ferrand iPPP =27m.1s., iPPS =36m.5s., iSS =42m.43s., iSSS =49m.3s.
Salo i =19m.54s.
Bologna ePP?E =24m.14s., eE =28m.58s.
Lisbon PKPZ =19m.58s., iZ =21m.30s., Z =22m.8s., EZ =23m.42s., PPSE =35m.10s.
Rome iPPZ =23m.39s.
Toledo iPPE =23m.50s.
Helwan e =30m.39s. and 34m.48s.
Tortosa PKP$_2$?E =20m.42s., SSE =51m.40s., SSSE =60m.44s.
Alicante PKP =20m.27s., PKS =23m.39s., PPP =27m.51s., PKKP =28m.29s., SKKS = 30m.55s., SKSP =34m.35s., SS =43m.47s., SSS =49m.47s., Q =64m.1s.
Granada iPP =24m.0s.k, pPP =24m.48s.k, PPP =28m.15s.k, iSKKS =29m.54s., SKSP =33m.15s., PPS =38m.0s., SSS =48m.54s.
Tamanrasset ePP =25m.28s., ePPP =29m.16s.
Long waves were also recorded at Tananarive.

June 29d. 14h. Undetermined shock, possibly in Mexico.

Tacubaya PNZ =56m.22s., eN =56m.36s., eE =57m.4s., LNZ =57m.11s.
Tucson iP =59m.39s., eS =65m.17s., e =66m.30s., eL =67m.24s.
Palomar iPEZ =60m.25s.a, iZ =60m.33s., iNZ =60m.42s.
Riverside iPZ =60m.31s.
Boulder City iP =60m.33s.
Pasadena iPZ =60m.38s.a.
Mount Wilson iPZ =60m.38s.a.
Tinemaha iPZ =60m.58s.
Rapid City ePE =61m.21s., eLE =70m.10s.
Mineral ePZ =61m.35s.
Cleveland iPZ =61m.38s.k, eSN =70m.21s.
Shasta Dam iP =62m.0s.
Long waves were also recorded at Bozeman, Logan, and Salt Lake City.

June 29d. 16h. 6m. 19s. Epicentre 41°·5N. 47°·0E.

$A = +·5123$, $B = +·5494$, $C = +·6601$; $\delta = +2$; $h = -2$;
$D = +·731$, $E = -·682$; $G = +·450$, $H = +·483$, $K = -·751$.

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Grozny		2·0	333	i 0 40	P_g	—	—	—	—	—
Baku		2·5	116	0 55?	P_g	i 1 6	− 8	—	—	—
Leninakan		2·5	253	i 0 46	P*	—	—	—	—	—
Piatigorsk		3·8	313	1 2	+ 1	1 45	− 2	i 1 8	P*	—
Sotchi		5·8	293	1 28	− 1	2 50	S*	—	—	—
Theodosia		9·2	296	e 2 19?	+ 3	—	—	—	—	—
Ashkabad		9·6	111	2 26	+ 5	—	—	—	—	—
Yalta		9·9	292	i 2 25	0	i 4 11	− 9	—	—	—
Ksara		11·7	232	i 2 56k	+ 5	5 24	SS	—	—	—
Istanbul		13·5	274	i 3 15	0	7 18	L	—	—	(7·3)
Samarkand		15·3	90	i 3 41?	+ 2	—	—	—	—	—
Moscow		15·5	340	i 3 37	− 5	6 17	−18	—	—	—
Bucharest		15·6	288	e 3 43	0	i 6 43	+ 6	e 3 46	P	7·7
Tashkent		16·7	83	i 4 0	+ 3	i 7 12	+ 9	—	—	—
Tchimkent		16·8	80	i 3 59	+ 1	e 6 59?	− 6	—	—	—
Stalinabad		16·9	93	i 4 4	+ 5	i 7 19	+12	—	—	—
Helwan		17·2	233	i 4 4a	+ 1	7 29	+15	—	—	—
Sverdlovsk		17·7	26	i 4 7	− 3	i 7 20	− 6	i 4 30	PP	—
Kulyab		17·9	94	i 4 17	+ 5	i 7 39	+ 9	—	—	—
Andijan		19·1	85	e 4 31	+ 4	7 57	0	i 4 53	PPP	—
Frunse		20·5	78	i 4 45	+ 3	—	—	—	—	—
Warsaw		20·6	311	i 4 40a	− 3	i 8 34	+ 5	i 5 11	PP	e 10·7
Budapest		20·7	297	4 46	+ 2	8 38	+ 7	5 1	PP	—
Kalossa	N.	20·7	296	4 47	+ 3	8 41	+10	—	—	—
Murgab		20·9	90	4 51?	+ 5	8 48?	+13	—	—	—
Almata		22·1	74	i 5 2	+ 3	i 8 59	+ 1	—	—	—
Taranto		22·4	278	e 4 54	− 8	9 13	+ 9	—	—	14·7
Helsinki		23·1	333	i 5 6	− 2	i 9 7	− 9	—	—	e 12·7
Prague		24·1	303	i 5 18a	0	e 9 32	− 2	e 5 56	PP	e 11·7
Messina		24·3	274	—	—	e 8 17	?	e 8 32	?	—
Triest		24·3	292	i 5 21	+ 1	i 9 39	+ 2	i 5 33	pP	—
Semipalatinsk		24·6	57	e 5 19	− 4	—	—	—	—	—
Catania		24·9	272	e 5 25	− 1	e 9 59	+12	—	—	—
Collmberg		25·2	305	i 5 29	0	e 8 53	−59	i 6 1	PP	e 12·6
Cheb		25·4	303	e 5 28	− 3	e 9 51	− 5	e 6 2	PP	e 11·7
Potsdam		25·4	308	i 5 31a	0	i 9 52	− 4	i 10 3	sS	e 12·7
Padova		25·7	290	5 33	0	10 40	+39	6 14	PP	—
Rome		25·7	284	i 5 36	+ 3	9 59	− 2	6 11	PP	—
Upsala		25·8	326	i 5 32a	− 2	i 10 4	+ 2	i 5 56	pP	e 11·7
Jena		26·0	303	i 5 35	− 1	e 10 5	− 1	—	—	—
Bologna		26·1	289	i 5 39a	+ 2	e 10 20	+13	i 6 12	PP	—
Copenhagen		26·6	315	i 5 40	− 2	i 10 11	− 5	i 10 26	?	13·7
Salo		26·6	291	5 42a	0	e 10 15	− 1	—	—	—
Chur		27·2	295	e 5 45	− 2	e 10 37	+12	—	—	—
Dehra Dun	N.	27·4	104	e 8 26	?	e 14 11	?	e 10 59	?	—
Stuttgart		27·4	299	i 5 47a	− 2	e 10 26	− 2	e 6 53	PPP	e 13·3
Pavia	Z.	27·6	292	i 5 55	+ 4	—	—	—	—	—
Zürich		27·9	296	e 5 50a	− 4	e 10 29	− 8	—	—	—
Strasbourg		28·4	299	i 5 57	− 1	e 11 27	+42	e 6 45	PP	—
Basle		28·5	296	i 5 57	− 2	e 11 0	+14	—	—	—
Neuchatel		29·0	295	e 6 1	− 3	—	—	—	—	—
De Bilt		30·1	306	i 6 13a	0	e 11 9	− 3	i 7 12	PP	e 14·7
Uccle		30·6	304	e 6 17	− 1	e 11 15	− 5	—	—	e 14·7
Bombay	N.	31·5	128	e 6 43	+17	e 11 56	+22	7 54	PP	15·4
Clermont-Ferrand		31·8	293	i 6 27	− 1	i 11 34	− 4	i 7 27	PP	15·7

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Paris		31·9	299	i 6 26	− 3	e 13 38	SS	e 13 59	SSS	e 15·9
Barcelona		33·3	286	e 7 42	PP	e 11 57	− 5	—	—	e 19·2
Kew		33·5	304	i 6 42	− 1	e 11 57	− 8	e 14 21	SSS	e 18·7
Durham	N.	34·3	310	—	—	i 12 11	− 6	—	—	i 16·6
Tortosa		34·7	285	i 6 50	− 4	12 18	− 6	8 23	PP	17·2
Aberdeen		34·8	315	i 7 27	+33	i 11 19	−66	e 16 46	Q	e 19·7
Hyderabad	N.	36·1	122	e 8 4	+59	13 47	+62	—	—	—
Alicante		36·2	282	i 7 14	+ 8	i 12 43	− 4	7 21	pP	17·7
Toledo		38·3	285	i 8 53	PP	i 13 8	−11	—	—	15·5
Granada		38·9	282	i 7 31k	+ 2	13 29	+ 1	7 48a	pP	i 19·1
Tamanrasset		39·3	255	i 7 35k	+ 3	e 13 32	− 2	e 8 32	?	—
Calcutta	E.	39·4	105	e 7 39	+ 6	i 13 39	+ 4	—	—	—
Irkutsk		39·6	54	i 7 36	+ 1	—	—	—	—	—
Lisbon	Z.	42·4	286	7 55k	− 3	—	—	8 5k	pP	21·0
Scoresby Sund		44·6	334	i 8 16a	0	14 50	− 2	18 11	SS	—
Colombo	E.	45·2	130	e 8 12	− 8	15 5	+ 4	—	—	—
Ivigtut		57·0	326	9 47	− 3	17 35	− 8	—	—	26·7
Tananarive		60·1	180	10 18	+ 7	e 18 35	+11	—	—	—
Vladivostok		60·1	58	i 10 10	− 1	e 18 19	− 5	—	—	—
Batavia		72·3	115	e 8 3	?	i 12 32	?	—	—	20·7
Seven Falls		76·0	322	11 48	− 3	21 29	− 5	—	—	32·7
Ottawa		79·5	323	12 10	0	22 9	− 2	—	—	36·7
Ville Marie		79·6	326	i 12 10	0	e 22 11	− 1	—	—	—
Harvard		79·7	319	i 12 11	0	—	—	—	—	e 45·2
Temiskaming		80·0	325	i 12 12	− 1	—	—	—	—	—
Sitka		81·3	2	e 12 22	+ 2	e 22 45	+15	e 23 28	PS	e 38·9
Fordham		81·9	319	i 12 24	+ 1	i 22 37	+ 1	i 22 55	SeS	—
Philadelphia		83·4	319	e 12 17	−13	e 22 37	−14	—	—	e 40·4
Cleveland		85·2	324	i 12 40s	+ 1	i 23 7	− 2	—	—	—
Victoria		90·0	354	i 13 50	+47	25 19	PPS	—	—	48·7
Grand Coulee		90·1	351	e 13 4	+ 1	—	—	—	—	—
Bozeman		91·0	344	e 13 8	+ 1	e 23 48	{− 1}	e 24 20	SeS	e 40·9
Rapid City	E.	91·2	338	e 13 8	0	e 24 1	− 4	e 25 16	PS	e 42·9
St. Louis		91·2	327	i 13 8	0	e 24 3	− 2	i 16 39	PP	—
Salt Lake City		95·9	344	e 13 30	0	e 24 3	[− 3]	e 17 16	PP	e 42·1
Shasta Dam		97·6	352	i 13 37	− 1	—	—	i 17 33	PP	—
Mineral	Z.	97·9	352	i 13 39	0	—	—	i 17 35	PP	—
Berkeley		100·6	351	—	—	e 29 17	?	—	—	e 54·3
Branner		100·8	351	i 26 52	PS	—	—	—	—	—
Pierce Ferry		100·8	344	i 13 53	+ 1	—	—	i 17 59	PP	—
Boulder City		101·1	345	i 13 55	+ 2	—	—	i 18 0	PP	—
Tinemaha	Z.	101·1	348	i 13 54s	+ 1	—	—	—	—	—
Fresno		101·2	349	i 13 55	+ 1	e 24 35	[+ 2]	i 17 57	PP	—
Mount Wilson	Z.	103·4	347	i 14 5	+ 1	—	—	—	—	—
Pasadena		103·5	347	i 14 5	+ 1	—	—	—	—	e 31·6
Riverside	Z.	103·5	347	e 14 5	+ 1	—	—	i 18 14	PP	—
Tucson		103·8	341	i 14 8s	+ 3	e 27 38	PPS	—	—	e 48·2
Palomar		104·0	346	i 14 8s	+ 2	—	—	i 18 23	PP	—
Tacubaya	N.	111·8	325	e 19 36	PP	e 25 54	{−24}	i 30 5	PPS	—
La Paz		119·5	274	e 18 55	[+ 3]	—	—	—	—	67·7

Additional readings :—
Piatigorsk iP_g = 1m.11s., iS_g = 1m.54s.
Warsaw iPPPZ = 5m.22s., eE = 6m.1s., iSN = 8m.42s., iSZ = 8m.45s., iSSZ = 9m.25s., eSSSE = 9m.32s., iSSSZ = 9m.45s., iE = 10m.1s.
Budapest ePPE = 4m.56s., PPPN = 5m.21s., PPPE = 5m.24s., SSN = 8m.57s., SSE = 9m.16s., eSSSE = 9m.57s.
Kalossa iN = 5m.36s., iE = 5m.42s. and 5m.58s.
Prague ePP? = 5m.35s., e = 6m.13s. and 11m.11s.
Triest iPP = 5m.56s., isS = 10m.9s., iSS = 10m.23s.
Collmberg iPP = 5m.43s., e = 6m.34s., 6m.58s., and 8m.2s.
Cheb ePN = 5m.32s.
Potsdam isSZ = 10m.8s.
Rome SS = 11m.1s.
Upsala PPE = 6m.7s., PPN = 6m.12s., iE = 6m.28s., SE = 9m.48s., SN = 9m.52s., iN = 10m.18s., isSE = 10m.27s., iN = 11m.15s., iE = 11m.20s.

Continued on next page.

Jena eS?Z =10m.9s., eS?E =10m.17s.
Bologna eE =10m.54s. and 16m.58s.
Salo iEZ =5m.53s., iN =5m.56s.
Stuttgart i =5m.59s. a, e =11m.15s.
Strasbourg iPP =6m.59s., iSS =11m.47s.
Bombay QN =13m.41s.
Clermont-Ferrand iPcS =12m.57s., iSS =13m.6s., iSSS =13m.41s.
Paris i =9m.50s., e =12m.32s., 14m.17s., and 15m.14s.
Kew iZ =6m.52s., eN =12m.19s.
Tortosa PcS?E =12m.56s.
Alicante PP =8m.39s., PPP =8m.59s., PcP =9m.47s., PcS =13m.19s., SS =14m.51s., SSS =15m.19s.
Granada iPP =9m.14s.k, PcP =9m.38s.k, iS =13m.14s., iSS =15m.43s.
Lisbon PcP?Z =9m.52s.
Scoresby Sund 9m.45s. and 15m.8s.
Tananarive e =10m.31s. and 23m.41s.?
Sitka ePP =15m.53s., e =18m.59s.
Cleveland iZ =13m.21s., iSKKS?N =23m.25s.
Salt Lake City e =18m.19s.
Shasta Dam e =13m.42s. and 13m.59s.
Pasadena iZ =16m.20s. and 16m.53s., iE =26m.32s. and 31m.29s.
Riverside eZ =18m.1s.
Tucson iPP =17m.31s., e =19m.13s.
Palomar iZ =14m.17s., eZ =17m.24s.
Tacubaya eSN =27m.20s.
Long waves were also recorded at Edinburgh.

June 29d. Readings also at 0h. (near Mineral (2), near Stalinabad, Andijan, and Samarkand), 1h. (near Ashkabad), 4h. (Pierce Ferry and near Tacubaya (2)), 5h. (Apia, Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Riverside, Palomar, Tinemaha, Fresno, and Mineral), 9h. (near Zürich), 10h. (near Tacubaya, and near Murgab), 11h. (Mizusawa, Boulder City, Pierce Ferry, Shasta Dam, Tucson, Mount Wilson, Palomar, Tinemaha, Fresno, Mineral (2), and near Apia), 12h. (Batavia), 13h. (near Zürich), 14h. (Istanbul, Kodaikanal, Pierce Ferry, and Bogota), 15h. (Pierce Ferry, Shasta Dam, Tucson, Pasadena, Mount Wilson, Palomar, Tinemaha, and near Mineral), 16h. (Stuttgart, Branner, and near Tacubaya), 18h. (Suva), 19h. (Stalinabad, Kulyab, and near Ashkabad), 20h. (Shasta Dam), 21h. (Kodaikanal), 22h. (near Tacubaya), 23h. (Pierce Ferry and Shasta Dam).

June 30d. 0h. Undetermined Shock.

Bombay eE =22m.30s., eEN =27m.9s.
Murgab P =23m.41s., S =27m.17s.
Kulyab iP =24m.9s.?, iS =28m.28s.?
Stalinabad iP =24m.19s. and iS =28m.25s.
Tashkent iP =24m.30s.?, eS =28m.57s.?
Stuttgart eZ =30m.0s., and 30m.18s.
Mount Wilson ePZ =32m.48s., ipPZ =33m.9s.
Palomar ePZ =32m.49s., ipPZ =33m.10s.
Pasadena ePZ =32m.51s., ipPZ =33m.7s.
Shasta Dam iP =32m.52s., ipP =33m.12s.
Pierce Ferry eP =33m.7s., ipP =33m.27s.
Riverside ipPZ =33m.9s.
Tucson iP =33m.10s., ipP =33m.31s.
Tinemaha ipPZ =33m.16s.
Boulder City eP =33m.34s., epP =33m.55s.

June 30d. 12h. 21m. 13s. Epicentre 38°·8N. 20°·6E. (as on 1948, April 22d.).

Destructive N.W. of Leucade; Intensity X at Tsoukalades; IX-X at Leucas (60 per cent. of the buildings destroyed) and at Drymon; IX at Aghios, Nikitas, and Katouna; VIII-IX at Kavalos, Lazarata, etc., 6 dead, 8 injured. Felt as far as Corfu, Larissa, Pyrgos, Aighion, etc. Epicentre 38°50′N. 20°40′E. Dr. Galanopoulos, Athens.

$A = +·7314$, $B = +·2749$, $C = +·6240$; $\delta = -11$; $h = -1$;
$D = +·352$, $E = -·936$; $G = +·584$, $H = +·220$, $K = -·781$.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Taranto		3·1	304	i 0 54	+ 3	1 29	0	—	—	—
Messina		4·0	263	e 1 6	+ 2	1 54	+ 2	i 1 44	P_g	—
Catania		4·6	255	e 1 12	0	e 1 59	− 8	—	—	e 2·9
Belgrade		6·0	359	i 1 33	+ 1	i 3 6	S*	i 3 22	S_g	—
Istanbul		6·9	68	i 1 46	+ 1	3 8	+ 3	—	—	—
Rome		6·9	299	i 1 44a	− 1	i 3 0	− 5	—	—	—
Bucharest		7·0	35	i 1 50	+ 4	i 3 5	− 3	i 2 0	P*	4·2
Triest		8·5	326	i 2 6a	− 1	i 3 40	− 5	i 2 41	P_g	—
Budapest		8·8	353	2 10	− 1	3 47	− 6	2 58	P_g	4·7
Bologna		9·0	312	i 2 13a	0	3 47	−11	e 4 55	S_g	—
Padova		9·3	317	2 15	− 2	i 4 4	− 1	—	—	5·4
Salo		10·1	315	i 2 27a	− 1	4 16	− 9	i 4 11	S	—
Pavia		10·6	310	i 2 37	+ 1	e 4 35	− 2	—	—	5·5
Chur		11·4	318	e 2 47	0	e 4 51	− 5	—	—	—
Raciborzu		11·4	352	i 2 47?	0	i 5 14	SS	—	—	—
Yalta		11·6	57	i 2 51	+ 1	—	—	—	—	—
Prague		12·1	341	i 2 54	− 3	i 5 8	− 6	—	—	e 5·8
Zürich		12·3	316	e 2 56a	− 3	e 5 15	− 3	—	—	—
Helwan		12·6	132	i 3 0k	− 3	5 5	−21	3 7	PP	—
Cheb		12·7	335	e 3 1	− 4	i 5 22	− 6	e 3 58	?	e 5·8
Basle		12·9	317	e 3 3	− 4	e 5 33	0	—	—	—
Neuchatel		12·9	314	e 3 5	− 2	e 5 21	−12	—	—	—
Stuttgart		12·9	324	i 3 4a	− 3	i 5 37	+ 4	i 3 19a	PP	i 7·4
Ksara		13·3	107	i 3 17a	+ 4	5 51?	+ 9	—	—	—
Warsaw		13·4	1	i 3 15a	+ 1	5 55	+10	3 27	PP	e 7·8
Strasbourg		13·5	321	i 3 13a	− 2	e 5 52	+ 5	i 3 24	PP	e 7·0
Collmberg		13·6	339	e 3 18	+ 1	i 4 49	−61	i 3 30	PP	i 7·1
Jena		13·7	335	e 3 15	− 3	e 6 7	+15	e 6 14	SS	e 6·9
Barcelona		14·4	286	i 3 23	− 4	e 6 5	− 4	i 4 13	?	e 6·9
Potsdam		14·6	341	i 3 28	− 2	i 6 9	− 4	i 3 39	PP	7·3
Clermont-Ferrand		14·7	304	i 3 30	− 1	i 6 22	+ 6	—	—	7·3
Sotchi		15·2	65	3 37	− 1	—	—	—	—	—
Tortosa		15·6	284	3 57	+14	i 6 55	+18	4 10	PP	i 8·6
Paris		16·4	313	i 3 53k	0	i 6 48	− 8	i 4 3	PP	e 9·3
Alicante		16·5	275	i 4 0	+ 6	i 7 0	+ 2	4 5	pP	8·3
Uccle		16·6	324	e 3 56a	0	i 7 6	+ 6	—	—	8·5
De Bilt		17·1	326	i 4 4	+ 2	i 7 32	+11	—	—	e 8·5
Piatigorsk		17·7	65	4 12	+ 2	—	—	—	—	—
Copenhagen		17·8	344	i 4 8a	− 3	7 24	− 4	7 33	S	8·8
Leninakan		17·8	76	4 15?	+ 4	—	—	—	—	—
Erevan		18·5	78	e 4 26	+ 7	—	—	—	—	—
Toledo		19·1	283	i 4 26	− 1	i 7 57	0	i 4 33	PP	10·6
Granada		19·2	274	i 4 13	−15	i 8 20	+21	4 38	PP	i 10·3
Jersey		19·3	312	e 4 29	0	e 8 20	+18	—	—	9·5
Kew		19·4	319	i 4 48?	PP	e 8 25	+21	i 5 0	PPP	e 10·8
Moscow		20·4	29	i 4 39	− 2	i 8 25	0	—	—	—
Tamanrasset		20·5	223	i 4 42a	0	—	—	—	—	—
Upsala		21·2	355	4 47?	− 2	i 8 37	− 4	i 5 13	PP	e 10·8
Helsinki		21·6	6	i 3 53	−61	i 8 37	−12	—	—	e 10·8
Durham	N.	21·9	326	i 4 55	− 2	i 8 57	+ 3	i 9 35	SS	—
Baku		22·6	76	5 8	+ 5	9 13	+ 6	—	—	—
Lisbon		23·2	281	5 7a	− 2	9 18	0	5 15	pP	9·9
Edinburgh		23·3	326	5 7	− 3	9 17	− 3	5 36	PP	—
Aberdeen		23·7	330	i 5 11	− 3	i 9 22	− 5	i 10 21	SS	12·6
Ashkabad		29·5	79	e 6 7	− 1	—	—	—	—	—

Continued on next page.

		Δ	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Sverdlovsk		31·8	42	i 6 27	− 1	i 11 34	− 4	—	—	—
Samarkand		35·6	74	e 7 1	0	—	—	—	—	—
Tashkent		37·0	71	i 7 12	− 1	—	—	—	—	—
Stalinabad		37·3	74	i 7 13	− 3	i 12 58	− 6	—	—	—
Kulyab		38·2	75	i 7 23	0	i 13 12	− 5	—	—	—
Scoresby Sund		38·6	340	7 28 a	+ 2	13 25	+ 2	8 55	PP	—
Andijan		39·4	71	e 7 33	0	—	—	—	—	—
Frunse		40·5	67	e 7 43	+ 1	—	—	—	—	—
Murgab		41·2	73	7 49	+ 1	—	—	—	—	—
Almata		42·1	65	e 7 55	0	—	—	—	—	—
Ivigtut		46·9	322	i 8 34	0	i 15 25	0	18 11	SS	22·8
Bombay		49·2	98	e 8 53	+ 1	e 15 56	− 2	—	—	24·1
Irkutsk		57·0	47	e 9 49	− 1	17 40	− 3	—	—	—
Kodaikanal	E.	58·0	104	e 9 40	−17	—	—	—	—	—
Colombo	E.	61·9	106	e 19 17	PPS	—	—	—	—	34·6
Harvard		66·5	307	i 10 54	0	—	—	—	—	e 31·6
Vermont		66·5	309	—	—	e 19 58	+14	—	—	e 26·4
Bermuda		67·2	294	e 11 3	+ 5	e 20 5	+13	—	—	e 27·1
Ottawa		67·5	312	11 1	+ 1	19 53	− 2	24 29	SS	31·8
Temiskaming		68·8	313	e 11 8	0	—	—	i 11 15	P	e 38·8
Ville Marie		68·8	314	e 11 7	− 1	—	—	e 11 14	P	37·0
Fordham		68·9	306	i 11 9	0	e 20 14	+ 1	—	—	—
Philadelphia		70·2	305	e 11 4	−13	i 20 16	−12	e 20 46	PS	e 30·6
Georgetown		72·0	306	e 11 27	− 1	e 20 50	+ 1	—	—	32·8
Cleveland		73·2	310	e 11 36	+ 1	i 21 5	+ 3	i 11 42	pP	34·8
College		76·3	356	—	—	e 21 30	− 7	—	—	e 31·9
Cincinnati		76·4	310	i 11 53	0	—	—	—	—	e 38·8
Chicago		76·6	314	e 11 53	− 1	e 21 39	− 1	—	—	e 32·7
Vladivostok		77·5	45	i 11 56	− 3	i 21 46	− 4	—	—	—
Saskatoon		78·5	330	12 9	+ 5	22 5	+ 4	15 12	PP	37·8
St. Louis		80·2	313	i 12 13	− 1	i 22 18	− 1	i 12 19	pP	—
Sitka		81·9	347	—	—	e 22 51	+15	—	—	e 35·3
Lincoln	E.	82·2	318	e 12 24	0	e 22 39	0	—	—	e 36·3
Rapid City	E.	83·1	323	e 12 31	+ 2	e 22 51	+ 3	e 24 10	PPS	e 34·4
Bozeman		85·3	328	e 12 42	+ 2	e 23 14	+ 4	—	—	e 38·9
Butte	N.	85·7	330	e 14 19	?	e 23 14	0	—	—	e 36·9
Victoria		87·4	337	13 38	+48	24 31	+61	—	—	44·8
Salt Lake City		89·7	326	e 13 9	+ 8	e 23 32	[+ 1]	e 16 29	PP	e 39·1
Bogota	E.	90·8	277	e 12 43	−23	e 23 7	[−31]	e 26 9	?	40·8
Batavia		90·9	97	e 12 58	− 9	e 24 2	− 1	e 29 24	SS	34·8
Mineral	Z.	94·0	332	i 13 22	+ 1	—	—	i 13 28	P_cP	e 55·7
Shasta Dam		94·0	332	e 13 19	− 2	—	—	e 18 3	?	—
Pierce Ferry		94·5	324	e 13 24	+ 1	—	—	—	—	—
Boulder City		95·0	325	e 12 58	−28	—	—	—	—	—
Tinemaha	Z.	95·5	328	i 13 36	+ 8	—	—	i 17 24	PP	—
Tucson		96·1	321	i 13 24	− 7	—	—	i 17 24	PP	e 38·2
Berkeley		96·4	331	—	—	e 24 59	+ 9	e 47 11	Q	e 49·0
Fresno		96·4	329	e 13 33	+ 1	e 24 7	[− 2]	i 13 42	P_cP	—
Riverside	Z.	97·8	326	e 13 39	+ 1	—	—	e 17 40	PP	—
Mount Wilson	Z.	97·9	326	e 13 40	+ 1	—	—	—	—	—
Pasadena		98·0	326	e 13 47	+ 8	—	—	i 17 39	PP	e 39·3
Palomar	Z.	98·1	325	i 13 40	0	—	—	e 17 38	PP	—
Tacubaya	N.	99·2	304	e 17 49	PP	e 25 39	pS	e 30 6	PKKP	—

Additional readings :—
Belgrade i = 1m.40s., iP_g = 1m.55s.
Bucharest iP_gE = 2m.13s., iSEN = 2m.42s., iS_g?EN = 3m.17s.
Budapest P_gP_gN = 2m.53s.
Bologna iE = 4m.17s., iEN = 5m.33s.
Padova iN = 2m.39s., S = 3m.52s.
Stuttgart i = 4m.5s., iS = 5m.20s., i = 6m.2s.
Warsaw ePE = 3m.23s., SSZ = 6m.10s., SSSZ = 6m.21s.
Strasbourg iS = 5m.55s. and 5m.58s.
Collmberg iPPP = 3m.35s., i = 3m.48s. and 4m.23s., iSS = 5m.57s., iSSS = 6m.5s.
Potsdam iPPNZ = 3m.36s., iSSSZ = 6m.33s.

Continued on next page.

Tortosa PPPE = 4m.16s., SSN = 7m.23s.
Paris i = 3m.58s. and 4m.52s., iSS = 7m.8s.
Alicante PP = 4m.9s., PPP = 4m.17s., sS = 7m.8s., SS = 7m.21s., SSS = 7m.35s., P_cP = 8m.57s., P_cS = 12m.13s.
Uccle iZ = 5m.25s., iSE = 7m.11s.
Granada iPP = 5m.5s., pPP = 5m.26s., sS = 8m.38s., iSS = 9m.14s.
Kew iN = 5m.35s., eN = 8m.32s., eE = 9m.37s., eEN = 10m.31s.
Durham iN = 5m.6s. and 5m.44s., iP_cPN = 9m.0s., iN = 10m.12s., iP_cSN = 12m.41s.
Lisbon Z = 5m.24s. and 5m.34s., PPEZ = 5m.44s., EN = 6m.22s., E = 6m.29s., iNZ = 9m.29s., E = 9m.42s.
Edinburgh PPP = 5m.46s., SS = 9m.57s., SSS = 10m.12s.
Vermont eS_cS = 21m.46s., eSS = 24m.54s.
Ottawa SSS = 26m.47s.
Cleveland isPZ = 11m.46s., isSN = 21m.13s., ePSE = 21m.43s., eE = 22m.5s. and 22m.34s.
Saskatoon SS = 27m.9s., SSS = 30m.12s.
Salt Lake City ePS = 24m.45s.
Tucson e = 17m.58s.
Berkeley iN = 29m.11s.
Pasadena eEN = 31m.35s.
Palomar iZ = 13m.47s., eZ = 16m.57s.
Tacubaya eN = 34m.53s.
Long waves were also recorded at La Paz, Huancayo, Ukiah, and Reykjavik.

June 30d. 19h. 31m. 39s. Epicentre 36°·5N. 49°·0E. (as on 17d.).

$A = +\cdot5287$, $B = +\cdot6081$, $C = +\cdot5922$; $\delta = +1$; $h = 0$;

		△	Az.	P.	O−C.	S.	O−C.	Supp.		L.
		°	°	m. s.	s.	m. s.	s.	m. s.		m.
Baku		3·9	10	e 1 8	+ 6	—	—	—	—	—
Erevan		5·1	317	e 1 34?	+14	—	—	—	—	—
Leninakan		5·9	318	e 1 39	+ 8	—	—	—	—	—
Ashkabad		7·6	76	e 1 52	− 3	e 3 18	− 5	—	—	—
Sotchi		10·0	318	e 2 37?	+10	—	—	—	—	—
Ksara		11·1	260	e 2 55?	+12	e 6 15	L	—	—	(e 6·2)
Yalta		13·8	310	e 3 17	− 2	—	—	—	—	—
Stalinabad		15·8	77	3 41?	− 4	6 47?	+ 5	—	—	—
Helwan		16·2	251	i 3 57k	+ 7	8 6	L	4 27	PP	(8·1)
Istanbul		16·2	292	3 54	+ 4	6 59	+ 8	—	—	—
Tashkent		16·5	67	e 3 45	− 9	—	—	—	—	—
Obi-garm		16·6	76	e 3 29?	−27	e 6 39?	−21	—	—	—
Andijan		18·7	70	e 4 19	− 3	—	—	—	—	—
Frunse		20·7	64	4 44	0	—	—	—	—	—
Moscow		20·7	342	e 4 40	− 4	e 8 29	− 2	—	—	—
Sverdlovsk		21·8	17	4 51	− 5	e 8 54	+ 2	—	—	—
Almata		22·4	63	e 5 8	+ 6	—	—	—	—	—
Warsaw		25·2	318	e 5 30	+ 1	e 9 58	+ 6	e 10 2	S	e 13·3
Bombay	E.	27·3	123	—	—	e 11 16	+49	—	—	—
Potsdam		29·8	314	—	—	e 11 21?	+14	—	—	e 16·3
Stuttgart	Z.	31·4	306	e 6 22	− 3	—	—	—	—	—
Tamanrasset		39·9	262	i 7 39s	+ 2	—	—	e 9 18	PP	—
Ville Marie		84·7	327	e 12 34	− 3	—	—	—	—	—

Helwan also gives PPP = 4m.36s.
Long waves were also recorded at Rome and Copenhagen.

June 30d. Readings also at 0h. (Stuttgart, Berkeley, Branner, and Lick), 1h. (Pierce Ferry, and near Lick), 6h. (Pierce Ferry and near Lick), 8h. (Pierce Ferry, Shasta Dam, and near Lick), 9h. (near Berkeley, Branner, Lick, Fresno, Santa Clara, and near Kulyab), 10h. (Harvard), 11h. (near Mineral), 13h. (La Paz, Paris, and Stuttgart), 14h. (Harvard), 15h. (near Mineral (3)), 16h. (Palomar, Tucson, and near Mineral), 17h. (Mount Wilson, Palomar, Tinemaha, Boulder City, Pierce Ferry, Shasta Dam, Tucson, and Reykjavik), 18h. (Mineral, Pierce Ferry, and Reykjavik), 20h. (near Shasta Dam), 21h. (near Leninakan and Piatigorsk), 23h. (Mount Wilson, Pasadena, Palomar, Riverside, Tinemaha, Tucson, and La Plata).

The scanned images of the bulletins of the International Seismological Summary (ISS) have been obtained thanks to funding provided by the US National Science Foundation through grant EAR-9725140 (Villaseñor et al., 1997) and collected by SGA Storia Geofisica Ambiente (Bologna) on behalf of the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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A digital hypocenter file of the ISS (Villaseñor and Engdahl, 2005) can be obtained from the USGS web site: http://earthquake.usgs.gov/scitech/iss/

Villaseñor, A., and E.R. Engdahl, *A digital hypocenter catalog for the International Seismological Summary,* Seism. Res. Lett., vol. 76, no. 5, pp. 554-559, 2005.

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