

Original 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 have been scanned and collected by SGA Storia Geofisica Ambiente (Bologna) thanks to funding provided by the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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The International Seismological Summary. 1938 July, August, September.

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. for financial support, which has covered the cost and preparation of this volume.

This Third Quarter contains determinations of 109 Epicentres, of which 46 are repetitions from previous shocks. Fifteen cases of abnormal focal depth are noted :—

	Date	Epicentre		Depth
July	2d. 21h.	6·2N.	82·4W.	0·010
	13d. 20h.	45·7N.	26·8E.	0·025
	14d. 23h.	22·0S.	175·0E.	Suggested Deep.
	28d. 8h.	46·0N.	153·5E.	Suggested Deep.
	31d. 21h.	45·7N.	137·3E.	0·080
Aug.	4d. 8h.	23·7S.	65·7W.	0·015
	16d. 4h.	22·5N.	94·5E.	0·005
	17d. 1h.	43·7N.	147·6E.	0·020
	18d. 9h.	3·8S.	102·8E.	0·005
	31d. 17h.	3·5S.	151·5E.	0·050
Sept.	7d. 12h.	6·2S.	154·8E.	0·020
	19d. 0h.	Undetermined Quake		Suggested Deep.
	20d. 13h.	34·8N.	5·7W.	0·005
	21d. 11h.	27·0N.	139·5E.	0·050
	21d. 18h.	36·4N.	141·1E.	0·005

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

KEW OBSERVATORY,
RICHMOND,
SURREY.

November, 1949.

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1938 JULY, AUGUST, SEPTEMBER.

July 1d. 9h. Local shock :—

Kiyosumi P = 32m.2s., S = 32m.18s.
 Koyama P = 32m.2s., S = 32m.26s.
 Titibu P = 32m.2s., S = 32m.21s.
 Tokyo Imp. Univ. P = 32m.32s., S = 32m.48s.
 Komaba P = 32m.33s., S = 32m.50s.
 Misaki P = 32m.34s., S = 33m.3s.
 Mitaka P = 32m.34s., S = 32m.53s.
 Tukubasan P = 32m.34s., S = 32m.44s.
 Sasaki P = 32m.49s., S = 33m.19s.
 Mizusawa eP = 32m.53s., S = 33m.23s.
 Nagoya P = 33m.6s., S = 33m.58s.
 Long waves were recorded at Vladivostok and Sverdlovsk.

July 1d. Readings also at 0h. (Harvard), 1h. (Harvard, Tifis, and near Ksara), 4h. (Samar-kand and near Wellington), 7h. (near New Plymouth (2)), 9h. (Samarkand and near Ksara), 11h. (Harvard, Apia, Haiwee, Mount Wilson, Pasadena, Riverside, Santa Barbara, Tucson, and near Tananarive), 12h. (Mount Wilson, Pasadena, Scoresby Sund, Uccle, De Bilt, Copenhagen, Pulkovo, Moscow, Sverdlovsk, and Tashkent), 13h. (Ksara, Tifis, Baku, Irkutsk, Vladivostok, and Mount Wilson), 15h. (Mount Wilson and Pasadena), 17h. (Andijan, Samarkand, and Tchimkent), 18h. (Balboa Heights, Bozeman, Fresno, Tucson, Haiwee, Mount Wilson, Pasadena, Santa Barbara, Tinemaha, and Sverdlovsk), 19h. (Baku, Tashkent (3), Ksara (2), Tifis, and near Medan), 20h. (Sverdlovsk, Tchimkent, and near Samarkand), 21h. (Christchurch), 22h. (near Andijan).

July 2d. 1h. 45m. 8s. Epicentre 42° 8N. 17° 9E.

Force III at Bari and Taranto (Italy), V at Slano and Sipan-Luka (Yugoslavia).

Epicentre Slano (Yugoslavia), 42° 47' N. 17° 55' E. (Belgrade).

J. Mihalovic.

Annuaire de l'Institut Seismologique de Beograd, Année XVIII, 1938, Beograd, 1939, pp. 33 and 73.

Notizie Sismiche.

Bollettino della Societa Sismologica Italiana, Vol. XXXVI (1938, XVII), No. 5-6, Roma, 1939, XVII, p. 221.

A = +.7004, B = +.2262, C = +.6770; d = +6; h = -3;
 D = +.307, E = -.952; G = +.644, H = +.208, K = -.736.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Sarajevo	1.1	20	10 32	+10	10 53	+14	—	—
Belgrade	2.8	42	10 56k	P _g	1 44	S _g	—	—
Sofia	4.0	89	e 1 10	P _g	12 27	S _g	—	—
Laibach	4.1	325	e 1 14	P _g	2 14	S _g	1 1 21	P _g
Triest	4.1	316	1 5	0	1 58	+ 3	1 18	P _g
Kecskemet	4.3	17	e 1 42	P _g	13 10	?	—	—
Budapest	4.8	10	1 25	P _g	12 47	S _g	1 43	P _g
Florence	4.9	283	1 14	- 3	2 4	-11	—	—
Ogyalla	5.1	3	1 49	P _g	2 45	S _g	—	—
Padova	5.1	304	e 1 38	P _g	12 55	S _g	—	—
Bucharest	6.2	72	e 2 10k	P _g	3 31	S _g	—	—
Chur	7.2	307	e 1 45	- 4	—	—	—	—
Moncalieri	7.7	290	e 1 12	-44	2 7	P _g	—	—
Prague	7.7	344	e 2 40?	P _g	e 4 2	S _g	—	—
Zurich	8.0	308	e 1 57	- 3	e 3 34	+ 1	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Cheb	8.2	335	e 3 29	P*	e 4 49	S _g	e 4 13	S*
Stuttgart	8.5	316	e 2 1	- 6	e 3 35	-10	e 4 44	S _g
Basle	8.7	307	e 2 2	- 8	e 4 11	S*	e 4 56	S _g
Neuchatel	8.8	302	e 2 2	- 9	e 3 56	+ 3	—	—
Karlsruhe	9.0	317	e 2 19	+ 6	e 4 2	+ 4	—	—
Jena	9.2	334	e 2 22	+ 6	4 0	- 3	e 4 34	S*
Strasbourg	9.2	313	e 2 16	0	e 4 23	S*	—	e 4.8
Potsdam	10.1	343	—	—	e 4 34	+ 9	e 5 10	S*
Göttingen	10.2	331	e 2 31	0	e 5 18	L	—	(e 5.3)
Puy de Dôme	11.1	291	e 4 31	S	(e 4 31)	-18	—	—
Hamburg	12.0	337	—	—	5 26	SS	e 5 35	SSS
Uccle	12.2	316	e 3 14	PPP	e 6 1	L	—	(e 6.2)
Paris	12.3	304	e 4 57	S	(e 4 57)	-21	—	7.9
De Bilt	12.7	322	—	—	e 5 52?	SSS	—	e 7.4
Kew	z. 15.1	311	e 3 36	0	—	—	—	—
Jersey	15.3	302	e 3 1	-38	—	—	—	e 8.9
Oxford	15.7	311	—	—	6 41	+ 2	—	e 7.8
Ksara	16.7	116	e 4 39	PPP	—	—	—	e 8.5
Moscow	18.2	38	e 5 19	PPP	—	—	—	12.4
Pulkovo	18.7	20	—	—	e 8 3	SS	—	—

Additional readings:—

Sarajevo $iP_g = +35s.$, $iS_g = +1m.3s.$, $i = +1m.5s.$
 Belgrade $iP_g = +1m.5s.$, $i = +1m.12s.$, $iS_g = +1m.48s.$, $i = +1m.58s.$ and $+2m.18s.$
 Laibach $iNE = +1m.57s.$ and $+2m.5s.$
 Trieste $PS = +1m.51s.$, $S_g = +2m.20s.$, $SS = +2m.27s.$
 Kecskemet $iPP = +2m.57s.$, $eSSZ = +4m.4s.$, $eSSE = +4m.9s.$
 Budapest $SE = +3m.0s.$
 Ogyalla $e = +3m.1s.$
 Bucharest $eN = +2m.18s.$ and $+2m.33s.$, $iE = +3m.41s.$ and $+3m.58s.$, $iN = +4m.2s.$
 Stuttgart $e = +2m.18s.$, $i = +4m.27s.$ and $+5m.3s.$
 Jena $eN = +2m.30s.$ and $+3m.3s.$, $iN = +4m.40s.$
 Strasbourg $eE = +2m.43s.$, $+3m.13s.$, and $+3m.20s.$
 Potsdam $eZ = +5m.22s.$, $eNZ = +5m.28s.$, $eE = +5m.40s.$, $eNZ = +5m.52s.$, $Z = +6m.29s.$, $eNZ = +6m.58s.$
 Puy de Dôme $e = +7m.0s.$
 Hamburg $eN = +6m.5s.$, $eE = +6m.14s.$
 Paris $eS = +6m.58s.$
 Pulkovo $e = +10m.35s.$
 Long waves were also recorded at Copenhagen, Bergen, Tiflis, Sverdlovsk, Tashkent, and Upsala.

July 2d. 7h. 40m. 32s. Epicentre 76°-7N. 7°-8E. (as on 1938 June 25d.).

A = +.2294, B = +.0314, C = +.9728; $\delta = -5$; $h = -13$;
 D = +.136, E = -.991; G = +.964, H = +.132, K = -.232.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	10.4	246	2 32	- 2	4 31	- 1	—	—
Pulkovo	18.7	143	4 20	- 2	e 8 5	SS	—	e 11.5
Copenhagen	21.2	172	14 52	+ 3	8 48	+ 7	—	11.5
Hamburg	z. 23.2	177	e 5 14	+ 5	—	—	—	—
Moscow	23.7	134	5 17	+ 3	9 42	SS	—	13.0
Potsdam	24.5	172	e 5 28	+ 6	e 10 4	+24	e 6 52	PPP e 13.1
De Bilt	24.7	182	e 5 34	+10	10 2	+18	—	e 12.5
Cheb	26.8	173	—	—	e 9 28?	-51	—	—
Sverdlovsk	27.2	107	e 3 50	?	e 10 31	+ 6	—	e 13.5
Strasbourg	28.2	179	—	—	e 12 28?	SSS	—	—
Tiflis	38.4	133	e 7 28?	+ 3	e 16 3	SS	—	e 19.5
Baku	40.6	128	e 9 21	PP	—	—	—	e 21.9
Irkutsk	41.3	68	—	—	e 17 28?	SS	—	24.5
Tashkent	43.7	106	1 10 0	PP	e 14 46	+ 7	—	e 22.5
Ksara	44.8	146	e 8 23	+ 6	e 18 53	SSS	—	23.5
Weston	N. 46.7	272	—	—	e 15 24	+ 2	—	e 27.2
Mount Wilson	Z. 64.4	312	e 10 39	- 1	—	—	—	—
Pasadena	Z. 64.5	312	e 10 40	- 1	—	—	—	—
Tucson	65.0	305	1 10 43a	- 1	—	—	—	1 37.9

For Notes see next page.

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NOTES TO JULY 2d. 7h. 40m. 32s.

Additional readings :—

Copenhagen +8m.53s.
Tiflis eE = +16m.7s.
Baku e = +15m.17s.
Irkutsk e = +22m.28s.†
Ksara e = +15m.32s.

Long waves were also recorded at Paris and Vladivostok.

July 2d. 12h. 26m. 32s. Epicentre 39°·0N. 28°·0E.

Felt at Istanbul.

Epicentre 37°·0N. 30°·0E. (U.S.S.R.),
39°·0N. 28°·0E. (Strasbourg).

See Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome III, 2e partie Seismologie, Mende, 1941, p. 50.

A = +·6880, B = +·3658, C = +·6268; $\delta = +3$; $h = -1$;
D = +·469, E = -·883; G = +·553, H = +·294, K = -·779.

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L. m.
			m. s.	s.	m. s.	s.	m. s.	s.	m. s.	s.			
Istanbul	2·2	21	0	34	-	4	1	21	S _r	0	41	P*	—
Sofia	5·1	318	e 1	14	-	6	i 2	20	0	—	—	—	—
Bucharest	5·6	344	e 1	14k	-	13	i 2	37	+ 4	2	50	S*	—
Simferopol	7·5	36	e 1	46	-	7	e 2	57	-23	—	—	—	—
Belgrade	8·1	319	e 1	58 _a	-	4	e 3	41	+ 6	3	59	S*	—
Ksara	8·2	127	—	—	—	—	e 3	39	+ 1	—	—	—	—
Theodosia	8·2	40	e 2	0	-	3	e 3	16	-22	—	—	—	—
Budapest	10·7	326	—	—	—	—	e 4	59	SS	—	—	—	e 6·2
Tiflis	13·1	73	—	—	—	—	e 5	11	-27	—	—	—	8·0
Prague	14·7	324	—	—	—	—	e 5	46	-30	—	—	—	—
Cheb	15·7	320	—	—	—	—	e 7	3	SSS	—	—	—	e 8·6
Baku	16·9	78	—	—	—	—	e 7	59	SSS	—	—	—	e 11·3
Basle	17·1	307	e 4	33	PPP	—	—	—	—	—	—	—	—
Strasbourg	17·4	310	e 4	8	+ 2	—	—	—	—	—	—	—	—
Moscow	17·9	17	e 4	16	+ 4	—	e 7	54	SS	—	—	—	10·0
Puy de Dôme	19·7	298	e 3	55	-39	—	—	—	—	—	—	—	e 10·9
Pulkovo	20·8	4	e 4	42	-3	—	e 8	15	-18	—	—	—	—
Sverdlovsk	27·8	39	5	57	+ 4	—	10	51	+16	—	—	—	13·5

Additional readings :—

Bucharest iE = +1m.33s., eP₂EN = +1m.38s., iS = +2m.14s.
Belgrade iNW = +3m.56s. and +4m.21s.
Budapest eE = +5m.10s. and +5m.28s.†, iN = +5m.37s. and +6m.1s.
Tiflis eNZ = +7m.30s.

Long waves were also recorded at Trieste, Ogyalla, Kew, Potsdam, Upsala, Durham, Edinburgh, Uccle, Fort de France, Paris, Moncalleri, Stuttgart, Göttingen, Hamburg, De Bilt, Tashkent, and Copenhagen.

July 2d. 21h. 4m. 28s. Epicentre 6°·2N. 82°·4W. (as on 1938 Mar. 9d.).

A = +·1315, B = -·9855, C = +·1073; $\delta = +2$; $h = +7$;
D = -·991, E = -·132; G = +·014, H = -·106, K = -·994.

Depth of focus 0·010 has been assumed.

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L. m.
			m. s.	s.	m. s.	s.	m. s.	s.	m. s.	s.			
Balboa Heights	3·9	45	i 0	58	-	1	i 1	45	+ 1	i 1	26	?	e 2·2
Huancayo	19·4	159	e 4	19	-	2	e 8	2	+12	e 4	37	PP	e 9·4
San Juan	20·0	51	e 4	28	+ 1	—	e 8	27	+25	e 4	48	PP	8·6
Fort de France	22·5	68	i 4	58	+ 6	—	e 9	6	+18	5	24	PP	e 11·4
La Paz	26·6	147	e 5	42	+11	—	10	20	+23	—	—	—	14·1
St. Louis	E. 33·0	349	e 6	30	+ 2	—	e 11	53	+15	—	—	—	—
Florissant	33·3	349	e 6	45	+15	—	e 12	12	+29	i 7	59	PP	e 15·4
Philadelphia	34·2	10	e 6	42	+ 4	—	e 12	0	+ 3	e 7	56	PP	e 14·3
Fordham	35·4	11	6	44	- 4	—	12	42	+27	—	—	—	—
Tucson	37·1	318	7	3 _a	0	—	e 12	59	+18	e 8	25	PP	e 15·8

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Weston	37.3	14	e 8 36	?	e 13 2	+18	—	e 15.8
Harvard	37.4	14	e 7 8	+ 3	—	—	e 8 38	PP e 15.5
Ottawa	39.5	7	e 7 22	0	e 13 32	+15	—	e 16.5
La Jolla	41.9	314	e 7 41	- 1	—	—	—	—
Seven Falls	42.0	12	—	—	e 13 32?	-22	—	e 16.5
Riverside	z. 42.6	315	e 7 49	+ 1	—	—	—	—
Mount Wilson	43.2	315	e 7 53	0	—	—	—	—
Pasadena	43.2	315	e 7 53	0	—	—	—	e 21.6
Berkeley	48.0	317	—	—	e 15 31	+11	—	—
De Bilt	83.6	38	e 12 50	+31	—	—	—	e 36.5
Chesb	88.4	40	—	—	e 23 32?	+14	—	—
Ksara	109.4	52	e 19 39	PP	—	—	—	93.5
Sverdlovsk	109.5	21	—	—	e 28 31	PS	—	45.5

Additional readings :-

Balboa Heights e = +1m.56s.

Huancayo PP = +4m.52s.

San Juan P = +4m.38s.

Fort de France PPP = +5m.34s.

Florissant ePZ = +6m.49s., iPPZ = +6m.52s., iPPPPZ = +8m.12s.

Berkeley eE = +15m.39s.

Long waves were also recorded at Paris, Strasbourg, Uccle, Baku, Tiflis, and Tashkent.

July 2d. Readings also at 1h. (near Christchurch), 3h. (La Paz), 4h. (Frunse and Moncalieri), 5h. (Samarkand, near Mizusawa, and Nagoya), 6h. (Samarkand, Montezuma, La Paz, Tucson, Mount Wilson, Pasadena, Riverside, and Adelaide), 8h. (Bozeman, Frunse, near Andijan, Samarkand, Tohinkent, and near Santiago), 11h. (Huancayo (2) and La Paz (2)), 12h. (Tucson, Mount Wilson, Pasadena, and Riverside), 13h. (Samarkand), 15h. (Harvard, Ottawa, and Huancayo), 19h. (Vladivostok and near Mizusawa), 20h. (Baku, Irkutsk, Tashkent, Tiflis, Sverdlovsk, Moscow, and Mizusawa), 23h. (Mizusawa and near Nagoya).

July 3d. Readings at 2h. (Balboa Heights, near Harvard, and Weston), 3h. (Tucson and near Balboa Heights), 4h. (Melbourne), 5h. (Adelaide), 9h. (Balboa Heights, Tashkent, and near Manila), 10h. (Sverdlovsk, La Paz, Christchurch, and near Wellington), 11h. (Sverdlovsk, Tashkent, and Manila), 13h. (Mizusawa), 17h. (Basle and near Zurich), 18h. (Andijan and Wellington), 20h. (Branner, Lick, and near Berkeley), 21h. (Mount Wilson, Pasadena, Riverside, Tucson, Tashkent, Manila, near Christchurch, New Plymouth, and Wellington), 22h. (Sverdlovsk), 23h. (Frunse (2), and near Samarkand).

July 4d. 21h. 12m. 29s. Epicentre 21° 0S. 169° 5E. (as on 1938 June 16d.).

A = -9188, B = +1703, C = -3563; δ = +15; h = +4;
D = +182, E = +983; G = +350, H = -065, K = -934.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	16.3	244	i 3 43	- 9	i 7 7	+14	i 7 13	SS —
Arapuni	17.8	165	—	—	7 55	SS	8 55	? —
Riverview	20.6	228	e 4 39	- 4	i 8 37	+ 8	i 4 47	PP e 10.9
Sydney	20.6	228	e 4 25	-18	i 8 29	0	—	e 10.7
Wellington	20.7	169	e 4 40	- 4	i 8 43	+12	i 5 17	PP 10.8
Christchurch	22.6	174	i 5 9a	+ 6	i 9 12	+ 5	i 5 13	PP i 11.9
Chatham Is.	25.7	157	—	—	e 8 31?	?	—	—
Melbourne	27.0	226	e 5 53	+ 8	10 20	- 2	12 11	SSS 13.7
Adelaide	30.5	237	e 9 2	?	e 11 21	+ 3	i 13 11	SSS 15.7
Perth	48.8	246	e 14 36	?	(16 4)	+12	(20 6)	SS 25.2
Honolulu	52.8	39	e 9 40	+21	e 17 10	+23	—	—
Manila	59.3	303	e 10 10	+ 4	18 21	+ 7	i 19 10	PPS e 22.2
Batavia	62.3	275	e 10 26	0	i 18 53	+ 1	—	—
Mizusawa	E. 65.5	338	(11 18)	+31	11 18	P	—	—
Hong Kong	69.0	306	11 17	+ 8	20 23	+ 9	13 41	PP —

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Vladivostok	72.6	333	e 11 32	+ 1	i 21 3	+ 7	—	e 30.1
Berkeley	86.8	48	i 12 46	- 1	e 23 11	[- 2]	—	—
Santa Barbara	86.9	53	e 12 53	+ 5	—	—	—	—
Pasadena	87.9	53	e 12 54k	+ 1	e 23 43	+ 8	e 24 49	PS e 40.6
Fresno	88.0	50	e 11 58	-55	—	—	—	—
La Jolla	88.0	54	e 12 59	+ 6	—	—	—	—
Mount Wilson	88.1	53	i 12 54	0	—	—	i 16 24	PP
Riverside	88.4	53	i 12 57	+ 2	—	—	—	—
Haiwee	89.0	51	e 13 4	+ 6	—	—	—	—
Tinemaha	89.2	50	i 13 3	+ 4	—	—	—	—
Sitka	90.4	27	—	—	e 23 39	[+ 4]	—	—
Colombo	92.1	277	—	—	e 23 31?	[- 14]	—	—
Irkutsk	92.3	326	i 13 12	- 1	23 23	[- 23]	25 12	PS e 44.5
Tucson	92.7	57	i 13 18	+ 3	e 23 52	[+ 4]	e 16 41	PP e 42.0
Bozeman	97.7	44	—	—	e 24 22	[+ 7]	e 31 12	SS e 41.7
Agra	100.6	296	e 17 43	PP	i 24 29	[- 1]	—	—
Bombay	102.6	285	—	—	i 24 45	[+ 6]	—	—
Florissant	110.5	56	i 19 12	PP	i 28 42	PS	e 22 0	PPP
St. Louis	110.6	56	—	—	e 26 17	{+ 8}	e 28 47	PS
Tashkent	111.0	308	e 18 37	[+ 2]	27 0	{+ 48}	i 19 14	PP
La Paz	112.3	119	i 12 27	?	—	—	—	66.5
Sverdlovsk	117.6	324	e 19 3	[+ 15]	27 48	{+ 61}	i 20 4	PP
Ottawa	121.9	49	e 18 59	[+ 3]	e 30 13	PS	—	53.5
Philadelphia	122.4	56	e 20 37	PP	e 28 37	{+ 67}	e 29 52	PS e 48.6
Fordham	123.4	54	i 20 58	PP	—	—	—	—
Williamstown	123.8	52	i 19 2	[+ 2]	—	—	i 19 52	PP e 58.5
Rio de Janeiro	124.0	143	—	—	e 25 31	[- 32]	—	—
Harvard	125.0	53	e 19 5	[+ 3]	—	—	—	e 61.5
Seven Falls	125.2	47	—	—	e 30 31?	PS	—	58.5
Weston	125.2	52	i 19 6	[+ 4]	e 30 48	PS	e 20 55	PP e 60.1
Baku	125.6	306	e 19 10	[+ 7]	e 28 17	{+ 26}	20 58	PP e 67.1
San Juan	127.8	83	e 21 26	PKS	e 25 20	[- 54]	—	—
Tiflis	129.4	307	e 19 27	[+ 16]	e 31 33	PS	e 21 31	PP e 74.5
Scoresby Sund	130.0	5	e 19 18	[+ 6]	—	—	21 30	PP e 65.5
Moscow	130.3	328	e 19 50	[+ 38]	—	—	—	—
Port de France	131.6	89	e 13 20	?	e 16 32	?	—	—
Fulkovo	131.7	334	e 22 44	PP	—	—	—	—
Theodosia	135.4	313	e 21 20	PP	—	—	—	—
Upsala	136.3	340	e 20 31?	[+ 67]	—	—	—	—
Sebastopol	136.8	314	i 22 17	PP	—	—	—	—
Ksara	137.2	297	i 19 32a	[+ 7]	e 40 35	SS	e 22 20	PP
Istanbul	141.1	311	i 19 32	[+ 0]	—	—	22 43	PP
Copenhagen	141.4	341	i 19 31	[- 2]	—	—	22 37	PP
Helwan	141.4	293	i 19 31	[- 2]	—	—	e 22 48	PP
Bucharest	141.8	317	i 19 31?	[- 3]	—	—	22 45	PP
Potsdam	143.8	335	e 19 43	[+ 6]	—	—	e 22 49	PP e 71.5
Hamburg	143.9	341	e 19 31	[- 6]	—	—	—	49.5
Sofia	144.4	315	e 18 42	[- 56]	e 40 43	SS	—	—
Belgrade	145.2	319	e 19 43k	[+ 4]	e 33 0	PS	e 23 16	PP e 43.4
Jena	145.5	334	i 19 44	[+ 4]	—	—	—	—
Göttingen	145.6	338	e 19 42	[+ 2]	—	—	—	—
De Bilt	146.7	343	e 19 46	[+ 4]	—	—	—	e 73.5
Uccle	148.1	343	e 19 52	[+ 8]	—	—	e 22 43	PP e 70.5
Stuttgart	148.1	336	i 19 54	[+ 10]	e 33 31?	PS	e 23 24	PKS e 79.5
Kew	148.6	348	i 19 52	[+ 7]	—	—	—	e 77.5
Strasbourg	148.8	337	e 19 51	[+ 6]	26 49	[- 2]	e 24 1	PP e 77.5
Zurich	149.5	336	e 19 59	[+ 13]	—	—	—	—
Basle	149.8	336	e 19 53	[+ 6]	—	—	—	—
Paris	150.4	342	e 19 55	[+ 7]	—	—	e 23 49	PP
Neuchatel	150.4	336	e 19 55	[+ 7]	—	—	—	—
Jersey	151.1	351	e 20 1	[+ 12]	—	—	—	—
Toledo	160.4	345	e 20 49	[+ 48]	—	—	e 24 41	PP
Malaga	163.5	342	i 19 29	[- 35]	—	—	e 23 35	PP
San Fernando	164.2	348	e 25 42	PP	—	—	—	92.5

For Notes see next page.

NOTES TO JULY 4d. 21h. 12m. 29s.

Additional readings :—

Brisbane iPN = +3m.49s., iSE = +8m.13s.
 Arapuni i = +9m.13s.
 Riverview ePN = +4m.44s., iE = +5m.21s. and +5m.32s., iN = +5m.35s., iE = +5m.51s. and +8m.44s., iN = +8m.47s., iE = +10m.40s.
 Wellington iZ = +5m.32s., i = +6m.14s. and +7m.24s., SS = +9m.35s., i = +9m.59s. and +10m.24s., P_cS₁? = +12m.23s.
 Christchurch iP_cPNZ = +8m.52s., iZ = +9m.24s., L_a = +9.9m., S_cS = +17m.24s.
 Melbourne i = +5m.58s. and +10m.45s.
 Adelaide i = +10m.20s., S₁? = +13m.40s.
 Perth P_cS = +20m.33s., SS = +22m.43s.
 Hong Kong S_cS₁? = +21m.21s., SS = +24m.35s.
 Berkeley ePEN = +12m.48s., eSN = +23m.18s.
 Irkutsk eS = +24m.6s.
 Tucson ePS = +24m.34s.
 Florissant iSZ = +21m.50s.
 Tashkent ePPP = +21m.42s., ePS = +28m.54s., eSS = +34m.31s., iSSS = +39m.1s.
 La Paz iPP = +16m.3s.
 Sverdlovsk iPS = +29m.53s., eSS = +36m.13s.
 Philadelphia eSS = +37m.10s.
 Harvard eN = +57m.31s.?
 Weston eSKPZ = +22m.48s., ePPSEZ = +32m.28s., eSSSE = +42m.23s.
 Baku SKSP = +31m.25s., SS = +36m.55s.
 Tifis eSKPE = +22m.37s., eSKPN = +22m.45s., eSSSZ = +42m.31s.
 Scoresby Sund ? = +22m.40s.
 Istanbul +20m.28s.
 Helwan e = +23m.37s.
 Jena eN = +20m.31s.
 Uccle eZ = +20m.4s.
 Strasbourg iPKPZ = +20m.5s., eSKPZ = +23m.11s., SKKSZ = +30m.58s., ePSKSZ = +34m.32s., ePPS = +37m.42s., eSS = +44m.6s.
 Jersey e = +20m.41s.
 Toledo e = +21m.16s.
 Malaga PPP = +27m.13s., i = +37m.56s.
 San Fernando ePPE = +30m.30s., eSSE = +49m.0s.
 Long waves were also recorded at New Plymouth.

July 4d. Readings also at 0h. (Grozny, Tashkent, Sverdlovsk, Baku, and Tifis), 1h. (Manila), 3h. (College), 4h. (Mizusawa), 7h. (Andijan), 10h. (Santiago and San Javier), 11h. (Santiago, San Javier, Rio de Janeiro, and La Plata), 12h. (Helwan), 14h. (Andijan), 15h. (Mizusawa), 16h. (Andijan (2), Tashkent (2), Pasadena, Riverside, Almata, near Medan, Frunse (2), Irkutsk, Perth, Melbourne, La Paz, Vladivostok, and Brisbane), 17h. (Apia, Christchurch, Copenhagen, Ksara, Fort de France, Honolulu, Sydney, Riverview, Tashkent, Manila, Tifis, Baku, and Sverdlovsk), 18h. (Wellington), 20h. (Tacubaya), 22h. (Puy de Dôme, Tucson, Haiwee, Mount Wilson, Fresno, La Jolla, Riverside, and Pasadena), 23h. (Santiago, Simferopol, Sofia, Bucharest, Sebastopol, and Theodosia).

July 5d. 2h. 3m. 36s. Epicentre 21°0S. 169°5E. (as on July 4d.).

A = -9188, B = +1703, C = -3563; δ = +15; h = +4.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m.	s.	m.	s.	m.	s.	m.	m.
Brisbane	16.3	244	i 3 36	-16	i 6 54	+ 1	7 42	SSS
Arapuni	17.8	165	—	—	7 54?	SS	—	—
Apia	19.2	72	i 4 34	+ 6	i 8 5	+ 6	i 4.44	pP
Riverview	20.6	228	e 4 43	0	8 33	+ 4	5 0	PP
Sydney	20.6	228	e 4 40	- 3	e 8 37	+ 8	e 5 2	PP
Wellington	20.7	169	e 4 42	- 2	i 8 36	+ 5	5 13	PP
Christchurch	22.6	174	i 5 4 _a	+ 1	i 9 9	+ 2	i 5 9	PP
Melbourne	27.0	226	5 44	- 1	10 24	+ 2	6 18	PP
Adelaide	30.5	237	e 6 49	+32	i 11 12	- 6	—	—
Palau	44.4	306	8 43	+29	—	—	—	—
Perth	48.8	246	i 11 6	PPP	16 4	+12	(19 49)	SS
Honolulu	52.8	39	e 9 24	+ 5	e 16 42	- 5	—	e 21.5
Titizima	54.6	331	9 42	+10	—	—	—	—
Manila	59.3	303	e 10 7	+ 1	17 6	-68	—	—
Batavia	62.3	275	i 10 33	+ 7	i 18 54	+ 2	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Tokyo, Cen. Met. Ob.	63-0	334	10 44	+13	18 58	- 3	—	—
Oiwake	64-1	333	10 42	+ 4	19 23	+ 9	26 51	SSS
Hukuoka B	65-8	325	e 10 55	+ 6	e 19 53	+18	—	—
Hong Kong	69-0	306	11 22	+13	20 15	+ 1	20 32	PS
Keizyo	70-7	326	e 11 26	+ 6	20 38	+ 4	—	—
Vladivostok	72-6	333	i 11 29	- 2	e 20 59	+ 3	—	e 32-0
Medan	73-5	281	11 47	+11	i 21 33	+27	—	—
Ukiah	86-7	47	—	—	e 29 40	SS	—	e 36-7
Berkeley	86-8	48	i 12 43	- 4	e 23 6	[- 7]	—	—
Santa Barbara	86-9	53	i 12 51	+ 3	—	—	—	—
Pasadena	87-9	53	i 12 54	+ 1	i 23 24	[+ 4]	e 24 50	PS e 40-5
Fresno	N. 88-0	50	e 11 58	-55	—	—	—	—
La Jolla	N. 88-0	54	e 12 51	- 2	—	—	—	—
Mount Wilson	88-1	53	e 12 53	- 1	—	—	—	—
Riverside	Z. 88-4	53	e 12 57	+ 2	—	—	—	—
Haiwee	89-0	51	i 13 1	+ 3	—	—	i 16 1	PP
Tinemaha	89-2	50	i 13 2	+ 3	e 23 37	[+10]	—	—
Calcutta	N. 90-2	294	e 12 38	-26	e 23 7	[-27]	e 25 20	PS e 45-8
Sitka	90-4	27	—	—	e 23 42	[+ 7]	—	e 38-0
Colombo	E. 92-1	277	e 19 54	PPP	—	—	—	—
Irkutsk	92-3	326	e 13 33	+20	e 24 23	+ 8	i 25 36	PS 43-4
Tucson	92-7	57	i 13 17k	+ 2	e 23 54	[+ 6]	e 25 36	PS e 42-7
Kodaikanal	E. 95-5	280	—	—	e 38 24?	P'P'	—	—
Bozeman	97-7	44	—	—	e 24 27	[+12]	e 31 31	SS e 40-7
Agra	E. 100-6	296	—	—	e 24 30	[+ 1]	—	—
Bombay	E. 102-6	285	e 17 39	PP	i 24 45	[+ 6]	37 36	SS e 63-2
Frunze	107-5	310	e 18 57	PP	—	—	—	—
Andijan	108-7	307	e 18 31	PKP	e 25 19	[+12]	—	—
Florissant	110-5	56	e 14 36	P	e 25 12	[- 2]	e 19 14	PP
St. Louis	N. 110-6	56	—	—	e 25 20	[+ 6]	e 26 19	SKKS
Tashkent	111-0	308	e 14 46	P	25 21	[+ 5]	e 19 1	PP e 51-9
La Paz	Z. 112-3	119	e 19 24	PP	—	—	—	—
Balboa Heights	112-7	89	—	—	e 45 40	?	—	—
Sverdlovsk	117-6	324	e 18 49	[+ 1]	e 27 7	{+ 9}	i 20 34	PP 48-4
Ottawa	121-9	49	e 18 55	[- 1]	e 26 6	[+10]	e 21 12	PP 52-4
Philadelphia	122-4	56	e 20 30	PP	e 28 24	{+54}	—	e 50-6
Fordham	123-4	54	e 20 43	PP	e 27 43	{+ 6}	e 41 1	SSS
Vermont	123-8	50	—	—	e 35 54	?	—	e 61-1
Williamstown	123-8	52	i 19 0	[0]	—	—	—	e 59-4
Rio de Janeiro	124-0	143	e 23 24	PPP	—	—	—	—
Harvard	125-0	53	e 19 3	[+ 1]	e 42 54	SSS	e 20 55	PP e 61-4
Seven Falls	125-2	47	—	—	e 30 24	PS	—	58-4
Weston	125-2	52	i 19 4	[+ 1]	e 26 14	[+ 8]	e 38 31	SS e 62-0
Baku	125-6	306	e 19 9	[+ 6]	e 26 18	[+10]	21 1	PP e 66-4
San Juan	127-8	83	e 21 34	PP	e 31 44	PS	—	—
Tiflis	129-4	307	i 19 12	[+ 1]	e 38 15	SS	e 21 37	PP e 62-4
Scoresby Sund	130-0	5	22 41	PP	—	—	—	68-4
Moscow	130-3	328	e 19 34	[+22]	31 40	PS	38 48	SS 71-9
Fort de France	131-6	89	e 13 17	?	i 16 43	?	—	18-2
Pulkovo	131-7	334	e 19 38	[+23]	—	—	e 22 42	PP
Ivigtut	132-1	24	22 44	PP	—	—	—	—
Theodosia	135-4	313	e 22 55	PP	—	—	—	—
Upsala	N. 136-3	340	e 20 24?	[+60]	—	—	—	—
Sebastopol	136-8	314	e 23 4	PP	—	—	—	—
Ksara	137-2	297	i 19 30a	[+ 5]	e 34 51	PPS	22 22	PP
Copenhagen	141-4	341	19 30	[- 3]	e 27 10	[+29]	22 48	PP 62-4
Helwan	141-4	293	e 19 46	[+13]	i 27 22	[+41]	22 48	PP
Bucharest	141-8	317	—	—	23 4	PP	—	81-4
Potsdam	143-8	335	e 19 36	[- 1]	—	—	—	—
Hamburg	Z. 143-9	341	e 19 24?	[-13]	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Sofia	144.4	315	e 18 42	[-56]	e 41 12	SS	—	—
Prague	144.9	333	e 20 24?	[+45]	—	—	—	—
Belgrade	145.2	319	e 19 41k	[+2]	—	—	e 24 47	PP
Jena	145.5	334	e 19 41	[+1]	—	—	—	—
Göttingen	z. 145.6	338	e 19 40	[0]	—	—	—	—
De Bilt	146.7	343	e 19 45	[+3]	—	—	—	e 73.4
Bidston	147.2	352	i 19 56	[+13]	—	—	—	—
Stuttgart	148.1	336	i 19 52a	[+8]	e 23 24	PKS	—	—
Uccle	148.1	343	e 19 50	[+6]	—	—	—	e 75.4
Triest	148.4	328	e 18 59	[-46]	—	—	—	e 71.4
Kew	z. 148.6	348	i 19 50a	[+5]	—	—	—	—
Strasbourg	z. 148.8	337	e 19 52	[+7]	e 26 46	[-5]	i 24 3	PP e 89.9
Zurich	149.5	336	e 19 57a	[+11]	—	—	e 23 36	PP
Basle	149.8	336	e 19 51	[+4]	—	—	—	—
Neuchatel	150.4	336	e 19 52	[+4]	—	—	—	—
Paris	150.4	342	e 19 50	[+2]	—	—	e 23 33	PP
Moncalieri	151.8	333	18 16	?	—	—	—	—
Puy de Dôme	152.9	338	e 19 44	[-7]	—	—	e 22 51	PP
Algiers	160.4	324	e 24 24?	PP	—	—	—	—
Almeria	162.7	337	e 24 52	PP	—	—	—	—
Malaga	163.5	342	e 20 24	[+20]	—	—	e 25 20	PP
San Fernando	E. 164.2	348	e 25 31	PP	—	—	—	86.4

Additional readings —

Brisbane iPN = +3m.42s.
 Arapuni i = +9m.12s. and +10m.0s., iS_cS? = +14m.36s.
 Apia sP = +4m.54s., i = +8m.18s.
 Riverview P_cP? = +8m.47s., iE = +9m.27s.
 Wellington i = +5m.40s., +7m.14s., and +9m.6s., SS = +9m.20s., P_cS? = +12m.11s., S_cS = +15m.36s.
 Christchurch iZ = +8m.49s., i = +8m.55s. and +11m.57s., iP_cSEZ = +12m.55s., iZ = +14m.57s., eNZ = +17m.7s.
 Melbourne i = +10m.44s.
 Perth P = +13m.37s., i = +14m.32s., PP = +14m.59s., P_cS = +18m.42s., PS = +20m.6s., SS = +22m.46s., SSS = +23m.39s., SSSS = +24m.13s.
 Hong Kong SS = +24m.35s.
 Medan iN = +20m.19s.
 Berkeley eSN = +23m.13s.
 Calcutta iSKKSN = +23m.46s., iSN = +24m.8s., ePPSN = +26m.0s., eSSN = +29m.52s., eSSS = +34m.51s.
 Irkutsk iSS = +30m.54s.
 Tucson iS = +24m.36s.
 Bozeman eS = +25m.6s., eSSS = +35m.33s.
 Agra SKKS?E = +25m.24s.
 Bombay eE = +18m.26s., iE = +20m.7s. and +21m.5s., eE = +21m.44s.
 Florissant eN = +20m.8s., iE = +26m.16s., eN = +27m.0s., iE = +28m.39s.
 St. Louis eN = +23m.48s.
 Tashkent ePPP = +21m.30s., iSKKS = +26m.16s., i = +28m.56s., e = +32m.39s., eSS = +34m.0s., eSSS = +38m.42s.
 Sverdlovsk PS = +29m.52s., SSS = +40m.48s.
 Weston eSKKSEN = +27m.56s., eSKSPEZ = +31m.26s., ePPPSE = +34m.11s., eSSS = +43m.11s.
 Baku SKKS = +27m.39s., PS = +30m.48s., SS = +38m.24s.
 Tiflis PPZ = +21m.40s., PKSZE = +22m.39s., iPPPZ = +24m.44s.
 Moscow ePKS = +22m.38s., PPS = +33m.21s.
 Fort de France SSS = +16m.59s.
 Ksara i = +19m.41s., SKP = +23m.3s.
 Copenhagen PKPZ = +20m.0s., eN = +23m.27s., eZ = +24m.17s. and +28m.15s., PSZ = +34m.54s.
 Helwan e = +20m.27s., SKP = +23m.21s., i = +23m.24s.
 Potsdam eZ = +20m.12s., +25m.0s., and +31m.0s.
 Sofia eE = +9m.12s. and +10m.21s.
 Belgrade iZ = +19m.48s. and +20m.31s., eZ = +21m.46s., eNW = +31m.17s.
 Jena e = +20m.33s.
 Stuttgart iPKPZ = +21m.11s. k.
 Uccle eZ = +20m.2s.
 Strasbourg iZ = +20m.45s., eZ = +21m.12s., iSKPZ = +23m.24s., PSKSZ = +34m.5s., SS = +43m.54s.
 Moncalieri e = +16m.42s.
 Algiers e? = +21m.44s., +25m.47s., and +34m.0s.
 San Fernando ePKPN = +25m.36s.
 Long waves were also recorded at Tananarive, New Plymouth, and Chatham Is.

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July 5d. 2h. 54m. 35s. Epicentre 21°08. 169°5E. (as at 2h. 3m.).

A = -9188, B = +1703, C = -3563; $\delta = +15$; $h = +4$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	16.3	244	i 3 49	- 3	e 7 1	+ 8	7 7	SS
Apia	19.2	72	e 4 32	+ 4	i 8 1	+ 2	i 4 43	PP
Riverview	20.6	228	e 4 46	+ 3	8 31	+ 2	—	—
Sydney	20.6	228	e 4 35	- 8	e 8 15	-14	—	e 9.8
Wellington	20.7	169	e 4 45	+ 1	i 8 39	+ 8	i 5 1	PP
Christchurch	22.6	174	i 5 3	0	i 9 8	+ 1	i 5 17	PP
Melbourne	27.0	226	5 58	+13	10 8	-14	—	12.4
Honolulu	52.8	39	—	—	e 16 22	-25	e 19 34	SS
Batavia	N. 62.3	275	i 11 13	+47	—	—	—	—
Vladivostok	72.6	333	i 11 28	- 3	i 20 56	0	e 25 6	SS
Santa Barbara	Z. 86.9	53	e 12 41	- 7	—	—	—	—
Pasadena	87.9	53	i 12 51	- 2	e 23 25	[+ 5]	—	—
La Jolla	88.0	54	e 12 43	-10	—	—	—	—
Mount Wilson	88.1	53	e 12 52	- 2	—	—	—	—
Riverside	88.4	53	i 12 55	0	—	—	—	—
Haiwee	89.0	51	e 13 3	+ 5	—	—	—	—
Tinemaha	89.2	50	i 13 1	+ 2	e 23 36	[+ 8]	—	—
Irkutsk	92.3	326	e 13 28	+15	i 24 14	- 1	e 25 36	PS
Tucson	92.7	57	i 13 15	0	e 24 37	+19	—	e 42.1
Agra	E. 100.6	296	—	—	i 24 25	[- 5]	—	—
Huancayo	108.4	112	e 14 22	P	e 28 29	PS	—	e 46.7
Tashkent	111.0	308	e 18 27	[- 8]	—	—	—	—
Weston	Z. 125.2	52	i 19 1	[- 2]	—	—	—	—
Tiflis	129.4	307	e 21 36	PP	—	—	—	e 31.4
Ksara	137.2	297	19 29	[+ 4]	23 0	SKP	22 20	PP
Copenhagen	141.4	341	22 31	PP	—	—	—	65.4
Helwan	141.4	293	i 19 31	[- 2]	—	—	—	—
Bucharest	E. 141.8	317	—	—	22 55	PP	—	—
Potsdam	143.8	335	e 19 37	[0]	e 26 31	[-14]	e 22 1	PP
Hamburg	143.9	341	e 19 31	[- 6]	e 28 25?	?	—	—
Sofia	144.4	315	e 19 28	[-10]	—	—	—	—
Belgrade	145.2	318	e 19 35k	[- 4]	—	—	—	e 38.0
Jena	145.5	334	e 19 40	[0]	—	—	—	—
Göttingen	Z. 145.6	338	e 19 37	[- 3]	—	—	—	—
De Bilt	146.7	343	e 19 41	[- 1]	—	—	—	e 73.4
Bidston	147.2	343	i 19 51	[+ 8]	—	—	—	e 50.4
Stuttgart	148.1	336	e 19 46	[+ 2]	e 31 25	?	—	e 80.4
Uccle	Z. 148.1	343	e 19 48	[+ 4]	—	—	—	—
Kew	148.6	348	i 19 46	[+ 1]	—	—	—	e 50.4
Strasbourg	148.8	337	i 19 47	[+ 2]	—	—	i 23 43	PP
Zurich	149.5	336	e 19 53	[+ 7]	—	—	—	—
Basle	149.8	336	e 19 50	[+ 3]	—	—	—	—
Neuchatel	150.4	336	e 19 51	[+ 3]	—	—	—	—
Paris	150.4	342	—	—	e 40 25?	?	—	90.4

Additional readings:—

Brisbane iN = +7m.43s.

Apia iPP = +5m.1s., i = +8m.17s.

Wellington i = +6m.41s., SS = +9m.23s., S₀S = +16m.22s.

Christchurch iZ = +9m.26s.

Irkutsk e = +30m.18s.

Tiflis eN = +21m.46s.

Potsdam eEN = +17m.25s.?

Sofia ePE = +18m.28s., eN = +18m.41s., eE = +19m.20s.

Belgrade iZ = +19m.59s., eZ = +20m.48s.

Jena eN = +19m.55s.

Stuttgart iPKP₁ = +20m.9s.a., eSKSP₁ = +37m.25s.

Uccle iZ = +20m.8s.

Strasbourg iPKP₁Z = +20m.10s.

Long waves were also recorded at Harvard, Fordham, New Plymouth, East Machias, Edinburgh, Aberdeen, and La Plata.

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July 5d. 9h. 50m. 57s. Epicentre 21°-0S. 169°-5E. (as at 2h.).

A = -9188, B = +1703, C = -3563; $\delta = +15$; $h = +4$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	E. 16.3	244	13 45	- 7	i 7 9	+16	—	e 8-0
	N. 16.3	244	13 51	- 1	i 7 3	+10	—	—
Riverview	20.6	228	e 5 21	PPP	e 8 38	+ 9	—	e 10-1
Sydney	20.6	228	e 4 40	- 3	e 8 35	+ 6	—	e 10-2
Wellington	20.7	169	e 4 50	+ 6	i 8 36	+ 5	9 26	SSS 10-8
Christchurch	22.6	174	e 3 37	?	8 57	-10	10 27	L _q 13-1
Melbourne	27.0	226	—	—	i 10 21	- 1	—	13-8
Vladivostok	72.6	333	e 11 27	- 4	e 20 57	+ 1	—	e 30-5
Pasadena	87.9	53	i 12 52	- 1	—	—	—	—
Mount Wilson	88.1	53	i 12 54	0	—	—	—	—
Riverside	88.4	53	e 12 56	+ 1	—	—	—	—
Haiwee	89.0	51	e 13 0	+ 2	—	—	—	—
Tinemaha	89.2	50	e 13 3	+ 4	—	—	—	—
Tucson	92.7	57	i 13 17 _a	+ 2	—	—	—	e 42-5
Tashkent	111.0	308	—	—	e 28 45	PS	e 38 57	SSS e 56-0
Stuttgart	148.1	336	e 19 48	[+ 4]	—	—	—	e 86-0
Basle	149.8	336	e 20 0	[+13]	—	—	—	—

Riverview gives also eN = +8m.48s.

Long waves were also recorded at Apia, Strasbourg, Tiflis, Baku, Harvard, and Philadelphia.

July 5d. 22h. 7m. 6s. Epicentre 22°-9S. 171°-7E.

A = -9125, B = +1331, C = -3869; $\delta = +6$; $h = +4$;
D = +144, E = +990; G = +383, H = -056, K = -922.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Arapuni	15.5	168	—	—	i 6 36	+ 1	—	8-2
New Plymouth	16.2	174	e 4 3	PP	7 18	SS	—	9-7
Brisbane	E. 17.5	250	i 4 6	- 1	i 7 36	SS	—	—
Apia	18.1	63	4 12	- 2	e 7 37	+ 2	4 24	pP
Wellington	18.5	173	i 4 21 _k	+ 2	i 8 16	SS	i 4 49	PP 10-7
Riverview	21.1	234	i 4 56 _a	+ 8	i 8 48	+ 9	5 19	pP e 10-2
Sydney	21.1	234	i 4 53	+ 5	i 8 49	+10	—	e 11-1
Chatham IIs.	23.1	158	—	—	9 6	-10	—	11-4
Melbourne	27.3	230	e 5 51	+ 3	i 10 27	0	—	14-7
Adelaide	31.2	239	i 7 9	PP	i 11 32	+ 3	i 14 21	SSS 14-5
Perth	49.9	247	e 9 39	+42	16 2	- 5	11 24	PP 22-9
Honolulu	53.0	36	e 9 23	+ 2	e 16 49	- 1	20 19	SS e 21-3
Manila	62.1	302	i 10 25	0	18 57	+ 8	—	30-4
Batavia	64.5	275	e 10 35	- 6	i 19 20	+ 1	—	34-9
Hukuoka B	68.6	324	e 11 3	- 4	—	—	—	—
Hong Kong	71.8	304	11 28	+ 2	20 53	+ 7	—	—
Vladivostok	75.2	331	e 11 40	- 6	i 21 28	+ 3	—	e 31-5
Medan	75.8	280	e 11 42	- 8	e 21 8	-23	—	e 40-9
Santa Barbara	86.5	51	i 12 48	+ 2	—	—	—	—
Berkeley	86.6	47	i 12 43	- 3	e 23 4	[- 8]	—	e 36-4
Ukiah	86.6	45	—	—	e 23 17	[+ 5]	e 23 31	PS 36-3
Pasadena	87.5	52	i 12 49	- 2	e 23 17	[0]	e 24 41	PS e 36-6
Mount Wilson	87.6	52	i 12 51	0	—	—	—	—
Riverside	88.0	52	i 12 52	- 1	—	—	—	—
Haiwee	88.6	49	e 12 57	+ 1	—	—	—	—
Tinemaha	88.9	49	i 12 59	+ 1	—	—	—	—
Sitka	91.2	26	—	—	e 23 44	[+ 4]	—	e 41-6
Tucson	92.1	56	i 13 13 _a	+ 1	e 30 6	SS	24 25	PS e 39-3
Calcutta	N. 92.7	293	i 12 23	-52	e 23 52	[+ 4]	e 16 39	PP e 49-0
College	92.9	16	—	—	e 25 29	PS	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Colombo	E. 94.3	275		—	i 21 24	?	—	—
Irkutsk	95.0	325	i 13 27	+ 1	24 1	[- 0]	e 19 27	PPP e 42.9
Bozeman	97.7	43	—	—	e 25 7	+ 6	e 23 44	SKS e 39.6
Kodaikanal	E. 97.8	278	—	—	e 25 54	PS	—	—
Agra	E. 103.2	294	e 18 10	PP	e 25 43	- 4	—	—
Bombay	105.0	284	—	—	e 26 8	+ 6	—	e 54.2
Florissant	109.9	55	e 14 37	P	25 11	[- 1]	i 19 7	PP
Tashkent	113.8	306	e 14 51	P	25 10	[- 17]	e 19 36	PP
Sverdlovsk	120.4	324	e 18 52	[- 1]	25 47	[- 4]	20 15	PP
Ottawa	121.6	49	e 20 24	PP	e 25 12	[- 43]	e 37 12	SS
Philadelphia	121.7	56	e 20 30	PP	e 30 20	PS	e 36 5	SS
Fordham	122.8	54	e 20 32	PP	e 26 6	[+ 7]	e 32 6	PPS
Rio de Janeiro	123.2	141	e 30 34	PS	—	—	—	e 54.3
Williamstown	123.3	53	e 20 37	PP	e 32 1	PPS	—	e 53.3
Vermont	123.4	50	e 31 44	PPS	—	—	—	e 53.9
Harvard	124.6	53	e 18 54	[- 8]	e 30 38	PS	e 20 52	PP
Weston	124.7	53	e 19 5	[+ 3]	e 37 58	SS	e 20 52	PP
Seven Falls	125.0	47	—	—	e 25 54?	[- 12]	e 37 54?	SS
San Juan	126.0	82	e 20 35	PP	e 26 21	[+ 12]	e 22 20	PPP
Baku	128.4	304	e 19 11	[+ 2]	38 42	SS	e 21 19	PP
Fort de France	129.5	90	e 13 13	P	—	—	—	—
Grozny	131.3	308	19 11	[- 3]	—	—	e 22 41	PP
Scoresby Sund	131.7	5	19 18	[+ 3]	31 42	PS	e 21 35	PP
Tiflis	132.2	306	e 19 18	[+ 2]	e 25 30	[- 55]	e 21 27	PP
Erevan	132.5	304	19 19	[+ 2]	—	—	—	—
Ivigtut	132.9	25	21 42	PP	—	—	22 46	PKS
Moscow	133.0	326	e 19 17	[- 1]	e 33 17	PPS	e 21 40	PP
Pulkovo	134.2	333	e 19 23	[+ 3]	31 49	PS	25 9	PPP
Theodosia	138.2	313	e 22 53	PP	—	—	22 53	PKS
Upsala	138.8	341	e 22 54?	PP	—	—	—	e 67.9
Sebastopol	139.6	313	e 23 8	PP	—	—	—	—
Ksara	139.9	295	e 19 28	[- 2]	e 26 29	[- 10]	e 22 33	PP
Bergen	141.3	349	e 22 35	PP	e 44 54?	SSS	—	—
Copenhagen	143.8	340	19 33	[- 4]	42 6	SS	22 55	PP
Istanbul	143.8	310	19 39	[+ 2]	—	—	22 54	PP
Helwan	144.0	289	e 19 36	[- 1]	e 28 42	{ - 62}	e 22 48	PP
Bucharest	144.7	316	e 19 40	[+ 1]	—	—	—	54.9
Hamburg	146.4	341	e 19 41a	[+ 0]	—	—	—	e 70.9
Potsdam	146.4	336	e 19 42	[+ 1]	e 33 30	PS	e 23 54	PP
Edinburgh	146.8	354	e 19 54?	[+ 12]	—	—	—	—
Budapest	147.1	325	19 45	[+ 2]	—	—	—	—
Sofia	147.2	314	19 48	[+ 5]	—	—	—	—
Ogyalla	N. 147.3	326	e 19 33	[- 10]	—	—	—	—
Prague	147.6	333	e 19 49	[+ 6]	—	—	—	—
Durham	E. 147.8	352	e 19 31	[- 13]	—	—	—	—
Belgrade	147.9	319	e 19 43	[- 1]	e 28 24	PPP	—	e 54.3
Göttingen	148.1	338	e 19 45	[+ 1]	—	—	—	—
Jena	148.1	335	e 19 46	[+ 2]	—	—	e 23 6	PP
Stonyhurst	148.8	353	e 22 54?	PP	—	—	—	67.9
De Bilt	149.1	343	i 19 50	[+ 4]	—	—	e 23 22	PP
Bidston	149.3	354	i 19 47	[+ 1]	—	—	—	67.9
Uccle	150.5	344	e 19 54	[+ 6]	—	—	23 32	PP
Kew	150.5	349	i 19 55a	[+ 7]	—	—	—	e 67.9
Stuttgart	150.7	335	e 19 49	[+ 1]	—	—	e 23 32	PP
Triest	151.1	327	e 19 54	[+ 5]	—	—	—	—
Strasbourg	z. 151.4	337	e 19 54	[+ 5]	26 16	[- 40]	e 43 54	SS
Zurich	152.1	335	e 19 46	[- 4]	—	—	—	—
Basle	152.3	336	e 19 51	[- 0]	—	—	—	—
Paris	152.8	344	e 19 49	[- 2]	e 27 13	[+ 16]	e 23 40	SKP
Puy de Dôme	155.4	340	e 24 21	PP	—	—	—	—
Toledo	162.7	348	e 19 16	[- 47]	e 51 59	SSS	—	84.2
Algiers	163.0	327	e 20 3	[- 1]	e 27 11	[+ 4]	e 44 22	SS
Malaga	165.8	347	e 23 49	PP	—	—	—	79.4
San Fernando	166.2	351	e 16 1	P	e 28 27	PPP	—	85.4

For Notes see next page.

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NOTES TO JULY 5d. 22h. 7m. 6s.

Additional readings :-

Arapuni S = +7m.42s.
New Plymouth i = +7m.27s., L_q = +8.2m.
Wellington iZ = +5m.3s., i = +6m.6s., +7m.0s., and +8m.16s., SS = +8m.42s., L_q = +8.3m.
Riverview sP?N = +5m.28s., iE = +5m.46s. and +5m.58s., $P_cP?$ = +9m.1s., iZ = +9m.6s., sS?E = +9m.20s.
Sydney e = +5m.51s.
Melbourne iP = +5m.57s., i = +10m.58s.
Perth P_cP = +11m.4s., PPP = +12m.2s., P_cS = +14m.54s., PS = +16m.16s., i = +17m.52s. and +18m.56s., SS = +19m.47s., SSS = +20m.52s.
Medan iE = +12m.56s.
Berkeley iPZ = +12m.46s., ePEN = +12m.50s., eSE = +23m.6s.
Pasadena eE = +25m.19s.
Calcutta ePPPN = +19m.5s., eN = +22m.57s., iSN = +24m.27s., iPSN = +25m.57s., iPPSN = +26m.50s., eSSN = +31m.58s., eSSSN = +37m.8s.
Irkutsk PS = +26m.2s., SS = +31m.18s.
Bombay eEN = +29m.17s. and +38m.24s.
Florissant eZ = +17m.54s., iN = +26m.55s., eZ = +28m.29s., iE = +23m.37s.
Tashkent PKP = +18m.5s., ePPP = +21m.48s., SKKS = +26m.8s., S = +27m.6s., PS = +28m.56s., ePPS = +30m.17s., SS = +35m.18s.
Sverdlovsk S = +28m.19s., PS = +30m.7s., SS = +36m.42s., eSSS = +41m.18s.
Ottawa eE = +30m.18s.
Williamstown e = +12m.5s.
Harvard eS₀SPN = +29m.8s., eSSN = +37m.44s., eL_qN = +55m.24s.
Weston ePZ = +15m.52s., ePPSEN = +32m.18s.
San Juan SSS = +41m.35s.
Baku SSS = +43m.36s.
Fort de France e = +15m.21s.
Scoresby Sund i = +22m.46s. and +33m.24s.
Tiflis SKPEZ = +22m.48s., ePPSEZ = +33m.26s., ePPSN = +33m.30s., eSSN = +39m.18s.
Moscow PKS = +22m.49s., PPP = +24m.35s.
Pulkovo PKS = +22m.51s.
Theodosia e = +16m.11s.
Ksara ePPS = +35m.9s., eSS = +41m.19s.
Copenhagen e = +19m.38s., eZ = +21m.54s., SSS = +46m.54s.
Istanbul +21m.0s. and +23m.57s.
Helwan e = +24m.22s.
Bucharest iE = +19m.53s.
Ogyalla PE = +19m.7s.
Prague e = +31m.54s.?
Belgrade iPZ = +19m.47s., eZ = +19m.56s., eNW = +21m.6s.
Jena eZ = +19m.54s., eN = +19m.59s.
Stuttgart iPKPZ = +19m.56s., ePKP = +20m.21s., ePKS = +22m.22s., eSKKS = +33m.8s., PPS = +38m.54s.
Strasbourg iZ = +19m.58s., eSKPZ = +23m.32s., SKKSZ = +30m.42s., PPSZ = +37m.36s.
Algiers eSKP? = +23m.11s., eSKKS = +30m.27s., PSKS = +34m.3s., PPS? = +37m.11s.
San Fernando ePPN = +16m.6s.
Long waves were also recorded at Aberdeen and Jersey.

July 5d. Readings also at 0h. (Ottawa and New Plymouth), 1h. (Pasadena, Mount Wilson, Riverside, Tucson, and Philadelphia), 3h. (near Istanbul and New Plymouth), 4h. (Huancayo and near Ksara (2)), 5h. (Mizusawa), 8h. (Malabar), 9h. (Semipalatinsk and Perth), 10h. (Tashkent, Vladivostok, Mizusawa, and Tiflis), 11h. (Tiflis (4) and Medan), 12h. (Andijan, Frunse, Almata, Tchimkent, and Samarkand), 14h. (Malabar), 16h. (Harvard), 17h. (Basle, Marseilles, Puy de Dôme, and Zurich), 18h. (Haiwee, Fresno, La Jolla, Santa Barbara, Riverside, Mount Wilson, Pasadena, and near Tucson), 20h. (near Balboa Heights and Ottawa), 22h. (Mount Wilson and Riverside), 23h. (Williamstown).

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July 6d. 1h. 24m. 23s. Epicentre 22° 9S. 171° 7E. (as on July 5d.).

A = -0.9125, B = +0.1331, C = -0.3869; $\delta = +6$; $h = +4$;
D = +0.144, E = +0.990; G = +0.383, H = -0.056, K = -0.922.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	°	m. s.	s.	m. s.	s.	m. s.	m.
Arapuni		15.5	168	—	—	16 43	+ 8	—	8.9
New Plymouth		16.2	174	e 3 37?	-13	7 37?	SSS	—	9.4
Brisbane	E.	17.5	250	i 4 7	0	i 7 13	- 8	—	—
	N.	17.5	250	e 4 13	+ 6	i 7 19	- 2	—	—
Apia		18.1	63	i 4 16	+ 2	e 7 39	+ 4	e 8 5 SS	—
Wellington		18.5	173	i 4 18	- 1	8 2	+18	i 8 27 SSS	9.8
Christchurch		20.6	177	i 4 42k	- 1	8 26	- 3	—	10.1
Riverview		21.1	234	e 4 44	- 4	i 8 45	+ 6	i 4 57 PP	—
Sydney		21.1	234	e 4 54	+ 6	i 8 46	+ 7	—	e 10.4
Melbourne		27.3	230	e 5 57	+ 9	10 34	+ 7	i 11 39 SS	14.0
Adelaide		31.2	239	i 7 15	PP	i 11 26	- 3	—	i 14.4
Palau		47.2	305	9 30	+54	—	—	—	—
Perth		49.9	247	9 31	+34	16 7	0	11 37 PPP	22.5
Honolulu		53.0	36	e 9 21	0	e 16 45	- 5	e 11 3 PP	e 20.7
Manila		62.1	302	i 10 21a	- 4	18 33	-16	—	28.6
Batavia		64.5	275	i 10 39k	- 2	i 19 18	- 1	—	e 35.6
Tokyo Cen. Met. Ob.		65.6	332	11 52	+64	21 37	?	—	—
Osaka B		66.7	329	10 19	-36	—	—	—	—
Hukuoka B		68.6	324	e 9 17	?	e 19 59	-10	—	e 29.6
Hong Kong		71.8	304	11 21	- 5	20 42	- 4	21 13 PS	—
Vladivostok		75.2	331	i 11 40	- 6	—	—	—	—
Medan		75.8	280	11 46	- 4	21 32	+ 1	i 17 20 PPP	39.6
Santa Barbara		86.5	51	e 12 48	+ 2	—	—	—	—
Berkeley		86.6	47	e 12 39	- 7	e 22 45	[-27]	—	e 36.3
Ukiah		86.6	45	e 12 48	+ 2	e 23 5	[-7]	e 29 1 SS	e 35.9
Pasadena		87.5	52	i 12 49a	- 2	e 23 25	- 6	i 16 22 PP	e 35.8
Mount Wilson		87.6	52	i 12 50	- 1	—	—	—	—
Fresno	N.	87.7	47	e 12 41	-11	—	—	—	—
Riverside		88.0	52	e 12 54	+ 1	—	—	—	—
Haiwee		88.6	49	e 13 6	+10	—	—	—	—
Tinemaha	E.	88.9	49	e 12 59	+ 1	—	—	—	—
Sitka		91.2	26	e 13 6	- 2	—	—	16 48 PP	e 41.6
Tucson		92.1	56	i 13 11a	- 1	23 49	[+ 4]	e 16 35 PP	36.8
College		92.9	16	—	—	e 25 31	PS	—	e 43.2
Colombo	E.	94.3	275	e 12 37?	-46	—	—	—	—
Irkutsk		95.0	325	e 13 31	+ 5	24 7	[+ 6]	e 19 45 PPP	42.6
Butte		96.9	42	—	—	e 26 4	PS	—	—
Bozeman		97.7	43	—	—	e 23 54	[-21]	e 26 13 PS	e 39.4
Kodaikanal	E.	97.8	278	—	—	i 25 12	+10	—	—
Agra	E.	103.2	294	18 17	PP	i 24 51	[+ 9]	27 25 PS	—
Bombay		105.0	284	e 18 11	PP	e 26 10	+ 8	—	—
Huancayo		105.8	110	—	—	e 28 54	PPS	—	e 44.3
La Paz		109.6	119	e 18 50	PP	i 29 43	PPS	—	56.4
Florissant		109.9	55	e 14 32	P	i 28 54	PS	e 18 58 PP	—
Frunse		110.3	309	e 19 20	PP	—	—	—	—
Andijan		111.4	306	19 32	PP	—	—	—	—
Tashkent		113.8	306	e 18 19	[-22]	25 11	[-16]	19 10 PP	e 43.0
Samarkand		115.3	304	e 19 37	PP	—	—	—	—
Sverdlovsk		120.4	324	e 18 51	[- 2]	i 30 5	PS	e 20 14 PP	51.6
Ottawa		121.6	49	—	—	30 37?	PS	37 7 SS	50.6
Fordham		122.8	54	e 18 58	[0]	—	—	e 21 26 PP	—
Rio de Janeiro		123.2	141	e 21 7	PP	—	—	(e 37 37) SS	37.6
Williamstown		123.3	53	e 18 54	[- 5]	e 42 3	SSS	e 20 37 PP	e 58.4
Vermont		123.4	50	e 20 37	PP	e 25 47	[-14]	e 30 25 PS	50.9
Harvard		124.6	53	e 19 7	[+ 6]	—	—	e 20 39 PP	e 59.1
Weston		124.7	53	e 19 3	[+ 1]	e 26 18	[+13]	e 21 13 PP	e 59.3
Seven Falls		125.0	47	e 20 37	PP	e 37 37?	SS	—	53.6
San Juan		126.0	82	e 19 7	[+ 3]	—	—	e 21 22 PP	i 51.3
Baku		128.4	304	e 19 15	[+ 6]	31 17	PS	21 14 PP	65.6
Fort de France		129.5	90	19 3	[- 8]	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	o	o	m. s.	s.	m. s.	s.	m. s.	m.	
Grozny	131.3	308	e 19 18	[+ 4]	—	—	i 22 40	PP	—
Scoresby Sund	131.7	5	e 19 15	[+ 0]	39 13	SS	43 37	SSS	e 59.6
Tiflis	132.2	306	e 19 16	[+ 0]	e 39 21	SS	e 21 34	PP	e 53.6
Yerevan	132.5	304	e 19 20	[+ 3]	—	—	—	—	—
Ivigtut	132.9	25	e 19 16	[- 1]	—	—	21 37	PP	—
Moscow	133.0	326	e 19 15	[- 3]	33 51	PPS	e 21 31	PP	e 73.1
Pulkovo	134.2	333	e 19 16	[- 4]	e 31 45	PS	e 21 58	PP	—
Theodosia	135.2	313	e 19 26	[- 1]	—	—	e 23 1	PP	—
Upsala	138.8	341	e 23 1	PP	—	—	—	—	e 60.6
Simferopol	139.1	313	e 19 38	[+ 9]	—	—	—	—	—
Ksara	139.9	295	e 19 24	[- 6]	e 35 12	PPS	e 22 30	PP	—
Bergen	141.3	349	e 19 32	[- 1]	—	—	—	—	e 86.6
Copenhagen	143.8	340	e 19 32	[- 5]	42 19	SS	e 22 7	PP	59.6
Istanbul	143.9	310	e 19 35	[- 2]	—	—	—	—	—
Helwan	144.0	289	e 19 33	[- 4]	e 27 9	[+24]	e 23 4	PP	—
Bucharest	144.7	316	(e 19 39)	[+ 0]	—	—	—	—	—
Aberdeen	145.5	354	e 19 37?	[- 3]	i 26 20	[-28]	e 22 21	PP	e 80.8
Hamburg	146.4	341	e 19 39 _a	[- 2]	—	—	—	—	e 66.6
Potsdam	146.4	336	e 19 49	[+ 8]	e 33 13	PS	—	—	e 47.6
Edinburgh	146.8	354	e 20 1	[+19]	—	—	—	—	e 65.6
Kecskemet	z. 147.0	323	i 19 46	[+ 3]	—	—	(e 23 10)	PP	23.2
Budapest	147.1	325	e 19 53	[+10]	—	—	—	—	e 84.8
Sofia	147.2	314	e 19 47	[+ 4]	—	—	—	—	—
Ogyalla	147.3	326	e 19 45	[+ 2]	—	—	—	—	—
Prague	147.6	333	e 19 45	[+ 2]	e 34 7	PS	—	—	62.6
Durham	E. 147.8	352	e 19 48	[+ 4]	—	—	—	—	—
Belgrade	147.9	319	e 19 42 _a	[- 2]	—	—	—	—	—
Göttingen	z. 148.1	338	e 19 44	[+ 0]	—	—	e 24 22	PP	e 78.0
Jena	148.1	335	e 19 45	[+ 1]	—	—	—	—	e 62.6
Cheb	148.4	335	e 19 48	[+ 3]	—	—	—	—	e 75.6
Stonyhurst	148.8	353	e 21 27	?	—	—	—	—	78.6
De Bilt	149.1	343	e 19 45	[- 1]	—	—	i 23 27	PP	e 74.6
Bidston	149.3	354	i 19 35	[-11]	—	—	—	—	e 65.6
Kew	150.5	349	i 19 48	[+ 0]	—	—	—	—	e 67.6
Uccle	150.5	344	e 19 45	[- 3]	—	—	23 32	PP	e 63.6
Stuttgart	150.7	335	e 19 48	[+ 0]	—	—	e 23 59	PP	e 66.6
Triest	151.1	327	e 19 37	[-12]	—	—	—	—	—
Strasbourg	z. 151.4	337	e 19 43	[- 6]	e 26 57	[+ 1]	e 24 5	PP	e 73.1
Zurich	152.1	335	e 19 50	[- 1]	—	—	—	—	—
Padova	152.2	328	e 19 7	[-44]	—	—	e 23 37	PP	—
Basle	152.3	336	e 19 46	[- 5]	—	—	—	—	—
Paris	152.8	344	19 52	[+ 1]	e 30 58	{+24}	e 23 26	SKP	82.6
Jersey	153.3	352	—	—	e 34 13	?	—	—	e 94.6
Puy de Dôme	155.4	340	21 24	?	—	—	—	—	e 50.5
Toledo	162.7	348	e 21 14	?	e 52 3	SSS	e 24 45	PP	74.4
Algiers	163.0	327	e 18 59	[-65]	26 50	[-17]	e 23 37	SKP	—
Almeria	165.2	341	e 20 11	[+ 5]	—	—	—	—	e 92.2
Malaga	165.8	347	20 6	[- 1]	—	—	24 37	PP	76.6
San Fernando	166.2	351	e 23 54	PP	e 45 40	SS	e 52 46	SSS	81.6

Additional readings :—

Arapuni S = +7m.43s.
 Christchurch iSNZ = +8m.32s.
 Wellington PP = +4m.46s., i = +5m.15s., +5m.27s. +6m.7s., +6m.27s., and +6m.54s.,
 SS = +8m.42s., L_q = +9m.1s., S_qS = +14m.42s.
 Riverview iEN = +5m.52s., iN = +8m.49s. and +8m.57s., iZ = +9m.13s.
 Melbourne IP = +6m.4s.
 Adelaide i = +9m.49s., +11m.39s., and +14m.16s.
 Perth P_qP = +11m.10s., i = +11m.57s., P_qS = +15m.23s., PS = +16m.20s.
 Honolulu ePPP = +12m.6s., eSS = +20m.7s.
 Batavia PEN = +10m.42s.
 Hong Kong SS = +25m.27s.
 Medan PE = +11m.59s., PN = +12m.6s., iE = +22m.22s.
 Berkeley ePE = iPZ = +12m.43s., iZ = +12m.52s.
 Pasadena iE = +24m.27s., eEZ = +24m.31s.

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Tucson iPP = +17m.0s., PPP = +18m.52s., iS = +24m.2s., PS = +24m.42s., SSS = +33m.52s., iSSS = +34m.12s.
 Irkutsk e = +23m.17s., PS = +26m.8s.
 Bozeman eS = +24m.42s., eSS = +30m.45s.
 Agra SKKSE = +25m.37s., SE = +26m.6s.
 La Paz ePZ = +19m.23s., SS = +46m.25s.
 Florissant iEZ = +19m.39s., eE = +20m.23s. and +33m.10s.
 Tashkent eS = +27m.3s., PS = +28m.51s., SKSP = +29m.55s., SS = +35m.13s.
 Sverdlovsk eSS = +36m.37s., eSSS = +41m.1s.
 Williamstown i = +32m.10s., e = +38m.51s. and +46m.7s.
 Weston eSKPZ = +22m.52s., ePPPEZ = +23m.45s., eSKKS = +27m.41s., ePPSZ = +32m.20s., ePPPSZ = +33m.23s., iSSNZ = +37m.51s., eSSSE = +42m.17s., eGE = +51m.37s.
 San Juan PPP = +23m.47s.
 Baku SS = +39m.1s., SSS = +51m.25s.
 Fort de France S_r = +19m.25s.
 Scoresby Sund † = +21m.32s. and +22m.43s.
 Tiflis ePKPEN = +19m.21s., iPKSEN = +22m.44s., iZ = +23m.17s., eE = +24m.55s., ePPPZ = +25m.29s., eSSSZ = +45m.1s.
 Ivigtut +22m.43s.
 Pulkovo PKS = +22m.45s.
 Copenhagen iZ = +19m.41s., eN = +23m.28s., SSS = +46m.49s.
 Istanbul e = +20m.37s. †
 Helwan e = +20m.37s.
 Bucharest eE = +20m.1s., eN = +20m.59s., iE = +21m.25s. and +21m.52s., iN = +22m.7s., iS†E = +22m.33s., iN = +22m.54s., iE = +24m.2s. and +24m.30s., eE = +35m.31s., iE = +36m.39s. All readings have been increased by 10 minutes.
 Aberdeen iPKP_r = +20m.55s., ePPP = +28m.48s., eSKKS = +31m.25s., i = +31m.58s. and +40m.0s., eSS = +45m.48s., eSSS = +52m.47s.
 Potsdam eEN = +20m.19s.
 Budapest i = +20m.15s. and +20m.40s., e = +43m.37s. †
 Kecskemet iZ = +20m.9s. and +20m.55s.
 Ogyalla iN = +20m.35s., iN = +20m.47s., eE = +21m.19s.
 Belgrade iPZ = +19m.50s., eNW = +20m.59s., +22m.2s. and +32m.53s.
 Jena e = +19m.49s., eN = +19m.57s., +20m.22s., and +21m.3s., e = +33m.56s.
 De Bilt iZ = +19m.51s. and +25m.45s.
 Bidston i = +20m.6s.
 Kew iZ = +20m.21s.
 Stuttgart iPKPZ = +20m.16s.k, ePKS = +22m.53s., eSKKS_r = +33m.42s.
 Strasbourg eSKPZ = +23m.21s., eSSN = +44m.1s.
 Jersey e = +40m.40s. and +44m.37s. †
 Algiers eSS† = +45m.37s. †
 San Fernando ePPN = +23m.58s.
 Long waves were also recorded at Tananarive, St. Louis, and La Plata.

July 6d. 6h. 2m. 28s. Epicentre 22° 9S. 171° 7E. (as at 1h.).

A = -.9125, B = +.1331, C = -.3869; δ = +6; h = +4.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	17.5	250	i 4 14	+ 7	i 7 32	+11	i 7 38	SS
Wellington	18.5	173	e 4 17	- 2	7 54	+10	8 32†	L _q
Christchurch	20.6	177	i 4 48 _a	+ 5	8 50	SS	9 14	L _q
Riverview	21.1	234	e 4 52	+ 4	e 8 48	+ 9	e 8 57	SS
Sydney	21.1	234	e 4 40	- 8	e 8 48	+ 9	—	e 10.3
								e 10.0
Adelaide	31.2	239	e 6 42	+19	—	—	—	e 13.6
Perth	49.9	247	i 9 45	+48	i 16 17	+10	—	i 26.6
Vladivostok	75.2	331	e 10 10	?	—	—	—	—
Pasadena	87.5	52	i 12 50 _a	- 1	—	—	—	—
Mount Wilson	z. 87.6	52	i 12 51 _a	0	—	—	—	—
Riverside	88.0	52	e 12 52	- 1	—	—	—	—
Halwee	E. 88.6	49	e 13 0	+ 4	—	—	—	—
Tucson	92.1	56	e 13 12 _a	0	—	—	—	e 42.4
Sverdlovsk	120.4	324	—	—	e 30 12	PS	—	60.5
Ksara	139.9	295	e 19 32	[+ 2]	—	—	e 22 34	PP
De Bilt	149.1	343	e 19 49	[+ 3]	—	—	—	e 72.6

Perth gives also i = +23m.45s.

Long waves were also recorded at Philadelphia, Harvard, Copenhagen, and Tashkent.

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July 6d. 9h. 39m. 29s. Epicentre 22°-9S. 171°-7E. (as at 6h.).

A = -9125, B = +1331, C = -3869; $\delta = +6$; $h = +4$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m.
Brisbane	17.5	250	i 4 7	0	i 7 19	- 2	—	—
Wellington	18.5	173	e 4 7	-12	i 7 34	-10	i 4 39	PP 10.2
Christchurch	20.6	177	i 4 47 _a	+ 4	8 33	+ 4	i 8 45	SS 10.3
Riverview	21.1	234	e 4 45	- 3	e 8 44	+ 5	—	e 10.5
Sydney	21.1	234	e 4 47	- 1	e 8 42	+ 3	—	e 11.4
Melbourne	27.3	230	e 6 3	+15	e 10 26	- 1	—	— 13.7
Adelaide	31.2	239	e 5 43	-40	e 11 25	- 4	—	— i 14.3
Perth	49.9	247	—	—	i 16 4	- 3	(19 39)	SS 26.6
Manila	62.1	302	i 10 22	- 3	18 52	+ 3	—	—
Batavia	64.5	275	10 43	+ 2	19 20	+ 1	—	—
Vladivostok	75.2	331	e 11 43	- 3	e 21 27	+ 2	—	— e 31.4
Medan	E. 75.8	280	11 16	-34	i 22 26	PPS	—	—
Pasadena	Z. 87.5	52	i 12 51	0	—	—	—	—
Mount Wilson	Z. 87.6	52	i 12 51	0	—	—	—	—
Riverside	Z. 88.0	52	e 12 54	+ 1	—	—	—	—
Haiwee	E. 88.6	49	e 13 5	+ 9	—	—	—	—
Tucson	92.1	56	e 13 13 _a	+ 1	—	—	—	— e 42.6
Irkutsk	95.0	325	—	—	e 24 31?	- 7	—	— e 46.5
Sverdlovsk	120.4	324	e 20 11	PP	e 25 47	[- 4]	—	— 59.5
Scoresby Sund	131.7	5	20 42	?	—	—	—	—
Moscow	133.0	326	e 23 51	PPP	—	—	—	—
Pulkovo	134.2	333	e 20 43	PP	—	—	—	—
Ksara	139.9	295	e 19 32	[+ 2]	e 23 8	SKP	e 22 38	PP —
Copenhagen	143.8	340	19 35	[- 2]	—	—	25 55	PPP 74.5
Helwan	144.0	289	i 19 37	[0]	e 28 41	?	—	—
Hamburg	Z. 146.4	341	e 19 43	[+ 2]	—	—	—	—
De Bilt	149.1	343	i 19 51	[+ 5]	—	—	—	— e 75.5
Uccle	Z. 150.5	344	e 19 53	[+ 5]	—	—	—	—
Stuttgart	150.7	335	e 19 53	[+ 5]	e 26 9	[- 45]	—	— e 87.5
Strasbourg	151.4	337	e 19 59	[+ 10]	—	—	—	—
Paris	152.8	344	e 19 55	[+ 4]	—	—	—	— e 85.0

Additional readings:—

Brisbane iSE = +7m.31s.

Wellington i = +5m.19s. and +5m.46s., iZ = +6m.18s. and +6m.47s., iS = +8m.4s.,

L_a = +8m.31s., SS = +8m.44s.

Christchurch L_aE = +18m.51s.

Riverview iE = +4m.50s.

Melbourne i = +10m.34s. and +10m.55s.

Perth P = +18m.53s., i = +22m.3s., S = +23m.21s., SS = +24m.46s., SSS = +25m.11s.,

P_cS = +25m.43s.

Batavia PN = +20m.47s.

Irkutsk e = +21m.31s.? and +39m.31s.?

Sverdlovsk e = +30m.7s. and +41m.41s.

Ksara ePPS = +35m.24s.

Strasbourg e = +21m.41s.

Long waves were also recorded at Honolulu and Philadelphia.

July 6d. 13h. 1m. 1s. Epicentre 36°-3N. 141°-5E.

Strong at Aidu, Hukusima, moderate at Mito, Onahama, Kakioka, slight at Tokyo.

Epicentre 36°-3N. 141°-5E. Shallow. Macroseismic radius 200-300kms.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1938. Tokyo 1940, pp. 50-52, macroseismic chart p. 52.

A = -6322, B = +5029, C = +5894; $\delta = -2$; $h = 0$;

D = +623, E = +783; G = -.461, H = +.367, K = -.808.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m.
Onahama	0.8	323	0 20	+ 2	0 31	S*	—	—
Tyosi	0.8	222	0 17k	- 1	0 29	S*	—	—
Mito	0.9	276	0 13k	- 2	0 31	S*	—	—
Kakioka	1.1	266	0 21k	- 1	0 35	S*	—	—
Utunomiya	1.4	281	0 26	- 1	0 45	S*	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tokyo Cent. Met. Obs.	1.5	247	0 26 _a	- 2	i 0 46	- 3	1 0	—
Tokyo Imp. Univ.	1.5	247	0 27	- 1	0 46	- 3	S _g	—
Katutura	1.6	223	0 36	P _g	0 48	S _g *	—	—
Kiyosumi	1.6	223	0 42	P _g	1 2	S _g *	—	—
Komaba	1.6	246	0 29	- 1	0 49	- 2	—	—
Hukusima	1.7	330	0 29 _k	- 2	0 52	- 2	—	—
Kumagaya	1.7	265	0 31	0	0 53	- 1	—	—
Mitaka	1.7	248	0 34	+ 3	0 59	S _g *	—	—
Yokohama	1.7	240	0 33 _a	+ 2	1 5	S _g *	—	—
Kamakura	1.9	238	0 34	0	1 6	S _g *	—	—
Mera	1.9	224	0 34 _a	0	1 17	S _g *	—	—
Misaki	1.9	233	0 34	0	1 1	S _g *	—	—
Maebasi	2.0	273	0 35 _k	0	0 59	- 3	—	—
Sendai	2.0	346	0 36 _a	+ 1	1 2	- 0	—	—
Yamagata	2.1	335	0 28	- 9	0 55	- 9	—	—
Koyama	2.3	245	0 42	+ 2	1 11	+ 2	—	—
Oiwake	2.3	271	0 42	+ 2	1 14	S _g *	—	—
Hunatu	2.4	250	0 30	-11	1 21	S _g *	—	—
Ito	2.4	236	0 43 _k	+ 2	1 15	+ 3	—	—
Misima	2.4	240	0 41 _a	0	1 19	S _g *	—	—
Kohu	2.5	254	0 42	- 1	1 13	- 1	—	—
Numadu	2.5	241	0 43	- 0	1 50	+ 36	—	—
Susaki	2.6	231	0 45	+ 1	1 23	S _g *	—	—
Yosiwara	2.6	244	0 42	- 2	1 15	- 2	—	—
Nagano	2.7	278	0 48	+ 3	1 32	S _g *	—	—
Mizusawa	2.8	354	0 52	P*	i 1 27	S _g *	—	—
Takada	2.8	287	0 46	- 1	1 20	- 2	—	—
Matumoto	2.9	269	0 57	P _g	1 44	S _g *	—	—
Iida	3.1	255	0 53	+ 2	1 33	+ 4	—	—
Omaesaki	3.2	238	0 55	+ 3	1 54	S _g *	—	—
Miyako	3.4	6	0 59	+ 4	1 33	- 4	—	—
Morioka	3.4	356	0 57	+ 2	1 37	0	—	—
Takayama	3.4	268	1 4	P*	2 7	—	—	—
Hamamatu	3.5	243	1 3	P*	1 48	S _g *	—	—
Hatidyoizima	3.5	204	0 53	- 4	1 35	- 5	—	—
Toyama	3.5	279	1 0	+ 3	1 48	S _g *	—	—
Akita	3.6	343	1 6	P*	1 56	S _g *	—	—
Husiki	3.6	278	0 59	+ 1	2 1	S _g *	—	—
Nagoya	3.8	254	1 5	P*	2 1	S _g *	—	—
Wazima	3.8	289	1 3	+ 2	1 59	S _g *	—	—
Kanazawa	3.9	279	1 5	+ 3	1 55	+ 5	—	—
Gihu	3.9	258	1 4	+ 2	2 0	S _g *	—	—
Hatinohe	4.2	0	1 3	- 4	2 5	S _g *	—	—
Hukui	4.2	266	1 14	P*	2 20	S _g *	—	—
Hikone	4.4	258	1 10	0	2 7	+ 5	—	—
Kameyama	4.4	251	1 10	0	2 19	S _g *	—	—
Tu	4.4	250	1 18	P*	2 14	S _g *	—	—
Aomori	4.6	354	1 18	P*	2 14	+ 7	—	—
Kyoto	4.9	256	1 16	- 1	2 35	S _g *	—	—
Yagi	5.0	250	1 39	P _g	2 29	S _g *	—	—
Miyadu	5.2	264	1 10	-11	2 32	S _g *	—	—
Osaka	5.2	251	1 25	+ 4	2 45	S _g *	—	—
Kobe	5.4	254	1 14	-10	2 51	S _g *	—	—
Hakodate	5.5	355	1 32	P*	2 41	S _g *	—	—
Siomisaki	5.5	241	1 22	- 3	3 0	S _g *	—	—
Toyooka	5.5	265	1 36	P*	2 40	S _g *	—	—
Wakayama	5.6	250	1 28	+ 1	2 53	S _g *	—	—
Sumoto	5.7	252	1 26	- 2	3 5	S _g *	—	—
Mori	5.9	351	1 39	P*	2 56	S _g *	—	—
Muroran	6.0	357	1 41	P*	2 59	S _g *	—	—
Tokusima	6.1	250	1 38	+ 4	3 32	S _g *	—	—
Tadotu	6.6	254	1 54	P*	—	—	—	—
Muroto	6.7	245	1 42	0	3 32	S _g *	—	—
Sakai	6.8	266	1 58	P*	—	—	—	—
Sapporo	6.8	359	2 56	S	(2 56)	- 7	4 20	?

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Koti	7-1	250	e 1 57	+ 9	3 25	S*	—	—
Asahigawa	7-5	5	2 7	P*	—	—	—	—
Matuyama	7-6	253	1 50	- 5	3 52	S*	—	—
Nemuro	7-6	21	2 15	P*	3 9	-14	—	—
Hirosima	7-7	257	2 8	P*	3 51	S*	—	—
Hamada	7-8	262	2 36	P _g	4 3	S*	—	—
Izuka	9-2	256	2 17	+ 1	4 54	S _g	—	—
Titizima	9-2	176	3 47	?	—	—	—	—
Miyazaki	9-4	245	2 20k	+ 2	4 25	+18	—	—
Hukuoka B	9-5	257	e 2 22	+ 2	e 5 2	S _g	—	—
Kumamoto	9-5	252	2 21	+ 1	4 52	S*	—	—
Unzendake	9-9	252	4 57	S	(4 57)	S*	—	—
Vladivostok	10-1	316	i 2 26	- 2	e 4 26	+ 1	—	e 5-0
Nagasaki	10-2	253	3 33	+62	5 31	S _g	—	—
Taiyu	10-4	271	e 2 36	+ 2	—	—	—	—
Kelzyo	11-7	281	2 55	+ 4	e 5 39	SSS	—	—
Zinsen	12-0	280	e 2 44	-11	e 5 32	SS	—	—
Irkutsk	30-6	314	—	—	e 11 59?	+39	—	16-0
Semipalatinsk	45-4	308	e 8 19	- 3	—	—	—	—
Andijan	53-0	297	e 9 9	-12	e 16 57	+ 7	—	—
Tashkent	55-0	298	17 31	PS	e 17 12	- 5	e 21 59	SS
Sverdlovsk	55-7	319	9 37	- 3	17 37	+11	—	28-5
Samarkand	57-2	298	e 8 59	-52	—	—	—	—
Moscow	67-9	323	e 12 0	+58	e 20 58	PPS	—	41-5
Pulkovo	68-9	330	—	—	e 27 18	SSS	—	e 35-4
Haiwee	E. 76-9	54	e 12 4	+ 8	—	—	—	—
Pasadena	Z. 77-7	56	e 12 9	+ 9	—	—	—	—
Mount Wilson	Z. 78-0	56	e 12 8	+ 6	—	—	—	—
Copenhagen	78-6	333	e 12 3	- 2	—	—	—	41-0
Potsdam	80-9	330	—	—	e 22 59?	+33	—	e 46-0
Ksara	81-6	305	e 12 21	0	e 24 30	PPS	e 16 1	PP 44-0
Tucson	84-0	54	e 12 31a	- 3	—	—	—	—

Long waves were also recorded at Baku, Tiflis, and other European stations.

July 6d. Readings also at 0h. (Koti, Tucson, Pasadena, Mount Wilson, Riverside, San Javier, Santiago, College, and Sitka), 1h. (Weston, Williamstown, Fordham, Florissant, Butte, and Fort de France), 2h. (Koti), 3h. (Riverview, Chatham Is., East Machias, Riverside, Mount Wilson, Pasadena, and Tucson), 4h. (Huancayo, Riverside (3), Mount Wilson (3), and Tucson (3)), 5h. (La Paz), 6h. (Fresno, near Tucson, Haiwee, Pasadena, Mount Wilson, Riverside, and Tinemaha), 8h. (Copenhagen and Fort de France), 9h. (near Apia and Riverside), 12h. (Nagoya), 13h. (Fort de France and Mizusawa), 14h. (Nagoya, Mizusawa, Tashkent, Andijan, Malabar, and Samarkand), 15h. (Hukuoka B), 16h. (Nagoya), 17h. (Istanbul, Pasadena, Mount Wilson, Riverside, and Tucson), 18h. (Tinemaha, Haiwee, near Tucson, Riverside, Mount Wilson, and Pasadena), 22h. (Batavia and Berkeley).

July 7d. 7h. 48m. 0s. Epicentre 46°0N. 12°2E.

Force V in the Province of Udine (Italy). Force II at Trieste.

Epicentre 46°0'N. 12°12'E. (Strasbourg).

See Bolletino Sismico della Stazione sismica di Trieste, July, 1938.

J. Mihalovic.

Annuaire de l'Institut Seismologique de Beograd, Année XVIII, 1938, Beograd, 1939, p. 34.

A = +.6814, B = +.1473, C = +.7170; δ = +9; h = -4;
D = +.211, E = -.977; G = +.701, H = +.152, K = -.697.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Padova	0-6	201	e 0 18	+ 3	i 0 36	+10	—	—
Triest	1-1	108	0 20	- 2	0 33	S _g	—	—
Laibach	1-6	88	e 0 29	- 1	i 0 48	- 3	—	—
Ravensburg	2-5	315	i 0 50	P _g	e 1 22	S _g	—	—
Zurich	2-8	299	e 0 50	P _g	1 31	S _g	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Moncalieri	3.3	252	1 45	S*	—	—	—	—
Stuttgart	3.4	325	e 0 57	+ 2	e 1 40	+ 3	e 1 8	P _g
Basle	3.5	298	e 1 6	P*	e 1 52	S _g	—	—
Neuchatel	3.7	287	e 1 4	P*	e 2 9	S _g	—	—
Karlsruhe	4.0	321	e 0 59	- 5	—	—	—	—
Strasbourg	4.0	313	i 1 10	P*	i 1 54	+ 2	i 1 25	P _g
Prague	4.3	18	e 1 35	P _g	—	—	—	—
Ogyalla	4.5	63	—	—	2 18	S*	—	—
Jena	4.9	356	i 1 19	+ 2	e 2 7	- 8	i 1 37	P _g
Göttingen	5.8	344	e 0 27	-62	—	—	e 2 4	P _g
Uccle	7.1	315	—	—	e 3 25	+15	i 4 8	S _g
Paris	7.2	296	e 1 37	-12	—	—	—	—
Hamburg	N. 7.7	351	—	—	e 3 36	+11	—	—

Additional readings:—

Laibach i = +36s.

Ravensburg eS_g = +1m.26s.

Moncalieri S = +2m.37s.

Stuttgart eS* = +1m.50s., iS_g = +1m.55s.

Strasbourg iS_g = +2m.11s., iE = +2m.17s. and +2m.34s.

Ogyalla e = +3m.14s.

Jena eZ = +1m.42s., iN = +1m.54s.

Long waves were also recorded at De Bilt and Copenhagen.

July 7d. 12h. 50m. 2s. Epicentre 40°·8N. 53°·5E. (as on 1938 Feb. 14d.).

A = +·4516, B = +·6103, C = +·6509; δ = +8; h = -2;
D = +·803, E = -·594; G = +·387, H = +·523, K = -·759.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Baku	2.7	261	e 0 51	P*	e 1 7	-12	—	1.4
Grozny	6.3	297	e 1 38	+ 2	e 2 51	+ 1	—	—
Tiflis	6.6	281	e 2 9	P _g	e 2 44	-14	—	e 3.2
Platovorsk	8.4	296	e 2 4	- 2	e 3 28	-15	—	—
Samarkand	10.3	99	e 2 33	+ 1	e 3 58	-32	—	—
Tashkent	11.9	86	e 2 49	- 5	i 4 54	-15	—	e 6.7
Andijan	14.3	84	e 3 36	+10	e 6 7	+ 1	e 6 30	SSS
Ksara	15.6	249	e 3 33	-10	e 6 38	+ 1	—	—
Fruse	15.8	76	e 3 46	+ 1	e 6 58	SSS	—	—
Sverdlovsk	16.7	14	i 3 55	- 2	6 55	- 8	—	9.3
Almata	17.6	74	e 4 9	+ 1	e 7 58	SSS	—	—
Moscow	18.2	330	e 4 14	- 2	e 7 33	- 4	—	—
Semipalatinsk	20.9	54	e 4 47	+ 1	—	—	—	—
Irkutsk	36.1	54	—	—	e 15 58	SSS	—	e 32.0

Additional readings:—

Grozny eS = +2m.38s.

Tiflis eE = +2m.42s.

Irkutsk e = +17m.53s. ?

July 7d. 17h. 27m. 57s. Epicentre 22°·3N. 142°·5E.

A = -·7347, B = +·5638, C = +·3773; δ = +1; h = +4;
D = +·609, E = +·793; G = -·299, H = +·230, K = -·926.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Titizima	4.9	357	1 14	- 3	—	—	—	—
Tokyo, Cen. Met. Ob.	13.6	350	3 14	- 3	7 20	L	—	(7.3)
Koti	13.8	326	e 5 18	S	(e 5 18)	-36	—	—
Miyazaki	13.8	317	3 23	+ 4	7 25	L	—	(7.4)
Mito	14.1	353	2 43	-40	7 33	L	—	(7.5)
Oiwake	14.4	347	3 29	+ 2	9 18	L	—	(9.3)
Hamada	15.5	326	3 51	PP	7 51	L	—	(7.8)
Hukuoka B	15.5	319	e 4 47	+65	—	—	—	—
Miyakozima	16.0	282	4 0	PP	9 39	L	—	(9.6)
Mizusawa	16.8	357	3 57	- 1	6 59	- 6	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Palau	16.8	209	4 0	+ 2	8 54	L	—	(8.9)
Zinsen	20.4	321	e 4 39	- 2	e 8 36	+11	—	—
Manila	21.8	254	i 4 56 _a	0	i 9 6	+14	—	—
Vladivostok	22.6	340	e 5 4	+ 1	e 9 7	0	—	e 11.6
Hong Kong	26.2	276	e 5 41	+ 3	11 15	SS	—	—
Phu-Lien	33.3	275	e 6 44	+ 3	e 12 14	+12	—	—
Irkutsk	41.9	326	7 53	- 1	e 14 11	- 2	—	—
Batavia	45.0	235	5 42	?	i 12 36	?	—	—
Sempalatinsk	55.5	318	e 9 39	0	—	—	—	—
Almata	57.5	309	e 9 46	- 7	—	—	—	—
Frunse	59.2	308	e 10 3	- 2	—	—	—	—
Andijan	61.0	306	e 10 16	- 2	e 18 42	+ 7	—	—
Tashkent	63.3	307	i 10 32	- 1	i 19 2	- 2	—	e 33.0
Baku	77.8	309	e 11 59	- 2	21 53	0	—	e 41.0
Grozny	79.8	313	e 12 11	- 1	—	—	—	—
Moscow	79.8	326	i 12 11	- 1	e 22 13	- 1	—	—
Tifis	81.0	311	12 15	- 3	e 22 25	- 2	—	e 47.0
Pulkovo	81.5	332	e 12 17	- 4	e 22 21	-11	—	—
Tinemaha	83.8	52	e 12 36	+ 4	—	—	—	—
Haiwee	E. 84.4	53	e 12 37	+ 1	—	—	—	—
Mount Wilson	85.1	55	i 12 35 _a	- 4	—	—	—	—
Pasadena	85.1	55	i 12 36	- 3	—	—	—	—
Riverside	85.7	55	e 12 37	- 5	—	—	—	—
Scoresby Sund	86.8	355	—	—	23 10	[- 3]	—	—
Ksara	90.7	307	e 13 3	- 3	e 25 19	PS	e 16 42	PP
Tucson	91.4	54	e 13 5	- 4	—	—	—	—
Weston	108.5	25	—	—	e 29 18	PPS	e 34 23	SSP e 53.6
La Paz	Z. 150.6	84	20 0	[+12]	—	—	—	—

Additional readings :-

Koti S = +9m.15s.

Mizusawa SN = +7m.2s.

Manila IZ = +7m.29s.

Tucson i = +13m.13s.

Long waves were also recorded at Strasbourg, Copenhagen, Cheb, Stuttgart, Sverdlovsk, De Bilt, and Potsdam.

July 7d. 17h. 53m. 31s. Epicentre 22°3N. 142°5E. (as at 17h. 27m.).

A = - .7347, B = + .5638, C = + .3773; $\delta = + 1$; $h = + 4$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Koti	13.8	326	e 5 25	- 3	(e 5 25)	-29	—	—
Mizusawa	16.8	357	4 0	+ 2	7 17	+12	—	—
Zinsen	20.4	321	e 5 1	+20	e 9 7	L	—	(e9.1)
Hong Kong	26.2	276	e 5 40	+ 2	10 19	+10	—	—
Almata	57.5	309	e 9 52	- 1	—	—	—	—
Frunse	59.2	308	e 10 21	+16	—	—	—	—
Andijan	61.0	306	e 10 24	+ 6	e 18 51	+16	—	—
Tashkent	63.3	307	—	—	e 19 7	+ 3	—	e 32.5
Sverdlovsk	67.2	325	e 10 59	+ 1	—	—	—	—
Grozny	79.8	313	e 11 57	-15	—	—	—	—
Moscow	79.8	326	e 12 14	+ 2	—	—	—	—
Tifis	E. 81.0	311	e 12 11	- 7	—	—	—	—
Fresno	82.8	53	e 15 1	PP	—	—	—	—
Santa Barbara	Z. 83.8	55	e 12 37	+ 5	—	—	—	—
Haiwee	N. 84.4	53	e 12 47	+11	—	—	—	—
Mount Wilson	Z. 85.1	55	e 12 35	- 4	—	—	—	—
Pasadena	Z. 85.1	55	e 12 35	- 4	—	—	—	—
Riverside	Z. 85.7	55	e 12 42	0	—	—	—	—
Tucson	91.4	54	e 13 7	- 2	—	—	—	—

Additional readings :-

Koti S = +9m.41s.

Tashkent e = +20m.20s.

Tifis ePN = +12m.16s.

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July 7d. Readings also at 1h. (Taikyū), 2h. (Taikyū and New Plymouth), 3h. (Balboa Heights, Wellington, and New Plymouth), 4h. (Taikyū and New Plymouth), 5h. (Taikyū (2) and Berkeley (2)), 6h. (Upsala), 8h. (Tacubaya, Puebla, Mount Wilson, Pasadena, Tucson, and Riverside), 13h. (Mount Wilson and Tucson), 14h. (Manila), 15h. (near Medan, Nagoya, Vladivostok, and near Koti), 16h. (Tucson, Harvard, Weston, and Sverdlovsk), 17h. (Wellington), 18h. (De Bilt), 19h. (La Paz and Huan-cayo), 20h. (Tiflis), 21h. (Florissant and St. Louis), 22h. (Fort de France), 23h. (near Fordham, Chicago, Branner, Oaxaca, Harvard, Weston, Tucson, Riverside, Pasadena, Mount Wilson, Puebla, and Tacubaya).

July 8d. 6h. 32m. 49s. Epicentre 46°·1N. 21°·1E.

Felt force V at Nagylaken, Kövegyen, Szöregen; IV at Mako, Orohazan, Battonyan, Szeged, etc.

Epicentre 46°·1N. 21°·1E. (Bucharest).
46°·2N. 21°·4E. (Strasbourg).

G. Petrescu.

Sur quelques tremblements de terre de Campulung Muscel du 8 Juillet, 1939.

Bull. Sec. Scientif Academie Roum, Tome XXII, No. 10, pp. 489-495.

Epicentre 45° 59'N. 20° 58'E. depth = 25km.

Simon Bela.

Az., 1938, Eui Magyarorszag Foldrengesck, Budapest, p. 8.

J. Mihailovic.

Annuaire de l'Institut Seismologique de Beograd, Année XVII, 1938, Beograd, 1939, p. 34.

A = +.6492, B = +.2505, C = +.7182; δ = +2; h = -4;
D = +.360, E = -.933; G = +.670, H = +.259, K = -.696.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		m.	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Keckemet		1.3	310	i 0 29	+ 4	i 0 48	+ 4	—	i 1.3
Belgrade		1.4	200	i 0 27	0	i 0 47	+ 1	i 0 30	—
Budapest		2.0	315	0 37	P*	1 7	S _r	—	—
Ogyalla	E.	2.7	312	0 42	- 3	1 26	S _r	0 46	P*
	N.	2.7	312	e 46	+ 1	1 30	S _r	—	—
Sofia		3.8	153	e 1 1	0	e 2 6	S _r	—	—
Bucharest		3.9	114	e 1 13	P*	e 1 54	+ 4	i 2 20	S _r
Laibach	N.E.	4.6	272	e 1 29 _k	P _r	i 2 27	S _r	—	—
Triest		5.2	268	e 1 7	-14	e 2 11	-11	—	—
Padova	Z.	6.5	267	e 2 32	P _r	—	—	—	—
Cheb		7.0	308	e 0 11	?	—	—	—	e 4.2
Florence		7.3	255	e 1 41	- 9	—	—	—	—
Jena		7.9	311	e 2 11	P _r	—	—	—	e 3.8
Stuttgart		8.5	293	e 2 9	+ 2	e 4 41	S _r	—	e 4.9
Zurich		8.7	283	e 2 6	- 4	e 2 44	-66	—	—
Göttingen		9.1	311	e 2 29	+15	—	—	—	—
Basle		9.4	284	e 2 18	0	e 5 20	S _r	—	—
Moncalleri		9.4	268	i 2 35	+17	i 5 18	S _r	—	—
Strasbourg		9.4	291	e 2 16	- 2	i 4 47	S _r *	—	—
Hamburg	E.	10.3	320	—	—	e 4 5	-25	—	—
Sverdlovsk		26.5	52	5 57	+16	e 10 31	+17	—	—
Tucson		30.7	321	e 13 8 _a	+ 2	—	—	—	—

Additional readings :-

Keckemet iPP = +39s., iPSSZ = +57s., eSSE = +1m.4s.

Belgrade iP_r = +35s.

Budapest PPsP = +44s.

Bucharest eP_rEN = +1m.35s., iEN = +1m.43s., iN = +2m.1s., iS* = +2m.12s.

Laibach iNE = +1m.40s. and +2m.38s.

Stuttgart e = +2m.15s. and +4m.31s.

Strasbourg eE = +3m.33s.

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

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July 8d. 13h. 59m. 0s. Epicentre 26°·3N. 126°·2E. (Epicentre given by Tyost).

A = -·5302, B = +·7244, C = +·4407; $\delta = +8$; $h = +3$;
D = +·807, E = +·591; G = -·260, H = +·356, K = -·898.

	Δ	Az.	P.		O-C.		S.	O-C.		Supp.		L. m.
			m.	s.	s.			m.	s.	m.	s.	
Taihoku	4·4	255	e 1	18	P*	2	8	+ 6				
Zi-ka-wei	6·4	321	e 1	52	P*	3	32	S*				
Hukuoka B	8·1	26	e 3	5	+63							
Husan	9·1	15	2	22	+ 8	e 4	48	S*				
Taikyu	9·7	12	2	31	+ 9	4	25	SS				
Zinsen	11·1	2	i 2	50	+ 7	e 5	1	SS				
Kelzyo	11·2	3	2	49	+ 5	e 5	0	SS				
Manila	12·6	204	3	3	0	i 5	45	SS				
Helzyo	12·7	358	i 4	11	+66	6	26	L				(6·4)
Vladivostok	17·4	14	e 4	5	- 1	e 7	35	SS				e 8·3
Phu-Lien	18·8	256	e 4	41	PP	e 8	8	SS				
Irkutsk	30·7	332	e 6	31	+12	e 11	46	+25				18·0
Andijan	46·4	302	e 8	32	+ 2							
Tashkent	48·8	303				e 20	7	SSS				e 25·4
Sverdlovsk	55·1	322	i 9	33	- 3	17	9	- 9				27·5
Baku	63·5	304	e 10	32	- 2	19	34	PS				e 35·5
Tiflis	66·9	306	e 10	16	-40	e 20	47	PPS				e 28·0
Moscow	67·9	322	e 11	1	- 1	e 20	55	PPS				40·5
Ksara	76·1	300	i 11	51	0	e 22	16	PS				50·0
Upsala	76·3	330				e 21	0?	-37				
Copenhagen	80·9	328	i 12	15	- 2							43·0
Scoresby Sund	80·9	350	12	14	- 3	22	30	+ 4				
Potsdam	82·4	325	e 12	24	- 1	e 23	36	PPS				e 43·0
Stuttgart	86·5	323	e 12	43	- 3							e 49·0
Strasbourg	87·4	323				e 23	48	+18				e 46·0
Pasadena	Z. 94·3	48	i 13	19	- 4							
Mount Wilson	Z. 94·4	48	i 13	20	- 3							
Riverside	Z. 95·0	48	i 13	22	- 4							
Weston	109·8	13				e 30	10	PPS				e 54·0

Additional readings:—

Zi-ka-wei iN = +2m.20s. and +3m.48s., eE = +4m.30s.

Moscow e = +21m.36s.

Potsdam eE = +12m.48s.

Strasbourg e = +20m.42s.

Weston eN = +36m.50s.

Long waves were also recorded at Hamburg, Cheb, Kew, De Bilt, Pulkovo, Paris, and Puy de Dôme.

July 8d. Readings also at 2h. (Santiago and Balboa Heights), 3h. (Santiago and Wellington), 4h. (Jena), 5h. (Harvard), 8h. (Andijan), 10h. (Sofa), 11h. (Tucson, Mount Wilson, Riverside, Wellington, and Apia), 12h. (Harvard, Sverdlovsk, Weston, and Baku), 17h. (Wellington, Sofa, and Bucharest), 18h. (Mizusawa), 22h. (Wellington, Tucson, Sverdlovsk, Mount Wilson, Riverside, Riverview, Brisbane, Pasadena, Scoresby Sund, and Vladivostok), 23h. (Weston and Harvard).

July 9d. Readings at 1h. (Apia, near Manila, and near Medan), 2h. (Manila and near San Javier), 3h. (near Balboa Heights), 5h. (Frunse), 6h. (Huancayo, La Paz, Tucson, Mount Wilson, Pasadena, Riverside, and Honolulu), 7h. (Tiflis, Vladivostok, Ksara, Sverdlovsk, Harvard, and Weston), 9h. (Scoresby Sund), 10h. (La Paz, near Erevan, Grozny, and Tiflis), 14h. (near Nagoya), 18h. (Oaxaca and Tacubaya), 19h. (Christchurch, near Wellington, and near Santiago), 20h. (Andijan), 22h. (Taoubaya), 23h. (Santiago).

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July 10d. Readings at 0h. (Christchurch and near Wellington), 1h. (near Fort de France), 4h. (Christchurch, near Wellington, and near Santiago), 11h. (near Mizusawa), 12h. (near Medan), 14h. (Tacubaya (2) and near Wellington), 16h. (Tacubaya and near Nagoya (2)), 17h. (Tacubaya (2), Tchinkent, and near Tashkent), 18h. (Tiflis, near Wellington, Mount Wilson, Fresno, near Pasadena, Riverside, La Jolla, and near Tucson), 20h. (Tchinkent), 23h. (Balboa Heights and La Paz).

July 11d. 15h. Undetermined shock.

Zi-ka-wei eE = 56m.53s., iN = 57m.10s. and 60m.5s.
 Husan eP = 57m.26s., eS = 59m.1s.
 Vladivostok eP = 58m.46s., iS = 61m.44s., eL = 62m.42s.
 Manila eP = 58m.58s., S = 61m.40s., LE = 63m.
 Zinsen ePN? = 60m.13s., eSE? = 61m.14s.
 Tashkent eP = 63m.54s., eS = 71m.1s., eL = 80m.30s.
 Sverdlovsk P = 64m.44s., eSS = 76m.36s., L = 80m.
 And long waves at Pulkovo, Moscow, Copenhagen, Potsdam, and De Bilt.

July 11d. Readings also at 0h. (Ksara), 1h. (near Apia), 2h. (Basle, Sverdlovsk, Balboa Heights, Haiwee, La Jolla, Mount Wilson, Pasadena, Riverside, Santa Barbara, Tinemaha, and Tucson), 4h. (Wellington, Mount Wilson, Pasadena, Riverside, and Tucson), 9h. (near Almeria, Granada, Malaga, and Toledo), 10h. (near Grozny and Tiflis), 11h. (near Manila), 12h. (Philadelphia), 14h. (Tacubaya), 16h. (near Tananarive), 18h. (4) and 19h. (2) (Tacubaya), 20h. (Oaxaca, Tacubaya, Puebla, Tucson, and Williamstown), 22h. (Andijan, Frunse, Samarkand, Tashkent, and Sverdlovsk).

July 12d. 12h. 36m. 45s. Epicentre 22°-9S. 171°-7E. (as on 1938 July 6d.).

A = -9125, B = +1331, C = -3869; δ = +6; λ = +4;
 D = +144, E = +990; G = +383, H = -056, K = -922.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Arapuni	15.5	168	—	—	17 39	SSS	—	19.4
Brisbane	17.5	250	14 9	+ 2	17 15	— 6	—	—
Apia	18.1	63	4 20	+ 6	8 4	SS	—	—
Wellington	18.5	173	e 4 15	- 4	8 3	SS	4 46	PP 9.9
Christchurch	20.6	177	i 4 44a	+ 1	i 8 44	+15	—	10.3
Riverview	21.1	234	14 50	+ 2	18 42	+ 3	15 25	PPP e 10.4
Sydney	21.1	234	e 4 47	- 1	18 46	+ 7	—	e 11.7
Melbourne	27.3	230	i 6 13	+25	10 15	-12	—	15.4
Adelaide	31.2	239	—	—	i 11 24	- 5	—	i 14.5
Perth	49.9	247	16 3	S	(16 3)	- 4	21 12	SSS 25.2
Honolulu	53.0	36	—	—	e 19 44	SS	—	e 22.9
Manila	62.1	302	i 10 20a	- 5	18 52	+ 3	—	—
Batavia	64.5	275	i 10 51	+10	i 19 18	- 1	—	—
Vladivostok	75.2	331	e 11 42	- 4	i 21 27	+ 2	—	e 31.4
Berkeley	86.6	47	e 12 44	- 2	e 23 30	+ 7	—	e 36.3
Pasadena	87.5	52	i 12 48	- 3	e 23 33	+ 2	—	e 36.7
Riverside	Z. 88.0	52	e 12 51	- 2	—	—	—	—
Haiwee	88.6	49	e 12 56	0	—	—	—	—
Tinemaha	E. 88.9	49	e 13 0	+ 2	—	—	—	—
Tucson	92.1	56	i 13 11a	- 1	i 23 37	[- 8]	—	42.5
Irkutsk	95.0	325	e 16 56	PP	e 24 1	[0]	—	28.2
Bozeman	97.7	43	—	—	e 24 18	[+ 2]	—	e 42.5
Kodaikanal	E. 97.8	278	—	—	e 29 15?	?	—	—
Agra	E. 103.2	294	—	—	24 32	[-10]	e 27 12	PS
Huancayo	105.8	110	—	—	e 24 34	[-20]	e 27 6	PS e 42.8
Tashkent	113.8	306	e 19 52	PP	e 25 25	[- 2]	e 28 52	PS
Sverdlovsk	120.4	324	e 18 51	[- 2]	25 50	[- 1]	e 37 3	SSP e 53.2
Williamstown	123.3	53	e 20 39	PP	—	—	—	e 62.4
Harvard	Z. 124.6	53	e 20 46	PP	—	—	—	62.2
Weston	124.7	53	e 19 32	[+30]	e 37 50	SS	—	e 59.8

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Grozny	131.3	308	e 22 41	?	—	—	—	—
Scoresby Sund	131.7	5	e 19 14	[- 1]	—	—	21 29	PP 65.2
Tiflis	132.2	306	e 20 7	[+ 51]	e 40 15?	SSP	i 22 45	e 70.2
Moscow	133.0	326	e 19 17	[- 1]	e 28 9	{ - 29}	e 22 48	PKS 70.7
Pulkovo	134.2	333	e 19 18	[- 2]	—	—	—	—
Upsala	138.8	341	e 23 15?	PKS	—	—	—	—
Ksara	139.9	295	e 19 26	[- 4]	—	—	e 22 34	PP —
Copenhagen	143.8	340	e 19 32	[- 5]	—	—	—	65.2
Helwan	144.0	289	e 19 32	[- 5]	—	—	e 22 33	PP —
Bucharest	144.7	316	e 19 38	[- 1]	—	—	e 22 55	PP 71.2
Hamburg	z. 146.4	341	e 19 39 _a	[- 2]	—	—	—	—
Potsdam	146.4	336	e 19 33	[- 8]	—	—	—	71.2
Jena	148.1	335	e 19 45	[+ 1]	—	—	—	—
De Bilt	149.1	343	e 19 45	[- 1]	—	—	—	e 73.2
Bidston	149.3	354	e 19 50	[+ 4]	—	—	—	e 66.2
Uccle	150.5	344	e 19 48	[0]	—	—	e 23 28	PP 74.2
Kew	150.5	349	e 19 46	[- 2]	—	—	—	e 65.2
Stuttgart	150.7	335	e 19 47	[- 1]	e 49 15	SSS	e 23 23	PP e 77.2
Strasbourg	151.4	337	e 19 48	[- 1]	—	—	e 23 43	PP e 74.2
Zurich	152.1	335	e 19 53	[+ 3]	—	—	—	—
Basle	152.3	336	e 19 53	[+ 2]	—	—	—	—
Paris	152.8	344	e 19 52	[+ 1]	—	—	—	79.2
Puy de Dôme	155.4	340	—	—	e 34 41	?	—	—

Additional readings:—

Arapuni SS = +8m.21s.

Brisbane ISE = +7m.21s.

Wellington $i = +5m.43s.$ and $+7m.42s.,$ SS = +8m.43s., $L_0 = +8m.58s.,$ $S_0S_1 =$

+15m.23s.

Riverview $iZ = +4m.53s.$

Melbourne $i = +7m.45s.$

Perth PP = +16m.50s., $i = +18m.49s.,$ $P_0S = +22m.15s.,$ SS = +23m.22s., SSS =

+23m.40s.

Bozeman eS = +25m.21s.

Agra SKKSE = +25m.18s., SE = +25m.42s.

Huancayo eSSS = +37m.2s.

Tashkent e = +20m.54s., +21m.56s., +23m.11s., +27m.10s., +29m.57s., +30m.52s.,

+35m.4s., +37m.13s., and +38m.20s.

Sverdlovsk eSSS = +41m.15s.

Weston eEN = +52m.32s.

Scoresby Sund $\eta = +22m.44s.$

Tiflis ePPN = +24m.45s.

Moscow e = +29m.37s.

Ksara ePPS = +35m.24s.

Bucharest eE = +20m.39s., eN = +20m.47s., eEN = +21m.21s., eE = +22m.23s.

Stuttgart ePKP₂ = +20m.13s., e = +32m.15s. and +37m.3s.

Strasbourg e = +34m.51s. and +40m.27s.

Long waves were also recorded at San Fernando, Moncalieri, Almeria, College, Jersey,

Piatigorsk, Toledo, and New Plymouth.

July 12d. Readings also at 1h. (Tacubaya (3)), 3h. (Brisbane, Riverview, Sydney, Melbourne, Adelaide, Perth, Huancayo, Weston, Malabar, La Paz, Andijan, Tacubaya (2), and Tashkent), 4h. (Mount Wilson, Riverside, Tacubaya, Sverdlovsk, and Tucson), 5h. (Nagoya and Tacubaya), 6h. (Tacubaya (2)), 7h. (Fort de France), 8h. (Tacubaya (4), Nagoya and Colombo), 9h. (Medan, Grozny, and Tacubaya (7)), 10h. (Tacubaya (2), Grozny (4), and Tiflis), 11h. (Tucson, Pasadena, Mount Wilson, Riverside, and Tacubaya (3)), 12h. (Tacubaya (3)), 13h. (Tacubaya, and Tananarive), 14h. (Piatigorsk), 15h. (Tacubaya (3), Wellington, Harvard, and Christchurch), 17h. (Tacubaya, Tananarive, and Harvard), 18h. (Wellington (2), Zurich, and Basle), 19h. (Istanbul), 20h. (Tacubaya, Samarkand, Ksara, Agra, Kodalkanal, Irkutsk, Grozny, Tucson, Tiflis, Colombo, Sverdlovsk, Tashkent, Mount Wilson (2), Pasadena, Haiwee, and Riverside), 21h. (near Wellington).

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July 13d. 20h. 15m. 16s. Epicentre 45°·7N. 26°·8E.

Felt at Bucharest and Temesvar, in N.E. Bulgaria, and in Hungary, in the districts of Heves and Borsod.

Epicentre Carpathians, Roumania, 45° 43'N. 26° 45'E. Depth 169km., Bucharest.

G. Demetrescu.

Boll. della Soc. Sism. Ital., XXXVII, 1939, p. 30, et Bull. Section Scient. Acad. Roumaine, 1939, No. 3-4.

$$A = +.6255, B = +.3160, C = +.7133; \quad \delta = -10; \quad h = -4; \\ D = +.451, E = -.893; \quad G = +.637, H = +.322, K = -.701.$$

A depth of focus 0.025 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	m. s.	s.	m. s.	s.	m. s.	m. s.	m.
Bucharest	1.4	198	i 0 27k	- 5	i 0 46	-12	—	—
Sofia	3.9	221	i 0 59	- 2	i 1 36	-12	1 55	S _g
Belgrade	4.5	262	e 1 12a	+ 3	i 2 11	+ 9	—	—
Kecskemet	5.1	286	i 1 14	- 2	e 2 20	+ 5	i 2 45	SSS
Simferopol	5.2	96	1 18	0	e 2 7	-11	1 25	PP
Yalta	5.3	101	e 1 19	0	e 2 9	-11	e 1 39	PPP
Budapest	5.6	291	1 19	- 4	2 38	SS	—	—
Theodosia	6.1	93	e 1 31	+ 2	i 2 29	-10	i 1 42	PP
Ogyalla	6.3	293	i 1 26	- 6	2 50	+ 7	2 58	SS
Triest	9.1	275	e 2 10	+ 2	—	—	—	4.2
Prague	9.4	303	2 12	0	e 4 3?	+13	—	—
Padova	10.5	274	0 44?	?	—	—	—	—
Cheb	10.6	300	e 2 44?	+16	—	—	—	—
Potsdam	11.2	312	e 2 14	-22	e 4 38	0	—	e 6.2
Jena	11.4	303	e 2 39	+ 1	e 5 11	SS	e 5 14	SSS
Moscow	12.1	30	e 2 52	+ 5	e 4 54	- 5	—	—
Stuttgart	12.4	291	e 2 49	- 2	e 5 9	+ 3	—	e 7.4
Zurich	12.7	284	e 2 55	0	e 4 48	-25	e 3 1	PP
Strasbourg	13.3	290	e 3 1	- 1	e 5 37	+11	—	e 9.2
Hamburg	13.4	312	e 3 8	+ 4	e 6 50	L	—	(6.8)
Basle	13.4	285	e 3 6	+ 2	—	—	—	—
Copenhagen	13.5	323	i 3 3	- 2	5 49	+18	—	7.5
Tiflis	13.6	100	—	—	e 5 42	+ 9	—	—
Grozny	13.7	93	e 3 16	+ 9	—	—	—	—
Ksara	13.8	146	i 3 15	+ 6	i 5 49	+11	—	—
Neuchatel	13.8	283	e 3 8	- 1	—	—	e 3 13	pP
Pulkovo	14.3	7	i 3 13	- 2	5 38	-11	—	—
Upsala	15.2	342	i 3 26	0	e 6 6	- 3	—	—
De Bilt	15.6	304	e 3 33	+ 2	6 31	+13	—	—
Uccle	15.8	297	e 3 26	- 7	e 6 39	+16	—	—
Puy de Dôme	16.6	279	i 3 44	+ 1	—	—	—	—
Kew	18.8	298	e 3 50	-17	e 7 37	+11	—	—
Almeria	23.6	258	e 5 0	+ 5	—	—	—	—
Sverdlovsk	23.7	50	e 5 25	+30	e 9 9	+16	—	11.9

Additional readings:—

Belgrade i = +1m.26s. and +1m.37s., iZ = +1m.43s., iNW = +2m.22s. and +2m.46s.

Kecskemet eZ = +1m.50s., ePPSZ = +2m.3s.

Simferopol eP_g = +1m.31s., e = +1m.41s., +1m.56s., and +2m.2s.

Yalta e = +2m.16s.

Budapest PP = +1m.49s., iE = +2m.14s., S_gN = +3m.10s., SSE = +3m.19s., iE =

+3m.32s. and +4m.4s.

Theodosia P_g = +1m.48s., e = +2m.1s., S* = +2m.34s., S_g = +2m.57s.

Ogyalla eE = +3m.26s., SSN = +3m.30s.

Jena eN = +3m.54s., eE = +4m.0s.

Kew eZ = +4m.11s.

Lenz waves recorded at Tashkent.

July 13d. Readings also at 0h. (Mizusawa), 1h. (Nagoya), 2h. (Tanananarive), 3h. (Malaga, Samarkand, and Balboa Heights (2)), 4h. (Riverside, Malabar, Andijan, and Mount Wilson), 5h. (Santiago, Samarkand, and Andijan), 6h. (Balboa Heights), 7h. (Tucson and Mount Wilson), 9h. (Istanbul and Samarkand), 10h. (Bucharest, Tiflis, Ksara, and Sverdlovsk), 11h. (Tashkent and Samarkand), 12h. (Wellington (2)), 13h. (Agra, Calcutta, Irkutsk, Medan, Tashkent, and Sverdlovsk), 14h. (De Bilt and Vladivostok), 15h. (Triest), 16h. (Andijan), 17h. (Weston), 18h. (Tiflis and Grozny), 19h. (Tiflis (2), Grozny (2), Tashkent, Ksara, Erevan (2), Piatigorsk (2), Sochi (2), Toledo, La Paz, Harvard, Tchikent, Zurich, Neuchatel, Baku, and Basle), 20h. (Pulkovo, Moscow, Copenhagen, Aberdeen, Tiflis (9), Grozny (3), Sverdlovsk, Erevan, Sochi, and Piatigorsk), 21h. (Istanbul and Tiflis (7)), 23h. (Tiflis (2)).

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July 14d. 19h. 57m. 48s. Epicentre 46°4N. 12°9E.

Force VI at Villa Santina and Tolmezzo and in a great part of Frioul; V-VI at Spilimbergo; IV at Venzone, Paluzza; III-IV at Tarcento; II at Pordenone (50km. SSW. of Villa Santina).

Macroseismic radius about 60km.

Epicentre 46°4N, 12°9E. (Strasbourg).
46° 25'N. 12° 54'E. (Rome).

J. Mihalovic.

Annuaire de l'Institut Seismologique de Beograd, Année XVIII, 1938, Beograd, 1939, p.35.

Bollettino della Societa Sismologica Italiana V., XXXVI (1938-XVII), No. 5-6, Roma, 1939, XVII. Notizie Sismiche p. 222.

A = +.6746, B = +.1545, C = +.7218; $\delta = -5$; $h = -4$;
D = +.223, E = -.975; G = +.704, H = +.161, K = -.692.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Triest	1-0	142	0 18	- 3	10 30	S _g	—	—
Laibach	1-2	107	e-0 32	?	i-0 22	?	—	—
Padova	1-2	216	i-0 26	?	i-0 9	?	—	—
Ravensburg	2-6	302	e 0 52	P _g	e 1 27	S _g	—	—
Florence	2-9	204	e 0 42	- 6	1 22	- 2	—	—
Zurich	3-1	288	e 0 52	+ 1	1 36	S*	e 1 0	P _g
Stuttgart	3-4	316	e 0 56	+ 1	e 1 38	+ 1	e 1 7	P _g
Basle	3-8	290	e 1 1	0	e 2 6	—	—	—
Moncalieri	3-9	251	e 1 16	P _g	e 2 33	S _g	—	—
Karlsruhe	4-0	312	e 1 12?	+ 8	e 2 12?	+ 20	—	—
Neuchatel	4-1	281	e 1 6	+ 1	e 2 14	—	—	—
Strasbourg	4-1	305	e 1 22	P _g	i 2 23	S _g	—	—
Jena	4-6	349	e 1 12	0	—	—	—	—
Göttingen	5-5	340	1 49	P _g	e 2 59	S _g	e 1 25	P*
Potsdam	6-0	3	—	—	e 3 6	S*	e 3 42	S _g
Puy de Dôme	6-9	269	—	—	e 3 46	S _g	—	—
Uccle	7-2	311	—	—	e 3 59	S _g	—	—

Additional readings:—

Padova i = 57m.28s.

Ravensburg e = +1m.32s.

Zurich eS_g = +1m.43s.

Stuttgart eS* = +1m.51s., iS_g = +1m.54s. and +1m.58s., i = +2m.1s.

Strasbourg iS* = +2m.27s., iS_g = +2m.47s.

Jena eE = +1m.29s.

Long waves were also recorded at Sverdlovsk and Tashkent.

July 14d. 23h. 31m. 31s. Epicentre 22°0S. 175°0E. (as on 1938 April 20d.).

A = -.9246, B = +.0809, C = -.3724; $\delta = +11$; $h = +4$;
D = +.087, E = +.996; G = +.371, H = -.032, K = -.928.

Pasadena suggests deep Focus.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Apla	15-0	59	i 3 35	0	e 7 11	SSS	i 3 45	pP
Arapuni	16-0	178	—	—	7 29	SSS	—	—
Wellington	19-2	181	4 31	+ 3	8 45	SSS	i 4 49	pP
Brisbane	20-7	250	i 4 29	-15	i 8 29	- 2	—	—
Christchurch	21-5	185	4 51	- 1	i 9 9	SS	9 24	SSS
Sydney	24-0	235	5 42	PP	e 9 44	+ 12	—	e 12-7
Riverview	24-1	235	e 5 21	+ 3	e 9 38	+ 4	i 10 45	SSS
Melbourne	30-3	231	e 7 13	PP	e 11 12	- 3	i 13 4	SS
Adelaide	34-3	239	8 22	PP	i 12 23	+ 6	—	—
Honolulu	50-5	34	—	—	e 15 42	-34	e 18 33	SS

Continued on next page.

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	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.	
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.	
Perth	53-1	246	21 31	S	(21 31)	SS	1 22 42	SSS	29-5
Manila	64-2	300	10 36	- 3	19 2	-14	—	—	—
Taihoku	69-8	50	10 55	-19	—	—	—	—	—
Vladivostok	76-0	330	e 11 55	+ 4	i 21 15	-19	—	—	e 32-7
Pasadena	84-6	51	e 12 26	-10	—	—	—	—	e 39-5
Mount Wilson	z. 84-7	51	e 12 27	-10	—	—	—	—	—
Riverside	z. 85-0	51	e 12 28	-10	—	—	—	—	—
Tucson	89-0	55	i 12 51 a	- 7	—	—	e 23 50	PS	e 36-4
Bozeman	94-9	43	—	—	e 23 58	[- 3]	e 24 36	S	e 41-9
Irkutsk	96-0	324	e 15 41	?	e 24 50	+ 3	e 30 48	SS	e 48-5
St. Louis	E. 107-0	56	—	—	e 25 27	[+28]	e 29 5	PPS	—
Tashkent	115-7	306	i 18 58	[+14]	e 35 13	SS	1 19 38	PP	e 49-5
Ottawa	118-7	49	—	—	e 25 53	[+ 8]	36 17	SS	54-5
Philadelphia	118-7	56	—	—	e 25 41	[- 4]	e 29 43	PS	e 58-1
Fordham	119-8	54	i 19 18	[+26]	e 25 38	[-12]	e 31 24	PPS	—
Sverdlovsk	121-4	324	e 20 20	PP	e 27 11	{-12}	e 36 59	SS	50-5
Harvard	121-6	53	—	—	e 30 5	PS	e 37 2	SS	e 59-5
Weston	121-8	52	—	—	e 36 51	SS	e 40 19	SSS	e 57-1
Seven Falls	122-1	47	—	—	e 39 47	?	—	—	e 57-5
Grozny	133-1	309	e 21 40	PP	—	—	—	—	—
Moscow	133-9	328	e 22 40	?	—	—	—	—	e 67-5
Tiflis	134-1	307	e 19 45	[+26]	—	—	e 22 39	PP	e 70-5
Pulkovo	134-8	335	e 13 9	?	—	—	e 22 39	PP	—
Ksara	142-2	296	e 19 30	[- 4]	—	—	e 22 37	PP	71-5
Copenhagen	143-9	344	22 53	PP	41 29	SS	—	—	70-5
Bucharest	146-0	319	e 20 9	[+28]	e 30 29	{+33}	26 8	PPP	76-5
Helwan	146-5	291	e 19 34	[- 8]	—	—	—	—	—
Potsdam	146-6	342	e 19 29	[-13]	—	—	e 23 17	PP	e 76-5
De Bilt	148-9	348	e 19 56	[+11]	—	—	e 34 13	PS	e 75-5
Uccle	150-3	349	e 19 42	[- 6]	—	—	—	—	e 71-5
Stuttgart	151-0	341	e 19 51	[+ 2]	—	—	23 6	PP	e 82-5
Strasbourg	z. 151-6	341	e 19 50	[0]	—	—	23 9	PP	82-7
Paris	152-6	349	e 20 14	[+23]	—	—	—	—	82-5
Puy de Dôme	155-4	347	e 24 55	PP	—	—	—	—	e 92-9
Toledo	162-2	358	e 19 31	[-32]	—	—	—	—	88-4

Additional readings:—

Apia i = +6m.36s.

Wellington PP = +5m.1s., i = +6m.57s., sS = +9m.17s.

Christchurch iN = +8m.50s., iE = +9m.54s., iN = +12m.34s., iZ = +12m.48s., SeS = +16m.48s.

Riverview iE = +5m.27s., iN = +10m.5s.

Adelaide iS = +13m.10s.

Perth i = +23m.22s., PeP = +24m.44s., S = +26m.2s., i = +26m.29s., SS = +27m.49s.,

SSS = +28m.6s., SSSS = +28m.26s.

Taihoku S = +11m.45s.

Pasadena iZ = +12m.46s. and +13m.6s.

Mount Wilson iZ = +12m.39s.

Bozeman ePS = +24m.58s., eS = +31m.2s.

Irkutsk e = +20m.32s., +22m.18s., +25m.40s., +27m.36s., +34m.42s., and +37m.50s.

St. Louis eE = +26m.15s.

Tashkent e = +20m.47s., +24m.32s., +27m.1s., +33m.29s., +36m.22s., and +38m.59s.

Ottawa eN = +39m.47s.

Philadelphia eSS = +36m.0s., eSSS = +40m.45s.

Fordham e = +27m.8s.

Tiflis eZ = +22m.45s., eEN = +23m.19s.

Ksara ePPP = +25m.52s.

Bucharest eE = +20m.40s. and +21m.29s., eN = +21m.35s., eE = +29m.14s. and +29m.37s.

Helwan i = +20m.12s. and +21m.5s.

Potsdam eNZ = +19m.59s., eZ = +20m.35s., eN = +40m.59s.

Uccle eZ = +18m.35s.

Stuttgart ePKP_s = +20m.17s., e = +24m.6s.

Strasbourg iZ = +21m.9s.

Toledo e = +20m.49s.

Long waves were also recorded at La Paz, Jersey, Trieste, San Fernando, Kodaikanal, Huancayo, Kew, and Cheb.

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July 14d. Readings also at 0h. (Sverdlovsk, Irkutsk, Istanbul, and Tifis), 1h. (Tananarive), 2h. (Wellington, Irkutsk, Vladivostok, Nagoya, Istanbul, and Hukuoka B), 3h. (Uccle, Potsdam, Strasbourg, Stuttgart, De Bilt, Copenhagen, Moscow, Pulkovo, Kew, Cheb, Nagoya, Sverdlovsk, Tifis, Tashkent, and Ksara), 4h. (Samarkand, Oaxaca, and Tacubaya), 5h. (Tifis), 6h. (Toledo, Williamstown, near Malaga, Huancayo, Almeria, Granada, Tananarive, Tucson, Mount Wilson, and La Paz), 7h. (Tacubaya (2) and Florence), 8h. (Istanbul, Amboina, and Tifis), 9h. (Tifis (2), Setchi, Erevan, Baku, Tacubaya, Ksara, Tashkent, Sverdlovsk, Grozny, and Piatigorsk), 10h. (Tacubaya, Tifis (2), Grozny, and Florence (2)), 11h. (Philadelphia, Ottawa, St. Louis, Bozeman, Pasadena, Chicago, Weston, Florissant, Haiwee, Finemaha, Tucson, Mount Wilson, Harvard, Florence, and Tacubaya), 12h. (near Tananarive, Nagoya, Tashkent, and Sverdlovsk), 13h. (Tacubaya, Florence, and Tifis), 17h. (Tananarive), 18h. (near Harvard), 19h. (La Paz, Mount Wilson, Tucson, and Grozny), 21h. (Tananarive, Tifis, and Piatigorsk), 22h. (Tifis, Piatigorsk, Grozny, and Santiago), 23h. (Christchurch).

July 15d. 22h. 46m. 13s. Epicentre 40°4N. 78°2W.

See Bulletin Seis. Soc. America, Vol. 28, No. 4, p. 237.

A = +.1562, B = -.7475, C = +.6456; $\delta = -5$; $h = -2$;
D = -.979, E = -.204; G = +.132, H = -.632, K = -.764.

	Δ	Az.	P.	O-C.	S.	O-C.	m.	Supp.
	°	°	m. s.	s.	m. s.	s.	s.	
Fordham	3.3	82	10 58	+ 5	1 1 37	+ 2	1 1 4	P _r
Williamstown	4.4	57	e 1 12	+ 2	1 2 11	S*	1 2 44	P _r
Harvard	5.4	65	1 1 21	- 3	1 2 26	- 2	e 2 48	S*
Weston	5.5	67	1 1 22k	- 3	1 2 26	- 4	1 2 45	S*

Additional readings —

Fordham i = +1m.41s. and +1m.48s.

Williamstown i = +1m.17s.

Harvard eE = +2m.43s.

Weston iE = +2m.35s., iS_rE = +2m.51s.

July 15d. Readings also at 0h. (Honolulu), 1h. (near Istanbul), 3h. (Santiago), 4h. (Vladivostok and near Mizusawa and Nagoya), 5h. (Tuai, Andijan, Samarkand, Tifis, Sverdlovsk, Ksara, Tucson, Mount Wilson, and Pasadena), 7h. (Mizusawa, Nagoya (2), near Tifis, and near Amboina), 9h. (Ukiah, Tashkent, Samarkand (2), Andijan (2), and Santiago), 10h. (Wellington, near Christchurch, and New Plymouth), 13h. (Piatigorsk, near Grozny (2), and Tifis (2)), 15h. (La Paz and Tifis), 16h. (Florence (2) and Malaga (2)), 17h. (Florence), 18h. (New Plymouth), 19h. (Malabar and Strasbourg), 22h. (Samarkand, Andijan, Tucson, Mount Wilson, Riverside, and near La Paz), 23h. (Bucharest, Sofia, Trieste, and near Mizusawa).

July 16d. Readings at 1h. (near Mizusawa), 2h. (La Paz), 3h. (Huancayo, La Paz, and Tifis), 5h. (Balboa Heights), 7h. (Andijan, Frunse, Samarkand, and Tashkent), 8h. (near Balboa Heights), 9h. (Christchurch, Adelaide, Brisbane, Melbourne, River-view, Sydney, Sverdlovsk, Ksara, Samarkand, De Bilt, and Stuttgart), 10h. (Adelaide, Tucson, Tifis, Tashkent, Copenhagen, near Christchurch, and near Tananarive), 12h. (Andijan, near Samarkand, Tashkent, and near Tananarive), 15h. (Apia, Tucson, Ferndale, Vladivostok, Tashkent, Ksara, Sverdlovsk, Tifis, De Bilt, Paris, Uccle, Stuttgart, and Strasbourg), 16h. (Huancayo, Copenhagen, Baku, and Kew), 17h. (Haiwee, Mount Wilson (2), Tucson, Pasadena, Riverside, De Bilt, Ksara, and near Apia), 18h. (Huancayo and Harvard), 19h. (Frunse, Andijan, Samarkand, Baku, Tashkent, Irkutsk, Tifis, Paris, Strasbourg, and Balboa Heights), 20h. (Mount Wilson and Tucson), 21h. (Frunse, Samarkand, near Andijan, near Mizusawa (2), and Nagoya), 22h. (near Mizusawa), 23h. (Basle, Jena, Göttingen, Strasbourg, and Stuttgart).

July 17d. 13h. Origin in the region of the Marianne Islands.

Manila ePNZ = 19m.28s., iZ = 19m.52s., iSN = 23m.31s.

Nagoya e = 19m.52s.

Hukuoka B eP = 19m.57s.

Vladivostok e = 22m.27s. and 26m.23s., L = 28m.18s.

Irkutsk e = 25m. and 30m., L = 40m.

Sverdlovsk eP = 26m.29s., eS = 36m.4s., L = 50m.

Pasadena eZ = 27m.42s.

Mount Wilson iZ = 27m.43s.

Riverside eZ = 27m.45s.

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Haiwee eEN = 27m.46s.
 Baku eP = 28m.3s., e = 37m.36s., eL = 61m.
 Tashkent e = 29m.39s., S = 34m.55s., i = 35m.45s., e = 38m.59s. and 40m.11s., L = 50m.
 Moscow e = 30m.26s., 33m.19s., 33m.51s., 35m.56s., 37m.56s., 38m.11s., 39m.16s., and 42m.14s., eL = 65m.30s.
 La Paz P = 32m.36s.
 Adelaide e = 33m.40s. and 40m.9s.
 Paris e = 35m., L = 79m.
 Strasbourg eZ = 35m.0s., eSZ = 41m.39s., eN = 52m.0s., e = 72m.
 Ksara e = 38m.49s.
 Tiflis eZ = 39m.11s., eLZ = 63m.
 Potsdam eEN = 39m.12s., eN = 40m.12s., eL = 66m.
 Stuttgart eZ = 39m.30s., eL = 72m.
 Melbourne e = 39m.38s., i = 42m.26s., L = 45m.
 Long waves also recorded at Pulkovo, Copenhagen, and De Bilt.

July 17d. Readings also at 2h. (near Tananarive), 3h. (Andijan), 5h. (near Hukuoka B), 7h. (Jena), 11h. (Huancayo, La Paz, Scoresby Sund, Copenhagen, Kew, Potsdam, De Bilt, Strasbourg, Stuttgart, Uccle, Paris, Puy de Dôme, Ksara, Sverdlovsk, and Tashkent), 12h. (Malabar), 13h. (Malabar, Mount Wilson, Pasadena, and Riverside), 14h. (Grozny, near Tiflis, and near Tananarive), 15h. (Harvard), 16h. (Rathfarnham Castle and near Wellington), 19h. (Cheb), 20h. (Samarkand and near Andijan), 21h. (Andijan), 22h. (near La Paz).

July 18d. 0h. 57m. 44s. Epicentre 44°6N. 6°8E.

Force VII-VIII at Saint Paul, VII at Guillestre, Vars, Reotier, Ceillac.

Macroseismic area in France 21,000 sq. kms. Epicentre French Alps 44°37'N. 6°47'E.

J. P. Rothé.

Les seismes des Alpes francaises en 1938 et la seismicite des Alpes occidentales.

Annales de l'Institut de Physique du Globe de Strasbourg, 2e partie, Geophysique Tome III, 1938, pp. 4-16. Mende, 1944. One isoseismic Chart.

A = +.7094, B = +.0846, C = +.6998; δ = +13; h = -3;
 D = +.118, E = -.993; G = +.695, H = +.083 K = -.714.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	o.	m. s.	s.	m. s.	s.	m. s.	m.
Moncalieri	0.7	58	10 16?	- 1	—	—	—	0.6
Marseilles	1.6	218	10 32	+ 2	10 53	+ 2	—	—
Sion	1.7	13	e 0 33	+ 2	e 1 58	+64	e 0 34	P _g
Neuchatel	2.4	2	e 0 42	+ 1	1 18	S _g	e 0 47	P _g
Besançon	2.7	348	e 1 10	P _g	1 18	S _g	—	—
Puy de Dôme	2.9	293	e 0 48	0	e 1 8	-16	—	—
Basle	3.0	10	e 0 49	- 1	1 135	S*	10 57	P _g
Zurich	3.0	24	e 0 51	+ 1	e 1 39	S _g	10 59	P _g
Florence	3.3	104	e 1 3	P _g	1 46	S _g	—	—
Padova	3.7	76	i 0 54	- 6	1 1 51	S*	e 1 0	P*
Ebingen	3.9	22	e 1 2	0	e 2 4	S*	e 1 18	P _g
Strasbourg	4.1	10	e 1 4	- 1	1 2 11	S*	1 2 23	S _g
Stuttgart	4.5	21	e 1 9	- 2	e 2 0	- 5	1 1 30	P _g
Karlsruhe	4.6	13	e 1 31	P _g	e 2 0	- 7	—	—
Triest	5.0	76	e 1 36	P _g	2 18	0	—	—
Paris	5.1	326	e 1 19	- 1	1 2 17	- 3	1 2 32	S*
Uccle	6.4	346	e 1 35	- 3	1 3 24	S*	1 1 30	S _g
Cheb	6.6	33	—	—	e 2 51	- 7	e 3 38	S _g
Jena	7.0	25	e 1 45	- 1	—	—	e 2 22	P _g
Göttingen	7.2	16	e 2 28	P _g	e 3 57	S _g	—	—
De Bilt	7.6	352	—	—	e 3 30	+ 7	—	14.2
Kew	8.4	327	e 2 24	+18	1 3 45	+ 2	1 4 40	S _g
Potsdam	8.8	26	—	—	e 3 46	- 7	e 4 28	S*
Oxford	9.0	326	—	—	e 3 48	-10	e 4 38	S*
Hamburg	9.2	12	—	—	e 4 16	+13	e 5 16	S _g

Continued on next page.

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	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Toledo	9.3	243	e 3 21	+64	e 3 58	- 7	5 16	S _g
Stonyhurst	11.0	331	i 1 30	-72	e 4 56	+ 9	—	16.1
Durham	11.5	335	—	—	i 4 46	-13	—	16.5
Malaga	11.6	231	—	—	e 6 0	SSS	—	6.7
Rathfarnham Castle	12.2	320	e 5 46	S	(e 5 46)	+30	—	7.2
Pulkovo	20.8	34	4 42	- 3	e 8 30	- 3	—	—
Moscow	22.4	49	e 6 4	PPP	e 9 8	+ 4	—	e 12.8
Ksara	24.8	107	e 5 33	+ 8	e 9 59	+13	—	—
Sverdlovsk	35.3	50	e 6 59	0	—	—	—	17.3

Additional readings:—

Marseilles P_g = +43s., iS_g?E = +56s.

Neuchatel i = +1m.11s. and +2m.6s.

Padova iS = +2m.23s.

Ebingen eS_g = +2m.15s.

Strasbourg iE = +1m.51s., SS = +2m.30s.

Stuttgart e = +1m.16s. and +1m.38s., i = +2m.6s. and +2m.12s., iS*E = +2m.20s.,

iEZ = +2m.24s., i = +2m.27s., iS_gEN = +2m.32s.

Paris iS_g = +2m.51s.

Uccle i = +3m.39s. and +4m.9s.

Jena eN = +1m.50s. and +2m.26s.

Kew iEN = +3m.29s.

Potsdam eEN = +4m.10s., iEN = +4m.48s., iNZ = +4m.53s., iN = +4m.59s. and

+5m.10s., iZ = +5m.14s., eZ = +5m.34s.

Oxford i = +4m.52s.

Toledo e = +4m.21s., ISS = +5m.27s., i = +5m.48s., +6m.8s., and +6m.24s.

Durham iE = +4m.53s., iEN = +5m.18s.

Rathfarnham Castle iS = +7m.15s., i = +9m.0s. and +11m.33s.

Moscow e = +11m.59s. and +12m.15s.

Long waves were also recorded at Belgrade, Bidston, Almeria, Granada, San Fernando, Aberdeen, Upsala, Bergen, and Copenhagen.

July 18d. Readings also at 2h. (Samarkand and near Branner), 3h. (Andijan and Puy de Dôme), 4h. (near Andijan and near Medan), 7h. (Tifis), 8h. (Mount Wilson, Tucson, Wellington and near Apla), 9h. (Sverdlovsk, Tifis, Tashkent, Vladivostok, Strasbourg, near Mizusawa, and Nagoya), 11h. (Manila), 12h. (Mizusawa and Sverdlovsk), 13h. (Wellington (2)), 14h. (Calcutta and near Santiago), 15h. (Tashkent and Sverdlovsk), 19h. (Mount Wilson, Riverside, and Tucson), 20h. (Tacubaya (2) and near Harvard).

July 19d. 19h. 45m. 22s. Epicentre 35°-2N. 59°-3E.

A = +.4181, B = +.7042, C = +.5740; δ = +18; h = 0;

D = +.860, E = -.511; G = +.293, H = +.494, K = -.819.

	Δ	Az.	P.	O - C.	S.	O - C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Samarkand	7.5	52	i 1 55	+ 2	3 13	- 7	—	—
Baku	9.0	308	e 0 58	?	e 4 52	S _g	—	e 7.6
Tashkent	9.9	49	e 2 17	- 8	i 4 8	-12	—	15.5
Andijan	11.6	58	e 2 51	+ 1	e 5 17	SS	—	—
Tifis	13.0	304	i 3 17	+ 8	e 6 23	?	—	6.8
Grozny	13.2	312	e 3 11	0	—	—	—	—
Frunse	14.3	53	e 3 25	- 1	6 0	- 6	—	12.6
Aggra	E. 17.9	111	i 4 12	0	—	—	—	—
Ksara	19.3	271	e 4 32	+ 3	—	—	—	—
Semipalatinsk	21.5	38	e 4 55	+ 3	—	—	—	—
Sverdlovsk	21.6	2	i 4 56	+ 2	8 58	+ 9	12 2	L _g 13.7
Helwan	24.1	264	e 5 19	+ 1	9 48	+14	—	—
Moscow	25.4	331	e 5 46	+15	e 10 18	+22	—	14.1
Pulkovo	31.0	332	e 7 12	PP	e 11 27	+ 1	—	—
Irkutsk	36.0	47	—	—	e 15 38?	SSS	—	20.6
Potsdam	36.8	313	—	—	e 14 38?	SS	—	—
Hamburg	N. 38.8	314	—	—	e 16 38?	SSS	—	—

Additional readings:—

Samarkand e = +3m.24s.

Baku i = +3m.9s. and +5m.33s.

Andijan e = +6m.42s.

Irkutsk e = +18m.38s.? i = +19m.42s.

Hamburg eN = +27m.38s.?

Long waves were also recorded at Strasbourg, De Bilt, Copenhagen, and Calcutta.

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July 19d. Readings also at 1h. (Oaxaca, Tacubaya, and Tucson), 5h. (Wellington), 6h. (Wellington), 8h. (Tashkent, Sverdlovsk, Samarkand, Andijan, and Frunse), 9h. (Frunse, Andijan, Samarkand, Sverdlovsk, Manila, Scoresby Sund, Mizusawa, Mount Wilson, Moncalieri (2), Hukuoka B, Vladivostok, Pasadena, Nagoya, Cheb, and Semipalatinsk), 10h. (Scoresby Sund), 11h. (Manila (2) and Sverdlovsk), 12h. (Mount Wilson and Mizusawa), 13h. (Butte and Wellington), 19h. (Tananarive), 20h. (Santiago (3)), 21h. (Sverdlovsk, Manila, Tashkent, Scoresby Sund, La Plata, Paris, Philadelphia, Uccle, San Juan, St. Louis, Huancayo, Fort de France, Copenhagen, De Bilt, Strasbourg, Hamburg, Ksara, Potsdam, Pulkovo, Moscow, Helwan, Tifis, Baku, Rio de Janeiro, and La Paz), 22h. (Bombay, Jena, Calcutta, Agra, and La Paz), 23h. (Wellington (2), Syuhurei, and Taikyu).

July 20d. 0h. 23m. 35s. Epicentre 38°-3N. 23°-8E.

Damage in the towns of North Greece and in the district of Oropos.

Epicentre 38°17'N. 23°45'E. (Strasbourg).
38°35'N. 23°8'E. (Athens).

J. Mihalovic.

Annuaire de l'Institut Seismologique de Beograd XVIII. Année, 1938. Beograd, 1939, p. 35.

Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome III, 2e partie Seismologie. Mende, 1941, p. 56.

La Croix Rouge hellénique, et le seisme d'Oropos.—"Revue pour l'étude des calamities" Tome I, p. 207-208—Geneva.

A = +.7199, B = +.3175, C = +.6172; $\delta=0$; $\lambda=-1$;
D = +.404, E = -.915; G = +.565, H = +.249, K = -.787.

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.		L. m.
			m.	s.	s.	m. s.	s.	m. s.	s.				
Sofia	4.4	356	i 1	12 _a	+ 2	12	13	S*	12	33	S ₂	—	
Istanbul	4.9	54	1	19	+ 2	2	20	+ 5	1	40	P ₂	—	
Bucharest	6.3	15	i 1	41 _a	+ 5	12	54	+ 4	1	57	P ₂	—	
Belgrade	7.0	340	e 1	48 _k	+ 2	13	4	- 4	2	12	P ₂	—	
Keoskemet	z.	9.1	12	19	+ 5	3	50	-10	e 4	51	S ₂	e 5.7	
Sebastopol	9.6	46	2	22	+ 1	e 4	32	+20	—	—	—	—	
Budapest	E.	9.8	341	2	24	0	4	3	-14	2	59	PP	5.7
Yalta	9.9	48	e 2	58	+33	5	31	S ₂	—	—	—	—	
Simferopol	10.2	46	e 2	31	0	e 4	27	0	e 5	4	S*	—	
Laibach	10.3	321	e 2	30	- 2	14	25	- 5	12	49	PPP	5.7	
Ogyalla	10.4	338	2	35	+ 1	3	45	-47	—	—	—	4.8	
Helwan	10.5	141	12	31	- 4	14	28	- 7	2	37	PP	—	
Triest	10.5	318	e 2	31	- 4	e 4	30	+ 5	—	—	—	—	
Ksara	10.8	111	12	40	+ 1	5	16	SSS	—	—	—	—	
Florence	10.9	304	e 2	45	+ 5	4	57	SS	—	—	—	—	
Theodosia	11.0	48	e 2	42	0	e 4	56	+ 9	—	—	—	e 5.6	
Padova	11.4	313	e 2	43	- 4	4	44	-12	—	—	—	—	
Sotchi	13.1	61	e 4	25	+75	—	—	—	—	—	—	—	
Prague	13.5	333	3	16 _a	+ 1	e 5	48	+ 1	—	—	—	e 7.4	
Moncalieri	13.7	304	13	30	PP	6	3	SS	—	—	—	7.1	
Cheb	14.3	329	e 3	27	+ 1	e 5	59	- 7	—	—	—	e 7.9	
Zurich	14.4	314	e 3	24 _a	- 3	e 6	8	- 1	—	—	—	—	
Hof	14.7	328	—	—	—	e 6	25	+ 9	—	—	—	e 7.4	
Stuttgart	14.8	320	e 3	31 _a	- 1	e 6	37	SS	e 3	40	PP	17.9	
Neuchatel	15.1	311	e 3	32	- 4	e 6	32	+ 7	13	41	PP	—	
Jena	15.3	329	e 3	37	- 2	e 6	47	SS	e 6	51	SSS	e 7.4	
Karlsruhe	15.4	319	e 3	26	-14	e 6	28	- 4	—	—	—	—	
Strasbourg	15.4	317	13	40	0	e 6	47	SS	14	3	PP	18.1	
Piatigorsk	15.6	62	e 3	45	+ 2	e 6	50	SS	—	—	—	e 8.7	
Besançon	15.8	310	e 3	49	+ 4	—	—	—	—	—	—	8.9	
Potsdam	16.0	335	e 3	43	- 5	e 6	55	+ 9	e 4	1	PP	e 7.9	
Erevan	16.2	77	e 3	59	+ 9	—	—	—	—	—	—	e 9.2	
Göttingen	16.4	328	e 3	55	+ 2	e 7	7	+11	—	—	—	e 9.4	
Tifis	16.4	71	13	58	+ 3	7	2	+ 6	14	2	PP	e 7.8	
Algiers	16.5	271	13	57	+ 3	e 7	8	+10	14	53	PPP	e 7.6	

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Puy de Dôme	17.2	302	e 3 34	-29	e 6 39	-35	e 4 47	PPP
Grozny	17.3	66	e 4 11	+7	e 7 30	+14	—	—
Hamburg	18.0	333	e 4 11	-2	17 38	+6	—	—
Paris	18.6	311	1 4 20	-1	7 48	+2	—	10.4
Uccle	18.6	319	1 4 21k	0	7 47	+1	—	9.1
Copenhagen	19.0	341	4 24	-2	8 0	+5	1 4 39	PP
De Bilt	19.0	325	1 4 25k	-1	8 0	+5	—	9.1
Moscow	19.7	24	1 4 35	+1	8 17	+7	—	—
Baku	20.3	75	1 4 43	+3	8 50	SS	5 8	PP
Almeria	20.8	275	e 4 40	-5	e 8 26	-7	—	e 17.2
Jersey	21.5	310	e 4 49	-3	e 8 55	+8	e 9 43	SSS
Kew	21.5	317	1 4 51k	-1	18 48	+1	1 9 0	SS
Toledo	21.6	283	1 4 52	-2	18 47	-2	1 9 11	SS
Granada	21.7	276	1 5 0	+5	e 8 47	-4	—	—
Pulkovo	21.9	9	1 4 55	-2	8 55	+1	—	10.5
Uppsala	21.9	352	1 4 55	-2	8 58	+4	—	—
Oxford	22.1	316	1 4 56k	-3	19 2	+4	—	12.1
Malaga	22.4	276	e 5 5	+3	e 9 9	+5	—	11.2
Durham	23.8	323	1 5 14	-1	19 33	+5	5 47	PP
Stonyhurst	23.8	320	1 6 0?	PPP	19 55?	SS	—	14.4
Bidston	23.9	318	1 5 14	-2	19 30	0	—	12.4
San Fernando	23.9	275	5 15	-1	19 31	+1	1 6 0	PPP
Bergen	25.0	340	5 29	+2	10 0	+11	—	13.8
Edinburgh	25.2	323	1 5 30	+1	e 10 0	+8	1 11 5	SSS
Aberdeen	25.4	327	1 5 28	-3	19 59	+3	1 10 54	SS
Rathfarnham Castle	25.5	317	5 34	+2	10 7	+10	7 7	PPP
Sverdlovsk	30.5	40	1 6 19	+2	1 11 19	+1	14 37	Lq
Samarkand	33.4	74	e 6 45	+3	e 12 10	+7	—	e 18.6
Tashkent	34.8	71	e 6 56	+2	1 12 30	+5	—	e 20.1
Andijan	37.2	70	e 7 19	+4	—	—	—	e 18.4
Frunse	38.4	67	e 7 27	+2	—	—	—	—
Scoresby Sund	40.0	338	7 39	+1	13 46	+2	9 16	PP
Sempalatinsk	41.2	54	e 7 47	-1	—	—	—	—
Agra	E. 46.4	87	e 8 26	-4	15 14	-4	10 19	PP
Bombay	E. 46.6	100	e 8 25	-7	e 15 5	-16	e 10 25	PP
Ivigtut	48.9	322	8 48k	-2	15 57	+4	10 42	PP
Kodaikanal	E. 55.4	105	—	—	e 18 25?	-57	—	—
Irkutsk	55.5	47	9 35	-4	17 27	+3	—	35.4
Calcutta	N. 56.8	86	—	—	17 43	+2	—	—
East Machias	65.0	308	e 10 40	-4	e 19 25	-1	—	e 31.9
Weston	68.7	308	1 11 7k	0	e 20 13	+3	e 12 57	PP
Harvard	68.8	308	1 11 7k	-1	e 20 16	+5	—	e 33.4
Ottawa	69.7	313	1 11 13	-1	20 25	+3	—	32.4
Williamstown	69.7	308	1 11 14	0	—	—	1 11 25	pP
Fordham	71.2	307	1 12 22	+59	21 43	+63	e 14 3	PP
Philadelphia	72.5	307	1 11 30	0	e 20 51	-3	—	e 35.0
Fort de France	77.1	278	e 11 52	-5	—	—	—	—
San Juan	78.8	284	e 12 2	-4	e 22 5	+1	—	—
Florissant	82.3	314	e 12 22	-3	e 22 42	+2	e 15 35	PP
St. Louis	82.4	314	1 12 25	0	e 22 42	+1	e 24 0	PPS
Batavia	E. 88.8	99	—	—	1 23 18	[-7]	—	—
Tucson	98.1	323	1 13 40	0	e 24 36	[+19]	e 17 37	PP
Mount Wilson	Z. 99.6	329	1 13 47	+1	—	—	1 17 49	PP
Pasadena	Z. 99.8	329	e 13 47	0	—	—	e 17 49	PP

Additional readings: —

Istanbul S_r = +2m.50s.

Bucharest iN = +2m.6s., iE = +2m.13s., iEN = +2m.26s. and +2m.32s., iE = +2m.39s., +2m.57s., +3m.3s., and +3m.14s., iSEN = +3m.17s., iN = +3m.21s.

Belgrade i = +2m.27s., iNE = +2m.34s., iPSNE = +3m.24s., iZ = +3m.50s., iNW = +4m.6s.

Keeskemet iZ = +2m.58s., ePPSZ = +3m.26s., eZ = +3m.56s.

Budapest iE = +2m.33s., eN = +2m.41s., iE = +2m.52s., iE = +3m.13s., PSE = +3m.33s., eN = +3m.37s. and +3m.58s., PSE = +4m.18s., iE = +4m.32s., SSE = +4m.52s., eN = +4m.50s., iE = +5m.7s., iN = +5m.24s. and +5m.41s.

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Simferopol i = +5m.26s.
 Laibach iSNE = +4m.48s.
 Helwan i = +3m.25s. and +3m.56s.
 Trieste PP = +3m.25s.
 Ksara SS = +5m.39s.
 Stuttgart e = +3m.55s. and +4m.7s., eEZ = +5m.10s., e = +6m.56s., eSS = +7m.15s., i = +7m.31s.
 Jena iP = +3m.44s., eSZ = +6m.43s.
 Strasbourg iZ = +4m.59s. and +5m.20s.
 Potsdam iP = +3m.49s., ePPPEN = +4m.13s., iPPPEN = +4m.16s., eE = +4m.25s. and +5m.37s., iSEN = +7m.0s., iE = +7m.5s., eN = +7m.19s., iSSN = +7m.24s., eSSZ = +7m.37s.
 Tifis iEN = +7m.16s.
 Hamburg i = +4m.14s. a, eSE = +7m.41s., eN = +9m.46s., iE = +9m.57s.
 Copenhagen i = +4m.26s.
 Baku PPP = +5m.20s.
 Jersey e = +6m.4s.
 Toledo e = +8m.52s., iSS = +9m.43s.
 Upsala iPE = +4m.58s.
 Durham iSSE = +10m.5s.
 Stonyhurst i = +11m.15s.?
 Bidston iS = +9m.12s.
 San Fernando SSE = +10m.49s.
 Edinburgh i = +10m.3s.
 Rathfarnham Castle SS = +12m.5s.
 Andijan e = +12m.27s.
 Scoresby Sund +9m.53s., +14m.21s., and +16m.37s.
 Agra SS?E = +17m.59s.
 Bombay iEN = +12m.35s. and +15m.25s.
 Ivigtut +19m.34s.
 Weston iPcPZ = +11m.34s., eSSSZ = +23m.1s.
 Fordham e = +13m.19s. and +20m.25s.
 Florissant iPNZ = +12m.26s., eSN = +22m.49s.
 St. Louis eE = +24m.18s.

July 20d. 11h. Undetermined Pacific quake.

Nagoya P = 53m.7s., S = 54m.14s.
 Mizusawa PN = 53m.34s., PE = 53m.36s., SE = 57m.12s.
 Manila eP = 54m.35s., iSEN = 59m.23s.
 Vladivostok iP = 55m.13s., ePP = 60m.4s., eS = 60m.8s., eL = 62m., e = 65m.19s.
 Hong Kong P? = 55m.54s., S? = 59m.33s.
 Irkutsk eP = 57m.57s., SS = 67m.30s., eL = 72m.
 Sverdlovsk iP = 60m.8s., S = 69m.6s., L = 84m.
 Baku eP = 60m.32s., e = 71m.9s., 80m.23s., and 82m.19s., eL = 91.5m.
 Tashkent e = 60m.52s., 68m.17s., 77m.30s., and 80m.42s., eL = 82m.
 Moscow iP = 61m.17s., eS = 71m.13s., SS = 76m.36s.
 Santa Barbara iPZ = 61m.17s.
 Grozny eP = 61m.18s., eS = 71m.19s.
 Halwee ePZ = 61m.18s.
 Pasadena iP = 61m.18s., iZ = 62m.12s., eSE = 71m.20s.
 Mount Wilson iPZ = 61m.19s., iZ = 62m.13s.
 Riverside ePZ = 61m.22s.
 Pulkovo eP = 61m.32s., e = 71m.19s.
 Tifis eZ = 61m.42s. and 62m.16s., eSE = 71m.23s., eE = 72m.40s., eEN = 83m.51s., eLN = 91m.
 Tucson eP = 61m.50s. a
 Ksara e = 62m.4s.
 Medan iE = 64m.16s.
 Calcutta eN = 65m.12s.

July 20d. 12h. 1m. 24s. Epicentre 7°0N. 39°7W.

A = +7637, B = -6340, C = +1211; δ = -14; h = +7;
 D = -639, E = -769; G = +093, H = -077, K = -993.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Fort de France	22.4	292	14 59	- 3	e 9 17	+13	—	e 11.7
San Juan	28.1	296	e 5 56	+ 1	e 9 44	-56	—	e 12.6
Rio de Janeiro	29.9	187	—	—	e 11 36	+27	—	e 15.6
La Paz	36.6	230	i 7 8a	- 2	i 13 26	+33	—	19.6
Huancayo	40.2	242	e 7 55	+15	e 13 29	-19	e 8 36 PP	e 17.9

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Weston	45.0	328	1 8 8	-11	e 14 38	-20	—	—
Almeria	45.1	43	e 10 48	PPP	—	—	—	—
Harvard	45.2	328	e 8 18	- 2	e 14 52	- 9	—	e 22.6
Williamstown	46.2	327	1 8 26	- 2	—	—	—	—
Ottawa	49.3	328	8 50	- 3	15 56	- 3	—	19.6
Jersey	52.6	29	e 9 6	-12	—	—	—	—
Paris	54.8	32	e 9 32	- 2	—	—	—	26.6
St. Louis	55.3	313	e 9 39	+ 1	e 17 20	- 1	e 11 37	PP
Florissant	55.4	313	e 9 41	+ 3	e 17 24	+ 2	—	—
Uccle	56.9	31	—	—	e 17 30	-12	e 19 40	? 38.6
Zurich	57.5	37	e 8 58	-55	—	—	—	—
Strasbourg	57.6	35	e 9 51	- 3	e 17 39	-12	—	e 34.6
De Bilt	58.1	30	e 9 57	- 1	e 17 46	-12	—	e 28.6
Stuttgart	58.5	35	e 9 56	- 4	e 17 54	- 9	e 15 39	? e 30.6
Hamburg	n. 60.6	30	e 10 18	+ 3	—	—	—	—
Potsdam	62.4	33	e 10 24	- 3	—	—	—	e 34.6
Copenhagen	63.6	29	e 10 33	- 2	e 19 0	- 8	e 12 24	PP
Bucharest	67.9	45	e 11 2	0	e 19 54	- 7	—	—
Helwan	70.1	60	e 11 7	+ 1	e 20 54	—	e 13 21	PP
Tucson	70.3	303	i 11 20k	+ 3	—	—	—	e 30.9
Ksara	74.2	57	e 11 41	+ 1	—	—	e 14 24	PP
Riverside	z. 75.9	304	i 11 54k	+ 4	—	—	—	—
Haiwee	76.4	306	e 11 57	+ 4	—	—	—	—
Mount Wilson	z. 76.5	304	i 11 56	+ 2	—	—	—	—
Pasadena	76.6	304	i 11 57	+ 3	—	—	—	—

Additional readings:—

Fort de France PP = +5m.29s., PPP = +5m.53s.

La Paz iZ = +7m.30s.

Huancayo ePPP = +9m.31s.

Weston iZ = +8m.22s. and +8m.27s.

St. Louis eE = +19m.29s.

Florissant iSE = +17m.28s.

Potsdam e = +5m.42s., eEN = +11m.6s., eN = +20m.24s.

Copenhagen eZ = +5m.27s., eEN = +10m.59s., and +20m.33s.

Bucharest S₀SEN = +21m.6s.

July 20d. Readings also at 1h. (Tacubaya), 2h. (Balboa Heights), 3h. (Nagoya), 8h. (Santiago), 10h. (New Plymouth and Wellington), 11h. (Jersey, Nagoya, and Huancayo), 12h. (Taikyū, Syuhurei, Husan, Oaxaca, and Tacubaya), 14h. (La Paz and Santiago), 15h. (Tacubaya, Santiago, and Toledo), 16h. (Calcutta), 17h. (Batavia), 18h. (La Paz, Samarkand, Andijan, Tashkent, Huancayo, Sverdlovsk, Tananarive, and Toledo), 19h. (Tananarive), 22h. (Bucharest), 23h. (Tucson, Mount Wilson, and Pasadena).

July 21d. 9h. 10m. 36s. Epicentre 3°-1S. 41°-1E.

A = +.7524, B = +.8564, C = -.0537; $\delta = -15$; $h = +7$;

D = +.657, E = -.754; G = -.040, H = -.035, K = -.999.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tananarive	17.0	158	e 4 0	- 1	e 7 13	+ 3	i 4 13	PP e 9.1
Helwan	34.1	346	e 6 49	+ 1	i 12 14	0	—	—
Ksara	37.1	353	i 7 15	+ 1	13 21	+20	8 33	PP 18.9
Kodalkanal	E. 38.6	68	—	—	e 13 24 [†]	+ 1	—	—
Baku	44.0	10	1 8 15	+ 4	e 14 43	0	—	22.4
Tiflis	44.7	4	1 8 16	0	14 56	+ 2	10 10	PP 23.4
Grozny	46.4	6	e 8 37	+ 7	—	—	—	—
Agra	E. 46.6	47	—	—	i 15 17	- 4	—	—
Platigorsk	47.0	2	e 8 34	- 1	—	—	—	—
Sofia	48.3	343	e 8 38	- 7	e 15 46	+ 1	e 18 36	SS
Samarkand	48.8	27	e 8 50	+ 1	—	—	e 10 48	PP
Tashkent	51.1	27	i 9 5	- 1	i 16 21	- 3	—	e 24.7
Andijan	52.2	30	e 9 15	0	e 16 42	+ 3	—	—
Calcutta	N. 52.7	58	—	—	e 16 46	0	—	—
Algiers	53.2	322	—	—	e 16 57	+ 5	—	e 29.4

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Frunse	54.9	29	e 9 36	+ 1	—	—	—	—
Prague	57.7	340	e 10 14	+19	e 17 49	- 4	—	e 36.4
Zurich	57.8	334	e 10 10	+15	—	—	—	—
Medan	57.9	83	e 9 58	+ 2	i 17 58	+ 3	—	—
Cheb	58.5	339	e 13 24?	PPP	e 18 3	0	—	e 32.4
Stuttgart	58.6	336	e 10 2	+ 1	e 17 59	- 5	—	e 28.4
Moscow	58.7	358	10 0	- 2	e 18 3	- 3	—	e 37.9
Strasbourg	59.1	335	e 10 8	+ 4	e 18 12	+ 1	—	e 28.4
Puy de Dôme	59.2	330	e 9 50	-15	—	—	—	—
Potsdam	60.1	341	e 10 12	+ 1	i 18 25	+ 1	e 20 0	S _c S 31.4
Paris	61.6	332	e 10 22	0	e 18 44	+ 1	—	34.4
Sverdlovsk	61.8	11	e 10 22	- 1	e 18 42	- 4	—	30.4
Hamburg	62.2	340	e 10 24	- 2	e 18 48	- 3	—	e 41.4
Uccle	62.2	335	e 10 30	+ 4	e 18 51	0	—	e 26.4
De Bilt	62.8	337	10 35	+ 5	19 3	+ 5	—	e 31.4
Copenhagen	63.1	343	10 30	- 2	19 3	+ 1	—	31.4
Pulkovo	63.3	354	e 10 30	- 3	e 19 2	- 2	—	e 30.7
Kew	64.8	333	—	—	i 19 24	+ 1	—	e 34.4
Oxford	65.4	333	—	—	i 19 29	- 1	—	e 32.8
Durham	E. 67.6	335	—	—	i 19 57	0	—	—
Edinburgh	69.0	335	—	—	e 20 18	+ 4	—	e 39.4
Irkutsk	76.6	34	e 11 51	- 3	e 21 6	- 34	e 14 43	PP 41.4
Rio de Janeiro	83.6	247	—	—	e 23 14	+ 21	—	e 41.4
Scoresby Sund	84.2	342	—	—	23 2	+ 3	—	43.4
Vladivostok	92.7	47	e 17 0	PP	e 24 0	[+12]	—	—
Tucson	140.8	321	i 19 35	[+ 3]	—	—	—	—
Riverside	z. 143.3	330	e 19 35	[- 1]	—	—	—	—
Mount Wilson	z. 143.4	330	e 19 35	[- 1]	—	—	—	—
Pasadena	143.6	330	e 19 44	[+ 8]	—	—	e 23 2	PP
Santa Barbara	z. 144.1	333	e 19 58	[+20]	—	—	—	—

Additional readings :-

Tananarive SSE = +7m.45s.

Tifis ePSN = +15m.23s., eSSN = +18m.24s. ?

Sofia eN = +8m.46s.

Algiers e = +14m.43s., +17m.56s., and +27m.24s. ?

Stuttgart eP = +10m.6s.

Strasbourg e = +10m.40s., iN = +18m.15s., e = +19m.53s.

Potsdam eEZ = +10m.30s., eSN = +18m.30s.

Irkutsk e = +29m.24s. ?

Long waves were also recorded at Colombo, Bombay., Harvard, San Fernando, Huan-

cayo, Almeria, La Paz, and La Plata.

July 21d. 21h. 56m. 3s. Epicentre 39°.5N. 33°.7E. (as on 1938 May 28d.).

A = +.6437, B = +.4293, C = +.6335; $\delta = -3$; $h = -2$;

D = +.555, E = -.832; G = +.527, H = +.351, K = -.774.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Istanbul	3.9	295	1 1	- 1	1 45	- 5	2 9	S _r —
Yalta	5.0	3	e 1 13	- 5	e 2 25	+ 7	—	—
Simferopol	5.4	3	e 1 22	- 2	2 40	S*	e 1 34	P*
Theodosia	5.7	13	i 1 24	- 4	2 46	S*	e 1 37	P*
Ksara	6.0	161	i 1 30k	- 2	e 2 50	+ 7	i 3 40	S _r —
Sotchi	6.0	46	e 2 12	—	—	—	—	—
Bucharest	7.5	313	e 2 3	P _r	e 3 18	- 2	2 26	P _r e 4.8
Erevan	8.3	83	e 2 10	+ 6	e 4 47	S _r	—	—
Platigorsk	8.3	54	e 2 7	+ 3	—	—	—	—
Sofia	8.5	296	e 2 15	+ 8	e 4 4	+19	—	—
Tifis	8.7	72	e 2 9	- 1	e 3 37	-13	—	e 4.4
Grozny	9.8	63	e 2 36	+12	—	—	—	—
Helwan	9.8	192	e 2 21	- 3	i 5 33	S _r	—	—
Baku	12.4	80	e 3 1	0	e 6 1	SSS	—	7.5
Ogyalla	14.0	312	—	—	e 6 51	SSS	—	—

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Triest	15.9	299	e 3 45	- 2	—	—	—	e 8.9
Moscow	16.5	8	e 3 48	- 6	e 7 7	+ 9	—	—
Padova	17.1	297	e 5 12	+70	—	—	—	8.4
Prague	17.2	314	e 4 3	0	e 7 27	+13	—	e 9.7
Florence	17.3	292	e 3 57	- 7	7 57	SS	—	—
Cheb	18.4	313	e 4 20	+ 2	e 7 51	+10	—	e 8.9
Potadam	19.2	320	e 4 31	+ 3	e 8 9	+10	e 8 57	SSS e 9.9
Stuttgart	19.8	308	e 4 32	- 3	e 8 16	+ 3	—	e 10.6
Zurich	19.8	303	e 5 32	+57	—	—	—	—
Moncalieri	20.0	295	e 4 12	-25	8 37	+20	—	11.5
Pulkovo	20.4	357	e 4 35	- 6	e 8 26	+ 1	—	10.0
Strasbourg	20.7	306	e 4 49	+ 5	i 8 35	+ 4	15 7	PP e 10.9
Neuchatel	20.8	302	e 4 44	- 1	—	—	—	—
Hamburg	21.4	320	e 4 50k	- 1	e 8 57	+12	—	e 12.3
Copenhagen	21.5	328	e 4 51	- 1	8 49	+ 2	9 10	SS 12.9
Uppsala	22.8	339	5 6	+ 1	—	—	—	—
De Bilt	23.4	314	e 5 12	+ 1	9 33	+12	—	e 11.4
Puy de Dôme	23.4	297	e 6 14	PPP	e 9 23	+ 2	—	—
Uccle	23.4	309	e 5 15	+ 4	e 9 29	+ 8	—	e 10.9
Paris	24.1	303	e 5 21	+ 3	e 10 3	+29	—	13.9
Algiers	24.2	273	e 4 46	-33	e 8 8	?	e 5 20	PP 10.2
Sverdlovsk	24.7	37	e 5 21	- 3	9 26	-18	—	11.9
Samarkand	25.6	79	e 5 22	-10	—	—	—	—
Tashkent	27.0	74	i 5 42	- 3	10 29	+ 7	—	e 13.9
Toledo	28.9	283	e 6 1	- 2	e 11 11	+18	e 7 8	PPP —
Andijan	29.4	76	e 6 9	+ 2	e 13 22	SSS	—	—
Rathfarnham Castle	30.3	312	i 13 57	S	(i 13 57)	SSS	—	17.0
Frunse	30.8	70	e 6 19	- 1	—	—	—	—
Agra	E. 38.7	94	—	—	e 16 13	SS	—	—
Irkutsk	48.9	50	e 11 57?	PPP	e 15 51	- 2	e 19 21	SS e 25.0

Additional readings:—

- Istanbul P₁ = +1m.15s.
- Simferopol e = +1m.54s.
- Theodosia e = +2m.2s.
- Bucharest eN = +2m.13s., eE = +3m.43s., eS?E = +3m.56s.
- Sofia eE = +4m.22s.
- Ogyalla eE = +7m.39s.
- Strasbourg eZ = +8m.37s., iE = +8m.42s.

Long waves were also recorded at Bergen, Malaga, Göttingen, Stonyhurst, San Fernando, Edinburgh, Kew, Belgrade, Budapest, and Calcutta.

July 21d. 22h. 35m. 36s. Epicentre 35°-6N. 139°-8E. (as on 1937 January 10d.).

Epicentre 35°-65N. 139°-91E. given by Tokyo.

$$A = -.6225, B = +.5260, C = +.5795; \quad \delta = 0; \quad h = 0;$$

$$D = +.645, E = +.764; \quad G = -.443, H = +.374, K = -.815.$$

	Δ °	P. m. s.	O-C. s.	S. m. s.	O-C. s.
Komaba	0.1	0 7	- 1	0 12	- 1
Tokyo, Cen. Met. Ob.	0.1	i 0 12	+ 4	0 18	+ 5
Tokyo, Imp. Univ.	0.1	0 12	+ 4	0 17	+ 4
Mitaka	0.2	0 7	- 3	0 13	- 3
Kiyosumi	0.5	0 14	0	0 22	- 1
Titibu	0.7	0 14	- 3	0 25	- 3

July 21d. Readings also at 0h. (Branner (2)), 5h. (near Fort de France), 6h. (Samarkand and Andijan), 7h. (Samarkand, Andijan, Sverdlovsk, Tashkent, Frunse, and Baku), 8h. (Toledo, Istanbul, Riverside, and Mount Wilson), 9h. (near Fort de France Helwan, Tananarive, and Theodosia), 11h. (Mizusawa), 13h. (Tiflis and Tananarive), 14h. (Pasadena, Tucson, Riverside, Mount Wilson, Sverdlovsk, and Tashkent), 15h. (De Bilt), 16h. (New Plymouth, Wellington, and Hastings), 18h. (Merida and Columbia), 21h. (near Santiago and Tananarive), 22h. (Fresno (2)).

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July 22d. 7h. 48m. 6s. Epicentre 18°·9N. 107°·0W.

Epicentre quoted by De Bilt and given by J.S.A. and U.S.C.G.S.

A = -·2768, B = -·9054, C = +·3220; $\delta = +5$; $h = +5$;
D = -·956, E = +·292; G = -·094, H = -·308, K = -·947.

	Δ	Az.	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Manzanillo	N.	2·5	87	0 43	0	—	—	—
Guadalajara	N.	3·9	60	1 0	- 2	—	—	—
Mazatlan	N.	4·3	7	1 3	- 5	—	—	—
Tacubaya	N.	7·4	85	e 1 52	0	—	—	—
Puebla	N.	8·3	88	e 2 5	+ 1	—	—	—
Chihuahua	Z.	9·7	5	i 2 19	- 3	—	—	—
Oaxaca	N.	9·9	99	e 2 28	+ 3	—	—	—
Tucson		13·7	346	i 3 21k	+ 3	i 5 51	- 1	i 3 24
Merida	N.	16·5	80	e 3 52	- 2	—	—	PP
La Jolla		16·7	328	e 3 57	0	—	—	i 6·8
Riverside		17·7	331	i 4 12k	+ 2	—	—	—
Mount Wilson		18·2	331	i 4 16k	0	—	—	—
Pasadena		18·2	331	i 4 16k	0	e 6 38	-59	i 4 40
Santa Barbara	Z.	19·2	328	i 4 30	+ 2	—	—	PP
Haiwee		19·7	334	e 4 34	0	—	—	e 7·9
Tinemaha		20·6	334	i 4 46	+ 3	—	—	—
Denver		20·8	5	e 4 47	+ 2	e 8 47	+14	PPP
Fresno	N.	21·0	331	e 4 48	+ 1	—	—	e 10·9
Lick		22·4	329	i 5 5	+ 3	i 9 29	+25	PP
Branner		22·7	328	e 5 8	+ 4	e 9 26	+17	e 11·2
Berkeley		23·1	329	e 5 10	+ 2	—	—	—
San Francisco		23·1	328	e 5 10	+ 2	—	—	e 12·2
Cape Girardeau		23·9	35	e 5 15	- 1	e 9 40	+10	i 11·8
Florissant		24·5	33	e 5 24	+ 2	i 9 45	+ 5	i 13·3
St. Louis		24·5	33	i 5 23	+ 1	e 9 47	+ 7	SSS
Ukiah		24·6	329	e 5 24	+ 1	9 52	+10	PP
Ferndale		26·2	330	e 5 44	+ 6	—	—	PP
Bozeman		26·9	355	e 5 44	- 1	i 10 27	+ 7	PP
Butte		27·4	354	e 5 49	- 0	i 10 34	+ 6	PP
Columbia		27·6	51	e 5 47	- 4	e 10 34	+ 2	—
Balboa Heights		28·4	106	e 6 1	+ 3	e 10 20	-25	—
Georgetown		32·7	45	e 6 34	- 2	i 11 55	+ 3	PP
Philadelphia		34·5	46	i 7 26	+34	i 13 21	+61	—
Fordham		35·8	44	i 6 57	- 6	i 12 45	+ 4	PP
Ottawa		37·0	36	7 12	- 1	13 4	+ 5	PP
Williamstown		37·1	43	i 7 14	0	i 13 3	+ 2	PP
Vermont		38·0	40	7 24	+ 3	i 13 20	+ 6	PP
Harvard		38·1	40	e 7 22a	0	i 13 18	+ 2	PP
Weston		38·2	40	e 7 23	0	i 13 22	+ 5	PP
San Juan		38·7	83	e 7 19	- 8	e 13 8	-17	PP
Shawigan Falls		39·4	38	7 30	- 3	16 30	SS	—
Seven Falls		40·8	38	7 45	0	14 8	+12	PP
East Machias		41·8	43	e 9 35	PP	14 16	+ 5	—
Sitka		43·5	339	e 8 6	+ 1	e 14 27	- 9	—
Huancayo		43·8	131	e 8 8	- 1	e 14 30	-10	PP
Fort de France		44·0	88	e 8 12	+ 1	i 14 50	+ 7	PP
Halifax		44·2	44	e 7 54f	-18	—	—	—
Honolulu		47·6	282	e 8 41	+ 2	e 15 42	+ 7	PP
La Paz		52·0	129	i 9 15k	+ 2	16 38	+ 2	PP
College		53·3	340	e 9 22	- 1	e 16 41	-13	p
Ivigtut		58·7	29	10 4	+ 2	18 11	+ 5	PP
Scoresby Sund		70·7	20	11 26	+ 6	20 35	+ 1	SSS
La Plata		71·0	138	11 20	- 2	20 42	+ 5	—
Rio de Janeiro		74·9	120	e 12 54	+70	i 21 24	+ 2	—
Rathfarnham Castle		81·3	36	i 13 48	f	23 27	PS	—

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o		m. s.	s.	m. s.	s.	m. s.	m.
Edinburgh	82-0	33	e 12 36	+13	i 22 42	+ 5	—	38-9
Aberdeen	82-1	32	i 12 37	+13	i 22 48	+10	—	40-2
Stonyhurst	83-2	35	e 12 34	+ 5	i 22 56	+ 7	—	39-9
Durham	83-3	34	e 12 34	+ 4	i 22 57	+ 7	i 28 25	SS
Bergen	84-2	27	e 13 11	+37	e 23 9	+10	—	e 34-9
Oxford	84-7	36	12 37	0	i 23 7	+ 3	—	—
Jersey	85-2	39	e 12 49	+10	e 23 12	+ 3	e 24 6	PS e 35-8
Kew	85-3	36	e 12 41	+ 1	e 23 10	0	e 28 53	SS e 31-9
San Fernando	87-3	52	e 13 7	+17	i 23 39	+10	—	—
Toledo	87-6	48	e 12 55	+ 4	e 23 42	+10	e 16 20	PP 36-1
De Bilt	88-1	34	13 1	+ 7	e 23 44	+ 7	e 29 27	S 41-9
Paris	88-1	38	e 13 2	+ 8	e 23 42	+ 5	24 9	SS 36-9
Uccle	88-3	36	e 13 4	+ 9	i 23 43	+ 4	24 32	PS 38-9
Malaga	88-5	51	i 13 1	+ 5	e 23 31	[+ 8]	—	—
Granada	88-9	51	e 13 9	+11	e 23 55	+11	—	—
Uppsala	89-6	24	e 12 54?	- 7	e 23 54?	+ 3	—	e 39-9
Puy de Dôme	89-8	41	e 13 9	+ 7	e 24 3	+10	—	—
Almeria	89-9	51	e 14 33	?	—	—	—	e 45-9
Copenhagen	89-9	29	—	—	23 54	0	—	35-9
Hamburg	89-9	32	e 13 8	+ 6	e 23 54	0	i 25 6	PS e 39-9
Göttingen	91-0	34	e 17 54?	PPP	—	—	—	e 44-9
Strasbourg	91-3	37	e 13 11	+ 2	e 23 44	[+ 4]	i 16 49	PP e 38-9
Neuchâtel	91-6	38	e 16 4	PP	e 24 18	+ 9	—	—
Basle	91-7	37	e 13 12	+ 2	e 24 24	+14	—	—
Stuttgart	92-0	36	e 13 10	- 2	e 23 49	[+ 5]	e 16 58	PP e 40-9
Jena	92-1	33	e 13 12	0	e 24 54	+41	—	e 36-9
Potsdam	92-1	31	e 13 24	+12	e 23 54	[+ 9]	e 16 54	PP e 41-9
Zurich	92-4	37	e 13 12	- 2	—	—	e 16 58	PP
Cheb	93-0	33	e 17 0	PP	e 24 2	[+12]	—	e 36-9
Moncalieri	93-1	39	e 13 0	-17	24 25	+ 3	—	e 39-7
Algiers	93-9	48	e 13 54?	+33	e 23 54	[- 1]	25 15	PS 42-9
Prague	94-1	33	e 21 18	?	e 25 54	PS	e 31 6	SS e 37-9
Pulkovo	94-3	19	e 13 8	-15	e 24 2	[+ 5]	—	e 44-0
Padova	95-4	37	e 12 54	-34	23 54	[- 9]	—	e 49-9
Florence	95-7	39	13 24	- 5	24 19	[+14]	—	43-9
Triest	96-3	36	13 43	+11	24 14	[+ 6]	—	e 42-2
Vladivostok	98-0	320	17 41	PP	24 33	[- 7]	31 36	SS e 37-9
Moscow	99-8	18	e 17 54	PP	24 33	[+ 7]	31 42	SS 47-4
Sofia	103-5	34	e 18 24	PP	e 26 6	+16	—	46-9
Bucharest	103-8	31	e 18 18	PP	28 12	PPS	—	46-9
Sverdlovsk	103-9	6	e 14 45	+39	25 54	+ 1	18 24	PP 40-9
Irkutsk	104-1	340	18 29	PP	24 44	[- 2]	e 28 25	PPS 45-9
Istanbul	107-7	32	18 58	PP	28 14	PS	32 24	SS
Riverview	E. 109-9	239	—	—	e 34 54	SSP	—	e 50-8
Grozny	113-2	21	e 18 26	[-13]	—	—	—	—
Tiflis	114-3	22	e 20 1	PP	e 26 59	{+24}	e 29 37	PS e 45-9
Melbourne	115-4	236	—	—	e 36 7	SS	i 29 36	PS 53-2
Ksara	116-8	34	e 19 55	PP	e 29 42	PS	e 20 18	pPP
Helwan	117-1	40	e 20 6	PP	—	—	—	—
Baku	117-2	19	e 20 1	PP	e 31 11	PPS	—	49-9
Tashkent	120-0	2	20 22	PP	27 49	{+35}	30 7	PS 53-9
Adelaide	120-3	239	—	—	e 34 24	?	—	—
Andijan	120-6	0	e 20 28	PP	—	—	—	63-9
Manila	122-2	301	e 19 27	[+30]	37 9	SS	—	56-9
Hong Kong	122-6	313	20 32	PP	31 31	PPS	37 23	SS
Phu-Lien	128-6	318	—	—	e 26 11	[- 5]	—	—
Agra	E. 134-0	352	e 22 59	PKS	—	—	—	—
Calcutta	N. 136-2	338	e 22 50	PKS	i 28 46	[-12]	e 24 32	PPP e 62-8
Bombay	142-4	359	e 23 24	PKS	e 27 28	[+45]	—	e 59-4
Batavia	144-7	286	i 19 40	[+ 1]	—	—	—	—
Kodaikanal	E. 150-7	351	—	—	e 34 54?	PS	—	105-9

For Notes see next page.

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NOTES TO JULY 22d. 7h. 48m. 6s.

Additional readings :-

Tucson $i = +6m.2s.$, $iS = +6m.5s.$ and $+6m.12s.$
Pasadena $iZ = +5m.1s.$, $iSN? = +6m.58s.$
Denver $ePPN = +5m.14s.$, $iN = +5m.23s.$, $eE = +5m.46s.$, $iN = +6m.2s.$, $iE = +6m.11s.$, $eN = +8m.50s.$, $iN = +9m.0s.$, $iSSE = +9m.11s.$
Fresno $ePPN = +5m.35s.$, $eN = +14m.3s.$
Branner $ePE = +5m.11s.$, $eN = +7m.30s.$
Berkeley $eN = +9m.42s.$, $eE = +8m.17s.$
Cape Girardeau $iN = +5m.18s.$ and $+5m.32s.$, $iSEN = +9m.45s.$, $iSSE = +10m.21s.$
Florissant $iPN' = +5m.27s.$, $iPE = +5m.30s.$, $eSG = +9m.48s.$, $iSE = +9m.56s.$, $iSEN = +10m.2s.$
St. Louis $ePcPE = +9m.11s.$, $ePcPN = +9m.14s.$, $iSE = +9m.52s.$
Ferndale $eN = +6m.58s.$
Bozeman $ePPP = +6m.41s.$, $ePcP = +8m.24s.$, $eS = +9m.44s.$
Georgetown $i = +11m.59s.$ and $+14m.5s.$
Fordham $e = +7m.27s.$, $i = +8m.19s.$
Ottawa $SSS = +15m.42s.$
Williamstown $eSS = +15m.35s.$
Harvard $eLcEN = +20m.24s.$
Weston $i = +7m.52s.$, $iZ = +8m.12s.$, $iPPEN = +9m.20s.$, $eSSEZ = +16m.0s.$
San Juan $ePPP = +9m.24s.$
Seven Falls $SS = +16m.45s.$
East Machias $iS = +14m.22s.$
Sitka $eS = +14m.40s.$
Huancayo $P = +8m.13s.$, $ePPP = +10m.37s.$, $i = +14m.46s.$, $+15m.31s.$, and $+15m.52s.$
Fort de France $PPP = +10m.26s.$, $SS = +17m.40s.$, $SSS = +18m.42s.$
Honolulu $ePPP = +11m.8s.$, $eSS = +18m.51s.$
La Paz $iPN = +9m.52s.$, $iSPZ = +10m.22s.$, $PPZ = +11m.8s.$, $pppz = +11m.44s.$, $sPPZ = +12m.26s.$, $iN = +16m.49s.$, $PSN = +17m.28s.$, $sSN = +18m.18s.$, $ScS = +19m.5s.$, $SSN = +20m.7s.$
Iviglut $+13m.40s.$
Scoresby Sund $+25m.6s.$
Durham $iSEN = +23m.0s.$
Oxford $PN = +12m.47s.$
Jersey $e = +27m.56s.$
Toledo $e = +16m.24s.$
De Bilt $iZ = +24m.42s.$, $eE = +24m.53s.$, $e = +36m.19s.$
Uccle $iSSN = +29m.35s.$, $i = +36m.17s.$
Copenhagen $+29m.54s.$
Hamburg $iN = +24m.39s.$ and $+25m.19s.$
Strasbourg $iSE = +24m.23s.$, $iPS = +25m.23s.$, $e = +29m.24s.$, $iSS = +30m.23s.$, $eSSS = +33m.54s.$
Stuttgart $e = +14m.24s.$, $eS = +24m.22s.$, $ePS = +25m.19s.$, $eSS = +30m.18s.$, $eSSS = +34m.0s.$
Jena $eZ = +13m.44s.$ and $+15m.4s.$
Potsdam $eN = +16m.24s.$ and $+19m.24s.$, $eEN = +28m.24s.$ and $+40m.24s.$
Moncalleri $i = +14m.28s.$
Algiers $e? = +16m.33s.$, $eS = +24m.42s.$, $e? = +29m.17s.$, $eSSS = +33m.3s.$ $eSSS = +33m.37s.$
Moscow $e = +18m.17s.$, $+21m.2s.$, and $+23m.36s.$
Sofia $eE = +17m.12s.$ and $+26m.54s.$
Bucharest $eSE = +28m.42s.$, $PSE = +29m.30s.$
Sverdlovsk $i = +19m.47s.$, $PS = +27m.37s.$, $SS = +33m.12s.$
Irkutsk $SS = +33m.12s.$, $eSSS = +36m.54s.$
Istanbul $PPP = +25m.14s.$
Riverview $eE = +47m.54s.$
Tiflis $ePPSE = +30m.25s.$
Ksara $eSS = +35m.58s.$
Tashkent $PPP = +23m.11s.$, $SS = +36m.24s.$, $SSS = +41m.58s.$
Adelaide $e = +44m.3s.$ and $+52m.7s.$
Calcutta $eN = +25m.52s.$, $iN = +34m.38s.$, $eN = +35m.55s.$
Bombay $eN = +24m.54s.$
Long waves were also recorded at Sydney, Dehra Dun, Colombo, Apta, Theodosia, Simferopol, Perth, Brisbane, and Budapest.

July 22d. 17h. Local shock. Tokyo gives Epicentre as $36^{\circ}14'N$. $139^{\circ}57'E$.

Kiyosumi $P = 54m.10s.$, $S = 54m.26s.$
Titibu $P = 54m.10s.$, $S = 54m.16s.$
Komaba $P = 54m.27s.$, $S = 54m.32s.$
Tokyo Imp. Univ. $P = 54m.27s.$, $S = 54m.33s.$
Tokyo Cent. Met. Obs. $iP = 54m.27s.k$, $iS = 54m.33s.$
Mitaka $P = 54m.29s.$, $S = 54m.35s.$
Nagoya $e = 55m.2s.$

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July 22d. Readings also at 0h. (Fresno, Berkeley, Lick (2), and Batavia), 1h. (Batavia), 2h. (Batavia (3)), 3h. (Batavia (2), Andijan, Frunse, and Samarkand), 4h. (Fort de France and Andijan), 6h. (Andijan, Samarkand, Berkeley, Lick, Pasadena, Mount Wilson, Santiago, and Tinemaha), 7h. (Andijan and Frunse), 8h. (Santiago), 9h. (Melbourne, Pasadena, Mount Wilson, and Tucson), 10h. (Wellington), 12h. (Grozny), 13h. (Harvard and Tananarive), 14h. (Tiflis), 15h. (Santiago), 16h. (Grozny), 18h. (Harvard), 19h. (Basle, Zurich, Tashkent, Sverdlovsk, Strasbourg, Samarkand, Frunse, and Andijan), 21h. (Tiflis, Grozny, Wellington, and Platigorsk), 22h. (Erevan), 23h. (Wellington).

July 23d. 23h. 0m. 17s. Epicentre 5°-0S. 146°-0E.

A = -·8259, B = +·5571, C = -·0866; $\delta = -3$; $h = +7$;
D = +·559, E = +·829; G = +·072, H = -·048, K = -·996.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m.
Amboina	17·8	273	i 4 14	+ 3	7 41	+13	7 48	SSS
Brisbane	E. 23·3	163	e 4 43	-27	i 8 49	-31	—	—
Riverview	29·1	171	e 6 5	+ 1	i 11 19	+23	—	e 15·4
Sydney	29·1	171	—	—	e 10 48	- 8	—	e 16·3
Adelaide	30·6	192	e 6 18	0	i 10 51	-29	13 37	SSS
Manila	31·5	309	i 6 24k	- 2	11 34	0	—	15·5
Melbourne	32·7	181	—	—	i 11 18	-34	i 13 15	SS
Miyakozima	35·8	327	7 9	+ 6	12 43	+ 2	—	15·4
Kosyun	36·5	318	7 8	- 1	12 52	+ 1	—	17·2
Karenko	37·4	322	7 17	+ 1	13 7	+ 2	—	—
Yakusima	38·3	340	7 25	+ 1	13 7	-12	—	—
Perth	38·9	223	i 13 6	S	(i 13 6)	-22	15 51	SS
Batavia	39·0	267	i 7 24	- 6	—	—	i 8 57	PP
Osaka B	40·7	347	8 22	+38	13 49	- 6	—	—
Kobe	40·8	347	8 11	+26	13 47	- 9	—	—
Hukuoka B	41·1	341	e 7 48	+ 1	e 14 1	0	—	—
Hong Kong	41·3	313	7 49	0	14 8	+ 4	17 23	SS
Oiwake	41·7	351	7 53	+ 1	14 6	- 4	17 38	SSS
Hamada	41·8	343	8 19	+26	14 8	- 3	—	—
Mizusawa	E. 44·1	356	e 8 9	- 3	14 42	- 3	—	—
	N. 44·1	356	e 8 12	0	14 44	- 1	—	—
Keizyo	45·9	339	8 25	- 1	15 10	- 1	—	—
Zinsen	46·0	338	18 25	- 2	i 15 10	- 2	8 56	PP
Mori	47·1	356	8 34	- 1	15 25	- 3	—	—
Medan	48·0	280	8 42	- 1	i 15 38	- 3	—	—
Vladivostok	49·6	347	e 8 55	0	i 16 0	- 3	—	21·5
Calcutta	N. 62·6	299	e 14 15	PPP	i 19 3	+ 7	—	—
Irkutsk	67·1	334	e 11 5	+ 8	i 19 47	- 4	—	30·7
Kodaikanal	E. 69·9	283	e 16 43?	PPP	—	—	—	—
Agra	E. 72·9	301	e 11 23	-10	i 20 47	-12	—	—
Bombay	E. 75·8	291	e 11 46	- 4	i 21 27	- 4	—	—
Semipalatinsk	78·7	324	e 13 26	+80	—	—	—	—
Andijan	81·9	313	e 12 28	+ 5	e 22 19	-17	—	—
Tashkent	83·4	313	12 23	- 7	i 22 35	-16	—	—
Samarkand	84·7	310	e 12 48	+11	e 23 3	- 1	—	—
Sverdlovsk	91·6	327	e 13 1	- 9	i 23 23	[-19]	e 30 1	SS
Pasadena	97·6	56	i 13 23 _a	-15	—	—	—	—
Mount Wilson	97·7	56	e 13 23 _a	-15	—	—	—	—
Haiwee	E. 97·8	54	e 13 22	-16	—	—	—	—
Baku	98·0	311	e 17 41	PP	27 15	PPS	—	e 48·7
Riverside	Z. 98·3	56	e 13 24	-17	—	—	—	—
Grozny	100·9	313	e 13 53	+ 1	e 24 15	[-16]	—	—
Tiflis	101·7	311	e 16 45	PKP	e 24 17	[-18]	e 17 56	PP
Tucson	103·8	58	e 18 6	PP	—	—	—	e 43·7
Moscow	104·5	326	e 18 20	PP	24 28	[-20]	e 26 56	PS
Pulkovo	107·0	332	—	—	e 33 43	SS	—	55·2
Ksara	109·5	303	e 19 5	PP	e 28 37	PS	e 34 53	SS
Copenhagen	117·4	333	20 28	PP	—	—	—	59·7
Florissant	119·0	48	e 19 55	PP	e 25 30	[-17]	—	—
Potsdam	119·0	330	e 20 37	PP	e 25 13	[-34]	e 27 49	SKKS
Cheb	120·6	328	—	—	e 33 43?	?	—	e 58·7

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
De Bilt	123-0	333	e 20 55	PP	e 37 24	SS	—	e 57-7
Stuttgart	123-1	327	e 20 45	PP	e 31 55	PS	e 37 19	SS e 57-7
Strasbourg	123-9	328	e 21 12	PP	e 27 26	{ -14 }	30 28	PS e 57-2
Uccle	124-2	332	e 21 9	PP	e 27 30	{ -12 }	e 37 37	SS e 57-7
Ottawa	125-8	35	e 18 50	[-14]	e 30 43	PS	—	46-7
Harvard	130-0	35	e 18 59	[-13]	e 31 13	PS	e 21 8	PP e 66-7
Weston	130-2	35	e 21 13	PP	e 31 21	PS	—	—
Huancayo	135-5	112	e 19 13	[-9]	—	—	e 21 22	PP —
Toledo	136-0	327	e 22 3	PP	—	—	e 24 10	PPP —
La Paz	140-0	123	e 19 15	[-16]	—	—	i 22 47	PP —
San Juan	145-9	63	e 19 8	[-33]	—	—	—	—
Fort de France	151-4	68	e 19 39	[-10]	—	—	e 33 19	PS —

Additional readings :—

Riverview iN = +11m.33s., iE = +13m.34s.

Adelaide i = +12m.4s.

Manila ePEN = +6m.30s.

Melbourne e = +10m.31s.

Perth PP = +13m.46s., PPP = +13m.58s., i = +15m.15s., S = +17m.48s., P_cS =

+19m.46s.

Hong Kong ? = +8m.20s.

Bombay iE = +12m.13s.

Sverdlovsk i = +13m.34s., i_cS = +23m.59s., eSSS = +33m.55s.

Tiflis eNZ = +18m.8s., eSKKSE = +24m.56s., eSE = +25m.15s., ePKKPN =

+30m.13s., eSSN = +32m.45s., eSSSN = +35m.50s.

Tucson e = +17m.17s.

Moscow e = +23m.17s. and +34m.22s.

Pulkovo e = +23m.39s.

Ksara ePPP = +21m.27s.

Florissant iZ = +20m.2s.

Potsdam eEN = +26m.55s. and +36m.31s., eZ = +36m.49s.

Stuttgart ePPP = +27m.21s.

Strasbourg eSKS = +31m.32s., eS = +32m.54s., ePS = +34m.19s., e = +37m.43s.,

eSS = +40m.55s.

Harvard ePPZ = +22m.11s.

Weston iZ = +22m.13s. and +23m.4s.

Huancayo iPKS = +22m.34s., ePPP = +24m.2s.

Toledo e = +22m.36s. and +22m.51s.

La Paz iPZ = +19m.19s.

San Juan i = +20m.24s.

Long waves were also recorded at Edinburgh, Guadalajara, and Kew.

July 23d. Readings also at 0h. (Tacubaya), 1h. (St. Louis), 4h. (Mizusawa, Tananarive, New Plymouth, Wellington, and Nagoya), 6h. (Tashkent, Sverdlovsk, Tiflis, and Ksara), 7h. (near Fort de France), 8h. (Tiflis), 10h. (Tiflis and Grozny), 11h. (Scoresby Sund), 12h. (Tiflis, Andijan, Samarkand, Hyderabad, Kodaikanal, Agra, Calcutta, Bombay, Ksara, Sverdlovsk, Tashkent, Irkutsk, and near Manila), 13h. (Bozeman, Oaxaca, Tacubaya, Philadelphia, Jersey, Pasadena, Mount Wilson, Riverside, and Tucson), 14h. (Harvard, Florissant, Tashkent, and Sverdlovsk), 15h. (Huancayo and Toledo), 16h. (Toledo, Nagoya, and Malaga), 18h. (near Malaga), 19h. (near Malaga, Wellington, La Paz, Sand Javier (2), Santiago (3), Rio de Janeiro, Granada, and La Plata), 20h. (Vladivostok, Copenhagen, Moscow, La Paz, Sverdlovsk, Tashkent, Tucson (2), Riverside, Mount Wilson, Pasadena, Manila, Irkutsk, and Tiflis), 21h. (Strasbourg, Santiago (2), and San Javier (2)).

July 24d. 13h. 12m. 12s. Epicentre 53°·6N. 166°·6W.

A = -·5798, B = -·1381, C = +·8030; $\delta = +5$; $h = -7$;
D = -·232, E = +·973; G = -·781, H = -·186, K = -·596.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
College	14-7	33	e 3 34	+ 3	e 6 23	+ 7	e 3 52	PP 6-8
Sitka	18-0	66	i 4 18	+ 5	7 43	+11	i 4 30	PP 8-2
Ferndale	E. 31-2	97	—	—	14 46	SSS	—	17-6
Ukiah	32-7	98	—	—	11 57	+ 5	—	14-3
Honolulu	32-9	164	e 6 43	+ 5	e 11 51	- 5	—	e 13-8
Berkeley	34-1	98	e 6 49	+ 1	e 12 16	+ 2	e 15 54	SSS —
Butte	34-9	79	e 6 53	- 2	e 12 22	- 5	—	e 15-9
Bozeman	36-0	79	e 7 17	+12	e 12 53	+ 9	e 8 28	PP e 15-4
Fresno	N. 36-3	98	e 7 10	+ 3	—	—	—	—
Tinemaha	37-0	96	i 7 16	+ 3	e 13 25	+26	e 17 24	S _c S —

Continued on next page.

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		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°		m. s.	s.	m. s.	s.	m. s.	m.
Haiwee		37.8	97	17 22	+ 2	e 13 13	+ 2	—	—
Santa Barbara	z.	37.9	101	17 23	+ 3	—	—	—	—
Pasadena		39.0	100	17 30	0	e 13 29	0	i 17 36	S _e S e 16.4
Mount Wilson	z.	39.1	100	17 30	- 1	—	—	—	—
Riverside	z.	39.6	100	17 34	- 1	—	—	—	—
La Jolla		40.5	100	e 7 38	- 4	e 13 50	- 2	i 17 43	S _e S
Vladivostok		41.0	282	e 7 45	- 1	e 13 51	- 8	—	e 20.3
Nagoya		43.1	269	e 8 3	- 1	—	—	—	—
Tucson		44.7	95	18 17 _a	+ 1	i 14 57	+ 3	—	18.3
Irkutsk		50.3	308	9 0	0	16 10	- 3	—	27.8
Chicago		51.7	69	e 9 12	+ 1	e 16 30	- 2	e 20 17	SS e 20.5
Florissant		52.3	74	19 15	0	i 16 38	- 2	i 19 25	PP
St. Louis		52.5	74	19 18	+ 1	e 16 40	- 3	i 11 20	PP
Cape Girardeau		53.8	75	e 9 29	+ 3	i 16 58	- 3	e 9 32	PP
Ivigtut		55.6	33	9 42	+ 2	—	—	—	—
Ottawa		55.7	59	9 40	0	i 17 25	- 1	—	25.8
Shawinggan Falls		56.4	56	9 48	+ 3	17 34	- 2	—	27.8
Seven Falls		56.9	55	9 47	- 2	17 38	- 4	—	24.8
Vermont		57.6	58	e 9 57	+ 3	e 17 54	+ 3	e 12 7	PP e 24.1
Williamstown		58.9	59	i 10 3	0	e 18 10	+ 2	i 12 13	PP e 28.8
Fordham		59.2	60	i 10 8	+ 3	i 18 20	+ 8	e 12 25	PP
Georgetown		59.6	65	e 10 7	- 1	i 18 15	- 2	—	27.8
Harvard		59.9	58	i 10 9 _a	- 1	i 18 21	0	e 12 4	PP e 31.8
Philadelphia		59.9	63	i 10 8	- 2	e 18 15	- 6	e 12 22	PP e 24.9
Weston		60.1	58	i 10 11 _a	0	i 18 25	+ 1	i 12 42	PP e 29.0
East Machias		60.3	54	e 10 14	+ 1	e 18 25	- 1	—	e 29.6
Sverdlovsk		63.4	334	e 10 34	0	19 4	- 2	—	29.8
Hong Kong		66.0	276	10 52	+ 2	19 36	- 2	—	—
Bergen		66.2	6	—	—	e 19 54	+14	—	e 36.4
Pulkovo		66.2	352	e 10 52	0	e 19 39	- 1	—	e 28.3
Uppsala		66.8	359	e 10 48 _f	- 8	e 20 48 _f	PPS	—	—
Manila		68.0	265	e 11 1 _a	- 2	19 55	- 7	—	—
Moscow		69.2	346	11 7	- 3	e 20 9	- 7	—	35.3
Frunse		70.5	318	e 11 21	+ 3	—	—	—	—
Copenhagen		71.1	2	i 11 22	0	20 38	0	21 24	PS 31.8
Durham		71.3	9	i 11 27	+ 4	i 20 40	- 1	—	—
Rathfarnham Castle		72.2	12	i 11 38	+ 9	i 21 3	+12	—	e 38.5
Bidston		72.5	11	e 11 23	- 7	e 20 54	0	—	e 30.8
Andifan		73.2	318	e 11 32	- 3	—	—	—	—
Hamburg	n.	73.2	3	e 11 31	- 4	e 21 1	- 1	—	e 35.8
Tashkent		74.0	321	i 11 39	0	i 21 5	- 6	—	e 34.8
Oxford		74.3	9	i 11 40 _a	- 1	i 21 12	- 3	—	e 35.7
De Bilt		74.4	6	i 11 43 _a	+ 1	21 17	+ 1	—	e 35.8
Potsdam		74.4	2	e 11 42	0	e 21 18	+ 2	e 16 18	PPP e 35.8
Kew		74.7	8	e 11 46	+ 3	e 22 30	PPS	—	e 31.8
Uocle		75.7	8	e 11 50 _a	+ 1	e 21 29	- 1	22 23	PS e 36.8
Cheb		76.7	2	—	—	(e 21 54)	+13	e 30 48 _f	SSS e 40.8
Prague		76.7	0	—	—	e 22 12	PS	—	—
Paris		77.5	9	e 12 1	+ 2	e 22 6	PS	—	46.8
Stuttgart		77.9	3	i 12 4 _a	+ 3	e 21 49	- 5	e 14 53	PP e 36.8
Strasbourg		78.1	5	i 12 4 _a	+ 2	e 21 57	+ 1	e 22 35	PS e 36.8
Zurich		79.3	4	e 12 8	- 1	—	—	—	—
Grozny		79.5	337	e 12 5	- 5	e 22 16	+ 5	—	—
Neuchatel		79.6	5	e 7 30	?	e 18 16	?	—	—
Calcutta	n.	80.6	295	—	—	e 22 8	-15	—	e 42.1
Puy de Dôme		80.6	9	e 12 20	+ 4	e 23 13	PS	—	—
Triest		81.1	1	12 17	- 1	e 22 34	+ 6	—	—
Baku		81.2	334	12 23	+ 4	e 23 37	PPS	28 58	SS 41.8
Tiflis		81.3	338	i 12 20	0	e 22 31	+ 1	15 21	PP e 39.8
San Juan		81.4	71	e 12 13	- 7	i 22 28	- 3	i 22 49	S _e S
Bucharest		81.8	351	e 12 24	+ 2	e 22 24	-11	e 23 54	PPS 42.8
Belgrade		81.8	355	e 12 23 _k	+ 1	e 22 33	- 2	—	e 44.3
Agra	e.	82.1	306	e 12 22	- 2	e 22 36	- 2	23 41	PS e 40.7
Florence		83.0	2	e 12 28	0	22 38	- 9	—	—
Sofia		83.7	353	e 12 33	+ 1	e 22 53	- 1	—	47.7

Continued on next page.

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Istanbul	84.7	349	12 58	+21	24 50	PS	16 13	PP
Toledo	85.3	14	e 12 44	+ 4	e 23 17	+ 7	e 16 3	PP
Granada	88.4	15	e 12 58	+ 3	e 23 46	+ 6	—	—
Malaga	88.7	15	e 13 14	+17	23 47	+ 4	—	—
Algiers	89.5	8	i 13 3	+ 3	23 48?	- 2	—	—
Ksara	90.8	342	i 13 8	+ 2	e 24 26	+24	i 13 24	pP
Bombay	91.6	305	—	—	i 24 3	- 6	—	—
Helwan	95.4	345	i 13 29	+ 1	i 24 18	[+15]	—	—
Kodaikanal	E. 96.6	297	e 21 48?	?	—	—	—	—
Christchurch	98.4	196	—	—	47 13	?	48 9	L _g
Huancayo	100.3	96	—	—	e 24 22	[- 6]	e 32 5	SS

Additional readings:—

Sitka iS = +7m.50s., i = +8m.3s.
 Berkeley iZ = +6m.51s., eZN = +7m.2s., iN = +7m.6s., eN = +12m.54s.
 Bozeman eP = +7m.22s., ePPP = +8m.51s., eS = +13m.3s.
 Tucson iP = +8m.19s., i = +8m.23s., iS = +15m.19s.
 Florissant isSN = +16m.57s.
 St. Louis isSN = +16m.59s.
 Cape Girardeau eEN = +17m.8s.
 Vermont eS₀S = +20m.2s.
 Philadelphia iS = +18m.19s., eS₀S = +19m.56s., eSS = +22m.7s.
 Weston iZ = +10m.21s., +10m.28s., and +10m.35s., iPS_{EN} = +18m.43s., iS₀SE = +20m.0s., eSSN = +22m.42s., eSSSZ = +25m.4s.
 Potsdam eZ = +17m.36s., eEZ = +22m.18s.
 Ucle SS = +27m.11s.
 Stuttgart eP₀PNZ = +12m.33s., eSKKS = +23m.17s., eSS = +26m.54s.
 Baku e = +33m.10s.
 Tifis eP₀PZ = +12m.37s., eNZ = +18m.51s., ePSN = +22m.49s., eSSN = +28m.55s., eSSSN = +32m.51s., eSSSZ = +33m.21s.
 Bucharest eE = +26m.18s.
 Agra SE = +22m.59s.
 Toledo e = +23m.29s.
 Ksara eP = +16m.52s., eSS = +31m.0s., ePKP,PKP = +38m.24s.
 Huancayo eS = +25m.25s.

Long waves were also recorded at Almeria, Jersey, Fort de France, Scoresby Sund, Aberdeen, Wellington, Stonyhurst, Göttingen, and San Fernando.

July 24d. Readings also at 0h. (Frunse and near Santiago), 3h. (Haiwee, La Jolla, Mount Wilson, Riverside, near Pasadena, and near Tucson), 4h. (Granada), 5h. (Tucson), 6h. (near Nagoya), 7h. (near Tananarive), 8h. (Malabar and Wellington), 16h. (Tucson), 17h. (Christchurch, New Plymouth, and near Wellington), 18h. (Haiwee, Mount Wilson, Riverside, and Tucson), 21h. (Sofia and near Wellington), 22h. (Mizusawa), 23h. (near Andijan and near Mizusawa).

July 25d. Readings at 2h. (Mizusawa and Nagoya), 5h. (New Plymouth and near Wellington), 7h. (Wellington, near Berkeley, near Branner, Fresno, and Lick), 8h. (Mount Wilson, Pasadena, Riverside, Tucson, and near Nagoya), 9h. (Irkutsk, Sverdlovsk (2), Ksara, Tashkent (2), Tchikment, Vladivostok, Hong Kong, near Manila, near Samarkand (2), and near Tananarive), 10h. (Tifis, Pulkovo, Copenhagen, De Bilt, and Strasbourg), 11h. (Frunse, Andijan, Sverdlovsk, Tashkent, Tchikment, and near Samarkand (2)), 14h. (Sofia, near Batavia, and Malabar), 15h. (Malabar), 16h. (near Andijan), 17h. (near Wellington), 18h. (Cape Girardeau and Harvard), 19h. (Ksara), 20h. (Nagoya), 21h. (Ksara, Vladivostok, Irkutsk, La Paz, Nagoya, and near Mizusawa), 22h. (Oaxaca, Tacubaya, Mount Wilson, Tucson, near Harvard, Tifis, Baku, Sverdlovsk (2), Irkutsk, Tashkent, Copenhagen, De Bilt, and Strasbourg), 23h. (Medan and Mount Wilson).

July 26d. Readings at 0h. (near Branner and near Andijan), 1h. (Samarkand), 2h. (near Andijan), 3h. (Samarkand (2)), 6h. (near Haiwee, Mount Wilson, Pasadena, Riverside, Santa Barbara, Fresno, Tinemaha, and Tucson), 7h. (Mount Wilson, Riverside, near Andijan, and near Tananarive), 8h. (Bucharest, Sofia, Triest (3), Harvard, and near Ottawa), 9h. (Andijan, Frunse, and Medan), 11h. (Tifis and Tucson (2)), 14h. (Medan), 15h. (Copenhagen, Baku, Irkutsk, Pulkovo, Sverdlovsk, Tashkent, Tifis, Tucson, Mount Wilson, and Pasadena), 16h. (Triest and near La Paz), 17h. (Wellington, Ottawa, near Harvard, Weston, near Batavia, and Malabar), 18h. (Santiago), 19h. (near Andijan), 20h. (Frunse, Tashkent, Sverdlovsk, and Andijan).

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July 27d. 1h. 29m. 10s. Epicentre 38°·3N. 23°·8E. (as on July 20d.).

Felt at Kapandriti (Altique), given by B.S.S.A. Epicentre Greece 38°·5N. 23°·8E.

See Annales de l'Institut de Physique du Globe de Strasbourg, 1938. Tome III 2e partie Seismologie, Mende, 1941, p. 59.

A = +·7199, B = +·3175, C = +·6172; $\delta = 0$; $h = -1$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Sofia	4·4	356	e 1 11	+ 1	i 2 11	S*	i 2 35	S _g
Bucharest	6·3	15	e 1 41	+ 5	i 3 2	S*	e 2 11	P _g
Belgrade	7·0	340	e 1 46 ^a	0	e 3 2	- 6	2 32	P _g
Kecskemet	z. 9·1	342	e 5 1	S _g	—	—	—	—
Ogyalla	10·4	338	—	—	e 5 50	S _g	—	—
Triest	10·5	318	e 3 22	+47	e 5 13	SSS	—	—
Theodosia	11·0	48	e 2 44	+ 2	—	—	—	—
Zurich	14·4	314	e 3 33	+ 6	e 5 24	-45	—	—
Stuttgart	14·8	320	e 3 30	- 2	—	—	—	e 7·8
Jena	15·3	329	e 3 44	+ 5	—	—	—	—
Potsdam	16·0	335	—	—	e 6 56	+10	—	e 8·2
Tiflis	16·4	71	e 2 58	-55	e 7 17	SS	—	9·2
Uccle	18·6	319	e 4 8	-13	—	—	e 5 20	PPP e 9·8
Copenhagen	19·0	341	e 4 24	- 2	7 56	+ 1	—	9·8
De Bilt	19·0	325	e 4 26	0	—	—	—	e 10·3
Moscow	z. 19·7	24	i 4 36	+ 2	8 20	+10	—	e 10·3
Kew	21·5	317	i 4 50	- 2	—	—	—	—
Pulkovo	21·9	9	e 4 56	- 1	e 8 54	0	—	e 10·5
Upsala	21·9	352	—	—	e 8 50?	- 4	—	—
Edinburgh	25·2	323	—	—	e 9 50?	- 2	—	—
Sverdlovsk	30·5	40	e 6 16	- 1	e 11 26	+ 8	—	15·8
Weston	68·7	308	e 11 7	0	—	—	—	e 31·3
Williamstown	69·7	308	i 11 17	+ 3	—	—	—	—
Rio de Janeiro	87·4	239	e 13 50	+60	—	—	—	—

Additional readings:—

Sofia iEN = +1m.27s. and +1m.45s., iE = +2m.30s.
 Bucharest eP* = +2m.1s., eEN = +2m.58s., iS* = +3m.22s., iS_gEN = +3m.33s.
 Belgrade eNW = +3m.52s., iNW = +4m.6s., +4m.32s., and +5m.15s.
 Kecskemet eZ = +6m.1s. and +6m.53s.
 Ogyalla eR = +6m.0s., iN = +7m.26s.
 Tiflis eZ = +7m.20s.
 Kew eEN = +12m.16s.
 Weston eN = +12m.31s.

Long waves were also recorded at Padova, Ksara, Baku, Karlsruhe, Strasbourg, Budapest, Cheb, Philadelphia, Tashkent, Harvard, and Fort de France.

July 27d. 11h. 47m. 48s. Epicentre 35°·4N. 140°·7E.
 (as on 1937 Dec. 1d. and near position 35°·7N. 140°·7E. given by Tokyo).

A = -·6322, B = +·5174, C = +·5767; $\delta = -4$; $h = 0$;
 D = +·633, E = +·774; G = -·446, H = +·365, K = -·817.

	Δ	Az.	P.	O-C.	S.	O-C.
	°	m. s.	m. s.	s.	m. s.	s.
Kiyosumi	0·5	239	0 22	+ 8	0 31	+ 8
Tokyo Cent. Met. Obs.	0·8	293	0 20k	+ 2	i 0 29	- 2
Tokyo Imp. Univ.	0·8	293	0 20	+ 2	0 30	- 1
Kamakura	0·9	265	0 22	+ 2	0 34	0
Komaba	0·9	287	0 20	0	0 30	- 4
Misaki	0·9	254	0 22	+ 2	0 33	- 1
Mitaka	1·0	286	0 22	+ 1	0 33	- 3
Tukubasan	1·0	329	0 22	+ 1	0 32	- 4
Koyama	1·4	268	0 22	- 5	0 37	- 9
Titibu	1·4	294	0 22	- 5	0 37	- 9
Susaki	1·6	242	0 30	0	0 46	- 5
Yosiwara	1·7	262	0 22	- 9	0 41	- 13
Nagoya	3·1	266	0 53	+ 2	1 29	0
Mizusawa	3·7	5	e 1 6	+ 5	1 44	- 1

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July 27d. 13h. 23m. 3s. Epicentre 61°·5N. 30°·0W.

A = +·4153, B = -·2398, C = +·8775; $\delta = -2$; $h = -9$;
D = -·500, E = -·866; G = +·760, H = -·439, K = -·480.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Edinburgh	14·9	99	e 3 33	- 1	—	—	—	e 6·9
Oxford	18·4	109	e 4 15	- 3	—	—	—	—
De Bilt	21·2	100	i 4 47	- 2	—	—	—	e 9·9
Uccle	21·7	105	e 4 51	- 4	—	—	—	e 11·1
Copenhagen	22·5	85	5 1	- 1	9 3	- 2	—	11·0
Hamburg	z. 22·6	92	e 5 1	- 2	—	—	—	—
Potsdam	24·8	91	e 5 21	- 4	—	—	—	e 13·0
Strasbourg	24·8	103	i 5 26	+ 1	e 12 44	L	—	(12·7)
Stuttgart	25·3	102	e 5 30	0	e 10 8	+14	—	e 12·5
Prague	26·9	94	e 6 57?	PPP	—	—	—	—
Pulkovo	28·7	66	e 6 3	+ 2	e 10 51	+ 1	—	e 14·6
Sverdlovsk	43·1	53	e 8 6	+ 2	e 14 34	+ 4	e 17 37	SS 20·0
Ksara	49·5	93	e 8 57	+ 3	—	—	—	—
Tucson	57·9	279	e 10 19k	+23	—	—	—	—
Mount Wilson	z. 59·7	286	e 10 42	+33	—	—	—	—

Additional readings:—

Copenhagen +5m.7s. and +9m.11s.

Potsdam eZ = +5m.24s.

Ksara e = +17m.31s.

Long waves were also recorded at Trieste, Bidston, Scoresby Sund, Aberdeen, Kew, Durham, Paris, Vladivostok, Ivigtut, Cheb, Harvard, Moscow, and Tifis.

July 27d. 16h. 55m. 38s. Epicentre 25°·3N. 125°·2E. (as on 1938 June 10d.).

A = -·5218, B = +·7396, C = +·4250; $\delta = -9$; $h = +3$;
D = +·817, E = +·576; G = -·245, H = +·347, K = -·905.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Taihoku	3·4	266	e 0 52	- 3	1 27	-10	—	—
Zi-ka-wei	6·8	331	e 1 32	-12	i 3 40	S _r	—	—
Hukuoka B	9·4	27	2 20	+ 2	e 5 24	S _r	—	—
Husan	10·3	18	2 35	+ 3	e 5 48	S _r	—	—
Hong Kong	10·6	256	2 28	- 8	4 25	-12	—	5·2
Taikyu	11·0	15	2 43	+ 1	5 57	SSS	—	9·0
Manila	11·4	201	e 2 50	+ 3	5 16	SS	—	—
Zinsen	12·2	5	e 2 56	- 2	e 6 53	L	—	(6·9)
Keizyo	12·4	8	e 2 55	- 6	e 6 55	L	—	e 11·5
Heizyo	13·7	2	i 3 17	- 1	i 6 11	SS	—	7·7
Phu-Lien	17·7	259	e 4 5	- 5	e 7 22	- 4	—	—
Vladivostok	18·6	15	4 21	0	i 7 50	+ 4	—	8·7
Mizusawa	E. 19·4	40	4 53	+23	8 22	+18	—	11·1
N. 19·4	40	4 44	+14	8 16	+12	—	—	10·9
Irkutsk	31·3	334	e 6 16	- 8	11 28	- 3	—	17·4
Calcutta	N. 33·8	274	e 6 42	- 4	e 11 48	-22	i 13·56	SS i 15·9
Agra	E. 42·2	283	e 8 6	+10	—	—	—	—
Frunse	44·7	306	e 8 25	+ 9	—	—	—	25·9
Andijan	46·2	303	e 8 31	+ 3	—	—	—	e 24·4
Kodaikanal	E. 47·6	262	—	—	e 15 22?	-13	—	—
Tashkent	48·6	305	i 8 42	- 5	e 15 39	-10	—	e 24·4
Bombay	48·7	274	9 0	+12	15 57	+ 7	18 41	SS —
Sverdlovsk	55·3	323	e 9 31	- 7	17 13	- 8	—	26·9
Baku	63·3	304	e 10 37	+ 4	e 19 0	- 4	—	31·9
Grozny	65·7	308	e 10 54	+ 6	—	—	—	—
Tifis	66·8	306	e 10 55	- 1	e 19 53	+ 5	e 13 15	PP e 31·4
Moscow	68·2	322	e 11 20	+16	e 19 53	-11	e 14 1	PP e 37·9
Pulkovo	70·9	328	e 11 16	- 5	e 20 29	- 7	—	—
Ksara	75·8	300	e 11 53	+ 3	e 21 36	+ 5	—	—
Upsala	N. 76·8	331	—	—	e 30 22?	SSS	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Istanbul	78.2	311	—	—	e 22 22?	PS	—	—
Copenhagen	81.3	328	—	—	22 28	- 2	—	40.4
Scoresby Sund	81.7	350	—	—	22 34	0	—	40.4
Bergen	81.7	334	—	—	e 22 36	+ 2	—	e 43.4
Potsdam	82.7	325	—	—	e 22 40	- 4	—	e 40.4
Hamburg	E. 83.6	327	—	—	e 22 58	+ 5	—	e 43.9
Cheb	84.3	324	—	—	e 22 22	- 38	—	e 45.4
De Bilt	86.8	327	e 12 57	+ 10	e 23 16	[+ 3]	—	e 42.4
Stuttgart	86.8	323	e 19 25	?	e 23 36	+ 11	24 52	PPS e 45.4
Strasbourg	87.7	324	—	—	e 24 28	PS	33 10	SSS e 44.4
Oxford	90.1	330	—	—	e 24 48	PS	—	e 40.4
Paris	90.3	326	e 19 22?	PPP	e 25 22?	PPS	—	46.4
Mount Wilson	z. 95.7	48	e 13 30	+ 1	—	—	—	—
Pasadena	z. 95.7	48	e 13 32	+ 3	—	—	—	—

Additional readings :—

Zi-ka-wei iE = +3m.44s., iN = +4m.14s. and +4m.30s.

Calcutta eN = +9m.54s., +10m.19s., and +14m.47s.

Tifis eSSZ = +24m.27s., eSSSZ = +27m.7s.

Potsdam eZ = +23m.10s., eN = +26m.16s.

Stuttgart e = +25m.52s.

Long waves were also recorded at Hnancayo, Medan, Harvard, Philadelphia, and European stations.

July 27d. 19h. 51m. 22s. Epicentre 76°7'N. 7°8'E. (as on 1938 July 2d.).

A = +.2294, B = +.0314, C = +.9728; δ = -5; h = -13;
D = +.136, E = -.991; G = +.964, H = +.132, K = -.232.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	10.4	246	2 33	- 1	—	—	—	4.6
Pulkovo	18.7	143	e 4 18	- 4	e 7 51	+ 3	—	e 9.1
Copenhagen	21.2	171	4 47	- 2	8 47	+ 6	—	11.6
Hamburg	z. 23.2	177	15 10k	+ 1	—	—	—	—
Moscow	23.7	134	5 15	+ 1	9 27	0	—	e 13.1
Ivigtut	24.0	261	5 18	+ 1	9 56	+ 24	—	11.6
Potsdam	24.5	172	e 5 20	- 2	e 9 44	+ 4	—	—
De Bilt	24.7	182	5 23	- 1	—	—	—	e 12.6
Jena	25.9	173	15 32	- 3	—	—	—	—
Uccle	26.0	185	e 5 42	+ 6	e 10 22	+ 16	—	—
Sverdlovsk	27.2	107	15 45	- 2	10 28	+ 3	—	13.1
Grozny	37.0	131	e 7 40	+ 27	—	—	—	—
Tifis	38.4	133	e 7 26	+ 1	e 15 48	SS	—	e 20.6
Baku	40.6	128	e 9 16	PP	—	—	—	e 21.1
Irkutsk	41.3	68	e 7 38?	- 11	e 13 38?	- 26	e 9 38?	PP 24.6
Tashkent	43.7	106	8 5	- 3	e 14 28	- 11	—	e 20.6
Ksara	44.8	146	18 17	0	e 16 6	?	e 10 28	PPP
Weston	46.7	272	—	—	e 15 26	+ 4	—	e 23.6
Williamstown	46.8	273	18 32	- 1	—	—	—	—
Philadelphia	49.9	275	—	—	e 16 9	+ 2	—	e 26.4
Tinemaha	61.6	313	e 10 22	0	—	—	—	—
Haiwee	62.5	312	e 10 27	- 1	—	—	—	—
Mount Wilson	z. 64.4	312	i 10 39a	- 1	—	—	—	—
Riverside	z. 64.5	312	i 10 39	- 2	—	—	—	—
Pasadena	z. 64.5	312	i 10 39a	- 2	—	—	—	—
Tucson	65.0	305	i 10 43a	- 1	—	—	13 6	PP

Additional readings :—

Potsdam eN = +9m.2s.

Jena iN = +5m.36s.

Irkutsk e = +19m.38s.† and +22m.38s.†

Ksara eSS = +19m.57s.

Pasadena iZ = +10m.44s.

Tucson i = +10m.48s.

Long waves were also recorded at Strasbourg and Harvard.

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July 27d. Readings also at 0h. (Istanbul), 1h. (La Paz, La Plata, and Huancayo), 2h. (Fort de France, Tashkent, Tifis, De Bilt, and Sverdlovsk), 3h. (Triest), 7h. (Nagoya and Mizusawa), 8h. (near Manila), 9h. (Tashkent, Andijan, and Frunse), 10h. (Sverdlovsk), 11h. (Pasadena, Wellington, Apia, Sverdlovsk, Tucson (2), Riverside, and Mount Wilson (2)), 12h. (Irkutsk, Tifis, and Scoresby Sund), 14h. (Scoresby Sund (2)), 15h. (Scoresby Sund, Tucson, Mount Wilson, Tashkent, Irkutsk, La Paz, Riverside, and Sverdlovsk), 16h. (Copenhagen, Koti, Ottawa, Tifis, and De Bilt), 17h. (Averros and near Tananarive), 18h. (Frunse, Andijan, Tashkent, Samarkand, and Tchikment), 19h. (near Irkutsk), 21h. (La Paz and Huancayo), 22h. (Scoresby Sund), 23h. (Irkutsk, Tashkent, Copenhagen, Vladivostok, Sverdlovsk, Medan, Calcutta, and Agra).

July 28d. 8h. 17m. 1s. Epicentre 46°·0N. 153°·5E.

A = -·6239, B = +·3110, C = +·7170; $\delta = +6$; $h = -4$;
D = +·446, E = +·895; G = -·642, H = +·320, K = -·697.

Pasadena suggests deep focus.

		Δ	Az.	P.		O-C.	S.		O-C.	Supp.		L.	
				m. s.	s.		m. s.	s.		m. s.	s.		
Mizusawa		11·4	237	e 2	58	+11	e 4	57	+ 1				
Vladivostok		15·7	266	e 3	48	+ 4	e 7	5	SSS			8·0	
Nagoya		16·5	235	e 3	34	-20	e 4	38	PPP				
Kelzyo		21·5	256	e 5	0	+ 8	9	1	+14				
Frunse		54·2	298	e 9	31	+ 2							
Sverdlovsk		54·6	319	i 9	29	- 3	e 17	29	PPS			26·0	
Andijan		56·8	297	e 9	48	0							
Tashkent		58·4	299	e 9	58	- 2	e 17	46	-16	e 12	59	PP	e 28·0
Samarkand		60·8	299	e 10	20	+ 4	e 16	33	?				
Butte		61·3	52	e 15	39	PPP	1	19	42	+63			
Tinemaha	E.	63·4	64	e 10	48	+14							
Scoresby Sund		63·8	358	e 10	34	- 2	19	2	- 9			31·0	
Haiwee	E.	64·2	64	e 10	53	+14							
Moscow		65·2	326	e 10	42	- 3						e 28·5	
Mount Wilson	Z.	65·3	66	i 10	47	+ 1							
Pasadena	Z.	65·3	66	e 10	46	0							
Riverside	Z.	65·9	66	i 10	50	0							
Tucson		71·2	63	i 11	24	+ 1							
Tifis		72·1	313	i 11	27	- 1	e 20	59	+ 9	e 21	11	PS	e 32·0
Theodosia		74·2	320	e 11	40	0							
Simferopol		74·8	321	e 11	44	0							
Potsdam		76·3	337	e 11	47	- 5						43·0	
Jena		78·0	337	i 11	59	- 3							
De Bilt	Z.	78·6	342	i 12	5	0						e 42·0	
Uccle	Z.	80·0	342	e 12	11	- 2							
Kew	Z.	80·3	344	i 12	13	- 1							
Stuttgart		80·6	338	e 12	15	- 1	e 22	16	- 7			e 40·0	
Strasbourg		81·2	338	e 12	17	- 2				e 16	26	PP	
Williamstown		82·4	32	i 12	24	- 1							
Ksara		82·6	312	i 12	27 _a	+ 1	e 24	7	PPS	12	45	pP	
Jersey		82·8	345	e 9	19	?							
Harvard	Z.	83·2	31	i 12	28 _a	- 1							
Weston	Z.	83·4	31	i 12	30 _a	- 0							
Fordham		83·7	34	i 12	26	- 6							

Additional readings:—

Tashkent e = +18m.48s. and +22m.29s.

Tucson i = +11m.30s. and +11m.35s.

Potsdam iZ = +11m.50s.

Weston iZ = +12m.37s.

Long waves were also recorded at Copenhagen.

July 28d. Readings also at 0h. (Tucson (3), Fresno (4), Pasadena, Tinemaha, Riverside, Haiwee, and Mount Wilson), 4h. (Scoresby Sund), 5h. (Mount Wilson, Riverside, Pasadena, Mizusawa, Wellington, Frunse, Agra, Calcutta, Tashkent, Andijan, Samarkand, and Nagoya), 6h. (Mizusawa, Sverdlovsk, Medan, Copenhagen, and Vladivostok), 7h. (Ksara), 8h. (Nagoya), 9h. (near Tananarive, Mount Wilson, and Riverside), 10h. (Malabar and Tifis), 12h. (Manila and Malabar), 13h. (Grozny, Samarkand, Moscow, Andijan, and Sverdlovsk), 17h. (La Paz and Tacubaya), 20h. (Weston), 21h. (Brisbane, Manila, Mount Wilson, Riverside, Ksara, Tashkent, Sverdlovsk, Pasadena, Tinemaha, and Haiwee), 22h. (Ksara and Tifis), 23h. (Tacubaya (2), Irkutsk, Tashkent, and Sverdlovsk),

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July 29d. 13h. 6m. 34s. Epicentre 0° 48. 98° 8E.

H. P. Berlage.

Aardbevingen in der Oost Indischer Archipel Waargenomen gedurende het jaar, 1938.

Natuurkundig Tijdschrift voor Nederlandsch-Indië Afl. van Deel, CXCV 40, blz. 38-75, p. 66.

Epicentre 0° 0 100° 0E. (Batavia).

A = -0.1530, B = +0.9882, C = -0.0069; $\delta = 0$; $h = +7$;
D = +0.988, E = +0.153; G = +0.001, H = -0.007, K = -1.000.

	Δ	Az.	m. s.	O-C.	m. s.	O-C.	Supp.	L.
							m. s.	m.
Medan	4.0	359	11 9	+ 5	1 50	- 2	11 11	P*
Batavia	9.8	126	2 23	- 1	15 29	- 6	15 29	SSS
Malabar	11.1	123	e 2 46	+ 3	14 43	- 6	—	—
Colombo	20.2	291	e 4 36	- 3	8 29	+ 8	—	—
Phu-Lien	22.4	20	e 5 1	- 1	e 9 10	+ 6	—	11.5
Kodakanal	E. 23.7	298	5 16a	+ 2	19 31	+ 4	110 36	SSS
Caloutta	N. 25.0	337	15 37	+10	110 7	+18	16 11	PP
Hong Kong	26.4	32	5 46k	+ 6	10 58	+46	6 40	PP
Manila	26.5	53	15 41a	0	110 32	+18	6 53	PP
Hyderabad	26.7	313	5 43	0	10 16	- 1	11 26	SS
Amboina	29.5	96	6 11	+ 3	10 57	- 5	—	17.4
Bombay	31.9	308	16 31	+ 2	111 41	+ 1	7 29	PP
Taiyu	32.3	39	6 27	- 6	—	—	—	—
Agra	E. 33.9	326	16 45	- 2	12 7	- 4	17 7	pP
Isigakizima	34.8	42	6 53	- 1	—	—	—	—
Perth	35.3	153	8 18	PP	112 28	- 5	8 51	PPP
Dehra Dun	N. 36.4	329	e 6 37	-31	e 12 20	-30	—	e 20.0
Zi-ka-wel	N. 38.1	32	e 7 22	0	—	—	—	—
Nake	41.0	43	7 48	+ 2	—	—	—	—
Yakusima	43.0	41	8 2	- 1	—	—	—	—
Hukuoka B	45.0	38	8 18	- 1	—	—	—	—
Husan	45.2	34	e 8 15	- 5	—	—	—	e 23.3
Taiyu	45.5	33	8 24	+ 1	e 18 40	SS	—	e 26.0
Zinsen	45.6	30	e 8 22a	- 2	e 13 49	?	—	—
Keizyo	45.9	31	8 24	- 2	e 17 23	?	—	e 22.3
Muroto	47.2	41	8 36	0	15 25	- 4	10 29	PP
Andijan	47.5	332	8 44	+ 6	15 40	+ 6	—	29.4
Frunse	48.3	336	8 46	+ 1	15 46	+ 1	—	31.4
Sumoto	48.3	40	8 44	- 1	15 41	- 4	11 22	PPP
Osaka B	48.9	40	8 51	+ 1	118 11	SS	—	—
Samarkand	49.3	327	8 50	- 3	—	—	—	—
Tashkent	49.4	331	18 50	- 3	115 58	- 2	—	27.8
Tchikment	50.0	332	8 58	0	16 6	- 3	e 16 10	PS
Gihu	50.2	41	8 59	- 1	16 8	- 3	—	—
Nagoya	50.2	41	8 59	- 1	—	—	—	19.8
Adelaide	50.6	136	19 8	+ 6	116 12	- 5	118 53	SS
Mera	51.9	42	8 15	-57	14 48	?	—	22.0
Sempalatinsk	52.3	346	e 9 24	+ 9	—	—	—	—
Tokyo C.M.O.	52.3	41	9 9	- 6	18 51	SS	—	—
Vladivostok	52.5	30	19 17	0	116 46	+ 3	—	25.2
Sendai	54.6	39	19 31	- 1	—	—	—	—
Mizusawa	55.2	39	9 36	- 1	17 16	- 4	—	—
Melbourne	56.5	135	19 44	- 2	17 32	- 5	17 57	PS
Brisbane	58.5	121	19 50	-10	118 2	- 1	—	e 32.5
Sydney	59.2	129	e 10 3	- 2	e 18 21	+ 9	—	e 30.6
Riverview	59.3	129	110 4k	- 2	118 10	- 4	119 49	SeS
Baku	60.2	318	10 12	0	18 26	+ 1	—	28.4
Tiflis	64.2	317	110 37	- 2	119 12	- 4	e 13 27	PP
Grozny	64.3	320	10 43	+ 4	19 16	- 1	—	—
Sverdlovsk	64.8	338	110 40	- 3	119 18	- 5	30 56	Lq

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m.	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Piatigorsk	66.3	319	e 10 52	0	—	—	—	—
Ksara	68.0	306	i 11 3 _a	0	20 5	+ 3	i 11 22	PP
Sotchi	68.4	318	e 11 2	- 4	e 20 1	- 6	—	—
Helwan	70.7	301	i 11 19	- 1	i 20 32	- 2	—	—
Theodosia	71.8	318	i 11 25	- 1	20 41	- 5	—	—
Simferopol	72.6	317	11 31	0	20 50	- 6	—	—
Sebastopol	72.9	317	e 11 33	0	—	—	—	—
Moscow	74.5	329	i 11 40	- 2	i 21 11	- 6	—	38.9
Istanbul	75.1	313	11 47	+ 1	20 57	PS	13 37	PP
Bucharest	78.0	315	e 12 2 _a	0	21 51	- 4	15 1	PP
Christchurch	78.0	134	12 54 _a	+52	i 22 53	+58	34 46	L ₀
Wellington	79.2	131	—	—	i 21 51	-17	27 57	SS
Sofia	79.6	313	e 12 2	- 8	i 22 6	- 6	i 22 27	PS
Pulkovo	79.7	331	i 12 10	- 1	i 22 8	- 5	—	e 38.1
Belgrade	82.0	315	i 12 23 _a	0	i 22 34	- 3	—	51.5
Kecskemet	z. 82.9	317	e 12 29	+ 1	e 22 57	+11	e 15 46	PP
Budapest	83.4	318	i 12 32	+ 2	22 49	- 2	e 25 4	PPS
Ogyalla	84.0	318	i 12 33	- 1	22 53	- 4	23 41	PS
Upsala	85.9	330	i 12 40	- 3	23 18	+ 2	—	e 42.4
Prague	86.7	320	e 12 46	- 1	e 23 19	- 5	e 24 26	PS
Triest	86.8	315	12 48	+ 1	23 11	[- 2]	—	—
Potadam	87.7	322	e 12 52	0	i 23 30	- 3	—	—
Cheb	88.0	320	e 12 55	+ 2	e 23 20	[0]	—	e 48.4
Padova	88.1	315	e 12 54	- 0	i 23 20	[- 1]	—	—
Copenhagen	88.3	326	i 12 54	- 1	23 36	- 3	29 20	SS
Florence	88.5	313	e 12 26	-30	23 36	- 5	—	—
Jena	88.5	320	e 12 55	- 1	e 23 36	- 5	—	e 46.4
Hamburg	89.6	323	e 12 59 _a	- 2	e 23 45	- 6	—	e 49.4
Göttingen	89.6	321	e 13 26 _f	+25	—	—	—	e 54.4
Stuttgart	90.0	319	i 13 2 _a	- 1	i 23 52	- 2	e 16 14	PP
Zurich	90.4	318	e 13 4	0	e 23 53	- 5	e 23 32	SKS
Strasbourg	91.0	319	i 13 7	0	e 23 26	[-13]	e 16 31	PP
Basle	91.1	318	e 13 7	- 1	—	—	—	—
Moncalieri	91.1	315	i 13 11	+ 3	24 7	+ 3	—	—
Neuchatel	91.6	318	e 13 8	- 2	e 23 54	[+11]	—	—
Bergen	92.1	331	13 13	+ 1	24 13	0	—	48.4
De Bilt	92.5	323	i 13 14 _a	0	e 24 16	- 1	e 16 57	PP
Uccle	93.1	321	e 13 16	- 1	24 20	- 2	17 2	PP
Puy de Dôme	94.4	316	e 13 21	- 2	e 24 12	[+14]	—	—
Paris	94.5	319	i 13 12	-11	i 24 11	[+13]	25 59	PS
Algiers	94.9	307	e 13 11	-14	e 24 2	[+ 1]	e 16 34	PP
Kew	96.0	322	i 13 31 _a	+ 1	e 24 3	[- 3]	i 25 4	S
Aberdeen	96.2	328	—	—	i 23 58	[- 9]	i 26 18	PS
Durham	96.3	325	—	—	i 24 2	[- 6]	i 25 46	PS
Oxford	96.5	322	e 18 23	PP	i 24 43	- 8	—	e 40.4
Edinburgh	97.0	327	—	—	e 24 9	[- 3]	—	e 54.4
Stonyhurst	97.0	325	e 13 28	- 7	i 24 13	[+ 1]	e 17 31	PP
Bidston	97.4	325	—	—	i 25 0	+ 1	—	e 48.4
Jersey	97.4	320	e 13 19	-18	e 24 27	[+13]	—	—
Almeria	99.3	308	—	—	e 24 32	[+ 9]	—	e 50.6
Rathfarnham Castle	99.3	325	i 18 22	PP	i 25 29	+15	e 21 11	PP
College	100.1	23	—	—	e 33 19	SSP	—	e 53.1
Toledo	100.1	311	i 18 1	PP	i 25 20	- 1	—	40.8
Scoresby Sund	100.3	343	i 13 49	- 1	24 26	[- 2]	32 26	SS
Malaga	100.8	308	e 13 50	- 2	i 25 23	- 4	17 51	PP
San Fernando	102.3	308	—	—	i 25 38	- 2	—	53.4
Irigtut	114.3	343	18 35	[- 7]	25 26	[- 3]	i 19 37	PP
Berkeley	126.9	41	i 19 7	[+ 1]	—	—	i 21 4	PP
Bozeman	127.8	26	e 21 32	PP	e 43 37	SSS	31 30	PS
Santa Barbara	z. 130.6	43	i 22 35	SKP	—	—	—	—

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	e.	m. s.	m. s.	s.	m. s.	s.	m. s.	m.	
Haiwee	130.7	40	e 19 15	[+ 2]	e 22 36	PPP	e 21 29	PP	—
Mount Wilson	131.8	42	e 19 17	[+ 2]	i 22 40	SKP	e 21 27	PP	—
Pasadena	131.8	42	e 19 6	[- 9]	i 22 38	SKP	i 21 34	PP	e 62.7
Riverside	z. 132.4	42	i 19 18	[+ 2]	i 22 41	SKP	e 21 33	PP	—
Seven Falls	132.6	349	—	—	e 40 20	SSP	—	—	62.4
La Jolla	133.2	42	e 19 19	[+ 1]	e 22 42	SKP	e 21 51	PP	—
Ottawa	134.8	354	e 19 22	[+ 1]	e 40 2	SS	e 21 50	PP	64.4
Rio de Janeiro	136.4	237	e 22 56	PP	—	—	—	—	e 40.1
Harvard	137.2	349	e 19 26	[+ 1]	e 40 20	SS	e 22 1	PP	e 71.4
Weston	137.3	349	i 19 24a	[- 1]	e 40 13	SS	e 21 52	PP	—
Williamstown	137.3	350	e 21 55	PP	—	—	—	—	—
Tucson	137.7	39	i 19 28k	[+ 2]	43 7	SSS	19 49	pPKP	e 66.8
Chicago	138.3	8	e 22 46	PP	e 29 4	{- 7}	e 23 2	SKP	—
Fordham	139.2	351	i 19 28	[- 1]	e 40 54	SS	e 22 18	PP	—
St. Louis	e. 141.1	11	e 20 23	[+ 5]	—	—	—	—	—
Georgetown	141.4	354	e 19 25	[- 8]	e 29 26	{- 3}	e 22 30	PP	—
Cape Girardeau	N. 142.5	10	e 19 32	[- 3]	e 29 30	{- 6}	e 23 15	SKP	—
Columbia	146.6	359	e 19 54	[+ 12]	—	—	—	—	e 82.0
Tacubaya	N. 154.2	41	e 20 12	[+ 19]	—	—	—	—	—
Fort de France	155.6	305	e 19 56	[+ 1]	—	—	—	—	—
San Juan	156.8	321	20 0	[+ 3]	—	—	—	—	—
La Paz	158.8	218	i 20 13a	[+ 14]	i 31 4	{- 2}	i 24 25	PP	77.8
Huancayo	166.3	205	19 49	[- 18]	—	—	e 20 21	pPKP	e 77.4

Additional readings:—

Hong Kong SS = +12m.12s.
 Amboina iEN = +16m.45s.
 Calcutta iPPPN = +6m.24s., iSSN = +11m.12s.
 Bombay iEN = +13m.41s.
 Agra iPPE = +8m.2s., eE = +9m.32s., iE = +12m.27s., sS?E = +12m.47s., P₀SE = +13m.12s., iE = +13m.57s., iSSSE = +14m.53s.
 Perth PPP = +9m.18s., PPPP = +9m.34s., S = +13m.6s., P₀S = +14m.28s., SS = +14m.54s., SSS = +15m.21s., SSSS = +15m.46s.
 Taikyū i = +23m.24s.
 Sumoto SS = +19m.47s.
 Adelaide i = +13m.51s.
 Brisbane iN = +17m.56s., eN = +19m.32s., iE = +19m.44s.
 Tifis ePPPPZ = +15m.2s., ePPPN = +15m.10s., PSE = +19m.32s., ePSZ = +19m.50s., eSKSZ = +20m.26s., iSKSEN = +20m.32s., eSSE = +23m.44s., eSSN = +24m.0s., eSSSN = +26m.10s.
 Ksara eSS = +24m.47s.
 Bucharest PPPE = +16m.43s., PSN = +22m.22s.
 Sofia eN = +12m.11s.
 Belgrade iZ = +12m.36s., eNW = +29m.5s.
 Kecskemet eP₀PZ = +12m.37s., eS?Z = +23m.15s., eS₀SZ = +23m.27s.
 Budapest iE = +12m.44s.
 Ogyalla iSN = +22m.57s., S₀SE = +23m.13s., eE = +24m.11s.
 Potsdam iE = +23m.34s.
 Copenhagen +23m.20s.
 Hamburg iSKSN = +23m.49s.
 Stuttgart eP₀PEZ = +13m.13s., eSKS = +23m.44s., eSN = +24m.14s., iSKSN = +23m.52s., ePS = +24m.52s., ePPS = +25m.45s., eSSS = +33m.26s., eEN = +38m.56s.
 Strasbourg iZ = +13m.17s., eZ = +16m.52s., eSN = +23m.56s., ePSE = +24m.56s.
 De Bilt eE = +24m.4s., eN = +24m.38s., eE = +25m.39s.
 Uccle SKKSE = +24m.6s., PPSE = +25m.49s.
 Algiers e? = +13m.45s.
 Kew iEZ = +17m.25s., iE = +24m.22s., iN = +24m.44s., iEZ = +26m.19s.
 Durham iE = +26m.4s.
 Stonyhurst i = +26m.13s.
 Rathfarnham Castle e = +27m.26s.
 Toledo e = +24m.44s.
 Scoresby Sund +17m.57s., +20m.5s., +21m.45s., +25m.27s., and +25m.48s., PZ = +26m.50s.
 Malaga PS = +26m.38s.
 Berkeley IPPZ = +21m.6s., eZ = +22m.20s.
 Pasadena iPKP₀Z = +19m.16s.
 Riverside iZ = +19m.29s.
 Harvard ePKSN = +23m.0s.
 Weston iZ = +22m.6s., eSKPNZ = +22m.55s., iPPPNZ = +25m.9s., ePSN = +32m.11s., eSSSN = +45m.1s., eSSSSN = +49m.51s.

Continued on next page.

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Tucson i sPKP = +20m.8s., i PP = +22m.22s., i = +22m.34s., i SKP = +22m.58s., PKs = +23m.7s., i sPKS = +23m.45s., i = +23m.58s., ePPP = +25m.34s., i = +31m.45s., SSS = +45m.7s.
 Fordham e = +23m.4s., i SKP = +23m.20s., e = +25m.24s., e = +27m.32s.
 St. Louis e ?E = +20m.41s., eSKP,E = +23m.29s., i E = +24m.9s., ePPPE = +28m.14s., IPPPPE = +30m.19s.
 Georgetown ePSKS = +32m.36s.
 La Paz i PKP,Z = +20m.50s., i SSN = +45m.10s.
 Huancayo ePP = +25m.3s., epPPP = +28m.56s., SPP = +38m.16s., esSS = +45m.37s., i = +47m.45s., eSSS = +51m.19s.
 Long waves were also recorded at East Machias, La Plata, and Tananarive.

July 29d. Readings also at 0h. (Tucson, Mount Wilson, Pasadena, Riverside, Santa Barbara, and near Santiago), 3h. (Malabar), 4h. (Irkutsk and near Manila), 6h. (Malabar), 7h. (Florence, Fordham, Harvard, Williamstown, and Weston), 8h. (Malabar), 11h. (Samarkand, Ksara, Sverdlovsk, Tifis, Tashkent, Istanbul, and Helwan), 12h. (La Paz), 13h. (Ottawa), 14h. (San Francisco, Branner, Lick, Ottawa, and near Berkeley), 16h. (Ottawa (2)), 18h. (Philadelphia, Andijan, Samarkand, and Ottawa), 19h. (Ottawa, Ksara, Sverdlovsk, Tifis, and Tashkent), 21h. (Hawaii, La Jolla, Riverside, Pasadena, Mount Wilson, and Tucson), 23h. (near Tananarive).

July 30d. 14h. Local Japanese earthquake.

Tokyo gives epicentre at $36^{\circ}4N$. $141^{\circ}1E$.

Tokyo, Cen. Met. Obs. P = 16m.19s., S = 16m.37s.
 Tokyo, Imp. Univ. P = 16m.19s., S = 16m.36s.
 Komaba P = 16m.20s., S = 16m.39s.
 Kiyosumi P = 16m.22s., S = 16m.43s.
 Misaki P = 16m.22s., S = 16m.46s.

Mitaka P = 16m.22s., S = 16m.41s.
 Titibu P = 16m.22s., S = 16m.44s.
 Tukupasan P = 16m.22s., S = 16m.32s.
 Yosiwara P = 16m.22s., S = 16m.53s.
 Susaki P = 16m.38s., S = 17m.8s.

Mizusawa ePN = 16m.39s., ePE = 16m.41s., i SE = 17m.16s.
 Nagoya P = 16m.56s., S = 17m.41s.

July 30d. Readings also at 0h. (Tacubaya), 2h. (Florence), 3h. (Nagoya), 4h. (Ksara, Batavia, and Malabar), 7h. (Mount Wilson, Riverside, Manila, Tucson, and La Paz), 8h. (Samarkand), 9h. (Batavia, Tifis, and Grozny), 11h. (La Jolla, Pasadena, Tucson, Mount Wilson, and Riverside), 12h. (La Paz and Huancayo), 13h. (Toledo and Wellington), 14h. (La Paz and Andijan), 15h. (Manila, Frunse, Semipalatinsk, and Belgrade), 16h. (Mizusawa), 17h. (Wellington and Malabar), 19h. (Copenhagen, Hamburg, De Bilt, Edinburgh, Istanbul, Bidston, Santiago, Puy de Dôme, Kew, Paris, Strasbourg, Uccle, Cheb, Triest, Toledo, Grozny, Tifis, Ksara, Tashkent, and Sverdlovsk), 20h. (Tashkent, Andijan, and Frunse), 21h. (Tashkent and Sverdlovsk), 22h. (Huancayo and La Paz).

July 31d. 21h. 54m. 7s. Epicentre $45^{\circ}7N$. $137^{\circ}3E$. (as on 1937 April 29d.).

A = -5150, B = +4754, C = +7133; δ = +3; h = -4;
 D = +678, E = +735; G = -524, H = +484, K = -701.

A depth of focus 0.030 has been assumed.

	Δ	Az.	P.		O - C.		S.	O - C.		Supp.	L.
			m. s.	s.	m. s.	s.		m. s.	s.		
Vladivostok	4.6	239	11 8	- 3	11 49	-16	—	—	—	—	—
Mizusawa	7.1	155	11 39	- 3	12 51	-11	—	—	—	—	—
Nagoya	10.5	182	e 2 6	-20	3 43	-38	—	—	—	—	—
Irkutsk	22.5	300	4 41	0	9 46	SS	—	—	—	—	—
Manila	33.9	208	7 5	PP	10 40	-51	—	—	—	—	—
Frunse	43.9	289	e 7 37	- 9	—	—	—	—	—	—	—
Andijan	46.7	288	e 8 0	- 8	e 13 31	-69	—	—	—	—	—
Sverdlovsk	46.8	313	18 10	+ 1	e 14 37	- 4	—	—	—	—	22.9
Tashkent	48.2	290	18 2	-18	i 14 39	-22	—	—	—	—	—
Samarkand	50.5	289	e 8 25	-12	—	—	—	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	\circ	\circ	m. s.	s.	m. s.	s.	m. s.	m.
Moscow	58.6	319	19 36	0	17 17	- 3	—	33.4
Baku	61.0	299	—	—	i 17 43	- 8	—	—
Grozny	61.7	304	—	—	e 17 50	-10	—	—
Copenhagen	68.8	330	i 10 45	+ 3	19 25	- 1	—	—
Hamburg	N. 71.4	330	—	—	e 19 53	- 3	—	—
Tinemaha	E. 73.2	53	e 11 17	+ 9	—	—	—	—
Ksara	73.7	300	e 12 11	+60	e 20 17	- 5	e 12 29	pP
Haiwee	E. 74.1	54	e 11 23	+10	—	—	—	—
De Bilt	74.2	332	12 37	?	20 28	+ 1	—	e 39.9
Santa Barbara	74.3	56	i 11 16	+ 2	—	—	—	—
Mount Wilson	Z. 75.4	55	i 11 27 _a	+ 6	—	—	—	—
Pasadena	75.4	55	e 11 26 _a	+ 5	—	—	—	—
Stuttgart	75.6	328	e 12 43	+81	e 20 39	- 4	—	e 40.9
Riverside	Z. 75.9	55	i 11 30	+ 6	—	—	—	—
Tucson	80.9	52	i 11 58 _a	+ 8	—	—	i 12 7	pP
Harvard	Z. 88.5	20	i 12 34 _a	+ 6	—	—	—	—
La Paz	Z. 144.0	44	19 13	[+ 5]	—	—	—	—

Additional readings:—

Irkutsk $i = +4m.56s.$, $e = +11m.21s.$, $i = +12m.41s.$, $e = +13m.31s.$
 Copenhagen $+12m.3s.$ and $+20m.12s.$
 Ksara $eS = +20m.46s.$

July 31d. Readings also at 0h. (Sotchi), 1h. (Irkutsk), 2h. (Sverdlovsk), 8h. (Lick, Branner, Fresno, and Rathfarnham Castle), 9h. (San Juan, Mizusawa, Nagoya, Florence, and Fort de France), 10h. (Fresno, Branner, Lick, Sarajevo, San Francisco, Berkeley, Haiwee, Tinemaha, Mount Wilson, Pasadena, Riverside, Tucson, and near Santiago), 11h. (Zurich, Trieste, and Sofia), 12h. (Grozny, Fresno, and Tiflis), 15h. (Weston, Tucson, Riverside, Mount Wilson, and Nagoya), 16h. (Tashkent, near Santiago, and Sverdlovsk), 17h. (Florence (2), Samarkand, Andijan, and Frunse), 18h. (Port de France and Samarkand), 20h. (Mount Wilson, Riverside, Tucson, and Pasadena), 21h. (Tiflis), 22h. (Wellington and La Paz).

Aug. 1d. Readings at 0h. (Sverdlovsk and Tashkent), 1h. (Manila, Berkeley, Lick, and near Branner), 2h. (Sverdlovsk and Tashkent), 3h. (Vladivostok, near Mizusawa, and Nagoya), 4h. (Sverdlovsk, Tashkent, and Copenhagen), 6h. (Sverdlovsk, Tashkent, Weston, Tucson, and Mount Wilson), 7h. (Tucson), 8h. (Berkeley, Branner, near Lick, and near Manila), 10h. (near Medan), 11h. (Copenhagen), 12h. (Brisbane, Christchurch, Wellington, Haiwee, Mount Wilson, Riverside, Tucson, Andijan, and near Mizusawa), 13h. (Sverdlovsk, Irkutsk, Tashkent, and Ksara), 15h. (Mizusawa, and near Yalta), 17h. (Branner, Andijan, and Tashkent), 18h. (Sverdlovsk and Tiflis), 19h. (Pasadena, Riverside, Tucson, near La Paz, and near Mizusawa), 20h. (Wellington), 22h. (Mizusawa and Pasadena).

Aug. 2d. 4h.

Scale V Hohenzollerngraben. Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome III, 2e partie Seismologie, Mende 1941, p.61. Epicentre $38^{\circ} 16' N.$ $9^{\circ} 2' E.$ (Stuttgart); depth about 10km.

Pietro Caloi. "Caratteristiche sismiche fondamentali dell' Europa Centrale, quali risultano dallo studio di 17 terremoti centro-europei." Extract from "Bollet no della Societa sismologica Italiana," vol. XL, No. 3-4, 1942, p. 26, published by l'Institute Geophysique de Rome, No. 107.

Caloi	$9^{\circ} 5' .7 \pm 4' .7$	$48^{\circ} 16' .1 \pm 1 .8$	$h = 6.5km. \pm 7.9.$
Hiller	$9^{\circ} 2' .5$	$48^{\circ} 15' .8$	$h = 10km.$

Ebingen $iP_g = 11m.3s.$
 Stuttgart $iP_g = 11m.10s.$, $iS_g = 11m.17s.$, $i = 11m.22s.$
 Ravensburg $eP_g = 11m.13s.$, $iS_g = 11m.22s.$
 Strasbourg $iP_g Z = 11m.17s.$, $eS_g Z = 11m.30s.$
 Zurich $eP_g = 11m.18s.$, $iS_g = 12m.30s.$
 Basle $iP_g = 11m.21s.$, $i = 11m.23s.$, $eS_g = 11m.39s.$
 Neuchatel $iP_g = 11m.35s.$, $eS_g = 11m.58s.$
 Jena $eN = 11m.58s.$ and $12m.4s.$, $iN = 12m.17s.$, $eN = 12m.31s.$, $eLN = 12m.36s.$
 Gottingen $eP_g = 12m.4s.$, $iS_g = 12m.47s.$
 Uccle $e = 12m.54s.$
 Trieste $eS = 12m.58s.$, $S_g = 13m.17s.$
 Paris $e = 13m.15s.$
 Puy de Dôme $e = 13m.32s.$

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Aug. 2d. Readings also at 0h. (De Bilt, Kew, Copenhagen, Ksara, and near Tiflis), 2h. (Andijan), 3h. (Florence), 4h. (Andijan, Ebingen, Stuttgart, and Medan), 5h. (Samarkand and Wellington), 6h. (Adelaide and near Santiago), 7h. (Tucson, near La Jolla, Pasadena, and Riverside), 9h. (near Weston, Fordham, and Williamstown), 10h. (Williamstown), 11h. (Fordham), 16h. (Fresno, near Branner, and Lick), 18h. (Mizusawa), 19h. (Tacubaya, near Harvard, near Weston, Williamstown, near Mizusawa, near Batavia, and Malabar), 20h. (Huancayo, La Paz, Rio de Janeiro, San Juan, Tucson, Philadelphia, Weston, Andijan, Frunse, Irkutsk, Sverdlovsk, Tashkent, Tchinkent, and near Almata), 21h. (Brammer and Sverdlovsk), 23h. (near Fort de France).

Aug. 3d. 8h. 22m. 15s. Epicentre 37°·1N. 141°·8E. (as on 1938, April 25d.).

Tokyo gives Epicentre 37°·21N. 141°·95E.

A = -·6283, B = +·4944, C = +·6006; δ = -9; h = -1;
D = +·618, E = +·786; G = -·471, H = +·371, K = -·800.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Tukubasan	1·6	237	0 41	+11	1 4	+13	—	—
Mizusawa	2·1	346	i 0 36	- 1	i 0 59	- 5	—	—
Tokyo, Imp. Univ.	2·1	229	0 38	+ 1	1 7	+ 3	—	—
Komaba	2·2	230	0 42	+ 4	1 10	+ 4	—	—
Kiyosumi	2·3	214	0 41	+ 1	1 15	S _r	—	—
Mitaka	2·3	232	0 41	+ 1	1 14	S*	—	—
Titibu	2·4	243	0 41	- 0	1 13	+ 1	—	—
Kamakura	2·5	226	0 41	- 2	1 9	- 5	—	—
Koyama	2·9	232	0 41	- 7	1 16	- 8	—	—
Yosiwara	3·2	232	0 41	-11	1 39	S*	—	—
Susaki	3·3	225	0 55	+ 2	1 34	- 1	1 40	S*
Nagoya	4·4	245	e 1 8	- 2	2 7	+ 5	—	—
Koti	7·6	245	e 3 26	S	(e 3 26)	+ 3	4 5	S _r
Hukuoka B	9·9	253	e 2 33	+ 8	—	—	—	—
Tashkent	54·8	299	e 7 58	?	e 17 11	- 3	e 12 4	PP e 29·8
Sverdlovsk	55·3	319	9 45	+ 7	e 17 15	- 6	—	26·8

Long waves were also recorded at Irkutsk, Vladivostok, Baku, De Bilt, Copenhagen, and Tiflis.

Aug. 3d. 13h. 32m. 29s. Epicentre 43°·6N. 128°·0W.

A = -·4473, B = -·5725, C = +·6872; δ = +8; h = -3;
D = -·788, E = +·616; G = -·423, H = -·542, K = -·727.

	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Ferndale	4·1	135	e 1 3	- 2	e 2 0	+ 5	e 2 6	S*
Seattle	5·7	42	e 2 1	P _r	e 3 5	S _r	—	e 3·6
Ukiah	5·7	139	e 1 26	- 2	3 2	S _r	—	3·1
San Francisco	7·1	142	—	—	e 3 50	S _r	—	—
Berkeley	7·2	141	e 1 46	- 3	e 3 14	+ 1	3 42	S*
Lick	7·9	140	e 2 0	+ 1	—	—	e 2 5	P*
Fresno	N. 9·3	134	e 2 19	+ 2	—	—	—	—
Haiwee	10·7	130	e 2 40	+ 2	—	—	—	—
Butte	11·2	73	e 2 53	+ 9	e 4 55	+ 3	—	e 6·9
Santa Barbara	11·2	142	e 2 47	+ 3	—	—	—	—
Pasadena	12·1	138	e 2 56	- 1	—	—	—	e 5·4
Bozeman	12·2	75	e 2 56	- 2	—	—	—	e 5·7
Riverside	12·6	135	e 3 4	+ 1	—	—	—	—
Sitka	14·2	345	e 3 30	+ 6	—	—	—	6·8
Tucson	17·6	124	i 4 11	+ 3	7 16	- 7	i 4 32	PP 9·3
Denver	17·7	95	e 3 11	-59	—	—	—	e 8·8
College	24·0	340	e 5 22	+ 5	9 35	+ 3	—	e 11·9
Florisant	28·5	87	e 5 50	- 9	e 10 43	- 3	—	—
St. Louis	E. 28·7	87	e 5 48	-13	e 10 42	- 8	—	—
Cape Girardeau	E. 29·1	88	e 7 2	PP	—	—	—	e 16·7

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Chicago	29.5	79	e 6 7	- 1	e 11 8	+ 6	—	—
Honolulu	33.3	238	—	—	e 12 42	+40	—	e 14.2
Ottawa	36.8	68	e 8 36	PP	e 12 59	+ 3	—	16.5
Columbia	37.4	38	—	—	e 13 1	- 4	—	e 16.0
Vermont	38.8	69	e 9 3	PP	e 13 31	+ 5	—	e 20.2
Philadelphia	39.0	76	e 7 25	- 5	e 13 20	- 9	e 8 46	PP e 15.4
Williamstown	39.3	71	i 7 32	0	—	—	—	—
Fordham	39.6	74	i 7 36	+ 1	e 13 44	+ 6	i 9 6	PP —
Seven Falls	39.6	64	e 8 13	+38	e 14 43	+65	—	20.5
Harvard	40.6	71	e 7 42	- 1	e 13 57	+ 3	e 9 12	PP 24.1
Weston	40.8	71	i 7 47	+ 2	e 13 54	- 2	i 9 20	PP —
East Machias	42.6	67	e 9 43	PP	e 14 31	+ 8	—	e 17.8
Scoresby Sund	54.6	24	—	—	e 17 15	+ 4	21 30	SS 27.5
San Juan	57.3	95	—	—	e 17 51	+ 4	—	e 26.8
Edinburgh	70.5	30	—	—	e 20 31?	- 1	—	—
Irkutsk	74.4	331	e 11 36	- 6	21 14	- 2	e 14 11	PP 36.5
Sverdlovsk	79.7	356	e 12 12	+ 1	e 22 15	+ 2	—	32.5
Ksara	101.6	12	17 29	PKP	e 26 39	PS	—	56.5

Additional readings:—

Ferndale eN = + 1m.38s.

Seattle eS = + 3m.10s.

San Francisco eN = + 4m.19s., eE = + 4m.29s. and + 5m.2s.

Berkeley eEN = + 1m.50s., eZ = + 3m.22s.

Denver iEN = + 3m.23s., ePPN = + 3m.31s.

Florissant ePZ = + 5m.58s., eSEN = + 10m.49s., eN = + 11m.15s., iN = + 16m.31s.,

iZ = + 17m.44s.

St. Louis ePE = + 5m.53s.

Weston ePPPZ = + 9m.47s., eSSEN = + 16m.56s.

Irkutsk e = + 26m.4s.

Long waves were also recorded at Strasbourg, Kew, Jersey, Puy de Dôme, Tifis, Tashkent, De Bilt, Bidston, and Copenhagen.

Aug. 3d. Readings also at 0h. (Adelaide), 2h. (Berkeley), 3h. (Samarkand), 8h. (Tucson and Riverside), 11h. (Mizusawa, Almata, and Nagoya), 13h. (Ottawa), 14h. (Triest), 15h. (Ottawa), 17h. (Nagoya), 18h. (Ottawa), 19h. (Gaudalajara, Tacubaya, and Manzanillo), 21h. (Medan and Sofia), 22h. (near Branner, San Francisco, and Berkeley).

Aug. 4d. 8h. 54m. 43s. Epicentre 23° 7S. 65° 7W.

A = + 3772, B = - 8355, C = - 3996; $\delta = + 2$; $h = + 4$;
D = - 911, E = - 412; G = - 164, H = + 364, K = - 917.

A depth of focus 0.015 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Montezuma	3.0	291	i 0 55	PP	—	—	1 3	PPP e 1.5
Coplapo	5.4	299	i 1 7	-13	2 1	-20	—	—
La Paz	7.5	341	i 1 58 _a	+10	i 2 56	-16	—	3.4
La Plata	13.0	151	i 3 9 _a	+ 8	5 29	+ 6	—	6.5
San Javier	13.0	202	i 3 4	+ 3	5 34	+11	—	—
Huancayo	14.8	320	i 3 26 _k	+ 2	i 6 4	- 1	—	—
Rio de Janeiro	20.7	92	i 4 39	+ 7	i 8 29	+19	—	i 10.5
Balboa Heights	35.2	337	i 6 43	- 1	e 11 59	- 8	e 15 30	SSS —
Fort de France	38.4	9	i 7 14	+ 4	i 12 44	-12	8 16	PP e 16.9
San Juan	41.8	0	i 7 38	0	i 13 38	- 8	i 9 29	PP —
Merida	N. 50.1	332	i 8 48	+ 4	—	—	—	—
Tacubaya	E. 53.9	321	e 9 10	- 2	—	—	—	—
Manzanillo	E. 56.8	316	e 9 33	0	—	—	—	—
Guadalajara	N. 57.4	318	e 9 39	+ 2	—	—	—	—
Columbia	59.2	346	e 9 50	0	i 17 37	- 9	21 29	SS 24.0
Georgetown	63.2	352	i 10 16	- 1	i 18 30	- 6	i 11 9	P.P —
Philadelphia	63.9	354	i 10 22	+ 1	i 18 39	- 6	e 15 22	PPP i 27.4
Cape Girardeau	64.7	340	i 10 18	- 9	i 18 38	-17	e 10 28	pP —
Fordham	64.7	354	i 10 25	- 2	i 18 48	- 7	i 12 50	PP —
Weston	65.9	357	i 10 35 _k	+ 1	i 19 6	- 3	11 30	pP e 27.4

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Harvard	66-1	357	i 10 36	0	i 19 7	-5	—	—
St. Louis	66-1	340	i 10 32	-4	i 19 1	-11	i 11 16	pP
Floriissant	66-3	340	i 10 34	-3	i 19 3	-11	i 11 24	pP
Williamstown	66-4	356	i 10 38	+1	i 19 15	0	i 11 18	pP
East Machias	68-2	0	10 51	+2	e 19 34	-3	e 23 41	SS
Vermont	68-2	356	i 10 52	+3	e 19 25	-12	e 11 47	sP
Chicago	68-3	343	e 10 50	+1	e 19 23	-15	e 15 11	PPP
Ottawa	68-4	354	i 10 55	-1	i 19 46	-5	27 17?	SSS
Shawinigan Falls	70-2	356	11 5	+4	20 0	0	—	—
Tucson	70-4	321	i 11 0	-2	20 0	-3	i 12 19	sP
La Jolla	74-7	317	i 11 26	-1	e 20 43	-8	—	—
Riverside	75-5	318	i 11 31k	-1	e 20 53	-7	i 12 28	pP
Pasadena	76-1	318	i 11 35k	0	i 21 0	-7	i 14 37	PP
Haiwee	77-3	320	i 11 40k	-2	i 21 13	-7	—	—
Santa Barbara	77-3	317	i 11 39k	-3	—	—	e 42 10	SKPPKP
Tinemaha	78-1	320	i 11 46	0	i 21 23	-5	—	—
Fesno	N. 78-8	319	e 11 50	0	—	—	—	—
Averroes	79-3	47	i 12 0	+7	e 21 42	+1	12 25	pP
Lick	80-3	318	e 11 56	-2	e 21 55	+3	—	—
Bozeman	80-4	330	e 11 56	-3	e 21 45	-8	e 11 59	pP
Branner	80-7	318	12 0	0	—	—	—	—
San Francisco	81-1	318	e 12 2	0	—	—	—	—
Berkeley	81-1	318	e 11 59	-3	e 21 53	-7	i 15 12	PP
San Fernando	82-0	45	e 12 13	+6	i 22 14	+5	27 40	SS
Ukiah	82-4	319	e 12 9	0	e 22 4	-9	e 15 22	PP
Malaga	83-3	46	i 12 20	+6	i 22 26	+4	—	—
Granada	84-1	46	i 12 26	+8	i 22 31	+1	—	—
Almeria	84-7	47	e 12 22	+1	i 22 26	-10	—	e 35-5
Toledo	85-4	44	i 12 30a	+6	e 22 39	-4	i 13 24	pP
Algiers	88-4	49	i 12 45	+6	e 22 55	[+2]	e 13 46	pP
Bagneres	89-8	42	e 12 52	+7	e 23 3	[+1]	e 29 17	SS
Jersey	92-0	34	—	—	(e 30 17?)	SS	—	e 48-8
Puy de Dôme	93-0	40	e 13 5	+5	e 22 41	[-39]	—	30-3
Bidston	93-9	31	—	—	i 23 22	[-3]	i 25 17	PS
Oxford	93-9	34	13 1	-3	i 23 24	[-1]	i 25 19	PS
Kew	94-2	34	i 13 8	+3	i 23 23	[-4]	i 25 16	PS
Stonyhurst	94-4	31	i 14 7	+61	i 23 27	[-1]	i 25 27	PS
Paris	94-7	37	—	—	i 23 26	[-3]	(26 17?)	PPS
Edinburgh	95-3	29	e 13 17?	+7	e 23 30	[-2]	—	e 40-3
Durham	95-4	31	—	—	i 23 35	[+2]	—	—
Uccle	96-3	36	e 13 20	+5	i 23 38	[0]	i 14 15	pP
Aberdeen	96-5	29	—	—	e 23 17	[-22]	e 25 51	PS
Basle	96-6	39	e 12 48	-28	e 23 40	[0]	—	—
Florence	97-2	44	e 14 1	+42	i 23 46	[+3]	—	—
Strasbourg	97-2	38	e 13 24	+5	e 23 48	[+5]	e 14 19	pP
Zurich	97-2	40	e 13 22	+3	e 23 42	[-1]	e 17 20	PP
De Bilt	97-4	35	i 13 24	+4	e 23 47	[+3]	—	—
Karlsruhe	97-8	38	e 13 31	+9	e 23 41	[-5]	—	—
Stuttgart	98-1	39	e 13 27	+4	e 23 31	[-16]	e 14 20	pP
Padova	98-3	43	—	—	e 23 53	[+5]	—	e 40-8
Scoresby Sund	98-9	36	13 35	+8	23 52	[+1]	14 24	pP
Triest	99-6	43	e 13 57	+27	i 23 54	[-1]	17 54	PP
Gottingen	99-8	36	—	—	e 24 0	[+4]	—	e 41-3
Honolulu	100-1	289	e 17 35	PP	e 23 57	[0]	19 31	PPP
Cheb	100-6	37	e 14 17?	P	e 24 7	[+7]	—	e 47-3
Hamburg	100-7	34	e 13 38k	+3	e 24 4	[+4]	—	e 39-3
Bergen	101-5	27	24 6	S	(24 6)	[+2]	—	41-3
Prague	101-8	39	—	—	e 23 56	[-10]	—	—
Potsdam	101-9	37	—	—	i 24 10	[+4]	i 26 47	PS
Copenhagen	102-9	33	13 52	+7	e 24 11	[+1]	e 26 56	PS
Ogyalla	103-3	43	e 19 47	PPP	e 24 14	[+2]	e 27 44	PS
Belgrade	103-7	46	e 18 7k	PP	i 24 16	[+2]	32 42	SSP
Budapest	103-7	44	—	—	e 24 10	[-4]	i 25 32	S
Kecskemet	z. 103-9	45	e 24 6	S	(24 6)	[-9]	—	—
Sofia	105-0	50	e 18 22	PP	i 24 20	[-1]	e 27 16	PS

Continued on next page.

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	Δ	Az.	P.		O-C.		S.	O-C.		Supp.		L.				
			m.	s.	s.	m. s.		s.	m. s.	s.	m.					
Upsala	106.9	31	e	13	9	P	i	24	27	[- 2]	i	27	23	PS	e	53.3
Helwan	107.2	64	e	12	57	P	i	24	38	[+ 8]	e	27	48	PS	—	—
Bucharest	107.4	48	e	18	29	PP	e	24	30	[- 1]	e	20	11	PPP	—	—
College	107.9	333	e	18	6	PKP	e	25	15	[+42]	e	18	44	PP	e	42.0
Istanbul	108.6	51	—	15	11	P	—	27	53	PS	—	18	49	PP	—	—
Ksara	112.0	62	i	19	13	PP	i	28	30	PS	i	20	4	pPP	—	—
Simferopol	113.1	48	—	—	—	—	e	24	48	[- 6]	e	28	31	PS	—	—
Pulkovo	113.2	32	i	19	6	PP	—	24	49	[- 5]	—	28	56	PS	—	50.8
Moscow	116.7	37	e	18	39	PKP	—	25	5	—	—	28	52	PS	—	50.8
Piatigorsk	119.3	51	e	18	54	PKP	—	—	—	—	—	—	—	—	—	—
Tiflis	120.4	53	e	19	39	PP	e	25	24	[+ 3]	i	29	37	PS	e	45.3
Grozny	121.2	52	e	18	31	PKP	e	25	22	[- 1]	e	19	25	PP	—	—
Baku	124.1	55	e	19	46	pPKP	e	30	47	PS	—	37	23	SSP	—	49.3
Sverdlovsk	129.2	33	e	18	53	PKP	—	25	43	[- 4]	—	19	52	pPKP	—	55.3
Samarkand	137.2	56	e	21	32	PP	—	—	—	—	—	—	—	—	—	—
Tashkent	138.7	53	e	19	1	PKP	—	27	45	SKKS	e	25	10	PPP	e	45.4
Andijan	141.1	53	e	19	19	PKP	—	—	—	—	e	23	4	PKS	—	—
Bombay	141.2	88	e	22	39	PKS	i	29	2	SKKS	e	33	26	PS	—	—
Frunse	142.1	49	e	19	30	[+13]	—	—	—	—	e	21	18	PP	—	—
Kodalakanal	E. 142.5	103	e	16	17?	P	—	—	—	—	—	—	—	—	—	—
Almata	143.6	47	e	19	34	[+14]	—	—	—	—	—	—	—	—	—	—
Hyderabad	145.9	93	i	19	28	[+ 4]	—	29	29	SKKS	—	30	2	PS	—	43.0
Agra	E. 147.1	75	i	19	33	[+ 7]	i	26	22	[+ 2]	—	22	59	PP	—	—
Malabar	148.4	165	i	19	15	[-12]	—	—	—	—	—	—	—	—	—	—
Batavia	149.4	164	i	19	42	[+13]	—	—	—	—	—	—	—	—	—	—
Irkutsk	150.5	12	—	19	40	[+ 9]	e	29	55	SKKS	—	20	40	pPKP	—	68.3
Sapporo	150.5	317	i	19	39	[+ 8]	—	—	—	—	—	—	—	—	—	—
Mizusawa	152.6	310	e	19	44	[+10]	—	—	—	—	—	—	—	—	—	—
Hakusima	153.6	308	—	19	44	[+ 8]	—	—	—	—	—	—	—	—	—	—
Medan	155.0	138	—	19	55	[+17]	i	30	8	SKKS	—	24	2	PP	—	—
Oiwake	155.6	308	—	19	39	[0]	—	—	—	—	—	—	—	—	—	—
Vladivostok	155.6	327	e	19	46	[+ 7]	i	23	53	PP	i	20	13	pPKP	—	—
Nagano	155.7	309	—	19	54	[+15]	—	—	—	—	—	—	—	—	—	—
Misima	155.8	303	—	20	5	[+26]	—	—	—	—	—	—	—	—	—	—
Calcutta	N. 156.1	86	e	20	35	[+56]	i	30	22	SKKS	e	23	30	PKS	—	43.3
Manila	169.0	218	i	19	57k	[+ 6]	—	—	—	—	—	24	54	PP	—	—
Phu-Lien	172.4	110	—	19	17?	[-36]	—	—	—	—	—	—	—	—	—	—
Hong Kong	178.6	—	—	21	52	?	—	31	8	SKKS	—	24	29	PP	—	—

Additional readings :—

Huancayo iP = +3m.30s., i = +4m.4s., +4m.15s., +4m.28s., +4m.36s., +4m.48s., +4m.55s., +5m.6s., +5m.34s., +5m.52s., and +6m.7s., iS = +6m.13s.
Rio de Janeiro iSN = +8m.36s.
Balboa Heights eE = +15m.39s., eN = +16m.39s.
Fort de France PPP = +8m.42s., SS = +14m.38s., SSS = +14m.55s.
San Juan iP = +7m.42s., isPP = +10m.31s., iSS = +16m.56s.
Columbia iS = +17m.46s.
Georgetown sS = +19m.52s.
Philadelphia i = +18m.29s., iScS = +19m.53s., eSSS = +25m.53s.
Cape Girardeau eE = +10m.33s., iN = +10m.42s., iN = +11m.18s. and +19m.12s., eSSN = +20m.5s.
Fordham iZ = +10m.29s., +11m.21s., and +11m.44s., iE = +22m.55s., eE = +26m.3s.
Weston iSPZ = +11m.33s., iZ = +13m.9s. and +14m.45s., iE = +20m.15s., iSE = +20m.38s., iSSN = +23m.34s., eSSSEN = +26m.30s., ePKP,PKPZ = +38m.59s.
Harvard ePKP,PKPZ = +40m.16s.
St. Louis iN = +10m.37s., iPPN = +13m.2s., iPPE = +13m.10s., iE = +19m.28s., eE = +20m.8s., isSE = +20m.33s.
Florissant iEN = +10m.39s., iN = +11m.28s. and +11m.50s., iPP = +13m.4s., isSZ = +20m.36s.
Williamstown iSP = +11m.36s., iPP = +12m.28s., i = +13m.3s., +22m.35s., and +26m.19s.
East Machias iS = +19m.38s., eSS = +20m.56s., eSSS = +25m.24s., eSSS = +27m.24s.
Vermont iS = +19m.37s., e = +20m.25s., eSSS = +27m.17s.
Chicago iS = +19m.30s., isS = +20m.32s.
Tucson i = +11m.4s., iPP = +13m.49s., i = +15m.42s., iS = +19m.55s., i = +20m.0s., iSs = +20m.28s., i = +21m.22s., isS = +21m.28s., sSS = +25m.49s., eSSS = +27m.52s.
Riverside eSKPPKPKZ = +42m.7s.
Pasadena iZ = +11m.39s., isPZ = +12m.51s., iN = +21m.53s. and +22m.29s., eSKPPKPKZ = +42m.6s.
Averroes e = +12m.8s., iPcP = +12m.7s., sP = +12m.39s., PP = +14m.59s., ScS = +21m.59s., SS = +22m.31s., sSS? = +22m.41s., SS = +26m.33s.
Bozeman eS = +21m.50s., sS = +23m.24s., sSS = +28m.38s.

Continued on next page.

- Ukiah eSS = +27m.21s., esSS = +28m.45s.
Berkeley iZ = +12m.4s.
Toledo i = +23m.36s. and +28m.0s.
Algiers iS = +23m.15s., iSS = +23m.39s., i = +28m.17s.
Bagneres eE = +23m.6s., iSKKSN = +23m.8s., iE = +23m.13s., eSE = +23m.31s., iSN = +23m.36s., eSPE = +24m.27s., ePKPPKPN = +38m.41s.
Bidston iSKKS = +24m.1s.
Kew iZ = +14m.4s., eZ = +22m.52s., iSKKS = +24m.2s.
Stonyhurst i = +23m.32s.
Edinburgh e = +10m.48s., i = +23m.36s., +24m.20s., and +24m.39s.
Durham iEN = +24m.16s.
Uccle eE = +18m.18s., iSN = +24m.21s., iE = +25m.46s., i = +31m.13s.
Aberdeen i = +23m.39s. and +24m.24s.
Florence iS = +24m.32s.
Strasbourg ePPZ = +16m.27s., epPPZ = +17m.13s., epPPPZ = +20m.20s., iSN = +24m.32s., iSE = +24m.38s., isS = +25m.56s., e = +26m.36s.
Zurich eS = +24m.40s.
De Bilt eN = +24m.29s., eE = +24m.33s.
Stuttgart e = +16m.22s., ePP = +17m.23s., e = +18m.3s., iSEN = +23m.51s., eE = +24m.22s., e = +24m.41s., +25m.57s., and +27m.11s.
Scoresby Sund +24m.44s., +26m.6s., +30m.17s., and +31m.36s.
Triest iS = +24m.53s., e = +30m.37s. and +36m.17s.
Honolulu i = +22m.59s., sPS = +27m.50s.
Bergen PP = +25m.10s.
Prague e = +25m.14s.
Potsdam iN = +24m.14s., iEN = +24m.51s.
Copenhagen i = +24m.56s., e = +25m.21s.
Ogyalla iN = +25m.26s., eN = +26m.32s.
Belgrade eZ = +19m.1s., iNE = +25m.34s.
Kecskemet eZ = +24m.24s. and +24m.43s.
Sofia eE = +25m.5s., eN = +25m.46s.
Upsala eN = +18m.37s., i = +25m.20s., iN = +25m.56s.
Helwan i = +18m.37s., e = +19m.26s., i = +25m.27s.
Bucharest e?N = +17m.46s., e?N = +18m.5s., ePN = +18m.34s., ePE = +18m.40s., PPE = +19m.44s., PPN = +19m.49s., iEN = +25m.26s. and +26m.7s., iSSE = +26m.47s., iSSSE = +27m.17s., iE = +27m.51s., +27m.54s., and +30m.2s.
College ePPP = +20m.45s., S = +25m.49s., pPS = +28m.35s., eSS = +33m.19s., eSSS = +37m.54s.
Ksara eP = +14m.25s., iSPP = +20m.33s., iSPP = +29m.39s.
Pulkovo e = +20m.5s., eS = +26m.45s., epS = +27m.36s., SP = +28m.16s., SPP = +29m.21s., sPS = +29m.46s., SS = +34m.47s., SSS = +38m.47s.
Moscow ePP = +19m.43s., e = +30m.27s. and +34m.6s.
Baku e = +23m.53s., +27m.19s., and +34m.33s.
Tiflis ePPEZ = +20m.12s., epPPZ = +20m.53s., sPPE = +21m.14s., iE = +26m.54s., iEZ = +28m.0s., iN = +29m.50s., eZ = +31m.16s., iE = +31m.20s., eSSNZ = +36m.48s., eSSSN = +40m.43s.
Sverdlovsk PP = +21m.4s., pPP = +21m.56s., SKSP = +30m.39s., e = +32m.32s. and +35m.11s., i = +37m.53s. and +38m.9s., e = +40m.37s.
Samarkand e = +28m.29s.
Tashkent iS PKP = +20m.18s., i = +22m.31s., pPP = +22m.39s., sPP = +23m.6s., i = +28m.43s., SKSP = +31m.22s., SP = +31m.48s., PS = +32m.39s., SS = +39m.47s.
Agra iE = +19m.38s., eE = +20m.24s. and +23m.58s., SKKSE = +29m.33s., eE = +30m.8s., iPSE = +33m.2s., eE = +35m.38s., +37m.21s., and +38m.25s., G = +42m.33s.
Batavia iE = +21m.11s.
Irkutsk PP = +23m.21s., e = +24m.49s., +34m.40s., +37m.42s., and +42m.5s.
Mizusawa PN = +19m.57s.
Calcutta eN = +25m.8s. and +30m.59s., iN = +35m.27s. and +38m.28s.
Manila PKP, PKPZ = +21m.6s.
Hong Kong ? = +25m.43s. and +28m.55s., PS = +32m.23s., SS = +36m.20s.
Long waves were also recorded at Yalta, Perth, and Wellington.

Aug. 14. 10h. Shock recorded by stations of the Earthquake Research Institute of Tokyo Imperial University. Suggested origin 36°14N. 139°98E.

- Komaba P = 48m.52s., S = 49m.3s.
Tokyo Imp. Univ. P = 48m.52s., S = 49m.2s.
Tokyo Cent. Met. Obs. iP = 48m.53s. a, iS = 49m.8s.
Kamakura P = 48m.56s., S = 49m.8s.
Kiyosumi P = 48m.56s., S = 49m.6s.
Koyama P = 48m.56s., S = 49m.9s.
Misaki P = 48m.56s., S = 49m.8s.
Mitaka P = 48m.56s., S = 49m.6s.
Titibu P = 48m.56s., S = 49m.7s.
Tukubasan P = 48m.56s., S = 49m.4s.
Yoshiwara P = 48m.56s., S = 49m.14s.
Susaki P = 49m.4s., S = 49m.21s.
Nagoya P = 49m.22s., S = 49m.58s.
Mizusawa iP = 49m.30s., iS = 50m.7s.
Hukuoka B eP? = 52m.15s.

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August 4d. Readings also at 0h. (Tucson), 1h. (La Paz), 6h. (Fort de France), 8h. (Samarkand (2)), 11h. (Grozny and Piatigorsk), 12h. (Tifis, Grozny (2), and Piatigorsk), 14h. (Grozny), 15h. (Amboina), 16h. (Upsala and Grozny), 21h. (Wellington), 22h. (Wellington).

Aug. 5d. 14h. 17m. 35s. Epicentre 36°·5N. 71°·5E.

A = +·2557, B = +·7642, C = +·5922; $\delta = +8$; $h = 0$;
D = +·948, E = -·317; G = +·188, H = +·562, K = -·806.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	'	m. s.	s.	m. s.	s.	m. s.	m.
Andijan	4·3	8	e 1 14	P*	1 59	- 1	i 1 29	P _g
Samarkand	4·8	313	i 1 14	- 1	2 14	+ 2	i 1 27	P*
Tashkent	5·2	341	i 1 19	- 2	i 2 40	S*	—	2·9
Tchimkent	6·0	346	i 1 33	+ 1	i 2 33	- 10	2 4	P _g
Frunse	6·8	20	e 1 43	- 1	2 57	- 6	1 55	P*
Almata	8·0	30	e 2 1	+ 1	e 3 31	- 2	—	—
Agra	E. 10·8	147	e 2 42	+ 3	i 4 44	+ 2	i 3 7	PPP
Semipalatinsk	15·3	22	e 3 34	- 5	e 6 31	+ 1	e 7 32	SSS
Baku	17·3	289	e 4 6	+ 2	e 7 21	+ 5	4 59	PPP
Bombay	17·6	175	—	—	e 7 46	+ 23	—	e 15·9
Calcutta	N. 20·2	129	e 5 12	PP	i 8 27	+ 6	—	—
Grozny	20·8	298	4 45	0	e 8 22	- 11	—	—
Tifis	21·3	293	i 4 47	- 3	e 8 42	- 1	e 5 22	PPP
Erevan	21·6	289	e 4 53	- 1	—	—	—	e 9·9
Sverdlovsk	21·6	344	i 4 48	- 6	i 8 37	- 12	—	11·9
Sotchi	25·2	297	e 5 29	0	—	—	—	—
Ksara	29·1	275	e 6 4	0	e 12 58	SSS	—	—
Moscow	29·9	321	e 6 9	- 3	e 10 38	- 31	e 6 48	PP
Pulkovo	35·1	324	e 6 53	- 4	e 12 16	- 14	—	e 15·9
Copenhagen	43·7	316	i 8 5	- 3	14 31	- 8	9 49	PP
Hamburg	Z. 45·2	313	e 10 1	PP	—	—	—	—
Zurich	46·9	304	e 8 29	- 5	—	—	—	—
De Bilt	48·3	311	e 8 40	- 5	e 15 33	- 12	—	e 19·4

Additional readings:—

Andijan i = +1m.51s., iS_g = +2m.16s.

Samarkand i = +1m.32s., S = +1m.54s., i = +2m.41s.

Tchimkent i = +2m.12s.

Frunse i = +1m.53s., +2m.23s., and +2m.43s., S_g = +3m.37s.

Agra sPE? = +3m.26s., iE = +4m.3s.

Baku e = +8m.19s.

Tifis eN = +9m.9s.

Ksara e = +12m.3s.

Copenhagen = +17m.49s.

Aug. 5d. Readings also at 2h. (Copiapo (2)), 5h. (Frunse and Andijan), 6h. (Tucson), 10h. (Huancayo), 14h. (La Paz), 16h. (Tucson, Riverside, Sitka, Balboa Heights, Pasadena, Kew, and Bagneres), 17h. (Christchurch, New Plymouth, Arapuni, Bunytorpe, Hastings, Wellington, Tchimkent, Tifis, East Machias, St. Louis, Harvard, Florissant, Tucson, Andijan, Frunse, Copenhagen, De Bilt, Sverdlovsk, Tashkent, and Samarkand), 18h. (Sverdlovsk, Manila, and Tashkent), 20h. (Moscow, De Bilt, and Sverdlovsk), 22h. (Malabar), 23h. (Samarkand and Andijan).

Aug. 6d. Readings at 0h. (Huancayo, Tucson, Grozny, and Tifis), 1h. (Ksara and Tifis), 2h. (Sverdlovsk, Tashkent, San Javier, Fresno, Tchimkent, near Andijan, Frunse, Samarkand, and near Manila), 3h. (Husan), 6h. (Mizusawa and near Nagoya (2)), 7h. (near Algiers), 10h. (Samarkand, near Andijan, and Frunse), 11h. (Mizusawa), 13h. (near Manila), 14h. (Andijan, Samarkand, near Frunse, Tchimkent, and near Nagoya), 17h. (Florence, Toledo, and near Mizusawa), 18h. (Almata, Samarkand, Tchimkent, Frunse, and near Andijan), 20h. (Tifis, near Berkeley, Branner, Lick, San Francisco, and near Santiago), 22h. (Tifis, near Grozny, near La Jolla, Mount Wilson, Pasadena, and Riverside), 23h. (Sverdlovsk, Tashkent, Samarkand, Andijan (2), and Frunse).

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Aug. 7d. Readings at 0h. (La Paz), 1h. (Batavia), 4h. (Fort de France), 7h. (near Hukuoka B), 8h. (La Paz, Mount Wilson, Riverside, and Tucson), 9h. (Wellington), 11h. (Sverdlovsk, Tashkent, Huancayo, and near Mizusawa), 14h. (Tiflis), 16h. (Mount Wilson, Pasadena, Riverside, and Tucson), 19h. (near Amboina), 20h. (Riverside and Tucson), 22h. (Scoresby Sund (2)), 23h. (Bucharest and Ksara).

Aug. 8d. 13h. 6m. 47s. Epicentre 71°·0N. 18°·0W. (fore-shock of 15h.).

A = +·3115, B = -·1012, C = +·9448; $\delta = -8$; $h = -12$;
D = -·309, E = -·951; G = +·899, H = -·292, K = -·328.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	1·4	248	0 49	S	(0 49)	+ 3	—	—
Edinburgh	16·4	149	—	—	e 5 19	?	—	e 8·2
Rathfarnham Castle	18·5	159	e 7 28	S	(e 7 28)	-16	—	—
Copenhagen	20·2	125	4 38	- 1	—	—	—	—
Oxford	20·8	151	—	—	e 6 50	?	—	e 12·2
Hamburg	21·4	131	e 5 31	PPP	—	—	—	—
De Bilt	21·7	140	4 56	+ 1	—	—	—	e 10·7
Pulkovo	22·3	96	4 59	- 2	9 5	+ 3	—	—
Uccle	22·7	144	—	—	e 9 17	+ 8	—	11·8
Strasbourg	z.	25·5	138	e 5 35	+ 3	—	—	—
Stuttgart	25·7	137	e 5 36	+ 3	—	—	—	—
Tiflis	42·4	100	e 9 40	PP	e 17 25	SS	—	—
Ksara	46·8	114	—	—	e 16 22	+58	—	e 23·4

Additional readings:—

Scoresby Sund = +1m.18s.

Rathfarnham Castle IS = +13m.13s.

Strasbourg eZ = +7m.35s.

Stuttgart ePP = +7m.43s.

Long waves were also recorded at Kew, Bidston, Stonyhurst, Durham, Aberdeen, Baku, Trieste, and Sverdlovsk.

Aug. 8d. 13h. 14m. 34s. Epicentre 71°·0N. 18°·0W. (as at 13h. 6m.).

A = +·3115, B = -·1012, C = +·9448; $\delta = -8$; $h = -12$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	1·4	248	0 44	S	(0 44)	- 2	—	—
Bergen	14·2	127	e 3 20	- 4	—	—	—	7·4
Aberdeen	15·4	146	—	—	e 7 17	SSS	—	8·0
Bidston	18·9	153	i 4 38	PP	e 8 41	SSS	—	e 9·4
Copenhagen	20·2	125	4 36	- 3	—	—	—	—
Kew	21·2	149	i 4 51	+ 2	e 8 52	+11	—	e 10·4
Hamburg	21·4	131	e 4 53	+ 2	—	—	—	e 11·4
De Bilt	21·7	140	4 54	- 1	e 8 58	+ 7	—	e 10·4
Pulkovo	22·3	96	i 5 2	+ 1	9 2	0	—	e 11·3
Uccle	22·7	144	e 5 7	+ 3	—	—	—	e 10·4
Gottingen	N.	23·3	133	e 5 26?	+16	e 9 26?	+ 6	—
Strasbourg	z.	25·5	138	i 5 33	+ 1	e 10 13	+16	e 13·4
Stuttgart	25·7	137	e 5 33	0	—	—	—	e 12·9
Prague	25·8	128	e 5 35	+ 1	e 10 4	+ 2	—	—
Puy de Dôme	27·3	148	e 6 40	PPP	—	—	—	—
Sverdlovsk	34·4	73	6 53	+ 2	—	—	—	e 15·4
Harvard	z.	38·7	253	e 9 26?	PPP	—	—	e 18·4
Tiflis	42·4	100	—	—	e 14 28	+ 8	—	e 21·4
Tashkent	50·7	120	e 10 53	PP	e 16 20	+ 2	e 21 45	SSS

Additional readings:—

Scoresby Sund = +1m.16s.

Stuttgart e = +8m.26s.

Tashkent e = +14m.50s. and +19m.52s.

Long waves were also recorded at Baku, Jersey, Edinburgh, and Paris.

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Aug. 8d. 15h. 35m. 1s. Epicentre 71°0N. 18°0W. (as at 13h. 14m.).

A = +.3115, B = -.1012, C = +.9448; $\delta = -8$; $h = -12$;
D = -.309, E = -.951; G = +.899, H = -.292, K = -.328.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	o.	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	1.4	248	0 45	S	(0 45)	- 1	—	—
Bergen	14.2	127	e 3 21	- 3	—	—	—	e 7.0
Aberdeen	15.4	146	—	—	e 6 44	+12	—	e 7.7
Edinburgh	16.4	149	e 1 22	?	e 7 5	+ 9	—	—
Durham	17.8	148	i 4 9	- 2	i 7 24	- 4	e 7 33	SS
Rathfarnham Castle	18.5	159	e 5 24	+65	e 9 9	L	—	(9.2)
Stonyhurst	18.6	151	—	—	e 7 51	+ 5	—	9.0
Bidston	18.9	153	i 4 25	+ 1	e 8 39	SSS	—	e 9.0
Copenhagen	20.2	125	4 37	- 2	8 17	- 4	—	9.0
Oxford	20.8	151	4 43	- 2	8 35	+ 2	—	e 10.2
Kew	21.2	149	i 4 50	+ 1	i 8 39	- 2	—	e 10.0
Hamburg	21.4	131	e 4 49	- 2	—	—	—	e 14.7
De Bilt	21.7	140	e 4 53	- 2	8 49	- 2	e 9 0	SS
Pulkovo	22.3	96	e 4 59	- 2	9 1	- 1	—	e 10.6
Uccle	22.7	144	e 5 4	0	9 15	+ 6	—	e 11.0
Gottingen	23.3	133	—	—	e 8 17	-63	—	—
Paris	24.3	147	e 5 22	+ 2	—	—	—	13.0
Cheb	25.2	132	e 4 59?	-30	—	—	—	—
Strasbourg	z. 25.5	138	i 5 34	+ 2	e 10 14	+17	—	e 13.0
Stuttgart	25.7	137	e 5 33	0	e 10 2	+ 1	—	e 13.0
Prague	25.8	128	e 5 34	0	e 9 59	- 3	—	—
Puy de Dôme	27.3	148	—	—	e 9 55	-32	—	e 14.0
Moscow	27.9	93	e 5 51	- 3	e 10 34	- 3	—	14.5
Sverdlovsk	34.4	73	—	—	12 20	+ 1	—	16.0
Weston	38.8	253	—	—	e 14 9	+43	—	e 21.0
Philadelphia	42.2	256	—	—	e 14 44	+27	—	e 19.3
Tiflis	42.4	100	e 8 1	+ 3	e 14 28	+ 8	e 9 39	PP
Baku	45.3	95	e 8 29	+ 8	e 15 12	+10	—	22.5
Ksara	46.8	114	e 8 35	+ 2	e 17 23	?	—	—
Tashkent	50.7	120	—	—	e 16 21	+ 3	e 19 56	SS
Tucson	60.8	284	e 10 34	+18	—	—	—	e 26.0

Additional readings :—

Scoresby Sund +1m.14s.

Kew eNZ = +8m.49s.

Tucson i = +10m.37s.

Long waves were also recorded at Harvard and Toledo.

Aug. 8d. 16h. 49m. 32s. Epicentre 71°0N. 18°0W. (as at 15h.).

A = +.3115, B = -.1012, C = +.9448; $\delta = -8$; $h = -12$;

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	o.	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	1.4	248	0 46	S	(0 46)	0	—	—
Bidston	18.9	153	e 4 28	+ 4	—	—	—	e 9.5
Copenhagen	20.2	125	4 36	- 3	—	—	—	8.5
Oxford	20.8	151	—	—	e 8 37	+ 4	—	e 10.6
Kew	21.2	149	e 4 50	+ 1	—	—	—	e 10.5
Hamburg	z. 21.4	131	e 4 50	- 1	—	—	—	—
De Bilt	21.7	140	e 4 53	- 2	e 8 57	+ 6	—	e 11.0
Pulkovo	22.3	96	e 4 56	- 5	e 8 52	-10	—	11.5
Uccle	22.7	144	e 5 10	+ 6	e 9 13	+ 4	—	e 11.5
Paris	24.3	147	e 5 28?	+ 8	—	—	—	15.5
Strasbourg	25.5	138	e 5 34	+ 2	—	—	—	e 16.0
Stuttgart	25.7	137	e 5 33	0	—	—	—	e 13.5
Moscow	27.9	93	e 5 54	0	—	—	—	15.0
Ksara	46.8	114	e 8 36	+ 3	e 15 54	+30	e 10 36	PP
Tashkent	50.7	120	e 11 25	PP	—	—	—	—

Additional readings :—

Scoresby Sund +1m.14s.

Long waves were also recorded at Sverdlovsk, Puy de Dôme, Stonyhurst, Edinburgh, and Aberdeen.

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Aug. 8d. 18h. Undetermined shock.

Tucson iP = 26m.18s., i = 26m.36s., 26m.42s., 26m.52s., 26m.59s., 27m.4s., 27m.13s., 27m.16s., and 27m.22s.
Chihuahua ePZ = 26m.23s.
Riverside ePZ = 26m.58s., iZ = 27m.15s., i = 28m.49s.
La Jolla eE = 27m.0s., eSE = 28m.17s.
Mount Wilson ePZ = 27m.5s.
Pasadena iPNZ = 27m.6s., iZ = 27m.28s., iSE = 28m.40s., eLN = 28.8m.
Tinemaha ePZ = 27m.40s., eEN = 30m.39s.
Ukiah e = 29m.0s.
Tacubaya ePN = 29m.8s., eLN = 33.9m.
Haiwee eE = 30m.13s.
Fresno eN = 30m.41s.
Denver eSE = 31m.44s., iSSEN = 32m.0s., iL = 32.5m.
Ottawa eZ = 32m.0s., eN = 40m.30s., L = 43.0m.
Weston eNZ = 32m.41s., iLNZ = 44.8m.
Bozeman e = 32m.50s.
Floriissant ePE = 34m.7s., ePN = 34m.13s. and 34m.16s., iSN = 36m.29s. and 36m.34s.
Cape Girardeau ePN = 35m.42s., eSN = 37m.20s., iN = 37m.37s., iLN = 38m.34s.
Seattle e = 37m.0s.
Philadelphia e = 37m.12s., i = 42m.35s., 42m.50s., 42m.55s., iL = 43.5m.
Chicago e = 37m.57s., i = 38m.34s.
Columbia e = 39m.51s.
Honolulu e = 41m.51s.
Fordham eZ = 42m.1s., 43m.9s., iZ = 43m.27s., iE = 44m.26s.
Vermont e = 43m.21s., i = 44m.8s., 44m.12s., and 44m.16s.
Harvard eNZ = 44m.2s., eLZE = 47.3m.
East Machias e = 44m.39s.
College e = 49m.12s.
Long waves were also recorded at Edinburgh, Tashkent, Pulkovo, Bidston, Kew, Uccle, De Bilt, Moscow, Ksara, Puy de Dôme, Tiflis, Baku, Strasbourg, and Sverdlovsk

Aug. 8d. Readings also at 0h. (Scoresby Sund), 1h. (Santiago), 2h. (Wellington and Columbia), 3h. (Tucson), 4h. (Bucharest and Trieste), 6h. (Florence, Tashkent, and Sverdlovsk), 7h. (La Paz and Santiago), 8h. (Sitka), 9h. (near Amboina), 11h. (Tucson, Philadelphia, Weston, Mount Wilson, Pasadena, Riverside, and College), 12h. (Toledo, Perth, Christchurch, and Brisbane, Riverside, Mount Wilson, and Pasadena), 13h. (La Paz, Montezuma, Riverside, Mount Wilson, Pasadena, Jena, Semipalatinsk, Erevan, Grozny, Tucson, Baku, Sverdlovsk, Wellington, Scoresby Sund (3), Tiflis, Tashkent, Strasbourg, Pulkovo, Copenhagen, and Stuttgart), 14h. (Santiago (2), San Javier, Scoresby Sund (2), and Tucson), 15h. (Ottawa), 16h. (Ottawa, Jersey, Edinburgh, Scoresby Sund (5), Samarkand, Copenhagen, Tashkent, and Sverdlovsk), 17h. (near Manila, Santiago, La Paz, and San Javier), 18h. (Fordham, Tucson, and Stonyhurst), 19h. (Andijan, Frunse, Scoresby Sund, Copenhagen, Sverdlovsk, and Tashkent), 20h. (Scoresby Sund (2) and College).

Aug. 9d. 18h. Readings which do not afford a determination :—

Istanbul P = 30m.6s., SP_gP_g = 30m.47s., S_g = 31m.7s.
Sofia eEN = 30m.18s., eSEN = 31m.31s.
Bucharest ePN = 30m.42s., eN = 30m.56s., eE = 31m.8s., eEN = 31m.12s., eE = 31m.20s., S_gEN = 31m.52s., iSEN = 32m.15s., iEN = 32m.23s., iN = 32m.34s. and 32m.41s.
Theodosia eP = 31m.14s.
Simferopol eP = 31m.16s., eS = 32m.42s.
Belgrade eZ = 32m.58s., eNW = 33m.9s., eZ = 33m.12s., eN = 33m.28s., iNW = 34m.0s.
Moscow eP = 33m.29s., eS = 37m.0s., L = 39m.30s.
Pulkovo eP = 33m.57s., eS = 37m.47s.
Ksara e = 34m.22s. and 36m.44s.
Budapest eN = 34m.38s., eE = 34m.56s.
Ogyalla e = 35m.8s.
Triest e = 35m.16s., S = 35m.26s.
Prague e = 36m.30s.
Cheb e = 37m.
De Bilt eS = 37m.28s., eL = 39m.30s.
Hamburg eN = 38m.
Strasbourg e = 38m.48s.
Long waves were also recorded at Tiflis, Sverdlovsk, Copenhagen, Potsdam, Uccle, Kew and Bidston.

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Aug. 9d. Readings also at 0h. (Almata, Andijan, Semipalatinsk, Sverdlovsk, Tashkent, Tchinkent, and near Frunse), 2h. (Tucson), 4h. (Andijan (3), Frunse, Tashkent, Baku, Sverdlovsk, Moscow, Tiflis, Copenhagen, De Bilt, near Medan, and Tucson), 5h. (near Santiago and San Javier), 8h. (near Apia and near Nagoya), 10h. (Mizusawa), 11h. (Edinburgh, Vladivostok, Tashkent, and near Santiago), 12h. (Kew, De Bilt, and Strasbourg), 14h. (Copenhagen, Frunse, Samarkand, Baku, and Tashkent), 15h. (Sverdlovsk, Tucson, Harvard, Riverside, Pasadena, Huancayo, La Paz, and La Plata), 16h. (Erevan, near Samarkand, and near Tiflis), 17h. (Almata (2), Andijan (2), Frunse (2), Tashkent, and near Pananarive), 18h. (Istanbul, Sofia, Bucharest, Edinburgh, Sverdlovsk, Trieste, and Scoresby Sund), 21h. (near Ksara), 22h. (De Bilt, Edinburgh, Kew, Bidston, and Scoresby Sund), 23h. (near Hukuoka B).

Aug. 10d. 10h. 34m. 3s. Epicentre 42°·6N. 145°·0E.

Strong at Kusiro, moderate at Obihiro, Nemuro, Hatinohe, slight at Urakawa.

Epicentre 42°·6N. 145°·0E.

Macroseismic radius 200-300km. Shallow.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1938, Tokyo, 1940, pp. 52-53. Macroseismic Chart p.52.

$$A = -\cdot6048, B = +\cdot4235, C = +\cdot6744; \quad \delta = -5; \quad h = -3;$$

$$D = +\cdot574, E = +\cdot819; \quad G = -\cdot552, H = +\cdot387, K = -\cdot73^{\circ}$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	s		m. s.	s.	m. s.	s.	m. s.	m.
Kusiro	0·6	311	0 35k	S	(0 35)	+ 9	—	—
Nemuro	0·8	30	0 29k	+11	0 41	+10	—	—
Obihiro	1·4	283	0 24k	- 3	0 39	- 7	—	—
Urakawa	1·7	255	0 39	P _r	0 59	S _r	—	—
Asahigawa	2·3	302	0 48k	P _r	1 13	+ 4	—	—
Sapporo	2·7	280	0 51k	P*	1 20	+ 1	—	—
Muroran	3·0	265	0 55k	P*	1 26	- 1	—	—
Hakodate	3·3	256	0 59	P*	1 32	- 3	—	—
Hatinohe	3·3	231	0 58	P*	1 32	- 3	—	—
Mori	3·3	262	0 59k	P*	1 35	0	—	—
Aomori	3·6	241	1 5	P*	1 41	- 1	—	—
Miyako	3·7	318	1 3k	+ 3	1 41	- 4	—	—
Morioka	4·1	225	1 8k	+ 3	1 50	- 5	—	—
Mizusawa	4·6	221	1 14	+ 2	2 1	- 6	—	—
Akita	4·7	233	1 25	P*	2 7	- 3	—	—
Sendai	5·3	217	1 34	P*	2 20	- 5	—	—
Yamagata	5·6	220	1 20	- 7	2 17	-16	—	—
Hukusima	6·0	217	1 34	+ 2	2 39	- 4	—	—
Nūgata	6·5	226	2 7	P _r	—	—	—	—
Onahama	6·5	210	1 49	P*	2 47	- 8	—	—
Mito	7·1	211	1 56	+ 8	3 3	- 7	—	—
Utunomiya	7·2	215	1 53	+ 4	3 10	- 3	—	—
Kakioka	7·4	211	1 52	0	3 8	-10	—	—
Tukubasan	7·4	212	1 52	0	3 9	- 9	—	—
Tyosi	7·6	206	1 58	+ 3	3 14	- 9	—	—
Maebasi	7·7	218	1 57	+ 1	3 22	- 3	—	—
Kunagaya	7·8	216	2 1	+ 3	3 20	- 8	—	—
Nagano	7·9	224	2 9	PP	3 20	-10	—	—
Oiwake	8·0	221	2 12	PP	3 44	+11	—	—
Wazima	8·0	232	2 4	+ 4	3 33	0	—	—
Tokyo, Cen. Met. Ob.	8·1	215	2 7	+ 5	3 28	- 7	—	—
Yokohama	8·3	212	2 13	PP	—	—	—	—
Toyama	8·4	228	2 10	+ 4	3 37	- 6	—	—
Hunatu	8·6	216	2 9	0	—	—	—	—
Kohu	8·6	218	2 17	PP	3 32	-16	—	—
Mera	8·7	209	2 21	PP	—	—	—	—
Misima	8·8	214	2 25	PP	3 48	- 5	—	—
Numadu	8·9	214	2 24	PP	3 49	- 6	—	—
Gihu	9·6	224	2 32	PP	3 54	-18	—	—
Nagoya	9·7	222	e 2 33	PP	4 34	SSS	—	—

Continued on next page,

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Vladivostok	9.7	277	e 3 26	?	—	—	—	—
Ibukisan	9.8	225	2 37	PP	—	—	—	—
Hikone	10.0	226	2 31	+ 4	—	—	—	—
Kameyama	10.2	223	2 49	PPP	—	—	—	—
Hatidyozima	10.4	205	2 34	0	—	—	—	—
Osaka	10.8	226	2 46	+ 7	5 56	L	—	(5.9)
Irkutsk	28.8	304	6 3	+ 1	10 46	- 5	—	13.4
Sverdlovsk	52.9	318	i 9 17	- 3	16 35	-13	—	25.0
Santa Barbara	z. 71.1	60	i 11 25	+ 3	—	—	—	—
Haiwee	71.2	58	i 11 25	+ 2	—	—	—	—
Pasadena	z. 72.3	59	i 11 30 _a	+ 1	—	—	—	—
Mount Wilson	z. 72.4	59	i 11 31 _a	+ 1	—	—	—	—
Riverside	z. 72.9	59	i 11 35	+ 2	—	—	—	—
Copenhagen	74.2	336	11 40	0	—	—	—	—
Tucson	78.2	57	i 12 5	+ 2	—	—	—	—

Long waves were also recorded at Tashkent.

Aug. 10d. Readings also at 1h. (Balboa Heights and Scoresby Sund), 2h. (Sofia, Trieste, Kew, Istanbul (2), Bucharest (2), Rio de Janeiro, Huancayo, San Juan, Balboa Heights, La Paz, Tucson, Riverside, Mount Wilson, Pasadena, De Bilt, and Copenhagen), 3h. (Ksara), 4h. (Grozny, near Medan, and Sverdlovsk), 5h. (Tashkent and La Paz), 6h. (Fort de France), 7h. (Pasadena, Tucson, Mount Wilson, and Riverside), 8h. (Semipalatinsk, Sverdlovsk, Samarkand, Tashkent, Almata, and River-side), 9h. (near Koti), 10h. (near Algiers), 12h. (Irkutsk, Taihoku, Andijan, Zi-ka-wei, Tiflis, Manila, Calcutta, Potsdam, Phu-Lien, Moscow, Pulkovo, near Santiago, Tashkent, Sverdlovsk, De Bilt, and Copenhagen), 14h. (Tashkent, Andijan, Frunse, and Almata), 15h. (Ksara), 18h. (Andijan and Trieste), 22h. (Nagoya), 23h. (La Paz).

Aug. 11d. 9h. 50m. 41s. Epicentre 41° 9N. 45° 0E.

$$A = +.5279, B = +.5279, C = +.6653; \quad \delta = -2; \quad \lambda = -2;$$

$$D = +.707, E = -.707; \quad G = +.470, H = +.470, K = -.747.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tiflis	0.2	219	i 0 9	- 1	—	—	—	i 0.3
Erevan	1.8	192	e 0 33	+ 1	e 1 9	+13	e 1 13	S _r
Piatigorsk	2.5	326	e 0 40	- 3	e 1 16	+ 2	i 0 52	P _r
Baku	3.9	111	1 6	+ 4	2 0	S*	—	—
Sotchi	4.2	296	e 1 24	P _r	e 2 30	S _r	e 2 40	S*
Simferopol	8.5	295	e 3 39	S	(e 3 39)	- 6	—	—
Ksara	10.8	225	3 19 _?	?	—	—	—	—
Moscow	14.7	343	e 3 26	- 5	e 5 55	-21	—	e 7.8
Samarkand	16.8	90	4 28	+30	7 58	+53	—	—
Sverdlovsk	18.0	28	i 3 54	-19	7 5	-27	—	10.8
Tashkent	18.2	84	4 26	+10	—	—	—	e 7.2
Pulkovo	20.1	338	4 35	- 3	8 1	-18	—	e 12.3
Andijan	20.5	85	4 40	- 2	8 20	- 7	—	—
Frunse	21.8	78	4 45	-11	8 37	-15	—	—
Hamburg	26.0	309	—	—	e 11 19 _?	SS	—	e 19.8

Additional readings:—

Piatigorsk eS* = +1m.22s., eS_r = +1m.30s.

Tashkent e = +4m.40s.

Long waves were also recorded at De Bilt and Potsdam.

Aug. 11d. Readings also at 0h. (College and La Paz), 4h. (Samarkand), 5h. (near Tananarive), 6h. (Huancayo, near La Paz, and near Tananarive), 7h. (Agra, Andijan, Tashkent, near Samarkand, and near San Javier), 8h. (Sverdlovsk), 10h. (near Santiago), 12h. (La Paz and near Fort de France), 15h. (near Amboina), 16h. (College), 18h. (Mount Wilson and Sverdlovsk), 20h. (Samarkand), 22h. (near Mizusawa, Nagoya, near Tananarive, and near Wellington).

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Aug. 12d. 2h. 28m. 33s. Epicentre 42° 6N. 13° 1E.

Scale VI at Aquila (Abruzzi).
 v at Rieti, Pizzoli, Poggio, S. Lorenzo.
 iv at Subiaco, Popoli, Terni.
 II-III at Rome, Norcia, Macarata.

Macroseismic area 15,400 sq. km. Radius 70km.

Pietro Caloi "Ativita Sismica in Italia, nel decurio, 1930-9." Florence, 1942 - XX. Map 69.

Bolletino della Societa Sismologica Italiana, Vol. XXXVI, (1938—XVII), Nos. 5-6. Rome, 1939, XVII, p. 225.

A = +.7191, B = +.1674, C = +.6744; $\delta = -6$; $h = -3$;
 D = +.227, E = -.974; G = +.657, H = +.153, K = -.738.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Florence	1.8	311	e 0 34	+ 2	i 0 57	+ 1	—	—
Padova	3.0	342	e 1 6	P _g	e 1 57	S _g	—	—
Triest	3.1	9	e 1 0	P _g	e 1 42	S _g	—	—
Chur	5.0	329	e 1 16	- 2	e 3 22	?	—	—
Belgrade	5.7	65	—	—	e 2 27	- 8	e 2 13	?
Zurich	5.8	326	e 1 29	0	e 2 37	- 1	—	—
Basle	6.3	323	e 1 35	- 1	e 2 57	+ 7	—	—
Stuttgart	6.8	337	e 2 46	S	(e 2 46)	-17	e 3 39	S _g e 4.8
Strasbourg	7.0	329	e 2 40	P _g	e 3 3	- 5	e 3 38	S _g
Sofia	7.6	86	—	—	e 3 5	-18	—	—
Puy de Dôme	7.9	297	—	—	—	—	e 4 14	S _g
Jena	8.4	352	e 2 27	P*	e 3 33	-10	—	e 4.1
Bucharest	9.6	75	—	—	e 4 35	+23	—	6.2
Potsdam	9.8	359	—	—	e 5 39	S _g	—	—
Hamburg	11.2	350	—	—	—	—	e 6 3	S _g 6.4

Additional readings:—

Triest P_g = +1m.11s., P_gP_g = +1m.17s., S_g = +2m.2s.

Belgrade iZ = +3m.17s., i = +3m.26s., e = +3m.43s.

Stuttgart eP_g = +3m.1s.

Strasbourg e = +3m.12s., +3m.19s., +4m.2s., +4m.42s., and +5m.27s.

Bucharest eN = +4m.47s., eE = +5m.1s., and +5m.34s.

Potsdam eNZ = +5m.51s., eE = +5m.57s., eEN = +6m.33s., eN = +7m.27s., iE = +7m.53s.

Long waves were also recorded at Copenhagen and De Bilt.

Aug. 12d. 4h. Epicentre Pacific Ocean.

Apla iP = 9m.6s., pP = 9m.18s., sP = 9m.27s., iS = 11m.38s., P_gP = 14m.19s.

Wellington eP? = 10m.25s., eS? = 15m.5s., L_g = 16m.18s., L? = 18m.

Christchurch PEZ? = 10m.31s., SNZ = 15m.18s., L_gN = 16m.20s., L = 18m.43s.

Brisbane ePEN = 11m.0s., i?EN = 13m.54s., iS?EN = 15m.24s.

Melbourne iP = 14m.3s., S = 18m.13s., i = 20m.20s., L = 22m.24s.

Arapuni eS = 14m.54s., L_g = 15m.42s.

Manila eP = 16m.11s., S?N = 26m.45s.

Sydney e = 16m.35s., eL = 19m.30s.

Riverview iE = 16m.39s., eLE = 17m.12s.

Batavia P?Z = 16m.35s., eP?E = 17m.1s., iE = 18m.46s.

Mount Wilson ePZ = 18m.19s., iZ = +18m.23s.

Riverside ePZ = +18m.21s., iZ = +18m.25s.

Pasadena iPZ = 18m.22s., eLE = 27m.12s.

Adelaide e = 18m.32s., and 19m.6s., i = 20m.20s., iS = 23m.43s., L = 25m.43s.

Tinemaha eZ = 18m.32s.

Tucson eP = 18m.44s., L = 45m.9s.

Honolulu eS = 21m.13s., eL = 26m.3s.

Potsdam eNZ = 24m. and 78m.

Agra eE = 24m.31s.

Moscow eP = 25m.20s., ePP = 28m.52s., e = 30m.48s., PS = 37m.39s., eL = 75m.30s.

Ksara ePKP = 25m.22s., e = 28m.45s., 31m.34s., and 41m.18s.

Belgrade eZ = 25m.38s., 25m.43s., and 26m.4s.

De Bilt eZ = 25m.40s., eL = 75m.

Uccle ePKPZ = 25m.41s., eL = 76m.

Helwan iP = 25m.42s., i = 26m.21s.

Continued on next page.

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Bidston e = 25m.43s., eL = 80m.
Stuttgart ePKPZ = 25m.43s., ePKPNZ = 25m.48s., eZ = 26m.39s., eL = 84m.
Chur e = 25m.47s.
Sofia eEN = 25m.48s.
Zurich e = 25m.48s.
Kew eNZ = 25m.49s., eZ = 28m.18s., eL = 80m.
Strasbourg iPKPZ = 25m.51s., eZ = 26m.41s., eLN = 77m.
Paris eL = 26m.5s.
Triest e = 26m.4s., 32m.33s., and 32m.45s.
Sverdlovsk eP = 26m.6s., e = 33m.56s., and 42m.3s., L = 53m.
Tashkent eP = 27m.12s., e = 33m.46s. and 35m.26s., PS = 41m.26s., SSS = 52m.30s., eL = 60m.54s.
Tiflis eN = 27m.12s. and 28m.48s., eLN = 65m.
Pulkovo PP = 28m.41s., eL = 65m.30s.
Copenhagen 29m., L = 66m.
College eS = 29m.14s., eL = 41m.29s.
Huancayo eS = 31m.56s., eSS = 39m.7s., eL = 55m.12s.
Philadelphia ePS = 35m.26s., eL = 58m.37s.
Long waves were also recorded at Columbia, Harvard, La Paz, Baku, Puy de Dôme, Jersey, and San Fernando.

Aug. 12d. Readings also at 1h. (near Santiago and San Javier), 3h. (near Hukuoka B and near Koti), 4h. (near Samarkand), 7h. (Tacubaya), 8h. (near Mizusawa), 13h. (Prague), 14h. (Samarkand), 15h. (Grozny, Trieste, and Belgrade), 16h. (Baku and near Balboa Heights), 17h. (Tashkent and Columbia), 19h. (Samarkand and near Andijan), 20h. (Frunse), 22h. (near Amboina, near Manila, and near Hukuoka B), 23h. (Tiflis, Tucson, near Batavia, and Malabar).

Aug. 13d. 6h. Local Japanese shock.
Kamakura P = 58m.14s., S = 58m.26s.
Kiyosumi P = 58m.14s., S = 58m.29s.
Komaba P = 58m.14s., S = 58m.24s.
Koyama P = 58m.14s., S = 58m.28s.
Misaki P = 58m.14s., S = 58m.30s.
Mitaka P = 58m.14s., S = 58m.25s. †
Titibu P = 58m.14s., S = 58m.23s.
Tokyo Cen. Met. Ob. iP = 58m.14s. a, iS = 58m.24s.
Tokyo Imp. Univ. P = 58m.14s., S = 58m.23s.
Tukubasan P = 58m.14s., S = 58m.20s.
Yosiwara P = 58m.14s., S = 58m.32s.
Susaki P = 58m.29s., S = 58m.47s.
Nagoya P = 58m.45s., S = 59m.28s.
Mizusawa iPE = 58m.52s., iSE = 59m.29s.

Aug. 13d. Readings also at 0h. (Berkeley and Grozny), 1h. (Sverdlovsk), 2h. (Fort de France and Florence), 8h. (Fort de France, Mount Wilson, Pasadena, Riverside, Sverdlovsk, Huancayo, and near La Paz), 9h. (Copenhagen, Andijan, Frunse, and Tashkent), 10h. (Triest), 12h. (Santiago), 15h. (Santiago, near Mizusawa, and Nagoya), 16h. (La Paz), 17h. (Samarkand), 18h. (La Jolla, Mount Wilson, Pasadena, Riverside, and Tucson), 19h. (Columbia), 20h. (Sverdlovsk), 21h. (Fort de France), 23h. (Merida).

Aug. 14d. Readings at 1h. (Mount Wilson, Pasadena, Tinemaha, Irkutsk, Tashkent, and Weston), 2h. (Baku, Tiflis, Copenhagen, Ksara, and Huancayo), 7h. (Samarkand), 8h. (Copenhagen, De Bilt, Strasbourg, Jersey, Rathfarnham Castle, Copenhagen Pulkovo, Moscow, Tashkent, Scoresby Sund, and near Malaga), 9h. (Almata, Andijan, Frunse, and near Malaga), 12h. (Medan, near Fort de France, and near Malaga), 14h. (Keizyo, near Balboa Heights, and near Malaga), 15h. (Fort de France), 16h. (near La Paz and near Malaga), 17h. (La Paz), 18h. (Tiflis), 20h. (near Ksara, Kew, Edinburgh, Strasbourg, De Bilt, Potsdam, Uccle, Stuttgart, Zurich, Granada, Malaga, Toledo, Harvard, Rio de Janeiro, Huancayo, La Paz, and San Juan), 21h. (Bidston, Copenhagen, Pulkovo, Baku, Tashkent, Tiflis, Huancayo, near La Paz, and near Wellington (3)), 22h. (Puebla, Tacubaya, Tucson, Toledo, and near La Paz),

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Aug. 15d. 11h. 2m. 4s. Epicentre 40°-0N. 20°-0E. (epicentre due to U.S.S.R.).

Prof. Mario Magnani.

Tettonica e Sismicità Nella Regione Albanese. Geofisica pura e applicata, Vol. VIII, fasc. 12, pp. 1-42. Resumé in English and German, p. 1, Appendix 1, p. 32.

A = +.7219, B = +.2627, C = +.6402; $\delta = +1$; $h = -2$;
D = +.342, E = -.940; G = +.602, H = +.219, K = -.768.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m.
Sofia	3.7	42	e 0 50	-10	i 1 44	- 1	—	—
Belgrade	4.8	5	e 1 11 _a	- 4	—	—	i 2 38	S _g
Bucharest	6.3	44	e 1 36	0	i 2 46	- 4	e 2 16	P _g
Keckskemet	z. 6.9	358	e 1 51	+ 6	e 3 4	- 1	—	—
Istanbul	7.0	79	e 2 14	P _g	—	—	3 32	S*
Laibach	N.E. 7.2	328	e 2 12	P*	i 3 9	- 4	—	—
Triest	7.3	323	e 1 48	- 2	i 3 14	- 1	2 3	P*
Budapest	7.5	356	e 1 54	+ 1	i 4 5	—	—	—
Florence	7.5	302	e 0 56?	?	e 3 56?	—	—	—
Ogyalla	N. 7.9	351	e 2 6	+ 7	e 3 26	- 4	e 4 10	S _g
Padova	8.1	315	e 2 32	P*	5 20	?	—	—
Chur	10.2	315	e 2 31	0	e 4 25	- 2	—	—
Moncalieri	10.4	303	e 1 56?	?	e 3 50	?	—	—
Prague	10.8	341	e 2 37	- 2	e 4 50	+ 8	—	e 4.9
Zurich	11.1	315	e 2 44k	+ 1	e 4 44	- 5	—	—
Cheb	11.4	334	e 3 56?	?	—	—	—	—
Basle	11.7	314	e 2 52	+ 1	e 5 13	+ 9	—	—
Stuttgart	11.7	322	e 2 49	- 2	e 5 4	0	—	—
Neuchatel	11.8	311	e 2 51	- 2	—	—	—	—
Karlsruhe	12.2	321	e 2 56?	- 2	e 5 30	+ 14	—	—
Strasbourg	12.3	319	e 3 13	+ 14	e 5 56	+ 38	—	e 6.4
Jena	12.4	334	e 2 56	- 5	e 3 56	?	—	e 6.8
Potsdam	13.3	341	—	—	e 6 2	+ 20	—	e 7.5
Göttingen	E. 13.5	332	e 3 56?	+ 41	—	—	—	—
Helwan	13.7	134	e 3 17	- 1	e 6 6	+ 14	—	—
Ksara	14.1	111	e 3 20	- 3	e 6 13	+ 11	—	—
Hamburg	N. 15.2	337	e 3 34	- 4	e 6 43	+ 15	—	e 8.4
Paris	15.3	311	—	—	e 6 49	+ 19	—	e 8.8
Uccle	15.4	320	e 3 50	+ 10	e 6 42	+ 10	—	i 8.8
De Bilt	15.8	325	e 4 2	+ 17	e 6 59	+ 17	—	e 8.4
Copenhagen	16.5	345	—	—	7 2	+ 4	—	9.0
Kew	18.2	317	i 4 21	+ 5	i 7 50	+ 13	—	10.9
Toledo	18.4	277	e 4 24	+ 6	e 7 54	+ 13	—	e 10.8
Granada	18.6	270	i 4 21	0	i 8 8	+ 22	—	e 10.7
Tiflis	18.8	77	4 21	- 2	e 7 54	+ 4	—	e 10.9
Malaga	19.4	270	—	—	e 8 8	+ 4	—	—
Moscow	19.6	32	e 4 26	- 6	e 8 3	- 5	—	e 10.4
Stonyhurst	20.6	322	e 4 56?	+ 13	e 8 46	+ 17	—	—
Pulkovo	20.8	16	e 4 38	- 7	e 8 25	- 8	—	e 9.9
Edinburgh	22.1	325	—	—	e 7 56?	?	—	—
Baku	22.8	80	e 5 6	+ 1	e 9 10	- 1	—	13.9
Sverdlovsk	31.2	44	6 16	- 7	—	—	—	14.9
Weston	z. 65.4	306	i 10 47	0	—	—	—	—

Additional readings :-

Sofia eE = +54s, iEN = +1m.3s., iE = +1m.36s., iN = +1m.48s. and +1m.54s.

Belgrade iZ = +1m.16s., iP*Z = +1m.22s., iP_g = +1m.30s., iNW = +2m.25s.

Bucharest ePN = +1m.39s., eP*E = +1m.58s., iS*EN = +3m.5s., iSEN = +3m.24s.,

i_SN = +3m.56s.

Keckskemet eZ = +2m.30s. and +3m.22s., iZ = +3m.47s., eZ = +4m.52s. and +5m.44s.

Laibach iNE = +2m.42s., +3m.36s., and +4m.24s.

Budapest PE = +1m.57s., PPN = +2m.59s., iN = +3m.31s., iSN = +4m.24s., PSSN =

+4m.38s., iE = +4m.16s., iN = +5m.1s.

Stuttgart e = +2m.58s., +6m.48s., and +6m.59s.

Potsdam eN = +6m.44s., eE = +6m.56s., eZ = +7m.20s.

Helwan e = +6m.26s., i = +6m.35s.

Toledo i = +4m.28s., e = +5m.19s.

Long waves were also recorded at Tashkent and Bergen.

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Aug. 15d. Readings also at 0h. (Berkeley, Mount Wilson, Pasadena, Riverside, and Tucson), 1h. (Tiflis), 2h. (Medan and Samarkand), 4h. (Fort de France), 5h. (Lick), 6h. (Santiago), 8h. (near La Paz (2)), 10h. (near Nagoya), 12h. (Tucson), 14h. (near Copiapo), 15h. (Bucharest and Samarkand), 16h. (Huancayo, La Paz, Tucson, Pasadena, Riverside, Ksara, Sverdlovsk, and Tashkent), 17h. (Baku, De Bilt, Kew, Guadalajara, Tacubaya, and Harvard), 18h. (Toledo), 20h. (near Bagnères), 23h. (near Wellington).

Aug. 16d. 4h. 27m. 55s. Epicentre 22°·5N. 94°·5E. (as on 1938 April 14d.).

Force VI at Noakhali, Silchar, Aijal (Lushai Hills), and in S.E. Bengal.

Epicentre 24°·0N. 94°·0E. (Bombay). Depth 60kms. (Strasbourg).

C. W. B. Normand.

Government of India Meteorological Dept. Seismological Bulletin, July-September, 1938, Delhi, 1939, p. 60.

A = -·0726, B = +·9219, C = +·3805; δ = -5; h = +4;
D = +·997, E = +·078; G = -·030, H = +·379, K = -·925.

A depth of focus 0·005 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	^o	^o	m. s.	s.	m. s.	s.	m. s.	m.
Calcutta	5·7	278	1 1 18	- 6	1 2 21	- 8	—	—
Phu-Lien	11·4	96	1 2 49k	+ 7	5 12	+23	2 54	PP 5·7
Agra	15·7	291	1 3 26	-12	6 5	-26	3 37	PP —
Hyderabad	15·9	254	3 38	- 3	6 24	-11	—	— 7·7
Dehra Dun	N. 16·7	301	1 3 41a	-10	1 6 28	-25	—	— 19·2
Hong Kong	18·2	86	4 16	+ 6	7 54	SS	—	— 10·0
Medan	19·2	168	1 4 32	+11	1 8 13	SS	—	— —
Kodaikanal	E. 20·4	238	1 4 32a	- 2	1 8 19	+ 5	4 54	PP 10·1
Bombay	20·6	265	1 4 33	- 3	1 8 13	- 5	1 8 36	SS —
Colombo	E. 21·0	226	4 41	+ 1	8 33	+ 8	—	— 13·5
Taiyu	24·1	80	5 17	+ 7	9 43	+22	—	— —
Taihoku	24·8	78	e 5 27	+10	9 50	+18	1 5 45	PP 12·9
Almata	25·3	331	5 21	- 1	e 9 44	+ 3	—	— —
Zi-ka-wei	E. 25·5	64	e 5 25	+ 1	10 3	+19	1 5 49	PP —
Andijan	26·1	320	5 31	+ 1	1 10 1	+ 7	—	— 17·3
Frunse	26·2	326	5 21	- 9	9 45	-11	1 6 0	PP 17·6
Manila	26·3	103	1 5 37k	+ 6	10 43	+46	—	— —
Isigakizima	27·3	79	5 35	- 6	—	—	—	— —
Dairen	28·3	48	6 14	+24	11 12	SS	—	— —
Tashkent	28·3	319	1 5 46	- 4	1 10 27	- 3	—	— —
Tohimkent	28·7	320	5 53	0	1 10 32	- 4	e 6 8	pP 13·1
Samarkand	29·0	312	5 58	+ 2	10 53	+12	—	— 15·1
Semipalatinsk	30·0	343	1 6 3	- 2	10 49	- 8	—	— 16·8
Irkutsk	30·7	12	1 6 15	+ 4	11 13	+ 5	—	— 12·6
Batavia	31·0	155	6 23	+ 9	1 11 27	+15	—	— e 20·1
Heizyo	31·3	51	e 6 37	+21	13 21	SS	—	— 16·9
Zinsen	31·4	54	1 6 11k	- 6	e 11 22	+ 3	e 7 23	PP —
Keizyo	31·7	55	6 31	+11	12 11	+48	—	— 17·4
Nake	32·1	72	6 25	+ 2	—	—	—	— —
Syuhurei	32·1	57	—	—	e 11 33	+ 3	—	— e 17·6
Taiyu	32·4	57	6 30	+ 4	11 42	+ 8	—	— 17·9
Hukuoka B	33·4	63	e 6 36	+ 2	1 11 39	-11	—	— 18·5
Miyazaki	34·0	66	6 59	+19	13 23	SS	—	— —
Hamada	35·0	61	6 54	+ 6	12 4	-11	8 13	PP —
Matuyama	35·4	62	6 55	+ 3	12 38	+17	8 21	PP 17·1
Muroto	36·5	64	7 7	+ 6	12 49	+11	8 47	PP —
Vladivostok	37·1	47	1 7 7	+ 1	1 12 56	+ 9	—	— 21·5
Sumoto	37·2	62	7 12	+ 5	12 58	+10	16 4	SSS 20·1
Osaka B	37·8	62	7 13	+ 1	13 1	+ 4	8 56	PP 20·7
Siomisaki	37·8	64	7 15	+ 3	13 8	+11	8 57	PP 21·0

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	o.	m. s.	m. s.	s.	m. s.	s.	m. s.	m.	
Gihu	38-9	61	7 26	+ 5	13 19	+ 5	9 3	PP	20-5
Nagoya	39-0	61	7 26	+ 4	—	—	—	—	20-4
Oiwake	40-4	59	7 27	- 6	13 47	+10	9 47	PP	—
Maebasi	40-9	59	7 42	+ 5	13 39	- 5	17 14	SS	—
Hatidyozima	41-2	64	7 52	+12	13 55	+ 7	—	—	21-0
Tokyo C.M.O.	41-3	61	7 43	+ 2	14 31	+41	9 44	PP	19-7
Baku	41-5	306	i 7 43	+ 1	16 59	SS	i 9 19	PP	29-4
Tukubasan	41-7	59	7 46	+ 2	13 57	+ 1	—	—	—
Amboina	E. 41-9	124	e 7 48	+ 2	14 4	+ 5	—	—	—
Sverdlovsk	42-3	334	i 7 48	- 1	i 14 2	- 3	21 17	L _q	25-1
Mizusawa	E. 42-9	56	8 0	+ 6	14 17	+ 4	—	—	17-8
	N. 42-9	56	8 13	+19	14 19	+ 6	—	—	17-9
Morioka	43-0	55	7 30	-25	14 20	+ 5	17 48	SSS	22-8
Sapporo	43-8	50	8 1	- 0	14 49	+22	—	—	—
Grozny	45-2	310	8 12	- 1	i 14 46	- 1	—	—	—
Erevan	45-6	305	8 19	+ 3	14 43	- 9	—	—	—
Tiflis	45-6	308	i 8 13	- 3	i 14 44	- 8	i 9 58	PP	—
Sotchi	49-5	310	8 46	0	e 15 45	- 2	—	—	—
Ksara	52-3	295	i 9 6 _a	- 1	i 16 30	+ 4	i 11 53	PPP	—
Theodosia	52-8	311	9 11	0	16 29	- 4	—	—	28-1
Moscow	53-2	324	9 13	- 1	16 34	- 4	—	—	26-6
Yalta	53-6	310	i 9 41	+24	—	—	—	—	—
Smferopol	53-7	310	i 9 18	0	i 16 43	- 2	—	—	29-9
Sebastopol	54-1	310	9 19	- 1	16 48	- 2	—	—	30-4
Helwan	56-5	292	i 9 35	- 3	17 8	-14	10 7	pP	—
Istanbul	57-4	306	9 47	+ 3	17 42	+ 8	11 59	PP	—
Pulkovo	57-9	328	i 9 44	- 4	17 36	- 5	—	—	e 27-2
Bucharest	59-4	310	e 9 57	- 1	i 18 3	+ 3	i 12 3	PP	28-1
Sofia	61-5	307	e 10 11	- 1	i 18 28	+ 1	e 12 23	PP	36-8
Tananarive	61-6	233	e 19 5	PS	e 25 47	SSS	—	—	e 30-8
Belgrade	z. 63-4	310	e 10 23 _k	- 2	i 18 49	- 2	i 14 25	PPP	e 33-9
Keeskemet	63-7	312	i 10 27	0	e 19 21	PS	e 12 47	PP	e 32-4
Budapest	64-1	314	e 10 30	0	i 18 59	- 1	12 8	PP	e 33-1
Upsala	64-2	328	10 26	- 4	i 18 55	- 6	e 25 30	SSS	e 33-1
Ogyalla	64-6	314	10 34	+ 1	19 2	- 4	12 18	PP	e 34-6
Frague	66-8	318	i 10 45	- 2	i 19 34	+ 1	e 13 13	PP	e 26-1
Copenhagen	67-3	324	i 10 48	- 2	i 19 38	- 1	13 15	PP	32-1
Laibach	67-4	312	e 11 10	+19	i 19 44	+ 4	—	—	e 39-5
Potsdam	67-4	320	e 10 47	- 4	i 19 38	- 2	i 13 18	PP	e 32-5
Triest	67-9	312	e 10 51 _a	- 3	i 19 54	+ 8	13 22	PP	e 35-1
Cheb	68-1	317	e 10 55	0	e 20 10	+22	e 13 25	PP	e 36-1
Hof	68-4	318	e 11 5	+ 8	e 20 5	+13	—	—	e 33-1
Jena	68-5	318	e 10 37	-21	i 19 50	- 3	e 13 25	PP	e 31-1
Hamburg	69-0	321	i 11 0 _a	- 1	i 19 59	0	e 13 31	PP	e 35-3
Padova	69-3	312	i 11 30	+28	i 20 30	PS	—	—	e 42-1
Göttingen	69-4	319	i 10 59	- 4	e 20 1	- 3	—	—	e 40-1
Florence	70-1	311	i 11 5	- 2	i 20 10	- 2	i 14 1	PP	34-5
Bergen	70-3	329	11 10	+ 1	20 14	0	—	—	38-1
Stuttgart	70-4	316	i 11 9 _a	0	20 16	+ 1	e 13 43	PP	e 35-1
Chur	70-6	314	e 11 8	- 2	e 20 14	- 4	—	—	—
Karlsruhe	70-7	317	i 11 10	- 1	i 20 20	+ 1	—	—	—
Adelaide	70-8	143	i 11 20	+ 8	e 20 28	+ 8	i 13 58	PP	e 32-5
Zurich	71-1	315	e 11 11 _a	- 2	e 20 3	-20	e 13 39	PP	—
Strasbourg	71-4	316	i 11 13	- 2	i 20 24	- 4	e 11 28	pP	e 37-8
Basle	71-7	315	e 11 15	- 2	e 20 29	- 1	e 11 19	pP	—
De Bilt	72-2	320	i 11 18	- 2	i 20 38	+ 2	13 59	PP	e 34-1
Moncalieri	72-3	312	i 11 5 ₁	-15	i 20 37	0	—	—	32-1
Neuchatel	72-3	315	e 11 19	- 1	e 20 32	- 5	—	—	—
Besançon	72-9	315	12 5 ₁	+41	—	—	—	—	39-1
Uccle	73-0	319	i 11 23 _a	- 2	i 20 45	0	i 14 6	PP	e 34-1
Marseilles	74-3	311	11 30	- 2	20 52	- 8	e 21 30	PS	33-1
Paris	74-7	317	i 11 34	0	i 21 4	0	—	—	40-1
Aberdeen	74-9	327	i 11 36	0	i 21 3	- 3	i 41 23	PP	e 40-6
Brisbane	75-3	128	e 11 35	- 3	i 21 23	+12	—	—	—
Durham	75-3	324	e 11 36	- 2	i 21 9	- 2	i 14 25	PP	—

Continued on next page.

Original 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 have been scanned and collected by SGA Storia Geofisica Ambiente (Bologna) thanks to funding provided by the Istituto Nazionale di Geofisica e Vulcanologia (Rome), in the frame of the EUROSEISMOS project.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Kew	75.6	320	i 11 39 _a	- 1	i 21 12	- 2	i 14 29	PP 37.1
Edinburgh	75.8	325	e 11 41	0	e 21 10	- 6	i 26 8	SS 38.1
Oxford	76.1	321	i 11 39 _a	- 3	i 21 17	- 3	i 14 28	PP e 37.2
Stonyhurst	76.1	323	i 11 41	- 1	i 21 21	+ 1	i 14 36	PP 38.1
Melbourne	76.5	141	12 4	+19	21 37	+13	22 35	PS 33.5
Bidston	76.6	323	i 11 49	+ 4	i 21 21	- 4	i 22 58	PS 36.1
Scoresby Sund	77.3	343	i 11 49	0	i 21 34	+ 1	14 44	PP 35.1
Jersey	77.4	319	i 11 51	+ 1	i 21 32	- 2	e 14 39	PP e 39.1
Riverview	77.7	135	e 12 12	+21	i 21 55	+18	e 28 23	SS e 35.7
Sydney	77.7	135	—	—	e 21 49	+12	—	e 34.4
Algiers	78.0	305	e 11 52	- 1	i 21 38	- 2	12 20	pP 39.1
Bagnères	78.0	312	e 11 53	0	i 21 40	0	e 14 39	PP e 39.1
College	80.8	23	e 12 6	- 2	22 7	- 3	e 27 30	SS —
Almeria	82.1	307	i 12 13	- 2	i 22 20	- 3	—	e 45.4
Toledo	82.1	310	e 12 15	0	i 22 23	0	e 15 22	PP e 33.6
Granada	82.8	307	i 12 21	+ 3	22 32	+ 2	i 15 37	PP 47.6
Malaga	83.6	307	e 12 35	+12	i 22 45	+ 7	—	42.1
San Fernando	85.0	307	i 12 36	+ 6	i 22 56	+ 4	e 18 21	PPP 43.1
Averroes	87.2	305	e 11 55	-45	22 9	[-50]	15 3	PP 38.2
Sitka	90.4	24	e 13 13	+18	23 25	[+ 6]	e 16 49	PP e 41.6
Ivigtut	91.3	343	—	—	23 17	[- 7]	23 51	S 44.1
Christchurch	97.0	134	13 34 _a	+ 8	i 24 4	[+ 8]	17 46	PP 48.6
Honolulu	97.2	63	e 17 25	PP	i 23 52	[- 5]	31 35	SS 44.4
Wellington	97.6	131	e 13 35	+ 7	24 4	[+ 5]	17 35	PP 45.9
Seattle	102.7	23	—	—	e 26 37	PS	—	e 42.1
Saskatoon	103.4	12	—	—	e 25 35	+ 2	—	e 51.1
Butte	107.5	18	e 18 35	PKP	i 24 51	[+ 6]	e 34 0	SS e 51.0
Bozeman	108.3	17	e 18 45	PP	e 24 55	[+ 6]	e 28 6	PS 52.3
Ukiah	109.3	29	e 18 51	PP	24 58	[+ 50]	e 28 9	PS 43.8
Seven Falls	109.4	349	e 19 58	PP	i 27 26	PS	e 35 15	SSP 47.1
Berkeley	110.7	30	e 19 22	PP	e 25 2	[+ 3]	28 26	PS —
East Machias	111.0	345	—	—	e 34 30	SS	e 28 28	PS 59.0
Ottawa	111.8	352	e 19 18	PP	i 26 45	SKKS	i 34 45	SS e 55.1
Vermont	112.4	350	e 19 19	PP	i 26 53	SKKS	i 34 54	SS e 49.6
Haiwee	114.1	27	e 18 39	PKP	—	—	—	—
Harvard	114.1	347	e 18 37	PKP	e 27 3	SKKS	e 19 23	PP e 59.1
Weston	114.1	347	i 18 35	PKP	e 27 3	SKKS	e 19 28	PP —
Williamstown	114.1	349	e 15 16	P	i 28 59	PS	19 31	PP —
Mount Wilson	115.6	29	e 15 8	P	—	—	i 19 32	PP —
Pasadena	115.7	29	i 15 30	P	i 25 27	[+ 8]	e 19 29	PP e 45.0
Chicago	115.9	2	e 19 32	PP	e 29 6	PS	35 24	SS e 46.2
Fordham	116.1	348	i 18 37	PKP	i 27 17	SKKS	i 19 41	PP i 51.5
Riverside	116.9	29	e 18 39	PKP	i 22 12	SKP	e 29 14	PS —
Philadelphia	117.1	350	e 19 44	PP	i 27 25	SKKS	e 22 13	PPP e 50.5
Florissant	118.8	3	e 19 26	PP	i 27 45	SKKS	i 29 55	PS —
St. Louis	119.0	3	—	—	i 27 45	SKKS	e 29 44	PS —
Cape Girardeau	E. 120.4	3	e 24 32	?	e 26 59	SKKS	e 41 52	SSS 47.2
Tucson	120.4	24	e 18 45 _a	PKP	25 47	[+ 12]	e 20 8	PP e 54.3
Columbia	123.7	354	e 23 17	PPP	28 24	S	e 37 5	SS e 48.8
San Juan	135.2	333	e 19 19	PKP	—	—	e 21 52	PP —
Tacubaya	E. 136.3	18	e 18 46	PKP	e 26 11	[- 6]	i 21 27	PP —
Rio de Janeiro	141.1	261	e 19 5	PKP	(41 5)	SS	—	e 41.1
Balboa Heights	148.1	348	e 19 47	[+ 12]	—	—	—	—
La Plata	152.9	236	e 19 55	[+ 12]	—	—	—	65.1
La Paz	162.4	287	i 20 3 _a	[+ 9]	i 26 39	[- 11]	i 24 33	PP 78.1
Huancayo	165.8	315	i 20 8	[+ 10]	i 27 10	[+ 17]	i 24 52	PP i 73.5

Additional readings :-

Calcutta iEN = + 1m.30s., i = + 1m.43s., iN = + 2m.39s., i = + 5m.54s.
 Agra eN = + 3m.29s., iN = + 4m.12s. and + 6m.17s., sS = + 6m.29s.
 Kodaikanal iSSe = + 9m.2s.
 Bombay P_ePEN = + 8m.52s.
 Zi-ka-wei iE = + 8m.23s., iN = + 12m.55s. and + 14m.9s.
 Tchikment e = + 6m.26s. and + 7m.15s.
 Batavia PE = + 6m.26s., iE = + 16m.5s.
 Zinsen iPZ = + 6m.14s., ePPZ = + 7m.26s.
 Osaka B SSS = + 16m.2s.

Continued on next page.

Gihu SS = +16m.16s.
Oiwake PS = +14m.57s., SS = +16m.57s.
Tokyo Cen. Met. Ob. SS = +17m.27s.
Baku e = +10m.41s. and +12m.10s., SSS = +17m.29s.
Amboina iE = +8m.12s.
Morioka PPP = +10m.10s.
Tiflis i = +8m.15s., iN = +11m.27s., iE = +11m.37s. and +12m.46s., P_cSE = +13m.52s., eSSE = +17m.34s., SSSSEN = +18m.6s.
Helwan PP = +11m.49s., PPP = +13m.1s., i = +17m.41s., sS = +18m.8s.
Istanbul PPP = +13m.19s.
Bucharest iP_cPE = +10m.33s., iPPPE = +13m.17s., iPSEN = +18m.35s., iS_cSEN = +19m.35s., iSSEN = +22m.9s., iSSSEN = +24m.53s.
Sofia ePPPE = +13m.49s., eE = +18m.47s.
Tananarive eEN = +21m.53s., eN = +29m.5s.
Belgrade iPZ = +10m.26s., iP_cPZ = +11m.3s., iNW = +13m.31s., eNW = +16m.39s., iNW = +26m.18s.
Keeskemet eP_cPZ = +11m.13s., eZ = +14m.51s. and +17m.13s., eS_cSZ = +20m.42s., eZ = +21m.36s. and +22m.31s., eSSZ = +23m.35s.
Budapest eE = +10m.27s., iE = +10m.42s. and +11m.5s., P_cPN = +11m.11s., iE = +12m.42s., PSE = +19m.10s., PSN = +19m.14s., S_cSE = +20m.20s., S_cSN = +20m.23s., iN = +20m.53s., eSSE = +22m.17s., iE = +23m.8s., eSSN = +23m.12s., iE = +25m.31s., iN = +26m.19s.
Upsala ePN = +10m.40s., iN = +20m.17s., eSSSN = +25m.45s.
Ogyalla PSN = +19m.14s., S_cSE = +19m.58s., S_cSN = +20m.2s., eE = +21m.6s., eN = +21m.46s., SSE = +22m.50s., SSN = +23m.30s.
Prague ePPP = +14m.51s., ePS = +19m.59s.
Copenhagen PPP = +14m.51s., e = +15m.23s. and +15m.53s., e = +19m.29s., PS = +20m.11s., S_cSN = +20m.46s., e = +22m.59s., SSE = +23m.59s., SSS = +26m.53s.
Potsdam iPEN = +10m.50s., eZ = +12m.29s., eN = +12m.59s., ePPPP = +14m.29s., iZ = +14m.56s., eE = +14m.59s., eP_cSZ = +15m.47s., e = +19m.29s., ePSNZ = +20m.11s., eZ = +20m.59s., eN = +22m.29s. and +26m.59s., eZ = +27m.29s. and +30m.41s.
Triest PS = +20m.15s., SS = +24m.9s.
Jena ePE = +10m.54s., iPN = +10m.59s., eE = +14m.57s., iS = +19m.53s., iSZ = +20m.5s., i = +20m.25s., eE = +24m.47s.
Florence i = 20m.35s. and +20m.59s.
Stuttgart eE = iZ = +12m.50s., ePPP = +15m.28s., iPSEN = +20m.47s., eS_cSN = +21m.8s., eSS = +24m.53s., eSSS = +23m.5s.
Adelaide i = +11m.26s., +12m.18s., +15m.52s., and +21m.18s., iSS = +25m.8s., i = +25m.43s. and +29m.3s.
Strasbourg i = +11m.17s., eSP = +11m.45s., ePPE = +13m.52s., iSSE = +20m.58s., eSSN = +25m.15s.
Uccle iSS = +25m.22s.
Marsilles eN = +21m.2s.
Aberdeen i = +13m.28s. and +14m.0s., iPPP = +15m.57s., i = +21m.21s., iPS = +21m.40s., i = +23m.17s. and +25m.5s.?, iSSS = +23m.45s.
Brisbane ePN = +11m.47s.
Durham iPEN = +11m.40s., iPSEN = +21m.45s.
Kew iP_cPEN = +12m.3s., iZ = +12m.13s., iPPP = +16m.2s., iPPPP = +16m.58s., iPS = +21m.46s., iE = +22m.46s., iSSEN = +26m.2s.
Edinburgh i = +21m.16s.
Stonyhurst SS = +26m.6s., i = +30m.6s.
Bidston iP_cP = +12m.14s., iPPP = +16m.13s., iSS = +26m.5s.
Scoresby Sund +14m.2s., i = +21m.38s., +22m.41s., +25m.35s., +26m.23s., and +29m.59s.
Jersey e = +12m.21s., +16m.10s., and +24m.4s., eSS = +26m.8s.
Riverview iE = +22m.23s.
Algiers iS = +22m.11s., eSS = +26m.40s., e = +32m.5s.?
Bagnères ePPP = +17m.50s., iS = +21m.44s., PS = +22m.15s., eSS = +26m.45s.
Toledo iP = +12m.18s., e = +18m.16s., ePS = +23m.11s., e = +31m.18s.
Granada i = +14m.32s., +17m.2s., and +25m.48s.
San Fernando iPSN = +27m.50s.
Averroes PPP = +16m.39s.
Sitka iSKS = +23m.28s., iS = +23m.52s.
Christchurch iSKSN = +24m.48s., S = +25m.13s., PS = +26m.28s., SS = +31m.33s., iE = +32m.11s., SSSSE = +35m.36s., L_qN = +42m.56s.
Honolulu iPP = +17m.42s., i = +24m.2s., iS = +24m.29s., iPPS = +26m.37s.
Wellington PPP = +19m.52s., SKKS = +24m.32s., S = +24m.52s., iZ = +26m.28s., PS = +26m.40s., iEN = +26m.56s., PPS = +27m.20s., iEN = +28m.7s., SS = +31m.36s., L_q = +42.6m.
Bozeman eS = +26m.17s., eSS = +33m.49s., SS = +34m.0s.
Ukiah S = +26m.25s., SS = +34m.7s., SSS = +38m.32s.
Berkeley eZ = +21m.38s., eE = +26m.46s.
East Machias PS = +28m.42s., SS = +34m.36s.
Ottawa e = +28m.35s.
Harvard eS_cSP = +29m.21s., eSSEN = +35m.15s., eL_qE = +50m.5s.
Weston eZ = +28m.55s., eN = +29m.8s., ePSNZ = +29m.23s., ePPSN = +30m.23s., iSSEN = +35m.15s.

Williamstown i = +29m.19s. and +30m.57s., iSS = +34m.51s.
 Mount Wilson iPKP = +18m.41s.
 Pasadena iPKP₂ = +18m.42s., iSKPZ = +22m.16s., iSEN = +27m.24s., iPS = +29m.17s., iPPSZ = +30m.47s., eSSN = +35m.28s.
 Fordham iE = +35m.37s. and +43m.32s.
 Philadelphia ePS = +29m.19s., eSS = +35m.51s.
 Butte eS = +26m.11s., PS = +27m.59s., eSSS = +38m.16s.
 Florissant ePPZ = +19m.33s., iE = +20m.17s. and +30m.0s.
 St. Louis eSSE = +36m.9s., eE = +37m.52s., +39m.38s., and +40m.14s.
 Cape Girardeau eSE = +27m.52s., ePPSE = +30m.22s., eE = +32m.2s. and +35m.19s.
 Tucson PKP = +18m.49s., iPP = +20m.26s., iPPP = +22m.21s., i = +23m.7s., iS = +28m.7s., ePS = +29m.49s., SS = +36m.38s., iSS = +37m.45s., SSS = +41m.18s.
 San Juan PP = +22m.50s.
 La Paz iPKP₂ = +20m.41s., iSKP = +23m.33s., iSKKSN = +31m.17s., iSKKSE = +31m.20s., iSKSP = +35m.37s., iZ = +38m.5s., PPS = +39m.40s., SSN = +45m.10s., SSSE = +51m.35s., L_N = +74m.5s.
 Huancayo iPKP = +20m.12s., i = +24m.40s., +27m.18s., +27m.46s., and +28m.31s., iPPP = +29m.25s., iSKKS = +31m.30s., i = +34m.34s., iSKSP = +35m.37s., iPPS = +39m.43s., iPPPS = +41m.11s., i = +45m.22s., iSS = +45m.25s., i = +48m.15s., +51m.31s., and +51m.45s., iSSS = +52m.11s., i = +56m.13s., +58m.4s., +58m.41s., and +59m.13s.

Aug. 16d. Readings also at 1h. (Tananarive and Amboina), 2h. (Santiago), 5h. (Toledo and Apia), 6h. (Medan, Andijan, Wellington, Honolulu, Tucson, Riverside, Pasadena, Toledo, Apia (2), Brisbane, Bombay, and Agra), 7h. (Mizusawa), 9h. (Copenhagen and Calcutta), 11h. (Malaga), 13h. (Nagoya, Bucharest, Sofia, Trieste, Belgrade, Haiwee, Tinemaha, Mizusawa, and Sverdlovsk), 14h. (Tashkent, Tucson, Riverside, Pasadena, Mount Wilson, Weston, and Harvard), 17h. (Tucson, Sverdlovsk, Tashkent, Agra, Bombay, Brisbane, and Calcutta), 20h. (Fort de France), 22h. (Manila, Tashkent, Sverdlovsk, and Mizusawa), 23h. (Baku and Tiflis).

Aug. 17d. 1h. 45m. 36s. Epicentre 43°7N. 147°6E.

Strong at Nemuro, moderate at Syana, Kusiro, and Hatinohe

Epicentre 43°7N. 147°6E. Depth 100km.

Macroseismic radius greater than 300km.

See Seismological Bulletin of the Central Met. Obs., Japan, for the year, 1938. Tokyo, 1940, p. 53-54. Macroseismic Chart, p. 55.

$$A = -6124, B = +3886, C = +6884; \delta = -6; h = -3; \\ D = +536, E = +844; G = -581, H = +369, K = -725.$$

A depth of focus 0.020 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Nemuro	1.4	256	0 26k	- 4	0 46	- 6	---	---
Kusiro	2.5	253	0 41k	- 1	1 8	- 6	---	---
Obihiro	3.3	259	1 3	+11	1 44	+12	---	---
Asahigawa	3.8	272	1 0	+ 1	1 46	+ 2	---	---
Urakawa	3.9	248	0 59	- 1	1 46	0	---	---
Ootomari	4.5	313	0 59k	- 9	1 46	-14	---	---
Sapporo	4.6	264	1 7	- 2	2 20	+18	---	---
Muroran	5.0	256	1 11	- 3	2 9	- 3	---	---
Hakodate	5.4	252	1 18	- 2	2 19	- 2	---	---
Mori	5.4	253	1 19k	- 1	2 59	+38	---	---
Hatinohe	5.6	236	1 18	- 4	2 20	- 6	---	---
Aomori	5.8	242	1 21	- 4	2 27	- 4	---	---
Miyako	5.8	228	1 21	- 4	2 26	- 5	---	---
Morioka	6.2	232	1 30	0	2 40	0	---	---
Sikka	6.3	330	1 22	-10	2 36	- 7	---	---
Mizusawa	6.7	229	1 31	- 6	i 2 49	- 3	---	---
Akita	6.8	237	1 39	+ 1	2 56	+ 1	---	---
Sendai	7.4	225	1 51	+ 5	3 8	- 1	---	---
Yamagata	7.7	228	1 43	- 7	3 4	-12	---	---
Hukushima	8.0	225	1 55	+ 1	3 22	- 2	---	---

Continued on next page.

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Onahama	8·5	219	2 3	+ 2	3 32	- 3	—	—
Mito	9·1	219	2 7	- 2	3 47	- 3	—	—
Utunomiya	9·3	222	1 52	-20	3 34	-20	—	—
Tukubasan	9·4	220	2 12	- 1	—	—	—	—
Kakioka	9·4	220	2 7	- 6	3 50	- 7	—	—
Tyoski	9·5	215	2 18	+ 4	—	—	—	—
Takada	9·7	230	2 22	+ 5	4 9	+ 5	—	—
Kumagaya	9·8	223	2 21	+ 3	4 7	+ 1	—	—
Maebasi	9·8	225	2 7	-11	4 7	+ 1	—	—
Nagano	10·0	229	2 21	0	4 13	+ 2	—	—
Tokyo, Cen. Met. Ob.	10·0	220	2 24	+ 3	4 11	0	—	—
Oiwake	10·1	226	2 25	+ 3	4 14	+ 1	—	—
Wazima	10·3	236	2 24	0	4 17	- 1	—	—
Yokohama	10·3	219	2 36	+12	4 19	+ 1	—	—
Hunatu	10·6	223	2 27	- 1	4 26	+ 1	—	—
Husiki	10·6	233	2 46	PP	—	—	—	—
Mera	10·6	217	2 52	PPP	4 27	+ 2	—	—
Kohu	10·7	224	2 33	+ 3	4 25	- 2	—	—
Toyama	10·7	232	2 29	- 1	4 7	-20	—	—
Misima	10·9	221	2 35	+ 3	4 34	+ 2	—	—
Numadu	10·9	221	2 54	PPP	4 48	+16	—	—
Vladivostok	11·4	272	e 2 36	- 3	—	—	12 57	PP
Gihu	11·8	229	2 44	0	4 39	-14	—	—
Nagoya	11·8	227	2 51	+ 7	4 53	0	—	—
Hikone	12·1	230	2 49	+ 1	—	—	—	—
Kameyama	12·4	228	2 57	+ 5	—	—	—	—
Wakayama	13·5	230	3 13	+ 7	6 1	SS	—	—
Irkutsk	29·8	303	e 5 50	- 4	e 10 34	- 3	—	13·9
Almata	49·8	296	e 8 37	- 1	—	—	—	—
Frunse	51·5	296	e 8 42	- 9	—	—	—	—
Sverdlovsk	53·4	318	9 1	- 4	15 59	-24	—	23·4
Andijan	54·0	295	e 9 10	0	e 16 40	+ 9	—	—
Tashkent	55·7	297	1 9 22	0	1 16 57	+ 3	—	e 27·3
Agra	E. 57·5	278	—	—	1 17 20	+ 3	—	—
Samarkand	E. 58·1	296	e 9 43	+ 4	e 17 40	+15	—	—
Moscow	64·7	324	e 10 22	- 1	e 18 51	+ 2	—	33·9
Pulkovo	64·8	331	—	—	18 49	- 1	19 22	PS
Tinemaha	68·2	59	e 10 45	0	—	—	e 11 9	pP
Baku	68·3	306	e 10 51	+ 5	e 19 38	+ 6	—	34·9
Santa Barbara	Z. 68·9	62	e 10 49	0	—	—	—	—
Mount Wilson	70·1	61	i 10 57k	0	—	—	i 11 5	pP
Pasadena	70·1	61	i 10 57	0	—	—	i 11 5	pP
Tiflis	70·4	309	e 10 59	0	19 57	+ 1	—	e 17·9
Riverside	Z. 70·7	61	i 10 59	- 1	—	—	—	—
Erevan	71·5	308	e 11 10	+ 5	—	—	—	—
Theodosia	73·1	317	e 11 14	0	—	—	—	—
Simferopol	73·7	318	11 16	- 2	—	—	—	—
Tucson	76·0	58	i 11 32k	+ 1	21 8	+ 9	1 12 5	pP
Potsdam	76·6	334	—	—	e 21 6	0	—	e 50·4
Bucharest	78·0	321	e 11 48	+ 6	21 25	+ 4	23 40	PPS 37·4
Istanbul	79·1	319	—	—	e 21 24?	- 8	—	—
Uccle	Z. 80·6	338	e 11 54	- 2	—	—	—	—
Ksara	80·9	307	i 12 1	+ 3	22 3	+12	i 12 24	pP
Strasbourg	81·6	334	e 12 4	+ 3	e 22 0	+ 2	—	e 43·9
Triest	82·1	330	e 12 3	- 1	e 22 2	- 1	—	—
Zurich	82·4	333	e 12 5a	0	e 22 10	+ 4	—	—
Basle	82·5	334	e 12 2	- 4	—	—	e 12 6	pP
Helwan	86·4	309	12 27	+ 2	i 22 44	- 2	—	—
Harvard	Z. 87·3	27	i 12 29a	- 1	—	—	—	—
Weston	87·5	27	i 12 30a	- 1	e 22 52	- 4	i 12 36	PcP
Toledo	93·0	341	e 12 56	0	—	—	—	—
Malaga	96·0	338	e 13 24?	+14	—	—	—	—

For Notes see next page.

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NOTES TO AUG. 17d. 1h. 45m. 36s.

Additional readings :—

Mizusawa iPE = +1m.36s.
 Pulkovo e = +19m.59s., SSS = +25m.54s.
 Mount Wilson iZ = +11m.22s.
 Pasadena iZ = +11m.21s.
 Bucharest SKSPE = +23m.19s.
 Weston eSN = +22m.59s., eN = +23m.56s.
 Toledo e = +14m.7s.
 Long waves were also recorded at Copenhagen.

Aug. 17d. Readings also at 0h. (Balboa Heights), 1h. (Andijan, Frunse, and Almata), 2h. (Fort de France, Erevan, and Tiflis), 4h. (Tucson (2)), 6h. (Tiflis and Samarkand), 7h. (Samarkand and Wellington), 9h. (Tucson, Mount Wilson, La Paz, Riverside, Pasadena, and Tinemaha), 11h. (Huancaayo and near Amboina), 12h. (Cheb), 13h. (Tacubaya and Zurich), 15h. (Grozny and Tiflis), 16h. (Mizusawa and Wellington), 18h. (Tucson), 19h. (Bucharest), 21h. (Tucson, Mount Wilson, and Merida), 22h. (La Paz).

Aug. 18d. 9h. 30m. 4s. Epicentre 3°-8S. 102°-8E.

Force VII in Benkoelen, in Central Sumatra, in the Isles of Mentawai and at Malabar.

Epicentre 3°-8S. 102°-8E. (Batavia). Depth 100kms. (Pasadena). 150kms. (Batavia).

H. P. Berlage.

Aardbevingen in den Ost-Indischer Archipel Waargenomen gedurende het Jaar, 1938.

Naturkundig Tijdschrift voor Nederlandsch-Indië, Afl. 1 Van Deel XCX'40 blz 38-75, p. 66.

A = -2211, B = +9730, C = -0658; $\delta = -6$; $h = +7$;
 D = +975, E = +222; G = +015, H = -064, K = -998.

A depth of focus 0.005 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Batavia	4.7	121	i 1 15k	+ 5	i 1 58	- 6	—	—
Malabar	5.8	126	i 1 28	+ 3	i 2 28	- 4	—	—
Medan	8.4	331	i 2 5	+ 3	3 45	+ 9	—	—
Phu-Lien	24.7	9	e 5 20	+ 4	e 9 37	+ 6	—	—
Colombo	E. 25.2	295	e 5 22	+ 1	9 44	+ 5	9 57	SS
Amboina	N. 25.3	90	5 24	+ 2	i 9 53	+12	—	—
Manila	25.7	44	i 5 28a	+ 2	9 56	+ 9	—	12.3
Hong Kong	28.2	23	5 52k	+ 3	10 36	+ 8	6 51	PPP
KodaiKANAL	E. 28.8	300	i 5 54k	+ 0	i 10 48	+10	i 6 26	PP
Calcutta	N. 29.7	330	e 6 11	+ 9	i 11 13	+21	e 7 2	PP
Perth	30.6	158	6 49	+39	10 56	-10	7 9	PP
Hyderabad	N. 32.0	313	6 22	0	11 26	- 2	7 25	PP
Karenko	33.1	32	6 32	0	—	—	—	—
Palau	33.5	70	6 36	+ 1	11 50	- 1	14 17	SS
Taihoku	33.9	31	6 41	+ 2	—	—	—	—
Miyakozima	35.4	35	6 59	+ 7	—	—	8 30	PP
Bombay	37.1	309	i 7 6	0	i 12 47	0	i 7 28	pP
Agra	39.0	325	i 7 19	- 3	13 6	-10	7 39	pP
Zi-ka-wei	39.1	26	i 7 24	+ 1	13 22	+ 5	—	—
Dehra Dun	N. 41.4	328	e 8 6?	+25	i 13 48	- 3	—	e 21.0
Kumamoto	45.0	34	8 12	+ 1	14 46	+ 2	—	—
Adelaide	45.4	138	e 8 14	0	i 14 44	- 6	i 8 39	pP
Hukuoka B	45.4	33	8 17	+ 3	—	—	—	—
Zinsen	46.7	26	i 8 25	+ 1	e 14 27	-41	e 10 17	PP
Koti	47.2	35	i 8 30	+ 2	e 15 23	+ 8	e 10 24	pP
Wakayama	48.6	36	8 41	+ 2	—	—	10 19	PP
Gihu	50.3	37	8 53	+ 1	16 1	+ 3	—	—
Nagoya	50.3	37	e 8 54	+ 2	—	—	—	—
Melbourne	51.3	137	i 9 26	+26	16 9	- 3	i 11 25	PP
Kohu	51.6	38	9 2	0	16 14	- 2	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Nagano	52.1	36	9 7	+ 1	16 30	+ 7	—	—
Almata	52.3	338	9 10	+ 3	e 16 32	+ 6	—	—
Andijan	52.4	332	e 9 6	- 2	i 16 24	- 3	e 9 54	pP
Frunse	53.0	335	—	—	i 16 25	- 11	—	—
Brisbane	53.3	122	i 9 8	- 7	i 16 38	- 2	—	—
Vladivostok	53.6	28	i 9 18	+ 1	e 16 43	- 1	—	e 30.9
Riverview	54.0	130	e 9 51	+ 31	i 16 47	- 2	i 19 0	e 29.8
Sydney	54.0	130	e 9 28	+ 8	e 16 48	- 1	—	e 25.9
Tashkent	54.3	330	i 9 21	- 1	i 16 50	- 3	—	27.8
Samarkand	54.4	327	e 9 25	+ 2	—	—	—	—
Tchinkent	54.9	332	e 9 22	- 4	16 56	- 5	i 11 37	PP
Mizusawa	55.4	36	i 9 31	+ 1	i 17 13	+ 5	—	—
E. N.	55.4	36	9 29	- 1	i 17 10	+ 2	—	—
Irkutsk	55.9	3	i 9 35	+ 1	i 17 19	+ 5	9 58	pP
Mori	57.1	32	9 45	+ 3	17 35	+ 5	—	29.4
Semipalatinsk	57.4	345	i 9 42	- 2	i 17 32	- 2	—	—
Baku	65.3	318	i 10 39	+ 2	i 19 16	+ 2	—	31.3
Erevan	68.9	316	e 11 2	+ 2	e 19 58	0	—	—
Grozny	69.4	320	e 11 4	+ 1	i 20 2	- 2	—	—
Sverdlovsk	69.4	338	i 11 2	- 1	i 20 0	- 4	34 26	L _a
Tiflis	69.4	317	i 11 1	- 2	i 20 0	- 4	11 25	pP
Platigorsk	71.5	320	i 11 13	- 3	i 20 23	- 5	—	e 34.9
Christchurch	72.8	135	i 11 24 _a	+ 1	20 42	- 1	29 8	L _a
Ksara	73.2	307	i 11 26 _a	0	20 49	+ 2	i 11 48	pP
Sotchi	73.6	318	e 11 24	- 4	e 20 44	- 8	—	—
Wellington	74.0	132	11 27	—	20 50	- 6	i 11 49	pP
Helwan	75.9	302	i 11 40	- 3	i 21 11	- 6	12 2	pP
Theodosia	77.0	319	11 46	- 2	21 24	- 5	—	—
Yalta	77.6	318	11 51	0	21 36	0	—	—
Simferopol	77.8	318	11 52	0	21 42	+ 4	—	—
Sebastopol	78.1	319	e 11 52	- 2	21 38	- 3	—	—
Moscow	79.5	330	e 11 56	- 5	i 21 50	- 6	12 20	pP
Istanbul	80.3	314	12 8	+ 3	21 46	- 18	15 8	PP
Bucharest	83.2	319	e 12 22	+ 1	i 22 30	- 4	15 18	PP
Pulkovo	84.5	332	i 12 28	+ 1	i 22 44	- 3	i 12 50	pP
Sofia	84.8	314	e 12 30	+ 1	e 22 42	- 8	23 23	PS
Belgrade	87.2	315	i 12 39 _k	- 1	i 22 56	[- 3]	—	e 51.3
Kecskemet	88.0	318	e 12 43	- 1	e 24 58	[PS	e 17 44	PPP
Budapest	88.5	318	e 12 46	- 1	i 23 3	[- 5]	i 23 21	S _c S
Ogyalla	89.2	319	12 48	- 2	e 24 8	+ 36	e 23 22	S _c S
Upsala	90.8	330	—	—	i 23 16	[- 6]	e 23 46	PS
Prague	91.8	320	e 13 3	+ 1	e 23 19	[- 8]	e 23 54	PS
Potsdam	92.8	323	—	—	i 23 29	[- 4]	i 25 13	PS
Cheb	93.2	321	e 16 56	PP	i 23 35	[0]	—	e 47.9
Copenhagen	93.3	326	13 8	- 1	23 29	[- 6]	13 31	pP
Padova	93.3	316	13 56?	+ 47	—	—	—	—
Jena	93.7	321	e 12 56	- 15	23 36	[- 2]	e 16 56	PP
Florence	93.7	313	e 13 56	+ 45	24 26	+ 17	—	—
Göttingen	94.7	322	—	—	e 23 39	[- 3]	—	—
Hamburg	94.7	324	—	—	i 23 40	[- 2]	—	51.9
Stuttgart	95.2	319	e 13 17	- 1	e 23 42	[- 3]	e 25 46	PS
Karlsruhe	95.7	319	e 13 18	- 2	e 23 44	[- 4]	—	e 48.9
Strasbourg	96.2	319	e 13 19	- 3	i 23 44	[- 8]	e 13 37	PP
Moncalieri	96.3	315	e 13 46	+ 24	24 35	+ 1	—	—
Bergen	97.0	331	13 59	+ 33	24 25	- 15	—	55.9
De Bilt	97.7	322	—	—	i 23 58	[- 1]	i 26 4	PS
Uccle	98.3	321	—	—	i 24 0	[- 2]	i 26 12	PS
Paris	99.6	318	—	—	i 24 6	[- 3]	—	—
Algiers	100.1	306	—	—	i 24 9	[- 2]	i 28 33	PPS
Kew	101.1	322	—	—	i 24 11	[- 5]	—	e 49.9
Oxford	101.7	322	—	—	i 24 15	[- 4]	—	—
Jersey	102.6	320	e 8 45	?	e 17 8	?	—	—
Almeria	104.5	308	—	—	i 24 23	[- 9]	—	—
Scoresby Sund	104.7	344	19 15	PP	24 32	[- 1]	27 17	PS
Granada	105.3	308	i 18 50	PP	i 24 25	[- 10]	20 41	PPP

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Toledo	105.3	310	e 18 50	PP	—	—	—	—
Malaga	106.1	308	—	—	e 25 59	+ 3	—	—
Fresno	N. 129.0	44	e 19 3	PKP	—	—	—	—
Santa Barbara	E. 130.2	47	e 19 4	PKP	e 22 19	SKP	—	—
Haiwee	130.6	44	i 19 5	PKP	i 22 20	SKP	—	—
Mount Wilson	131.0	46	e 18 54	PKP	i 22 24	SKP	i 19 6	PP
Passadena	131.4	46	e 18 59	PKP	i 22 24	SKP	e 19 24	PP
La Jolla	132.7	47	i 19 11	PKP	i 22 31	SKP	e 21 34	PP
Riverside	132.9	46	i 19 8	PKP	i 22 27	SKP	e 21 27	PP
Seven Falls	136.5	352	—	—	—	—	e 39 56?	SS 55.9
Tucson	137.6	43	e 19 9	PKP	—	—	i 22 5	PP 61.6
Ottawa	138.6	357	e 19 18	PKP	i 22 10	SKP	e 40 11	SS e 61.9
Harvard	141.1	351	i 19 23	PKP	e 40 51	SS	e 22 23	PP e 72.9
Weston	141.2	351	e 19 19 _a	PKP	i 29 4	SKKS	i 19 48	pPKP
Fordham	143.0	354	i 19 41	[+14]	e 29 20	SKKS	i 22 38	PP
Florissant	143.2	16	e 19 22	[- 5]	e 29 18	SKKS	i 19 43	pPKP
St. Louis	143.3	16	i 19 20	[- 7]	i 26 49	[+21]	i 23 1	pPP
Philadelphia	144.0	356	i 19 24	[- 4]	e 41 12	SS	i 22 42	PP e 62.5
Cape Girardeau	N. 144.8	17	i 19 36	[+ 7]	e 29 34	SKKS	e 22 48	PP
La Paz	157.9	205	i 19 54 _a	[+ 4]	44 6	SS	24 24	PP 75.9
Fort de France	160.8	304	19 53	[+ 1]	e 24 11	PP	—	e 26.6
San Juan	161.9	324	e 19 57	[+ 4]	e 26 22	[-28]	25 3	PP e 65.6
Huancayo	164.2	186	e 19 54	[- 2]	e 30 40	SKKS	e 20 7	pPKP e 64.8
Balboa Heights	174.4	23	e 19 56	[- 6]	—	—	—	—

Additional readings :—

Hong Kong SS = +11m.58s.
 Kodaikanal iPPPE = +6m.39s.
 Calcutta isS = +12m.45s.
 Perth SS = +11m.36s., i = +12m.56s.
 Hyderabad SSN = +12m.53s.
 Bombay isPEN = +7m.41s., iPPE = +8m.32s., P_CPEN = +9m.17s., isSEN = +13m.14s., iN = +14m.19s., SSEN = +15m.47s., S_CSEN = +17m.2s., iN = +18m.37s.
 Agra iN = +7m.43s. PPPE = +9m.20s., iE = +12m.24s., iP_CSEN = +13m.12s., sSE = +13m.44s., i = +14m.29s., S_CS = +17m.4s., sS_CS = +17m.59s., i = +19m.55s.
 Adelaide i = +10m.18s., +10m.33s., +16m.45s., +18m.16s., and +18m.44s.
 Gihu SS = +18m.36s.
 Melbourne i = +16m.47s. and +20m.0s., e = +24m.31s.
 Brisbane ePN = +9m.14s.
 Riverview iPE = +9m.55s., iE = +17m.23s., iN = +17m.26s., iE = +21m.2s., iN = +22m.7s., +23m.40s., +25m.20s., and +26m.15s.
 Tchikent i = +9m.57s. and +10m.37s.
 Tiflis esPPNZ = +15m.24s., ePPZ = +16m.4s., iSN = +20m.2s., isSE = +20m.38s., eSSN = +24m.20s.
 Ksara PPP = +16m.6s., ipS = +21m.19s., isSS = +26m.26s.
 Wellington SP = +21m.30s., S_CS = +21m.48s., SS = +25m.35s.
 Helwan e = +12m.10s., PP = +14m.36s., e = +14m.56s., +17m.31s., +17m.56s., and +20m.16s., sS = +21m.50s.
 Bucharest ?EN = +14m.36s., iPSEN = +23m.9s., ?E = +28m.4s. and +31m.35s.
 Pulkovo PP = +15m.58s., sPP = +16m.26s., iSKS = +22m.40s., sS = +23m.32s., SP = +23m.42s., SS = +28m.14s., SSS = +31m.32s.
 Sofia eE = +19m.15s.
 Belgrade iZ = +13m.14s.
 Keckemet eP_CPZ = +12m.53s., eZ = +15m.46s., +23m.24s., and +25m.0s., eS_CSZ = +25m.28s., eSSiZ = +30m.29s.
 Budapest iE = +23m.59s.
 Ogyalla eE = +24m.30s.
 Upsala eE = +23m.43s.
 Potsdam e = +24m.2s., iE = +24m.34s., iN = +24m.38s., iE = +24m.43s., iN = +24m.46s., iE = +25m.1s., eNZ = +25m.8s., iE = +25m.38s., eNZ = +25m.44s., eN = +26m.56s. and +30m.8s.
 Copenhagen S = +24m.8s., e = +24m.44s., eE = +25m.13s. and +25m.50s., eN = +29m.32s., eE = +30m.20s.
 Jena eN = +13m.8s., eZ = +13m.32s., eN = +16m.12s., +24m.8s., and +24m.11s.
 Hamburg iSE = +24m.20s.
 Stuttgart eEz = +13m.38s., eS = +24m.24s., e = +25m.2s., ePPSE = +26m.26s., eSS = +30m.56s.
 Strasbourg ePPZ = +17m.18s., epPPZ = +17m.48s., eSN = +24m.38s., iPSN = +25m.57s., eSSN = +31m.21s.
 Jersey e = +16m.4s., +24m.20s., and +26m.23s.

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Scoresby Sund +25m.15s., +28m.13s., and +33m.8s.
 Mount Wilson iZ = +23m.4s., eZ = +31m.0s., eSKKPZ = +32m.10s.
 Pasadena iPKP₁Z = +19m.6s., iZ = +23m.5s., iSKKPZ = +32m.11s.
 Tucson iPKP = +19m.18s., sPKP = +19m.51s., iPP = +22m.8s., ipPP = +22m.33s.,
 sPP = +22m.43s., iPKS = +22m.45s., pPKS = +23m.9s., isPKS = +23m.23s.,
 PPP = +25m.23s.
 Harvard eL_qE = +62m.56s.
 Weston iPKPZ = +19m.24s., iZ = +22m.28s. and +22m.52s., iPP = +22m.59s., iZ =
 +23m.38s., iPPPZ = +26m.16s., eSS = +40m.52s., eSSSN = +47m.38s.
 Fordham i = +22m.56s.
 Florissant eE = +19m.37s., iPPNZ = +22m.36s., iNZ = +23m.6s., iN = +23m.40s.,
 eE = +41m.6s.
 St. Louis iPKP₂E = +19m.29s., iN = +19m.35s., ipPKP₂E = +19m.54s., iN = +23m.54s.,
 SKKS = +29m.15s.
 Philadelphia iPKP = +19m.29s., i = +29m.23s., ePKP₂PKP₂ = +40m.49s.
 Cape Girardeau iN = +19m.41s. and +19m.57s., eN = +29m.40s.
 La Paz iZ = +21m.36s.
 Fort de France PP = +20m.17s., PPP = +20m.33s., SS = +24m.51s.
 San Juan PPP = +28m.46s., i = +44m.23s., iSS = +45m.24s., sSS = +46m.17s., eSSS =
 +52m.3s.
 Huancayo ePKP = +20m.37s., ePKP₂ = +20m.51s., ePKP₃ = +21m.36s., ePP =
 +24m.37s., sPP = +25m.15s., ePSKS = +34m.36s., i = +37m.17s., esSS =
 +45m.17s., eSSS = +51m.42s., i = +58m.17s.
 Long waves were also recorded at Edinburgh, Bidston, and East Machias.

Aug. 18d. 19h. 6m. 27s. Epicentre 28°-5N. 129°-0E.

A = -5539, B = +6840, C = +4747; δ = 0; h = +2;
 D = +777, E = +629; G = -299, H = +369, K = -880.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°		m. s.	s.	m. s.	s.	m. s.	m.
Hukuoka B	5.2	12	1 25	+ 4	—	—	—	i 2.5
Koti	6.4	37	e 1 33	- 5	e 2 40	-13	e 3 12	S*
Husan	6.6	359	1 44	+ 3	e 3 47	S _g	—	—
Zi-ka-wei	7.1	294	e 1 51	+ 3	i 3 35	S*	i 4 59	S _g
Taikyu	7.3	357	e 2 7	P*	3 31	S*	—	—
Taihoku	7.5	245	e 1 58	+ 5	3 58	S _g	i 2 9	P*
Keizyo	9.2	349	2 19	+ 3	e 4 3	0	—	—
Zinsen	9.2	347	e 2 38	PPP	e 4 5	+ 2	—	—
Nagoya	9.5	43	e 2 15	- 5	5 35	L	—	(5.6)
Keizyo	E. 10.9	346	e 4 43	S	(e 4 43)	- 1	—	—
Mizusawa	E. 14.6	40	e 3 27	- 3	e 7 3	+50	—	—
	N. 14.6	40	e 3 23	- 7	e 7 0	+47	—	—
Hong Kong	14.7	249	3 35	+ 4	6 34	SS	3 39	PP
Vladivostok	14.8	7	—	—	e 6 47	SSS	—	e 9.4
Manila	15.7	210	i 3 39 _a	- 5	6 33	- 6	—	—
Phu-Lien	21.7	255	e 4 50	- 5	e 10 50	L	—	(e 10.8)
Irkutsk	30.0	330	e 6 12	0	e 11 12	+ 2	—	16.0
Calcutta	N. 37.0	271	e 7 14	+ 1	—	—	—	i 17.4
Batavia	40.6	215	i 7 43	0	13 53	- 1	—	—
Sempalatinsk	42.6	316	e 8 9	+10	—	—	—	—
Dehra Dun	N. 44.1	285	—	—	18 24?	SS	—	e 25.0
Agra	E. 44.8	281	8 12	- 5	14 30	-25	8 25	pP
Frunse	45.7	304	e 8 2	-22	—	—	—	—
Andijan	47.4	301	8 40	+ 2	e 18 28	SS	—	—
Hyderabad	N. 47.5	268	—	—	18 30	SS	—	—
Tashkent	49.7	302	e 8 43	-13	e 16 45	+41	10 27	PP
Kodalakanal	E. 51.5	261	e 9 13	+ 4	—	—	—	26.5
Bombay	51.9	274	i 9 13	+ 1	i 16 38	+ 3	e 20 8	SS
Sverdlovsk	54.9	322	e 9 32	- 3	e 17 4	-12	26 9	L _a
Baku	64.3	305	e 10 36	- 3	e 20 32	?	—	31.2 34.6
Grozny	66.4	308	e 10 54	+ 1	—	—	—	—
Tiflis	67.6	307	e 10 56	- 5	e 19 57	0	e 20 53	PS
Moscow	67.7	323	e 11 1	0	e 19 55	- 3	—	e 36.0
Pulkovo	70.0	329	—	—	e 20 21	- 5	e 21 7	PS
Ksara	77.1	302	11 57	0	e 21 50	+ 4	e 14 54	PP

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Istanbul	78.7	311	12 6	0	22 5	+ 2	—	—
Bucharest	79.0	315	e 12 21	+14	22 1	- 5	—	—
Scoresby Sund	79.1	351	—	—	22 59	PS	—	41.6
Bergen	80.2	336	—	—	e 22 11	- 8	—	48.6
Copenhagen	80.3	330	12 27	+13	22 14	- 6	—	41.6
Sofia	81.6	314	e 12 23	+ 2	e 22 31	- 2	—	46.6
Potsdam	82.0	327	i 12 15	- 8	i 22 32	- 5	—	e 47.6
Hamburg	82.3	329	—	—	e 22 33?	- 7	—	e 42.6
Helwan	82.3	300	i 12 24	- 1	e 22 36	- 4	—	—
Prague	82.7	325	e 13 3	+36	e 32 39	SSS	—	e 42.6
De Bilt	85.9	330	—	—	e 23 9	[+ 2]	—	e 43.6
Stuttgart	86.2	325	e 12 41	- 3	e 23 3	[- 6]	e 12 56	PcP e 44.6
Edinburgh	86.6	336	—	—	e 33 33	SSS	—	—
Strasbourg	87.0	326	e 12 43	- 5	e 23 22	- 5	—	e 43.6
Uccle	87.2	329	e 12 48	- 1	e 23 13	[- 2]	—	e 44.6
Florence	88.3	320	e 11 58	-57	e 23 3	[-19]	—	—
Pasadena	z. 91.0	50	i 13 3	- 4	—	—	—	—
Mount Wilson	z. 91.1	50	i 13 2	- 6	—	—	—	—
Riverside	z. 91.7	50	e 13 3	- 7	—	—	—	—
Tucson	97.0	47	e 13 30k	- 5	e 24 7	[- 5]	—	e 44.3
Toledo	99.2	326	—	—	e 30 42	?	—	e 53.4
Ottawa	103.1	17	—	—	e 24 33?	[- 9]	—	48.6
Harvard	106.8	15	—	—	e 24 51	[- 8]	—	e 55.6
Weston	107.0	15	—	—	i 24 51	[- 8]	—	e 54.6
Philadelphia	108.3	18	—	—	e 24 57	[- 8]	—	e 53.9
Fort de France	z. 135.9	13	e 22 19	PP	—	—	—	—
La Paz	z. 160.2	55	e 19 58	[- 3]	—	—	—	—

Additional readings :-

- Zinsen eSZ? = +4m.14s.
- Hong Kong SS = +6m.49s.
- Irkutsk e = +6m.28s., +7m.17s., and +13m.18s.
- Dehra Dun e = +21m.55s.
- Agra PPP = +10m.6s., sSE? = +14m.57s., SSSE = +18m.7s.
- Tashkent i = +18m.29s.
- Bombay iEN = +17m.6s.
- Pulkovo e = +23m.41s.
- Ksara ePS = +22m.27s.
- Copenhagen = +22m.28s.
- Helwan i = +12m.36s.
- Stuttgart eSEN = +23m.15s.
- Tucson eP = +13m.50s., eS = +24m.50s.
- Toledo e = +28m.47s. and +34m.24s.
- Weston iN = +29m.15s.
- Philadelphia eS = +26m.20s.

Long waves were also recorded at Upsala, Colombo, Belgrade, Cheb, Paris, Kew, Jersey, Göttingen, Bidston, and Stonyhurst.

Aug. 18d. 22h. Local shock recorded at stations of Earthquake Research Institute, Tokyo, which suggests 36°.4N. 140°.4E. :-

- Tokyo, Cen. Met. Obs. iP = 13m.31s.a, iS = 13m.47s.
- Tokyo, Imp. Univ. P = 13m.32s., S = 13m.46s.
- Komaba P = 13m.32s., S = 13m.48s.
- Tukubasan P = 13m.35s., S = 13m.42s.
- Mitaka P = 13m.35s., S = 13m.51s.
- Titibu P = 13m.35s., S = 13m.51s.
- Kiyosumi P = 13m.35s., S = 13m.53s.
- Koyama P = 13m.35s., S = 13m.56s.
- Susaki P = 13m.49s., S = 14m.15s.
- Mizusawa P = 13m.54s., S = 14m.25s.
- Nagoya eP = 14m.6s., S = 14m.54s.

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Aug. 18d. Readings also at 0h. (Andijan and Frunse), 1h. (Wellington), 4h. (near Amboina), 5h. (Erevan), 6h. (College), 7h. (Mount Wilson, Fresno, Santa Barbara, Haiwee, La Jolla, Tucson, Tinemaha, Lick, Riverside, Pasadena), 11h. (Fort de France, Balboa Heights, La Plata, La Paz, Huancayo, and Montezuma), 12h. (Moscow, Weston, Tucson, Harvard, Florissant, Riverside, Pasadena, and Sverdlovsk), 14h. (Tucson (2) and Merid), 15h. (Semipalatinsk, Almata, and Samarkand), 18h. (New Plymouth and Wellington), 19h. (New Plymouth and Wellington), 22h. (Taihoku, Manila, Tashkent, Calcutta, Irkutsk, Hong Kong, Vladivostok, Pulkovo, Tifis, Amboina, and Sverdlovsk), 23h. (Copenhagen).

Aug. 19d. Readings at 1h. (Sverdlovsk and Tashkent), 3h. (Tashkent, Frunse, Tchikent, near Andijan, and Samarkand), 4h. and 5h. (Samarkand), 8h. (near Tananarive), 11h. (Mount Wilson, Pasadena, Riverside, Tucson, and Tchikent), 12h. (Tchikent), 14h. (Cape Girardeau, Harvard, La Paz, Mount Wilson, Pasadena, Riverside, Tucson, Tacubaya, and Huancayo), 16h. (Tacubaya, New Plymouth, and near Wellington), 17h. (Brisbane, Jena, and Tacubaya), 18h. (Tacubaya), 19h. (New Plymouth, and Wellington), 21h. (Tacubaya), 22h. (Sverdlovsk, Tashkent, Mizusawa and near Medan).

Aug. 20d. 5h. 5m. 25s. Epicentre 5°·0S. 131°·5E. (as on 1938 Feb. 1d.).

$$A = -.6601 \quad B = +.7461, \quad C = -.0866; \quad \delta = -10; \quad h = +7; \\ D = +.749, \quad E = +.663; \quad G = +.057, \quad H = -.065, \quad K = -.996.$$

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Amboina		3.6	292	1 10	P _g	—	—	—	—
Manila		22.1	333	e 4 59	0	i 9 5	+ 7	—	11.6
Batavia		24.6	267	e 5 29	+ 6	10 8	+26	—	15.6
Brisbane	E.	30.3	139	i 9 59	?	e 15 41	L	—	(e 15.7)
Adelaide		30.5	169	e 6 10	- 7	i 11 24	+ 6	—	18.0
Perth		30.6	206	i 8 13	PPP	i 11 45	+25	13 0	SS
Medan	E.	33.9	285	e 7 53	PP	i 12 26	+15	—	—
Riverview		34.0	150	e 5 2	?	i 12 22	+ 9	e 15 22	SSS
Sydney		34.1	150	e 10 15	?	—	—	—	—
Melbourne		34.9	161	—	—	e 12 32	+ 5	—	19.7
Calcutta	N.	50.3	305	—	—	e 13 45	?	—	—
Agra	E.	60.7	305	—	—	e 18 33	+ 1	—	—
Bombay		62.5	294	—	—	e 19 5	+11	—	—
Andijan		70.6	316	e 11 23	+ 4	e 20 40	+ 7	—	—
Tashkent		73.0	316	e 11 42	+ 9	i 21 3	+ 3	—	—
Sverdlovsk		83.8	329	e 12 33	+ 1	22 53	- 2	—	38.6
Baku		86.8	311	12 59	+12	23 40	+15	—	e 42.6
Tifis		90.8	312	—	—	e 23 48	[+10]	—	e 48.6
Ksara		97.4	302	e 12 17	?	e 23 51	[-23]	—	47.6
Upsala		106.2	331	—	—	e 29 35?	PPS	—	—

Additional readings :-

Amboina eE = +5m.30s., iE = +7m.53s.

Adelaide i = +8m.6s., +16m.26s., and +17m.31s.

Perth i = +13m.50s., +14m.30s., +19m.43s., +21m.58s., and +24m.40s.

Riverview S?N = +19m.1s.

Melbourne i = +16m.15s., +16m.50s., +18m.27s., and +18m.54s.

Andijan e = +12m.34s.

Long waves were also recorded at Philadelphia, Tucson, Jersey, Kew, Potsdam, De Bilt, Strasbourg, Moncalleri, Copenhagen, Wellington, and Christchurch.

Aug. 20d. 8h. 31m. 4s. Epicentre 1°·0S. 150°·0E.

$$A = -.8659, \quad B = +.4999, \quad C = -.0173; \quad \delta = -2; \quad h = +7; \\ D = +.500, \quad E = +.866; \quad G = +.015, \quad H = -.009, \quad K = -1.000.$$

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Amboina		22.0	263	4 50	- 8	8 49	- 7	—	—
Brisbane	E.	26.5	174	e 5 44	+ 3	i 10 14	0	—	—
Manila		32.6	303	i 6 34k	- 1	i 11 52	+ 1	—	13.9
Riverview		32.7	178	i 6 37	+ 1	e 11 50	- 2	14 20	SSS e 17.4
Sydney		32.8	178	e 6 27	-10	e 12 12	+18	—	e 16.8

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	°	°	m. s.	s.	m. s.	s.	m. s.	m.	
Adelaide	35.4	196	i 7 2	+ 2	e 12 18	-16	i 8 21	PP	16.7
Melbourne	37.0	186	i 8 49	PP	i 15 43	SS	—	—	—
Nagoya	38.0	344	e 7 19	- 2	—	—	—	—	—
Apia	39.9	111	—	—	e 17 25	SSS	—	—	e 20.6
Mizusawa	E. 40.8	350	e 7 45	0	e 13 49	- 7	—	—	—
	N. 40.8	350	e 7 43	- 2	e 13 45	-11	—	—	—
Hong Kong	41.9	306	7 56	+ 2	14 12	- 1	9 36	PP	—
Batavia	43.4	263	i 8 5	- 1	—	—	9 37	PP	—
Zinsen	44.0	333	e 8 11k	0	e 14 40	- 3	—	—	—
Perth	44.6	223	i 10 31	PPP	18 2	SS	18 16	SSS	24.1
Wellington	45.9	154	8 24	- 2	15 12	+ 1	10 19	PP	20.3
Christchurch	46.9	158	8 33a	- 1	14 30	-55	10 37	P _c P	19.5
Phu-Lien	47.6	300	e 8 43	+ 4	e 15 34	- 1	—	—	—
Medan	51.5	276	e 9 1	- 8	16 22	- 7	i 16 36	PS	—
Honolulu	55.6	63	—	—	17 31	+ 6	—	—	e 25.5
Calcutta	N. 64.4	296	e 10 56	+16	i 19 17	- 1	20 34	PPS	—
Agra	74.5	299	e 11 41	- 1	i 21 12	- 5	—	—	—
Sempalatinsk	78.0	323	e 12 4	+ 2	—	—	—	—	—
Bombay	78.2	290	e 12 2	- 1	e 21 55	- 2	—	—	—
Almata	78.4	315	e 12 22	+18	—	—	—	—	—
Andijan	81.3	311	e 12 15	- 5	—	—	—	—	—
Tashkent	83.7	312	i 12 51	+19	i 22 45	- 9	e 24 30	PPS	—
Samarkand	85.2	310	e 12 41	+ 2	—	—	—	—	—
Ukiah	88.1	52	—	—	e 23 25	[+ 4]	—	—	e 39.2
Berkeley	E. 88.8	53	—	—	e 23 33	[+ 7]	e 29 50	SS	—
Sverdlovsk	90.5	327	e 13 6	+ 1	i 24 1	+ 2	—	—	43.9
Tinemaha	92.0	53	e 13 21	+ 9	—	—	—	—	—
Pasadena	92.1	56	i 13 17	+ 5	—	—	i 17 5	PP	145.9
Mount Wilson	Z. 92.2	56	e 13 17	+ 4	—	—	e 16 58	PP	—
Riverside	Z. 92.7	56	i 13 19	+ 4	—	—	e 17 2	PP	—
Tucson	98.3	57	e 13 44k	+ 3	—	—	18 10	PP	—
Baku	98.3	311	e 13 49	+ 8	e 24 52	-14	17 49	PP	e 48.9
Tiflis	102.0	312	e 13 59	+ 2	e 25 37	0	e 18 13	PP	e 42.9
Moscow	103.3	327	e 14 5	+ 2	27 35	PS	18 31	PP	e 29.0
Scoresby Sund	110.4	358	—	—	25 20	[+ 6]	28 38	PS	55.9
Ksara	110.5	306	i 19 18	PP	e 28 48	PS	—	—	—
St. Louis	E. 113.6	47	e 19 39	PP	e 26 39	{+ 9}	e 29 38	PS	—
Helwan	115.2	303	e 19 50	PP	e 29 31	PS	—	—	—
Copenhagen	115.6	335	—	—	36 8	SSP	—	—	58.9
Ottawa	120.3	35	—	—	e 25 56?	[+ 5]	—	—	55.9
Stuttgart	121.7	331	e 18 59	[+ 3]	e 30 26	PS	20 32	PP	e 63.9
Strasbourg	Z. 122.5	332	e 20 44	PP	e 30 38	PS	e 22 14	PPP	—
Philadelphia	123.6	40	—	—	e 26 1	[0]	—	—	e 58.5
Harvard	124.4	36	e 20 56?	PP	e 30 56	PS	e 37 56	SS	e 61.9
Weston	Z. 124.6	36	i 19 10	[+ 9]	—	—	—	—	—
La Paz	Z. 138.6	116	e 19 41	[+13]	—	—	—	—	—
Fort de France	146.3	65	i 19 50	[+ 9]	—	—	—	—	—

Additional readings :-

Manila ePE = +6m.38s.
 Riverview iE = +12m.0s., +12m.11s., and +14m.28s.
 Melbourne e = +11m.9s. and +14m.26s., i = +20m.46s. and +21m.21s.
 Hong Kong SS = +17m.14s.
 Batavia iZ = +10m.1s.
 Perth P = +11m.36s., PP = +13m.22s., PPP = +13m.56s., PPPP = +14m.9s., P_cS = +17m.9s., SS = +20m.46s., SSS = +22m.24s., SSSS = +22m.48s.
 Wellington SS = +18m.26s., SSS = +19m.20s.
 Medan PN = +9m.19s.
 Agra i = +11m.44s.
 Ukiah S = +23m.46s.
 Berkeley eN = +23m.52s., eE = +41m.16s.
 Mount Wilson eZ = +16m.29s.
 Tucson eP = +13m.49s.
 Tiflis ePPN = +18m.25s., eSSN = +32m.47s., eSSZ = +33m.0s.
 Moscow e = +19m.20s. and +22m.17s.
 Stuttgart e = +23m.9s. and +41m.44s.
 Long waves were also recorded at East Machias, De Bilt, and Potsdam,

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Aug. 20d. 22h. Local Japanese shock, suggested epicentre 35°·8N. 140°·1E. Earthquake Research Institute, Tokyo Imperial University.

Titibu P = 25m.23s.
 Kamakura P = 25m.23s., S = 25m.30s.
 Tukubasan P = 25m.23s., S = 25m.30s.
 Kiyosumi P = 25m.23s., S = 25m.32s.
 Komaba P = 25m.23s., S = 25m.32s.
 Misaki P = 25m.23s., S = 25m.33s.
 Mitaka P = 25m.23s., S = 25m.33s.
 Koyama P = 25m.23s., S = 25m.37s.
 Tokyo Cent. Met. Obs. iP = 25m.33s.a, S = 25m.42s.
 Tokyo Imp. Univ. P = 25m.33s., S = 25m.42s.
 Susaki P = 25m.42s., S = 25m.57s.
 Nagoya P = 26m.2s., S = 26m.45s.
 Mizusawa P = 26m.18s., S = 26m.55s.

Aug. 20d. Readings also at 0h. (Wellington), 1h. (Moncalieri), 2h. (Fort de France), 3h. (Andijan), 4h. (Sofia, Kodaikanal, Samarkand, and Medan), 6h. (Calcutta), 7h. (Andijan and Kodaikanal), 8h. (Tucson, Pasadena, Mount Wilson, Riverside, Tananarive, Pulkovo, Irkutsk, Baku, Helwan, Tifis, Ksara, Tashkent, and Agra), 9h. (Fort de France, Tucson (2), Pasadena, Mount Wilson, and Riverside), 11h. (Fort de France), 12h. (Nagoya), 18h. (Tokyo and Nagoya), 19h. (Grozny, Tucson, and Mount Wilson), 20h. (near Branner), 21h. (Moncalieri).

Aug. 21d. 16h. 22m. 9s. Epicentre 18°·0N. 109°·0W. (as on 1938 Mar. 4d.).

A = -·3098, B = -·8999, C = +·3071; δ = +11; h = +5;
 D = -·946, E = +·326; G = -·100, H = -·290, K = -·952.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
		o	o	m. s.	s.	m. s.	s.	m. s.	m.
Tacubaya	N.	9·4	80	2 31	PP	—	—	—	—
Tucson		14·3	354	i 3 21k	- 5	6 14	+ 8	i 3 29	PP 6·6
La Jolla		16·5	335	e 3 51	- 3	—	—	—	—
Riverside		17·6	337	e 4 6	- 2	—	—	—	—
Pasadena		18·0	337	i 4 11	- 2	i 7 34	+ 2	—	e 8·8
Mount Wilson		18·1	337	i 4 12	- 2	—	—	—	—
Haiwee		19·7	340	i 4 33	- 1	—	—	—	—
Tinemaha		20·7	340	i 4 43	- 1	—	—	—	—
Fresno	N.	21·0	336	e 4 47	0	—	—	—	—
Branner		22·5	333	e 5 5	+ 3	—	—	—	—
Berkeley		23·0	334	i 5 7	0	e 9 15	+ 1	—	—
San Francisco	N.	23·0	333	e 5 8	+ 1	—	—	—	—
Ukiah		24·4	334	e 5 22	+ 1	e 9 43	+ 4	—	e 10·3
Florissant		26·3	35	—	—	e 11 7	SS	—	i 13·6
Chicago		30·0	32	—	—	e 11 3	- 7	—	e 13·0
Philadelphia		36·5	47	—	—	e 12 50	- 1	—	e 15·3
Fordham		37·8	45	i 7 22	+ 2	—	—	—	e 19·6
Ottawa		38·9	38	—	—	e 13 27	- 1	e 16 3	SS 19·9
Harvard		40·0	44	i 7 42 _a	+ 4	e 13 45	+ 1	—	e 22·4
Weston		40·1	44	i 7 43	+ 4	e 13 33	- 13	e 16 43	SS —
Honolulu		46·0	283	—	—	e 19 6	SSS	—	e 19·4
La Paz	z.	52·9	127	9 43	+ 23	—	—	—	—
Sverdlovsk		105·0	6	—	—	e 33 22	SS	—	48·9

Additional readings:—

Tucson iP = +3m.27s.
 Berkeley eN = +9m.23s., eZ = +12m.43s.
 Harvard eN = +20m.51s.?

Long waves were also recorded at Tifis, Tashkent, Kew, East Machias, De Bilt, Potsdam, and Vermont.

Aug. 21d. Readings also at 0h. (Sofia), 1h. (Andijan), 2h. (Andijan, Samarkand, and Frunse), 6h. (Samarkand), 8h. (Triest), 11h. (near Tifis), 12h. (Weston, Harvard, Tucson, Mount Wilson, Riverside, and Fordham), 15h. (Calcutta), 16h. (San Javier, La Plata, Tucson, Mount Wilson, La Paz, and Riverside), 17h. (Pasadena, La Jolla, Tucson, Mount Wilson, and Riverside), 18h. (Tucson), 20h. (Amboina (2)), 22h. (Wellington), 23h. (Toledo).

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Aug. 22d. 21h. 37m. 21s. Epicentre 37°3N. 98°6E.

A = -1192, B = +7884, C = +6034; $\delta = -13$; $h = -1$;
D = +989, E = +150; G = -090, H = +597, K = -797.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Irkutsk	15.5	13	e 3 41	- 1	e 6 34	- 1	e 6 57	SSS e 8.1
Calcutta	17.2	214	i 4 1k	- 2	i 7 33	+19	i 4 19	PP e 9.0
Almeta	17.5	296	e 4 6	- 1	e 7 18	- 3	---	8.8
Phu-Lien	17.9	155	e 4 14	+ 2	e 7 32	+ 2	---	---
Dohra Dun	18.4	253	---	---	e 7 54	+13	---	i 10.6
Sempalatinsk	18.6	323	e 4 18	- 3	e 7 47	+ 1	---	---
Zi-ka-wei	19.8	100	e 4 37	+ 2	8 27	SS	---	---
Hong Kong	20.1	132	e 4 39	+ 1	e 8 27	+ 8	---	10.8
Andijan	20.6	258	e 4 43	0	e 8 47	+18	---	---
Zinsen	22.3	81	e 9 2	S	(e 9 2)	0	---	---
Tchikment	22.7	292	e 5 17	PP	---	---	e 5 53	PPP
Taikyū	24.1	83	e 9 24	S	(e 9 24)	-10	e 10 40	SSS
Husan	24.6	86	e 9 55	S	(e 9 55)	+13	---	---
Samarkand	24.8	285	e 5 17	- 8	e 9 58	+12	---	---
Vladivostok	26.0	66	---	---	i 10 16	+10	i 11 44	SSS
Hukuoka B	26.1	88	---	---	e 10 27	+20	---	---
Hyderabad	26.6	227	5 45	+ 3	e 10 20	+ 4	10 55	SS 14.0
Bombay	29.1	238	e 6 17	+13	i 11 3	+ 7	i 12 16	SS e 14.4
Manila	30.2	132	i 7 9	PP	12 4	+61	---	15.0
Sverdlovsk	31.8	321	6 26	- 2	i 11 41	+ 3	i 15 15	L _a i 17.2
Medan	33.6	179	e 8 42	PPP	i 12 13	+ 7	---	---
Baku	37.7	391	i 7 23	+ 4	e 13 34	+24	---	e 21.2
Grozny	40.2	296	e 7 39	- 1	---	---	---	---
Tiflis	41.2	294	i 7 50	+ 2	e 14 3	+ 1	9 26	PP 16.9
Moscow	44.3	315	e 8 9	- 4	e 14 48	0	---	20.1
Pulkovo	47.9	322	e 8 44	+ 2	e 15 40	+ 1	---	e 22.6
Ksara	50.3	286	19 4 _a	+ 4	16 38	+25	11 4	PP
Istanbul	52.7	298	16 56	S	(16 56)	+10	---	---
Uppsala	54.3	322	---	---	e 16 39?	-28	---	e 29.0
Helwan	55.5	283	i 9 41	+ 2	e 17 27	+ 3	11 47	PP
Sofia	56.1	301	e 9 39	- 4	17 57	+25	---	---
Copenhagen	58.2	319	---	---	18 3	+ 4	---	28.6
Potsdam	59.0	315	---	---	e 17 39?	-31	e 25 39?	SSS e 28.6
Prague	59.1	312	---	---	e 25 2	SSS	---	e 30.6
Bergen	59.9	326	---	---	e 25 29	SSS	---	33.6
Cheb	60.3	313	---	---	e 18 39?	+13	---	---
Hamburg	60.3	317	---	---	e 19 3	+37	e 24 39?	SSS 30.6
Jena	60.4	313	e 10 15	+ 2	---	---	---	e 27.6
Triest	61.3	308	---	---	e 18 42	+ 3	e 25 27	SSS
Padova	62.5	308	---	---	e 19 12	+18	---	e 34.6
Stuttgart	62.7	313	e 19 5	S	(e 19 5)	+ 8	e 25 40	SSS e 32.6
De Bilt	63.5	318	---	---	e 19 9	+ 2	---	e 30.6
Strasbourg	63.7	313	---	---	e 19 9	- 1	e 23 39	SS e 33.3
Zurich	63.7	312	e 10 39	+ 3	---	---	---	---
Basle	64.3	312	e 10 37	- 2	---	---	---	34.9
Uccle	64.5	316	e 10 43	+ 2	e 19 20	+ 1	23 31	SS 30.6
Kew	66.8	318	---	---	e 27 26	SSS	---	e 32.6
Oxford	67.2	319	---	---	19 59	+ 7	---	e 32.1
Jersey	69.0	318	e 16 51	?	e 20 49	PS	e 25 9	SS 35.7
Toledo	75.5	309	e 11 46	- 2	---	---	---	37.2

Additional readings :-

Irkutsk e = +5m.7s.

Calcutta iSSN = +8m.12s.

Zinsen eSEN = +13m.11s.

Tchikment e = +12m.17s.

Vladivostok eS = +8m.41s., +10m.53s., +14m.8s., +14m.30s., and +14m.50s.

Hukuoka B i = +14m.27s.

Manila ePEN = +7m.17s., iE = +10m.22s.

Medan iE = +18m.3s., eN = +18m.33s., iN = +19m.8s.

Ksara eSS = +20m.16s.

Continued on next page.

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Helwan $e = +17m.45s.$ and $+18m.9s.$

Potsdam $eN = +27m.45s.$

Prague $eS = +28m.39s.$

Bergen $S = +31m.25s.$

Cheb $e = +27m.39s. ?$

Strasbourg $e = +26m.12s.$

Toledo $e = +11m.51s.$

Long waves were also recorded at Harvard, Tucson, Simferopol, and other European stations.

Aug. 22d. Readings also at 0h. (Batavia, Malabar, Keizyo, Syuhurei, Hukuoka B, Husan, Talkyu, and Zinsen), 1h. (Tchimkent, Samarkand, and Andijan), 2h. (Tashkent), 4h. (Tucson), 5h. (near Mizusawa and Nagoya), 6h. (Fort de France and Grozny), 7h. (Tucson), 9h. (Sofia), 10h. (Rio de Janeiro, Kew, Ksara, and Baku), 11h. (Sverdlovsk and Tiflis), 12h. (Fordham, Ottawa, Seven Falls, Tucson, Harvard, Weston, and Williamstown), 15h. (Copenhagen), 16h. (near Balboa Heights, near Copiapo, Andijan, and Frunse), 17h. (Sverdlovsk, Tashkent, Riverside, Mount Wilson, Pasadena, and Tinemaha), 18h. (Frunse, Andijan, and Tchimkent), 19h. (Takaka), 20h. (Harvard, Weston, and Williamstown), 21h. (Kodaikanal), 23h. (Tucson and Amboina).

Aug. 23d. 8h. 16m. 1s. Epicentre $32^{\circ}2N. 92^{\circ}8E.$

$A = -.0414, B = +.8468, C = +.5303; \delta = 0; \lambda = +1;$
 $D = +.999, E = +.049; G = -.026, H = +.530, K = -.848.$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Calcutta	N. 10.4	203	e 2 41	+ 7	14 43	SS	—	—
Dehra Dun	12.7	265	—	—	e 5 48	SS	—	17.3
Agra	13.8	252	13 16	- 3	15 43	-11	—	—
Almata	16.7	316	e 4 5	+ 8	e 7 14	SS	—	9.4
Phu-Lien	16.8	129	e 3 53	- 5	—	—	—	—
Frunse	17.9	312	e 3 59	-13	e 7 33	+ 3	—	—
Andijan	18.5	302	4 20	+ 1	7 59	SS	—	—
Hyderabad	N. 19.6	225	4 33	+ 1	8 14	+ 6	—	10.0
Sempalatinsk	20.4	338	e 4 39	- 2	—	—	—	—
Hong Kong	21.4	113	4 53	+ 2	8 57	+12	—	11.1
Irkutsk	21.7	19	e 4 58	+ 3	e 9 9	SS	—	e 12.5
Samarkand	22.1	296	e 4 58	- 1	e 9 3	+ 5	—	—
Bombay	22.3	239	e 5 4	+ 3	i 9 5	+ 3	—	—
Kodaikanal	E. 26.0	218	e 5 38	+ 2	e 10 13	+ 7	e 5 59	PP i 12.5
Colombo	E. 27.9	209	e 8 29	?	—	—	—	—
Zinsen	28.2	70	—	—	e 12 1	SS	—	—
Medan	29.0	168	e 11 5	S	(e 11 5)	+11	—	—
Taikyu	29.8	73	—	—	e 10 58	- 9	—	e 16.6
Manila	31.1	118	9 55	?	15 6	L	—	(15.1)
Sverdlovsk	33.1	328	e 6 39	- 1	12 0	+ 1	16 17	Lq 18.9
Baku	35.2	296	e 7 0	+ 2	e 12 39	+ 8	—	e 20.6
Grozny	38.3	301	e 1 9	?	—	—	—	—
Tiflis	39.1	298	e 7 32	+ 1	e 13 26	- 5	e 9 5	PP e 19.0
Moscow	44.7	319	e 8 20	+ 4	e 17 27	SS	—	24.5
Ksara	47.2	288	e 8 40	+ 4	e 15 58	+29	e 10 34	PP —
Pulkovo	49.0	324	—	—	e 15 34	-21	e 20 2	SS e 21.7
Helwan	52.1	285	e 9 14	0	e 16 41	+ 3	—	—
Prague	59.0	313	—	—	i 24 35	SSS	—	e 29.8
Jersey	69.3	316	e 23 54	?	e 28 56	SSS	—	e 37.0

Additional readings:—

Calcutta $iSN = +5m.28s., iS_2N = +6m.0s.$

Agra $iE = +5m.54s.$

Kodaikanal $SSE = +11m.9s.$

Medan $S_2E = +16m.49s., eSEN = +17m.28s.$

Tiflis $eSN = +13m.36s., eSSN = +15m.59s., eZ = +16m.28s.$

Moscow $e = +16m.50s.$

Ksara $eSS = +19m.26s.$

Jersey $e = +31m.24s.$

Long waves were also recorded at Batavia, Uccle, Kew, De Bilt, Potsdam, Upsala, Stonyhurst, Bergen, Hamburg, Strasbourg, Paris, Copenhagen, Göttingen, Edinburgh, Bidston, and Belgrade.

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Aug. 23d. Readings also at 0h. (Sverdlovsk, Tucson, Pasadena, Mount Wilson, Riverside, and Tashkent), 2h. (Tchinkent), 3h. (Weston, Harvard, Ottawa, Philadelphia, Fordham, Shawinigan Falls, and Williamstown), 4h. (Batavia), 5h. (Weston (2), Williamstown (2), Shawinigan Falls, Fordham (2), Ottawa, and Harvard (3)), 6h. (Riverside, Mount Wilson, Pasadena, Tucson, Sverdlovsk, Andijan, Tinemaha, and Haiwee), 7h. (Tifis, Philadelphia, Weston (2), Harvard (2), Ottawa, Fordham (2), and Williamstown (2)), 10h. (Riverside, Mount Wilson, Pasadena, Tucson, Ferndale, Berkeley, Malaga, and Ukiah), 11h. (Fordham, Harvard, Weston, Philadelphia, and Williamstown), 13h. (near Algiers and Wellington), 14h. (Riverview and near Balboa Heights), 15h. (Malabar), 16h. (Sverdlovsk and Tashkent), 17h. (Florence), 18h. (New Plymouth, Medan, and Wellington), 20h. (Riverview), 22h. (Medan), 23h. (Samarkand, Tashkent, Frunse, and Andijan).

Aug. 24d. 15h. 43m. 47s. Epicentre 9° 3S. 119° 2E.

H. P. Berlage.

Aardbevingen in der Oost-Indischer Archipel Waargenomen gedurende het Jaar, 1938.

Naturkundig Tijdschrift Voor Nederlandsch Indie, Afl. Van Deel XCX '40 blz. 38-75, p. 66 et 39.

Felt force VI at Soemba.

Epicentre 9° 8S. 119° 4E. (Batavia).

A = -4815, B = +8616, C = -1605; δ = -4; h = +7;
D = +873, E = +488; G = +078, H = -140, K = -987.

		Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
				m. s.	s.	m. s.	m. s.	m. s.	m.
Amboina	N.	10.7	59	i 2 36	- 2	i 4 49	+10	—	—
Batavia		12.6	283	e 3 7	+ 4	i 6 0	SSS	—	—
Perth		22.8	187	3 33	?	8 53	-18	5 8	PP 14.1
Manila		23.8	6	15 18 ^a	+ 3	9 43	+15	—	12.1
Medan		24.1	302	i 5 20	+ 2	i 9 52	+18	i 10 12	SS —
Adelaide		31.1	149	e 6 41	+19	i 12 43	SS	7 42	PP 1 15.8
Phu-Lien		32.4	339	e 6 36	+ 2	—	—	—	—
Brisbane		36.7	124	i 7 13	+ 3	i 12 43	-11	i 15 13	SS —
Melbourne		36.7	145	—	—	i 12 44	-10	—	18.2
Riverview	N.	38.2	135	—	—	e 17 34	?	—	e 23.1
Sydney		38.2	135	—	—	e 12 59	-18	—	e 20.7
Calcutta	N.	43.3	317	—	—	e 18 0	SSS	—	—
Kodaikanal	E.	45.8	295	e 8 13 [?]	-12	—	—	—	—
Bombay		53.0	302	e 9 30	+ 9	e 16 51	+ 1	i 19 9	SS —
Agra		53.9	315	e 9 22	- 5	16 53	- 9	—	—
Irkutsk		62.6	350	10 28	0	18 57	+ 1	—	—
Frunse		64.5	326	e 10 34	- 7	—	—	—	—
Almata		64.9	328	e 10 42	- 1	—	—	—	—
Andijan		65.9	323	e 10 48	- 2	e 19 28	- 9	—	—
Tashkent		68.1	322	i 11 0	- 4	i 19 58	- 5	—	35.2
Samarkand		68.6	319	e 11 6	- 1	20 8	- 1	—	—
Baku		80.6	314	i 12 17	+ 1	22 25	+ 2	—	40.2
Sverdlovsk		81.3	332	i 12 18	- 2	22 26	- 4	—	42.2
Grozny		84.5	316	e 12 37	+ 1	—	—	—	—
Tifis		84.7	314	i 12 35	- 2	22 58	- 6	—	e 34.2
Ksara		89.6	306	e 13 1	0	e 24 20	+29	e 16 47	PP —
Helwan		92.7	300	—	—	e 23 43	[- 5]	—	—
Moscow		92.9	326	e 13 21	+ 5	—	—	e 16 52	PP —
College		99.6	26	e 19 56	PPP	—	—	—	—
Mount Wilson	z.	122.0	55	i 18 56	[- 1]	—	—	—	—
Pasadena	z.	122.1	55	e 18 55	[- 2]	—	—	—	—
Riverside	z.	122.8	55	i 18 57	[- 1]	—	—	—	—
Tucson		123.5	56	19 8 ^a	[- 1]	—	—	22 28	PKS —
Ottawa		141.8	17	—	—	e 30 49	?	—	54.2
Williamstown		145.0	14	i 19 38	[- 1]	—	—	—	—
Harvard	z.	145.6	13	i 19 39	[- 1]	—	—	—	—
Weston		145.8	13	i 19 39 ^k	[- 1]	33 38	PS	—	—
Fordham	z.	146.5	19	i 19 41	[- 1]	—	—	—	—
La Paz	z.	152.5	166	e 20 9	[+18]	—	—	—	—

For Notes see next page.

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NOTES TO AUG. 24d. 15h. 43m. 47s.

Additional readings:—

Perth PP = +4m.36s., i = +5m.18s., PPPP = +5m.28s., P_gS = +9m.3s., SS = +11m.23s.
 Medan iN = +17m.58s.
 Adelaide i = +13m.33s.
 Brisbane iN = +17m.19s., eE = +17m.37s.
 Riverview eN = +21m.48s.
 Helwan i = +24m.35s.
 Moscow ePPP = +19m.11s.
 Tucson P = +19m.17s.
 Williamstown i = +19m.50s. and +19m.57s.
 Weston iPKP₂ = +19m.41s.
 La Paz i = +21m.3s.
 Long waves were also recorded at De Bilt, Kew, Copenhagen, Strasbourg, Jersey, Potsdam, and Bidston.

Aug. 24d. Readings also at 0h. (Tifis and La Paz), 4h. (near Manila), 8h. (Triest), 9h. (near Tananarive), 10h. (Tucson), 12h. (Almata, Andijan, Frunse, Tashkent, Samarkand, Sverdlovsk, and Baku), 16h. (Baku, Tifis, Tucson, Haiwee, Moscow, Pulkovo, Mount Wilson, Pasadena, Riverside, Christchurch, Mizusawa, and Timmaha), 17h. (near Fordham, Neuchatel, Basle, and Zurich), 22h. (Columbia).

Aug. 25d. 1h. 28m. 1s. Epicentre 5°·5S. 101°·3E.

Force II on the South Coast of Sumatra, at Palambang and Benkoelen.

Epicentre 4°·8S. 101°·9E. (Batavia). Depth 100kms. (Batavia).

H. P. Berlage.

Aardbevingen in der Oost Indischer Archipel Waargenomen gedurende het Jaar, 1938.

Natuurkundig Tijdschrift voor Nederlandsch-Indie, Afl. van Deel XCX 40, blz. 38-75, p. 66.

A = -·1951, B = +·9762, C = -·0952; δ = +9; h = +7;
 D = +·981, E = +·196; G = +·019, H = -·093, K = -·996.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	°	°	m. s.	s.	m. s.	s.	m. s.	m.	
Batavia	5·5	97	i 1 28k	+ 3	2 25	- 5	i 1 59	P _g	—
Malabar	6·5	106	1 42	+ 3	i 2 50	- 5	—	—	—
Medan	9·4	344	2 24	+ 6	4 20	+13	—	—	—
Colombo	E. 24·7	300	5 25	+ 1	9 55	+11	—	—	12·0
Phu-Lien	26·7	12	e 5 44	+ 1	10 17	0	—	—	—
Manila	27·9	45	i 5 55a	+ 1	i 10 43	+ 6	—	—	—
Kodaikanal	E. 28·4	305	i 5 59a	+ 1	i 10 51	+ 6	i 12 16	SS	i 14·6
Perth	29·6	154	4 4	?	9 1	?	7 4	PP	12·8
Hong Kong	30·4	25	6 18k	+ 2	11 21	+ 5	7 29	PP	14·6
Calcutta	N. 30·6	337	i 6 16k	- 2	i 12 32	SS	i 7 15	pP	—
Hyderabad	32·1	317	6 34	+ 3	11 49	+ 6	7 35	PP	15·5
Taito	34·1	34	6 54	+ 6	12 7	- 7	—	—	17·6
Karenko	35·4	33	7 0	0	12 31	- 3	—	—	—
Bombay	37·1	312	i 7 15	+ 1	i 13 12	+11	7 50	pP	—
Miyakozima	37·9	37	7 20	0	13 6	- 7	—	—	—
Agra	E. 39·5	328	i 7 31	- 3	13 29	- 8	i 8 1	pP	i 21·2
Zi-ka-wei	N. 41·3	27	e 3 45	?	10 1	PPP	—	—	—
Dehra Dun	N. 42·0	331	i 8 18k	+24	e 14 21	+ 7	e 17 40	SS	e 23·5
Adelaide	E. 45·2	135	e 8 17	- 3	i 17 53	SS	—	—	25·3
Kumamoto	47·2	35	8 37	+ 1	15 27	- 2	—	—	—
Huknoka B	47·6	34	e 8 40	+ 1	—	—	—	—	—
Husan	48·1	31	e 8 44	+ 1	—	—	—	—	—
Taikyu	48·5	30	8 50	+ 4	15 50	+ 2	—	—	e 26·5
Zinsen	49·0	27	i 8 48	- 2	e 15 53	+ 2	—	—	—
Keizyo	49·1	28	8 50	- 1	15 55	- 1	—	—	28·0
Koti	49·4	36	11 19	PP	18 25	?	—	—	35·2
Melbourne	51·1	135	i 9 5	- 1	i 16 13	-11	i 20 28	SS	27·1
Kobe	51·2	37	8 58	- 9	16 21	- 4	—	—	—
Osaka B	51·3	37	9 14	+ 6	16 24	- 2	—	—	—
Toyouka	51·5	35	9 10	+ 1	16 32	+ 3	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Nagoya	52-5	38	(9 29)	+12	9 29	P	—	—
Gihu	52-6	38	9 17	-1	16 41	-3	—	—
Andijan	53-2	333	9 23	+1	17 1	+9	—	34-0
Almata	53-3	339	9 24	+1	e 17 17	+23	e 13 31 PPP	—
Brisbane	53-7	120	i 9 23	-3	i 16 59	0	e 22 11 SSS	—
Kohu	53-8	38	9 23	-3	16 55	-6	—	—
Frunse	53-9	337	i 9 12	-15	e 16 47	-15	—	—
Tananarive	54-0	251	e 9 26	-2	e 17 8	+5	e 9 56 pP	25-6
Wazima	54-0	35	9 28	0	17 1	-2	—	—
Riverview	54-1	128	i 9 26	-3	e 17 5	0	i 21 51 SSS	e 27-9
Sydney	54-1	128	e 9 13	-16	—	—	—	e 24-4
Nagano	54-3	37	9 34	+4	17 16	+9	—	—
Tashkent	54-4	332	i 9 34	+3	i 17 13	+4	—	29-2
Tokyo Cent. Met. Obs.	54-6	38	9 37	+5	17 18	+7	—	—
Samarkand	55-0	328	e 9 34	-1	e 16 52	-25	—	—
Vladivostok	55-8	27	i 9 37	-4	i 17 33	+5	—	e 34-3
Hukusima	56-4	38	9 43	-2	17 31	-5	—	—
Irkutsk	57-6	2	9 57	+3	17 56	+5	10 25 pP	22-0
Mizusawa	E. 57-7	37	9 55	0	17 54	+1	—	—
	N. 57-7	37	9 52	-3	17 49	-4	—	—
Morioka	58-1	37	9 56	-2	17 57	-1	—	—
Semipalatinsk	58-6	346	e 9 57	-4	—	—	—	—
Baku	65-6	320	i 10 50	+2	i 19 37	+4	—	31-8
Tiflis	69-6	318	i 11 11	-2	20 19	-2	11 44 pP	e 28-0
Grozny	69-8	321	e 11 15	+1	e 20 22	-1	—	—
Sverdlovsk	70-4	339	i 11 18	0	i 20 28	-2	i 11 47 pP	37-4
Christchurch	72-7	134	e 11 25k	-7	i 21 24	+27	41 59 Lq	37-3
Ksara	73-0	306	i 11 35k	+2	e 21 1	+1	14 19 pP	35-0
Wellington	74-0	131	e 11 25	-14	20 59?	-12	—	38-0
Helwan	75-6	302	i 11 47	-1	21 27	-2	14 41 PP	—
Theodosia	77-2	319	11 57	0	21 43	-4	—	—
Yalta	77-9	318	11 59	-2	21 50	-4	—	—
Simferopol	78-1	318	e 12 2	0	e 21 52	-4	—	—
Moscow	80-2	330	i 12 14	0	22 16	-3	12 45 pP	47-5
Istanbul	80-3	313	i 12 14	-1	22 13	-8	15 30 PP	—
Bucharest	83-3	316	e 12 31a	+1	22 36	-14	15 51 PP	40-0
Sofia	84-8	314	e 12 41	+4	e 22 59	-6	—	—
Pulkovo	85-3	332	i 12 39	-1	23 5	[+ 2]	13 10 pP	e 41-0
Belgrade	87-4	315	i 12 49a	-1	i 23 16	[0]	—	e 52-1
Keckskemet	z. 88-2	317	e 12 54	0	e 23 40	+2	e 16 24 PP	—
Budapest	88-8	318	12 57	0	23 24	[- 2]	—	—
Ogyalla	89-4	318	12 51	-9	23 47	-2	24 35 PS	—
Upsala	91-5	330	e 12 59?	-11	i 23 40	[- 2]	i 16 59 PP	e 44-0
Prague	92-2	320	e 13 8	-5	e 23 44	[- 1]	e 16 59 PP	e 47-0
Triest	92-2	316	13 13	0	i 23 43	[- 2]	30 46 SS	—
Potsdam	93-2	322	i 13 7	-10	e 23 47	[- 4]	e 17 5 PP	e 50-0
Padova	93-5	315	e 12 20	-59	e 24 47	+22	—	—
Cheb	93-5	320	e 13 20	+1	i 23 54	[+ 1]	—	e 55-0
Copenhagen	93-9	326	i 13 20	-1	24 34	+5	13 54 pP	50-0
Jena	94-0	321	e 12 19	-62	e 24 53	+23	—	e 54-0
Hamburg	95-2	323	e 13 24	-3	i 24 3	[+ 1]	i 17 14 PP	e 54-0
Stuttgart	95-5	319	i 13 28k	0	e 24 2	[- 2]	e 17 16 PP	e 56-0
Zurich	95-9	317	e 13 28k	-2	e 24 11	[+ 5]	e 17 12 PP	—
Basle	96-4	317	e 13 32	0	—	—	—	—
Strasbourg	96-4	318	i 13 35	+3	i 24 8	[- 1]	26 59 PS	e 46-0
De Bilt	98-1	322	13 39	-1	i 24 17	[0]	e 26 26 PS	e 47-0
Uccle	98-5	321	e 13 41	-1	i 24 19	[0]	e 17 25 PP	e 46-0
Paris	99-9	318	—	—	e 24 24	[- 3]	e 17 23 PP	57-0
Algiers	99-9	316	12 59?	-49	25 59?	+39	—	54-0
Kew	101-5	322	e 13 54	-1	i 24 33	[- 1]	i 18 3 PP	e 57-0

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Aberdeen	101.9	327	—	—	e 24 32	[- 4]	—	e 60.2
Durham	E. 101.9	325	e 18 14	PP	i 24 32	[- 4]	—	—
Oxford	102.1	322	i 18 10	PP	i 24 35	[- 2]	i 28 6	PPS
Stonyhurst	102.5	324	i 18 9	PP	i 24 39	[0]	—	e 60.0
Edinburgh	102.6	326	—	—	i 24 39	[0]	—	57.0
Jersey	102.9	319	e 14 0	- 1	e 23 57	[-44]	e 18 38	PP
College	103.8	23	e 18 24	PP	e 24 33	[-12]	e 27 34	PS
Almeria	104.3	307	e 17 34	?	i 24 41	[- 7]	—	e 65.2
Rathfarnham Castle	104.8	324	—	—	i 29 0	PPS	—	i 44.8
Granada	105.2	306	i 14 15	P	27 48	PPS	18 40	PP
Toledo	105.3	309	e 15 12	P	e 25 45	-20	e 18 22	PP
Scoreby Sund	105.8	342	14 17	P	24 54	[0]	e 18 44	PP
Malaga	105.9	306	18 19	PKP	26 3	- 7	—	49.0
San Fernando	107.3	306	e 17 9	?	28 13	PS	—	52.0
Averroes	108.6	303	—	—	—	—	e 18 59?	PP
Ukiah	127.7	43	e 21 4	PP	e 31 7	PS	—	—
Berkeley	128.8	44	i 21 16	PP	e 28 3	{ - 8}	31 11	PS
Fresno	N. 131.3	43	e 19 17	[+ 3]	e 22 57	SKP	—	—
Tinemaha	132.1	43	e 19 18	[+ 2]	—	—	—	—
Haiwee	E. 132.8	43	e 19 20	[+ 3]	e 22 47	SKP	—	—
Pasadena	133.7	46	i 19 19	[- 0]	i 22 47	SKP	e 21 34	PP
Mount Wilson	133.7	46	e 19 6	[-13]	i 22 46	SKP	e 19 27	PP
Riverside	134.3	46	e 19 20	[- 0]	e 23 8	SKP	e 22 4	PP
La Jolla	135.0	47	e 19 20	[- 1]	—	—	—	—
Rio de Janeiro	135.3	230	e 21 59	PP	—	—	—	e 40.5
Seven Falls	137.2	351	e 19 29	[+ 4]	—	—	—	64.0
East Machias	139.6	347	e 19 35	[+ 5]	e 40 57	SS	e 22 30	PP
Tucson	139.9	44	i 19 24k	[- 6]	33 37	PS	i 19 46	pPKP
Ottawa	140.2	356	i 19 22	[- 9]	29 17	{ - 5}	e 22 28	PP
Harvard	142.6	349	i 19 29k	[- 6]	e 41 29	SS	i 22 47	PP
Williamstown	142.6	351	i 19 30	[- 5]	i 27 12	[+29]	i 22 41	PP
Weston	142.7	349	i 19 21k	[-14]	e 34 10	PS	e 22 44	PP
Chicago	142.9	11	e 19 37	[+ 2]	—	—	e 22 51	PP
Fordham	144.6	352	i 19 36	[- 2]	—	—	23 0	PP
St. Louis	145.4	15	i 19 31	[- 9]	—	—	i 22 53	PP
Philadelphia	145.5	353	i 19 40k	[- 0]	e 33 19	PSKS	i 19 57	pPKP
Columbia	151.6	3	e 19 49	[- 1]	—	—	23 26	PP
La Paz	155.4	206	i 19 56k	[+ 1]	i 30 24	{ -24}	i 23 59	PP
Fort de France	160.5	298	i 20 1	[- 0]	(e 26 49)	[-16]	i 24 21	pPKP
Huancayo	162.3	191	e 19 58	[- 5]	e 34 17	SKSP	e 20 19	pPKP
San Juan	162.3	318	19 56	[- 7]	26 47	[-20]	24 26	PP
Balboa Heights	E. 176.5	15	e 19 59	[-13]	—	—	—	—

Additional readings :-

Malabar iN = +2m.45s.
 Medan iE = +3m.16s., iN = +3m.59s.
 Perth PP = +4m.26s., PPP = +4m.35s., i = +5m.42s. and +6m.6s., SS = +10m.19s.,
 SSS = +10m.29s., P_cS = +10m.49s.
 Hong Kong SS = +12m.56s.
 Calcutta isSN = +13m.25s.
 Hyderabad SSN = +13m.15s., S_cSN = +16m.55s.
 Bombay iN = +7m.37s., isP = +8m.6s., iPP = +8m.42s., iP_cPEN = +9m.28s., sSEN =
 +14m.13s.
 Agra iPP = +9m.9s., iP_cPE = +9m.21s., iE = +10m.46s., S_cPE = +13m.6s., P_cSE =
 +13m.18s., sSE = +14m.22s., iE = +14m.54s., isSSE = +16m.30s., S_cSE =
 +17m.14s.
 Adelaide iE = +22m.29s.
 Melbourne i = +16m.43s. and +17m.20s.
 Tananarive iPE = +9m.29s., ePP = +11m.26s., eSS = +20m.39s.
 Riverview iN = +26m.50s. and +27m.30s.
 Tifis eZ = +13m.37s., PPE = +14m.11s., ePPPZ = +15m.23s., iPPP = +15m.41s.,
 sSZ = +21m.10s., sSE = +21m.20s., SSZ = +24m.39s.
 Christchurch iEZ = +11m.29s. and +21m.4s.
 Ksara i = +11m.47s., PS = +21m.34s.
 Wellington i = +11m.35s.
 Helwan e = +11m.59s. and +12m.26s., i = +14m.14s., e = +14m.59s., PS = +22m.9s.,
 e = +22m.47s. and +23m.2s.

Continued on next page.

Bucharest PPPEN = +17m.45s., S = +22m.53s.
Belgrade IZ = +13m.5s.
Kecskemet eP,PfZ = +13m.10s., eZ = +14m.54s.
Budapest iSN = +23m.53s., iN = +24m.24s.
Ogyalla ePE = +13m.29s., eSN = +23m.59s., eN = +25m.5s., eE = +25m.21s.
Triest e = +16m.39s., SKKS = +24m.24s., S = +24m.49s.
Potsdam eN = +13m.17s., iE = +13m.20s., eE = +16m.35s., ePPPE = +19m.5s., eE = +19m.59s., eZ = +20m.59s., eSKKSE = +24m.11s., eSKKSN = +24m.17s., eNZ = +24m.59s.?, iN = +27m.7s., eN = +28m.35s., eZ = +28m.59s.?, eN = +30m.29s. and +32m.11s.
Copenhagen PP = +17m.4s., e = +19m.5s. and +20m.53s., SKSE = +23m.5s., PS = +25m.35s.
Jena ePN = +12m.24s. and +12m.29s., eE = +28m.41s.
Hamburg ePS = +26m.53s., ePPSN = +27m.19s., ePKKPN = +22m.32s.
Stuttgart eZ = +13m.59s., ePPP = +20m.16s., ePS = +26m.35s.
Strasbourg iPP = +14m.22s., eS = +24m.50s.
Uccle iEZ = +17m.56s., eSN = +25m.14s., ePS = +26m.32s.
Kew IZ = +27m.1s., eE = +28m.3s.
Oxford iN = +25m.40s.
Jersey eS = +24m.44s., PS = +27m.26s.
Rathfarnham Castle i = +42m.14s.
Granada PPP = +21m.44s., PPS = +43m.28s.
Toledo e = +37m.41s.
Scoresby Sund +13m.4s., +22m.45s., +28m.5s., and +28m.59s.
Berkeley ePKPE = +21m.19s., eSKPE = +22m.35s., ePPE = +26m.25s., eE = +33m.21s.
Pasadena ePPZ = +21m.45s., iSKPE = +22m.50s., iPKSZ = +23m.7s., eZ = +31m.40s. and +38m.17s.
Mount Wilson iPKPNZ = +19m.19s., iPKSZ = +23m.6s.
Riverside iZ = +19m.34s.
Tucson iPKP = +19m.31s., isPKP = +19m.59s., i = +20m.12s., +21m.5s., and +21m.29s., PP = +22m.23s., ipPP = +22m.43s., isPP = +23m.15s., ipPKS = +23m.23s., i = +23m.39s., isPKS = +23m.45s., fPP = +25m.39s.
Ottawa SS = +40m.59s.
Harvard eL₀E = +66m.
Weston eSKPZ = +23m.14s.
Fordham IZ = +19m.48s., eZ = +20m.4s., iZ = +23m.30s., eE = +24m.18s. and +25m.30s.
St. Louis i = +19m.55s., eE = +20m.17s. and +20m.31s.
Philadelphia ePP = +23m.19s., ePSKS = +33m.19s., ePKP,PKP, = +40m.53s.
La Paz iPKP,N = +20m.32s., SKPZ = +23m.33s., iPPN = +24m.12s., iZ = +25m.6s., iSKKSN = +30m.59s., iSKSPZ = +33m.56s., iSKSPN = +34m.16s., iN = +37m.8s., iSSN = +44m.20s., iSSS = +49m.44s.
Fort de France PP = +20m.32s., PPP = +20m.41s., SS = +25m.1s., SSS = +25m.16s.
Huancayo esPKP = +20m.32s., PKP, = +20m.56s., ePKP, = +21m.23s., esPKP, = +21m.37s., PP = +24m.39s., sPP = +25m.9s., i = +25m.52s. and +26m.17s., PPP = +28m.32s., i = +29m.34s., +30m.9s., +31m.24s., +32m.34s., +32m.55s., and +33m.43s., ePSKS = +34m.35s., i = +35m.12s., ePFS = +38m.12s., i = +41m.34s. and +45m.2s., esSS = +45m.29s., i = +46m.44s., SSS = +50m.51s., i = +58m.51s.
San Juan i = +52m.2s. and +58m.4s.
Long waves were also recorded at Bidston, Bergen, and La Plata.

Aug. 25d. Readings also at 0h. (Ksara, Mount Wilson, Pasadena, Riverside, Tucson, Toledo, Huancayo, Balboa Heights, San Juan, La Paz, and Fort de France), 1h. (Tchikment, Apia, Tucson, Riverside, Pasadena, and Mount Wilson), 2h. (Tiflis), 4h. (Mount Wilson, Pasadena, Riverside, Tucson, Tinemaha, Haiwee, Cape Girardeau, and Grozny), 6h. (Frunse and Andijan), 7h. (Padova, Belgrade, Sofia, Trieste, Bucharest, and near Ksara), 8h. (Ksara, Wellington, Christchurch, and Brisbane), 9h. (Tiflis), 12h. (Apia), 13h. (Mizusawa), 14h. (La Paz and Samarkand), 15h. (Andijan and near San Javier), 16h. (La Paz), 19h. (Huancayo and La Paz), 20h. (Samarkand), 22h. (near Manila), 23h. (Hukuoka B and near Koti).

Aug. 26d. Readings at 3h. (Amboina), 5h. (Ksara), 7h. (Ksara, Agra, Baku, Tiflis, Sverdlovsk, Tashkent, Moscow, and Helwan), 8h. (near Tananarive), 9h. (Ksara and near San Javier), 10h. (College), 15h. (Moncalieri), 18h. (De Bilt, Hyderabad, Calcutta, Agra, Bombay, Tashkent, Ksara, Moncalieri, Tiflis, and Baku), 19h. (Koti, Weston, near Fordham, and Williamstown).

Aug. 27d. Readings at 1h. (Apia), 4h. (Sverdlovsk and Tashkent), 5h. (Mount Wilson, Pasadena, Riverside, and Tucson), 7h. (Christchurch), 8h. (Copenhagen), 9h. (Huancayo and near La Paz (2)), 10h. (Batavia and near Malabar), 12h. (near Christchurch), 14h. (Sverdlovsk, Tashkent, La Paz, near Andijan (2), and Frunse (2)), 15h. (Moncalieri and Columbia), 16h. (Florence), 17h. (Wellington), 18h. (Sverdlovsk and Tashkent), 19h. (Andijan), 20h. (Mount Wilson and Tucson), 21h. (near Ferndale), 22h. (Harvard (2), Philadelphia (2), near Fordham (2), Weston (2), Williamstown (2), and near Berkeley), 23h. (near Medan).

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Aug. 28d. 21h. 3m. 3s. Epicentre 71°0'N. 18°0'W. (as on 1938 Aug. 8d.).

A = +3115, B = -1012, C = +9448; $\delta = -8$; $h = -12$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	1.4	248	0 50	S	(0 50)	+ 4	—	—
Bidston	18.9	153	e 4 25	+ 1	—	—	—	e 8.9
Copenhagen	20.2	125	e 4 36	- 3	8 14	- 7	—	9.9
Oxford	20.8	151	e 4 46	+ 1	—	—	—	e 9.6
Kew	21.2	149	e 4 44	- 5	—	—	—	e 9.9
Hamburg	21.4	131	e 4 57	+ 6	—	—	—	e 14.9
De Bilt	21.7	140	e 4 48	- 7	8 33	- 18	—	e 9.9
Pulkovo	22.3	96	e 5 10	+ 9	9 9	+ 7	—	e 10.7
Uccle \	22.7	144	e 5 0	- 4	e 9 4	- 5	—	e 10.9
Potsdam	23.3	128	e 4 57?	- 13	e 8 57?	- 23	—	e 10.9
Paris	24.3	147	—	—	e 8 57	- 40	—	12.9
Cheb	25.2	132	—	—	e 9 57?	+ 5	—	e 14.9
Strasbourg	25.5	138	e 5 30	- 2	e 9 57	0	—	e 13.4
Stuttgart	25.7	137	e 5 31	- 2	e 10 0	- 1	—	e 13.4
Sverdlovsk	34.4	73	e 7 7	+ 16	e 12 42	+ 23	—	16.9
Tiflis	42.4	100	—	—	e 17 6	SS	—	e 21.9
Baku	45.3	95	—	—	e 18 39	SS	—	e 23.3
Ksara	46.8	114	8 57?	+ 24	—	—	—	—
Tashkent	50.7	120	—	—	i 16 42	+ 24	—	e 26.6
Tucson	60.8	284	e 10 36	+ 20	—	—	i 12 5	PP
Mount Wilson	z. 61.3	290	e 10 41	+ 21	—	—	—	—

Additional readings:—

Tashkent e = +14m.49s., +20m.20s., and +22m.18s.

Tucson i = +11m.4s.

Long waves were also recorded at Rathfarnham Castle, Ivigtut, Edinburgh, Aberdeen, Jersey, Toledo, and Stonyhurst.

Aug. 28d. Readings also at 0h. (Sverdlovsk, Ksara, Tashkent, and Manila), 2h. (near Malaga and near Tananarive), 3h. (Frunse, Samarkand, Almata, Grozny, San Juan, Weston, Agra, Tashkent, Sverdlovsk, Tiflis, and Andijan), 5h. (Tiflis, Sverdlovsk, Tashkent, Malaga, Ksara, Baku, and Helwan), 7h. (Baku and Tiflis), 9h. (Tacubaya (2) and Oaxaca), 13h. (near Tananarive), 17h. (Tashkent, Andijan, and Sverdlovsk), 18h. (Agra, Tashkent, and Sverdlovsk), 19h. (Bergen), 22h. (Apia), 23h. (Sitka).

Aug. 29d. 15h. 22m. 20s. Epicentre 11°9'N. 124°1'E.

Damage at Cataingan (Isle of Masbate), Force IX; Force VIII at Calbayog (Isle of Samar), some damage; V-VI at Legaspi; felt in the whole of Luzon, N. and W. of Samar, in N. Leyte, Bohol, Cebu, and Panay. Macroseismic radius 200-250kms.

Epicentre 12°05'N. 124°05'E. (Manila).

W. C. Repetti.

Manila Central Obs. Seismological Bulletin for 1938, July-Dec., Manila, 1939, p. 37.

A = -5488, B = +8105, C = +2049; $\delta = +8$; $h = +6$;

D = +828, E = +561; G = -115, H = +170, K = -979.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Manila	4.0	311	i 0 59k	- 5	1 51	- 1	—	—
Palau	11.2	114	2 41	- 3	5 10	SS	—	—
Tainan	11.6	343	2 56	+ 6	5 30	SSS	—	—
Miyakozima	12.8	4	3 0	- 6	6 18	L	—	(6.3)
Hong Kong	14.0	319	3 20k	- 2	5 29	- 30	—	6.4
Amboina	16.0	165	e 3 37	- 11	6 53	+ 7	13 50	PP 8.7
Nake	17.1	16	4 2	0	7 25	SS	—	—
Phu-Lien	19.0	300	4 21	- 5	7 58	+ 3	—	—
Yakusima	19.4	18	4 25	- 5	8 9	+ 5	—	12.5
Zi-ka-wei	N. 19.4	354	e 4 24	- 6	8 10	+ 6	i 6 6	? —

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	\circ		m. s.	s.	m. s.	s.	m. s.	m.
Kumamoto	21.7	16	4 56	+ 1	8 52	+ 1	—	—
Hukuoka B	22.3	15	5 18	PP	—	—	—	9.2
Simidu	22.3	21	5 7	+ 6	9 10	+ 8	—	—
Titizima	22.7	47	5 10	+ 6	9 7	- 2	—	—
Koti	23.2	21	5 10	+ 1	9 20	+ 2	—	—
Muroto	23.2	23	5 9	0	9 20	+ 2	—	13.3
Husan	23.5	10	5 11	- 1	9 31	+ 8	—	—
Siomisaki	24.0	26	5 7	-10	9 41	+ 9	—	—
Hamada	24.0	17	5 13	- 4	9 35	+ 3	6 6	PP
Talkyu	24.2	9	5 17	- 2	9 44	+ 9	—	—
Batavia	24.8	225	5 35	+10	10 1	+15	—	19.7
Kobe	24.8	23	5 19	- 6	9 55	+ 9	—	—
Osaka B	24.9	24	5 19	- 7	10 0	+13	6 29	PPP
Zinsen	25.6	4	5 31	- 1	10 5	+ 6	—	15.0
Hikone	25.7	25	5 30	- 3	10 10	+ 9	—	—
Keizyo	25.7	6	5 29	- 4	9 57	- 4	—	13.0
Nagoya	25.9	26	5 37	+ 2	—	—	—	10.1
Gihu	26.1	26	5 37	0	10 36	+29	6 36	PP
Medan	26.5	254	5 41	0	11 24	SS	—	15.7
Kohu	27.0	28	5 53	+ 8	11 10	SS	—	—
Tokyo Cent. Met. Obs.	27.6	29	6 18	PP	11 30	SS	13 30	L (13.5)
Kumagaya	27.8	27	6 21	PP	11 40	SS	—	—
Akita	31.1	25	6 21	- 1	13 8	SS	—	—
Mizusawa	31.1	26	6 24	+ 2	13 0	SS	—	—
Mori	33.3	22	6 50	+ 9	13 37	SS	—	—
Calcutta	N. 35.7	293	6 29	-33	12 37	- 2	e 7 49	PP i 18.1
Irkutsk	43.3	343	8 22	+17	14 52	+19	—	18.7
Colombo	E. 43.9	268	—	—	14 43	+ 1	—	22.7
Perth	44.3	189	8 17	+ 4	14 50	+ 2	9 53	PP 23.6
Hyderabad	44.4	284	8 19	+ 5	14 53	+ 4	9 50	PP 22.0
Agra	45.8	297	8 22	- 3	15 11	+ 2	8 40	pp
Kodaikanal	E. 45.8	273	8 24	- 1	15 14	+ 5	i 10 36	PPP i 22.2
Dehra Dun	N. 46.8	301	e 9 14?	+41	e 15 40	+16	—	e 20.1
Brisbane	48.2	145	8 40	- 4	15 40	- 3	19 22	SS
Adelaide	48.6	164	8 48	+ 1	15 52	+ 3	10 15	PP i 22.8
Bombay	49.8	286	e 8 54	- 2	16 5	- 1	i 11 12	PP
Almata	51.2	318	e 9 9	+ 2	(e 16 28)	+ 3	(e 11 8)	PP 16.5
Riverview	52.3	151	i 9 17 _a	+ 2	16 46	+ 6	i 21 31	SSS e 29.9
Sydney	52.3	151	e 9 9	- 6	16 42	+ 2	e 20 9	SS e 29.4
Semipalatinsk	52.5	328	e 9 14	- 3	—	—	—	—
Frunse	52.7	316	e 9 3	-15	e 15 37	-69	—	28.3
Melbourne	53.2	159	e 9 23	+ 1	16 56	+ 4	—	26.2
Tashkent	56.0	313	i 9 38	- 5	i 17 28	- 2	—	26.7
Tchinkent	56.0	314	e 9 43	0	—	—	—	—
Samarkand	57.3	310	e 9 50	- 2	e 18 0	+13	—	—
Sverdlovsk	65.7	329	i 10 45	- 3	i 19 21	-13	—	31.2
Apia	68.5	110	—	—	e 18 40?	?	—	—
Baku	70.4	310	i 11 20	+ 2	20 37	+ 7	—	34.7
Wellington	70.6	142	e 11 17	- 2	i 20 25	- 8	20 38	PS 32.7
Christchurch	70.7	145	i 11 24 _a	+ 4	i 20 42	+ 8	24 50	SS 34.4
Grozny	73.5	313	11 37	+ 1	e 20 59	- 7	—	—
Tiflis	74.2	311	11 39	- 1	21 17	+ 3	e 14 9	PP e 33.7
Erevan	74.5	309	11 44	+ 2	e 21 20	+ 3	—	—
Honolulu	74.8	71	e 11 50	+ 6	21 10	-10	e 22 3	PS 31.1
Moscow	78.3	326	i 12 2	- 1	21 52	- 7	—	41.2
College	78.5	26	e 12 58	+54	e 21 55	- 6	27 34	SS
Theodosia	80.3	315	12 17	+ 3	22 24	+ 4	—	33.7
Tananarive	81.4	249	—	—	22 31	0	—	e 34.3
Yalta	81.7	314	e 12 29	+ 7	e 22 45	+11	—	41.7
Pulkovo	81.7	330	12 23	+ 1	22 27	- 7	—	e 39.0
Simferopol	81.7	315	12 21	- 1	22 32	- 2	—	39.7
Ksara	82.0	303	i 12 27	+ 4	e 22 49	+12	15 37	PP 39.7
Istanbul	86.1	312	12 46	+ 2	23 14	[+ 6]	16 4	PP
Helwan	86.5	300	i 12 48	+ 2	i 23 16	[+ 5]	16 7	PP
Bucharest	87.4	315	e 12 54	+ 4	23 23	[+ 7]	16 17	PP 41.3

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Upsala	87.9	332	e 12 54	+ 1	i 23 22	[+ 2]	—	e 40.7
Sofia	89.8	314	e 13 3	+ 1	e 23 33	[+ 1]	e 16 40?	PP e 45.7
Belgrade	91.2	316	e 13 11k	+ 3	i 23 43	[+ 3]	e 17 7	PP e 47.9
Budapest	91.2	319	e 12 49	- 19	i 23 41	[+ 1]	24 40	S _C S e 45.7
Ogyalla	91.7	320	e 13 12	+ 2	24 16	+ 6	25 52	PS e 37.7
Copenhagen	92.0	328	13 12	0	24 15	+ 3	—	— 43.7
Bergen	93.0	335	e 23 40?	SKS	(e 23 40?)	[- 10]	—	— 43.7
Potsdam	93.1	326	13 10	- 7	e 24 16	- 6	e 25 28	PS e 37.7
Cheb	94.4	324	e 13 14	- 9	e 24 3	[+ 5]	—	— e 47.7
Jena	94.5	324	e 13 22	- 1	e 23 59	[+ 1]	—	— e 37.7
Hamburg	94.8	327	13 22	- 3	i 24 4	[+ 4]	—	— e 44.7
Göttingen	95.2	326	—	—	e 24 5	[+ 3]	—	— e 44.7
Triest	95.3	319	e 13 37	+ 10	24 4	[+ 2]	17 20	PP e 43.3
Padova	96.6	319	—	—	e 25 20	+ 28	—	— e 47.7
Stuttgart	96.8	323	e 13 34	0	e 24 0	[- 11]	e 16 46	PP e 44.7
Karlsruhe	97.2	324	—	—	e 24 16	[+ 3]	—	— e 51.7
Strasbourg	97.2	323	e 13 43	+ 7	24 10	[- 3]	e 17 43	PP e 45.7
De Bilt	97.5	327	13 39	+ 2	i 24 21	[+ 7]	e 17 40	PP e 46.7
Florence	97.7	318	e 13 59	+ 21	24 16	[+ 1]	i 34 10	SSS e 47.7
Zurich	97.8	322	e 13 38	0	e 24 11	[- 5]	e 17 27	PP —
Aberdeen	98.2	334	—	—	i 24 17	[- 1]	e 26 47	PS e 47.3
Basle	98.5	322	e 13 40	- 2	e 24 15	[- 5]	—	—
Uccle	98.6	326	e 13 43	+ 1	i 24 24	[+ 4]	e 17 45	PP e 43.7
Durham	99.4	331	—	—	i 24 28	[+ 4]	—	—
Edinburgh	99.5	333	—	—	e 24 23	[- 1]	—	— 45.7
Moncalieri	99.5	321	e 10 30	?	24 22	[- 2]	—	— 44.3
Ukiah	99.5	47	—	—	e 24 56	- 20	e 28 20	?
Stonyhurst	100.4	331	—	—	i 24 30	[+ 1]	—	— 49.7
Kew	100.7	329	e 13 52	0	i 24 38	[- 2]	i 26 44	PS e 47.7
Berkeley	100.7	47	e 17 33	PP	e 24 28	[- 2]	—	—
Paris	100.7	325	e 17 55	PP	24 33	[+ 3]	—	— 41.7
Bidston	101.0	331	—	—	i 24 36	[+ 4]	i 26 53	PS e 45.7
Oxford	101.0	329	e 19 12	PP	i 24 32	[0]	—	—
Rathfarnham Castle	102.5	333	e 12 16	?	i 24 11	[- 28]	i 27 23	PPS 48.7
Jersey	103.0	327	e 13 58	- 4	e 24 43	[+ 2]	e 18 1	PP e 50.2
Butte	103.2	36	—	—	e 24 47	[+ 5]	e 27 16	PS e 42.3
Bozeman	104.3	36	—	—	e 25 10	[+ 23]	e 28 8	PS e 42.9
Bagnères	105.1	321	e 18 43	PP	24 58	[+ 7]	e 27 52	PS 48.9
Mount Wilson	105.3	50	e 14 15	P	—	—	e 18 17	PP —
Algiers	106.5	314	e 13 40?	PP	e 24 40?	[- 17]	—	— e 51.7
Ivigtut	106.9	356	—	—	26 25	+ 7	25 4	SKS 49.7
Toledo	109.5	320	e 18 58	PP	—	—	—	— e 43.2
Almeria	110.2	317	e 19 12	PP	e 29 26	PPS	—	— e 61.4
Granada	110.8	318	e 19 55	PP	(26 52)	{+ 41}	21 0	PPP e 57.7
Malaga	111.6	318	e 19 10	PP	e 25 15	[- 3]	—	— 53.7
Tucson	111.6	48	19 19	PP	e 26 57	{+ 41}	e 21 18	PPP e 45.9
San Fernando	112.9	318	e 23 58	?	(e 26 5)	{- 20}	30 0	PPS 53.7
Averroes	115.6	316	—	—	e 25 40	[+ 6]	—	— 40.0
Chicago	119.0	26	e 22 0	PPP	e 25 40	[- 7]	e 29 56	PS —
Seven Falls	119.7	11	—	—	37 10	SSP	e 28 10	PPS 52.7
Ottawa	120.2	15	e 18 58	[+ 5]	e 25 40?	[- 10]	e 36 40?	SS 52.7
Vermont	121.7	14	e 21 5	PP	e 26 50	{- 35}	e 30 22	PS e 57.9
East Machias	122.6	8	e 20 42	PP	37 21	SS	e 23 12	PPP 58.7
Harvard	124.0	12	e 20 44	PP	37 34	SS	e 59 40	L ₀ e 64.7
Weston	124.2	12	e 19 2	[+ 1]	e 23 11	SKP	i 20 43	PP —
Fordham	124.9	15	e 20 43	PP	e 30 35	PS	—	—
Philadelphia	125.4	17	e 20 55	PP	e 26 10	[+ 3]	e 37 43	SS e 53.7
Columbia	128.5	26	e 19 0	[- 9]	e 31 25	PS	e 21 15	PP e 56.0
San Juan	148.3	17	e 19 58	[+ 13]	27 51	[+ 59]	23 59	PP e 63.5
Fort de France	153.0	10	e 20 21	[+ 29]	—	—	—	—
Huancayo	161.0	92	e 20 9	[+ 7]	44 46	SS	e 25 6	PP e 66.0
La Paz	167.2	112	e 20 13	[+ 5]	i 27 9	[- 1]	e 21 49	pPKP 79.2

For Notes see next page.

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NOTES TO AUG. 29d. 15h. 22m. 20s.

Additional readings :-

Amboina iPEN = +3m.43s., iE = +7m.47s.
Osaka B SS = +11m.42s.
Medan iPE = +5m.48s.
Mizusawa ePN = +6m.30s.
Calcutta ePPN = +8m.18s., eSSN = +15m.2s., iSSSN = +5m.39s.
Perth i = +6m.45s., ? = +7m.40s., P₀P = +9m.2s., i = +9m.15s., PPP = +10m.28s.,
P₀S = +13m.10s., SS = +18m.23s., SSS = +20m.25s., SSSS = +21m.3s.
Hyderabad S₀SE = +18m.32s.
Agra PPE = +10m.15s., eE = +13m.21s., eN = +15m.1s., sSE = +15m.52s., iE =
+16m.47s., +17m.32s., and +18m.17s., SSE = +18m.41s., SSN = +18m.53s.,
SSSE = +20m.12s.
Kodaikanal iSSE = +18m.13s., iSSSE = +19m.22s.
Brisbane iSE = +15m.46s., iE = +19m.28s.
Adelaide i = +10m.42s., +11m.27s., +12m.1s., +19m.19s., and +21m.6s.
Bombay P₀PN = +10m.7s., iN = +16m.54s., S₀SEN = +18m.58s.
Riverview iE = +9m.51s., i = +16m.57s., iN = +22m.30s., iE = +26m.30s., +27m.24s.,
and +28m.45s.
Sydney e = +27m.16s.
Melbourne e = +7m.32s., i = +17m.6s.
Thimkent e = +10m.9s., +10m.34s., and +10m.56s.
Wellington P₀P = +11m.32s., S₀S = +21m.25s., i = +22m.5s., and +22m.56s., SS =
+24m.55s., i = +25m.36s., L₀ = +29m.55s.
Christchurch SSS = +28m.6s., L₀E = +29m.57s.
Tiflis ePPZ = +16m.7s., eZ = +21m.35s., ePPSEZ = +22m.27s., eSSSN = +31m.20s.
Honolulu P = +11m.53s., S = +21m.25s., eSS = +26m.25s., SS = +26m.41s., eSSS =
+30m.12s.
Tananarivo N = +20m.28s.
Kaara ePS = +23m.34s.
Istanbul PS = +24m.29s.
Helwan e = +12m.55s., +13m.13s., and +15m.1s., i = +23m.50s. and +24m.30s.
Bucharest PSEN = +24m.5s., SSE = +29m.13s., SSSE = +32m.40s.
Upsala iS = +23m.33s.
Sofia eE = +23m.57s.
Belgrade i = +25m.26s.
Budapest ePE = +13m.13s., iSE = +23m.7s., SN = +24m.33s., ePSN = +25m.48s.,
iN = +26m.19s., eN = +27m.30s.
Ogyalla ePE = +14m.40s., iE = +23m.48s., eE = +24m.6s. and +24m.44s., SN =
+24m.52s.
Copenhagen eE = +18m.34s., SKSE = +23m.49s., PSE = +25m.4s., eE = +26m.58s.
Triest i = +24m.29s., PS = +25m.36s., SS? = +30m.41s.
Potsdam eZ = +14m.34s., +16m.22s., and +18m.28s., eN = +23m.46s., eZ =
+26m.46s., eNZ = +32m.22s.
Jena eSN = +24m.25s.
Stuttgart eEZ = +14m.0s. and +14m.59s., e = +20m.49s., ePS = +24m.55s.,
eSSSEN = +40m.10s.
Strasbourg SN = +25m.10s., PSZ = +26m.40s., SSZ = +32m.4s.
Florence i = +25m.25s. and +27m.50s.
Aberdeen e = +23m.20s., i = +25m.7s.
Uccle eZ = +16m.59s., iSN = +25m.19s., SSN = +32m.5s.
Durham iEN = +25m.48s.
Edinburgh i = +24m.28s. and +25m.42s.
Kew eZE = +19m.2s., iEN = +24m.34s., iSEN = +25m.50s., eZ = +26m.59s.
Bidston i = +24m.40s., iS = +25m.58s.
Berkeley eE = +17m.39s.
Rathfarnham Castle PP = +16m.11s., iPS = +25m.34s.
Jersey eS = +25m.45s., e = +26m.10s. and +32m.58s.
Butte eS = +26m.11s., eSS = +32m.54s., eSS = +36m.55s.
Bagnères eE = +26m.10s., +26m.47s., and +42m.40s. ?
Ivigtut +33m.40s.
Granada SKKS = +29m.31s.; reading entered as SKKS was given as PPP.
Tucson iPP = +19m.47s., S = +27m.1s., PS = +28m.54s.
San Fernando eSSN = +37m.10s.
Vermont eSS = +37m.20s.
Weston ePSN = +30m.41s., ePPSZ = +32m.11s., eSSEN = +38m.1s., eSSSN =
+43m.20s.
Fordham iE = +39m.2s.
Philadelphia eS = +29m.0s., eSSS = +42m.30s.
Columbia eSS = +38m.42s.
San Juan SSS = +48m.27s.
Huancayo ePPP = +28m.35s., iSS = +44m.54s., i = +45m.47s., +46m.31s., +49m.48s.,
and +50m.17s., eSSS = +51m.28s., i = +52m.58s.
La Paz iPKPZ = +20m.46s., SKPZ = +24m.1s., iZ = +26m.15s., iPPZ = +28m.25s.,
SKKS = +30m.52s., iN = +33m.59s., SSN = +44m.21s. and SSSN = +49m.40s.
Long waves were also recorded at Rio de Janeiro, Vladivostok, Pasadena, and La Plata.

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Aug. 29d. Readings also at 0h. (Sitka), 1h. (Malaga, Grozny, and Fort de France), 2h. (Copenhagen, Sverdlovsk, Tashkent, Frunse, and Andijan), 5h. (Sofa and near Bucharest), 6h. (Christchurch, Samarkand, Almata, Andijan, Frunse, and Tashkent), 9h. (Mizusawa and La Paz), 10h. (Andijan), 13h. (Fort de France (2)), 14h. (near Algiers), 15h. (Batavia and Taihoku), 16h. (near Hukuoka B, Husan, Taikyu, Keizyo, Zinsen, Mount Wilson, Pasadena, Tucson, Nagoya, and Koti), 17h. (Koti, Nagoya, and Mizusawa), 19h. (Tucson and Riverside).

Aug. 30d. 11h. 49m. 37s. Epicentre 3° 2S. 143° 7E. (as on 1937 April 5d.).

$A = -.8047$, $B = +.5911$, $C = -.0555$; $\delta = +2$; $h = +7$;
 $D = +.592$, $E = +.806$; $G = +.045$, $H = -.033$, $K = -.999$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.	m. s.
Palau	13.9	319	3 23	+ 2	6 49	L	—	(6.8)
Brisbane	E. 25.7	160	e 5 29	- 4	i 10 11	+10	—	—
	N. 25.7	160	i 5 23	-10	i 10 5	+ 4	—	—
Manila	28.6	310	5 59 _a	- 1	11 0	+12	—	—
Titizima	30.2	358	6 27	+13	12 26	SS	—	(15.2)
Riverview	31.3	168	e 6 27	+ 3	11 31	0	i 7 14	PP e 15.5
Sydney	31.3	168	e 6 53	+29	e 11 35	+ 4	—	e 15.6
Adelaide	31.9	188	e 6 25	- 4	i 11 35	- 5	i 7 14	PP e 14.4
Miyakozima	33.1	329	6 45	+ 5	13 3	SS	14 27	SSS
Kosyun	33.6	320	6 32	-12	—	—	8 12	PPP
Karenko	34.5	323	6 55	+ 3	—	—	8 11	PP
Melbourne	34.5	178	e 6 38	-14	12 23	+ 3	i 8 21	PPP 15.5
Yakusima	35.8	342	7 3	0	12 46	+ 5	—	—
Batavia	36.8	264	e 6 45	-26	—	—	8 51	PPP
Muroto	37.2	347	7 22	+ 7	16 3	SS	—	—
Koti	37.8	347	7 22	+ 2	—	—	16 5	Lq 17.6
Hong Kong	38.4	313	7 24	- 1	13 27	+ 7	8 59	PP 18.7
Kobe	38.6	350	7 25	- 1	13 28	+ 5	15 46	SS
Hukuoka B	38.7	342	e 7 26	- 1	—	—	—	—
Nagoya	38.7	352	e 6 58	-29	—	—	—	—
Tokyo Cent. Met. Obs.	38.8	355	7 45	+17	14 17	?	—	(16.6)
Perth	38.8	219	7 43	+15	13 20	- 6	8 53	PP 18.1
Hamada	39.4	346	7 32	- 1	13 55	+20	16 19	SS
Oiwake	39.6	355	7 38	+ 3	13 4	-34	16 15	SS
Zi-ka-wei	N. 40.3	330	e 7 38	- 2	—	—	—	—
Husan	40.5	341	7 43	+ 1	e 13 56	+ 4	—	—
Taikyu	41.4	341	e 7 52	+ 2	14 14	+ 9	e 9 49	PPP
Mizusawa	E. 42.2	358	8 0	+ 4	17 17	SS	—	—
	N. 42.2	358	7 58	+ 2	17 20	SS	—	—
Morioka	42.7	358	8 2	+ 2	14 25	+ 1	—	—
Phu-Lien	43.5	305	e 8 4	- 3	e 14 37	+ 1	—	—
Zinsen	43.5	340	18 7	0	e 14 37	+ 1	—	—
Apta	45.2	106	i 8 28	+ 8	e 15 3	+ 2	e 10 13	PP
Arapuni	45.4	144	—	—	e 15 41	PPS	19 41	Lq 22.6
Medan	45.5	279	8 22	- 1	i 15 9	+ 4	i 15 4	PS
Wellington	47.1	148	8 34	- 1	i 15 53	+25	10 21	PP 23.0
Vladivostok	47.3	349	e 8 41	+ 4	i 15 31	0	—	—
Christchurch	47.6	152	e 8 35 _a	- 4	15 31	- 4	18 45	SS 22.9
Calcutta	N. 59.8	298	e 10 24	+15	i 18 24	+ 4	i 18 56	PS e 28.2
Honolulu	62.2	64	10 25	- 1	18 59	+ 8	—	e 26.1
Colombo	E. 64.5	279	10 46	+ 5	19 27	+ 8	—	—
Irkutsk	E. 64.5	335	e 10 38	- 3	19 14	- 5	—	e 27.9
Kodaikanal	E. 67.3	283	e 10 55	- 4	i 19 50	- 4	i 20 21	PS 31.5
Hyderabad	E. 67.5	291	e 11 5	+ 5	19 59	+ 3	24 25	SS 33.6
Agra	E. 70.1	301	11 12	- 4	20 18	- 9	11 33	pP
Dehra Dun	N. 70.8	305	e 12 6 _f	+46	i 21 15	PPS	—	—
Bombay	73.0	291	e 11 36	+ 3	i 21 9	+ 9	e 14 33	PP
Almata	75.5	317	e 11 51	+ 3	—	—	—	—
Frunse	77.1	316	e 11 40	-17	—	—	—	—
Tashkent	80.5	313	i 12 16	+ 1	i 22 25	+ 3	—	e 41.0

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	e	m. s.	s.	m. s.	s.	m. s.	m.
Tchikent	80.5	314	e 12 21	+ 6	—	—	—	—
Samarkand	81.9	310	e 12 25	+ 2	e 22 25	- 11	—	—
College	83.9	24	e 12 19	- 14	e 22 53	- 3	e 31 32	SSS
Sitka	87.7	32	e 12 54	+ 2	e 23 36	+ 3	e 23 49?	PS e 35.3
Sverdlovsk	88.9	327	12 54	- 4	23 23	[- 3]	16 25	PP e 48.2
Ukiah	94.4	50	e 17 27	PP	e 23 59	[+ 1]	i 25 33	PS e 41.4
Tananarive	94.8	251	—	—	e 24 3	[+ 3]	e 30 15	SS e 49.3
Baku	95.0	309	e 13 51	+ 25	25 54	PS	17 16	PP e 48.4
Berkeley	95.1	52	e 13 28	+ 2	e 25 46	PS	17 30	PP e 43.0
Santa Barbara	z. 97.2	55	e 17 46	PP	—	—	—	—
Grozny	98.0	313	e 13 27	- 12	e 22 38	?	e 17 45	PP
Pasadena	98.5	56	e 13 38	- 4	e 23 33	[- 47]	e 17 41	PP e 43.1
Mount Wilson	z. 98.6	56	e 13 39	- 3	—	—	e 17 40	PP
Tiflis	98.8	312	e 13 41	- 2	e 24 18	[- 3]	17 47	PP e 46.4
Riverside	z. 99.2	312	e 13 41	- 4	—	—	e 17 51	PP
Moscow	101.7	326	e 13 53	- 3	24 32	[- 3]	26 57	PS 50.9
Butte	101.8	42	e 20 3	PPP	—	—	—	i 41.6
Bozeman	102.9	43	—	—	e 25 7	[+ 26]	—	e 42.4
Pulkovo	104.4	331	e 14 10	+ 2	24 47	[- 1]	33 11	SS e 43.5
Tucson	104.8	58	e 18 30	PP	e 24 42	[- 8]	e 27 24	PS e 46.8
Theodosia	105.2	315	e 14 5	P	—	—	e 18 36	PP
Yalta	106.1	315	e 17 56	PP	—	—	—	—
Simferopol	106.1	315	e 18 40	PP	—	—	—	60.4
Ksara	106.6	303	e 14 28	P	24 0	[- 57]	18 16	PKP
Istanbul	110.6	313	19 3	PP	25 18	[+ 4]	29 48	PFS
Helwan	110.9	300	18 20	[- 15]	26 23	{+ 12}	28 45	PS
Bucharest	111.7	317	e 19 25	PP	e 28 48	PS	e 22 5	PPP 47.4
Scoresby Sund	112.2	355	19 32	PP	35 2	SS	—	—
Sofa	114.2	315	e 19 29	PP	e 35 23	SS	—	—
Copenhagen	114.7	332	19 41	PP	29 17	PS	—	—
Bergen	114.8	338	—	—	e 28 23	?	—	e 53.4
Kecskemet	z. 115.0	321	e 19 45	PP	—	—	e 21 27	PPP
Budapest	115.2	321	e 19 44	PP	—	—	—	—
Belgrade	115.4	318	e 19 45k	PP	e 26 44	{+ 1}	—	i 46.7
Ogyalla	115.6	322	e 19 53	PP	—	—	—	—
Potsdam	116.7	329	e 14 59	P	e 29 35	PS	35 23?	SS e 58.4
Prague	116.7	326	e 20 3	PP	e 29 41	—	—	e 55.4
Hamburg	117.1	331	e 19 35	PP	—	—	—	e 53.4
Jena	117.8	327	e 20 2	PP	—	—	—	e 49.4
Cheb	117.9	326	e 20 14	PP	e 30 5	PS	—	e 59.4
Göttingen	118.3	329	e 20 5	PP	—	—	—	e 58.4
Triest	119.3	321	20 13	PP	e 25 59	[+ 11]	—	—
Florissant	119.5	46	e 20 5	PP	e 25 51	[+ 3]	i 29 58	PS
St. Louis	E. 119.7	46	i 20 11	PP	i 25 52	[+ 3]	i 30 0	PS
Aberdeen	119.8	338	e 21 38	?	e 30 43	PS	—	e 57.1
Chicago	120.2	42	e 20 14	PP	e 28 12	{+ 57}	36 2	SS 48.1
De Bilt	120.3	331	e 19 15	[+ 22]	e 30 13	PS	e 20 27	PP e 55.4
Stuttgart	120.3	326	e 18 55	[+ 2]	e 25 31	[- 20]	e 20 38	PP e 57.4
Karlsruhe	120.6	327	e 20 35	PP	—	—	—	e 62.0
Padova	120.6	321	e 18 23	[- 31]	e 29 23	?	—	—
Edinburgh	121.1	338	e 20 23?	PP	—	—	—	e 50.4
Strasbourg	121.2	327	e 19 16	[+ 21]	25 44	[- 10]	i 20 33	PP e 58.4
Durham	121.4	336	e 20 34	PP	i 30 35	PS	—	—
Zurich	121.3	325	e 19 10	[+ 15]	—	—	e 23 7	PPP
Uccle	121.6	331	e 20 29	PP	i 30 19	PS	e 23 11	PPP 53.4
Florence	121.8	321	e 20 41	PP	30 57	PS	i 31 23?	PPS 59.4
Basle	121.9	325	e 19 23	[+ 27]	—	—	—	—
Stonyhurst	122.4	336	e 20 53	PP	—	—	—	—
Bidston	123.0	336	e 23 13	PPP	e 30 23	PS	—	e 55.4
Kew	123.3	333	e 19 5	[+ 6]	e 27 39	{+ 3}	i 20 44	PP e 55.4

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Oxford	123.5	334	e 18 50		e 27 40	{+ 3}	—	e 53.4
Paris	123.8	329	e 20 40	PP	33 25	?	—	e 60.4
Ottawa	125.7	32	18 59	[- 5]	e 37 59	SS	—	e 49.4
Jersey	125.7	333	—	—	e 31 33	PS	—	e 58.5
Seven Falls	127.0	27	e 21 53	PP	e 38 53	SS	—	e 53.4
Columbia	128.3	47	e 21 9	PP	—	—	—	e 53.1
Bagnères	128.8	325	e 15 18	PP	28 13	{+ 1}	e 21 59	PP e 59.4
Philadelphia	129.3	37	e 21 7	PP	28 47	{+ 32}	38 54	SS e 54.0
Fordham	129.5	35	e 19 6	[- 5]	i 31 38	PS	e 21 45	PP —
Harvard	129.8	32	i 19 19	[+ 7]	e 38 57	SS	e 21 23	PP e 60.4
Weston	130.0	32	e 19 9	[- 3]	i 39 14	SS	e 21 23	PP e 60.9
East Machias	130.4	28	e 19 9	[- 4]	e 31 26	PS	23 6	PP e 51.3
Algiers	130.8	316	e 19 23	[+ 10]	—	—	i 22 43	PP e 68.4
Toledo	133.3	324	e 19 24	[+ 6]	—	—	e 22 5	PP e 53.7
Almeria	134.3	320	e 22 58	?	—	—	—	e 70.3
Granada	134.8	322	i 19 45	[+ 24]	i 32 9	PS	i 23 6	PP —
Malaga	135.6	322	19 28	[+ 6]	—	—	22 50	PP 64.4
San Fernando	136.8	323	e 23 50	?	e 40 42	SS	e 46 5	SSS 66.4
Huancayo	138.6	111	e 19 32	[+ 4]	e 26 41	[+ 4]	e 21 58	PP e 55.2
Averroes	139.7	320	e 19 37	[+ 7]	—	—	—	e 68.4
La Paz	143.0	123	i 19 43a	[+ 7]	i 26 15	[- 29]	i 22 33	PP 67.9
Fort de France	153.0	63	e 20 14	[+ 22]	e 31 26	—	—	—
Rio de Janeiro	153.2	166	e 20 23	[+ 31]	(e 42 23)	SS	—	e 42.4

Additional readings and note. The SS reading recorded at several Japanese stations

have been entered as L.
Riverview iN = +6m.41s., iSEN = +12m.30s., iEN = +14m.13s., iE = +14m.26s. iN = +14m.30s.

Adelaide i = +6m.31s., +7m.30s., +11m.52s., +13m.10s., and +13m.43s.

Melbourne e = +7m.26s., i = +12m.6s. and +14m.30s.

Batavia iE = +7m.19s. and +9m.27s.

Hong Kong SS = +16m.16s., S₀S = +17m.41s.

Perth PPP = +9m.18s., PPPP = +9m.30s., P₀P = +9m.43s., P₀S = +13m.33s., SS = +15m.37s., SSS = +16m.6s., SSSS? = +17m.3s.

Apia eP₀C = +10m.5s., sS = +15m.35s.

Arapuni i = +17m.5s.

Medan iN = +8m.36s.

Wellington i = +9m.28s., P₀C = +9m.52s., i = +17m.11s., SS = +18m.43s., i = +19m.8s., L₀ = +20m.13s.

Christchurch i = +8m.51s., iZ = +13m.33s., i = +19m.31s., L₀? = +20.4m.

Calcutta eSSN = +22m.21s., eSSSN = +24m.12s.

Honolulu iP = +10m.38s.

Kodalkanal iSSE = +24m.33s.

Hyderabad S₀SE = +21m.3s.

Agra i = +11m.15s., i = +12m.26s., PPE = +14m.3s., PPPE = +15m.36s., sSE = +21m.2s., iE = +23m.35s., SSE = +24m.56s., SSSE = +28m.50s.

Bombay iN = +11m.44s., PSEN = +21m.45s., SSEN = +25m.41s.

Tchmkent e = +12m.35s.

Sverdlovsk iS = +23m.42s., PS = +24m.39s., SS = +29m.58s., L₀ = +41m.23s.

Baku e = +18m.1s. and +23m.43s.

Berkeley eZ = +31m.20s.

Pasadena iE = +26m.33s., eSSE = +31m.23s.

Mount Wilson eZ = +16m.49s.

Tiflis ePPZ = +20m.20s., ePSZ = +26m.47s., SSZ = +31m.58s., SSE = +32m.5s., eSSSEN = +35m.53s.

Riverside eZ = +16m.59s.

Moscow eS = +25m.17s., SS = +32m.47s.

Pulkovo S = +25m.39s.

Tucson iPP = +18m.52s., iPPP = +20m.23s., iPS = +27m.45s., PPS = +28m.39s., SS = +32m.45s.

Ksara PP = +18m.48s., ipPP = +19m.2s., PS = +28m.10s.

Helwan e = +19m.14s., SKP = +19m.29s., i = +19m.47s., +25m.25s., and +27m.48s.

Bucharest iE = +31m.5s., iEN = +31m.41s.

Scoresby Sund +30m.57s.

Sofia eN = +19m.47s.

Budapest eE = +19m.53s.

Belgrade eNW = +27m.43s. and +37m.10s.

Potsdam eEZ = +19m.53s., eZ = +22m.17s. and +32m.5s.

Jena eEN = +20m.5s., eN = +20m.11s.

Triest ePP = +20m.18s., e = +28m.19s.

Florissant eE = +26m.19s.

Continued on next page,

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De Bilt c = +37m.23s.
 Stuttgart ePZ? = +15m.31s., e = +20m.1s., +20m.50s., +22m.53s., +27m.23s., +30m.11s., and +33m.35s.
 Edinburgh e = +28m.23s.?
 Strasbourg ePZ = +15m.32s., iPPPN = +23m.5s., SKKSZ = +27m.31s., iPSN = +30m.23s.
 Florence e = +14m.53s., i = +27m.53s.
 Kew eNZ = +23m.21s., iZ = +25m.13s., e = +30m.35s., iZ = +32m.46s.
 Jersey e = +42m.24s.
 Bagnères eE = +16m.23s. and +22m.12s., PPPE = +22m.50s., eE = +23m.5s. and +24m.17s., ePPSE = +31m.47s., eSSE = +36m.11s., eSSSE = +40m.11s.
 Fordham e = +19m.15s. and +21m.29s., eE = +22m.39s., iE = +39m.8s.
 Harvard ePKSE = +22m.37s., eL₀E = +53.4m.
 Weston iPKPZ = +19m.13s., i = +22m.38s., ePPPPN = +28m.38s., eSKSPZ = +31m.54s., ePPPSZ = +34m.2s., iSSSE = +43m.59s., eL₀ = +53m.44s.
 Ottawa e = +20m.53s., eN = +32m.47s.
 Huancayo ePPP = +25m.11s., iSS = +40m.44s., SSS = +45m.22s.
 Toledo e = +21m.13s., ePP = +22m.47s.
 Granada iPPP = +25m.54s.
 San Fernando ePPN = +25m.42s., ePPPN = +26m.54s.
 La Paz iPPZ = +22m.51s., iSKPN = +23m.33s., SKKSN = +29m.49s., SKSPN = +33m.11s., SSN = +42m.37s., L₀N = +61m.23s.
 Long waves were also recorded at Ferndale, Lick, Moncalieri, Chatham IIs., and La Plata.

Aug. 30d. 17h. 8m. 37s. Epicentre 3° 7'S. 128° 7'E.

A = -.6240, B = +.7789, C = -.0640; δ = +16; h = +7;
 D = +.780, E = +.625; G = +.040, H = -.050, K = -.998.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
			m. s.	s.	m. s.	s.	m. s.	m.
Manila	19.7	337	14 36 _a	+ 2	8 17	+ 7	—	—
Batavia	21.9	263	15 2	+ 5	18 50	- 4	—	—
Hong Kong	29.5	332	6 9	+ 1	11 5	+ 3	—	—
Modan	30.9	284	5 57	- 23	—	—	—	—
Adelaide	32.4	165	16 34	0	11 47	- 1	17 25	PP 15.9
Phu-Lien	32.6	320	e 6 37	+ 2	—	—	—	—
Brisbane	33.1	138	16 41	+ 1	12 5	+ 6	—	i 17.5
Riverview	36.6	148	e 8 38	PP	e 13 1	+ 8	—	e 19.6
Sydney	36.6	148	e 8 25	PP	e 12 49	- 4	—	e 19.2
Melbourne	37.1	159	17 19	+ 5	13 10	+ 9	—	23.0
Zinsen	N. 41.0	357	e 7 51	+ 5	—	—	—	—
Keizyo	N. 41.1	358	7 50	+ 3	—	—	—	e 14.2
Calcutta	N. 47.3	306	e 8 26	- 11	15 34	+ 3	—	—
Kodalkanal	E. 52.9	286	e 9 23?	+ 3	—	—	—	—
Christchurch	55.5	142	24 19	SSS	—	—	31 31	L ₀ 34.1
Agra	E. 57.7	306	i 9 51	- 4	17 44	- 9	—	—
Bombay	59.4	294	e 10 5	- 1	e 18 13	- 2	e 13 7	PPP
Irkutsk	59.5	343	e 10 7	0	e 18 12	- 4	—	e 31.9
Tashkent	70.1	317	i 11 14	- 2	20 22	- 5	—	e 33.4
Sverdlovsk	81.3	329	i 12 20	0	e 22 28	- 2	—	37.4
Baku	83.9	310	12 35	+ 2	23 6	+ 10	—	40.4
Grozny	87.4	313	e 12 51	+ 1	23 14	[- 2]	—	—
Tiflis	87.9	310	12 53	0	e 23 37	+ 2	e 16 57	PP e 40.4
Moscow	93.7	325	e 13 17	- 3	23 55	[+ 1]	e 17 8	PP
Ksara	94.4	302	i 13 26 _k	+ 3	e 24 50	+ 18	e 17 14	PP
Pulkovo	97.4	329	e 18 43	PP	e 24 15	[+ 1]	—	—
Helwan	98.2	299	e 13 43	+ 3	e 24 23	[+ 5]	—	—
Copenhagen	107.6	327	18 53	PP	24 59	[- 3]	—	57.4
Potsdam	108.4	324	e 18 23?	PKP	e 26 23?	{+29}	29 23?	PPS e 51.4
Hamburg	109.7	326	e 19 23?	PP	—	—	—	—
Stuttgart	111.9	321	e 18 53	[+16]	e 29 59	PPS	—	e 68.4
De Bilt	112.9	325	e 19 34	PP	—	—	—	e 57.4
Strasbourg	112.9	321	e 19 32	PP	e 24 38	[-46]	e 22 14	PPP 61.4
Uccle	z. 114.0	325	e 19 23?	PP	—	—	e 29 9	PPS
Kew	116.3	326	—	—	e 26 23?	{-26}	—	—
Weston	137.5	21	e 19 27	[+ 1]	e 35 3	PPS	—	e 76.4
La Paz	154.0	142	20 0	[+ 7]	—	—	—	—
Fort de France	165.4	41	e 20 11	[+ 5]	—	—	—	78.4

For Notes see next page.

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NOTES TO AUG. 30d. 17h. 8m. 37s.

Additional readings :—

- Batavia iS?E = +9m.0s.
- Medan iE = +8m.12s., eE = +9m.19s., iN = +17m.6s. and +18m.22s.
- Adelaide i = +7m.41s., +10m.34s., and +13m.5s.
- Brisbane ePN = +6m.47s., iE = +15m.5s.
- Melbourne e = +12m.15s.
- Christchurch SN = +29m.43s.
- Bombay eEN = +10m.23s. and +11m.13s.
- Tifis ePPPZ = +18m.33s., eZ = +23m.31s., eSSSN = +33m.45s.
- Moscow PS = +25m.37s.
- Ksara ePS = +26m.0s.
- Strasbourg ePSZ = +29m.5s.
- Long waves were also recorded at Wellington.

Aug. 30d. Readings also at 0h. (Tashkent, Sverdlovsk, and Scoresby Sund), 1h. (Wellington), 2h. (Scoresby Sund), 4h. (Manzanillo and Medan), 5h. (Scoresby Sund, Bucharest, Sofia, Trieste, and Mizusawa), 6h. (Rathfarnham Castle), 9h. (Scoresby Sund), 10h. (Malabar), 13h. (Mount Wilson, Riverside, and Tucson), 14h. (Mount Wilson, Pasadena, Trieste, and Riverside), 15h. (Harvard, Tucson, and Scoresby Sund (3), near Batavia, and Malabar), 18h. (Christchurch and Wellington), 19h. (Bidston, Edinburgh, Kew, De Bilt, Copenhagen, Scoresby Sund, Sverdlovsk, and Tashkent), 20h. (Tifis and Santiago), 23h. (Fort de France).

Aug. 31d. 15h. North India.

- Dehra Dun iPN = 29m.15s., iSN = 29m.28s.
- Agra ePE = 29m.30s., P* = 29m.37s., ePE = 29m.50s., SEN = 30m.11s., S*E = 30m.21s., S₂EN = 30m.29s.
- Samarkand eP = 31m.15s., e = 32m.3s.
- Andijan eP = 31m.21s., e = 33m.53s.
- Almata e = 31m.59s. and 34m.44s.
- Tashkent iP = 32m.10s., iS = 34m.49s., L = 35m.30s.
- Frunse e = 32m.57s. and 34m.29s.
- Sverdlovsk eP = 34m.10s., e = 39m.17s., L = 43m.
- Bombay iS* = 34m.58s., iS₂ = 35m.8s., e = 35m.47s., iL = 36m.16s.
- Calcutta iN = 35m.3s.
- Moscow e = 35m.27s. and 46m.22s., eL = 49m.30s.
- Hyderabad S₂ = 35m.33s.
- Pulkovo e = 35m.49s.
- Kodaikanal eE = 37m.
- Long waves also recorded at Tifis and De Bilt.

Aug. 31d. 17h. 45m. 17s. Epicentre 3°·5S. 151°·5E.

$$A = -\cdot8772, B = +\cdot4763, C = -\cdot0606; \quad \delta = +1; \quad h = +7;$$

$$D = +\cdot477, E = +\cdot879; \quad G = +\cdot053, H = -\cdot029, K = -\cdot998.$$

A depth of focus 0·050 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	23·7	177	i 4 43	0	i 8 31	0	—	—
Riverview	30·2	180	i 5 38	- 3	i 10 9	- 5	i 6 58	pP 15·2
Sydney	30·2	180	—	—	e 10 6	- 8	e 12 25	SS e 14·9
Adelaide	33·5	198	i 6 3	- 6	i 10 57	- 8	7 16	PP
Melbourne	34·7	188	i 6 15	- 4	11 16	- 7	i 7 45	PP 18·3
Manila	35·2	302	i 6 25k	+ 1	12 29	+58	—	—
Hukuoka B	41·9	334	e 7 22	+ 4	—	—	—	—
Wellington	43·0	153	7 26	- 1	i 13 22	- 4	9 16	P _c P 18·6
Mizusawa	E. 43·5	349	7 33	+ 2	13 40	+ 6	—	—
	N. 43·5	349	7 30	- 1	13 27	- 7	—	—
Husan	43·8	333	e 7 36	+ 2	e 8 51	?	—	—
Christchurch	44·0	158	i 7 32a	- 3	i 13 31	-10	i 9 25	P _c P 18·8
Batavia	44·6	265	e 7 42	+ 2	13 48	- 1	—	—
Hong Kong	44·6	307	7 42	+ 2	13 51	+ 2	9 13	PP 19·0
Taikyu	44·6	333	7 42	+ 2	9 35	PP	—	—
Keizyo	N. 46·8	334	7 46	-11	10 0	PP	—	—
Zinsen	46·9	332	i 7 59k	+ 1	e 9 49	PP	—	—
Phu-Lien	50·2	301	e 8 22	- 1	e 9 51	?	—	—
Medan	53·3	277	8 47	+ 1	15 50	+ 1	—	—
Honolulu	55·4	61	e 9 1	0	e 16 21	+ 4	e 9 7	pP —

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Calcutta	N. 66-8	296	e 14 15	PP	i 18 38	- 2	e 14 59	PPP
Irkutsk	68-3	331	10 23	- 3	e 19 3	+ 6	11 51	pP
Hyderabad	74-9	289	—	—	20 16	+ 4	—	—
Kodaikanal	E. 75-0	281	i 11 3	- 2	—	—	—	—
Aggra	E. 77-0	299	i 11 12	- 4	e 20 24	-10	12 42	pP
Bombay	80-4	289	e 11 37	+ 3	i 21 12	+ 2	i 12 56	pP
Semipalatinsk	80-8	322	e 11 35	- 1	—	—	—	—
Almata	80-9	315	e 11 44	+ 7	—	—	—	—
Frunse	82-8	314	e 11 41	- 6	—	—	—	—
Andijan	84-1	311	e 11 56	+ 3	e 24 19	PPS	—	—
Tashkent	86-4	311	i 12 5	+ 1	i 21 56	-13	e 17 35	PPP
Samarkand	88-0	309	e 12 13	+ 1	e 22 23	- 1	—	—
Berkeley	89-2	52	i 12 19	+ 1	e 22 17	-17	i 23 47	PS
Santa Barbara	91-0	55	i 12 26	0	—	—	—	—
Pasadena	92-2	55	i 12 32k	0	e 22 35	-26	i 13 58	pP
Mount Wilson	92-3	55	i 12 33k	+ 1	—	—	i 13 56	pP
Tinemaha	92-3	53	i 12 35	+ 3	—	—	—	—
Haiwee	92-5	53	i 12 35	+ 2	—	—	—	—
Siversdole	92-9	55	i 12 35	0	—	—	e 16 20	PP
Sverdlovsk	93-4	326	i 12 35	- 2	i 22 31	-40	i 16 28	PP
Tucson	98-3	57	i 13 2	+ 3	24 5	+12	14 22	pP
Baku	101-1	310	13 13	+ 1	33 58	SSS	e 18 12	PP
Grozny	103-8	313	e 13 27	P	e 23 31	[+ 3]	—	—
Tiflis	104-8	312	13 27	P	26 9	PS	e 14 55	pP
Moscow	106-2	327	13 34	P	23 56	[+17]	15 6	pP
Pulkovo	108-3	332	13 42	P	23 46	[- 2]	15 11	pP
Theodosia	110-7	316	18 41	PP	—	—	—	—
Ksara	113-1	304	e 14 8	P	34 14	SS	e 15 28	pP
Upsala	113-7	337	e 19 43?	PP	—	—	—	—
Florissant	113-9	48	i 19 16	PP	e 26 30	SKKS	e 28 59	PS
St. Louis	N. 114-1	48	e 26 14	SKKS	e 28 40	PS	e 36 33	SS
Istanbul	116-4	315	20 6	PP	30 6	PPS	—	—
Bucharest	117-2	319	e 19 23	PP	e 24 26	[+ 3]	e 22 22	PPP
Bergen	117-7	342	—	—	e 26 43?	?	30 43?	PPS
Helwan	117-8	301	e 19 28	PP	e 24 28	[+ 4]	—	—
Copenhagen	118-5	335	18 7	[+ 1]	e 28 27	PS	19 25	PP
Potsdam	120-4	332	i 19 42	PP	e 31 31	PPS	—	—
Hamburg	121-0	335	e 18 13	[+ 2]	—	—	e 19 47	PP
Ottawa	121-4	36	e 18 13	[+ 2]	—	—	e 19 47	PP
Jena	122-0	330	e 18 13	[0]	—	—	e 19 55	PP
Cheb	122-2	330	e 19 43?	PP	—	—	—	—
Seven Falls	123-3	33	—	—	e 27 13	SKKS	36 25	SS
Edinburgh	123-9	343	e 20 13	PP	—	—	—	—
De Bilt	124-1	335	e 18 18	[+ 1]	e 31 50	PPS	e 20 8	PP
Triest	124-2	325	e 20 10	PP	i 24 49	[+ 3]	e 30 8	PS
Williamstown	124-3	37	i 18 19	[+ 2]	—	—	i 20 1	PP
Durham	E. 124-4	341	e 20 9	PP	—	—	—	—
Philadelphia	124-4	42	e 20 2	PP	e 29 3	PS	—	—
Stuttgart	124-6	330	e 18 19k	[+ 1]	e 24 46	[- 1]	20 12	PP
Fordham	124-9	40	e 18 21	[+ 3]	i 29 7	PS	20 13	PP
Strasbourg	125-4	331	e 18 21	[+ 2]	—	—	19 46	pPKP
Uccle	125-4	335	e 18 21	[+ 2]	e 32 0	PPS	e 20 4	PP
Harvard	125-5	37	i 18 21a	[+ 2]	e 36 43	SS	e 20 17	PP
Weston	125-7	37	i 18 21a	[+ 2]	e 41 49	SSS	i 20 44	PP
Zurich	125-9	329	e 18 22	[+ 2]	—	—	e 20 23	PP
Bidston	126-0	342	e 22 19	PP	e 29 18	?	e 32 8	PPS
Kew	126-7	337	e 19 46	PP	e 29 16	PS	e 32 1	PPS
Oxford	126-8	339	e 20 22	PP	—	—	i 32 8	PPS
Paris	127-7	334	e 21 45	PP	e 24 57	[+ 1]	—	—
Huancayo	130-0	108	e 18 35	[+ 7]	25 21	[+19]	i 38 10	SS
La Paz	136-1	118	i 18 45	[+ 6]	25 38	[+23]	20 8	pPKP
Toledo	137-6	331	e 18 45	[+ 3]	—	—	e 21 40	PP
Almeria	139-1	327	e 18 34	[-11]	—	—	—	—
Granada	139-4	328	i 18 52	[+ 7]	—	—	21 3	PP
Malaga	140-2	329	e 21 55	PP	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
			m. s.	s.	m. s.	s.	m. s.	m.
San Juan	140.3	64	e 18 48	[+ 1]	e 40 14	SS	e 23 45 pPKS	—
Averroes	144.4	328	i 18 56	[+ 1]	e 32 39	PS	e 21 6 PP	—
Fort de France	145.9	69	i 19 1	[+ 3]	i 20 27	PP	—	—

Additional readings:—

Riverview iPcPE = +8m.55s., isS = +12m.31s., iE = +13m.33s., iN = +14m.5s., iE = +14m.42s., iScSN = +16m.15s.
 Adelaide i = +7m.35s., +7m.39s., +11m.3s., +12m.3s., +13m.31s., +15m.4s., +15m.49s., and +19m.43s.
 Melbourne i = +8m.27s., +14m.8s., and +16m.38s.
 Wellington iZ = +8m.31s., i = +14m.21s., SS = +15m.27s., ScS = +16m.36s.
 Christchurch L_q = +16m.13s., ScS = +17m.12s.
 Hong Kong ? = +13m.2s., SS = +16m.0s.
 Honolulu is = +16m.25s., sS = +18m.23s.
 Calcutta iN = +19m.40s. and +20m.59s.
 Irkutsk e = +10m.39s., +14m.43s., +20m.15s., +21m.15s., and +22m.15s.
 Agra PpPE = +11m.29s., pPcPE = +13m.11s., PPE = +14m.7s., PPPE = +15m.59s., iE = +22m.9s., sSE = +22m.57s., SSE = +25m.8s., SSSE = +27m.50s.
 Bombay esPEN = +13m.37s., eEN = +14m.47s., eE = +16m.41s., esSEN = +23m.43s.
 Tashkent i = +22m.11s., PS = +23m.49s., sS = +14m.30s., sPS = +25m.27s., sSS = +29m.54s.
 Berkeley eZ = +13m.39s., eE = +24m.55s.
 Pasadena eZ = +13m.51s., iZ = +14m.53s., iPPZ = +16m.17s., eZ = +17m.29s.
 Mount Wilson iPEZ = +16m.17s., eZ = +17m.29s.
 Sverdlvsk e = +14m.32s., iPP = +17m.30s., i = +18m.16s., iPS = +25m.1s., isS = +25m.43s., e = +27m.43s.
 Tucson i = +13m.51s. and +14m.9s., iPP = +17m.2s., ipPP = +18m.27s., SKS = +23m.9s., SP = +25m.27s., i = +25m.31s., ePS = +26m.7s., esS = +26m.16s., i = +29m.29s., eSS = +30m.56s., i = +38m.55s.
 Baku PPP = +20m.0s., eSP = +25m.52s.
 Tiflis PP = +17m.54s., PPP = +19m.9s., sPPZ = +19m.44s., sPPE = +19m.51s., PPPZ = +20m.11s., PPPE = +20m.17s., eE = +22m.14s., iE = +23m.35s., sSNZ = +27m.22s., eZ = +28m.29s., eSSN = +31m.26s., esSN = +34m.18s.
 Moscow PP = +17m.59s., sPP = +19m.57s., PPP = +20m.25s., SP = +26m.17s., PS = +27m.25s., sPS = +29m.5s.
 Pulkovo e = +15m.42s., ePKP = +17m.54s., iPP = +18m.17s., iPPP = +20m.4s., SP = +27m.14s., sS = +27m.42s., PS = +27m.58s.
 Ksara eSP = +16m.6s., iPP = +18m.56s., PPS = +29m.46s.
 Florissant eEN = +28m.17s., eN = +28m.56s., iEN = +31m.0s.
 St. Louis eN = +27m.8s., +28m.0s., +30m.40s., and +34m.15s.
 Bucharest eE = +21m.8s., eN = +26m.47s., eE = +27m.4s., eEN = +28m.23s., eE = +30m.58s.
 Helven e = +20m.52s. and +21m.19s.
 Copenhagen eZ = +20m.43s., e = +21m.25s. and +23m.49s., eE = +27m.8s. and +29m.13s., e = +31m.1s., eZ = +32m.16s.
 Potsdam eEZ = +21m.25s., eNZ = +23m.55s.
 Hamburg eZ = +21m.43s.
 Ottawa e = +27m.13s. and +35m.55s.
 De Bilt iZ = +22m.4s.
 Philadelphia ePSKS = +30m.0s.
 Stuttgart eZ = +19m.48s., e = +22m.1s., +22m.56s., +26m.42s., +28m.56s., and +31m.49s.
 Fordham eE = +21m.30s., iZ = +22m.9s.
 Strasbourg eZ? = +14m.46s., iPPZ = +20m.20s., epPP = +21m.23s., i = +22m.14s., ipPPP = +24m.52s.
 Uccle iZ = +20m.19s. and +22m.13s.
 Harvard ePKSZ = +22m.11s., eScSPE = +29m.11s.
 Weston iZ = +19m.4s., i = +20m.15s., iZ = +20m.24s., ISS?EN = +36m.52s.
 Zurich e = +20m.38s.
 Oxford i = +21m.42s.
 Kew iZ = +20m.23s., eN = +21m.41s.
 Huancayo SKP = +21m.30s., ipPP = +22m.4s., pPKS = +23m.27s., sSS = +40m.27s.
 La Paz iSKP = +21m.44s., PPZ = +22m.50s., iZ = +24m.28s., PPPN = +26m.28s., iZ = +31m.22s.
 Toledo e = +28m.2s. and +36m.59s.
 Granada PP = +22m.19s., i = +23m.42s. and +37m.41s.
 Averroes e = +22m.8s. and +26m.54s.

Aug. 31d. Readings also at 2h. (near Mizusawa), 3h. (Tucson, Haiwee, near Ferndale, Mount Wilson, Pasadena, Riverside, and near Santa Barbara), 4h. (near Fort de France), 5h. (Rathfarnham Castle), 6h. (Tucson), 8h. (near Ksara), 10h. (near Batavia and Malabar, near Nagoye, and near Samarkand), 11h. (Agra, Calcutta, and near Balboa Heights), 12h. (Butte and Williamstown), 15h. (La Paz), 16h. (Tucson, Mount Wilson, Pasadena, and Riverside), 17h. (Sverdlvsk and Tashkent), 19h. (Balboa Heights), 20h. (Branner, Fresno, and near Lick), 21h. (Tucson and near Lick), 23h. (Fort de France).

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September 1d. 2h. 54m. 9s. Epicentre 24°·1N. 123°·1E. (as on 1938 Feb. 13d.).

A = -·4991, B = +·7656, C = +·4061; $\delta = +16$; $h = +4$;
D = +·838, E = +·546; G = -·222, H = +·340, K = -·914.

	Δ	Az.	P.	O-C.	S.		O-C.	Supp.		L.
					m. s.	s.		m. s.	s.	
Taihoku	1·6	303	i 0 30	0	0 52	+ 1		i 0 32	P _r	—
Zi-ka-wei	7·1	352	1 47	- 1	i 3 53	S _r		—	—	—
Hong Kong	8·4	259	2 1	- 5	3 2	-41		—	—	3·4
Manila	9·7	193	2 23	+ 1	5 20	S _r		—	—	6·9
Hukuoka B	11·4	32	3 0	PP	—	—		—	—	—
Husan	12·1	24	3 9	PP	e 6 38	L		—	—	(6·6)
Taikyu	12·6	21	i 3 15	PP	7 43	L		—	—	(7·7)
Koti	13·1	42	3 31	PPP	6 25	L		—	—	(6·4)
Zinsen	13·7	12	e 3 27	+ 9	e 6 16	SSS		—	—	e 7·5
Keizyo	n. 13·8	13	3 27	+ 8	e 7 47	L		—	—	(7·8)
Phu-Lien	15·6	260	e 3 38	- 5	e 6 44	+ 7		—	—	—
Medan	31·2	234	e 7 8	PP	e 13 36	SSS		—	—	—
Irkutsk	31·6	358	e 6 27	+ 1	e 11 36	+ 1		—	—	e 18·3
Calcutta	n. 31·9	275	e 10 5	?	e 14 5	SSS		—	—	e 15·6
Batavia	e. 34·0	210	8 29	PPP	i 12 18	+ 5		—	—	—
Agra	e. 40·6	285	i 7 39	- 4	—	—		19 14	PP	—
Semipalatinsk	42·2	321	e 7 55	- 1	—	—		—	—	—
Alma \dot{a}	42·3	310	e 8 21	+24	—	—		—	—	—
Bombay	46·9	274	e 10 28	PP	e 18 24	SS		—	—	—
Tashkent	47·7	305	1 8 38	- 2	e 15 45	+ 9		—	—	24·7
Samarkand	49·3	303	8 54	+ 1	e 15 30	-29		—	—	—
Sverdlovsk	55·1	325	i 9 35	- 3	17 11	- 7		27 33	L _q	33·4
Baku	62·4	305	10 28	+ 1	e 19 6	+13		—	—	e 32·3
Grozny	64·9	309	e 10 46	+ 3	—	—		—	—	—
Tiflis	65·9	307	10 47	- 3	e 19 35	- 2		e 13 33	PP	39·9
Moscow	68·0	324	11 0	- 3	e 19 51	-11		—	—	34·3
Pulkovo	70·9	329	e 11 18	- 3	e 20 28	- 8		—	—	e 34·0
Ksara	74·8	300	e 11 44	0	e 21 22	+ 2		e 14 36	PP	—
Istanbul	77·5	310	12 1	+ 2	—	—		—	—	—
Bucharest	78·3	314	e 12 5	+ 2	—	—		—	—	49·9
Helwan	79·8	298	i 12 11	- 1	e 22 9	- 5		22 58	PS	—
Copenhagen	81·2	328	12 19	0	22 27	- 2		—	—	41·9
Potsdam	82·6	325	i 12 26	0	i 22 39	- 4		—	—	e 40·9
Hamburg	83·6	328	e 12 27	- 5	—	—		—	—	e 42·9
Triest	85·6	319	e 12 37	- 4	e 23 3	[- 2]		—	—	—
Stuttgart	86·6	323	e 12 46	0	e 23 9	[- 3]		—	—	e 47·9
De Bilt	86·8	328	12 46	- 1	e 23 14	[+ 1]		—	—	e 42·9
Strasbourg	87·5	324	i 12 51	0	—	—		—	—	e 50·9
Uccle	88·0	327	e 12 53	0	e 23 33	- 3		e 29 41?	SS	43·9
Edinburgh	88·2	333	—	—	e 22 51?	[- 31]		—	—	e 48·9
Rome	88·3	314	—	—	e 23 34	- 5		—	—	—
Kew	89·9	329	e 13 0	- 2	—	—		—	—	e 47·9
Mount Wilson	z. 97·9	47	e 17 38	PP	—	—		—	—	—
Tucson	103·9	45	e 18 21	PP	—	—		—	—	—
Harvard	112·4	11	—	—	e 30 9	PPS		e 52 51?	L _q	e 63·9
Weston	112·5	11	—	—	e 30 16	PPS		e 43 52	?	—
La Paz	z. 167·0	56	20 17	[+10]	—	—		—	—	99·8

Additional readings:—

Zi-ka-wei iE = +4m.9s. and +4m.12s., iN = +4m.39s., iE = +5m.13s.

Medan S?E = +16m.25s., S?N = +16m.29s.

Tiflis ePSZ = +20m.3s., ePSE = +20m.7s., eSSN = +24m.40s., eE = +32m.26s.

Ksara ePS = +22m.0s.

Bucharest eNE = +12m.53s.

Long waves were also recorded at Rathfarnham Castle, Florence, Paris, Aberdeen, Bidston, Granada, Stonyhurst, Prague, Cheb, Philadelphia, Toledo, Bergen, Karlsruhe, and Moncalieri.

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Sept. 1d. 10h. 56m. 16s. Epicentre 36°0N. 139°9E.

(as on 1937 Feb. 12d. and given by Tokyo Imp. Univ.).

A = -6203, B = +5223, C = +5852; $\delta = +3$; $\lambda = 0$.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	
	°	°	m. s.	s.	m. s.	s.	m. s.	s.
Tokyo, Imp. Univ.	0.3	201	0 11	0	0 19	+ 1	—	—
Komaba	0.4	207	0 13	0	0 21	0	—	—
Mitaka	0.5	220	0 13	- 1	0 22	- 1	—	—
Titibu	0.7	269	0 38	S	(0 38)	+10	0 48	?
Kiyosumi	0.9	165	0 38	S	(0 38)	+ 4	0 52	?
Koyama	1.0	229	0 38	S	(0 38)	+ 2	0 52	?
Yosiwara	1.3	230	0 38	+13	0 57	+13	—	—
Susaki	1.5	209	0 24	- 4	0 46	- 3	—	—
Nagoya	2.5	251	0 45	P*	1 22	+ 8	—	—
Mizusawa	E. 3.3	17	e 0 43	-10	e 1 28	- 7	—	—

Sept. 1d. 22h. 48m. 21s. Epicentre 12°6N. 89°3W.

A = +0119, B = -9761, C = +2168; $\delta = -8$; $h = +6$;
D = -1.000, E = -0.12; G = +0.03, H = -0.217, K = -0.976.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Merida	N. 8.3	357	i 1 59	- 5	—	—	—	—
Balboa Heights	10.3	110	i 2 34	+ 2	i 5 1	S*	i 3 11	P* 5.9
Tacubaya	11.7	307	i 2 54	+ 3	—	—	—	—
Guadalajara	N. 15.7	303	e 3 47	+ 3	—	—	—	—
Columbia	22.6	18	5 6	+ 3	9 14	SS	e 5 20	PP 9.6
San Juan	23.1	73	i 5 10	+ 2	i 9 13	- 3	i 5 49	PPP i 9.8
Cape Girardeau	24.6	0	e 5 21	- 2	i 9 41	- 1	i 5 50	PP —
St. Louis	25.9	358	i 5 36	+ 1	i 10 5	+ 1	i 6 8	PP (e 14.2)
Port de France	27.4	84	i 5 51	+ 2	e 14 11	L	—	—
Tucson	27.8	319	i 5 53k	0	e 10 44	+ 9	i 6 45	PP —
Huancayo	28.1	151	e 5 57k	+ 2	i 10 46	+ 6	e 6 51	PP i 11.8
Chicago	29.2	1	6 1	- 4	e 10 53	- 5	—	— 12.6
Philadelphia	30.0	23	i 6 14a	+ 2	i 11 2	- 8	i 6 52	PP i 11.8
Fordham	31.2	23	i 6 23	0	i 11 31	+ 2	—	—
Williamstown	33.1	24	i 6 40	0	i 12 0	+ 1	—	—
Riverside	33.3	315	i 6 41k	0	i 13 16	S ₀ P	e 8 17	PPP —
Harvard	33.5	25	i 6 43	0	i 12 6	+ 1	e 7 48	PP e 22.3
Weston	33.5	25	e 6 44	+ 1	e 12 6	+ 1	e 7 51	PP e 16.3
Mount Wilson	33.9	315	i 6 46k	- 1	i 13 18	S ₀ P	i 9 23	P _c P —
Pasadena	33.9	315	i 6 46k	- 1	e 12 7	- 4	i 9 22	P _c P e 15.0
Ottawa	34.7	17	6 52	- 1	12 22	- 2	—	— 17.1
Halwee	34.9	319	e 6 55	0	e 12 31	+ 4	—	—
Santa Barbara	35.1	315	i 6 58	+ 1	e 12 33	+ 3	e 8 39	PPP —
Tinemaha	35.6	320	i 7 2k	+ 1	e 17 22	S ₀ S	i 9 29	P _c P —
La Paz	35.7	144	i 6 59k	- 3	i 12 23	-16	i 7 47	PP 15.4
Fresno	36.4	317	e 7 7	- 1	e 13 18	+28	—	—
Shawinigan Falls	36.6	20	7 9	- 1	12 41	-12	8 27	PP 17.6
East Machias	37.2	27	i 7 22	+ 7	i 13 8	+ 6	i 8 41	PP i 15.9
Bozeman	37.8	336	e 7 16	- 4	e 13 9	- 2	—	e 21.3
Seven Falls	37.8	21	7 21	+ 1	13 9	- 2	8 53	PP 18.7
Lick	38.0	318	e 7 22	+ 1	e 13 22	+ 8	—	—
Berkeley	38.7	318	e 7 24	- 3	e 13 24	- 1	—	—
Butte	38.7	336	e 7 28	+ 1	e 13 45	+20	e 9 19	PPP e 19.1
Ukiah	40.0	318	e 7 37	- 1	e 13 42	- 2	—	e 16.1
Saskatoon	41.8	345	7 52	- 1	—	—	—	— 18.6
Seattle	44.5	330	e 8 31	+16	e 14 18	-33	—	— 17.8
La Plata	55.8	149	9 38	- 3	17 27	- 1	—	— 29.6
Sitka	56.5	333	e 9 42	- 4	e 17 41	+ 4	—	e 31.7
Ivgitut	56.9	233	9 48a	- 1	e 17 38	- 4	13 14	PPP —
Rio de Janeiro	57.3	128	e 9 49	- 3	e 17 45	- 2	—	e 28.5

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
College	65.6	338	e 10 37	-11	e 19 27	-6	e 14 47	PPP e 24.8
Honolulu	65.7	289	0 10 48	0	—	—	—	e 27.9
Scoresby Sund	70.7	20	11 20	0	20 33	-1	14 7	PP e 32.6
Averoes	76.5	59	11 52	-2	e 21 43	+4	—	e 32.6
San Fernando	77.1	56	e 12 6	+9	e 22 22	PS	—	36.6
Edinburgh	77.5	36	e 11 59	0	i 21 45	-5	—	—
Bidston	77.7	38	—	—	e 21 59	+7	e 22 17	PS e 36.6
Aberdeen	78.0	35	—	—	e 21 51	-4	e 22 12	PS
Stonyhurst	78.1	38	e 12 7	+5	e 21 54	-2	i 22 27	PS e 36.6
Toledo	78.4	53	i 12 5	+1	e 22 1	+1	e 15 6	PP 33.5
Durham	78.5	37	i 12 2	-2	i 21 52	-9	e 15 2	PP
Malaga	78.5	55	e 12 2	-2	e 22 7	+6	—	37.6
Oxford	79.0	40	e 12 6	-1	e 22 18	+12	—	e 37.0
Granada	79.1	55	i 12 11	+3	—	—	e 14 54	PP 36.3
Kew	79.6	40	i 12 10	0	e 22 5	-7	e 15 12	PP e 36.6
Almeria	80.1	55	e 12 19	+6	e 22 25	+7	—	e 43.0
Bergen	81.4	30	e 12 25	+5	e 22 39	+8	—	e 46.6
Paris	81.8	43	e 15 37	PP	22 39	+4	—	34.6
Uccle	82.7	40	e 12 26	-1	i 22 46	+2	e 15 39	PP e 38.6
De Bilt	82.9	39	12 29	+1	22 50	+4	—	e 38.6
Strasbourg	85.3	42	i 12 41	+1	i 23 4	[+2]	i 16 2	PP e 40.3
Basle	85.4	43	e 12 43	+3	e 23 6	[+2]	—	—
Hamburg	85.4	37	e 12 36	-4	i 23 4	[0]	i 16 5	PP e 43.6
Göttingen	85.9	39	e 12 42	-1	—	—	—	e 52.6
Zurich	86.1	43	e 12 42	-2	—	—	—	—
Copenhagen	86.2	34	12 45	+1	23 10	[+1]	16 5	PP e 41.6
Stuttgart	86.2	42	i 12 43	-1	e 23 8	[-1]	16 12	PP e 40.6
Potsdam	87.5	38	12 52	+1	e 23 15	[-2]	e 16 21	PP e 41.6
Upsala	87.5	29	e 12 51	0	e 23 14	[-3]	—	—
Cheb	87.8	40	i 12 53	+1	e 23 22	[+3]	—	e 41.6
Florence	88.9	46	13 3	+5	23 22	[-4]	—	42.6
Prague	89.1	39	e 12 55	-3	e 23 33	[+7]	—	e 38.6
Triest	90.0	43	13 7	+4	i 23 34	[+1]	e 16 36	PP e 43.9
Rome	90.3	48	13 6	+2	i 23 37	[+2]	—	i 30.6
Pulkovo	93.3	26	e 13 20	+2	23 49	[-2]	e 16 41	PP e 42.0
Belgrade	94.7	43	e 13 26a	+2	i 24 0	[+1]	e 26 23	PPS e 54.2
Bucharest	98.6	41	e 16 3	PP	24 19	[-1]	—	47.6
Moscow	98.8	27	13 43	0	24 19	[-2]	e 17 52	PP 47.1
Istanbul	102.0	43	14 4	+7	24 44	[+7]	27 51	PPS
Simferopol	103.2	36	—	—	24 43	[+1]	—	—
Sverdlovsk	106.5	16	i 14 19	P	24 58	[+1]	e 18 40	PP 48.6
Helwan	109.0	53	—	—	i 25 15	[+7]	—	—
Ksara	110.4	47	e 14 40	P	e 35 2	SS	i 19 12	PP
Tiflis	111.4	35	e 14 43	P	e 25 19	[+1]	19 18	PP e 43.6
Baku	115.1	33	e 19 46	PP	25 44	[+12]	22 7	PPP 52.0
Tashkent	122.8	18	20 31	PP	26 6	[+7]	31 58	PPS e 55.6
Agra	E. 138.6	15	i 19 40	[+12]	i 23 2	SKP	—	—
Manila	139.6	310	e 19 21	[-9]	23 31	SKP	22 21	PP
Bombay	144.1	28	i 19 36	[-1]	i 29 45	{ 0}	23 27	SKP
Calcutta	145.0	1	i 19 43	[+4]	i 23 18	SKP	—	—
Kyderabad	N. 147.8	20	i 19 49	[+5]	—	—	—	—
Kodaikanal	E. 153.8	28	e 20 7	[+14]	—	—	—	—
Colombo	E. 158.5	27	e 19 39?	[-20]	—	—	—	—
Medan	162.1	334	e 20 7	[+4]	—	—	—	—
Batavia	E. 162.8	291	e 20 2	[-1]	i 26 32	[-35]	—	—

Additional readings :-

Columbia PP = +5m.23s.

San Juan i = +5m.20s.

Cape Girardeau iN = +5m.26s. and +5m.30s., eN = +6m.22s. and +6m.50s., iSN = +9m.45s., eSSN = +10m.49s.

St. Louis ePPP = +6m.35s., eS₀PE = +8m.46s., eEN = +10m.47s., eSSE = +11m.15s., eP₀PN = +12m.45s.

Fort de France PP = +8m.6s., PPP = +9m.16s.

Tucson i = +6m.18s., iPPP = +7m.3s., i = +8m.4s., +9m.5s., and +9m.8s., S = +10m.54s., i = +11m.27s., +14m.59s., and +15m.20s.

Continued on next page.

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Huancayo iP = +6m.0s., iPPP = +6m.56s., i = +10m.24s., i = +11m.1s.
 Chicago S = +11m.11s.
 Philadelphia iP = +6m.28s., iS = +11m.25s., i = +11m.43s.
 Fordham iZ = +6m.34s. and +9m.20s.
 Williamstown i = +6m.50s., +6m.59s., and +9m.21s.
 Riverside iPcPZ = +9m.23s., eScSEN = +17m.12s.
 Weston iZ = +6m.53s., ePPPN = +8m.8s.
 Pasadena iScPZ = +13m.18s., eScSN = +17m.17s.
 Santa Barbara ePcPZ = +9m.27s., eScPZ = +13m.23s., eScSE = +17m.21s.
 Tinemaha eScPZ = +13m.24s.
 La Paz iPPP = +8m.23s., iN = +12m.59s., iSSN = +14m.23s.
 East Machias iS = +12m.44s.
 Berkeley iZ = +7m.28s., eZ = +10m.41s., eE = +31m.28s., eZ = +13m.33s., eN = +17m.51s.
 Ukiah iS = +13m.49s.
 Seattle eP = +8m.54s.
 Ivigtut +24m.21s.
 Scoresby Sund ? = +15m.46s., +21m.19s., +25m.3s., and +29m.3s.
 Averroes e? = +11m.40s., e = +12m.15s., +20m.48s., +21m.3s., eS? = +21m.26s.
 San Fernando ePSN = +18m.10s.
 Edinburgh e = +12m.15s.
 Toledo e = +27m.11s.
 Durham iPcPN = +12m.12s.
 Kew iZ = +12m.27s., ePSEN = +22m.26s.
 Uccle e = +24m.52s., eSS = +28m.9s., eSSS = +31m.27s.
 Strasbourg iSN = +23m.7s.
 Copenhagen PS = +24m.28s., SS = +28m.57s.
 Stuttgart ePcP = +13m.2s., eSS = +29m.21s.
 Potsdam eE = +24m.39s.
 Florence i = +15m.9s.
 Trieste PS = +24m.19s.
 Rome iS = +23m.55s.
 Ksara ePS = +23m.40s., ePKP.PKP = +38m.2s.
 Tiflis ePPPZ = +21m.1s., SKSEZ = +25m.24s., eSKKSZ = +26m.4s., PPSNZ = +29m.5s., SSE = +34m.59s., eSSN = +35m.4s., ePPPZ = +37m.3s.
 Tashkent SKKS = +27m.38s., SSS = +41m.57s.
 Medan ePE = +18m.57s., ePN = +19m.12s., iE = +19m.16s.

Sept. 1d. Readings also at 1h. (Nagoya), 2h. (Williamstown, Weston (3), Harvard, and San Juan), 4h. (Tucson and Balboa Heights), 5h. (Mizusawa), 6h. (Taihoku and La Paz), 7h. (Taihoku, Tacubaya, Sverdlovsk, Ksara, and Tashkent), 13h. (Tucson (2), Riverside, and Mount Wilson), 14h. (Branner, Fresno, and Lick), 16h. (Huancayo and La Paz), 17h. (Huancayo and La Paz), 19h. (Yalta), 20h. (Sebastopol, San Juan, Harvard, and Weston (2)), 22h. (Triest), 23h. (Christchurch, Wellington, Strasbourg (2), Uccle (2), Stuttgart (2), and near Andijan).

Sept. 2d. Readings at 1h. (Fort de France, Tucson, Mount Wilson, Pasadena, and Riverside), 4h. (Balboa Heights), 5h. (Andijan, Samarkand, La Paz, and Rome), 11h. (Tucson, Mount Wilson, Pasadena, La Paz, Riverside, and near Belgrade), 15h. (Fordham), 16h. (San Juan), 20h. (Bombay, Calcutta, Tashkent, Baku, Grozny, Tiflis, Ksara, Sverdlovsk, Pulkovo, Moscow, and Ukiah), 21h. (Riverview).

Sept. 3d. 4h. 45m. 51s. Epicentre 58°0N. 34°0W.

A = +.4414, B = -.2978, C = +.8464; $\delta = -9$; $h = -8$;
 D = -.559, E = -.829; G = +.702, H = -.473, K = -.532.

	Δ	Az.	P.		O-C.		S.		O-C.		L.
			m.	s.	s.	m. s.	s.	m. s.			
Edinburgh	16.9	82	e 3	57	- 2	—	—	—	—	e 8.1	
Durham	E. 18.2	85	e 4	14	- 2	—	—	—	—	—	
Kew	20.4	93	i 4	38	- 3	—	—	—	—	10.1	
De Bilt	23.0	86	e 5	12	+ 5	e 9	16	+ 2	e 11.1	—	
Uccle	23.2	91	e 5	10	+ 1	e 9	13	- 5	e 11.1	—	
Hamburg	Z. 24.8	80	e 5	23	- 2	—	—	—	—	—	
Copenhagen	25.1	74	5	27	- 1	9	55	+ 4	12.1	—	
Strasbourg	26.3	91	e 5	48	+ 9	c 10	25	+14	e 13.2	—	
Stuttgart	26.9	90	e 5	44	- 1	c 10	29	+ 9	e 14.1	—	
Potsdam	27.0	80	—	—	—	e 8	9	?	e 14.1	—	
Zurich	27.5	93	e 5	44	- 6	—	—	—	—	—	
Fordham	E. 30.5	254	e 7	47	PPP	—	—	—	—	—	
Sverdlovsk	46.9	49	e 8	35	+ 1	—	—	—	—	19.1	
Ksara	51.6	86	e 9	11	+ 1	e 16	2	-29	—	—	

Long waves were also recorded at Scoresby Sund, Ivigtut, Harvard, Philadelphia, Aberdeen, Bidston, Rathfarnham Castle, Jersey, Tashkent, and Moscow.

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Sept. 3d. 23h. 58m. 12s. Epicentre 36°4N. 141°1E. (as on 1938, June 29d.).

Strong at Mito; moderate at Onahama, Kakioka, Kumagaya, and Tsubasan; slight at Tokyo.

Epicentre 36°4N. 141°0E. Macroseismic radius 200-300km. See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1938, Tokyo, 1940.

A = -6279, B = +5067, C = +5908; $\delta = +5$; $h = 0$;
D = +628, E = +778; G = -460, H = +371, K = -807.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Mito	0.5	268	0 11k	- 3	0 21	- 2	---	---
Onahama	0.6	343	0 12k	- 3	0 19	- 7	---	---
Tyosi	0.7	196	0 15a	- 2	0 26	- 2	---	---
Kakioka	0.8	257	0 17k	- 1	0 27	- 4	---	---
Tsubasan	0.8	257	0 17k	- 1	0 28	- 3	---	---
Utunomiya	1.0	279	0 20k	- 1	0 33	- 3	---	---
Tokyo, Cen. Met. Obs.	1.3	237	i 0 28k	+ 3	0 45	+ 1	---	---
Tokyo, Imp. Univ.	1.3	237	0 25	0	0 41	- 3	---	---
Aidu	1.4	326	0 23k	- 4	0 38	- 8	---	---
Hukushima	1.4	339	0 23k	- 4	0 40	- 6	---	---
Komaba	1.4	237	0 24	- 3	0 40	- 6	---	---
Kumagaya	1.4	260	0 25k	- 2	0 42	- 4	---	---
Katsuma	1.5	211	0 37	P _g	0 55	S _g	---	---
Mitaka	1.5	240	0 27	- 1	0 45	- 4	---	---
Yokohama	1.5	231	0 31	+ 3	0 48	- 1	---	---
Maebasi	1.6	270	0 29	- 1	0 49	- 2	---	---
Misaki	1.7	224	0 27	- 4	0 52	- 2	---	---
Titubu	1.7	256	0 27	- 4	0 50	- 4	---	---
Mera	1.8	215	0 38	P _g	1 3	S _g	---	---
Sendai	1.9	355	0 19k	-15	0 39	-20	---	---
Yamagata	2.0	342	0 29	- 6	---	---	---	---
Koyama	2.0	239	0 27	- 8	0 55	- 7	---	---
Hunatu	2.1	245	0 37	0	1 4	0	---	---
Oiwake	2.1	268	0 36	- 1	1 1	- 3	---	---
Ito	2.2	229	0 46	P _g	1 12	S _g	---	---
Kohu	2.2	249	0 39k	+ 1	1 9	+ 3	---	---
Misima	2.2	234	0 39	+ 1	1 11	+ 5	---	---
Numadu	2.2	235	0 38	0	1 8	+ 2	---	---
Niigata	2.3	313	0 39	- 1	1 17	S _g	---	---
Nagano	2.3	277	0 41	+ 1	1 11	+ 2	---	---
Yosiwara	2.3	238	0 27	-13	0 55?	-14	---	---
Takada	2.4	287	0 41	0	1 9	- 3	---	---
Matumoto	2.5	266	0 43	0	1 11	- 3	---	---
Iida	2.8	252	0 46	- 1	1 18	- 4	---	---
Mizusawa	2.9	0	0 45	- 3	i 1 13	-11	---	---
Omaesaki	3.0	232	0 54	+ 4	1 31	+ 4	---	---
Hamamatu	3.2	239	0 58k	P*	1 32	0	---	---
Toyama	3.2	275	0 51	- 1	1 36	+ 4	---	---
Husiki	3.3	277	0 56	+ 3	1 42	S*	---	---
Miyako	3.3	12	0 49	- 4	1 29	- 6	---	---
Morioka	3.3	1	0 48	- 5	1 26	- 9	---	---
Akita	3.4	346	0 56	+ 1	1 36	- 1	---	---
Hatidyojima	3.4	198	0 58	+ 3	1 34	- 3	---	---
Nagoya	3.5	250	0 59	+ 2	1 39	- 1	---	---
Wazima	3.5	289	0 54	- 3	1 39	- 1	---	---
Kanazawa	3.6	274	0 58	0	1 41	- 1	---	---
Gihu	3.7	256	0 59	- 1	1 49	+ 4	---	---
Ibukisan	3.9	256	1 5	+ 3	1 57	S*	---	---
Hatinohe	4.1	4	1 3	- 2	---	---	---	---
Hikone	4.1	255	1 3	- 2	1 51	- 4	---	---
Kamayama	4.1	249	1 10	P*	2 11	S*	---	---
Tu	4.1	247	1 22	P _g	2 15	S _g	---	---
Aomori	4.4	357	1 6	- 4	2 0	- 2	---	---
Kyoto	4.6	254	1 7	- 5	2 18	S*	---	---
Yagi	4.7	248	1 24	P*	2 14	+ 4	---	---

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	e	o	m. s.	s.	m. s.	s.	m. s.	m.
Miyadu	4.8	262	1 16	+ 1	2 17	+ 5	—	—
Osaka	4.9	252	1 22	+ 5	2 29	S*	—	—
Kobe	5.1	252	1 16	- 4	2 35	S*	—	—
Toyouka	5.2	262	1 21	0	2 40	S*	—	—
Wakayama	5.3	247	1 24	+ 2	2 45	S*	—	—
Hakodate	5.4	357	2 23	+59	3 32	+64	—	—
Sumoto	5.5	250	1 31	+ 6	2 56	S*	—	—
Mori	5.7	356	1 20	- 8	2 23	-12	—	—
Tokusima	5.8	249	1 54	P*	3 38	S*	—	—
Muroto	6.4	244	2 3	P*	3 31	S*	—	—
Sapporo	6.7	1	2 2	P*	—	—	—	—
Matuyama	7.3	252	1 52	+ 2	3 46	S*	—	—
Asahigawa	7.4	8	3 4	S	(3 4)	-14	—	—
Hirosima	7.4	257	1 48	- 4	3 47	S*	—	—
Hamada	7.5	260	3 5	S	(3 5)	-15	3 47	S*
Nemuro	7.7	24	1 44	-12	3 8	-17	—	—
Kumamoto	9.3	250	3 22	P*	5 38	S*	—	—
Sverdlovsk	55.5	319	e 19 31	- 8	e 17 12	-12	—	23.8
Moscow	67.6	323	e 11 18	+17	—	—	—	e 32.3
Tiflis	71.0	308	e 11 14	- 8	—	—	—	e 33.8

Additional readings:—

Tokyo 1 = +39s.

Long waves were also recorded at Uccle, Copenhagen, Ksara, Baku, and De Bilt.

Sept. 3d. Readings also at 0h. (Mount Wilson, Riverside, and Tucson), 6h. (Scoresby Sund, Ivigtut, Harvard, Edinburgh, De Bilt, Uccle, Strasbourg, Paris, Copenhagen, Tiflis, and Sverdlovsk), 7h. (Tashkent and near Manila), 8h. (Balboa Heights, Branner, Fresno, near Berkeley, Lick, and San Francisco), 9h. (Zurich), 11h. (near Manila), 12h. (Sverdlovsk and Tashkent), 16h. (Mount Wilson, Pasadena, Riverside, and Tucson), 18h. (near San Javier).

Sept. 4d. 19h. 21m. 40s. Epicentre 13°.5N. 120°.0E.

A = -4864, B = +8424, C = +2320; $\delta = +5$; $h = +6$;
D = +866, E = +500; G = -116, H = +201, K = -973.

Scale IV at Cullion and Batangas; III at Manila and Santa Cruz Is. 13°.5N. 122°.0E.

W. C. Repetti, Seismological Bulletin of Manila Central Observatory, 1938, July-Dec., p.40.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Manila	1.4	44	10 29 _a	+ 2	0 56	+10	—	—
Hong Kong	10.3	328	2 34	+ 2	4 31	+ 1	2 43	PP
Phu-Lien	14.7	301	e 3 34	+ 3	—	—	—	—
Medan	23.2	247	5 16	+ 7	e 11 21	L	—	(e 11.4)
Batavia	23.5	215	e 5 20	+ 8	—	—	—	e 14.3
Calcutta	N. 31.4	292	i 10 9	?	i 11 39	+ 7	—	e 15.7
Colombo	E. 40.0	264	e 7 50	+12	—	—	—	—
Hyderabad	E. 40.2	281	7 42	+ 2	13 49	+ 1	—	—
Irkutsk	E. 40.7	345	e 7 45	+ 1	13 54	- 1	—	20.8
Agra	E. 41.5	296	9 31	PP	i 14 3	- 4	—	—
Kodaikanal	E. 41.7	271	e 7 47	- 5	i 14 20	+10	i 19 30	PP
Bombay	45.5	283	i 8 23	0	i 15 7	+ 2	i 10 13	PP
Andijan	49.5	312	9 7	+13	16 24	+22	—	—
Tashkent	51.9	313	i 9 12	0	i 16 30	- 5	—	e 25.7
Sverdlovsk	62.2	328	i 10 23	- 3	i 18 50	- 1	—	28.3
Baku	66.3	309	e 10 55	+ 3	i 19 45	+ 3	—	32.5
Grozny	69.4	312	e 11 23	+11	—	—	—	—
Moscow	74.7	325	11 40	- 3	21 13	- 6	—	41.8
Ksara	77.8	302	e 12 2	+ 1	e 22 16	PS	e 23 0	PPS
Pulkovo	78.3	329	e 12 2	- 1	e 21 52	- 7	—	e 37.5

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	Δ o	Az.	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Istanbul	82.0	311	—	—	e 22 20? -17	—	—	—
Helwan	82.3	298	e 12 24	-1	e 22 38 -2	e 15 38	PP	—
Upsala	84.5	331	e 18 20?	PPP	—	—	—	—
Sofia	85.8	312	—	—	e 22 7 [-59]	—	—	—
Budapest	87.4	318	e 13 5	+15	—	—	—	—
Copenhagen	88.6	328	13 2	+ 6	e 23 38 -4	—	—	44.3
Potsdam	89.4	325	e 12 56	- 4	e 23 44 -5	e 24 20?	PS	e 50.3
Prague	89.5	322	—	—	e 23 47 -3	—	—	—
Bergen	90.0	333	—	—	i 23 53 -1	—	—	e 48.3
Cheb	90.7	323	—	—	e 23 20? [-17]	—	—	e 53.3
Hamburg	90.7	326	e 13 8	+ 2	e 23 34 [-3]	—	—	e 48.3
Stuttgart	93.1	321	e 13 15	- 2	e 24 20 -2	e 17 5	PP	e 48.3
Chur	93.7	320	e 13 17	- 3	—	—	—	—
Rome	93.7	313	—	—	(e 23 57) [+3]	e 30 58	SS	e 47.3
De Bilt	94.0	325	—	—	e 24 8 [+12]	e 30 50	SS	e 47.3
Strasbourg	94.1	322	e 13 22	0	e 24 33 +2	e 17 11	PP	e 46.3
Zurich	94.1	320	e 13 20	- 2	—	e 17 21	PP	—
Basle	94.6	320	e 13 22	- 2	—	—	—	—
Uccle	95.0	325	e 13 23	- 3	e 24 27 -11	e 17 24	PP	e 47.3
Edinburgh	96.2	331	—	—	e 24 20? [+12]	—	—	e 50.3
Kew	97.2	327	—	—	e 24 20? [+7]	—	—	e 50.3
Toledo	105.7	318	e 18 38	PKP	—	—	—	58.5
Fort de France	151.9	2	e 20 12	[+22]	—	—	—	—

Additional readings :—

Hong Kong S? = +5m.56s.

Medan iN = +5m.26s.

Batavia PZ = +5m.24s., iPN = +5m.28s., iEZ = +6m.42s.

Calcutta iN = +10m.43s., eN = +10m.56s., iN = +14m.39s.

Agra SSSE = +17m.19s.

Stuttgart eSS = +30m.38s.

Rome records S as ePP.

Zurich e = +13m.34s.

Uccle e = +31m.34s.

Long waves were also recorded at Vladivostok, Aberdeen, Bidston, Stonyhurst, and Puy de Dôme.

Sept. 4d. 20h. Undetermined shock :—

Manila iP,Z = 19m.51s. a S_gEN = 20m.15s.

Mizusawa ePE = 24m.57s., ePN = 24m.59s., eSN = 26m.18s., iSE = 26m.21s.

Vladivostok i = 27m.32s., eL = 31m.

Irkutsk e = 30m.14s. and 35m.0s., L = 40m.30s.

Ksara e = 31m.54s., 35m.23s., and 42m.12s.

Sverdlovsk e = 32m.35s., L = 52m.

Tashkent iP = 32m.44s., iS = 40m.53s., L = 54m.12s.

Pasadena eZ = 34m.11s., iZ = 34m.24s. and 34m.41s.

Riverside eZ = 34m.14s., iZ = 34m.26s., eZ = 34m.43s.

Mount Wilson iZ = 34m.25s.

Copenhagen iP = 34m.39s. k, L = 60m.

Tucson P = 34m.45s., i = 35m.0s.

Potsdam eNZ = 34m.48s., eL = 66m.

Hamburg eZ = 34m.54s.

Strasbourg e = 35m.17s., eL = 64m.

Uccle e = 35m.17s., eL = 63m.

Stuttgart eP = 35m.18s., ePP = 39m.10s., eL = 69m.

Chur eP = 35m.26s.

Zurich eP = 35m.26s.

Basle eP = 35m.27s.

Weston iPZ? = 35m.46s.

Harvard eZ = 35m.47s., eLZ = 66m.

Long waves were also recorded at Andijan, Moscow, Baku, Prague, De Bilt, and Puy de Dôme.

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Sept. 4d. 22h. 16m. 24s. Epicentre 10°-0N. 44°-0W.

A = +.7085, B = -.6842, C = +.1725; $\delta = -14$; $h = -3$;
D = -.695, E = -.719; G = +.124, H = -.120, K = -.985.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Fort de France	17.4	287	e 3 56	-10	—	—	—	—
San Juan	23.0	294	e 4 57	-10	—	—	—	—
La Paz	N. 35.6	221	7 48	PP	—	—	—	—
Weston	N. 40.2	329	—	—	e 12 56	-52	e 15 16	? 18.6
Uccle	56.7	34	—	—	e 17 16	-24	—	e 24.6
Strasbourg	57.7	38	e 9 51	-4	—	—	—	e 24.6
De Bilt	57.8	33	i 9 49	-6	e 17 36	-18	—	e 25.6
Rome	58.6	48	e 10 20	+19	e 18 2	-2	—	—
Stuttgart	58.7	38	e 9 56	-6	e 17 56	-10	—	e 36.6
Hamburg	z. 61.1	33	e 10 14	-4	—	—	—	—
Tucson	65.2	302	10 41k	-4	—	—	—	—
Mount Wilson	z. 71.3	303	e 11 17	-6	—	—	—	—
Helwan	72.4	62	11 39	+9	—	—	—	—
Ksara	76.1	58	e 12 2	+11	e 23 36	?	e 14 56	PP
Sverdlovsk	89.6	32	13 5	+4	—	—	—	37.6

Additional readings:—

San Juan i = +5m.2s.

Tucson i = +10m.46s.

Long waves were also recorded at Toledo, Puy de Dôme, Kew, Bidston, Potsdam, Copenhagen, Tashkent, and Harvard.

Sept. 4d. Readings also at 0h. (Hukuoka B), 4h. (Copenhagen, Moscow, Sverdlovsk, Almata, Triest, Andijan, Frunse, and Tiflis), 5h. (La Paz), 6h. (Mount Wilson, La Paz, and Tucson), 7h. (Mizusawa), 9h. (Yalta and near Sebastopol), 10h. (La Paz), 11h. (near Ferndale), 12h. (Merida), 14h. (Fort de France), 15h. (near Wellington), 19h. (Rathfarnham Castle and near Batavia), 20h. (Harvard and Tucson), 21h. (Copenhagen, Sverdlovsk, Tashkent, Weston, Tucson, Mount Wilson, Pasadena, Riverside, and Mizusawa), 22h. (Guadalajara).

Sept. 5d. 14h. 42m. 26s. Epicentre 56°-0S. 147°-0W.

A = -.4712, B = -.3060, C = -.3273; $\delta = +9$; $h = -8$;
D = -.545, E = +.839; G = +.694, H = +.451, K = -.562.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Chatham IIs.	22.3	291	—	—	10 34	SSS	—	e 13.6
Christchurch	28.5	279	5 51a	-8	i 10 39	-7	11 44	L _a 13.6
Wellington	28.9	285	5 57	-6	10 44	-9	6 42	PP 13.9
Riverview	47.2	271	e 8 40	+4	i 15 28	-1	—	e 19.8
Sydney	47.2	271	e 8 37	+1	i 15 22	-7	—	e 20.6
Melbourne	47.8	263	e 8 46	+5	15 34	-4	i 20 37	SSS
Brisbane	51.0	279	11 40	PP	16 10	-12	e 19 40	SS
Adelaide	53.1	261	e 12 26	PPP	i 16 50	-1	—	e 24.7
Perth	67.9	246	17 31	?	20 26	+25	24 44	SS 32.6
Huancayo	69.9	82	i 11 22	+7	i 20 38	+14	i 25 5	SS
La Paz	70.3	91	i 11 26k	+9	i 21 16	PS	—	23.6
Rio de Janeiro	78.7	114	—	—	e 19 34	?	—	e 39.6
Riverside	z. 93.1	24	i 13 16	-1	—	—	e 17 6	PP
Pasadena	93.1	23	e 13 15	-2	e 23 24	[-27]	e 16 57	PP e 43.4
Tucson	93.1	30	i 13 18	+1	e 43 58	SSS	i 17 3	PP i 46.5
Mount Wilson	93.2	23	i 13 18	+1	—	—	i 17 6	PP
Haiwee	95.1	23	e 13 23	-3	—	—	—	—
Berkeley	95.9	19	—	—	e 24 52	+6	—	—
Tinianaha	95.9	22	i 13 30	0	—	—	—	—
Ukiah	96.9	18	—	—	25 4	+10	—	—
Fort de France	99.8	79	—	—	e 27 2	PS	—	e 50.9
San Juan	100.1	72	e 14 11	+22	—	—	—	—
Manila	103.1	277	—	—	i 24 43	[+1]	32 54	SS
Bozeman	105.7	25	—	—	e 33 9	SS	—	—
Chicago	109.7	42	—	—	e 26 58	S	—	—

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Philadelphia	113-2	52	—	—	e 29 11	PS	—	—
Weston	116-9	54	—	—	e 29 46	PS	36 32	SSP
Harvard	116-9	54	—	—	e 29 46	PS	—	e 62-6
Ottawa	117-6	48	—	—	e 29 58	PS	e 36 34?	SSP
Seven Falls	120-8	50	—	—	e 37 10	SSP	—	42-6 64-6
Calcutta	N. 127-6	254	—	—	e 38 21	SS	—	—
Bombay	132-3	235	i 22 49	PP	—	—	—	—
Irkutsk	139-8	295	e 23 11	PP	—	—	—	—
Averroes	144-1	110	e 19 43	[+ 6]	—	—	e 23 11	SKP
San Fernando	N. 147-2	109	e 20 4	[+21]	—	—	—	—
Malaga	148-3	110	20 9	[+24]	—	—	—	77-6
Granada	149-1	110	i 19 54 _a	[+ 8]	—	—	i 24 35	PP
Andijan	150-2	255	e 19 53	[+ 5]	—	—	—	e 73-6
Toledo	150-9	107	e 19 52	[+ 3]	—	—	—	75-5
Scoresby Sund	152-4	35	19 51	[0]	—	—	23 39	PP
Tashkent	152-3	254	—	—	30 54	{+23}	44 4	SSP
Helwan	153-9	176	i 19 59	[+ 6]	—	—	—	e 70-3
Rathfarnham Castle	157-3	79	—	—	i 25 34	?	—	—
Ksara	157-7	187	i 19 36k	[-22]	e 37 28	PPS	e 23 48	PP
Puy de Dôme	158-7	105	e 20 45	[+46]	e 44 40	SS	—	e 77-9
Oxford	159-5	87	e 24 8	PP	—	—	—	e 75-6
Stonyhurst	159-6	81	—	—	c 32 4	{+54}	—	e 87-6
Edinburgh	159-9	75	e 24 44	PP	—	—	—	e 81-6
Kew	159-9	89	i 20 4	[+ 4]	—	—	c 24 29	PP
Paris	160-2	98	e 24 34?	PP	—	—	—	e 67-6 79-6
Rome	160-6	133	e 20 28	[+27]	e 31 36	{+20}	i 24 56	PP
Baku	160-8	223	e 20 5	[+ 3]	e 45 4	SS	—	67-6
Basle	162-2	107	e 20 8	[+ 5]	—	—	—	—
Uccle	162-2	94	i 20 5k	[+ 2]	—	—	i 24 42	PP
Zurich	162-7	109	e 20 3	[0]	—	—	e 24 45	PP
Chur	162-8	112	e 20 9	[+ 6]	—	—	—	—
Strasbourg	162-9	104	i 20 8	[+ 4]	e 27 0	[- 7]	i 24 48	PP
De Bilt	163-3	91	i 20 8	[+ 4]	—	—	e 24 44	PP
Stuttgart	163-8	107	20 8	[+ 4]	e 26 28	[-39]	24 52	PP
Triest	164-1	122	24 38	PP	e 33 48	?	28 35	PPP
Sverdlovsk	164-7	285	i 20 59	[+54]	e 31 29	{- 7}	e 37 59	PPS
Cheb	166-3	107	e 20 51	[+44]	—	—	i 25 5	PP
Hamburg	166-5	90	e 20 2	[- 5]	—	—	e 25 4	PP
Prague	167-4	110	—	—	e 30 20	?	—	e 83-6
Potsdam	167-8	98	e 20 4	[- 4]	e 27 34	[+24]	i 25 11	PP
Copenhagen	168-4	82	20 10	[+ 2]	—	—	e 25 14	PP
Pulkovo	176-0	21	e 20 9	[- 3]	—	—	—	83-6
Moscow	177-5	267	20 11	[- 1]	e 32 35	{- 4}	e 25 44	PP

Additional readings:—

Chatham Is. i = +11m.58s.

Christchurch iEZ = +5m.58s., iPCP = +8m.56s., iPCSEZ = +12m.54s., iNZ = +14m.8s.,

S_cSEZ = +16m.32s., iEZ = +17m.46s.

Wellington i = +6m.29s. and +11m.11s., SS = +11m.51s., i = +12m.21s., L_a =

+12m.54s.

Melbourne i = +17m.5s., e = +22m.19s.

Brisbane iE = +17m.10s. and +18m.10s., iN = +19m.58s.

Perth PP = +19m.34s., S = +24m.32s., SS = +28m.40s.

Huancayo e = +7m.49s., +20m.55s., +21m.22s., +25m.20s., +21m.34s., and

+32m.40s.

Tucson i = +13m.31s., +13m.34s., +14m.2s., +17m.21s., +23m.53s., +24m.30s.,

+25m.39s., and +42m.34s.

Berkeley eE = +10m.22s., eZ = +12m.35s. and +24m.19s.

Manila iN = +10m.56s.

Averroes ePKP = +20m.5s. and +20m.11s., eE = +40m.46s., eSSE = +43m.46s.

Granada i = +26m.46s.

Toledo e = +20m.0s., i = +20m.4s. and +20m.30s.

Tashkent eS = +33m.47s., PS = +36m.31s., SSS = +49m.4s.

Helwan i = +20m.22s.

Kew iPKP_z = +20m.46s.

Paris e = +12m.34s.?

Rome iE = +20m.47s., i = +28m.44s., iSKKS? = +30m.12s., SS = +41m.55s.?

Continued on next page.

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Baku $e = +20m.49s.$ and $+28m.45s.$, PPS = $+36m.7s.$, SSS = $+46m.40s.$
 Uccle IPKP₂ = $+20m.53s.$
 Zurich $e = +21m.0s.$
 Strasbourg IPKP₂Z = $+21m.2s.$, ePPPZ = $+27m.36s.$, PSKSZ = $+35m.14s.$, SSE = $+45m.4s.$
 De Bilt IZ = $+21m.2s.$
 Stuttgart ePKP₂ = $+21m.6s.$, ePPP = $+28m.34s.$, eSKSP = $+35m.22s.$, ePPS = $+38m.34s.$, eSS = $+44m.34s.$
 Trieste ePSKS = $+36m.17s.$
 Sverdlovsk $i = +18m.4s.$, $e = +24m.39s.$ and $+35m.7s.$, SS = $+46m.4s.$
 Cheb $e = +34m.34s.?$
 Potsdam eE = $+20m.16s.$ and $+21m.22s.$, eE = $+25m.46s.$, eEZ = $+29m.22s.$ and $+31m.34s.?$, eE = $+37m.34s.$ and $+40m.34s.$, eZ = $+47m.34s.$
 Copenhagen = $+21m.23s.$
 Pulkovo $e = +21m.50s.$, PPP = $+25m.40s.$, $e = +28m.57s.$, SKKS = $+29m.55s.$, PPS = $+36m.22s.$
 Moscow $e = +21m.54s.$, SKKS = $+30m.34s.$, PS = $+35m.19s.$, SS = $+42m.46s.$
 Long waves were also recorded at Upsala, Bidston, Kodaikanal, College, Butte, Honolulu, and Apia.

Sept. 5d. Readings also at 0h. (Riverside, Tucson, Mount Wilson, and Pasadena), 2h. (Andijan), 7h. (Tucson, Toledo, Rome, Paris, Puy de Dôme, Averroes, and Algiers), 8h. (Manila, Strasbourg, Kew, Edinburgh, Stonyhurst, and De Bilt), 10h. (Fort de France and Tchimkent), 11h. (Mount Wilson (2), La Paz, Pasadena, Riverside, and Huancayo (2)), 12h. (Harvard and Fort de France), 13h. (Andijan and Frunse), 14h. (La Paz, Puebla, Oaxaca, Tacubaya, Guadalajara, and Tucson), 16h. (Fort de France), 18h. (Tchimkent), 19h. (Berkeley, Branner, and Lick), 20h. (Erevan and Grozny), 21h. (Tinemaha, Toledo, Tucson, Mount Wilson, Pasadena, and Riverside), 22h. (Lick, Branner, and Berkeley), 23h. (Grozny, Sverdlovsk, Irkutsk, and Bozeman).

Sept. 6d. 13h. 28m. 16s. Epicentre 41° 0N. 50° 0E.

A = $+4865$, B = $+5798$, C = $+6535$; $\delta = -9$; $h = -2$;
 D = $+766$, E = -643 ; G = $+420$, H = $+501$, K = -757 .

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Baku	0-6	187	i 0 15	0	0 30	+ 4	—	—
Erevan	4-3	261	i 1 15	P*	2 3	+ 3	—	—
Piatigorsk	5-9	304	o 30	-61	—	—	i 1 43	P*
Sotchi	8-0	292	e 1 56	- 4	—	—	—	—
Theodosia	11-4	295	e 2 50	+ 3	—	—	—	—
Yalta	12-2	292	e 3 42	PPP	e 5 54	SSS	—	—
Simferopol	12-3	294	e 3 0	+ 1	—	—	—	—
Sebastopol	12-6	292	e 3 6	+ 3	e 5 30	+ 4	—	—
Samarkand	13-0	90	3 8	- 1	—	—	—	e 6-8
Ksara	13-3	242	i 3 12	- 1	e 6 8	SS	—	—
Tashkent	14-5	82	e 3 30	+ 2	e 6 6	- 5	—	7-6
Tchimkent	14-7	78	3 27	- 4	—	—	e 3 37	PP
Andijan	16-9	84	e 3 53	- 6	e 6 57	-10	—	e 9-1
Moscow	16-9	335	e 4 2	+ 3	7 4	- 3	—	—
Sverdlovsk	17-3	20	i 3 58	- 6	i 7 7	- 9	9 56	L ₀ 11-7
Helwan	18-8	240	i 4 18	- 5	e 7 50	0	—	—
Almata	20-1	73	e 4 50	PP	—	—	—	—
Pulkovo	22-4	334	e 5 5	+ 3	9 5	+ 1	—	e 10-8
Potsdam	27-5	308	—	—	e 10 20	-10	—	e 15-7
Jena	N.	28-2	304	e 5 56	0	—	—	—
Copenhagen	28-6	315	i 5 58	- 2	10 50	+ 2	—	17-7
Chur	29-5	297	e 6 4	- 4	—	—	—	—
Hamburg	N.	29-5	310	e 9 44?	?	—	—	—
Stuttgart	29-6	300	e 6 6	- 3	e 12 44?	SSS	—	e 19-7
Zurich	30-1	296	e 6 8	- 5	—	—	—	—
Irkutsk	38-1	54	—	—	e 16 36	SSS	—	e 20-2

Additional readings :-

Samarkand $e = +4m.15s.$
 Tashkent $i = +5m.51s.$, $e = +6m.53s.$
 Tchimkent $e = +4m.9s.$ and $+5m.17s.$
 Potsdam eNZ = $+13m.32s.$
 Irkutsk $e = +17m.44s.$

Long waves were also recorded at De Bilt.

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Sept. 6d. 20h. 45m. 42s. Epicentre 44° 1N. 150° 2E. (as on 1937 Feb. 26d.).

Strasbourg gives Epicentre 47° 0N. 147° 0E.
U.S.S.R. gives Epicentre 43° 0N. 149° 0E.

A = -6252, B = +3581, C = +6935; $\delta = +5$; $h = -3$;
D = +497, E = +868; G = -602, H = +345, K = -720.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	$^{\circ}$	$^{\circ}$	m. s.	s.	m. s.	s.	m. s.	m.
Mizusawa	8.4	237	2 2	- 4	3 20	-23	---	---
Vladivostok	13.1	272	e 4 18	+68	e 5 41	+ 3	---	e 6.3
Nagoya	13.5	233	e 3 23	+ 8	5 45	- 2	---	---
Husan	18.6	251	e 4 16	- 5	7 48	+ 2	---	---
Keizyo	n. 18.7	258	e 4 17	- 5	e 7 58	+10	---	---
Zinsen	19.0	260	e 4 23	- 3	e 7 50	- 5	---	---
Irkutsk	31.2	303	e 7 11	PP	e 11 45	+16	e 7 43	PPP e 16.8
Hong Kong	36.7	247	7 8	- 2	13 6	+12	---	---
Manila	38.5	231	e 9 41	+ 1	13 18	- 4	---	18.4
College	39.5	36	---	---	e 13 32	- 5	---	e 16.6
Phu-Lien	42.8	253	e 7 59	- 2	---	---	---	---
Frunse	53.0	299	e 9 1	-20	---	---	---	---
Calcutta	n. 54.7	269	e 9 30	- 3	i 17 25	+12	---	---
Tchimkent	56.5	301	e 9 41	- 5	---	---	---	---
Tashkent	57.2	298	i 9 48	- 3	i 17 36	-10	---	e 27.0
Moscow	65.3	326	10 46	0	19 27	- 2	---	34.8
Scoresby Sund	65.6	359	10 49	+ 1	---	---	---	29.3
Pulkovo	65.8	333	10 44	- 5	e 19 25	-10	---	e 29.9
Tinimaha	66.4	61	i 11 2	+ 9	---	---	---	---
Mount Wilson	z. 68.3	63	i 11 12	+ 7	---	---	---	---
Pasadena	z. 68.3	63	e 11 12	+ 5	---	---	---	e 27.3
Riverside	z. 68.9	63	e 11 14	+ 5	---	---	---	e 35.7
Baku	69.6	308	11 13	0	i 20 34	+13	---	---
Grozny	69.9	313	e 11 4	-11	20 24	0	---	---
Theodosia	74.1	320	e 11 37	- 3	---	---	---	---
Tucson	74.2	61	i 11 47	+ 7	---	---	---	e 35.9
Copenhagen	74.4	339	e 11 41 ^a	- 1	21 12	- 4	---	38.3
Simferopol	74.7	321	e 11 33	-10	---	---	---	43.3
Yalta	75.1	320	e 11 41	- 5	---	---	---	47.3
Sebastopol	75.3	321	e 11 48	+ 1	---	---	---	---
Hamburg	76.9	338	e 11 55	- 1	e 22 22	PS	---	e 41.3
Potsdam	77.0	336	e 11 54	- 2	e 21 36	- 9	30 18?	SSS e 44.3
Bucharest	78.8	322	e 12 18?	+12	22 8	+ 4	e 23 2	PPS
Jena	n. 78.8	335	e 12 8	+ 2	---	---	---	---
Cheb	79.3	335	e 11 18?	-51	---	---	---	e 42.3
De Bilt	79.5	340	12 10	0	22 25	+14	---	e 38.3
Istanbul	80.1	320	12 16	+ 3	22 17	- 1	---	---
Uccle	80.9	340	e 12 19	+ 2	e 22 37	+11	---	e 40.3
Florissant	81.0	44	---	---	i 22 33	+ 6	---	---
Kew	81.4	343	i 12 22	+ 2	---	---	---	e 48.3
Oxford	81.4	344	---	---	e 22 44	+13	---	e 44.3
Sofia	81.4	324	e 12 21	+ 1	e 22 25	- 6	e 22 44	PS e 44.3
Stuttgart	81.4	336	e 12 20	0	e 22 38	+ 7	e 12 34	PcP e 42.3
Strasbourg	82.0	337	i 12 24	+ 1	e 22 51	PS	---	e 40.3
Ksara	82.1	310	i 12 25 ^a	+ 1	e 22 58	PS	28 50	SS
Triest	82.7	332	e 12 36	+ 9	22 37	- 7	---	---
Zurich	82.8	336	e 12 28	+ 1	---	---	---	---
Basle	83.0	337	e 12 29	+ 1	---	---	---	---
Harvard	86.0	30	e 12 48	+ 5	---	---	e 46 18	L _a e 50.3
Weston	86.2	30	i 13 1	+17	---	---	---	e 52.3
Rome	86.4	329	e 13 3	+18	e 23 19	- 2	---	---
Helwan	87.6	310	i 12 53	+ 2	i 23 48	+16	---	---

Additional readings:—

Irkutsk e = +14m.33s.
Tchimkent e = +9m.56s. and +10m.12s.
Tinimaha eZ = +11m.18s.

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Mount Wilson iZ = +11m.25s.
 Pasadena iZ = +11m.25s.
 Riverside iZ = +11m.27s.
 Tucson I = +12m.2s.
 Potsdam eN = +21m.54s.
 Jena eN = +12m.24s.
 Strasbourg eSZ = +22m.54s.
 Ksara ePS = +23m.51s.
 Weston iPZ = +4m.49s.

Long waves were also recorded at Prague, Edinburgh, Kodaikanal, Bombay, Taikyū, Belgrade, Granada, Malaga, Puy de Dôme, Toledo, San Fernando, Philadelphia, Honolulu, Stonyhurst, Bidston, Bergen, Paris, and Jersey.

Sept. 6d. Readings also at 0h. (Balboa Heights), 1h. (Andijan and La Paz), 5h. (Istanbul), 8h. (Puebla, Manzanillo, Oaxaca, Riverside, Pasadena, Mount Wilson, Tucson, Ksara, La Paz, Tacubaya, and Guadalajara), 9h. (Sverdlovsk, Baku, Tucson, and De Bilt), 10h. (Tchikent), 11h. (Guadalajara, Tacubaya, Ksara, and Tucson), 12h. (Simferopol, Sverdlovsk, and Baku), 14h. (Guadalajara, Tacubaya, Baku, and Tashkent), 15h. (Guadalajara and Tacubaya), 18h. (Guadalajara, Tacubaya, and Balboa Heights), 19h. (Hukuoka B), 21h. (Samarkand, Almata, Frunse, Tchikent, and Andijan), 23h. (Christchurch, Hastings, and Wellington).

Sept. 7d. 1h. 54m. 34s. Epicentre 5°·0N. 126°·8E.

Force III at Béo (Isle of Taland).

Epicentre S. Philippines, Isle of Taland, 5°·0N. 126°·8E. Depth 120km. (Batavia).

See Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome III, 2e partie, Seismologie. Mende, 1941, p.72.

A = -·5967, B = +·7977, C = +·0866; δ = -12; h +7;
 D = +·801, E = +·599; G = -·052, H = +·069, K = -·996.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Palau	8·0	72	2 3	+ 3				
Manila	11·1	329	i 2 47 _a	+ 4	4 46	- 3		
Taito	18·5	344	4 20	+ 1	7 49	+ 5		10·8
Isigakizima	19·4	354	4 33	+ 3	8 13	+ 9		
Miyakozima	19·7	357	4 35	+ 1	8 8	- 2		
Taihoku	20·6	347	e 4 42	- 1	8 56	SS		
Hong Kong	21·1	327	3 46	-62	8 46	+ 7		10·1
Batavia	22·8	241	e 5 2k	- 3	i 9 36	SS		
Nake	23·4	7	5 8	- 3	9 24	+ 3		
Phu-Lien	25·1	311	e 5 26?	- 2	e 9 46	- 5		
Yakusima	25·5	9	5 39	+ 7	9 57	0		
Medan	28·1	269	e 5 53	- 2	10 35	- 5	i 6 5	PP
Hirosima	29·7	9	6 20	+10	11 1	- 5		
Nagoya	31·5	17	e 6 25	- 1				
Kohu	32·4	18	6 34	0	11 44	- 4		
Tokyo, Cen. Met. Ob.	32·8	19	8 16	PPP	14 57	SSS		
Oiwake	33·0	17	6 42	+ 3			8 8	PPP
Toyama	33·0	15	7 3	+24	11 54	- 3		
Calcutta	N. 41·0	299	e 7 43	- 3	i 13 31	-28	e 15 38	SS
Brisbane	41·1	143	i 7 38	- 9	i 13 44	-17	i 16 56	SS
Riverview	45·0	150	e 8 15	- 4	i 14 49	- 9	i 18 5	SS
Sydney	45·0	150	e 5 46	?	e 14 44	-14	i 18 8	SS
Melbourne	45·9	159	8 31	+ 5	14 56	-15	i 18 19	SS
Colombo	E. 46·7	275	8 23	- 9	15 13	- 9		
Hyderabad	48·9	289	8 46	- 4	15 49	- 4		22·6
Kodaikanal	E. 49·1	280	i 8 42	- 9	i 15 43	-13	i 11 6	PPP
Irkutsk	50·7	342	e 9 3	0	16 17	- 1		
Agra	E. 51·4	301	9 0	- 9	i 16 17	-11		25·9
Bombay	E. 54·4	289	i 9 23	- 8	e 16 53	-16	9 23	pP
Almata	58·1	319	e 10 2	+ 4				25·2

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	Δ °	Az. °	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	I. m.
Frunse	59.5	317	e 9 45	-22	—	—	—	—
Sempalatinsk	59.7	328	e 10 26	+17	—	—	—	—
Andijan	60.2	314	e 10 10	-2	e 18 22	-3	—	—
Christchurch	63.5	144	e 10 38	+4	e 18 55	-12	—	26.8
Samarkand	63.8	312	e 10 32	-4	e 19 2	-9	—	—
Sverdlovsk	72.9	329	i 11 28	-5	i 20 19	-10	—	33.4
Baku	76.8	310	i 11 52	-3	i 21 40	-2	—	37.4
Grozny	80.1	313	e 12 16	+3	e 22 18	0	—	—
Moscow	85.5	325	i 12 37	-4	e 22 56	[-8]	16 4	PP 45.9
Theodosia	87.5	315	12 46	-5	e 23 7	[-10]	—	—
Ksara	88.0	303	i 12 49	-4	e 23 25	[+5]	e 16 8	PP —
Simferopol	88.4	315	e 12 50	-5	e 23 11	[-11]	—	—
Yalta	88.4	314	e 12 52	-3	e 23 15	[-7]	—	—
Sebastopol	88.8	315	e 12 55	-2	e 23 19	[-6]	—	—
Pulkovo	89.0	330	e 12 50	-8	23 16	[-11]	—	e 41.2
Helwan	92.3	300	i 13 8	-5	i 23 36	[-10]	—	—
Istanbul	92.6	311	i 13 23	+8	i 23 32	[-16]	—	—
Bucharest	94.1	315	e 13 18	-4	23 50	[-6]	—	—
Copenhagen	99.3	328	i 13 41 ^a	-4	24 16	+2	17 47	PP 47.4
Potsdam	100.2	325	i 13 45	-4	e 24 14	-8	e 17 26 [?]	PP e 53.4
Bergen	100.6	334	—	—	i 24 34	[+4]	—	e 50.4
Cheb	101.5	323	e 19 48	PPP	e 24 26 [?]	[-8]	—	e 55.4
Hamburg	101.5	327	e 13 51	-4	e 24 27	[-7]	—	e 51.4
Scoresby Sund	101.8	350	i 13 56	0	24 32	[-4]	18 5	PP 48.4
Triest	102.2	319	e 14 8	+10	e 24 26	[-12]	—	—
Padova	103.6	319	e 12 41	-83	—	—	—	—
Stuttgart	103.9	323	e 14 0	-6	e 24 34	[-12]	e 18 21	PP e 53.4
Rome	104.4	314	e 18 23	PP	i 24 35	[-13]	e 33 41	SS e 52.2
Chur	104.5	321	e 15 26 [?]	?	—	—	—	—
De Bilt	104.7	327	14 6	-3	e 24 44	[-5]	—	e 49.4
Strasbourg	104.9	323	e 14 6	-4	24 56	[+6]	e 18 8	PP e 52.4
Uccle	105.8	326	e 14 9	P	e 24 44	[-10]	e 28 17	PS e 51.4
Mount Wilson	107.6	51	e 18 31	PP	—	—	—	—
Kew	108.0	328	e 18 51	PP	—	—	—	e 57.4
Puy de Dôme	109.1	322	e 18 56	PP	e 25 30	+22	—	e 60.4
Tucson	114.0	51	e 18 7	[-34]	29 1	PS	i 19 41	PP e 51.5
Toledo	116.5	319	e 19 48	PP	—	—	—	e 53.4
Harvard	z. 129.9	16	e 19 14	[+2]	i 22 28	PKS	e 21 26 [?]	PP e 66.4
Weston	130.0	16	i 19 15	[+3]	—	—	i 22 28	SKP —
Fordham	130.6	19	i 22 50	PP	—	—	—	—
San Juan	153.5	27	e 20 18	[+26]	—	—	e 24 7	PP —
Fort de France	158.9	22	e 19 59	[0]	—	—	—	—
La Paz	z. 161.4	130	i 20 3	[+1]	—	—	—	77.4

Additional readings:—

Medan $iN = +10m.57s.$, $iE = +11m.57s.$, $iN = +12m.17s.$, $eE = +13m.5s.$, $eN = +13m.15s.$

Calcutta $iN = +13m.53s.$

Riverview $iN = +14m.45s.$, $iE = +18m.12s.$

Kodaikanal $iSSE = +18m.33s.$, $iSSSE = +19m.52s.$

Agra $PPE = +11m.5s.$, $PcSE = +14m.11s.$, $sSE = +17m.4s.$, $ScSE = +18m.49s.$

Christchurch $ePNZ = +9m.54s.$, $eS = +17m.43s.$

Ksara $ePS = +24m.21s.$

Pulkovo $S = +23m.36s.$

Helwan $i = +13m.29s.$

Bucharest $eE? = +12m.44s.$

Potsdam $eN = +23m.26s.?$, $eE = +24m.26s.?$

Stuttgart $ePPP = +20m.38s.$, $eSN = +25m.50s.$

Strasbourg $eS = +25m.59s.$, $ePS = +26m.59s.$

Tucson $iPP = +20m.24s.$, $iPPS = +30m.3s.$

Toledo $iP = +20m.10s.$

Weston $iPKP,Z = +19m.30s.$

Long waves were also recorded at Aberdeen, Edinburgh, Stonyhurst, Bidston, Prague,

Paris, Jersey, Pasadena, and Philadelphia.

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Sept. 7d. 4h. 3m. 17s. Epicentre 23°·9N. 121°·7E.

Slight damage at Karenko. Felt strongly at Karenko, Giran, Taito, Sintiku, Taihoku, and slightly at Hokoto and Kosyun.

Epicentre 23°·9N. 121°·7E. shallow. Macro seismic radius greater than 300km.

See Seismological Bulletin of the Central Met. Obs. Japan for the year 1938, Tokyo, 1940, pp. 56-58. Macro seismic chart p. 56.

A = -·4809, B = +·7787, C = +·4029; $\delta = -3$; $h = +4$;
D = +·851, E = +·525; G = -·212, H = +·343, K = -·915.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Karenko	0·1	—	0 7 _a	- 1	0 10	- 3	—	—
Arisan	0·9	245	0 19 _a	- 1	0 27	S _g	—	—
Giran	0·9	3	0 23 _k	+ 3	0 35	+ 1	—	—
Taityu	1·0	285	0 21 _a	0	0 29	S _g	—	—
Sintiku	1·1	325	0 25	+ 3	0 36	S _g	—	—
Taihoku	1·1	352	1 0 25	+ 3	0 39	0	—	—
Taito	1·3	204	0 22 _a	- 3	0 37	- 7	—	—
Tainan	1·5	237	0 32 _k	P _g	0 47	- 4	—	—
Takao	1·8	226	0 35	P _g	0 48	- 8	—	—
Hokoto	2·0	259	0 37 _a	P*	1 3	S*	—	—
Kosyun	2·1	205	0 39	P*	1 2	- 2	—	—
Isigakizima	2·3	79	0 42 _k	P*	1 12	S _g	—	—
Miyakozima	3·4	75	0 57 _k	+ 2	1 34	- 3	—	—
Naha	5·9	66	1 5	-26	2 23	-17	—	—
Hong Kong	7·1	258	1 44	- 4	3 12	+ 2	—	5·3
Zi-ka-wei	7·2	358	e 1 53	+ 4	3 11	- 2	i 3 39	S*
Nake	8·3	56	2 3	- 1	3 53	+13	—	—
Manila	9·3	184	i 2 18 _k	+ 1	4 53	S*	—	—
Yakusima	10·2	49	2 35	+ 4	4 37	+10	—	—
Tomie	10·7	34	2 32 _k	- 6	4 38	- 1	—	—
Kagosima	11·0	44	2 47	+ 5	6 56	?	—	—
Nagasaki	11·4	38	2 49	+ 2	5 5	+ 9	—	—
Unzendake	11·6	39	3 0	PP	5 31	SSS	—	—
Miyazaki	11·7	45	2 56 _a	+ 5	5 18	SS	—	—
Kumamoto	11·9	40	2 54 _k	0	5 21	SS	—	—
Saga	12·0	37	2 55	0	—	—	—	—
Ithara	12·2	31	3 5 _a	+ 7	—	—	—	—
Hukuoka B	12·3	36	3 3	+ 4	5 24	+ 6	—	6·5
Izuka	12·5	37	3 7	+ 5	5 33	SS	—	—
Husan	12·9	28	3 11	+ 4	5 52	SS	—	—
Simonoseki	12·9	37	3 16	PP	—	—	—	—
Simidu	13·3	46	3 31	PPP	6 0	SS	—	—
Taikyu	13·3	25	i 3 19	+ 6	5 52	+10	—	7·2
Matuyama	13·9	42	3 23	+ 2	—	—	—	—
Hirosima	14·0	40	3 24 _a	+ 2	6 9	+10	—	—
Koti	14·1	44	e 3 27	+ 4	e 6 7	+ 5	6 28	SSS
Hamada	14·2	37	3 14	-10	6 20	SS	—	—
Zinsen	14·2	16	i 3 28 _k	+ 4	i 6 9	+ 5	8 4	L _a
Phu-Lien	14·3	260	i 3 22	- 4	i 6 15	+ 9	—	7·2
Keizyo	14·4	17	3 30	+ 3	6 15	+ 6	—	7·9
Muroto	14·4	47	3 36	+ 9	6 48	SSS	—	—
Okayama	15·1	41	3 41	+ 5	—	—	—	—
Tokusima	15·2	45	3 45	+ 7	—	—	—	—
Heizyo	15·5	12	i 3 44 _a	+ 2	i 6 47	SS	—	8·5
Sumoto	15·5	45	3 51	PP	7 16	SSS	—	—
Siomisaki	15·6	49	3 44	+ 1	8 21	L	—	(8·4)
Wakayama	15·6	46	3 51 _a	PP	6 13	-24	—	—
Kobe	15·9	45	3 49	+ 3	7 38	SSS	—	—
Osaka	16·1	45	4 2	PP	7 22	SSS	—	—
Toyooka	16·2	41	4 7	PP	7 20	SSS	—	—
Yagi	16·2	46	3 59	+ 9	7 28	SSS	—	—
Kyoto	16·5	45	4 3	+ 9	7 38	SSS	—	—
Miyadu	16·5	42	3 45	- 9	7 51	L	—	(7·9)
Kameyama	16·9	46	4 6	+ 7	7 40	SSS	—	—
Hikone	17·0	45	4 6	+ 5	—	—	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Ibukisan	17-1	45	4 19	PP	7 34	SS	—	—
Gihu	17-4	45	4 14	+ 8	7 46	SSS	—	—
Nagoya	17-4	46	4 12	+ 6	—	—	—	—
Hukui	17-5	43	4 8	+ 1	9 15	L	—	8-7
Hamamatu	17-6	49	4 19k	PP	7 29	+ 6	—	(9-2)
Kanazawa	18-0	41	4 29	PP	8 5	SSS	—	—
Hatidyozima	18-4	53	4 14	- 4	7 50	+ 9	—	—
Husiki	18-4	42	4 28	PP	8 7	SS	—	—
Toyama	18-4	42	4 23	+ 5	8 1	SS	—	—
Hunatu	18-6	48	4 24	+ 3	8 1	+15	—	—
Numadu	18-6	48	4 23	+ 2	7 59	+13	—	—
Kohu	18-7	47	4 29	+ 7	8 3	SS	—	—
Matumoto	18-7	44	4 22	0	7 59	+11	—	—
Misima	18-7	48	4 18	- 4	8 24	SSS	—	—
Titizima	18-8	75	4 22k	- 1	—	—	—	—
Nagano	19-1	43	4 26	- 1	8 27	SSS	—	—
Oiwake	19-1	44	4 24	- 3	8 8	+11	—	—
Mera	19-2	48	4 26	- 2	—	—	—	—
Yokohama	19-3	47	4 31	+ 2	—	—	—	—
Kumagaya	19-5	46	4 36	+ 5	9 40	L	—	(9-7)
Maebasi	19-5	45	4 40	+ 9	9 42	L	—	(9-7)
Tokyo C.M.O.	19-6	48	4 22	-10	8 14	+ 6	—	—
Kakioka	20-1	47	4 27	-11	—	—	—	—
Tukubasan	20-1	47	4 37	- 1	9 46	L	—	(9-8)
Utunomiya	20-1	46	4 44	+ 6	—	—	—	—
Tyosi	20-3	50	4 34	- 6	8 19	- 4	—	—
Mito	20-4	47	4 36	- 5	—	—	—	—
Palau	20-6	142	4 42	- 1	8 36	+ 7	—	—
Vladivostok	21-0	22	4 49	+ 2	8 35	- 2	—	10-1
Hukusima	21-2	45	4 48	- 1	8 43	+ 1	—	—
Sendai	21-8	44	4 50	- 6	8 52	0	—	—
Mizusawa	22-4	42	e 4 53	- 9	e 8 58	- 6	—	—
Morioka	22-8	41	5 3	- 2	9 7	- 4	—	—
Aomori	23-3	39	4 55	-15	—	—	—	—
Hatinohe	23-5	40	5 11	- 1	9 53	SS	—	—
Mori	24-0	36	5 57	PP	10 45	SSS	—	—
Sapporo	25-1	34	5 33	+ 5	10 40	SS	—	—
Asahigawa	26-1	35	5 44	+ 7	—	—	—	—
Medan	30-0	233	1 6 13	+ 1	i 11 8	- 2	—	—
Calcutta	N. 30-7	275	1 6 17	- 2	i 11 39	+18	e 7 14	PP i 15-6
Irkutsk	31-3	340	e 6 23	- 1	11 28	- 3	—	16-2
Batavia	33-2	208	i 6 44a	+ 4	12 3	+ 3	—	18-7
Dehra Dun	N. 39-2	290	e 7 44?	+13	i 13 44	+12	—	i 21-5
Agra	39-4	285	i 7 30a	- 3	13 27	- 8	9 2	PP 18-7
Hyderabad	40-9	270	7 45	- 1	13 54	- 4	9 24	PP 19-8
Almata	41-4	310	e 7 51	+ 1	—	—	—	—
Semipalatinsk	41-5	321	e 7 51	+ 1	e 14 2	- 5	—	—
Frunse	43-0	309	e 7 47	-16	e 14 31	+ 2	—	—
Kolombo	E. 43-5	255	8 6	- 1	14 52	+16	—	25-4
Kodalkanal	E. 44-2	261	1 8 10a	- 2	i 15 3	PS	i 10 11	PP i 20-7
Andtjan	44-4	305	8 15	+ 1	e 14 46	- 3	—	—
Bombay	45-6	274	i 8 23	- 1	i 15 23	+17	i 10 8	PP 24-8
Tchinkent	46-6	307	e 8 44	+12	—	—	—	—
Samarkand	48-4	303	8 41	- 5	15 38	- 8	—	—
Sverdlovsk	54-6	324	1 9 31	- 1	i 17 8	- 3	26 7	L _a 32-8
Brisbane	59-4	147	i 10 7	+ 1	i 18 7	- 8	i 22 1	SS —
Adelaide	60-7	164	e 7 51	?	18 22	-10	—	—
Baku	61-4	305	i 10 20	0	e 18 44	+ 4	—	33-7
Riverview	63-9	153	i 10 45	+ 8	i 19 11	- 1	—	e 27-6
Sydney	63-9	153	e 10 43	+ 6	i 19 11	- 1	—	e 27-1
Grozny	64-0	309	e 10 45	+ 7	e 20 19	+66	—	—
Melbourne	65-2	160	e 10 51	+ 6	19 26	- 2	—	32-2
Erevan	65-5	305	e 10 50	+ 3	e 20 44	+72	—	—
Piatigorsk	65-9	310	e 11 4	+14	e 21 1	?	—	—
Moscow	67-3	323	i 10 57	- 2	19 47	- 7	—	—

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	°	°	m. s.	s.	m. s.	s.	m. s.	m.	
College	68.8	27	e 11 7	- 1	i 20 11	0	25 0	SS 28.3	
Pulkovo	70.3	328	e 11 15	- 2	20 23	- 6	—	e 33.6	
Theodosia	71.0	312	i 11 18	- 4	20 34	- 3	—	40.7	
Simferopol	71.9	312	i 11 24	- 3	20 44	- 4	—	29.2	
Sebastopol	72.4	312	i 11 27	- 3	20 50	- 3	e 15 58	PPP 46.7	
Honolulu	73.3	73	i 11 40	+ 5	i 21 8	+ 4	—	i 31.2	
Ksara	73.8	300	i 11 37 _a	- 1	e 21 15	+ 6	e 14 25	PP —	
Apia	75.0	112	e 18 12	?	e 21 25	+ 2	—	—	
Upsala	76.4	331	i 11 48	- 5	i 21 31	- 7	e 26 43?	SS e 35.7	
Istanbul	76.6	310	i 11 54	0	21 39	- 1	—	—	
Sitka	77.0	33	e 11 55	- 1	21 46	+ 1	—	e 36.6	
Bucharest	77.5	313	e 11 58 _a	- 1	i 21 44	- 6	15 42	PPP —	
Helwan	78.8	298	i 12 4	- 2	i 21 58	- 6	14 58	PP —	
Sofia	79.6	312	e 12 12	+ 2	e 22 13	0	e 15 14	PP 31.2	
Kecskemet	z.	80.6	318	e 12 13	- 3	e 22 38	+15	e 15 11	PP e 32.2
Copenhagen	80.7	328	i 12 14	- 2	22 19	- 6	15 7	PP 37.7	
Budapest	E.	80.8	318	i 12 17	0	e 22 30	+ 5	—	41.7
	N.	80.8	318	i 12 22	+ 5	22 20	- 5	e 15 24	PP 41.7
Belgrade	81.0	315	i 12 16 _k	- 2	e 22 24	- 3	e 15 51	PP e 33.9	
Ogyalla	E.	81.1	319	12 17	- 1	22 23	- 5	22 43	S _c S 40.7
	N.	81.1	319	12 13	- 5	22 25	- 3	23 5	PS 39.7
Wellington	81.4	143	i 12 22	+ 2	i 22 23	- 8	e 15 15	PP 35.8	
Bergen	81.5	334	12 18	- 3	22 23	- 9	—	29.7	
Christchurch	81.8	146	e 12 26 _k	+ 4	i 22 33	- 2	15 38	PP 38.9	
Potsdam	82.0	325	e 12 13	- 10	i 22 32	- 5	e 15 19	PP e 38.7	
Prague	82.1	322	12 22	- 2	22 34	- 4	e 27 52	SS e 40.7	
Scoresby Sund	82.4	349	i 12 23	- 2	22 37	- 4	15 28	PP 37.7	
Hamburg	83.0	327	e 12 25 _a	- 3	e 22 41	- 6	e 15 39	PP e 37.7	
Cheb	83.5	323	e 12 29	- 2	e 22 50	- 2	—	e 43.7	
Jena	83.5	323	i 12 23	- 8	e 22 43	- 9	e 15 43	PP e 36.7	
Göttingen	z.	83.7	325	i 12 30	- 2	—	e 15 47	PP e 49.7	
Tananarive	83.9	247	15 42	PP	22 52	- 4	i 27 33	SS 41.4	
Triest	84.9	318	12 33	- 5	e 22 47	- 19	15 52	PP —	
Stuttgart	86.0	323	i 12 41 _a	- 2	e 23 5	[- 3]	e 15 59	PP e 43.7	
Padova	86.1	319	e 12 48	+ 4	e 23 29	+11	e 23 56	PS e 43.7	
De Bilt	86.3	327	i 12 43 _a	- 2	e 23 19	+9]	i 16 4	PP e 40.7	
Karlsruhe	86.3	324	i 12 43	- 2	e 23 13	[+ 3]	—	e 40.7	
Aberdeen	86.5	333	i 12 44	- 2	i 23 14	[+ 3]	i 29 10	SS e 40.8	
Chur	86.7	322	e 12 44	- 3	e 23 19	- 5	—	—	
Strasbourg	86.9	323	i 12 45 _a	- 3	i 23 22	- 4	i 16 5	PP e 47.5	
Zurich	87.1	322	e 12 46 _a	- 3	e 23 22	- 6	e 15 50	PP —	
Florence	87.4	317	12 52	+ 2	23 3	[-14]	—	42.7	
Uccle	87.4	327	i 12 48 _a	- 2	i 23 26	- 4	i 16 13	PP e 41.7	
Basle	87.5	322	e 12 48	- 3	e 23 21	[+ 4]	—	—	
Rome	87.5	314	i 12 45	- 6	i 23 12	[- 5]	i 16 9	PP —	
Durham	87.8	331	i 12 51	- 1	i 23 31	- 3	i 16 17	PP —	
Edinburgh	87.8	333	e 12 52	0	i 23 46	+12	e 16 35	PP 41.7	
Chatham IIs.	88.1	141	—	—	e 24 43?	+66	—	31.7	
Neuchatel	88.2	322	e 12 51	- 3	e 23 32	- 6	—	—	
Seattle	88.5	38	e 13 13	+17	e 23 12	[-11]	e 23 28	S —	
Stonyhurst	88.8	331	i 12 55	- 2	i 23 10	- 4	i 16 28	PP e 34.7	
Moncalieri	88.9	321	13 1	+ 3	23 2	[-24]	—	42.5	
Bidston	89.4	331	i 12 54	- 6	e 23 24	[- 5]	i 16 24	PP e 36.7	
Kew	89.4	328	i 12 58 _a	- 2	e 23 30	[+ 1]	i 16 28	PP e 33.7	
Oxford	89.6	329	13 0	- 1	e 23 15	[-15]	e 16 30	PP 39.0	
Paris	89.6	325	e 12 57	- 4	e 23 46	- 5	16 24	PP 43.7	
Grenoble	89.9	321	i 13 10	+ 8	23 44	-10	16 29	PP e 42.2	
Rathfarnham Castle	90.9	332	i 13 12	+ 5	i 23 33	[- 5]	i 16 41	PP —	
Marseilles	91.2	319	—	—	e 32 13	—	—	e 56.7	
Puy de Dôme	91.2	322	i 13 5	- 3	i 23 59	- 6	i 16 37	PP e 47.1	
Jersey	91.7	327	e 14 37	?	e 24 9	- 1	15 18	PS e 47.5	
Ukiah	92.8	45	e 13 13	- 3	e 23 45	[- 4]	e 17 8	PP e 37.4	
Berkeley	94.1	46	i 23 54	SKS	(i 23 54)	[- 2]	—	—	
Baznères	94.4	321	e 13 21	- 2	e 23 51	[- 7]	e 17 10	PP e 47.7	
Rutte	94.8	34	e 13 21	- 4	e 23 57	[- 3]	i 24 35	S e 41.9	
Ivigtut	94.8	355	—	—	e 24 21	-15	—	42.7	

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Bozeman	95.8	34	—	—	e 24 46	+ 1	—	e 50.4
Algiers	96.4	314	e 13 43	+ 11	e 23 43?	[-26]	i 17 25	PP e 45.7
Tinemaha	97.2	44	i 13 38	+ 2	—	—	—	—
Santa Barbara	97.8	47	i 13 38	+ 0	—	—	—	—
Haiwee	97.9	45	e 13 40	+ 1	—	—	—	—
Toledo	98.9	320	e 13 41	- 2	e 24 17	[- 4]	e 17 43	PP e 48.1
Mount Wilson	99.0	47	i 13 44	0	—	—	e 17 44	PP
Pasadena	99.0	47	i 13 43	- 1	i 24 17	[- 5]	i 26 54	PP i 41.3
Almeria	99.9	318	e 17 49	PP	e 27 1	PS	—	e 55.8
Granada	100.4	319	i 13 50a	0	i 27 55	PPS	i 17 5	PP e 51.5
Malaga	101.2	319	13 51	- 3	25 26	- 4	17 51	PP 47.7
San Fernando	102.4	320	e 18 17	PP	e 28 9	PPS	e 34 1	SS 51.7
Tucson	104.9	44	e 14 8	- 3	i 24 47	[- 3]	18 24	PP 42.1
Averroes	105.7	318	e 14 11	P	e 24 48	[- 6]	e 18 25	PP e 55.7
Seven Falls	108.4	9	—	—	e 28 19	PS	—	47.7
Chicago	108.7	23	e 19 2	PP	e 25 45	[- 11]	e 28 21	PS e 46.6
Ottawa	109.2	13	e 19 13	PP	e 26 31	{+32}	28 16	PS 47.7
East Machias	110.5	6	e 19 2	PP	e 26 37	{+32}	e 28 33	PS e 43.7
Vermont	110.6	11	—	—	i 26 49	{+44}	i 28 32	PS e 54.7
Florissant	110.8	26	e 14 40	P	i 25 15	{ 0}	i 19 12	PP
St. Louis	111.0	26	e 14 41	P	i 26 48	{+36}	e 19 13	PP 61.7
Williamstown	112.3	11	e 19 18	PP	e 25 32	{+11}	i 28 42	PS
Harvard	112.8	10	e 19 31	PP	e 25 27	{+ 4}	e 28 46	PS e 59.7
Weston	113.0	10	e 19 27	PP	e 30 3	PPS	e 28 55	PS e 53.4
Fordham	114.0	13	i 19 24	PP	i 28 39	PS	i 39 13	SSS
Philadelphia	114.6	14	e 19 35	PP	e 27 15	{+38}	e 28 57	PS e 51.2
Columbia	118.5	22	e 20 17	PP	e 36 25	SS	e 22 45	PPP e 48.4
San Juan	137.3	11	e 19 25	[- 0]	e 26 33	[- 1]	e 22 0	PP e 54.1
Fort de France	141.5	4	e 19 27	[- 6]	—	—	e 22 35	PP
Huancayo	160.0	57	e 20 2	[+ 1]	e 27 5	{ 0}	25 22	? 63.8
Rio de Janeiro	166.1	273	e 21 14	[+ 3]	i 31 43	{ 0}	24 57	? e 46.0
La Paz	168.2	53	i 20 11a	[+ 3]	27 7	[- 3]	i 21 28	pPKP 80.7

Additional readings: —

Zi-ka-wei iN = +3m.59s., +4m.15s., +4m.51s., iE = +5m.53s. and +6m.12s., iN =

+6m.15s.

Koti eNZ = +6m.48s.

Calcutta ePPP = +7m.33s., iN = +9m.56s., iSSN = +13m.22s.

Agra eN = +7m.36s., iE = +7m.42s., iEN = +13m.48s., SSEN = +16m.28s.

Hyderabad S₀SN = +17m.24s.

Frunse e = +14m.12s.

Bombay iP₀PEN = +9m.34s., iPSE = +15m.33s., S₀SE = +18m.14s., SSEN =

+18m.42s.

Tchimkent e = +9m.23s.

Brisbane eSE = +18m.13s.

Riverview iN = +19m.19s.

Melbourne i = +25m.23s., +26m.40s., and +28m.41s.

Ksara ePS = +21m.51s., eSS = +26m.11s.

Bucharest iE = +16m.22s., iSEN = +21m.48s., iSSN = +26m.31s.

Helwan e = +12m.23s., PPP = +16m.43s., i = +16m.59s., e = +22m.55s.

Sofia eN = +14m.56s. and +18m.48s.

Kecskemet eZ = +15m.55s. and +17m.5s., eSSZ = +27m.5s.

Copenhagen PPP = +17m.13s., PPPP = +18m.47s., PS = +23m.7s., SS = +27m.49s.,

SSS = +31m.43s.

Budapest E iE = +12m.24s.

Budapest N SKKS = +22m.43s., PS? = +23m.9s., e = +23m.26s. and +23m.56s.

Belgrade iZ = +13m.14s., iNW = +26m.45s.

Wellington i = +12m.41s., PPP = +17m.26s., PS = +23m.24s., SS = +26m.54s., SSS =

+30m.24s., L₀ = +32m.21s.

Christchurch iZ = +12m.30s., iNZ = +17m.18s., eZ = +22m.0s., iSE = +22m.41s.,

iSSN = +27m.52s., SSS = +31m.11s., L₀N = +34m.0s.

Potsdam iP = +12m.20s. and +18m.43s., ? eE = +22m.7s., iSE = +22m.36s., iE =

+22m.51s. and +23m.37s., eE = +32m.31s., eNZ = +33m.43s.

Scoresby Sund +19m.14s., +19m.40s., +23m.37s., +28m.2s., and +34m.1s.

Hamburg eN = +14m.37s., eSE = +22m.45s.

Jena iP₀N = +12m.29s., eE = +23m.25s.

Stuttgart iP₀PZ = +12m.55s., e = +19m.43s., ePS = +24m.17s., eSSN = +29m.5s.,

E₀SSS = +35m.26s.

Padova ePP = +16m.49s.

De Bilt e = +23m.6s., eSS = +28m.58s.

Aberdeen i = +24m.29s., eSSS = +32m.26s.

Continued on next page.

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Strasbourg i = +13m.11s., iZ = +16m.55s., eN = +22m.13s., eZ = +22m.17s., PSZ = +24m.31s., eSSN = +29m.8s.
 Uccle eEN = +23m.17s., iSE = +23m.30s., iPSEN = +24m.45s., SS = +29m.15s.
 Rome iPcP = +13m.1s., iSKS = +22m.55s., i = +23m.23s. and +24m.34s., iSS = +29m.14s.
 Durham iSN = +23m.55s., iEN = +24m.38s., iSSE = +29m.27s.
 Edinburgh i = +23m.29s. and +29m.32s.
 Seattle S = +23m.53s.
 Stonyhurst i = +23m.58s., SS = +29m.28s.
 Bidston iPPS = +25m.11s., iSS = +29m.31s.
 Kew iN = +24m.32s., iSPZ = +24m.50s., iPPSEN = +25m.16s., eZ = +26m.13s., iSSEN = +29m.36s.
 Oxford iS = +23m.44s.
 Paris PS = +24m.58s.
 Grenoble eS = +24m.29s., e = +25m.16s.
 Rathfarnham Castle i = +21m.13s., iS = +24m.1s., iPS = +25m.3s., iPPS = +25m.23s.
 Puy de Dôme e = +23m.1s.
 Jersey e = +30m.21s. and +38m.53s.
 Ukiah iSKKS = +24m.11s., S = +24m.19s.
 Bagnères e = +16m.23s., eSKKS = +24m.27s. and +24m.30s., eS = +24m.49s., e = +25m.40s., ePS = +26m.3s., eSS = +31m.13s., e = 38m.13s.
 Algiers PS? = +26m.13s., e = +31m.43s.
 Toledo eS = +25m.9s., ePS = +26m.37s.
 Pasadena eE = +25m.37s.
 Granada i = +17m.57s.
 San Fernando eN = +17m.17s., ePPN = +21m.49s., eSSSN = +39m.51s.
 Tucson P = +14m.16s., iPP = +18m.29s., i = +18m.38s., S = +25m.53s., iPS = +27m.41s., eSS = +33m.20s., SSS = +37m.30s.
 Averroes ePS = +27m.40s., ePPS = +28m.20s., eSS = +33m.39s.
 Chicago eSS = +34m.5s., eSSS = +38m.51s.
 Last Machias eSS = +34m.19s., eSSS = +38m.49s.
 Florissant eS = +26m.47s., iS = +26m.50s., iPS = +28m.37s., i = +28m.54s., iPKKP = +29m.46s., i = +30m.17s., ePPPS = +30m.28s.
 St. Louis eSKPE = +19m.47s., ePPPE = +23m.51s., eSKKSEN = +26m.3s., iPSEN = +28m.34s., ePPSEN = +29m.49s., ePPPP = +41m.47s.
 Williamstown iPPS = +29m.48s.
 Harvard eSKKSE = +26m.56s., eSpSPN = +30m.13s., eLqE = +54m.13s.
 Fordham iE = +27m.12s.
 Philadelphia eSS = +34m.52s.
 Columbia ePS = +29m.50s.
 San Juan eSS = +40m.7s.
 Huancayo PKP = +20m.50s., PPP = +27m.58s., iSS = +44m.37s.
 La Paz iPKP,Z = +20m.45s., iPKP,Z = +21m.1s., iPPZ = +25m.17s., SKSZ = +26m.43s., SKKS = +31m.43s., SKSP = +35m.33s., eN = +46m.7s.
 Long waves were also recorded at La Plata, Besançon, and Cape Girardeau.

Sept. 7d. 12h. 58m. 23s. Epicentre 6°·2S. 154°·8E.

A = -·8997, B = +·4233, C = -·1073; δ = +16; h = +7;
 D = +·426, E = +·905; G = +·097, H = -·046, K = -·994.

A depth of focus 0·020 has been assumed.

	△	Az.	P.		O-C.		S.		O-C.		Supp.		L. m.
			m.	s.	s.	s.	m.	s.	m.	s.			
Brisbane	21·2	184	i 4	37	+ 3	i 8	19	+ 4	i 5	1	PP	—	
Riverview	27·7	187	e 5	33	- 2	i 10	8	+ 4	i 11	19	SS	e 14·5	
Sydney	27·7	187	e 5	34	- 1	i 10	3	- 1	—	—	—	e 14·1	
Adelaide	32·3	205	i 6	15	- 1	i 11	19	+ 3	i 7	27	PP	i 13·9	
Melbourne	32·7	194	e 7	52	PPP	11	27	+ 4	—	—	—	16·1	
Apia	33·7	105	e 6	24	- 4	—	—	—	i 6	58	pP	—	
Wellington	39·2	156	i 7	13	- 1	12	57	- 5	i 7	47	pP	—	
Manila	39·4	303	i 7	16k	0	13	7	+ 2	—	—	—	—	
Christchurch	40·3	160	i 7	26k	+ 3	i 13	18	0	i 7	58	pP	17·0	
Nagoya	44·4	340	(7	58)	+ 2	7	58	P	—	—	—	—	
Perth	44·5	230	—	—	—	i 14	22	+ 3	i 17	37	SS	—	
Chatham Is.	45·2	151	—	—	—	i 14	1	-28	i 17	37	SS	e 50·9	
Mizusawa	E. 46·8	346	e 7	41	-34	e 8	43	?	—	—	—	—	
Malabar	46·9	266	8	24	+ 8	i 14	59	+ 5	—	—	—	—	
Batavia	47·7	268	i 8	30	+ 8	15	11	+ 6	—	—	—	—	
Husan	47·7	332	8	31	+ 9	—	—	—	—	—	—	—	
Taikyū	48·5	333	e 8	28	0	—	—	—	—	—	—	—	
Hong Kong	48·8	308	8	32	+ 1	(15	27)	+ 7	9	24	PP	—	
Keizyo	N. 50·7	332	8	44	- 1	11	15	PPP	—	—	—	—	
Zinsen	50·8	331	e 8	45	- 1	e 15	49	+ 1	—	—	—	—	

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Vladivostok	53.3	340	i 9 4	0	—	—	i 9 56	PP
Honolulu	53.9	58	—	—	i 16 32	+ 2	i 17 25	sS
Phu-Lien	54.4	302	e 9 12	0	e 16 43	+ 6	—	—
Medan	56.9	280	9 22	- 8	i 16 57	- 13	i 17 6	PS
Calcutta	N. 70.9	297	e 10 56	- 6	i 19 56	- 6	e 13 30	PP e 31.2
Colombo	E. 75.5	279	11 31	+ 3	—	—	—	—
Kodaikanal	E. 78.7	283	i 11 47k	+ 1	i 21 33	+ 5	i 22 41	PS
Agra	E. 81.2	299	i 12 1k	+ 2	i 21 56	+ 2	23 1	sS
Bombay	84.4	290	i 12 21	+ 6	i 22 29	+ 3	i 23 37	sS
Almata	85.4	316	e 11 37	- 43	—	—	—	—
Frunse	87.1	314	e 11 12	- 77	—	—	—	—
Berkeley	88.2	53	i 12 32	- 2	e 23 7	+ 4	i 13 14	pP
Andijan	88.3	311	e 12 36	+ 2	e 23 10	+ 6	e 13 53	PP
Santa Barbara	89.8	56	i 12 41k	- 1	—	—	e 13 20	pP
Tashkent	90.7	312	i 12 44	- 2	e 23 26	+ 1	e 13 10	pP
Pasadena	91.0	56	i 12 47k	0	i 23 33	+ 5	i 13 26	pP e 36.6
Mount Wilson	91.1	56	i 12 48k	0	—	—	i 13 28	pP
Tinemaha	91.3	53	e 12 49	0	—	—	i 13 32	pP
Haiwee	91.4	54	i 12 50	+ 1	—	—	i 13 30	pP
Riverside	91.6	56	i 12 50k	0	e 23 37	+ 4	i 13 28	pP
Samarkand	92.2	309	e 12 12	- 41	—	—	—	—
Tucson	97.0	58	i 13 15	0	e 24 23	+ 3	i 13 51	pP 43.5
Sverdlovsk	97.4	327	e 13 16	0	e 23 38	[+ 1]	i 18 35	PPP 46.6
Baku	105.3	310	e 16 56	?	e 27 35	PS	e 33 13	SS 44.6
Grozny	108.1	314	e 18 31	PP	e 25 9	[+ 42]	—	—
Tifis	109.0	312	e 15 2	pP	e 24 34	[+ 3]	i 18 44	PP e 46.6
Erevan	109.5	311	—	P	e 25 7	[+ 34]	—	—
Moscow	110.2	327	e 14 13	P	e 24 39	[+ 4]	e 19 44	PP 47.1
Pulkovo	112.2	333	e 13 47	P	—	—	e 19 7	PP 49.6
Florissant	113.1	51	e 19 48	PP	i 26 42	SKKS	e 34 40	SS
Scoresby Sund	115.5	359	19 27	PP	25 5	[+ 8]	20 13	PP
Ksara	117.4	304	e 14 39?	P	e 30 56	PPS	e 19 42	PP
Upsala	117.4	337	e 19 37?	PP	—	—	—	—
Istanbul	120.6	315	20 4	PP	29 38	PS	35 21	PPS
Bergen	121.2	343	e 20 7	PP	e 25 13	[- 3]	—	—
Bucharest	E. 121.4	319	e 20 11	PP	—	—	—	—
Ottawa	121.4	39	—	—	e 36 37?	SS	—	e 58.6
Helwan	122.0	301	i 20 12	PP	—	—	—	—
Copenhagen	122.3	336	20 1	PP	e 25 22	[+ 2]	21 1	pPP 55.6
Vermont	123.5	39	—	—	e 26 45	SKKS	—	(e 64.6)
Seven Falls	123.6	34	—	—	e 26 13	SKKS	e 37 55	SS 52.6
Philadelphia	124.1	45	—	—	e 27 10	SKKS	e 31 37	PPS e 48.6
Williamstown	124.2	40	i 18 39	[- 1]	—	—	i 21 8	pPP
Potsdam	124.3	333	e 18 37	[- 3]	e 29 37	PS	e 20 19	PP
Fordham	124.6	43	e 20 14	PP	i 29 26	PS	i 12 14	pPP
Hamburg	124.8	336	e 18 40	[- 1]	—	—	—	53.6
Harvard	125.4	40	e 19 23	pPKP	—	—	e 20 37	PP e 63.6
Weston	125.6	40	i 18 43	[+ 1]	—	—	i 19 24	pPKP
Cheb	126.1	331	e 20 42	PP	e 30 37?	PS	—	—
Göttingen	126.3	334	e 21 37	pPP	—	—	—	—
Edinburgh	127.4	344	e 17 51	?	—	—	e 20 37?	PP
De Bilt	127.9	337	e 18 47	[0]	—	—	e 20 50	PP e 60.6
Stuttgart	128.6	332	i 18 49k	[+ 1]	e 32 25	PS	e 20 51	PP e 63.6
Uccle	z. 128.9	337	18 50	[+ 2]	i 26 2	[+ 25]	i 21 53	pPP
Strasbourg	z. 129.4	332	i 18 51	[+ 2]	25 51	[+ 11]	i 20 58	PP e 58.6
Bidston	129.6	343	i 21 2	PP	—	—	—	—
Chur	129.7	330	e 18 50	[0]	—	—	—	—
Zurich	129.8	331	e 18 51	[0]	—	—	e 21 4	PP
Basle	130.2	331	e 18 51	[0]	—	—	—	—
Kew	130.4	340	i 18 53	[+ 1]	—	—	i 21 10	PP
Oxford	130.5	341	e 21 18	PP	—	—	i 22 19	pPP e 57.6
Florence	130.8	325	e 18 59	[+ 6]	22 1	pPP	—	—
Rome	131.2	321	e 18 56	[+ 3]	i 39 17	SS	i 22 20	pPP

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	c	m. s.	s.	m. s.	s.	m. s.	m.
Paris	131.5	336	e 21 33	PP	—	—	—	39.6
La Paz	z. 131.9	118	19 1	[+ 6]	—	—	22 9	PP
Moncalieri	131.9	330	(21 37?)	PP	—	—	—	21.6
Puy de Dôme	133.7	333	e 21 19	PP	—	—	—	—
San Juan	138.3	68	e 19 58	sPKP	e 39 51	SS	22 41	pPP e 57.8
Toledo	141.5	334	e 22 21	PP	—	—	i 22 37	pPP
Almeria	143.1	329	e 19 13	[- 2]	e 22 36	PP	—	—
Granada	143.4	331	i 19 17k	[+ 2]	i 25 5	[-62]	i 22 37	PP e 65.6
Fort de France	143.7	73	i 19 13	[- 2]	e 23 5	PP	—	e 29.9
Malaga	144.2	331	e 20 21	pPKP	—	—	—	—
San Fernando	145.2	333	e 19 19	[+ 1]	—	—	—	—
Rio de Janeiro	146.2	149	e 21 37	?	—	—	—	—
Averroes	148.3	331	e 19 27	[+ 4]	—	—	e 23 57	pPP 53.6

Additional readings:—

Riverview iN = +10m.14s., iE = +12m.24s.
 Adelaide i = +12m.22s. and +13m.0s.
 Melbourne i = +15m.4s.
 Wellington PP = +8m.32s., iZ = +8m.53s., iPcP = +9m.15s., i = +13m.32s., sS? = +13m.47s., i = +14m.27s., SS = +16m.22s., i = +16m.37s., S_cS? = +17m.15s.
 Christchurch iEN = +8m.10s., iPcPNZ = +8m.54s., isSNE = +14m.15s., iS_cS = +16m.44s.
 Perth i = +21m.37s.
 Chatham Is. S = +13m.37s.?
 Hong Kong S? = +13m.52s., ? = +16m.36s.
 Vladivostok e = +11m.44s. and +14m.9s.
 Honolulu iS = +16m.42s., i = +17m.48s. and +19m.48s., iSS = +20m.2s.
 Medan iN = +18m.11s., iE = +18m.43s.
 Calcutta eN = +20m.27s., iN = +20m.41s. and +21m.4s.
 Kodaikanal iE = +22m.29s.
 Agra eE = +12m.38s., sPE = +12m.58s., eE = +15m.51s. and +23m.31s.
 Bombay esPEN = +13m.18s., iE = +15m.37s.
 Tashkent e = +15m.38s. and +16m.52s., i = +22m.55s., +24m.6s., +24m.38s., +25m.28s., +37m.14s. and +41m.56s.
 Pasadena iN = +24m.40s., eN = +29m.43s.
 Riverside iZ = +14m.15s., eN = +23m.7s.
 Tucson iP = +13m.18s., isP = +14m.29s., i = +16m.50s., iPP = +17m.7s., ipPP = +17m.49s., iSKS = +24m.3s., iSKKS = +24m.15s., sS = +25m.36s., iSP = +25m.47s., ePS = +26m.57s., i = +27m.43s., SS = +30m.53s., sSS = +32m.3s., ePKP, PKP = +38m.10s.
 Sverdlovsk e = +14m.9s., i = +16m.2s., +17m.14s., +18m.1s., +24m.45s. and +26m.14s., e = +32m.10s.
 Baku e = +18m.15s. and +36m.55s.
 Tiflis eZ = +19m.37s., and +21m.44s., eE = +28m.9s.
 Erevan e = +25m.35s.
 Moscow e = +18m.29s., +18m.48s., +19m.31s., +21m.41s., +23m.7s., +23m.41s., +27m.58s., +28m.46s., and +30m.8s.
 Florissant e = +27m.26s. and +27m.50s.
 Scoresby Sund ? = +26m.10s. and +29m.7s.
 Ksara iPP = +20m.34s., isPP = +20m.58s.
 Copenhagen +30m.1s. and +30m.55s.
 Philadelphia eSS = +37m.0s.
 Williamstown i = +19m.20s.
 Potsdam eZ = +21m.7s., eNZ = +32m.25s., eZ = +36m.19s.
 Fordham iPZ = +20m.25s., iN = +28m.16s., +31m.49s., and +37m.9s.
 Harvard eZ = +21m.19s.
 De Bilt eZ = +21m.46s.
 Stuttgart iPP = +20m.59s., esP = +21m.50s., ePP = +23m.14s., e = +23m.37s., esS = +33m.19s.
 Uccle iZ = +20m.58s., +23m.22s., +26m.26s., +26m.41s., +29m.59s., and +30m.22s.
 Strasbourg eZ = +20m.49s., isPPZ = +21m.55s., eZ = +25m.15s., ePSZ = +30m.40s., iPPSZ = +32m.42s., e = +35m.55s.
 Zurich e = +21m.57s.
 Kew i = +22m.2s., iN = +22m.16s.
 Rome iPP ? = +23m.12s., i = +35m.59s., e = +44m.37s.?
 Toledo e? = +10m.59s.
 Granada iN = +19m.21s., PPP = +25m.53s., i = +33m.57s.
 Averroes e = +20m.12s., i = +20m.29s. and +20m.43s., e = +34m.37s.?
 Long waves were also recorded at Huancayo.

Sept. 7d. Readings also at 5h. (Riverside, Tinemaha, Mount Wilson, Pasadena, Nagoya (2), Taihoku, and Tucson), 6h. (Tiflis), 7h. (Apia), 8h. (Apia and Tucson), 11h. (Sverdlovsk and Manila), 12h. (Copenhagen and Tiflis), 13h. (Granada, Trieste, Rome, Florence, Basle, Chur, Zurich, and Tiflis), 14h. (Fort de France and La Paz (2)), 15h. (Fort de France), 18h. (Fort de France (2)), 22h. (Sofia), 23h. (Weston, Harvard, Fordham, Ottawa, Williamstown, and Shawinigan Falls).

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Sept. 8d. Readings at 0h. (Toledo and Malaga), 1h. (La Paz), 2h. (Taihoku), 5h. (Nagoya), 6h. (Taihoku, Medan, and Ksara), 7h. (Sverdlovsk and Tashkent), 8h. (Lick), 11h. (Rome), 12h. (Sverdlovsk, Tashkent, La Paz, and Vladivostok), 13h. (Wellington), 14h. (Lick), 15h. (Lick, Ksara, Tucson, La Paz, Huancayo, La Plata, Fort de France, and Pasadena), 16h. (Samarkand, Frunse, Andijan, Sverdlovsk, and Tashkent), 20h. (Oaxaca and Fordham).

Sept. 9d. 17h. 27m. 4s. Epicentre 7° 8S. 80° 3W. (as on 1937 June 24d.).

A = +.1670, B = -.9767, C = -.1348; $\delta = 0$; $h = +7$;
D = -.986, E = -.168; G = -.023, H = +.132, K = -.991.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Huancayo	6.4	132	e 1 44	+ 6	i 2 49	- 4	—	i 3.3
La Paz	14.7	127	i 4 10k	+39	i 7 30	?	—	9.1
Balboa Heights	16.7	3	e 3 53	- 4	—	—	—	—
Fort de France	29.4	43	e 6 9	+ 2	e 11 21	+20	—	e 15.3
San Juan	29.5	30	e 6 8	0	i 11 33	+31	e 6 39	PP
Rio de Janeiro	38.6	117	e 7 56	+30	e 13 56	+33	—	e 20.7
Florissant	47.3	351	e 8 33	- 4	e 15 8	-23	e 18 6	SS
Tucson	49.3	326	i 8 51	- 2	—	—	—	e 22.3
Chicago	49.9	354	—	—	e 15 32	-35	—	e 18.5
Weston	50.6	9	i 9 2	0	i 16 20	+ 3	—	—
Harvard	50.7	9	e 9 2	- 1	—	—	—	c 28.9
Williamstown	50.7	8	i 9 1	- 2	—	—	—	—
Bozeman	50.9	337	e 11 56?	PP	—	—	—	—
Ottawa	53.1	6	—	—	e 16 32	-19	—	22.9
Seven Falls	53.2	10	—	—	e 17 2	+10	—	22.9
Riverside	z. 54.4	323	e 9 32	+ 1	—	—	—	—
Pasadena	55.0	323	e 9 36	+ 1	—	—	—	e 27.3
Rome	97.2	50	—	—	e 29 0	?	—	48.9
Pulkovo	107.0	30	e 18 42	PP	—	—	—	—
Moscow	111.9	32	—	—	e 30 11	PPS	—	58.4
Ksara	116.0	57	e 19 58	PP	e 29 56	PS	—	—
Sverdlovsk	122.4	23	e 20 36	PP	e 26 28	[+30]	—	51.9
Baku	125.1	45	—	—	e 31 15	PS	—	56.9
Tashkent	137.1	34	i 22 27	PP	—	—	—	e 23.1
Agra	151.9	44	—	—	e 32 2	?	—	—
Medan	175 7	165	—	—	28 29	?	—	—

Additional readings:—

Huancayo i = +2m.23s.
La Paz iSN = +7m.34s.
Florissant e = +16m.8s. and +19m.10s.
Weston iZ = +9m.15s.
Harvard eE = +18m.56s.
Ottawa eE = +19m.2s.

Long waves were also recorded at Tifis, Puy de Dôme, Strasbourg, Cpristchurch, La Plata, De Bilt, Kodakanal, Bombay, and Edinburgh.

Sept. 9d. 18h. Undetermined quake.

Santiago P = 24m.37s., S = 25m.5s.
San Javier P = 24m.55s., S = 25m.39s.
La Plata P = 23m.16s., S = 30m.24s., L = 31m.6s.
La Paz P = 29m.12s., iSN = 32m.19s., LZ = 34.1m.
Huancayo eP = 30m.11s., PP = 30m.39s., S = 33m.48s., iL = 34.5m.
Tucson P = 37m.4s., a, iP = 37m.14s. and 37m.45s., iL = 64.2m.
Harvard iPZ = 37m.5s.
Williamstown e = 37m.5s.
Riverside iPZ = 37m.31s., iZ = 37m.42s.
Pasadena iPZ = 37m.34s., iNZ = 37m.44s.
Mount Wilson iPZ = 37m.34s., i = 37m.45s.
Tinemaha iP = 37m.46s., i = 37m.57s.
Haiwee i = 37m.54s.
Tashkent i = 45m.13s., e = 46m.4s. and 48m.36s., eL = 87.0m.
Samarkand eP = 45m.6s., e = 45m.24s.
Andijan e = 45m.40s.
Moscow e = 46m.25s., L = 88.5m.
Sverdlovsk e = 48m.6s., L = 86.0m.
Jena e = 59m.48s.
Stuttgart eS_r = 59m.54s.
Strasbourg e = 60m.35s.
Long waves were also recorded at Ksara, Tifis, De Bilt, and Copenhagen.

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Sept. 9d. Readings also at 1h. (Istanbul), 3h. (Mount Wilson, Pasadena, and Tucson), 5h. (Santiago, Christchurch, La Paz, Mount Wilson, Pasadena, Riverview, Brisbane, and Sydney), 6h. (Sverdlovsk, Tashkent, Copenhagen, and Nagoya), 7h. (Medan), 8h. (Lick, Berkeley, Branner, Fresno, and San Francisco), 9h. (Sverdlovsk, Tashkent, Tiflis, Ksara, Colombo, Hyderabad, Bombay, Kodaikanal, Baku, and Agra), 10h. (Wellington, Lick, and Christchurch), 11h. (Mizusawa), 13h. (Mizusawa), 15h. (Nagoya), 17h. (Medan and Copenhagen), 18h. (Mizusawa), 19h. (Santiago, Strasbourg, Stuttgart, Jena, Trieste, Rome, Prato, Prague, Zurich, Florence, Belgrade, Padova, Budapest, Karlsruhe, Göttingen, Cheb, Ogyalla, Potsdam, Hamburg, and Puy de Dôme), 20h. (Riverside, Samarkand, La Paz, Istanbul, Mount Wilson, and Tucson), 22h. (Istanbul), 23h. (La Paz).

Sept. 10d. 22h. 23m. 45s. Epicentre 7°·7N. 79°·2E.

Felt strongly in Ceylon and Southern India. Force IV at Palamcoltah and Kodaikanal. Epicentre 7°·7N. 79°·2E. Bombay.

C. W. B. Normand.

Government of India Meteorological Dept. Seismological Bulletin, July-Sept., 1938, Delhi, 1936, p. 61.

A = +·1857, B = +·9736, C = +·1331; $\delta = +10$; $h = +7$;
D = +·982, E = -·187; G = +·025, H = +·131, K = -·991.

		Δ	Az.	P.	O=C.	S.	O=C.	Supp.	L.
				m. s.	s.	m. s.	s.	m. s.	m.
Colombo	E.	1·0	140	0 25	+ 4	—	—	—	—
Kodaikanal	E.	3·0	326	i 0 55k	P*	i 1 40	S ₂	1 15	?
Hyderabad		9·7	354	2 30	PP	4 53	SS*	—	5·6
Bombay		12·7	332	e 3 6	+ 1	e 5 28	SS	i 3 22	PPP
Calcutta	N.	17·2	30	e 4 17	PP	i 7 55	SS	e 4 36	PPP
Agra		19·4	358	4 46	PP	e 8 17	+13	4 56	pP
Medan		19·8	99	e 4 20	-15	—	—	4 54	PP
Dehra Dun	N.	22·5	358	e 5 46?	PPP	i 9 47	SS	—	e 14·1
Andijan		33·5	351	e 7 23	+40	e 13 48	SS	—	—
Samarkand		33·7	342	e 6 51	+ 6	—	—	—	—
Tashkent		34·6	347	e 7 10	+17	e 13 31	SS	i 8 35	PPP
Frunse		35·3	354	e 6 53	- 6	—	—	—	—
Manila		41·5	76	8 7	+17	14 23	+16	—	—
Baku		41·7	326	e 7 56	+ 4	e 14 17	+ 7	—	21·2
Tiflis		45·5	323	8 23	0	15 6	+ 1	e 9 58	PP
Ksara		47·6	308	e 8 39	0	e 15 44	+ 9	e 9 10	P·P
Irkutsk		49·0	20	—	—	e 16 18	PS	e 20 15	SSS
Helwan		49·9	302	e 8 51	- 6	15 55	-12	—	e 28·8
Sverdlovsk		51·1	347	e 9 13	+ 7	17 2	PS	—	26·3
Moscow		58·1	334	e 9 55	- 3	—	—	—	30·8
Rome		67·6	311	10 3	-58	i 19 48	- 9	—	e 39·1
Chur		70·5	317	e 11 13	- 5	—	—	—	—
Copenhagen		70·6	327	i 11 16	- 3	—	—	—	42·3
Zurich		71·3	318	e 11 7	-16	—	—	—	—
Basle		72·0	318	e 11 23	- 5	—	—	—	—
Strasbourg		72·0	319	e 11 22	- 6	e 20 49	0	—	e 45·8
De Bilt		74·1	323	e 11 38	- 2	e 21 11	- 1	—	e 41·3
Uccle		74·5	321	—	—	e 21 11	- 6	—	e 46·3
Oxford		78·1	321	—	—	e 21 51	- 5	—	e 45·8
Harvard	z.	123·4	333	e 18 56	[- 3]	—	—	—	—
Tucson		139·1	13	e 19 21	[- 8]	—	—	—	—
La Paz	z.	146·9	251	i 19 37	[- 5]	—	—	—	77·3

Additional readings:—

Bombay iSSEN = +5m.56s., iE = +6m.1s., iEN = +5m.47s., iSEN = +7m.2s.

Calcutta ePPP = +4m.42s., eSSN = +3m.35s.

Agra sSEN = +8m.35s.

Dehra Dun e?N = +6m.56s., iN = +12m.25s.

Andijan e = +18m.24s.

Samarkand e = +14m.23s.

Tashkent e = +13m.12s., i = +15m.1s., +15m.26s., and +15m.50s.

Tucson i = +19m.28s.

Long waves were also recorded at Pulkovo, Puy de Dôme, Potsdam, Bidston, Edinburgh, La Plata, Hamburg, and Kew.

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Sept. 10d. Readings also at 0h. (Samarkand, Frunse, and Andijan), 1h. (Triest), 3h. (Florence), 5h. (Zinsen, Keizyo, Husan, Taikyū, Koti, Nagoya, Hukuoka B, Tashkent, and Sverdlovsk), 6h. (Tiflis), 7h. (near Algiers), 8h. (Santiago), 9h. (Santiago), 12h. (San Javier and Samarkand), 14h. (Fordham and Harvard), 16h. (Tashkent and Sverdlovsk), 17h. (Huancayo and La Paz), 19h. (La Paz), 20h. (Santiago), 21h. (Santiago and Triest), 22h. (Pasadena, Mount Wilson, Riverside, La Paz, Tucson, Harvard, and Grozny), 23h. (Grozny and Tiflis).

September 11d. 8h. Local shock.

Piatigorsk $iP_g = 22m.0s.$
 Grozny $eP = 22m.2s., P_g = 22m.4s., i = 22m.6s., 22m.15s., iS_g = 22m.32s.$
 Tiflis $iP = 22m.2s., iL = 22m.19s.$
 Tashkent $i = 22m.15s., 24m.23s., e = 29m.19s., eL = 30.4m.$
 Erevan $eP = 22m.27s., e = 23m.30s.$
 Sochi $eP = 22m.35s., eS_g = 23m.20s.$
 Baku $eP = 23m.11s., S = 24m.0s.$
 Sebastopol $e = 23m.36s.$
 Theodosia $e = 23m.53s.$
 Simferopol $e = 24m.12s.$
 Ksara $iP = 24m.23s., e = 26m.47s.$
 Moscow $e = 24m.53s., 26m.20s., 27m.45s., 28m.14s.,$ and $29m.43s.$
 Sverdlovsk $P = 25m.37s., eS = 28m.54s., L = 32.0m.$
 Yalta $e = 25m.43s.$
 Pulkovo $e = 25m.56s.$ and $32m.22s.$
 Andijan $e = 26m.33s.$ and $34m.12s.$
 Frunse $e = 26m.34s.$

Sept. 11d. 17h. 20m. 8s. Epicentre $40^\circ 2'N. 142^\circ 3'E.$ (as on 1937 Dec. 11d.).

$A = -06060, B = +4684, C = +6429; \delta = -5; h = -2;$
 $D = +612, E = +791; G = -509, H = +393, K = -766.$

	Δ	Az.	P.		O-C.		S.		O-C.		Supp.	L.
			m.	s.	s.		m.	s.	m.	s.		
Mizusawa	1.4	220	i 0	23	- 4	i 0	40	- 6	---	---	---	---
Nagoya	6.6	221	e 1	31	-10	2	52	- 6	---	---	---	---
Vladivostok	8.3	294	e 2	14	+10	e 4	18	S*	---	---	---	e 4.8
Hukuoka B	11.6	239	e 2	55	+ 5	---	---	---	---	---	---	---
Taikyū	11.6	253	e 2	49	- 1	e 7	3	?	---	---	---	---
Husan	11.7	248	e 1	51	-60	---	---	---	---	---	---	---
Keizyo	N. 12.2	264	3	10	PP	---	---	---	---	---	---	8.1
Zinsen	E. 12.5	262	e 3	4	+ 2	---	---	---	---	---	---	e 7.4
Irkutsk	28.6	308	e 6	1	+ 1	e 10	3	-45	---	---	---	e 14.1
Manila	31.6	222	e 4	28	?	11	28	- 7	---	---	---	---
Almata	47.7	297	e 8	51	+11	---	---	---	---	---	---	---
Calcutta	N. 48.6	266	---	---	---	e 15	45	- 4	---	---	---	---
Frunse	49.5	297	e 8	31	-23	---	---	---	---	---	---	---
Andijan	51.8	296	e 8	53	-19	---	---	---	---	---	---	---
Sverdlovsk	53.3	318	i 9	24	+ 1	17	2	+ 8	---	---	---	28.9
Tashkent	53.7	297	i 9	25	- 1	e 17	11	+12	---	---	---	29.8
Samarkand	56.0	296	e 9	37	- 6	---	---	---	---	---	---	---
Moscow	65.2	323	e 10	44	- 1	---	---	---	---	---	---	e 33.0
Baku	67.0	305	e 10	55	- 2	e 19	56	+ 6	---	---	---	34.9
Grozny	67.9	309	e 11	3	+ 1	---	---	---	---	---	---	---
Tiflis	69.4	308	i 11	10	- 2	e 20	57	PS	e 13	52	PP	e 30.9
Mount Wilson	z. 75.4	58	o 11	43	- 4	---	---	---	---	---	---	---
Istanbul	78.9	316	---	---	---	e 21	52?	-13	---	---	---	---
Ksara	79.9	306	i 12	11	- 1	e 22	46	PS	---	---	---	---
Tucson	81.2	56	e 12	11	- 8	---	---	---	---	---	---	---
Stuttgart	82.2	331	e 12	22	- 2	---	---	---	---	---	---	e 45.9
Strasbourg	82.9	332	e 12	16	-12	---	---	---	---	---	---	e 52.1
Helwan	85.4	306	i 12	39	- 1	---	---	---	---	---	---	---
Rome	86.5	325	---	---	---	e 23	12	[+ 1]	---	---	---	---

Long waves were also recorded at Pulkovo, Belgrade, Prague, Paris, Uccle, Copenhagen, Puy de Dôme, San Fernando, Bidston, Potsdam, and De Bilt.

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Sept. 11d. 19h. 41m. 26s. Epicentre 40°·2N. 142°·3E. (as at 17h.).

A = -·6060, B = +·4684, C = +·6429; $\delta = -5$; $h = -2$.

	Δ	Az.	P.	O-C.	S.	O-C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Mizusawa	1·4	220	i 0 26	- 1	i 0 46	0	—
Nagoya	6·6	221	e 1 33	- 8	2 57	- 1	—
Vladivostok	8·3	294	e 2 4	0	e 4 8	SSS	e 4·9
Taiyky	11·6	253	e 2 48	- 2	e 7 16	?	—
Keizyo	E. 12·2	264	e 3 9	PP	—	—	—
Zinsen	E. 12·5	262	e 3 9	+ 7	—	—	e 7·7
Irkutsk	28·6	308	e 6 5	+ 5	e 11 1	+13	17·1
Manila	31·6	222	7 3	+37	12 58	SS	—
Calcutta	N. 48·6	266	—	—	e 16 4	+15	—
Sverdlovsk	53·3	318	e 9 27	+ 4	e 17 6	+12	26·6
Tashkent	53·7	297	e 9 27	+ 1	—	—	—
Pulkovo	65·8	330	—	—	e 26 10	?	—
Baku	67·0	305	e 10 57	0	e 20 28	PS	e 37·1
Grozny	67·9	309	e 11 0	- 2	—	—	—
Tiflis	69·4	308	e 11 12	0	e 20 40	PS	e 34·6
Mount Wilson	Z. 75·4	58	e 11 41	- 6	—	—	—
Ksara	79·9	306	i 12 15	+ 3	e 22 24	+ 8	—
Stuttgart	82·2	331	e 12 19	- 5	—	—	e 46·6
Rome	86·5	325	—	—	23 48	PS	—

Additional readings:—

Irkutsk e = +14m.8s.

Tiflis eE = +19m.52s.

Long waves were also recorded at De Bilt, Potsdam, Bidston, Moscow, San Fernando, Strasbourg, Puy de Dôme, Copenhagen, Kew, Uccle, and Hukuoka B.

Sept. 11d. Readings also at 2h. (Santiago, Andijan, and Frunse), 4h. (San Juan, Harvard, Weston (3), and Fort de France), 6h. (La Paz), 7h. (Santiago), 8h. (Grozny (2), Tiflis (2), and Piatigorsk (4)), 9h. (Taihoku, Grozny, and Tiflis), 11h. (Frunse and Almata), 14h. (Sverdlovsk, Bombay, Tashkent, and Calcutta), 15h. (Irkutsk, Tashkent, and Tiflis), 18h. (Mizusawa, Istanbul, and Wellington), 19h. (Budapest), 20h. (Istanbul), 21h. (Frunse, Andijan, and Samarkand), 23h. (Mizusawa, Williamstown, Fort de France, Weston, and Harvard).

Sept. 12d. 5h. Local Japanese shock.

Tokyo, Imp Univ. P = 24m.36s., S = 24m.56s.

Komaba P = 24m.39s., S = 24m.59s.

Mitaka P = 24m.46s., S = 25m.7s.

Tukubasan P = 24m.46s., S = 24m.55s.

Mizusawa PE = 24m.54s., iSE = 25m.28s.

Susaki P = 24m.57s., S = 25m.29s.

Kiyosumi P = 25m.2s., S = 25m.23s.

Koyama P = 25m.2s., S = 25m.29s.

Titibu P = 25m.2s., S = 25m.23s.

Yosiwara P = 25m.2s., S = 25m.38s.

Nagoya eP = 25m.13s., S = 25m.56s.

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Sept. 12d. 6h. 10m. 36s. Epicentre 40°·4N. 125°·1W. (as on 1937. May 6d.).

Felt in the area of Humboldt, VI at Ferndale, Petrolia, Scotia.

Macroseismic area 20,000 sq. miles.

Epicentre California 40°·3N. 124°·8W. (U.S.C.G.S.).

See Abstracts of earthquake reports from the Pacific Coast, U.S.C.G.S., M-S-A. 19, pp. 15-27, and one chart.

De Bilt quotes Epicentre 40°·2N. 125°·0W. (J.S.A.).

A = -·4391, B = -·6248, C = +·6456; $\delta = -2$; $h = -2$;
D = -·818, E = +·575; G = -·371, H = -·528, K = -·764.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o.	m. s.	s.	m. s.	s.	m. s.	m. s.	m.
Ferndale	0·6	75	i 0 14	- 1	i 0 21	- 5	i 0 19	S _g
Ukiah	1·9	131	i 0 34	0	i 0 51	- 8	—	—
Berkeley	3·4	138	i 0 52	- 3	e 1 22	-15	i 0 57	P*
San Francisco	3·4	140	e 0 53	- 2	i 1 31	- 6	2 7	S _g
Branner	E. 3·8	141	e 1 24?	P _g	—	—	—	—
Lick	4·1	137	e 1 3	- 2	i 1 45	-10	—	—
Fresno	N. 5·5	129	e 1 23	- 2	e 1 59	-31	—	—
Tinemaha	6·3	120	e 1 39	+ 3	i 2 59	+ 9	—	—
Haiwee	7·0	125	i 1 47	+ 1	i 3 21	+13	—	—
Santa Barbara	Z. 7·3	143	i 1 49	- 1	i 3 13	- 2	—	—
Seattle	7·5	14	—	—	e 3 20	0	—	e 3·9
Mount Wilson	8·4	134	e 2 4	- 2	e 3 56	+13	—	—
Pasadena	8·4	136	e 2 2	- 4	i 3 32	-11	—	i 3·9
Riverside	8·9	133	e 2 11	- 1	—	—	—	—
La Jolla	9·8	138	e 2 30	+ 6	—	—	—	—
Butte	10·7	54	e 2 37	- 1	4 55	SS	—	e 5·8
Tucson	14·1	121	i 3 23	0	e 6 3	+ 1	3 41	PP
Denver	15·5	85	e 3 4	-38	e 6 58	SS	i 3 52	PP
Saskatoon	17·3	41	e 4 6	+ 2	—	—	—	e 8·4
Florissant	26·7	83	e 5 40	- 3	e 10 14	- 3	e 6 17	PP
St. Louis	26·9	83	—	—	i 10 17	- 3	e 11 17	SS
Cape Girardeau	N. 27·8	85	e 6 25	PP	e 10 34	- 1	e 6 49	PPP
College	27·8	339	—	—	e 10 24?	-11	—	—
Chicago	28·1	75	e 5 56	+ 1	e 10 32	- 8	—	e 13·1
Columbia	35·4	86	—	—	e 12 31	- 3	—	e 17·8
Ottawa	36·1	65	7 5	0	12 42	- 3	—	18·4
Philadelphia	37·7	74	e 7 17	- 2	e 13 4	- 6	e 8 40	PP
Vermont	38·0	66	—	—	e 13 14	0	—	e 15·7
Williamstown	38·2	68	i 7 23	0	e 16 2	SS	8 42	PP
Fordham	38·4	72	i 7 26	+ 1	i 13 18	- 2	—	i 19·9
Seven Falls	39·1	62	—	—	e 13 30	- 1	—	19·4
Harvard	39·6	69	i 7 35 _a	0	e 13 37	- 1	e 20 24?	L _g
Weston	39·8	69	i 7 37	+ 1	e 13 43	+ 1	e 9 9	PP
East Machias	42·0	65	—	—	e 14 10	- 4	—	e 17·3
San Juan	54·8	95	—	—	i 17 11	- 3	e 20 47	SS
Fort de France	60·8	95	e 13 24?	PPP	e 25 30	SSS	—	—
Huancayo	69·6	128	—	—	20 20	- 1	25 5	SS
Oxford	76·0	32	—	—	e 21 41	+ 7	—	e 23·4
Pulkovo	78·1	12	—	—	e 31 17	SSS	—	e 31·4
De Bilt	78·3	29	—	—	e 22 2	+ 3	—	e 34·4
Uccle	79·0	31	—	—	e 22 11	+ 5	—	e 34·4
Paris	79·8	33	e 17 24?	PPP	—	—	—	39·4
Sverdlovsk	83·0	357	—	—	22 50	+ 3	—	34·4
Rome	89·5	30	—	—	e 23 56	+ 6	—	e 39·4
Ksara	104·1	17	i 14 36	+29	e 29 1	PPS	—	46·4

Additional readings:—

Tucson i = +3m.27s. and +3m.31s.

Denver eN = +5m.24s., iE = +5m.37s., iN = +5m.56s.

Florissant eS = +10m.17s., iSS = +11m.27s.

St. Louis eS_ePN = +11m.43s.

Cape Girardeau eSSN = +11m.24s.

Ottawa eN = +16m.24s.?

Weston eSSN = +16m.36s.

Long waves were also recorded at Stonyhurst, Kew, Copenhagen, Bidston, Edinburgh,

Stuttgart, La Paz, Strasbourg, Puy de Dôme, Tiflis, Baku, and Potsdam.

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Sept. 12d. Readings also at 0h. (Jena), 3h. (Mizusawa, Rome, and Nagoya), 4h. (Rome), 5h. (Mizusawa and Riverside), 7h. (Bozeman), 8h. (Riverside, Pasadena, and Tucson), 12h. (Manila), 13h. (Samarkand), 15h. (Samarkand, Andijan, Tchinkent, Frunse, Almata, and Fordham), 16h. (Ferndale, Trieste, and Istanbul), 18h. (Tifis, Wellington, Christchurch, and New Plymouth), 19h. (Rome), 20h. (Balboa Heights, Branner, Samarkand, Andijan, Tchinkent, and Frunse), 21h. (Tananarive), 22h. (Rome and Ferndale).

Sept. 13d. Readings at 0h. (La Plata), 1h. (Harvard, near Santiago, Tucson, Tinemaha, and Pasadena), 2h. (Tifis), 4h. (Mizusawa, Lick, and Berkeley), 5h. (Huancayo and La Paz), 7h. (Wellington), 14h. (Ottawa), 17h. (Ottawa (2)), 19h. (La Paz), 20h. (Ferndale), 21h. (Branner), 23h. (Wellington, Christchurch, New Plymouth, La Paz, Hastings, and Tuai).

Sept. 14d. Readings at 0h. (Ferndale), 1h. (near Batavia and Malabar), 3h. (Baku, Irkutsk, Sverdlovsk, La Paz, Tashkent, Nagoya, and near Mizusawa), 6h. (Wellington, Samarkand, and near Andijan), 7h. (Kodaikanal), 8h. (Tucson, Mount Wilson, Pasadena, Riverside, Phu-Lien, Heizyo, Husan, Keizyo, Taikyu, Zi-ka-wei, Vladivostok, Zinsen, Manila, Hong Kong, near Taihoku, and near Mizusawa), 9h. (Bombay, Calcutta, Irkutsk, Sverdlovsk, Medan, Tashkent, Ksara, Moscow, Pulkovo, Baku, De Bilt, Stonyhurst, Bidston, Tifis, Edinburgh, Puy de Dôme, Strasbourg, Cheb, Uccle, Copenhagen, Hamburg, Potsdam, Kew, and Upsala), 10h. (near Malaga), 12h. (Bombay, Calcutta, Kodaikanal, Tashkent, Baku, Tifis, Ksara, and Sverdlovsk), 13h. (Sverdlovsk and Nagoya, and near Mizusawa), 14h. (Baku and Tacubaya), 17h. (near Tananarive), 18h. (Tucson, near Fordham, Harvard (2), Mount Wilson, Pasadena, and Riverside), 21h. (near Mizusawa), 22h. (Mount Wilson, Pasadena, and Merida), 23h. (Merida, Oaxaca, Tacubaya, Mount Wilson, Tucson, and Weston).

Sept. 15d. Readings at 2h. (Grozny and Tifis), 4h. (Bergen), 5h. (Rome, Ksara, and Tifis), 8h. (Frunse, Samarkand, Andijan, Tashkent, and Baku), 10h. (Tacubaya, Oaxaca, and La Paz), 13h. (Copenhagen, Grozny, and Tifis), 14h. (Rome, Tifis, Trieste, Ksara, and Sofia), 15h. (Nagoya, Bucharest, and Istanbul), 16h. (near Algiers), 18h. (Harvard, Weston, and Fordham), 22h. (Manila), 23h. (Manila and La Paz).

Sept. 16d. 6h. Local shock. Pasadena suggests epicentre approx. $36^{\circ}4N$. $121^{\circ}2W$.

Lick $iP_g = 11m.16s.$, $iS_g = 11m.30s.$

Branner $iP_g = 11m.21s.$, $iS_g = 11m.38s.$

Berkeley $iPZ = 11m.26s.$, $iSZ = 11m.46s.$, $iN = 11m.49s.$

San Francisco $eP^*N = 11m.29s.$, $eN = 11m.46s.$, $eSE = 11m.48s.$

Fresno $iSN = 11m.34s.$

Santa Barbara $iPZ = 11m.40s.$, $eSN = 12m.20s.$

Tinemaha $iPZ = 11m.42s.$, $iSEN = 12m.13s.$

Haiwee $iPE = 11m.45s.$, $iSE = 12m.20s.$

Mount Wilson $iPZ = 11m.54s.$

Pasadena $ePZ = 11m.54s.$, $iSE = 12m.33s.$

Tucson $eP = 13m.23s.$, $L = 17m.39s.$

Long waves also recorded at Harvard, Baku, La Paz, Sverdlovsk, Tifis, and other European stations.

Sept. 16d. Readings at 0h. (near Florence), 1h. (Samarkand), 2h. (Grozny, Tucson, Bucharest, near Sofia, near Erevan, and Tifis), 4h. (Brisbane, Ksara, Puy de Dôme, Strasbourg, Rome, Kew, Uccle, La-Paz, Bidston, De Bilt, Granada, Sverdlovsk, Tifis, Istanbul, Baku, Tashkent, Huancayo, Harvard, and Weston), 5h. (Ksara, Tifis, Andijan, Almata, Frunse, De Bilt, Granada, Apia, Christchurch, Wellington, Brisbane, Riverview, Tucson, Mount Wilson, Pasadena, Riverside, and Tinemaha), 6h. (Huancayo, Tashkent, near Tifis, Grozny, Erevan), 7h. (Grozny, Rome, and Tifis), 10h. (Malabar), 12h. (Tifis and Malabar), 16h. (Tifis), 19h. (Vladivostok, Tashkent, Strasbourg, near Bagnères, and Puy de Dôme),

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Sept. 17d. 3h. 34m. 26s. Epicentre 35°·5N. 90°·3W.

E. J. Walter.

The Arkansas Earthquake of Sept. 17d., 1938. Reprint from Bulletin of the Seismological Society of America, Vol. 29, No. 3, July, 1939, pp. 497-503. Isoseismic chart, p. 500.

Force IV. in an area of 90,000 sq. kms. Epicentre 35°28'N. 90°20'W., about 32 miles S.E. of Jonesboro.

A = -·0043, B = -·8160, C = +·5781; $\delta = +7$; $h = 0$;
D = -1·000, E = +·005; G = -·003, H = -·578, K = -·816.

	Δ	Az.	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Cape Girardeau	1·9	19	e 0 36	+ 2	1 2	+ 3	1 0 43	P _g
St. Louis	3·2	1	e 0 54	+ 2	1 1 30	- 2	1 0 59	P*
Florissant	3·3	359	e 0 56	+ 3	1 1 34	- 1	e 1 2	P*
Cincinnati	5·9	50	—	—	i 2 45	+ 5	1 3 6	S _g
Chicago	6·7	17	—	—	e 3 23	—	—	—
Denver	12·3	294	—	—	e 4 50	-28	1 5 46	SS
Fordham	14·0	62	e 3 0	-22	e 6 18	SS	1 6 39	SSS
Ottawa	14·8	44	e 3 9	-23	—	—	—	—
Williamstown	15·1	56	e 3 13	-23	i 6 32	+ 7	e 6 52	SSS
Harvard	16·1	59	e 3 48	- 1	e 6 38	-11	e 7 34	SSS
Weston	16·3	55	i 3 50	- 2	i 6 52	- 1	i 4 5	PP
Shawinigan Falls	17·1	45	e 4 4	+ 2	—	—	—	—
Tucson	17·3	265	e 4 3k	- 1	e 7 32	+16	—	—

Additional readings:—

St. Louis iPE = +1m.7s., iS*E = +1m.35s., iS_gN = +1m.41s.
Florissant e = +59s., iS* = +1m.38s., iS_g? = +1m.46s., iS_g* = +1m.49s.
Chicago iS = +3m.26s.
Fordham iP = +3m.30s.
Williamstown i = +3m.32s., iS? = +7m.50s.
Harvard iSN = +8m.34s.
Weston ePPP = +4m.8s., iS = +7m.2s., iSS = +7m.38s.
Tucson i = +5m.14s.
Long waves were also recorded at other American stations.

Sept. 17d. 17h. 20m. 12s. Epicentre 33°·6N. 109°·1W. (as given by J.S.A.).

A = -·2731, B = -·7887, C = +·5508; $\delta = +1$; $h = +1$;
D = -·945, E = +·327; G = -·180, H = -·520, K = -·835.

	Δ	Az.	P. m. s.	O-C. s.	S. m. s.	O-C. s.	Supp. m. s.	L. m.
Tucson	2·0	227	i 0 41	+ 6	i 1 12	S _g	—	—
Denver	6·9	27	—	—	e 2 48	-17	e 3 59	S _g
Riverside	z.	6·9	e 1 54	+ 9	i 3 21	S*	—	i 4·0
Pasadena	z.	7·5	e 2 6	P*	e 3 47	S*	—	i 4·4
Mount Wilson	z.	7·5	i 2 4	P*	—	—	—	—
Halwee	7·7	292	e 2 16	P*	—	—	—	—
Tinemaha	8·3	298	e 2 23	P*	—	—	—	—
Fresno	N.	9·3	e 2 37	P*	—	—	—	e 5·2
Lick	10·9	294	e 2 59	P*	—	—	e 3 5	e 6·1
Branner	11·3	293	e 3 20	+34	—	—	—	e 6·5
Little Rock	13·9	80	e 3 22	+ 1	e 5 53	- 4	i 6 33	SS
Florissant	16·0	65	e 3 48	0	e 6 43	- 3	e 4 5	PP
St. Louis	16·1	65	e 3 49	0	e 6 42	- 7	i 8 8	SS
Philadelphia	27·8	67	—	—	e 10 52	+17	—	e 14·1

Additional readings:—

Tucson i = +4s., +53s., +3m.8s., +4m.56s., +5m.8s., and +5m.49s.
Denver eN = +2m.55s., eE = +2m.59s., eS = +3m.17s., eN = +3m.55s. and +4m.4s.
eE = +4m.8s., iN = +4m.15s.
Little Rock eSEN = +6m.5s.
Florissant e = +3m.54s., eS = +6m.47s. and +6m.51s., e = +7m.2s. and +7m.50s.
St. Louis iP_gPEN = +9m.35s.
Long waves were also recorded at Berkeley, Ferndale, Ukiah, Butte, Harvard, Williams-town, Weston, Chicago, and Fordham.

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Sept. 17d. Readings also at 1h. (near Nagoya), 2h. (Oaxaca and Tacubaya), 3h. (Tucson, Mount Wilson, Riverside, Pasadena, Tinemaha, Merida, and near St. Louis), 4h. (Helwan), 5h. (Apia, Malabar, and Tucson), 6h. (Huancayo and La Paz), 7h. (Moncalieri, Harvard, Williamstown, Tucson, and near St. Louis), 8h. (Florence (2) and near Tananarive), 11h. (Mizusawa and Tiflis), 12h. (Apia and near Tananarive), 14h. (Tucson, Berkeley, Branner, San Francisco, near Fresno, Lick, Haiwee, Mount Wilson, Pasadena, Santa Barbara, Riverside, Tinemaha, and near Nagoya), 16h. (Grozny and Tucson (2)), 18h. (Tucson), 19h. (Samarkand, Perth, Fordham, and Tucson), 20h. (Mizusawa and Tucson), 21h. (Tiflis and Tucson), 22h. (Nagoya and near Mizusawa).

Sept. 18d. 0h. 38m. 35s. Epicentre 9°·5N. 40°·3E. (epicentre given by Bombay).

A = +·7524, B = +·6381, C = +·1640; δ = +17; h = +7;
D = +·647, E = -·763; G = +·125, H = +·106, K = -·987.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Helwan	21·9	339	i 4 55	- 2	9 5	+11	5 23	PP
Ksara	24·5	351	i 5 21k	- 1	9 55	+15	e 5 59	PP
Baku	31·9	14	e 6 29	0	e 11 52	+12	—	e 16·4
Tiflis	32·3	7	e 6 28	- 5	e 11 44	- 2	7 28	PP
Bombay	32·8	70	i 6 36	- 1	e 11 40	-14	e 7 48	PP
Grozny	34·0	8	e 6 47	- 1	—	—	—	—
Hyderabad	37·9	74	7 21	+ 1	13 12	- 1	8 44	PP
Rome	40·5	329	e 7 44	+ 2	e 13 40	-12	e 16 44	SS
Tashkent	40·7	34	i 7 42	- 2	e 13 36	-19	i 9 9	PP
Andijan	42·1	37	e 8 19	+24	—	—	—	—
Moscow	46·2	358	e 8 30	+ 2	e 15 15	0	—	—
Zurich	46·3	331	e 8 34	+ 5	—	—	—	25·9
Stuttgart	47·0	333	e 8 35	0	e 15 30	+ 4	e 10 26	PP
Strasbourg	47·6	332	e 8 40	+ 1	e 18 55	SS	e 10 31	PP
Potsdam	48·1	338	—	—	e 15 25?	-17	—	—
Sverdlovsk	49·8	14	e 8 52	- 4	e 16 6	0	—	—
Pulkovo	50·7	354	e 9 3	0	e 16 17	- 1	—	—
De Bilt	51·2	333	e 9 9	+ 2	—	—	—	e 27·4

Additional readings:—

Helwan e = +5m.50s. and +6m.51s., i = +11m.28s. and +12m.37s.

Ksara eSS = +11m.3s.

Tashkent e = +15m.10s. and +16m.24s.

Andijan e = +25m.41s.

Stuttgart e = +18m.53s.

Long waves were also recorded at Irkutsk, Malaga, Puy de Dôme, Uccle, San Fernando,

Averroes, Toledo, Copenhagen, and Istanbul.

Sept. 18d. 1h. 29m. 28s. Epicentre 48°·0N. 151°·0E.

A = -·5874, B = +·3256, C = +·7409; δ = -1; h = -5;
D = +·485, E = +·875; G = -·648, H = +·359, K = -·672.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Mizusawa	11·4	223	2 34	-13	i 4 9	-47	—	—
Vladivostok	14·2	257	e 3 20	- 4	e 6 13	+ 9	—	e 6·9
Nagoya	16·5	224	e 3 49	- 5	e 6 35	-23	—	—
Keizyo	20·4	250	4 12	-29	8 32	+ 7	—	—
Zinsen	20·7	251	e 4 34	-10	e 8 15	-16	—	—
Husan	20·8	242	e 5 0	+15	—	—	—	—
Irkutsk	29·8	298	—	—	i 10 55	-12	—	e 17·0
College	36·1	40	e 7 13	+ 8	e 13 0	+15	—	e 15·8
Hong Kong	39·0	243	7 30	0	13 2	-27	8 44	PP
Manila	41·6	228	e 8 0	+ 9	13 32	-36	—	—
Almata	50·1	296	e 9 6	+ 7	—	—	—	—
Frunse	51·8	296	e 8 35	-37	—	—	—	—
Sverdlovsk	51·9	318	9 15	+ 3	e 16 42	+ 7	—	—
Andijan	54·4	295	e 9 29	- 2	e 17 15	+ 6	—	—
Tashkent	55·9	297	e 9 40	- 2	i 17 26	- 3	—	e 27·1

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Scoresby Sund	61.7	359	—	—	18 59	+15	—	26.5
Pulkovo	62.2	332	—	—	e 19 30	PPS	—	e 33.0
Moscow	62.6	326	e 10 29	+ 1	e 19 41	PPS	e 11 36	PP
Pasadena	z. 66.0	66	i 10 49	— 1	—	—	—	e 26.0
Mount Wilson	z. 66.1	66	i 10 48	— 3	—	—	—	—
Riverside	66.6	66	e 10 51	— 3	—	—	—	—
Baku	67.7	308	e 11 5	+ 4	e 20 5	+ 7	—	e 35.5
Grozny	67.8	312	e 11 11	+ 9	—	—	—	—
Tifis	69.6	311	i 11 13	0	e 20 24	+ 3	e 16 3	PP
Copenhagen	71.0	339	—	—	20 32?	- 5	—	36.5
Tucson	71.8	63	i 11 25 _a	- 1	—	—	e 14 3	PP
Potsdam	73.7	337	—	—	e 24 32?	?	—	—
Cheb	76.0	336	—	—	e 21 32?	- 2	—	—
Florissant	77.8	47	e 12 5	+ 4	e 22 2	+ 9	—	—
Stuttgart	78.1	337	—	—	e 22 6	+10	—	e 43.5
Strasbourg	78.7	338	—	—	e 24 56	?	—	e 45.2
Zurich	79.5	337	i 12 14	+ 4	—	—	—	—
Ksara	80.0	311	i 12 17	+ 4	e 22 23	+ 6	e 23 8	PS
Harvard	z. 82.4	31	i 12 27	+ 2	—	—	—	41.0
Rome	83.3	330	e 12 27	- 3	i 22 52	+ 2	e 23 28	PS
Helwan	85.5	311	—	—	e 23 2	[- 2]	e 28 17	SS

Additional readings :-

Scoresby Sund ? = +20m.21s.

Moscow e = +15m.8s.

Pasadena eZ = +11m.24s.

Mount Wilson iZ = +11m.23s.

Tifis ePSZ = +21m.7s.

Rome e = +23m.2s.

Long waves were also recorded at De Bilt, Upsala, Uccle, and Puy de Dôme.

Sept. 18d. 3h. 50m. 28s. Epicentre 38°·3N. 23°·8E. (as on 1938 July 20d.).

A = +·7199, B = +·3175, C = +·6172; $\delta = 0$; $h = -1$;
D = +·404, E = -·915; G = +·565, H = +·249, K = -·787.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Sofia	4.4	356	e 1 16	P*	i 2 22	S _r	i 1 31	P _r
Istanbul	4.9	54	(1 35)	P _r	(3 6)	?	—	—
Bucharest	6.3	15	e 1 50 _a	P*	i 2 52	+ 2	2 1	P _r
Belgrade	7.0	340	e 1 46 _a	0	i 3 17	+ 9	2 10	P _r
Kecskemet	z. 9.1	342	i 2 17	+ 3	e 4 1	+ 1	4 53	S _r
Rome	9.4	296	i 2 11	- 7	i 3 56	-11	—	—
Sebastopol	9.6	46	2 41	PPP	—	—	—	—
Budapest	9.8	341	2 27	+ 3	e 4 54	S*	—	i 5.7
Yalta	9.9	48	2 43	PPP	—	—	—	—
Simferopol	10.2	46	2 46	PPP	—	—	—	e 5.8
Laibach	10.3	321	e 2 39	PP	i 6 2	?	—	—
Ogyalla	10.4	338	2 35	+ 1	e 4 32?	0	e 4 52	SS
Helwan	10.5	141	i 2 47	PP	i 4 42	+ 7	—	—
Triest	10.5	318	e 2 33	- 2	i 5 19	+44	—	—
Ksara	10.8	111	i 2 58	PPP	5 23	L	—	(5.4)
Florence	10.9	304	2 42	+ 2	4 32	-12	—	—
Theodosia	11.0	48	3 0	PPP	—	—	—	—
Padova	11.4	313	e 2 41	- 6	i 4 45	-11	—	—
Prague	13.5	333	3 15 _a	0	e 5 31	-16	—	—
Moncalieri	13.7	304	2 32?	-46	5 12	-40	—	8.2
Cheb	14.3	329	e 3 26	0	e 5 52	-14	—	e 7.7
Stuttgart	14.8	320	e 3 27 _a	- 5	e 5 56	-22	e 3 52	PP
Basle	15.0	313	e 3 28	- 7	e 5 33	-50	—	—
Neuchatel	15.1	311	e 3 30	- 6	e 6 16	- 9	—	—
Grenoble	15.2	303	e 3 26	-12	e 7 12	SSS	e 4 8	PPP

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.	
	°	°	m. s.	s.	m. s.	s.	m. s.	m.	
Jena	15.3	329	i 3 44	+ 5	e 6 32	+ 2	i 3 56	PP	e 7.5
Karlsruhe	15.4	319	i 3 44	+ 4	e 6 14	-18	—	—	—
Strasbourg	15.4	317	i 3 38	- 2	e 6 22	-10	i 3 48	PP	e 7.7
Piatigorsk	15.6	62	e 4 6	PP	—	—	—	—	—
Potsdam	16.0	335	e 3 50	+ 2	i 6 53	+ 7	e 4 26	PPP	8.3
Erevan	16.2	77	e 4 12	PPP	e 7 36	SSS	—	—	—
Göttingen	16.4	328	i 3 56	+ 3	e 7 3	+ 7	—	—	e 9.2
Tiflis	16.4	71	i 4 11	PP	7 40	SSS	e 4 28	PPP	e 9.5
Algiers	16.5	271	e 3 46	- 8	e 6 58	0	7 51	SSS	e 17.5
Puy de Dôme	17.2	302	e 3 53	-10	—	—	—	—	e 9.0
Grozny	17.3	66	e 3 39	-25	—	—	—	—	—
Hamburg	18.0	333	e 4 15a	+ 2	i 7 31	- 1	—	—	e 9.7
Bagnères	18.5	294	e 4 10	- 9	—	—	e 4 28	PP	10.5
Paris	18.6	311	i 4 18	- 3	i 7 49	+ 3	—	—	10.5
Uccle	18.6	319	i 4 17k	- 4	i 7 35	-11	i 4 35	PP	i 9.1
Copenhagen	19.0	341	i 4 25	- 1	7 53	- 2	—	—	—
De Bilt	19.0	325	i 4 24k	- 2	7 54	- 1	—	—	e 9.3
Moscow	19.7	24	4 42	+ 8	i 8 29	SS	—	—	12.0
Baku	20.3	75	i 4 57	PP	i 8 57	SS	—	—	12.0
Jersey	21.5	310	e 4 47	- 5	e 8 43	- 4	e 5 32?	PPP	e 13.0
Kew	21.5	317	i 4 49a	- 3	i 8 46	- 1	—	—	11.5
Toledo	21.6	283	e 4 46	- 8	e 8 33	-16	e 9 2	SS	—
Granada	21.7	276	e 4 50	- 5	8 56	+ 5	—	—	—
Pulkovo	21.9	9	e 5 1	+ 4	e 9 0	+ 6	—	—	e 11.5
Upsala	21.9	352	i 4 57	0	i 8 56	+ 2	—	—	e 12.9
Oxford	22.1	316	i 4 56k	- 3	8 46	-12	—	—	e 10.7
Malaga	22.4	276	e 4 53	- 9	e 8 52	-12	—	—	10.9
Durham	23.8	323	i 5 13	- 2	i 9 26	- 2	i 9 33	SS	—
Stonyhurst	23.8	320	i 5 12	- 3	i 9 27	- 1	—	—	13.2
Bidston	23.9	318	i 5 29	+13	i 9 27	- 3	—	—	12.5
San Fernando	23.9	275	e 5 7	- 9	e 9 13	-17	e 5 13	PP	13.5
Bergen	25.0	340	e 7 8	—	e 9 52	+ 3	—	—	e 15.5
Edinburgh	25.2	323	e 4 36	-53	i 9 56	+ 4	—	—	13.5
Rathfarnham Castle	25.5	317	6 2	PP	i 10 12	+ 5	—	—	11.6
Averroes	25.7	269	i 5 31	- 2	e 9 53	- 8	i 6 0	PP	e 13.5
Tashkent	34.8	71	i 7 5	+11	i 12 40	+15	—	—	e 17.1
Andijan	37.2	70	e 7 8	- 7	e 12 57	- 5	—	—	—
Frunse	38.4	67	e 7 9	-16	e 13 17	- 3	—	—	22.6
Scoresby Sund	40.0	338	e 7 39	+ 1	13 25	-19	9 17	PP	20.5
Sempalatinsk	41.2	54	e 7 57	+ 9	—	—	—	—	—
Agra	E. 46.4	87	8 41	+11	15 42	+24	10 37	PP	—
Bombay	46.6	100	i 8 41	+ 9	i 15 37	+16	i 10 33	PP	—
Kodaikanal	E. 55.4	105	—	—	e 16 32?	-50	—	—	—
Irkutsk	55.5	47	e 9 50	+11	—	—	e 11 8	PP	e 28.0
Weston	68.7	308	e 11 6	- 1	e 20 32	PS	e 27 40	SSS	—
Harvard	68.8	308	i 11 7	- 1	e 21 32?	PPS	—	—	e 34.5
Ottawa	69.7	313	e 11 12	- 2	e 20 24	+ 2	—	—	27.5
Williamstown	69.7	308	i 11 13	- 1	—	—	—	—	e 39.0
Fordham	71.2	307	i 11 21	- 2	e 20 49	+ 9	—	—	—
Philadelphia	72.5	307	—	—	e 20 50	- 4	—	—	e 31.4
Florissant	82.3	314	i 12 29	+ 4	e 22 39	- 1	—	—	—

Additional readings :-

Sofia $i = +1m.26s.$, $iS_2NE = +2m.41s.$
 Istanbul $P_2 = (+1m.55s.)$; readings have been diminished by 6m.
 Bucharest $eEN = +2m.17s.$, $iEN = +2m.21s.$, $iE = +2m.42s.$, $iEN = +2m.54s.$, $iSE = +3m.7s.$, $iEN = +3m.21s.$ and $+3m.24s.$, $iE = +3m.31s.$, $iEN = +3m.52s.$
 Belgrade $iNW = +2m.24s.$, $i = +2m.57s.$, $iNE = +3m.0s.$, $+3m.20s.$, $+3m.46s.$, and $+4m.1s.$
 Kecskemet $iPPZ = +2m.57s.$
 Rome $i = +2m.21s.$, $+3m.1s.$, $+3m.46s.$, $+4m.22s.$, $+4m.37s.$, and $+4m.57s.$
 Sebastopol $e = +6m.57s.$
 Yalta $e = +6m.10s.$
 Jaibach $eNW = +3m.14s.$, $i = +4m.54s.$
 Ogyalla $ePE = +3m.15s.$, $iN = +4m.57s.$
 Helwan $i = +3m.7s.$, $e = +3m.32s.$ and $+3m.54s.$
 Trieste $P_2P_2 = +3m.21s.$

Continued on next page.

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Theodosia e = +6m.41s.
 Stuttgart iP = +3m.30s., e = +4m.53s. and +5m.8s., eSEZ = +6m.15s., eSS = +6m.37s.
 Strasbourg i = +4m.16s. and +5m.48s., eZ = +6m.27s., eSS = +6m.53s.
 Potsdam eN = +5m.2s., eZ = +6m.32s., eEN = +6m.44s., iSSE = +7m.3s., eEZ = +7m.8s., iPcPE = +7m.32s.
 Tiflis iSE = +7m.44s., iE = +8m.6s.
 Algiers i = +3m.51s., eS? = +6m.39s.
 Bagnères eE = +4m.18s., ePPPE = +4m.40s.
 Uccle iE = +5m.7s. and +7m.48s.
 Jersey e = +10m.39s.
 Oxford S = +9m.1s.
 Bergen e = +14m.32s. ?
 Edinburgh i = +5m.8s. and +10m.3s.
 Averroes iPPP = +6m.13s., S = +9m.57s., i = +10m.1s., eSS = +10m.58s.
 Scoresby Sund ? = +14m.25s.
 Bombay eEN = +8m.59s., iE = +16m.0s., eEN = +18m.32s.
 Long waves were also recorded at Almata, Tucson, Vladivostok, Sverdlovsk, Aberdeen, Besançon, and Chur.

Sept. 18d. Readings also at 0h. (Fort de France), 1h. (Pasadena, Mount Wilson, Riverside, and Tucson (2)), 2h. (Helwan and Harvard), 5h. (Ksara and Helwan), 8h. (Balboa Heights and Tucson), 9h. (Neuchatel and Huancayo), 10h. (Wellington and Tucson), 11h. (Tiflis), 12h. (Kodaikanal, Ksara, Baku, Sverdlovsk, and Tashkent), 13h. (Manila, Hong Kong, Taihoku, Phu-Lien, Vladivostok, Irkutsk, near Ferndale, and Ksara), 14h. (Sverdlovsk, Baku, Moscow, Tashkent, Tiflis, Copenhagen, Strasbourg, and De Bilt), 15h. (New Plymouth), 16h. (Fort de France and Tucson (3), near Ferndale), 17h. (Haiwee, Tinemaha, Apia, Tucson (2), Riverside, Mount Wilson, and Pasadena), 18h. (Tucson (3) and La Paz), 19h. (Tucson (4)), 20h. (Tashkent, Moscow, Baku, Sverdlovsk, Helwan, Vladivostok, Irkutsk, Ksara, Tucson (4), Tiflis, Medan, and Rome), 21h. (Tucson (3)), 22h. (Tucson (3), Ksara, and Fort de France).

Sept. 19d. 0h. Undetermined quake.

Focus deep according to Pasadena.

Apia eP = 32m.3s., iS = 33m.13s.
 Wellington P = 35m.3s., S = 38m.42s., S₀S = 45m.44s.
 Pasadena iZ = 41m.45s., 42m.44s., and 53m.0s.
 Mount Wilson iZ = 41m.46s., 42m.45s., and 53m.1s.
 Riverside eZ = 41m.47s., 42m.45s., and 52m.54s.
 Haiwee eE = 41m.54s. and 42m.54s.
 Tinemaha iNEZ = 41m.56s., iZ = 42m.50s.
 Tucson e = 42m.9s., i = 42m.12s., 42m.27s., 43m.7s., 43m.41s., and 43m.59s.
 Sofia eEN = 42m.12s. and 46m.29s.
 Bucharest eEN = 44m.24s., eN = 45m.7s., LN = 48m.32s.
 Balboa Heights eP = 46m.39s., eSN = 47m.30s.
 Sverdlovsk iP = 48m.48s., e = 50m.35s., 51m.59s., 55m.31s., L = 78-0m.
 Tashkent e = 48m.54s., i = 51m.41s., 55m.17s., 56m.48s., 57m.15s., 60m.10s., 61m.40s., 62m.59s., 63m.42s., 65m.59s., and 68m.10s., eL = 83-0m.
 Tiflis eZ = 49m.9s., eEZ = 52m.29s., eZ = 54m.25s.
 Grozny eP = 49m.16s., e = 52m.30s.
 Copenhagen i = 49m.21s.
 Theodosia iP = 49m.23s.
 Simferopol iP = 49m.27s.
 Yalta iP = 49m.28s.
 Ksara iPKP = 49m.34s., ipPKP = 50m.42s., isPKP = 51m.11s., ePP = 53m.11s.
 Hamburg eN = 49m.35s.
 Uccle iZ = 49m.35s. and 50m.38s.
 De Bilt iZ = 49m.36s., 50m.37s., eL = 90-0m.
 Jena eE = 49m.37s.
 Ogyalla e = 49m.38s.
 Strasbourg iPKPZ = 49m.38s., ipPKP = 50m.48s.
 Helwan i = 49m.40s. and 50m.0s.
 Budapest P = 49m.41s.
 Potsdam eNZ = 49m.42s. and 50m.42s.
 Stuttgart e = 49m.43s., 49m.51s., and 50m.36s.
 Zurich e = 49m.45s.
 Toledo eP = 49m.48s., i = 50m.26s., e = 51m.23s.
 Trieste e = 49m.48s., 50m.9s., and 51m.1s.
 Rome i = 50m.4s., 50m.50s., 51m.54s., e = 58m.50s.
 Moscow e = 50m.10s., 52m.50s., and 53m.20s.
 Baku e = 51m.53s., 52m.23s., and 60m.19s., eL = 90m.

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Sept. 19d. Readings also at 0h. (Tucson and near La Paz), 1h. (Tifis), 2h. (Almata, Tucson, Andijan, Tchikent, and Samarkand (2)), 5h. (Cape Girardeau), 7h. (Sverdlovsk, Tashkent, and Calcutta), 8h. (Tucson (2), Fordham, Mount Wilson, Riverside, and Tinemaha), 9h. (Sebastopol, Yalta, Simferopol, Theodosia, Sverdlovsk, and Tashkent), 10h. (Tucson), 11h. (Tucson (2), Fort de France, Batavia, and Malabar), 12h. (Baku, Moscow, De Bilt, College, Harvard, Tucson, Tashkent, Sverdlovsk, Tifis, Tinemaha, Riverside, Mount Wilson, Fordham, La Paz, Irkutsk, Pasadena, Copenhagen, and Ksara), 13h. (Arapuni and Tucson, Pasadena, Mount Wilson, and Riverside), 14h. (Tucson), 15h. (Samarkand), 16h. (Tucson), 17h. (Tucson (2), La Paz, Nagoya, Mount Wilson, and Riverside), 18h. (Mizusawa), 19h. (Irkutsk, Sverdlovsk, and Tashkent), 20h. (Malaga, Berkeley, Lick, Branner, Fresno, near Tananarive, Ksara, Copenhagen, and Tifis), 21h. (Tucson (4)), 22h. (Tifis, Tashkent, Sverdlovsk, and Tucson).

Sept. 20d. 3h. 5m. 8s. Epicentre 7°·0N. 82°·7W.

$$A = +.1261, B = -.9846, C = +.1211; \quad \delta = 0; \quad h = +7;$$

$$D = -.992, E = -.127; \quad G = +.015, H = -.120, K = -.993.$$

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Balboa Heights	3·7	57	e 1 3	+ 3	e 1 23	-22	—	1·7
San Juan	19·7	54	e 4 33	- 1	—	—	—	e 13·3
Huancayo	20·3	158	e 4 39	- 1	8 34	+11	e 5 3	PP e 9·2
Fort de France	22·5	69	e 5 7	+ 5	—	—	—	—
La Paz	N. 27·4	147	6 1	+12	11 21	SS	—	15·3
Tucson	36·3	319	i 7 7	0	—	—	8 55	PPP 20·1
Weston	N. 36·5	14	i 7 5	- 4	i 13 53	+62	—	21·5
Harvard	Z. 36·7	14	i 7 12	+ 2	—	—	—	—
Riverside	Z. 41·8	316	e 7 53	0	—	—	—	—
Mount Wilson	Z. 42·4	316	i 7 58	0	—	—	—	—
Pasadena	Z. 42·4	316	e 7 58	0	—	—	—	—
Haiwee	E. 43·3	318	e 8 18	+13	—	—	—	—
Tinemaha	44·1	318	e 8 12	0	—	—	—	—

Additional readings:—

Huancayo S = + 8m.39s.

Tucson i = + 7m.29s., iP = + 7m.35s.

Tinemaha i = + 8m.19s.

Long waves were also recorded at Sverdlovsk, Vladivostok, and Tashkent.

Sept. 20d. 13h. 31m. 24s. Epicentre 34°·8N. 5°·7W.

Force IV-V at Fez and district, III at Port Lyautey, Casablanca, Sidi Said, and Machon. Epicentre Ouezzane region, 34°·8N. 5°·7W. (Strasbourg). Depth 50km.

J. Debrach.

Tremblements de Terre au Maroc. Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome III, 2e partie Seismologie. Mende 1941, p. 163.

$$A = +.8188, B = -.0817, C = +.5681; \quad \delta = -15; \quad h = 0;$$

$$D = -.099, E = -.995; \quad G = +.565, H = -.056, K = -.823.$$

A depth of focus 0·005 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Averroes	1·6	223	0 32	+ 5	0 48	+ 1	—
San Fernando	1·7	346	i 0 29	+ 1	e 1 19	+29	—
Malaga	2·2	28	e 0 31	- 4	i 0 58	- 4	—
Granada	2·9	35	i 0 43	- 2	1 27	+ 8	—
Toledo	5·2	15	i 0 58	-19	i 2 16	- 1	—
Ksara	34·2	81	e 6 51	+10	—	—	18·6
Pulkovo	34·2	33	e 4 16	?	—	—	—
Moscow	36·2	41	e 7 39	PP	—	—	e 14·1

Additional readings:—

Averroes P_g = +35s., PP = +41s. +57s., iS_g = +1m.2s., iSS = +1m.6s., +1m.14s., +1m.23s., and +1m.38s.

Granada PS = +1m.15s. and +1m.24s.

Toledo eP_g = +1m.14s., i = +2m.4s.

Long waves were also recorded at Strasbourg, Jersey, De Bilt, Cheb, Potsdam, Copenhagen, and Vladivostok.

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Sept. 20d. 13h. New Zealand.

Christchurch eP? = 38m.58s., eS? = 41m.38s., iEN = 41m.48s., eE = 42m.24s., iEN = 43m.24s., iZ = 44m.28s., P_cS? = 48m.16s., S_cS = 51m.22s.
 Brisbane eE = 40m.48s., SEN = 41m.18s., iE = 42m.54s.
 Wellington eP? = 40m.49s., eS? = 42m.45s.
 Sydney eP = 41m.0s., eS = 45m.57s., eL = 49m.3s.
 Riverview ePE = 41m.1s., eSEN = 46m.1s., eLN = 49m.0s.
 Apia i = 41m.7s., eL = 41m.42s.
 Melbourne i = 42m.53s., L? = 51m.30s.
 Pasadena iPZ = 47m.15s., eL = 77m.
 Mount Wilson iPZ = 47m.17s.
 Riverside iPZ = 47m.17s.
 Haiwee iPE = 47m.27s.
 Tinemaha ePNZ = 47m.27s.
 Tucson i = 47m.34s., 47m.38s., 47m.57s., 48m.0s., 48m.13s., 48m.18s., 49m.13s., 49m.21s., 50m.48s., 74m.5s., and 81m.51s.
 Adelaide e = 48m.10s. and 52m.26s.
 Moscow e = 54m.20s., 55m.49s., and 57m.31s.
 Tiflis ePZ = 54m.22s., eZ = 57m.36s., eE = 57m.40s.
 Ksara ePKP = 54m.41s., ePP = 58m.21s., SKSP = 68m.36s., ePPS = 71m.34s.
 Fort de France e = 55m.5s. and 65m.15s.
 Sverdlovsk e = 56m.2s., i = 59m.26s., L = 107m.
 Batavia iE = 56m.22s. and 56m.39s.
 Rome ePKP = 56m.23s., e = 70m.28s. and 86m.50s.
 Fordham i = 64m.48s.
 Huancayo e = 64m.58s.
 Strasbourg e = 65m.8s., eL = 128.5m.
 Long waves were also recorded at Vladivostok, Bombay, Colombo, La Paz, Tashkent, Cheb, Puy de Dôme, Copenhagen, De Bilt, and Harvard.

Sept. 20d. 22h. 4m. 30s. Epicentre 49°·0N. 90°·0E. (Rough).

A = -0000, B = +·6586, C = +·7525; $\delta = +1$; $h = -5$;
 D = +1·000, E = -000; G = -000, H = +·753, K = -·659.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	e	m. s.	s.	m. s.	s.	m. s.	m.
Irkutsk	9·7	65	e 2 20	- 2	e 3 39	-36	—	—
Frunse	12·3	246	e 2 39	-20	i 6 5	SSS	5 35	SS 16·4
Andjian	14·9	243	e 3 43	+ 9	e 8 9	L	—	— (8·1)
Tchinkent	15·7	253	i 3 50	+ 6	i 8 48	L	i 4 6	PPP (8·8)
Tashkent	16·5	250	3 55	+ 1	i 7 15	SS	—	— 8·6
Samarkand	18·8	249	e 4 23	0	e 9 39	L	—	— (9·6)
Sverdlovsk	19·2	307	i 5 30	+62	i 9 19	L	—	— (9·3)
Agra	E. 23·7	206	e 5 3	-11	i 9 36	+ 9	—	—
Calcutta	N. 26·4	183	—	—	e 10 16	+ 4	—	—
Baku	29·5	270	e 6 7	- 1	e 12 15	SS	—	— 18·5
Grozny	30·8	277	e 6 23	+ 3	—	—	—	—
Moscow	32·0	304	e 7 40	PP	e 14 0	SSS	—	— e 21·0
Tiflis	32·2	275	e 6 30	- 2	e 12 55	SS	—	— 14·5
Fulkovo	35·3	312	e 8 24	PP	e 14 32	SS	—	— e 19·8
Ksara	42·4	270	—	—	e 14 52	PPS	e 18 5	SSS 23·1
Tinemaha	90·7	22	e 12 52	-14	—	—	—	—
Mount Wilson	z. 93·5	23	i 13 5	-14	—	—	—	—
Pasadena	z. 93·5	23	i 13 4	-15	—	—	—	—
Riverside	z. 93·8	23	i 13 5	-15	—	—	—	—
Tucson	97·0	18	i 13 21	-14	—	—	—	—

Additional readings :-

Tchinkent i = +4m.43s. and +5m.20s.

Baku e = +14m.37s.

Moscow e = +9m.3s., +10m.5s., +14m.49s., +16m.52s., +18m.7s., +18m.34s., and

+19m.15s.

Tiflis eZ = +13m.15s.

Tucson i = +13m.25s.

Long waves were also recorded at Almata, Bombay, De Bilt, Cheb, Potsdam, Hamburg,

Prague, Copenhagen, Vladivostok, and Rome.

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Sept. 20d. Readings also at 1h. (Mizusawa, Tucson (2), Samarkand, Erevan, and Nagoya), 2h. (Istanbul), 3h. (Wellington and Tucson), 4h. (Tucson, and Little Rock), 5h. (Tucson, Riverside, Pasadena, Mount Wilson, Tinemaha, and Fresno), 8h. (Mount Wilson, Pasadena, Riverside, and Balboa Heights), 10h. (Tucson and Mizusawa), 11h. (Tucson and Tiflis), 12h. (Tucson, Kodaikanal, and Tacubaya), 13h. (Theodosia, Simferopol, Yalta, Tiflis, Frunse, Andijan (2), Almata, Zi-ka-wei, Mount Wilson, Pasadena, Manila, Husan, Vladivostok, Sverdlovsk, Phu-Lien, Keizyo, Zinsen, and Taikyu), 14h. (Ottawa, Tiflis, Tashkent, and Vladivostok), 15h. (Vladivostok, Taikyu, Zinsen, Husan, Phu-Lien, Sverdlovsk, Irkutsk, Manila, Tashkent, Tucson, Ottawa, Bombay, Calcutta, Medan, Ksara, Agra, and Hong Kong), 16h. (Copenhagen, Moscow, Potsdam, De Bilt, Puy de Dôme, Tiflis, Cheb, Ottawa, Strasbourg, and Hamburg), 18h. (Tashkent, Manila, Sverdlovsk, Huancayo, and Rio de Janeiro), 19h. (Hukuoka B and Ottawa), 21h. (Strasbourg and Tucson), 22h. (Keizyo, Zinsen, Mizusawa, Husan, and Taikyu), 23h. (near Ferndale).

Sept. 21d. 11h. 36m. 12s. Epicentre 27°-0N. 139°-5E.

A = -·6784, B = +·5794, C = +·4516; $\delta = -13$; $h = +3$;
D = +·649, E = +·760; G = -·343, H = +·293, K = -·892.

A depth of focus 0-050 has been assumed.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Koti	8·3	323	—	—	e 3 37	+ 5	—	—
Nagoya	8·4	345	i 2 3	+ 3	3 32	- 2	—	—
Hukuoka B	10·2	312	2 32	+11	4 33	SS	—	—
Husan	12·1	314	2 49	+ 5	4 57	+ 3	—	—
Mizusawa	12·2	6	e 2 38	- 7	i 4 43	-13	—	—
Taikyu	12·8	316	2 57	+ 5	5 15	+ 6	—	—
Keizyo	N. 14·9	318	e 3 10	- 6	5 51	- 2	—	—
Zinsen	15·1	317	e 3 14	- 4	e 5 51	- 6	—	—
Heizyo	N. 16·6	320	—	—	i 6 35	+ 9	—	—
Vladivostok	17·3	340	e 3 38	- 3	i 6 27	-12	i 5 19	PPP
Manila	21·2	237	i 4 34	+14	6 29	?	—	—
Irkutsk	36·5	324	e 6 33	- 1	e 11 43	- 8	—	e 14·3
Frunse	54·2	306	e 8 29	-23	—	—	—	—
Tchinkent	58·0	305	e 8 22	-57	—	—	—	—
Tashkent	58·4	304	e 9 22	0	i 16 51	- 5	—	—
Sverdlovsk	61·8	323	i 9 44	0	17 31	- 8	—	25·8
Grozny	74·5	312	e 11 6	+ 4	—	—	—	—
Tiflis	75·8	310	11 9	- 1	e 20 38	+16	e 16 5	PPP e 40·8
Simferopol	81·4	317	e 11 41	+ 1	—	—	—	—
Yalta	81·6	316	e 11 40	- 1	—	—	—	—
Tinemaha	83·1	52	i 11 51	+ 3	—	—	—	—
Haiwee	E. 83·8	52	e 13 24	?	—	—	—	—
Mount Wilson	Z. 84·6	54	i 11 56	0	—	—	i 13 26	pP
Pasadena	Z. 84·6	54	i 11 55	- 1	—	—	i 13 26	pP
Riverside	Z. 85·2	54	i 11 59	0	—	—	e 13 29	pP
Tucson	90·2	53	e 12 24	+ 2	—	—	—	—

Additional readings:—

Vladivostok i = +6m.39s.

Tiflis eE = +20m.48s., eEN = +23m.0s.

Mount Wilson iZ = +12m.0s.

Riverside iZ = +12m.3s.

Tucson i = +12m.28s. and +12m.36s.

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Sept. 21d. 18h. 52m. 3s. Epicentre 36°4N. 141°1E. (as on 1938 June 29d.).

Violent at Mito, strong at Onahama, Tyosi, Tukubasan, Kakioka, Hukushima, Utunomiya, Katura, Kumagaya, Tokyo, Yokohama, slight at Maebasi, Oiwake, and Hunatu. Epicentre Bay of Kasima, 36°35'N. 141°05'E. Macro seismic radius greater than 300kms. Depth 60kms. (Pasadena).

See Seismological Bulletin of the Central Met. Obs., Japan, for the year 1938, Tokyo 1940, pp. 58-60. Macro seismic chart p. 61.

A = -·6279, B = +·5067, C = +·5908; $\delta = +5$; $h = 0$;
D = +·628, E = +·778; G = -·460, H = +·371, K = -·807.

. A depth of focus 0·005 has been assumed.

	Δ	Az.	P.	O-C.		S.		O-C.		Supp.	L.
				m. s.	s.	m. s.	s.	m. s.	s.		
Mito	0·5	268	0 10k	- 3	0 20	- 3	—	—	—	—	
Onahama	0·6	343	0 11	- 3	0 19	- 6	—	—	—	—	
Tyosi	0·7	196	0 13a	- 2	0 21	- 6	—	—	—	—	
Kakioka	0·8	257	0 14k	- 3	0 23	- 6	—	—	—	—	
Tukubasan	0·8	257	0 21k	+ 4	0 31	+ 2	—	—	—	—	
Utunomiya	1·0	279	0 13k	- 6	0 28	- 5	—	—	—	—	
Tokyo, Cent. Met. Obs.	1·3	237	i 0 23k	0	0 43	+ 3	—	—	—	—	
Tokyo, Imp. Univ.	1·3	237	0 21	- 2	0 39	- 1	—	—	—	—	
Aidu	1·4	326	0 22a	- 2	0 37	- 6	—	—	—	—	
Hukushima	1·4	339	0 23k	- 1	0 41	- 2	—	—	—	—	
Komaba	1·4	237	0 21	- 3	0 40	- 3	—	—	—	—	
Kumagaya	1·4	260	0 22k	- 2	0 40	- 3	—	—	—	—	
Katura	1·5	211	0 15	-11	0 30	-15	—	—	—	—	
Kiyosumi	1·5	211	0 29	+ 3	0 51	+ 6	—	—	—	—	
Mitaka	1·5	240	0 21	- 5	0 41	- 4	—	—	—	—	
Yokohama	1·5	231	0 26k	0	0 46	+ 1	—	—	—	—	
Maebasi	1·6	270	0 26k	- 1	0 43	- 4	—	—	—	—	
Kamakura	1·7	229	0 21	- 7	—	—	—	—	—	—	
Titibu	1·7	256	0 29	+ 1	0 49	- 1	—	—	—	—	
Mera	1·8	215	0 30	0	0 56	+ 4	—	—	—	—	
Sendai	1·9	355	0 32	+ 1	0 54	0	—	—	—	—	
Koyama	2·0	239	0 29	- 3	0 56	- 1	—	—	—	—	
Yamagata	2·0	342	0 29k	- 3	0 53	- 4	—	—	—	—	
Hunatu	2·1	245	0 33k	- 1	0 58	- 1	—	—	—	—	
Oiwake	2·1	268	0 28k	- 6	0 50	- 9	—	—	—	—	
Ito	2·2	229	0 36k	+ 1	1 8	+ 6	—	—	—	—	
Kohu	2·2	249	0 34k	- 1	0 59	- 3	—	—	—	—	
Misima	2·2	234	0 33k	- 2	1 4	+ 2	—	—	—	—	
Numadu	2·2	235	0 46k	+11	1 26	+24	—	—	—	—	
Nagano	2·3	277	0 37k	0	1 8	+ 4	—	—	—	—	
Niigata	2·3	313	0 42	+ 5	1 19	+15	—	—	—	—	
Yosiwara	2·3	238	0 29	- 8	1 2	- 2	—	—	—	—	
Susaki	2·4	225	0 37	- 1	1 7	0	—	—	—	—	
Takada	2·4	287	0 38	0	1 24	+17	—	—	—	—	
Matumoto	2·5	266	0 38k	- 1	1 24	+15	—	—	—	—	
Hida	2·8	252	0 43k	- 1	1 15	- 2	—	—	—	—	
Mizusawa	2·9	0	0 42	- 3	i 1 17	- 2	—	—	—	—	
Omaesaki	3·0	232	0 56	+ 9	1 42	+20	—	—	—	—	
Hamamatu	3·2	239	0 50a	+ 1	1 26	- 1	—	—	—	—	
Takayama	3·2	265	0 51k	+ 2	1 32	+ 5	—	—	—	—	
Toyama	3·2	275	0 49	0	1 34	+ 7	—	—	—	—	
Husiki	3·3	277	0 53k	+ 2	1 46	+17	—	—	—	—	
Miyako	3·3	12	0 49	- 2	1 22	- 7	—	—	—	—	
Morioka	3·3	1	0 50a	- 1	1 31	+ 2	—	—	—	—	
Akita	3·4	346	0 54a	+ 2	1 40	+ 8	—	—	—	—	
Hatidyozima	3·4	198	0 54a	+ 2	1 28	- 4	—	—	—	—	
Nagoya	3·5	250	i 0 54	0	1 45	+11	—	—	—	—	
Wazima	3·5	289	0 53k	- 1	1 55	+21	—	—	—	—	
Kanazawa	3·6	274	1 3	+ 8	1 54	+17	—	—	—	—	
Gihu	3·7	256	0 56k	0	1 50	+11	—	—	—	—	

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	o	o	m. s.	s.	m. s.	s.	m. s.	m.
Hukui	3-9	266	0 50k	- 9	1 47	+ 3	—	—
Ibukisan	3-9	256	0 58	- 1	—	—	—	—
Hatinohe	4-1	4	1 1a	- 1	1 57	+ 8	—	—
Hikone	4-1	255	1 2k	0	2 5	+16	—	—
Kameyama	4-1	249	1 0k	- 2	2 11	+22	—	—
Tu	4-1	247	0 57a	- 5	2 3	+14	—	—
Aomori	4-4	357	1 5	- 1	2 1	+ 4	—	—
Kyoto	4-6	254	1 8	- 1	2 18	+16	—	—
Yagi	4-7	248	1 10a	0	2 12	+ 8	—	—
Miyadu	4-8	262	1 12k	0	2 15	+ 8	—	—
Osaka	4-9	252	1 13	0	2 26	+17	—	—
Kobe	5-1	252	1 11	- 5	2 31	+17	—	—
Siomisaki	5-2	238	1 17a	0	2 36	+19	—	—
Toyooka	5-2	262	1 16k	- 1	2 33	+16	—	—
Wakayama	5-3	247	1 18k	- 1	2 25	+ 6	—	—
Hakodate	5-4	357	1 22	+ 2	2 31	+ 9	—	—
Sumoto	5-5	250	1 20k	- 1	2 42	+18	—	—
Mori	5-7	356	1 25	+ 1	2 37	+ 8	—	—
Tokusima	5-8	249	1 27	+ 2	3 2	+30	—	—
Muroran	5-9	0	1 33k	+ 6	2 46	+12	—	—
Urakawa	5-9	12	1 35	+ 8	2 46	+12	—	—
Okayama	6-1	256	1 28	- 2	3 0	+21	—	—
Muroto	6-4	244	1 35a	+ 1	2 55	+ 9	—	—
Sakai	6-4	265	1 25	- 9	3 3	+17	—	—
Obihiro	6-7	13	1 40	+ 2	3 7	+13	—	—
Sapporo	6-7	1	1 46	+ 8	2 55	+ 1	—	—
Kotl	6-8	248	i 1 39a	0	e 2 59	+ 3	e 3 11	SS e 3-2
Kusiro	7-0	24	1 53	+11	3 11	+10	—	—
Matuyama	7-3	252	1 46a	0	3 51	+42	—	—
Asahigawa	7-4	8	1 49	+ 1	3 15	+ 4	—	—
Hirosima	7-4	257	1 43	- 5	3 37	SS	—	—
Hamada	7-5	260	1 53	+ 4	3 15	+ 1	—	—
Simidu	7-6	244	1 51	+ 1	3 43	SS	—	—
Nemuro	7-7	24	1 51	- 1	3 9	-10	—	—
Uwazima	7-7	248	1 50a	- 2	3 24	+ 5	3 40	SS
Haboro	7-9	3	2 39	+44	—	—	—	—
Ooita	8-4	251	2 6	+ 4	4 13	SSS	—	—
Siomisaki	8-6	257	1 59	- 5	4 14	SSS	—	—
Izuka	9-0	255	2 9	- 1	4 28	SSS	—	—
Hukuoka B	9-2	256	2 14	+ 2	4 47	L	—	(4-8)
Miyazaki	9-2	243	2 13a	+ 1	3 59	+ 4	—	—
Kumamoto	9-3	250	2 14	0	4 27	SS	—	—
Saga	9-4	254	2 20	+ 5	5 15	L	—	(5-2)
Unzendake	9-7	251	2 24a	+ 5	4 27	SS	—	—
Husan	9-8	266	2 24	+ 3	4 25	+15	—	—
Vladivostok	9-8	316	i 2 19	- 2	i 4 14	+ 4	—	4-4
Nagasaki	9-9	253	2 26	+ 4	4 33	SS	—	—
Kagosima	10-0	244	2 25	+ 2	5 0	L	—	(5-0)
Taiyu	10-1	271	i 2 26	+ 1	i 4 30	+13	—	—
Yakusima	10-6	239	2 33	+ 2	4 31	+ 2	—	—
Tomie	10-8	253	2 37	+ 3	4 59	SS	—	—
Keizyo	11-4	280	2 49	+ 7	4 57	+ 8	—	—
Zinsen	11-6	280	e 2 44	- 1	e 5 1	+ 7	—	—
Heizyo	12-4	287	i 2 58	+ 2	i 5 4	- 9	—	i 6-7
Nake	12-6	234	2 58	0	5 25	+ 7	—	—
Dairen	15-7	285	3 46	+ 8	8 4	L	—	(8-1)
Zi-ka-wei	17-2	253	e 3 55	- 2	—	—	—	i 9-3
Miyakozima	17-8	234	4 3	- 2	7 23	+ 5	—	—
Isigakizima	18-9	235	4 11	- 7	—	—	—	—
Taiyu	21-4	241	4 56	+12	9 4	SS	—	—

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	Δ	Az.	P.		O-C.	S.	O-C.	Supp.		L.						
	°	°	m.	s.	s.	m.	s.	m.	s.	m.						
Arisan	21.7	240	4	30	-17	—	—	—	—	—						
Tainan	22.5	240	4	29	-26	—	—	—	—	—						
Hong Kong	27.2	247	5	40	0	10	40	+28	6	6	PP	13.9				
Manila	28.2	225	i	5	46 ^a	-3	i	12	1	SS	—	19.0				
Irkutsk	30.3	314	6	7	0	11	18	+17	—	—	—	14.4				
Phu-Lien	33.8	252	e	6	38	0	e	11	44	-12	—	—				
Calcutta	47.6	269	e	8	29	-2	i	15	10	-11	i	10	4	PP	i	21.9
Almata	48.7	300	e	8	41	+1	—	—	—	—	—	—	—	—	—	
College	49.8	32	e	8	48	—	15	57	+5	18	41	SS	—	—	—	
Frunse	50.4	300	i	8	28	-25	15	50	-10	—	—	—	—	—	29.8	
Medan	50.9	241	8	59	+2	15	52	-15	—	—	—	—	—	e	26.9	
Andijan	52.7	298	9	12	+2	e	16	39	+8	e	17	3	PP	—	—	
Batavia	53.1	225	i	9	19	+6	i	16	45	+8	—	—	—	e	29.0	
Agra	53.6	280	9	12	-5	16	37	-7	11	22	PP	—	—	—	31.0	
Tchinkent	54.1	300	i	9	21	+1	16	59	+9	—	—	—	—	—	—	
Honolulu	54.7	88	e	9	44	+19	e	17	0	+2	—	—	—	e	22.4	
Sverdlovsk	55.5	319	i	9	30	-1	i	17	12	+3	26	51	L ₁	—	34.1	
Samarkand	56.9	298	e	9	38	-3	e	17	44	+16	—	—	—	—	24.7	
Hyderabad	58.0	269	9	46	-2	17	46	+4	18	5	PS	—	—	—	27.5	
Bombay	61.8	274	i	10	14 ^k	0	i	18	32	+1	i	10	58	P _c P	—	—
Kodaikanal	62.8	264	i	10	22 ^a	+1	i	18	49	+5	i	19	23	PS	e	30.1
Kolombo	62.9	259	i	10	20	-2	18	47	+2	—	—	—	—	—	31.0	
Brisbane	64.5	168	—	—	—	i	19	9	+4	e	23	21	SS	—	—	
Moscow	67.6	323	10	48	-4	i	19	41	-1	—	—	—	—	—	33.4	
Baku	68.4	305	i	10	59	+2	—	—	—	—	—	—	—	—	—	
Pulkovo	68.6	330	i	10	57	-1	19	58	+4	—	—	—	—	e	32.9	
Grozny	69.8	310	e	11	7	+2	e	20	31	PS	—	—	—	—	—	
Riverview	70.5	172	e	11	11	+1	i	20	23	+6	i	20	50	PS	e	28.1
Sydney	70.5	172	e	10	59	-11	i	20	23	+6	i	21	21	PPS	e	28.0
Adelaide	71.0	183	e	14	0	PP	i	20	26	+4	—	—	—	e	28.6	
Tiflis	71.0	308	i	11	12	-1	e	20	22	0	e	14	2	PP	e	33.0
Erevan	72.0	307	e	11	21	+2	—	—	—	—	—	—	—	—	—	
Ukiah	72.0	54	—	—	—	e	20	28	-6	—	—	—	—	i	30.7	
Scoresby Sund	72.7	355	11	22	-1	20	48	+6	—	—	—	—	—	—	—	
Upsala	73.4	335	i	11	25	-2	e	20	50	0	e	25	57?	SS	e	34.0
Branner	73.6	56	e	11	45	+17	—	—	—	—	—	—	—	—	—	
Melbourne	73.9	177	—	—	—	i	21	0	+5	i	25	31	SS	—	30.4	
Lick	74.0	56	e	11	39	+9	—	—	—	—	—	—	—	—	—	
Butte	74.6	44	e	11	27	-7	e	21	33	+30	—	—	—	e	31.5	
Theodosia	74.8	316	11	36	+1	21	27	+22	—	—	—	—	—	—	38.0	
Simferopol	75.6	317	11	40	0	21	39	+25	—	—	—	—	—	—	40.4	
Bozeman	75.7	44	—	—	—	e	21	22	+7	e	25	52	SS	e	41.8	
Yalta	75.9	316	11	38	-3	—	—	—	—	—	—	—	—	—	44.4	
Sebastopol	76.1	317	11	51	+9	—	—	—	—	—	—	—	—	—	—	
Tinemaha	76.4	54	i	11	47	+3	—	—	—	i	12	2	pP	—	—	
Santa Barbara	76.9	57	i	12	4	+17	—	—	—	—	—	—	—	—	—	
Bergen	77.0	340	11	49	+1	21	41	+12	—	—	—	—	—	—	37.0	
Haiwee	77.1	55	e	11	52	+4	—	—	—	—	—	—	—	—	—	
Pasadena	78.1	56	e	11	55	+1	i	21	49	+8	i	12	10	pP	e	33.0
Mount Wilson	78.2	56	e	11	55	+1	—	—	—	i	12	11	pP	—	—	
Copenhagen	78.4	335	i	11	56 ^a	+1	21	48	+4	15	3	PP	—	—	—	
Riverside	78.8	56	i	11	57	0	—	—	—	i	12	14	pP	—	—	
Bucharest	80.3	319	e	12	7	+2	22	30	+26	15	13	PP	—	—	39.0	
Potsdam	80.7	332	e	12	9	+1	e	22	39	+30	i	15	10	PP	e	38.0
Istanbul	80.9	316	12	9	0	0	22	41	+30	15	21	PP	—	—	—	
Hamburg	80.9	334	i	12	9 ^a	0	e	22	17	+6	e	27	57	SS	e	36.0
Ksara	81.3	306	i	12	12 ^a	+1	e	22	38	+23	15	27	PP	—	40.0	
Aberdeen	81.7	341	—	—	—	i	22	45	+26	—	—	—	—	—	39.1	
Budapest	81.7	325	12	15	+2	—	—	—	—	i	12	26	pP	e	42.0	
Ogyalla	81.9	326	e	12	15	+1	e	22	53	+32	23	5	PS	e	41.0	
Prague	81.9	329	12	15 ^a	+1	e	22	36	+15	—	—	—	—	—	37.0	
Jena	82.4	330	i	12	15	-1	e	22	53	+27	—	—	—	—	28.0	
Göttingen	82.5	333	e	12	18	+1	—	—	—	—	—	—	—	—	43.0	
Ivgitut	82.5	5	—	—	—	—	22	32	+5	—	—	—	—	—	35.0	
Cheb	82.7	330	i	12	20	+2	e	22	57	+28	—	—	—	—	41.0	

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	Δ o	Az. o	P.		O-C.		S.		O-C.		Supp.		L. m.
			m.	s.	s.	m. s.	s.	m. s.	m. s.	m. s.			
Belgrade	83-0	322	i 12	20k	0	i 23	3	+31	i 15	33	PP	e 44-6	
Sofia	83-0	319	e 12	22	+ 2	22	38	+ 6	—	—	—	—	
Edinburgh	83-1	341	—	—	—	i 23	4	+31	—	—	—	39-0	
Wellington	83-2	156	e 12	27	+ 6	22	37	+ 3	15	40	PP	38-0	
Durham	83-7	340	e 12	19	- 4	e 22	40	+ 1	e 12	28	pP	—	
De Bilt	83-8	335	i 12	25	+ 1	e 22	41	+ 1	i 12	40	pP	e 38-0	
Tucson	84-2	54	i 12	27 _a	+ 1	i 22	43	- 1	i 12	41	pP	e 34-8	
Christchurch	84-6	157	i 12	28 _a	0	i 22	46	- 2	i 28	16	SS	e 39-9	
Stonyhurst	84-8	340	i 12	27	- 2	i 23	22	+32	—	—	—	e 39-0	
Stuttgart	85-0	330	i 12	31 _a	+ 1	e 23	3	+11	i 12	46	PcP	e 43-0	
Karlsruhe	85-1	332	i 12	33	+ 3	e 23	23	+30	—	—	—	e 45-0	
Uccle	85-2	335	i 12	31 _a	0	e 22	56	+ 2	i 16	3	PP	e 38-0	
Bidston	85-3	340	i 12	37	+ 6	i 23	28	+33	i 13	19	pP	e 39-0	
Triest	85-5	326	i 12	33	+ 1	e 22	54	[+ 6]	—	—	—	e 39-5	
Strasbourg	85-8	331	i 12	35 _a	+ 1	e 22	51	[+ 0]	e 16	7	PP	e 35-0	
Kew	86-2	338	i 12	38	+ 3	i 23	32	+28	—	—	—	e 38-0	
Oxford	86-2	338	—	—	—	e 23	7	+ 3	—	—	—	e 34-0	
Rathfarnham Castle	86-3	342	i 12	7	-29	i 22	57	- 7	i 28	29	SS	e 41-4	
Chur	86-4	331	e 12	36	0	e 23	9	+ 4	—	—	—	—	
Zurich	86-4	331	e 12	37 _a	+ 1	e 23	19	+14	i 12	50	pP	—	
Padova	86-6	327	e 12	44	+ 7	e 23	27	+20	e 12	50	pP	e 49-4	
Basle	86-7	330	e 12	38	0	e 23	38	+30	—	—	—	—	
Helwan	86-8	305	i 12	38	0	e 23	24	+15	i 12	54	pP	—	
Neuchatel	87-4	331	e 12	41	0	e 23	15	0	—	—	—	—	
Paris	87-5	334	i 12	43	+ 1	e 23	28	+12	—	—	—	44-0	
Florence	88-1	326	16	59	PP	23	27	+ 6	—	—	—	41-0	
Jersey	88-7	338	—	—	—	e 24	30	PS	—	—	—	e 37-0	
Moncalieri	88-7	330	e 11	57?	-50	23	4	[- 5]	—	—	—	—	
Rome	89-0	323	12	48	- 1	e 23	42	+12	i 16	33	PP	40-4	
Puy de Dôme	89-9	332	e 12	51	- 2	e 23	51	+13	—	—	—	e 40-0	
Chicago	90-2	35	—	—	—	23	54	+13	—	—	—	—	
Florissant	91-4	38	—	—	—	i 23	57	+ 6	i 24	22	PS	—	
Ottawa	92-1	25	e 13	9	+ 6	i 24	3	+ 5	e 30	21	SS	e 38-0	
Seven Falls	92-1	21	—	—	—	e 23	57?	- 1	—	—	—	e 38-0	
Bagnères	93-3	332	e 12	29	-40	e 23	52	-16	e 24	9	PS	e 41-5	
Toledo	97-6	334	e 13	29	+ 1	—	—	—	e 13	45	pP	—	
Granada	99-2	332	i 13	44	+ 8	—	—	—	(18 . 7)	—	PP	18-1	
Columbia	99-7	34	—	—	—	(27 34)	PPS	—	e 32	21	SS	27-6	
San Fernando	101-4	334	—	—	—	e 24	54	-22	e 32	21	SS	49-0	
Fort de France	125-0	26	e 19	27	PP	—	—	—	—	—	—	—	
Huancayo	139-2	62	e 16	35	P	e 28	59	SKKS	e 22	14	PP	e 65-5	
La Paz	147-4	59	i 19	39	[+ 5]	42	16	SS	23	40	PP	70-0	
Rio de Janeiro	165-9	17	e 24	51	PP	—	—	—	e 24	57	PPP	e 54-4	

Additional readings :-

- Zi-ka-wei iE = +5m.11s.
- Hong Kong PPP = +6m.40s., SS = +12m.1s.
- Calcutta iPPP = +10m.44s., eSSN = +18m.6s., iSSSN = +19m.9s.
- Medan S?EN = +16m.36s.
- Andian e = +9m.54s.
- Agra SS = +20m.24s.
- Tchimkent i = +9m.35s. and +10m.2s.
- Hyderabad SSN = +21m.30s.
- Bombay iE = +12m.49s., iEN = +18m.46s., +21m.10s., and +22m.32s., iE = +23m.0s.
- Kodaikanal SSE = +23m.5s., eSSSE = +25m.15s.
- Brisbane iE = +20m.27s., eE = +26m.21s.
- Riverview eN = +11m.24s., iE = +21m.18s.
- Tiflis ePcPE = +11m.38s., eE = +21m.30s., eSSEZ = +25m.33s., eSSN = +25m.49s., eSSSNZ = +29m.5s.
- Ukiah iS = +20m.42s.
- Branner +13m.27s.
- Melbourne i = +21m.27s.
- Pasadena iSSE = +22m.14s.
- Copenhagen = +22m.9s., SS = +27m.3s.
- Bucharest PPPPE = +17m.19s.
- Potsdam ePcPN = +12m.21s., eZ = +21m.57s.?, eN = +22m.9s. and +24m.57s.?
- Hamburg eE = +22m.38s.
- Ksara i = +12m.26s.

Continued on next page.

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Aberdeen i = +32m.2s. and +32m.50s.
 Budapest iE = +12m.32s.
 Jena iPN = +12m.18s., iZ = +12m.32s.
 Belgrade iZ = +12m.33s., eNE = +22m.29s.
 Sofia eSEN = +23m.4s.
 Wellington PeP = +12m.35s., PS = +23m.37s., SS = +28m.5s., Lq? = +31m.57s.
 Durham iSEN = +22m.54s.
 De Bilt eSS = +28m.17s.
 Tucson isP = +12m.52s., i = +13m.12s., +13m.39s., and +14m.6s., PP = +16m.13s.,
 i = +17m.1s., and +22m.52s., iS = +23m.0s., SS = +28m.21s., SSS = +30m.57s.
 Christchurch iSSSE = +31m.39s., Lq = +35m.44s.
 Stuttgart ePPP = +17m.57s., eS = +23m.17s., eSS = +28m.27s.
 Uccle SSE = +27m.54s.
 Trieste S = +23m.18s.
 Strasbourg iZ = +12m.49s., PPPE = +17m.57s., iS = +23m.27s., eSSN = +29m.21s.
 Kew iEN = +13m.10s., iE = +13m.24s.
 Rathfarnham Castle i = +15m.25s. and +23m.57s.
 Padova iS = +23m.30s.
 Helwan e = +14m.3s., PP = +16m.3s.
 Rome i = +25m.7s., SS = +29m.47s., SL? = +30m.51s.
 Bagnères ePPS = +24m.42s., eSS = +32m.15s.
 Toledo ePP = +17m.29s., e = +17m.34s.
 San Fernando ePPSN = +27m.24s., eSSSN = +36m.33s.
 Huanacayo ePKP = +19m.13s., ePPP = +22m.56s., ePKS = +23m.21s., esPS =
 +33m.50s., ePPS = +34m.49s., ePKP,PKP = +39m.21s., eSS = +40m.25s.
 La Paz iPKPZ = +19m.42s.k, iPKP₂Z = +19m.59s., iZ = +20m.29s. and +21m.11s.
 Long waves were also recorded at La Plata, Algiers, Besançon, East Machias, and Malaga.

Sept. 21d. Readings also at 0h. (Tucson), 1h. (Rome, Sofia, Ksara, Bucharest, Tiflis, Sebastopol, Theodosia, Baku, Simferopol, and Tashkent), 2h. (Copenhagen and Tucson), 4h. (Oaxaca (2), Tacubaya (2), Puebla, Mount Wilson, and Tucson), 5h. (Tucson), 6h. (Tucson (2)), 7h. (Mount Wilson, Riverside, Mizusawa, Nagoya, Pasadena, and Tinemaha), 8h. (Erevan, Tucson (2), Grozny, and Tiflis), 9h. (Batavia and Tucson (2)), 12h. (Nagoya, Mizusawa, and Tucson (3)), 13h. (Grozny, Tiflis, and Kew), 14h. (Grozny and Tiflis), 15h. (Kew), 16h. (Tucson), 17h. (Tucson, Mount Wilson, and Riverside), 19h. (Tucson and Tiflis), 21h. (Kodaikanal), 22h. (Nagoya).

Sept. 22d. Readings at 0h. (near Ottawa), 1h. (Frunse, Tehimkent, and near Andijan), 4h. (Neuchatel, Samarkand, and Tucson), 5h. (Basle, Cheb, Strasbourg, De Bilt (2), Uccle, Stuttgart, Rome, Ksara, Tiflis, Copenhagen (2), Ivigtut (2), and Scoresby Sund (2)), 6h. (Balboa Heights, Ivigtut, Scoresby Sund, Copenhagen, De Bilt, Uccle, Sverdlovsk, and Tashkent), 7h. (near Wellington), 8h. (Almata, Andijan, Frunse, and near Mizusawa), 11h. (Tucson), 12h. (Guadalajara, Oaxaca, Puebla, Tacubaya, Tucson, Mount Wilson, Pasadena, Riverside, and Tinemaha), 13h. (Jersey), 14h. (Fordham, Haiwee, Mount Wilson, Pasadena, Riverside, Tinemaha, Tucson, Balboa Heights, La Paz, and Rome), 15h. (Sverdlovsk, Tashkent, and Tucson), 17h. (Tucson and La Paz), 19h. (near Mizusawa and near Tananarive (2)), 20h. (Tucson (3), Medan, near Nagoya, and near Tananarive), 21h. (Tucson), 22h. (Sverdlovsk, Tashkent, and Tucson), 23h. (Tucson).

Sept. 23d. 1h. 3m. 16s. Epicentre 0°-0 85°-0E.

A = +.0872, B = +.9962, C = .0000; δ = +2; h = +7;
 D = +.996, E = -.087; G = .000, H = .000, K = -1.000.

	△	Az.	P.	O-C.	S.	O-C.	L.
	°	m. s.	m. s.	m. s.	m. s.	m. s.	m.
Colombo	E.	8.6 323	2 5	- 4	i 3 22	-26	—
Kodaikanal	E.	12.6 324	—	—	c 4 57	-29	—
Hyderabad		18.5 340	4 26	+ 7	8 5	SS	9.2
Bombay		22.3 328	i 5 3	+ 2	i 9 1	- 1	—
Calcutta	N.	22.6 8	—	—	i 9 59	SSS	—
Agra	E.	27.8 348	—	—	e 11 18	+43	—
Andijan		42.2 346	e 8 10	+14	—	—	—
Tashkent		43.5 343	i 8 8	+ 1	e 14 33	- 3	e 21.7
Frunse		43.7 349	e 8 0	- 8	—	—	—
Ksara		57.0 311	e 9 45	- 5	c 17 53	+10	29.2
Sverdlovsk		59.9 345	i 10 7	- 3	c 18 15	- 6	27.7

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Sept. 23d. 1h. 51m. 31s. Epicentre 45°-9N. 7°-3E.

Felt in Switzerland in the Valais, in Italy in the Vale of Aosta and Locarno, and in France in several communes in Chamonix. Scale IV at Locarno and Valais, III at Chamonix.

See J. P. Rothé. Les seismes des Alpes francaises en 1938 et la seismicite des Alpes occidentales. Annales de l'Institut de Physique du Globe de Strasbourg, 1938, Tome II, partie III, Geophysique. Mende, 1941, pp. 18-19.

A = +.6927, B = +.0887, C = +.7158; $\delta = +7$; $h = -4$;
D = +.127, E = -.992; G = +.710, H = +.091. K = -.698.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.
	°	°	m. s.	s.	m. s.	s.	m. s.
Sion	0.4	7	e 0 6	P _g	i 0 13	S _g	—
Neuchatel	1.1	348	e 0 21	- 1	e 0 37	- 2	—
Besançon	1.6	326	e 0 29	- 1	i 0 53	+ 2	—
Basle	1.7	7	e 0 30	- 1	e 0 56	+ 2	—
Chur	1.8	58	e 0 34	+ 2	e 1 2	S _g	—
Zurich	1.8	31	e 0 33	+ 1	i 0 59	+ 3	—
Strasbourg	2.7	7	e 0 51	P*	i 1 32	S _g	—
Puy de Dôme	3.0	268	i 0 54	+ 4	i 1 28	+ 1	—
Stuttgart	3.2	24	e 0 49	- 3	e 1 41	S*	—
Triest	4.5	91	—	—	e 2 11	+ 6	e 2 16 S*

Additional readings:—

Sion i = +11s.

Neuchatel i = +23s. and +33s.

Strasbourg eP_g = +56s., ePS = +1m.15s., iSSZ = +2m.0s.

Stuttgart eP_g = +1m.5s., iS_g = +1m.46s., e = +1m.55s.

Triest eS_g = +2m.31s.

Sept. 23d. 8h. 20m. 6s. Epicentre 38°-8N. 117°-0W. (as on 1937 Aug. 19d.).

A = -.3547, B = -.6962, C = +.6240; $\delta = -12$; $h = -1$;
D = -.891, E = +.454; G = -.283, H = -.556, K = -.781.

	Δ	Az.	P.	O-C.	S.	O-C.	L.
	°	°	m. s.	s.	m. s.	s.	m.
Tinemaha	2.0	210	i 0 26	- 9	i 0 53	- 9	—
Haiwee	2.8	196	i 0 46	- 1	i 1 23	+ 1	—
Fresno	N. 3.0	227	e 0 40	- 10	—	—	—
Lick	E. 3.9	249	e 0 54	- 8	e 1 37	- 13	—
Berkeley	4.3	258	e 0 57	- 11	i 1 39	P _g	—
Branner	4.3	252	e 1 46	P _g	—	—	—
San Francisco	4.4	258	e 1 10	0	e 1 45	?	—
Mount Wilson	4.6	191	i 1 19	+ 7	i 2 19	+ 12	—
Pasadena	4.7	192	e 1 19	+ 5	e 2 21	S*	—
Riverside	4.7	184	i 1 25	+ 11	i 2 27	S*	—
Tucson	8.2	141	e 2 2	- 1	i 4 31	S _g	5.1

Sept. 23d. Readings also at 0h. (Tucson, Frunse, and near Andijan), 1h. (Calcutta, Nagoya, and Tucson), 2h. (Tucson (2)), 3h. (2) and 4h. (2) (Tucson), 5h. (New Plymouth, near Wellington, near Taihoku, and near Rome), 9h. (near New Plymouth and Wellington), 10h. (Tucson), 11h. (Florissant, Tucson (2), Mount Wilson (2), Pasadena, Riverside (2), Tinemaha, Oaxaca (2), Puebla (2), and Tacubaya (2)), 14h. (Tucson, Rome, Bucharest, Sofia, and Ksara), 15h. (Sverdlovsk, Tiflis, Vladivostok, Cape Girardeau, and near Rome (2)), 17h. (Mount Wilson, Pasadena, Riverside, and Tucson), 18h. and 20h. (Rome).

Sept. 24d. Readings also at 0h. (Tucson), 5h. (Sverdlovsk, Tashkent, and Tiflis), 9h. (Tiflis), 10h. (near Nagoya), 12h. (Columbia and Tucson), 13h. (Copenhagen, Wellington, La Paz, and near Copiapo), 14h. (Christchurch, Wellington, and Tucson), 15h. (Christchurch, Wellington, and Tucson (2)), 19h. and 20h. (La Paz), 21h. (near Mizusawa and near Tiflis), 22h. (Wellington and New Plymouth), 23h. (near Branner).

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Sept. 25d. 20h. 13m. 46s. Epicentre 14°0S. 162°0E. (as on 1937 July 2d.).

A = -0.9458, B = +0.2184, C = -0.2404; $\delta = +3$; $h = +6$;
D = +0.229, E = +0.974; G = +0.234, H = -0.054, K = -0.971.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m.	s.	m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	N. 18.7	222	i 4 20	- 2	i 8 2	SS	i 4 50	PP
Apia	20.6	92	e 4 46	+ 3	e 8 2	-27		e 8.9
Riverview	24.4	214	e 5 25	+ 4	i 9 46	+ 7	5 59	PP
Sydney	24.4	214	e 5 17	- 4	e 9 48	+ 9		e 12.3
Wellington	28.0	168	5 57	+ 2	i 11 54	SS	i 7 7	PPP
Christchurch	29.8	171	e 6 10 ^a	- 1	i 11 12	+ 5	i 6 25	PP
Melbourne	30.8	216	i 7 26	PP	e 11 39	+16	i 13 28	SSS
Adelaide	33.0	225	i 6 50	+11	i 11 48	- 9		
Perth	49.9	240	i 8 34	-23	i 16 26	+19	i 21 29	SSS
Nagoya	56.6	332	e 9 45	- 2				
Batavia	59.6	271	e 10 12	+ 4	i 19 39	PPS		
Hong Kong	63.1	304	18 59	S	(18 59)	- 3		
Vladivostok	65.3	333	e 10 44	- 2	e 19 30	+ 1		e 29.8
Berkeley	83.9	49	e 12 52	+19				e 39.0
Calcutta	N. 85.1	295			i 23 11	+ 3		
Irkutsk	85.2	327	e 12 45	+ 6	e 23 5	[+ 3]	e 16 5	PP
College	85.7	18			e 23 4	[- 2]	e 23 18	PS
Mount Wilson	Z. 85.7	53	e 12 41	- 1				
Colombo	E. 88.9	277			e 22 44	?		
Tucson	90.9	57	e 13 7	0				42.0
Kodaikanal	E. 92.0	280	e 19 14?	PPP				
Bombay	98.3	287	e 14 4	+23	24 44	{+ 2}		
Tashkent	104.9	310	e 16 6	?	25 52	- 9	e 18 25	PP
Sverdlovsk	110.6	326	e 19 8	PP	e 28 34	PS		e 46.8
Huancayo	113.0	110			e 28 44	PS	e 34 31	SS
Ottawa	119.0	45			e 29 14?	PS	e 37 14?	SSP
Tiflis	123.1	311	e 18 38	[- 21]	e 30 38	PS	e 20 37	PP
Moscow	123.2	328	e 20 37	PP				e 57.2
Pulkovo	124.4	335	e 20 43	PP				e 66.7
Ksara	131.7	303	e 19 26	[+ 11]	e 22 45	SKP	e 21 37	PP
Fort de France	133.4	83	e 19 13	[- 5]				
Copenhagen	134.0	341	22 42	SKP				64.2
Istanbul	134.6	316	22 54	SKP				
Bucharest	135.0	321	22 14?	PP				78.2
Potsdam	136.4	338	e 19 20	[- 4]			e 22 8	SKP
Hamburg	N. 136.6	342	e 18 14?	[- 70]				e 73.2
De Bilt	139.3	343	e 19 21	[- 8]			e 22 22	PP
Uccle	140.7	344	e 19 30	[- 1]			e 22 31	PP
Stuttgart	140.8	337	e 19 27	[- 4]			e 22 32	PP
Oxford	141.2	349	e 19 30	[- 3]				e 68.7
Triest	141.2	331	23 19	PP	e 33 5	PS	e 26 15	PPP
Strasbourg	141.5	338	e 19 30	[- 3]			e 22 28	PP
Rome	144.5	324	i 19 36	[- 2]	i 27 9	[+ 23]	i 21 59	PP
Toledo	153.1	345	e 20 0	[+ 8]				e 82.1

Additional readings :-

Apia e = +7m.34s.
Riverview ePE = +5m.29s., i = +5m.34s., PPPE = +6m.9s., i = +6m.36s., iE = +10m.0s., SSN = +10m.12s., SSE = +10m.16s.
Wellington iZ = +6m.52s., PPP = +7m.47s., ePS? = +12m.14s.
Christchurch LaE = +12m.9s., iPcSEZ = +14m.57s., iScS = +18m.37s.
Tucson P = +13m.33s.
Bombay eE = +16m.55s.
Tashkent e = +20m.15s., +27m.35s., and +32m.32s.
Tiflis eZ = +8m.41s.
Ksara ePPS = +33m.40s.
De Bilt eZ = +23m.20s.
Uccle eN = +23m.14s.
Strasbourg ePPZ = +23m.42s.
Rome i = +20m.1s., +21m.28s., and +28m.4s., e = +42m.33s.
Long waves were also recorded at Baku, Kew, Pasadena, Puy de Dôme, Stonyhurst, San Fernando, Göttingen, Ukiah, East Machias, and Chicago.

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Sept. 25d. Readings also at 0h. (Tiflis), 1h. (Mount Wilson, Pasadena, and Tucson), 4h. (Calcutta, Nagoya, Tashkent, and Mizusawa), 5h. (Sverdlovsk), 7h. (Tucson), 8h. (Nagoya), 10h. (Sofia), 11h. (Tucson and New Plymouth), 12h. (Tacubaya), 13h. (Tucson and Pasadena), 14h. (Tucson), 16h. (Pasadena, Sverdlovsk, Mizusawa, Tashkent, Tiflis, Tucson, Ksara, Tinemaha, Copenhagen, Irkutsk, and Vladivostok) 19h. (Mount Wilson, Tucson, La Paz, Pasadena, and Apia), 21h. (Malabar and Batavia), 23h. (Batavia).

Sept. 26d. Readings at 0h. (Tchikent), 2h. (near Mizusawa), 5h. (Medan and Tucson), 6h. (Christchurch, near Wellington, and New Plymouth), 9h. (Batavia, Medan, Bombay, Kodaikanal, Tashkent, and Collee), 10h. (Ksara, Oaxaca, Tacubaya, Sverdlovsk, Vladivostok, and Tucson), 11h. (Sebastopol), 12h. (Collee), 13h. (Copenhagen), 15h. (Pasadena, La Paz, Tinemaha, and Tucson), 16h. (Moncalieri, La Plata, Tucson, and near Copiapo), 17h. (near Christchurch, Wellington, and New Plymouth), 18h. (Erevan, Tiflis (2), and Ksara), 19h. (Tucson), 21h. (New Plymouth and near Wellington), 23h. (Agra, Frunse, Grozny, Almata, Sverdlovsk, Tashkent, Tchikent, near Andijan, and near Samarkand, Tucson, Fresno, near Branner and Lick).

Sept. 27d. 2h. 31m. 41s. Epicentre 9°·5N. 40°·3E. (as on 1938 Sept. 18d.).

A = +·7524, B = +·6381. C = +·1640; δ = +17; h = +7.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	m.	s.	m.	s.	m.	s.	m.	m.
Helwan	21·9	339	i 4 54	- 3	i 9 1	+ 7	5 21	PP
Ksara	24·5	351	5 19	- 3	9 55	+15	i 5 55	pP
Tananarive	29·1	167	6 26	+22	e 11 34	+38	—	—
Erevan	30·8	6	e 6 25	+ 5	e 11 39	+16	—	—
Baku	31·9	14	e 6 24	- 5	i 11 56	+16	—	—
Tiflis	E. 32·3	7	4 19	?	i 9 31	?	—	—
Bombay	32·8	70	i 6 40	+ 3	i 12 5	+11	e 7 45	PP
Istanbul	33·0	344	6 40	+ 1	15 31	PS	8 30	PPP
Grozny	34·0	8	e 6 52	+ 4	—	—	—	—
Sofia	36·3	339	e 7 7	0	e 12 45	- 3	e 15 41	SSS
Kodaikanal	E. 36·6	85	i 7 14k	+ 4	i 13 9	+16	—	—
Bucharest	36·9	343	e 7 15k	+ 3	12 59	+ 1	8 37	PP
Hyderabad	37·9	74	7 24	+ 4	13 22	+ 9	8 47	PP
Samarkand	38·3	35	e 7 26	+ 2	—	—	—	—
Belgrade	N.W. 39·1	338	e 7 31	0	e 13 33	+ 2	e 8 52	PP
Colombo	E. 39·2	91	7 25	- 6	13 46	+14	—	—
Agra	E. 39·7	58	7 34	- 2	13 45	+ 5	9 4	PP
Rome	40·5	329	7 43a	+ 1	13 46	- 6	i 9 2	PP
Tashkent	40·7	34	i 7 35	- 9	13 57	+ 2	—	—
Kecksemet	Z. 41·2	337	e 7 56	+ 8	e 14 0	- 2	e 9 19?	PP
Tchikent	41·6	33	e 7 46	- 5	—	—	e 9 29	PP
Budapest	41·9	339	7 57	+ 3	14 5	- 8	—	—
Andijan	42·1	37	e 7 57	+ 2	e 17 33	SS	—	—
Florence	42·5	329	e 7 47	-12	—	—	i 9 49	PP
Ogyalla	N. 42·6	338	8 5	+ 6	e 14 23	0	—	—
Triest	42·6	333	e 7 58	- 1	e 14 21	- 2	16 3	SS
Algiers	43·3	315	i 8 16	+11	e 14 37	+ 4	—	—
Padova	43·3	332	9 55	PP	16 19	?	—	—
Frunse	44·7	36	—	—	e 14 45	- 9	—	—
Moncalieri	45·2	328	7 49	-31	15 14	+13	—	—
Chur	45·5	331	8 21	- 2	—	—	e 10 15	PP
Prague	45·8	338	e 8 19	- 6	e 15 1	- 8	—	—
Moscow	46·2	358	e 8 19	- 9	e 15 12	- 3	—	—
Zurich	46·3	331	e 8 21	- 8	e 15 21	+ 5	e 10 13	PP
Almata	46·4	36	e 8 33	+ 3	—	—	—	—
Cheb	46·6	336	e 10 19?	PP	e 16 53	?	e 20 29	?
Basle	46·9	331	e 8 30	- 4	e 15 32	+ 7	—	—
Stuttgart	47·0	333	e 8 32k	- 3	e 15 28	+ 2	e 10 15	PP
Karlsruhe	47·5	333	e 8 37	- 1	e 15 23	-11	—	—
Jena	47·6	336	e 10 49	PP	e 15 49	+14	—	—

Continued on next page.

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	N.	Δ °	Az. °	P.		O-C.		S.		O-C.		Supp.		L.
				m.	s.	s.	m.	s.	s.	m.	s.	m.	s.	
Strasbourg		47.6	332	e 8	39	0	e 15	56	+21	i 10	29	PP	e 25.3	
Calcutta		47.7	68	e 8	59	+19	i 15	43	+12	i 18	51	SS	i 22.3	
Potsdam		48.1	338	e 8	37	-6	e 15	31	-11	e 10	37	PP	e 28.3	
Granada		48.2	313	i 8	55k	+11	e 15	58	+15	i 10	51	PP	e 22.4	
Puy de Dôme		48.2	325	e 8	38	-6	i 16	5	+22	—	—	—	e 29.8	
Bagnères		48.4	322	e 8	56	+10	i 15	54	+8	e 10	41	PP	e 32.0	
Malaga		48.6	312	e 8	54	+7	i 16	3	+14	—	—	—	26.3	
Göttingen		48.7	336	e 8	48	0	e 15	59	+9	—	—	—	e 28.3	
Toledo		49.6	315	e 8	56	+1	e 16	13	+10	e 10	58	PP	—	
Averroes		49.8	307	e 8	11	-45	e 16	16	+10	10	3	PP	20.2	
Sverdlovsk		49.8	14	e 8	50	-6	16	3	-3	24	7	L _a	28.9	
San Fernando		49.9	310	e 9	3	+6	i 16	10	+3	e 19	1	SS	26.8	
Hamburg		50.2	338	e 8	57	-3	e 16	14	+3	e 11	7	PP	28.3	
Paris		50.3	329	e 11	3	PP	i 16	14	+1	20	17	SS	28.3	
Pulkovo		50.7	354	8	56	-7	16	9	-9	—	—	—	—	
Uccle		50.7	332	9	5	+2	16	19	+1	e 10	53	PP	e 24.3	
Copenhagen		51.0	341	9	4a	-2	16	24	+2	11	7	PP	25.3	
De Bilt		51.2	333	e 9	2	-5	e 16	16	-9	e 16	30	PS	e 24.3	
Jersey		53.0	327	e 9	10	-11	e 16	49	-1	e 12	17	PP	e 31.3	
Upsala		53.1	347	e 9	22	+1	e 16	48	-3	—	—	—	—	
Kew		53.4	330	i 9	24a	0	i 17	1	+6	—	—	—	e 24.3	
Oxford		54.0	330	e 9	31k	+3	e 16	57	-6	—	—	—	e 27.0	
Bidston		55.9	330	i 9	48	+6	i 17	29	0	—	—	—	e 24.3	
Stonyhurst		55.9	332	e 9	48	+6	i 17	39	+10	—	—	—	e 31.3	
Durham		56.0	333	i 9	42	-1	i 17	28	-2	i 17	39	PS	—	
Bergen		57.1	341	9	54	+4	17	46	+1	—	—	—	33.3	
Rathfarnham Castle		57.4	330	i 13	32	PPP	i 18	4	+15	e 21	59	SS	31.9	
Aberdeen		57.7	335	i 10	3	+8	i 17	53	0	i 12	10	PP	e 32.3	
Edinburgh		66.2	333	i 9	56	-56	—	—	—	—	—	—	e 33.3	
Irkutsk		66.3	37	e 11	18	+26	e 19	37	-5	13	46	PP	e 35.8	
Batavia		68.2	101	e 11	17	+13	e 20	23	+19	e 21	20	PPS	—	
Scoresby Sund		72.0	342	i 11	31	+3	20	56	+7	14	3	PP	—	
Ivigtut		81.0	331	12	21	+3	22	34	+7	15	25	PP	—	
ladivostok		84.7	48	e 12	42	+5	i 23	13	+9	—	—	—	e 46.1	
Fort de France		98.5	287	e 13	50	+8	—	—	—	e 17	42	PP	—	
Ottawa		100.9	320	—	—	—	e 25	43	+15	24	37	SKS	e 45.3	
Fordham		101.5	315	e 14	0	+5	e 25	57	+24	e 27	19	PS	—	
San Juan		102.3	291	i 18	23	PP	24	50	[+12]	e 36	40	SSS	—	
Philadelphia		102.8	314	—	—	—	e 24	49	[+9]	e 28	2	S	e 45.6	
College		105.6	4	e 17	59	PP	—	—	—	e 28	44	PPS	—	
Chicago		110.1	321	e 28	19?	PS	—	—	—	—	—	—	—	
La Paz		110.2	256	e 19	10	PP	29	10	PS	—	—	—	55.3	
Florissant		113.6	320	e 19	5	PP	e 29	14	PS	—	—	—	—	
Huancayo		116.9	262	e 20	27	PP	e 26	5	[+26]	e 30	15	PS	e 47.9	
Bozeman		119.3	337	—	—	—	e 43	19?	?	—	—	—	—	
Haiwee		130.2	337	i 19	24	[+12]	—	—	—	—	—	—	—	
Tucson		130.2	328	e 19	21	[+9]	i 22	35	PKS	i 21	24	PP	e 59.4	
Mount Wilson	Z.	131.9	336	i 19	27	[+12]	—	—	—	—	—	—	—	
Pasadena	Z.	132.0	336	i 19	28	[+12]	—	—	—	—	—	—	—	

Additional readings:—

Helwan i = +6m.45s., e = +7m.24s.

Tananarive eN = +14m.37s.

Bombay eN = +8m.37s., iE = +15m.27s., eEN = +18m.22s.

Istanbul SSS = +19m.32s.

Sofia ePE = +7m.11s., eN = +12m.54s.

Bucharest P_cPE? = +10m.1s., SSEN = +14m.55s., iE = +15m.24s., SSSN = +15m.47s.,

SSSE = +15m.50s., iE = +16m.5s., S_cSE = +17m.40s.

Hyerabad SSE = +15m.50s.

Agra iE = +9m.44s., SSE = +16m.25s.

Rome iPP = +9m.20s., i = +10m.7s. and +10m.51s., iS? = +13m.55s., iS = +14m.4s.,

i = +14m.18s., iSS = +16m.44s., i = +16m.50s., iSSS = +17m.43s.

Kecskemet eP_cPZ = +10m.8s.

Tchikent e = +9m.54s. and +17m.3s.

Ogyalla ePE = +9m.55s., SE = +14m.31s.

Triest iP = +8m.2s., SSS? = +17m.31s.

Continued on next page.

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Padova eSS = +19m.46s.
 Cheb e = +26m.19s.
 Stuttgart IP = +8m.37s., e = +8m.58s., iPP = +10m.33s., eSS = +19m.4s., e = +22m.31s.
 Strasbourg i = +8m.45s., +10m.36s., +16m.0s., iSS = +19m.23s.
 Calcutta iSSSN = +20m.0s.
 Potsdam ePPPZ = +11m.7s., eZ = +13m.7s., eN = +19m.19s.
 Granada PPP = +11m.50s.
 Bagnères e = +9m.54s., ePPPE = +12m.12s., ePS = +16m.28s., eSS = +19m.20s., SS = +19m.36s.
 Averoeres e = +11m.48s. and +13m.11s., eS = +14m.26s., eSS = +17m.15s.
 Hamburg iZ = +9m.2s., ePPPN = +11m.52s., eSSE = +19m.58s.
 Uccle iEN = +16m.27s., iN = +19m.9s. and +19m.59s.
 De Bilt iZ = +9m.8s.
 Jersey e = +15m.22s., eS = +19m.10s. and +21m.16s., eSS = +24m.39s., eSSS = +26m.43s.
 Rathfarnham Castle i = +22m.42s. and +29m.39s.
 Edinburgh i = +17m.55s.
 Iviqtut +12m.59s.
 Ottawa e = +32m.19s.
 San Juan iSKS = +24m.56s., eS = +25m.43s.
 Florissant eP = +19m.28s. and +19m.33s., eS = +29m.21s. and +29m.26s.
 Huancayo eS = +27m.35s., eSS = +35m.31s.
 Tucson PKP = +19m.25s., iPKP = +19m.28s.
 Long waves were also recorded at Yalta, Sotchi, Phu-Lien, La Plata, and Wellington.

Sept. 27d. 10h. 15m. 42s. Epicentre 6° 1S. 150° 5E.

A = - .8655, B = + .4897, C = - .1055; $\delta = +3$; $h = +7$;
 D = + .492, E = + .870; G = + .092, H = - .052, K = - .994.

	Δ	Az.	P. m. s.	O - C. s.	m. s.	O - C. s.	Supp. m. s.	L. m.
Brisbane	21.4	174	i 4 54	+ 3	19 0	+ 15	—	—
Riverview	27.6	178	e 6 7	+16	e 10 34	+ 2	e 6 40	PP e 14.8
Sydney	27.6	178	e 5 52	+ 1	e 10 51	+19	—	e 14.6
Adelaide	30.7	199	—	?	i 11 28	+ 7	i 13 43	SSS 17.0
Melbourne	32.0	189	i 9 38	?	i 14 0	SSS	—	16.5
Manila	35.8	306	i 7 8	+ 5	12 47	+ 6	—	17.4
Apia	37.9	103	e 7 18?	- 2	—	—	—	—
Arapuni	39.2	148	—	—	e 13 48	+16	—	—
Wellington	41.2	152	i 8 1	+13	i 14 14	+12	i 8 8	pP 19.1
Perth	41.3	227	i 9 2	PP	14 15	+11	15 47	SS 17.3
Christchurch	42.1	156	e 1 12	?	9 56	PP	17 42	L _n 20.9
Batavia	43.4	268	e 8 2	- 4	e 14 8	-27	—	e 27.3
Husan	45.7	335	e 8 18	- 6	e 15 10	+ 2	—	—
Mizusawa	45.8	350	e 8 26	+ 1	—	—	—	—
Taikyu	46.5	336	e 8 31	0	—	—	—	—
Keiyo	48.7	335	e 8 49	+ 1	e 15 48	- 2	—	e 19.2
Zinsen	48.7	334	e 8 55	+ 7	e 16 1	+11	—	—
Vladivostok	51.8	343	e 9 9	- 3	e 16 41	+ 8	—	e 22.3
Medan	N. 52.6	280	e 7 22	?	—	—	—	—
Honolulu	57.5	60	9 52	- 1	i 18 3	+13	—	26.5
Calcutta	N. 67.1	297	—	—	e 20 1	+10	—	—
Irkutsk	70.1	332	e 11 17	+ 1	20 28	+ 1	—	33.8
Kodaikanal	E. 74.5	283	e 11 18?	-24	—	—	—	—
Agra	E. 77.4	300	11 58	0	i 21 59	+10	15 10	PP —
Bombay	80.4	290	e 12 18	+ 3	e 22 33	+12	—	—
College	83.9	32	—	—	e 22 18?	-38	—	—
Frunse	83.9	314	e 13 8	+35	—	—	—	—
Andijan	85.0	312	e 12 44	+ 6	e 23 18	+11	—	—
Tashkent	87.4	312	e 12 53	+ 3	i 23 21	[+ 5]	e 33 12	SSS e 36.6
Tehinkent	87.4	313	e 12 37	-13	—	—	—	—
Ukiah	90.9	51	e 13 31	+24	e 23 54	- 9	—	e 38.5
Berkeley	91.5	52	e 13 8	- 2	i 24 0	- 8	—	e 42.0
Santa Barbara	93.2	56	e 13 20	+ 3	—	—	—	—
Pasadena	94.5	56	i 13 21 _a	- 2	i 26 2	PS	—	e 42.9
Mount Wilson	94.6	56	i 13 23 _a	- 1	—	—	e 17 4	PP —

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Tinemaha	94.6	54	i 13 24	0	—	—	—	—
Haiwee	94.8	54	i 13 24	- 1	—	—	—	—
Sverdlovsk	95.0	326	i 13 23	- 3	24 10	[+ 9]	i 17 19	PP 41.3
Riverside	95.1	56	e 13 26	0	—	—	—	—
Tucson	100.6	58	i 13 51	0	i 26 49	PS	i 17 52	PP 41.0
Baku	102.0	310	e 18 28	PP	e 28 18	PPS	—	e 48.3
Tiflis	105.8	312	e 18 37	PP	e 25 17	[+23]	e 27 55	PS e 42.3
Moscow	107.8	327	e 19 4	PP	e 25 15	[+12]	e 28 35	PS e 55.8
Pulkovo	110.1	332	e 19 10	PP	e 28 29	PS	—	e 42.2
Ksara	113.8	303	i 19 15	[+36]	e 26 43	{+11}	i 19 42	PP 58.3
Scoresby Sund	115.5	358	19 36	PP	e 25 53	[+19]	—	—
Upsala	115.6	335	e 18 18?	[-26]	—	—	—	—
Florissant	116.4	49	e 19 40	PP	e 27 7	{+17}	e 29 24	PS —
Helwan	118.2	300	e 20 23	PP	—	—	—	—
Bucharest	118.4	318	—	—	e 24 18?	?	—	—
Copenhagen	120.4	334	e 20 19	PP	e 27 36	{+20}	e 31 48	PPS e 56.3
Potsdam	122.2	331	e 20 18?	PP	e 29 18?	?	e 37 18	SS e 62.3
Prague	122.8	328	e 20 38.	PP	e 30 18	PS	—	—
Hamburg	122.9	353	e 19 1	[+ 3]	—	—	—	e 58.3
Cheb	123.9	329	—	—	e 30 18?	PS	—	e 60.3
Ottawa	124.0	37	e 19 0	[- 1]	e 27 54	{+13}	e 37 18	SS e 51.3
Triest	125.3	324	e 20 49	PP	e 26 36	{+29}	e 30 47	PS e 59.3
De Bilt	126.0	334	e 19 6	[+ 2]	—	—	e 20 59	PP e 61.3
Edinburgh	126.1	342	—	—	e 25 18?	{-51}	e 33 18?	PPS e 63.3
Stuttgart	126.4	329	e 19 7	[+ 2]	e 31 20	PS	e 23 38	PPP e 62.3
Durham	E. 126.5	340	e 20 53	PP	—	—	—	—
Williamstown	126.9	38	i 19 12	[+ 6]	—	—	—	e 59.6
Philadelphia	127.0	43	e 20 59	PP	e 37 55	SS	—	e 52.9
Strasbourg	127.2	329	e 19 9	[+ 3]	e 28 7	SKP	e 21 9	PP e 62.3
Uccle	127.3	333	e 19 9	[+ 3]	e 38 37	SSP	e 21 5	PP e 62.3
Chur	127.4	328	e 19 9	[+ 2]	—	—	—	—
Fordham	127.4	41	e 21 2	PP	—	—	—	—
Zurich	127.6	328	e 19 7	[0]	—	—	—	—
Basle	128.0	329	e 19 8	[0]	—	—	—	—
Bidston	128.1	340	e 22 18?	?	—	—	—	e 65.3
Rome	128.5	319	e 19 12a	[+ 3]	i 39 34	SSP	—	e 64.8
Kew	128.7	337	e 21 18?	PP	—	—	—	e 64.3
Oxford	128.8	338	e 22 32	?	—	—	—	—
Paris	129.5	332	—	—	e 29 18?	{+62}	—	66.3
Huancayo	131.0	111	e 19 19	[+ 5]	e 26 6	{-16}	e 21 35	PP e 53.8
La Paz	135.7	121	i 19 27a	[+ 5]	—	—	i 22 59	PP 65.8
Toledo	139.4	329	e 19 33	[+ 4]	—	—	e 22 28	PP e 68.2
Granada	141.1	326	i 19 28a	[- 4]	i 33 11	PS	e 22 43	PP e 79.9
San Juan	142.3	67	i 19 29	[- 6]	e 32 43	SKSP	e 22 35	PP 54.5
San Fernando	N. 143.0	328	e 23 8	PP	—	—	—	66.3
Fort de France	147.7	72	i 19 51	[+ 7]	—	—	e 23 19	PP —

Additional readings :-

Brisbane ePE = +5m.0s.
 Riverview eN = +6m.12s., PPPN = +6m.49s., iSSN = +11m.30s., iE = +12m.26s.,
 iN = +13m.26s.
 Sydney e = +13m.3s.
 Adelaide i = +12m.1s. and +14m.23s.
 Washington PP = +10m.0s., iPeP = +10m.15s., iPeS = +13m.58s.,
 iSS = +17m.23s., iScS = +17m.38s., SSS = +18m.20s.
 Perth IP = +9m.18s., PeP = +12m.23s., SSS = +16m.8s.
 Christchurch iNZ = +1m.27s., PP = +3m.38s., SS = +14m.15s., eSSSEN = +16m.58s.
 Honolulu iP = +10m.9s.
 Agra SSE = +27m.24s.
 Tashkent S = +23m.43s., PPS = +24m.55s.
 Tshimkent e = +12m.53s. and +13m.15s.
 Sverdlovsk PS = +26m.9s., eSS = +31m.18s., eSSS = +35m.12s.
 Tiflis ePSE = +27m.59s., eSSN = +34m.1s., eSSZ = +35m.5s.
 Tucson iP = +13m.55s.
 Ksara ePPS = +30m.42s., ePKP,PKP = +37m.42s.
 Scoresby Sund = +27m.4s., +29m.36s., +30m.42s., and +36m.30s.
 Florissant e = +25m.36s. and +36m.3s.

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Copenhagen PS = +30m.18s.
 Potsdam eEN = +26m.18s., eE = +32m.18s.?
 Stuttgart e = +21m.3s., eS = +31m.20s., ePPS = +33m.48s., eSS = +38m.18s., eSSS = +43m.6s.
 Strasbourg SKP = +22m.25s., e = +22m.46s., ePPP = +23m.47s., cPPS = +32m.47s., SS = +38m.33s.
 Uccle eSKPE = +22m.30s.
 Fordham e = +34m.14s.
 Zurich e = +22m.28s.
 Rome iPKP = +22m.30s., i = +22m.34s., iPP = +23m.0s., i = +23m.26s., iPS = +33m.13s., e = +49m.51s., eL₁ = +59.3m.
 Huancayo ePPP = +24m.8s., SKKS = +27m.57s., ePS = +31m.52s., eSS = +38m.52s., eSSS = +43m.33s.
 La Paz iZ = +23m.18s.
 Granada i = +23m.37s.
 San Juan PS = +22m.49s., iPKS = +23m.25s., PPP = +25m.42s., eSSS = +46m.20s.
 Fort de France e = +20m.31s. and +21m.12s.
 Long waves were also recorded at Göttingen, Stonyhurst, La Plata, Phu-Lien, Puy de Dôme, Rathfarnham Castle, Bozeman, Chicago, and Columbia.

Sept. 27d. 12h. Local shock. Pasadena gives Epicentre 36°-3N. 120°-9W.

Lick iP₂N = 23m.59s., iS₂E = 24m.11s.
 Branner eP₂EN = 24m.4s., iSN = 24m.18s., iS₂ = 24m.20s.
 Fresno iP₂N = 24m.6s., iN = 24m.8s., iS₂N = 24m.23s.
 Berkeley ePZEN = 24m.9s., iN = 24m.12s., iS₂N = 24m.32s.
 San Francisco eP₂N = 24m.10s., eE = 24m.12s., eS₂E = 24m.32s.
 Santa Barbara eP = 24m.25s., eSEN = 25m.3s.
 Tinemaha iP = 24m.27s., eS = 24m.57s.
 Haiwee iPZ = 24m.29s., iSE = 25m.7s.
 Mount Wilson iPZ = 24m.39s., iSE = 25m.22s.
 Pasadena iP = 24m.39s., iSE = 25m.29s.
 Riverside ePEN = 24m.47s., eSN = 25m.35s.
 Ukiah eP = 25m.11s., iS = 25m.24s., iL = 25m.59s.
 Ferndale eN = 26m.4s., eE = 26m.32s., eN = 26m.35s.
 Tucson eP = 26m.4s., iP = 26m.12s., S = 27m.33s., L = 28m.30s.
 Long waves were also recorded at Butte and Columbia.

Sept. 27d. Readings also at 0h. (Baku, Copenhagen, and Tananarive), 2h. (Samarkand, Calcutta, Frunse, Agra, Tchikent, Andijan, Algiers, Almata, Sverdlovsk, and Tashkent), 5h. (La Paz), 6h. (Ksara and Fresno), 7h. (Mount Wilson, Chicago, Tucson, Tacubaya, Oaxaca, and Cape Girardeau), 9h. (Toledo), 10h. (Fresno), 11h. (Helwan and Tananarive), 13h. (Columbia and Ksara), 14h. (Helwan, Sverdlovsk, Tashkent, and Tifis (2)), 15h. (Baku, Helwan, Ksara, Sverdlovsk, Tashkent, and Tifis), 18h. (Mizusawa), 20h. (New Plymouth).

Sept. 28d. 18h. 13m. 32s. Epicentre 11°-2S. 163°-9E. (as on 1937 July 4d.).

A = -.9427, B = +.2721, C = -.1930; $\delta = -3$; $h = +6$;
 D = +.277, E = +.961; G = +.185, H = -.054, K = -.981.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
			m. s.	s.	m. s.	s.	m. s.	m.
Brisbane	19.2	211	i 4 28	0	i 8 16	+17	—	—
Apia	23.9	99	e 5 17	+ 1	e 9 54	+24	5 29	pP 10.7
Riverview	25.4	204	e 5 33	+ 2	e 10 2	+ 6	i 10 38	SS e 13.4
Sydney	25.4	204	e 5 26	- 5	i 10 8	+12	—	e 13.4
Melbourne	31.5	208	i 6 30	+ 4	e 11 40?	+ 6	i 7 28	PP 14.5
Wellington	31.5	163	7 4	+38	i 11 33	- 1	(13 28)	SS 18.4
Adelaide	33.0	220	i 7 49	PP	i 11 55	- 2	—	14.6
Christchurch	33.1	168	i 6 11 _a	-29	i 12 5	+ 6	14 12	L ₁ 16.8
Chatham IIs.	36.6	157	—	—	13 40	+47	i 14 28	SS —
Perth	48.8	237	14 35	?	i 15 46	- 6	(19 33)	SS 23.4
Honolulu	49.6	49	—	—	19 28?	SS	—	—
Manila	49.7	300	8 55	- 1	—	—	i 10 53	PP —
Nagoya	52.7	334	e 9 17	- 1	16 47	+ 1	—	—
Batavia	56.6	270	e 9 44	- 3	—	—	—	—
Hong Kong	59.0	304	18 9	S	(18 9)	- 1	22 26	SS 25.7
Vladivostok	61.5	334	i 10 25	+ 4	i 18 39	- 3	—	—
Medan	E. 66.5	279	i 9 8	?	—	—	—	—
Calcutta	N. 81.2	294	—	—	i 22 27	- 2	—	—
Irkutsk	81.2	327	i 12 23	+ 4	e 22 26	- 3	—	—
College	84.0	18	—	—	e 22 28?	-29	—	—

Continued on next page.

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	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	m. s.	m. s.	s.	m. s.	s.	m. s.	m.
Ukiah	84.1	48	—	—	22 56	- 2	—	e 1 34.8
Sitka	84.2	28	—	—	e 23 2	+ 3	—	e 35.9
Berkeley	84.4	49	i 12 35	- 1	e 23 2	+ 1	e 15 48	PP e 38.4
Colombo	85.5	277	—	—	e 22 58	[- 6]	—	—
Pasadena	86.4	54	i 12 44	- 1	i 23 23	+ 2	e 24 22	PS e 39.3
Riverside	87.0	54	i 12 48 a	0	—	—	—	—
Haiwee	87.1	52	e 12 52	+ 3	—	—	—	—
Tinemaha	87.2	51	e 12 50	+ 1	—	—	—	—
Seattle	87.5	40	—	—	e 23 28	- 3	—	e 40.9
Hyderabad	E. 89.0	287	—	—	23 28	[+ 1]	—	—
Agra	E. 91.4	297	e 16 37	PP	i 23 40	[- 1]	i 25 18	PS —
Tucson	91.9	57	i 13 11	0	e 23 38	[- 6]	e 16 49	PP 36.9
Bombay	94.6	288	—	—	e 23 57	[- 2]	—	—
Tashkent	100.7	310	e 13 48	- 4	e 25 24	- 2	17 39	PP e 45.5
Sverdlovsk	106.6	326	18 46	PP	e 25 0	[+ 2]	e 28 1	PS 44.5
Florissant	109.2	53	e 18 56	PP	e 25 12	[+ 3]	e 28 28	PS —
Chicago	111.1	49	e 28 34	PS	e 34 47	SS	—	41.7
Baku	115.4	310	e 19 53	PP	e 27 38	{ +55}	35 22	SS 57.0
Huancayo	116.8	110	e 19 57	PP	e 25 48	[+10]	e 22 8	PPP e 48.7
Columbia	116.9	57	e 15 48	P	e 29 0	PS	—	e 46.7
Tiflis	119.0	312	e 20 1	PP	e 36 52	SS	e 29 55	PS e 48.5
Ottawa	119.1	44	e 20 10	PP	e 25 46	[- 1]	e 20 46	PS e 49.5
Moscow	119.2	329	e 19 5	[+14]	e 41 40	SSS	e 21 25	PP e 57.0
Pulkovo	120.6	335	20 20	PP	e 28 9	{ +51}	—	e 39.5
Philadelphia	120.7	51	e 20 16	PP	e 25 49	[- 3]	e 30 3	PS e 50.7
Fordham	121.5	48	e 20 34	PP	e 27 30	{ + 7}	e 30 2	PS 54.1
La Paz	121.6	118	20 33	PP	e 34 47	SS	—	59.5
Seven Falls	121.9	41	—	—	e 25 52	[- 4]	e 30 22	PS 66.5
Ksara	127.6	304	i 21 12	PP	e 31 16	PS	e 38 4	SS —
Copenhagen	130.3	340	21 34	PP	—	—	—	58.5
Bucharest	131.0	321	e 21 46	PP	—	—	—	52.5
San Juan	132.0	275	21 34	PP	—	—	i 22 38	PKS e 55.4
Helwan	132.2	300	i 21 45	PP	—	—	—	—
Potsdam	132.7	336	e 18 28?	[- 49]	e 25 34	[- 52]	e 39 28?	SS e 64.5
Hamburg	132.9	339	e 22 28?	?	—	—	—	e 61.5
Prague	133.8	333	—	—	e 39 32	SS	—	e 53.5
Edinburgh	134.3	350	—	—	e 35 28?	?	39 28	SS e 65.5
Göttingen	134.5	338	—	—	e 39 28?	SS	—	e 63.5
Cheb	134.7	335	e 22 53	PP	e 32 28	PS	—	e 56.5
Durham	E. 135.1	348	e 22 48	PP	—	—	—	—
De Bilt	135.7	341	e 19 46	[+24]	e 40 3	SS	e 22 4	PP e 65.5
Fort de France	136.0	80	e 18 42	[- 41]	—	—	e 21 52	—
Rio de Janeiro	136.1	142	e 22 28	PP	—	—	—	—
Stonyhurst	136.1	349	—	—	e 39 58	SS	—	e 66.5
Bidston	136.6	349	e 23 28?	PKS	—	—	—	e 74.5
Stuttgart	137.0	336	e 17 46	?	e 28 40	{ - 23}	22 10	PP e 62.5
Uccle	137.1	342	e 22 11	PP	e 40 5	SS	e 45 3	SSS e 59.5
Triest	137.3	329	e 23 5	PKS	—	—	—	—
Kew	137.8	345	e 23 28?	PKS	—	—	—	e 73.5
Oxford	137.8	346	e 22 58	PP	e 40 33	SS	—	e 62.5
Strasbourg	137.8	337	e 19 29	[+ 3]	—	—	e 22 8	PP e 56.5
Paris	139.4	342	—	—	e 40 28?	SS	—	72.5
Rome	140.5	323	e 22 35	PP	e 29 7	{ - 17}	41 4	SS —
Toledo	149.5	342	e 19 52	[+ 5]	—	—	—	68.4

Additional readings :-

Apia PP = +6m.4s., e = +9m.15s. and +10m.17s.

Riverview eZ = +5m.36s., iZ = +5m.40s., iSN = +10m.7s., iE = +10m.14s., iN = +12m.43s.

Sydney e = +12m.22s.

Wellington SS = +15m.11s., L_q = +16m.4s., SSS = +16m.49s.; true SS is recorded as S.

Christchurch P_cPZ = +8m.8s., iZ = +12m.12s., ScS = +15m.50s.

Perth i = +16m.6s., SS = +21m.30s., SSS = +21m.46s., SSSS = +22m.6s.

Batavia eEN = +10m.36s., iN = +19m.38s.

Berkeley eE = +12m.42s.

Continued on next page.

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Tucson iS = +24m.16s., iPS = +25m.20s., iPPS = +25m.31s.
 Tashkent PPP = +20m.7s., e = +23m.36s., ePS = +26m.53s., SS = +32m.16s.
 Sverdlovsk SKKS = +26m.13s., SS = +33m.52s.
 Florissant eP = +19m.1s., e = +20m.27s., +26m.8s., and +29m.33s.
 Baku SSS = +40m.16s.
 Huancayo S = +27m.16s., ePS = +29m.50s., iPS = +29m.54s., i = +30m.7s., eSS = +36m.10s., eSSS = +40m.4s.
 Tiflis eEN = +20m.18s., ePPZ = +22m.37s., eN = +28m.3s., PSE = +30m.3s., eN = +31m.56s., eSSZ = +34m.29s.
 Ottawa e = +36m.28s.
 Moscow e = +28m.41s. and +35m.19s.
 Philadelphia eS = +28m.16s., eSS = +36m.49s., eSSS = +41m.25s.
 Fordham eE = +26m.0s., eN = +28m.34s., eE = +31m.27s.
 Seven Falls e = +36m.52s.
 Ksara eSKP = +22m.35s.
 Copenhagen +23m.46s.
 Helwan e = +22m.46s.
 Potsdam e = +22m.46s.
 Stuttgart eZ = +19m.48s., e = +23m.2s. and +33m.52s., eSS = +40m.3s.
 Rome i = +23m.49s., e = +24m.8s., ePKP? = +25m.5s., e = +34m.30s., +36m.33s., +37m.18s., and +46m.2s.
 Toledo IP = +20m.0s.
 Long waves were also recorded at Kodaikanal, Puy de Dôme, San Fernando, Bozeman, and Vermont.

Sept. 28d. Readings also at 0h. (La Paz), 1h. (Lick), 2h. (Mizusawa and Samarkand), 3h. (Wellington), 4h. (Williamstown, Shawinigan Falls, La Paz, Seven Falls, and Fordham), 6h. (Fort de France), 7h. (Tucson), 8h. (Tucson and Santiago), 11h. (Fort de France), 14h. (Tacubaya (2)), 15h. (Denver (2)), 16h. (Nagoya and Wellington), 18h. (Fort de France), 20h. (Tucson), 21h. (Tucson, Mizusawa, Samarkand, Tchikent, Nagoya, Wellington, Andijan, Helwan, Ksara, Medan, and Christchurch), 22h. (Fort de France, Tchikent, and Tiflis), 23h. (Cape Girardeau, St. Louis, and Florissant).

Sept. 29d. 23h. 31m. 42s. I)
 23h. 34m. 59s. II) Epicentre 33°-2N. 108°-6W.
 23h. 36m. 17s. III)

A = -2674, B = -7947, C = +5450; δ = +8; h = +1;
 D = -948, E = +319; G = -174, H = -517, K = -838.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
I Tucson	2.1	243	10 37k	0	i 1 6	+ 2	i 1 10	S _z
II	2.1	243	10 35	- 2	i 1 4	0		
III Denver	7.1	24	e 1 51	+ 3	e 3 7	- 3	e 2 24	P _z
II La Jolla	z.	7.2	270	i 1 50	+ 1			
I Riverside	z.	7.4	280	i 1 50	- 2	i 3 13	- 5	i 4.0
II	z.	7.4	280	i 1 48	- 4	i 3 13	- 5	
I Mount Wilson	z.	7.9	279	i 2 1	+ 2			i 4.2
II	7.9	279	i 2 1	+ 2	e 3 52	S*	i 4 13	S _z
I Pasadena	z.	8.0	279	e 2 2	+ 2			e 4.2
II	z.	8.0	279	i 2 0	0			i 4.2
III	E.	8.0	279			e 3 42	+ 9	
II Haiwee	z.	8.3	293	i 2 6	+ 2			i 4.5
I Tinemaha	z.	8.8	299	i 2 49	+ 38			e 4.8
III	8.8	299	3 22	+ 71				
II Lick	E.	11.4	295	e 2 51	+ 4			e 6.0
III	11.4	295			e 4 44	- 12		
I Little Rock	E.	13.6	282	i 4 20	+ 63	e 7 6	L	(e 7.1)
III	13.6	282	e 3 18	+ 1	e 5 18	- 32		7.0
III Florissant	15.7	64	e 3 39	- 5	i 6 39	0		
III St. Louis	15.8	65	i 3 45	0	i 6 43	+ 1	e 6 58	SS 7.8
III Cape Girardeau	16.1	70	e 3 48	- 1	e 6 53	+ 4		e 8.5
III Chicago	18.7	56			e 7 54	+ 6		e 9.4
III Philadelphia	27.6	67	e 9 56	?	e 10 16	- 16		e 12.0
III Ottawa	28.0	55			e 10 2	- 36	e 12 19	SS 13.7
III Fordham	28.6	65			i 10 31	- 17		
III Williamstown	29.3	62			e 10 39	- 20		e 15.6
III Shawinigan Falls	30.3	53			e 11 19	+ 4		14.7

For Notes see next page.

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NOTES TO SEPT. 29d. 23h. 31m. 42s. I.
23h. 34m. 59s. II.
23h. 36m. 17s. III.

Additional readings:—

Tucson I i = +41s., II i = +41s., +45s., +57s., +1m.0s., and +1m.7s.
Denver III eP*N = +1m.59s., iN = +3m.18s., iS* = +3m.26s., eS_eN = +3m.56s.
Little Rock III i = +3m.28s., eSEN = +5m.56s.
Florissant III iP = +3m.42s. and +3m.59s., iS = +6m.47s.
Cape Girardeau III iE = +3m.57s., eE = +6m.49s. and +6m.58s.
Fordham III e = +12m.39s., i = +13m.34s. and +13m.45s., e = +15m.45s., i = +16m.9s. +16m.52s.
Williamstown e = +13m.53s.
Long waves were also recorded to one or other of the above shocks at Haiwee, La Jolla, Fresno, Butte, Ukiah, Cincinnati, and East Machias.

Sept. 29d. Readings also at 0h. (Irkutsk, Tashkent, Tifis, Sverdlovsk, Batavia, and Medan), 1h. (Bucharest, Ksara, Sverdlovsk, Triest, and Tashkent), 2h. (La Paz), 3h. (near Wellington), 4h. (Nagoya, near Mizusawa, and near Tananarive), 6h. (Andijan and near Manila), 8h. (near Santiago and La Paz), 9h. (Huancayo, Tucson, La Paz, Pasadena (2), Riverside (2), and Tchimkent), 10h. (Brisbane, Wellington, Tchimkent, and near Tananarive), 11h. (Tucson, Pasadena, Riverside, Riverview, Sydney, Ksara, near Santiago (2), and San Javier), 12h. (Fresno), 13h. (Huancayo), 15h. (Triest), 16h. (near Branner and Lick), 17h. (College, Tifis, and near Ksara), 18h. (Brisbane and La Paz), 19h. (Fordham), 22h. (Fordham and Williamstown).

Sept. 30d. 9h. 2m. 18s. Epicentre 35°·1N. 78°·1E. (as on 1937 Nov. 15d.).

A = +·1691, B = +·8024, C = +·5724; δ = +8; h = 0;
D = +·979, E = -·206; G = +·118, H = +·560, K = -·820.

	Δ	Az.	P.	O-C.	S.	O-C.	Supp.	L.
	°	°	m. s.	s.	m. s.	s.	m. s.	m.
Andijan	7·2	322	1 49	0	e 3 13	0	2 18	—
Agra	E. 7·9	180	e 2 8	+ 9	3 24	- 6	4 5	P _e S*
Almata	8·2	355	e 2 27	P*	3 49	+11	—	—
Frunse	8·2	342	e 1 31	-32	e 3 41	+ 3	—	—
Tashkent	9·3	315	e 2 21	+ 4	e 4 12	+ 7	—	4·8
Tchimkent	9·8	320	e 2 23	- 1	e 4 8	- 9	—	—
Samarkand	9·9	300	e 2 53	+28	e 4 19	- 1	—	—
Semipalatinsk	15·4	5	e 3 33	- 7	e 6 37	+ 5	—	—
Calcutta	N. 15·4	142	—	—	e 6 9	-23	—	i 8·7
Bombay	16·8	198	e 4 6	+ 8	e 7 3	- 2	—	—
Sverdlovsk	24·8	338	5 20	- 5	9 44	- 2	12 54	L ₀ 15·3
Irkutsk	25·4	39	e 5 26	- 5	e 10 4	+ 8	—	14·2
Tifis	26·8	295	e 10 35	S	(e 10 35)	+16	—	e 14·9
Ksara	34·6	280	e 8 12	PP	e 14 14	SS	—	—
Pulkovo	39·4	324	—	—	e 15 13	?	—	e 22·4

Additional readings:—

Andijan e = +2m.48s. and +3m.46s.
Tchimkent e = +2m.30s., +3m.50s., and +5m.48s.
Frunse e = +1m.59s. and +3m.17s.
Pulkovo e = +19m.53s.
Long waves were also recorded at Copenhagen and De Bilt.

Sept. 30d. Readings also at 0h. (Tucson and La Paz), 2h. (Melbourne and Sverdlovsk), 5h. (Sotchi), 6h. (Tucson), 9h. (Tacubaya), 10h. (near Rome and Tucson), 13h. (Tacubaya), 14h. (Andijan, Agra, and Nagoya), 15h. (Almata, Tashkent, Tchimkent, Frunse, Samarkand, Weston, Andijan, and Sverdlovsk), 16h. (Tacubaya), 17h. (Tucson), 19h. (Wellington), 22h. (Mount Wilson, Riverside, Pasadena, and Tucson),

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